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Ministry of Health
Sultanate of Oman

Cancer Incidence in Oman
1998

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

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Preface

The past decade witnessed rapid improvements in the field of health care in Oman. The control of most of the communicable diseases resulted in an increased life expectancy at birth and this along with the rapid socio-economic development led to an increased incidence of non-communicable diseases including cancer.

The Oman National Cancer Registry was established in 1985 as a hospital based registry. Subsequently in 1996 this was shifted to the Non-Communicable Diseases Section under the Directorate General of Health Affairs. Currently the Oman National Cancer Registry functions as a population based registry covering the entire Sultanate.

The first issue of the "Cancer Incidence in Oman" was published in 1996. The second issue was published in 1997 and for the first time included age-standardised incidence rates to make cross-country comparisons possible.

In 1998, data from the Oman National Cancer Registry were transferred to the Canreg-3 programme, supplied by the International Agency for Research on cancer (IARC),Lyon France. Data entry and analysis is currently done in this programme. This shift permitted retrieval and analysis of data faster than before, and made it less prone to errors.

The current issue of "Cancer Incidence in Oman" summarizes the available data for the year 1998, and for the first time, data on childhood cancers has been presented in the format of the International Classification of Childhood Cancers (ICCC).

In bringing out this issue I wish to thank all the health professionals working in the regional hospitals, as well as those from sister institutions of the Ministry of Health for promptly notifying cancer cases under their care. I also express my sincere thanks to the staff of the Non-Communicable Diseases Section for their earnest effort in preparing this publication in time. I sincerely hope that this booklet would serve as a reference book for all those interested to study the pattern of cancer in the Sultanate of Oman.

Dr. Ali Jaffer Mohammed
Chairman, National Cancer Control Committee

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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 Hormuz 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 (U.A.E) in the west, the Republic of Yemen in the south, the Strait of Hormuz 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 Governorates/Regions with 59 Wilayats. These are: Muscat, Dhofar and Musandam Governorates and regions of Dakhiliyia, 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 populaiton in 1998 was 2,287,640 of which 1,684,850 were Omanis and 602,790 were expatriates (Table 1). The Omani population shows a sex ratio of 104 males per 100 females. About 15% of the population is under-5 years and 46% is under-15 years. Only 4.5% 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.

Cancer among the Omani Population

Table 1: Age Structure Of The Omani Population

Age	Male		Female		Total	
Group	Number	Percentage	Number	Percentage	Number	Percentage
0 - 4	124,450	14.53	119,880	14.48	244,330	14.50
5 - 9	131,360	15.33	126,570	15.28	257,930	15.31
10 - 14	136,260	15.91	132,400	15.99	268,660	15.95
15 - 19	120,730	14.09	115,680	13.97	236,410	14.03
20 - 24	86,920	10.15	81,650	9.86	168,570	10.01
25 - 29	55,620	6.49	50,600	6.11	106,220	6.30
30 - 34	39,520	4.61	39,300	4.75	78,820	4.68
35 - 39	31,500	3.68	32,940	3.98	64,440	3.82
40 - 44	27,710	3.23	31,640	3.82	59,350	3.52
45 - 49	22,750	2.66	22,860	2.76	45,610	2.71
50 - 54	20,910	2.44	20,600	2.49	41,510	2.46
55 - 59	19,690	2.30	18,310	2.21	38,000	2.26
60 - 64	12,470	1.46	10,300	1.24	22,770	1.35
65 - 69	12,850	1.50	10,740	1.30	23,590	1.40
70 - 74	5,430	0.63	5,020	0.61	10,450	0.62
75 - 79	4,890	0.57	5,440	0.66	10,330	0.61
80 - 84	1,550	0.18	1,700	0.21	3,250	0.19
85 +	2,090	0.24	2,520	0.30	4,610	0.27
Total	856,700	100.00	828,150	100.00	1,684,850	100.00

Table 2: Population Distribution Of Omanis By Regions And Sex

Governorate / Region	No. of Males	No. of Females	Total Population
Muscat	179,670	163,520	343,190
Dhofar	73,640	69,420	143,060
Dakhiliya	111,790	113,400	225,190
North Sharqiyah	57,640	57,730	115,370
South Sharqiyah	66,120	66,220	132,340
North Batinah	169,700	167,310	337,010
South Batinah	98,030	96,640	194,670
Dhahira	78,750	74,520	153,270
Musandam	13,200	12,180	25,380
Al-Wousta	8,160	7,210	15,370
Total	856,700	828,150	1,684,850

Cancer among the Omani Population

Oman National Cancer Registry

Cancer is emerging as a major public health problem throughout the world. In 1996, more than 10 million people developed cancer, and at least 6 million people who already had the disease died from it. At present it 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-Nahdha 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 speciality 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. The programme generates frequency distribution and incidence tables. The data are then exported to EPI Info 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 9 and 10 could be used for comparison purposes with other rates where the same world standard population was used, especailly 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 Contenents.

Table 3: The Age Structure of the 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
	100,000

Cancer among the Omani Population

Overall Results

The total number of cancer cases registered in 1998 in the Oman National Cancer Registry was 915 (Table 4). Of these, 817 (89.3%) cases were among Omanis, and 97 (10.6%) 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	817	89.3
Expatriates	97	10.6
Unknown	1	0.1
Total	915	100

Age & Sex

Of the total of 817 cases, males accounted for 434 cases (53.0%), and females accounted for 383 cases (46.9%) (Table 5); the male : female ratio being 1.1 : 1. Seventy cases (6.4%) were reported in children aged 14 years and below. The median age at diagnosis was 50 years. This was higher in males (median age 56 years) than in females (median age 50 years).

Table 5: Distribution Of Cancer Cases Among Omanis By Gender

Sex	Frequency	Percentage (%)
Male	434	53.0
Female	383	46.9
Total	817	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 1998, the crude incidence rates for all cancers among Omanis 50.7 per 100,000 for males and 46.3 per 100,000 for females. The age standardised rates, adjusted to the world standard population, was 101.5 per 100,000 for males and 89.4 per 100,000 for females (Tables 8 and 9).

Basis Of Diagnosis

Tables 10 and 11 give the most valid basis of diagnosis of the various cancers for males and females. The majority of cases 64% were diagnosed by histology of the primary. Clinical investigation was the second most common method of diagnosis in males (8.5%),whereas histology of the metastasis was the second most common method of diagnosis in females(10.2%). Cases diagnosed clinically alone constituted only 0.9% in males and 2.0% in females.

Table 6: Frequency of Incident Cases among Omanis by Site and Age (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	1	0	1	0	0.5%	C00
Tongue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C01-C02
Salivary gland	5	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	1	1.2%	C07-C08
Mouth	6	0	0	0	0	0	0	0	1	1	0	0	0	0	2	1	1	0	1.4%	C03-C06
Oropharynx	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2%	C09-C10
Nasopharynx	3	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0.7%	C11
Hypopharynx	1	0	0	0	0	0	0	0	0	1	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	9	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	5	2.1%	C15
Stomach	43	0	0	0	0	0	0	0	2	1	2	1	3	2	11	7	6	8	9.9%	C16
Small intestine	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2%	C17
Colon	14	0	0	0	0	0	1	1	1	1	0	1	2	1	2	2	2	0	3.2%	C18
Rectum	10	0	0	0	0	0	0	0	0	0	1	1	2	0	1	2	2	1	2.3%	C19-C21
Liver	29	1	0	0	0	0	0	1	1	0	2	3	6	5	4	2	2	2	6.7%	C22
Gallbladder etc.	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0.7%	C23-C24
Pancreas	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0.9%	C25
Nose, sinuses etc.	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2%	C30-C31
Larynx	9	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	3	2.1%	C32
Bronchus, lung	27	0	0	0	0	0	0	0	1	1	1	2	2	2	6	2	3	7	6.2%	C33-C34
Other Thoracic organs	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.5%	C37-C38
Bone	5	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0	0	1.2%	C40-C41
Connective tissue	9	0	0	1	0	1	2	1	0	1	0	1	1	0	0	0	0	1	2.1%	C47;C49
Mesothelioma	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2%	C45
Kaposi's sarcoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C46
Melanoma of skin	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2%	C43
Other skin	18	0	0	0	0	0	0	1	0	0	2	3	3	2	3	0	3	1	4.1%	C44
Breast	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.5%	C50
Prostate	37	0	0	0	0	0	0	0	1	0	1	1	3	3	9	4	8	7	8.5%	C61
Testis	4	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0.9%	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	24	0	0	0	0	0	0	0	0	1	2	1	4	2	4	2	1	7	5.5%	C67
Kidney etc.	4	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	0	0	0.9%	C64-C66;C68
Eye	4	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.9%	C69
Brain, nervous system	23	0	1	5	4	1	3	1	1	0	1	1	1	1	1	1	1	0	5.3%	C70-C72
Thyroid	6	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1.4%	C73
Other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C74-C75
Hodgkin's disease	16	0	0	1	1	0	0	4	2	1	0	1	1	1	1	1	1	1	3.7%	C81
Non-Hodgkin lymphoma	32	0	1	0	1	1	3	0	1	4	2	2	3	3	6	0	4	1	7.4%	C82-C85;C96
Multiple myeloma	7	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	1	0	1.6%	C88;C90
Lymphoid leukaemia	17	0	5	7	0	0	2	0	0	0	0	0	0	0	0	2	0	1	3.9%	C91
Myeloid leukaemia	15	0	2	0	0	1	1	1	0	1	1	1	3	2	1	0	1	0	3.5%	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	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0.9%	C95
Other & unspecified	35	0	2	0	0	0	0	2	0	1	3	3	2	4	7	6	3	2	8.1%	
All sites	434	1	14	16	9	5	13	14	12	15	23	27	48	36	68	32	46	55	100.0%	

Table 7: Frequency of Incident Cases among Omanis by Site and Age (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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3%	C00
Tongue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C01-C02
Salivary gland	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0.5%	C07-C08
Mouth	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3%	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	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3%	C11
Hypopharynx	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	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	11	0	0	0	0	0	0	0	0	0	0	0	1	0	6	0	2	2	2.9%	C15
Stomach	29	0	0	0	0	0	0	0	0	1	3	2	4	5	7	0	3	4	7.6%	C16
Small intestine	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3%	C17
Colon	11	0	0	0	0	0	0	0	0	3	1	0	1	1	3	0	0	2	2.9%	C18
Rectum	10	0	0	0	0	0	0	0	2	0	2	1	2	2	1	0	0	0	2.6%	C19-C21
Liver	15	0	1	0	0	0	0	0	0	0	1	0	7	1	4	0	0	1	3.9%	C22
Gallbladder etc.	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1.0%	C23-C24
Pancreas	8	0	0	0	0	0	0	0	0	0	3	0	0	1	3	0	1	0	2.1%	C25
Nose, sinuses etc.	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.5%	C30-C31
Larynx	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.5%	C32
Bronchus, lung	7	0	0	0	0	0	0	0	0	0	0	1	3	3	0	0	0	0	1.8%	C33-C34
Other Thoracic organs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C37-C38
Bone	4	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	1.0%	C40-C41
Connective tissue	4	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1.0%	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	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3%	C46
Melanoma of skin	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3%	C43
Other skin	12	0	0	0	0	0	1	0	0	1	1	3	2	0	0	2	2	0	3.1%	C44
Breast	50	0	0	0	0	0	0	4	3	7	7	8	8	4	3	2	3	1	13.1%	C50
Uterus unspec.	6	0	0	0	0	0	0	2	1	1	0	0	1	0	0	0	1	0	1.6%	C55
Cervix uteri	21	0	0	0	0	0	0	0	1	4	2	2	6	0	3	1	1	1	5.5%	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	5	0	0	0	0	0	0	0	0	1	2	0	0	0	0	2	0	0	1.3%	C54
Ovary etc.	31	0	0	0	1	0	2	1	0	1	1	2	7	3	3	1	6	3	8.1%	C56
Other female genital	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.5%	C51-C52;C57
Bladder	8	0	1	0	0	0	1	0	0	0	0	0	0	1	0	3	0	2	2.1%	C67
Kidney etc.	7	0	1	0	0	0	1	0	0	0	0	2	2	0	0	1	0	0	1.8%	C64-C66;C68
Eye	4	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1.0%	C69
Brain, nervous system	14	0	1	1	3	0	0	2	1	2	1	0	0	0	2	1	0	0	3.7%	C70-C72
Thyroid	26	0	0	0	1	0	4	2	4	3	3	1	5	0	1	0	0	2	6.8%	C73
Other endocrine	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.5%	C74-C75
Hodgkin's disease	4	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1.0%	C81
Non-Hodgkin lymphoma	17	0	1	3	0	1	2	0	1	0	1	0	3	1	2	1	0	1	4.4%	C82-C85;C96
Multiple myeloma	6	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	1	1.6%	C88;C90
Lymphoid leukaemia	13	0	5	1	1	0	0	2	0	1	0	1	0	0	1	0	1	0	3.4%	C91
Myeloid leukaemia	6	0	0	3	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1.6%	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.	3	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0.8%	C95
Other & unspecified	30	1	0	1	0	0	0	1	3	0	3	1	5	1	6	2	3	3	7.8%	
All sites	383	1	12	12	11	6	12	16	17	29	34	28	60	25	50	18	28	24	100.0%	

Table 8: Age Specific Incidence Rates per 100,000 among Omanis (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	-	-	-	-	-	-	-	-	-	-	-	-	8.0	-	18.4	-	0.2	0.7	C00
Tongue	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C01-C02
Salivary gland	5	0	-	-	0.7	-	-	-	-	-	-	-	9.6	-	8.0	-	-	11.7	0.6	1.1	C07-C08
Mouth	6	0	-	-	-	-	-	-	2.5	3.2	-	-	-	-	16.0	7.8	18.4	-	0.7	1.6	C03-C06
Oropharynx	1	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	-	-	0.1	0.2	C09-C10
Nasopharynx	3	0	-	-	-	-	-	-	2.5	-	7.2	-	-	-	-	-	-	-	0.4	0.6	C11
Hypopharynx	1	0	-	-	-	-	-	-	-	3.2	-	-	-	-	-	-	-	-	0.1	0.2	C12-C13
Pharynx unspec.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C14
Oesophagus	9	0	-	-	-	-	-	-	-	-	-	4.4	9.6	-	-	-	18.4	58.7	1.1	2.3	C15
Stomach	43	0	-	-	-	-	-	-	5.1	3.2	7.2	4.4	14.4	10.2	88.3	54.5	110.6	93.9	5.0	11.6	C16
Small intestine	1	0	-	-	-	-	-	-	-	-	-	-	-	5.1	-	-	-	-	0.1	0.2	C17
Colon	14	0	-	-	-	-	1.2	1.8	2.5	3.2	-	4.4	9.6	5.1	16.0	15.6	36.9	-	1.6	3.4	C18
Rectum	10	0	-	-	-	-	-	-	-	-	3.6	4.4	9.6	-	8.0	15.6	36.9	11.7	1.2	2.7	C19-C21
Liver	29	1	-	-	-	-	-	1.8	2.5	-	7.2	13.2	28.7	25.4	32.1	15.6	36.9	23.5	3.4	6.9	C22
Gallbladder etc.	3	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	18.4	11.7	0.4	0.8	C23-C24
Pancreas	4	0	-	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	35.2	0.5	1.0	C25
Nose, sinuses etc.	1	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	-	-	0.1	0.2	C30-C31
Larynx	9	0	-	-	-	-	-	-	-	-	-	-	4.8	5.1	16.0	-	36.9	35.2	1.1	2.5	C32
Bronchus, lung	27	0	-	-	-	-	-	-	2.5	3.2	3.6	8.8	9.6	10.2	48.1	15.6	55.3	82.1	3.2	7.1	C33-C34
Other Thoracic organs	2	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	-	11.7	0.2	0.5	C37-C38
Bone	5	0	-	0.8	-	-	1.2	1.8	-	-	-	-	4.8	-	8.0	-	-	-	0.6	0.9	C40-C41
Connective tissue	9	0	-	0.8	-	0.8	2.3	1.8	-	3.2	-	4.4	4.8	-	-	-	-	11.7	1.1	1.4	C47;C49
Mesothelioma	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.4	-	0.1	0.4	C45
Kaposi's sarcoma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C46
Melanoma of skin	1	0	-	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	-	0.1	0.3	C43
Other skin	18	0	-	-	-	-	-	1.8	-	-	7.2	13.2	14.4	10.2	24.1	-	55.3	11.7	2.1	4.8	C44
Breast	2	0	-	-	-	-	-	-	-	-	7.2	-	-	-	-	-	-	-	0.2	0.4	C50
Prostate	37	0	-	-	-	-	-	-	2.5	-	3.6	4.4	14.4	15.2	72.2	31.1	147.4	82.1	4.3	10.4	C61
Testis	4	0	0.8	-	-	0.8	-	1.8	-	-	3.6	-	-	-	-	-	-	-	0.5	0.5	C62
Penis	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C60
Other male genital	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C63
Bladder	24	0	-	-	-	-	-	-	-	3.2	7.2	4.4	19.1	10.2	32.1	15.6	18.4	82.1	2.8	6.0	C67
Kidney etc.	4	0	-	-	-	-	-	-	-	3.2	-	8.8	4.8	-	-	-	-	-	0.5	1.0	C64-C66;C68
Eye	4	0	0.8	0.8	-	-	-	-	-	-	-	-	-	5.1	8.0	-	-	-	0.5	0.7	C69
Brain, nervous system	23	0	0.8	3.8	2.9	0.8	3.5	1.8	2.5	-	3.6	4.4	4.8	5.1	8.0	7.8	18.4	-	2.7	3.2	C70-C72
Thyroid	6	0	-	-	-	-	-	-	-	-	-	4.4	-	10.2	8.0	-	18.4	11.7	0.7	1.6	C73
Other endocrine	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C74-C75
Hodgkin's disease	16	0	-	0.8	0.7	-	-	7.2	5.1	3.2	-	4.4	4.8	5.1	8.0	7.8	18.4	11.7	1.9	3.1	C81
Non-Hodgkin lymphoma	32	0	0.8	-	0.7	0.8	3.5	-	2.5	12.7	7.2	8.8	14.4	15.2	48.1	-	73.7	11.7	3.7	7.4	C82-C85;C96
Multiple myeloma	7	0	-	-	-	-	-	-	-	-	-	4.4	4.8	15.2	8.0	-	18.4	-	0.8	1.8	C88;C90
Lymphoid leukaemia	17	0	4.0	5.3	-	-	2.3	-	-	-	-	-	-	-	-	15.6	-	11.7	2.0	1.9	C91
Myeloid leukaemia	15	0	1.6	-	-	0.8	1.2	1.8	-	3.2	3.6	4.4	14.4	10.2	8.0	-	18.4	-	1.8	3.0	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	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	11.7	0.5	0.5	C95
Other & unspecified	35	0	1.6	-	-	-	-	3.6	-	3.2	10.8	13.2	9.6	20.3	56.2	46.7	55.3	23.5	4.1	8.6	
All sites	434	1	11	12	7	4	15	25	30	48	83	119	230	183	546	249	848	645	50.7	101.5	

Table 9: Age Specific Incidence Rates per 100,000 among Omanis (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	1	0	-	-	-	-	-	-	-	-	-	-	-	-	9.7	-	-	-	0.1	0.4	C00
Tongue	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C01-C02
Salivary gland	2	0	-	-	-	-	-	2.0	-	-	-	-	-	-	9.7	-	-	-	0.2	0.5	C07-C08
Mouth	1	0	-	-	-	-	-	-	-	-	-	-	4.9	-	-	-	-	-	0.1	0.2	C03-C06
Oropharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C09-C10
Nasopharynx	1	0	-	-	-	-	-	-	-	3.0	-	-	-	-	-	-	-	-	0.1	0.2	C11
Hypopharynx	1	0	-	-	-	-	-	-	-	-	3.2	-	-	-	-	-	-	-	0.1	0.2	C12-C13
Pharynx unspec.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C14
Oesophagus	11	0	-	-	-	-	-	-	-	-	-	-	4.9	-	58.3	-	39.9	20.7	1.3	3.8	C15
Stomach	29	0	-	-	-	-	-	-	-	3.0	9.5	8.8	19.4	27.3	68.0	-	59.8	41.4	3.5	8.1	C16
Small intestine	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	9.3	-	-	0.1	0.3	C17
Colon	11	0	-	-	-	-	-	-	-	9.1	3.2	-	4.9	5.5	29.1	-	-	20.7	1.3	2.8	C18
Rectum	10	0	-	-	-	-	-	-	5.1	-	6.3	4.4	9.7	10.9	9.7	-	-	-	1.2	2.3	C19-C21
Liver	15	0	0.8	-	-	-	-	-	-	-	3.2	-	34.0	5.5	38.9	-	-	10.4	1.8	4.0	C22
Gallbladder etc.	4	0	-	-	-	-	-	-	-	-	-	4.4	-	-	-	9.3	19.9	10.4	0.5	1.1	C23-C24
Pancreas	8	0	-	-	-	-	-	-	-	-	9.5	-	-	5.5	29.1	-	19.9	-	1.0	2.4	C25
Nose, sinuses etc.	2	0	-	-	-	-	-	-	-	-	-	4.4	-	5.5	-	-	-	-	0.2	0.5	C30-C31
Larynx	2	0	-	-	-	-	-	-	2.5	-	3.2	-	-	-	-	-	-	-	0.2	0.3	C32
Bronchus, lung	7	0	-	-	-	-	-	-	-	-	-	4.4	14.6	16.4	-	-	-	-	0.8	1.6	C33-C34
Other Thoracic organs	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C37-C38
Bone	4	0	-	-	0.8	1.7	1.2	-	-	-	-	-	-	-	-	-	-	-	0.5	0.3	C40-C41
Connective tissue	4	0	0.8	0.8	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.3	C47;C49
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C45
Kaposi's sarcoma	1	0	-	-	-	-	-	-	-	-	-	-	-	5.5	-	-	-	-	0.1	0.2	C46
Melanoma of skin	1	0	-	-	-	-	-	-	-	-	3.2	-	-	-	-	-	-	-	0.1	0.2	C43
Other skin	12	0	-	-	-	-	1.2	-	-	3.0	3.2	13.1	9.7	-	-	18.6	39.9	-	1.5	3.1	C44
Breast	50	0	-	-	-	-	-	7.9	7.6	21.3	22.1	35.0	38.9	21.9	29.1	18.6	59.8	10.4	6.0	11.7	C50
Uterus unspec.	6	0	-	-	-	-	-	4.0	2.5	3.0	-	-	4.9	-	-	-	19.9	-	0.7	1.3	C55
Cervix uteri	21	0	-	-	-	-	-	-	2.5	12.2	6.3	8.8	29.1	-	29.1	9.3	19.9	10.4	2.5	5.3	C53
Placenta	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C58
Corpus uteri	5	0	-	-	-	-	-	-	-	3.0	6.3	-	-	-	-	18.6	-	-	0.6	1.1	C54
Ovary etc.	31	0	-	-	0.8	-	2.5	2.0	-	3.0	3.2	8.8	34.0	16.4	29.1	9.3	119.6	31.1	3.7	8.1	C56
Other female genital	2	0	-	-	-	-	-	-	-	-	-	-	4.9	-	-	-	19.9	-	0.2	0.6	C51-C52;C57
Bladder	8	0	0.8	-	-	-	1.2	-	-	-	-	-	-	5.5	-	28.0	-	20.7	1.0	1.7	C67
Kidney etc.	7	0	0.8	-	-	-	1.2	-	-	-	-	8.8	9.7	-	-	9.3	-	-	0.8	1.5	C64-C66;C68
Eye	4	0	0.8	0.8	-	-	-	-	-	3.0	-	-	-	-	9.7	-	-	-	0.5	0.8	C69
Brain, nervous system	14	0	0.8	0.8	2.3	-	-	4.0	2.5	6.1	3.2	-	-	-	19.4	9.3	-	-	1.7	2.5	C70-C72
Thyroid	26	0	-	-	0.8	-	4.9	4.0	10.2	9.1	9.5	4.4	24.3	-	9.7	-	-	20.7	3.1	4.8	C73
Other endocrine	2	0	-	-	0.8	-	-	-	-	3.0	-	-	-	-	-	-	-	-	0.2	0.3	C74-C75
Hodgkin's disease	4	0	-	0.8	0.8	0.9	-	2.0	-	-	-	-	-	-	-	-	-	-	0.5	0.4	C81
Non-Hodgkin lymphoma	17	0	0.8	2.4	-	0.9	2.5	-	2.5	-	3.2	-	14.6	5.5	19.4	9.3	-	10.4	2.1	3.2	C82-C85;C96
Multiple myeloma	6	0	-	-	-	-	-	-	-	-	-	4.4	4.9	-	19.4	-	19.9	10.4	0.7	1.9	C88;C90
Lymphoid leukaemia	13	0	4.2	0.8	0.8	-	-	4.0	-	3.0	-	4.4	-	-	9.7	-	19.9	-	1.6	2.2	C91
Myeloid leukaemia	6	0	-	2.4	0.8	-	-	-	-	-	-	4.4	-	-	-	-	19.9	-	0.7	1.0	C92
Monocytic leukaemia	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C93
Other leukaemia	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C94
Leukaemia unspec.	3	0	-	-	0.8	-	-	-	-	3.0	-	-	-	-	-	-	19.9	-	0.4	0.6	C95
Other & unspecified	30	1	-	0.8	-	-	-	2.0	7.6	-	9.5	4.4	24.3	5.5	58.3	18.6	59.8	31.1	3.6	7.7	
All sites	383	1	10	9	8	5	15	32	43	88	108	123	291	137	486	168	558	249	46.3	89.4	

Table 10: Incident Cases By Most Valid Basis Of Diagnosis Among Omani Males

Site	A	B	C	D	E	F	G	H	I	J
Lip	0	0	0	0	0	0	2	0	0	0
Mouth	0	0	0	0	0	1	4	0	0	0
Salivary gland	0	0	0	0	0	0	5	0	0	0
Oropharynx	0	0	0	0	0	0	1	0	0	0
Nasopharynx	0	0	0	0	0	0	3	0	0	0
Hypopharynx	0	0	0	0	0	0	1	0	0	0
Oesophagus	0	0	0	0	0	0	8	1	0	0
Stomach	1	0	4	1	0	0	31	4	0	2
Small intestine	0	0	0	0	0	0	1	0	0	0
Colon	0	0	2	1	0	0	8	2	0	1
Rectum	0	1	0	1	0	0	7	1	0	0
Liver	4	0	4	2	0	1	8	5	0	5
Gall bladder	0	0	1	0	0	0	1	0	0	1
Pancreas	0	0	1	0	0	0	2	0	0	1
Nose, Sinuses	0	0	0	0	0	0	1	0	0	0
Larynx	0	0	0	0	0	0	6	0	0	3
Bronchus, Lung	0	0	3	0	0	4	12	3	0	5
Other thoracic organs	1	0	1	0	0	0	0	0	0	0
Bone	0	0	0	0	0	1	4	0	0	0
Connective Tissue	0	0	0	0	0	0	8	0	0	1
Melanoma of skin	0	0	0	0	0	0	0	1	0	0
Other skin	0	0	0	0	0	0	18	0	0	0
Mesothelioma	0	0	0	0	0	0	1	0	0	0
Breast	0	0	0	0	0	0	0	2	0	0
Prostate	0	0	7	0	1	1	25	1	0	2
Testis	0	0	1	0	0	0	3	0	0	0
Kidney	0	0	1	0	0	0	0	2	0	1
Bladder	0	0	2	1	0	2	19	0	0	0
Eye	0	0	0	0	0	0	4	0	0	0
Brain, Nervous system	0	0	2	0	0	0	16	1	0	4
Thyroid	0	0	0	0	0	0	5	0	0	1
Hodgkin's disease	0	0	0	1	0	2	12	0	0	1
Non-hodgkin's disease	0	1	1	0	0	0	27	0	0	3
Multiple myeloma	0	0	1	0	0	1	3	0	0	2
Lymphoid leukemia	0	0	1	0	1	6	8	0	0	0
Myloid leukemia	0	0	2	0	0	2	10	0	0	1
Leukemia unspecified	0	0	1	0	0	2	1	0	0	0
Other and unspecified	0	2	2	1	0	4	14	11	0	1
Total	6	4	37	8	2	27	279	34	0	37
Percentage	1.4	0.9	8.5	1.8	0.5	6.2	64.3	7.8	0.0	8.5

†Key to Basis of Diagnosis

A = Death certificate only **B** = Clinical only **C** = Clinical investigation (e.g. X-ray, Isotopes)
D = Exploration surgery but without Histology **E** = Specific Biochemical and / or Immunological test
F = Cytological /Hematological **G** = Histology of primary **H** = Histology of Metastasis
I = Autopsy **J** = Not known

Table 11: Incident Cases By Most Valid Basis Of Diagnosis Among Omani Females

Site	Basis of Diagnosis									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Lip	0	0	0	0	0	0	1	0	0	0
Mouth	0	0	0	0	0	0	1	0	0	0
Salivary gland	0	0	0	1	0	0	1	0	0	0
Nasopharynx	0	0	0	0	0	0	0	0	0	1
Hypopharynx	0	0	0	0	0	0	1	0	0	0
Oesophagus	0	0	1	0	0	0	8	1		1
Stomach	0	0	4	0	0	1	23	1	0	0
Small intestine	0	0	0	0	0	0	0	1	0	0
Colon	0	0	0	0	0	1	10	0	0	0
Rectum	0	1	0	1	0	0	8	0	0	0
Liver	0	0	4	0	0	0	8	2	0	1
Gall bladder	0	1	0	0	0	0	3	0	0	0
Pancreas	0	1	1	2	0	1	2	1	0	0
Nose, Sinuses	0	0	0	1	0	0	1	0	0	0
Larynx	0	0	0	0	0	0	2	0	0	0
Bronchus, Lung	0	0	1	0	0	1	3	2	0	0
Bone	0	0	0	0	0	0	4	0	0	0
Connective Tissue	0	0	0	0	0	0	4	0	0	0
Melanoma of skin	0	0	0	1	0	0	0	0	0	0
Other skin	0	0	0	0	0	0	11	0	0	1
Kaposi's sarcoma	0	0	0	0	0	0	1	0	0	0
Breast	0	2	2	1	0	9	24	9	0	3
Other female genital	0	2	7	1	0	3	46	4	0	2
Kidney	0	0	0	0	0	0	5	2	0	0
Bladder	0	0	0	0	0	1	6	1	0	0
Eye	0	0	0	0	0	0	2	0	0	2
Brain, Nervous system	0	0	1	0	0	0	13	0	0	0
Thyroid	0	0	0	0	0	0	23	2	0	1
Other endocrine	0	0	1	0	0	0	0	0	0	1
Hodgkin's disease	0	0	0	0	0	0	4	0	0	0
Non-hodgkin's disease	1	0	1	0	0	2	12	1	0	0
Multiple myeloma	0	0	0	0	0	1	4	0	0	1
Lymphoid leukemia	0	0	1	0	0	4	7	0	0	1
Myloid leukemia	0	0	2	0	0	1	2	0	0	1
Leukemia unspecified	0	0	0	0	1	2	0	0	0	0
Other and unspecified	0	1	2	1	0	7	6	12	0	1
Total	1	8	28	9	1	34	246	39	0	17
Percentage	0.3	2.0	7.3	2.3	0.3	8.9	64.2	10.2	0.0	4.4

†Key to Basis of Diagnosis

A = Death certificate only **B** = Clinical only **C** = Clinical investigation (e.g. X-ray, Isotopes)
D = Exploration surgery but without Histology **E** = Specific Biochemical and / or Immunological test
F = Cytological /Hematological **G** = Histology of primary **H** = Histology of Metastasis
I = Autopsy **J** = Not known

Cancer among the Omani Population

Common Cancers Among Omanis

Overall, the commonest cancer in the Omani population was stomach cancer followed by leukemia and breast cancer (Table 12). The most common cancer in males was cancer of the stomach followed prostate cancer and leukemia (Table 13). In females, the most common cancer was breast cancer followed by ovarian cancer and stomach cancer (Table 14).

Table 12: Ten Most Common Cancers In The Omani Population (Males & Females)

Topography	Frequency	Percentage (%)
Stomach	72	8.8
Leukemia	58	7.1
Breast	52	6.4
Non-Hodgkin's Lymphoma	49	6.0
Liver	44	5.4
Prostate	37	4.5
Brain & Nervous System	37	4.5
Lung & Bronchus	34	4.2
Thyroid	32	3.9
Urinary bladder	32	3.9

Table 13 : Ten Most Common Cancers In The Omani Population (Males)

Topography	Frequency	Percentage (%)
Stomach	43	9.9
Prostate	37	8.5
Leukemia	36	8.3
Non-Hodgkin's Lymphoma	32	7.4
Liver	29	6.7
Lung & Bronchus	27	6.2
Bladder	24	5.5
Brain & Nervous System	23	5.3
Skin	18	4.1
Hodgkin's Disease	16	3.7

Table 14 : Ten Most Common Cancers In The Omani Population (Females)

Topography	Frequency	Percentage (%)
Breast	50	13.1
Ovary	31	8.1
Stomach	29	7.2
Thyroid	26	6.8
Leukemia	22	5.7
Cervix	21	5.5
Non-Hodgkin's Lymphoma	17	4.4
Liver	15	3.9
Brain & Nervous system	14	3.7
Skin	12	3.1

Regional Distribution Of Cancer Cases

The incidence rate in the various regions varies from 19.6 per 100,000 population to 67.2 per 100,000 population. The highest incidence is seen in Musandam region and the lowest in Al-Wousta region. Table 15 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, Muscat and people sometimes give a local address in Muscat, rather than their original place of residence.

Table 15: Regional Distribution Of Cancer Cases Among Omanis

Region	Frequency	Incidence rate (per 100,000)
Musandam	17	67.2
Dhofar	91	63.9
South Batinah	113	58.3
South Sharqiyah	68	51.6
Muscat	173	50.6
North Batinah	149	44.4
Dakhiliya	94	41.9
North Sharqiyah	47	40.9
Dhahira	59	38.7
Al-Wousta	3	19.6
Unknown	3	0.0
Total	817	

Childhood Cancers

Of the 817 cases reported during 1998, 70 cases were among children aged 14 years and below, constituting 8.6% of the total cancers reported. Leukemias, brain and spinal neoplasms, followed by lymphomas were the commonest tumours seen in this age group. Tables 17 - 19 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 19. The age standardized rates were 95.9 per million for males and 87.7 per million for females.

Table 16: Common Cancers In Omani Children (Boys & Girls)

Topography	Frequency	Percentage (%)
Leukemia	27	38.6
Brain & Spinal Neoplasm	15	21.4
Lymphoma	8	11.4
Germ Cell & Gonadal Neoplasm	4	5.7
Retinoblastoma	4	5.7
Soft Tissue Sarcoma	2	2.9
Hepatic Tumours	2	2.9
Sympathetic Nervous System Tumours	2	2.9
Carcinomas & Epithelial Neoplasms	2	2.9
Renal Tumours	1	1.4

Table 17: Common Cancers In Omani Children (Boys)

Topography	Frequency	Percentage (%)
Leukemia	16	43.2
Brain & Spinal Neoplasm	10	27.0
Lymphoma	3	8.1
Retinoblastoma	2	5.4
Germ Cell & Gonadal Neoplasm	2	5.4
Soft Tissue Sarcoma	1	2.7
Bone Tumour	1	2.7
Sympathetic Nervous System Tumours	1	2.7

Table 18: Common Cancers In Omani Children (Girls)

Topography	Frequency	Percentage (%)
Leukemia	11	33.3
Lymphoma	5	15.2
Brain & Spinal Neoplasm	3	9.1
Retinoblastoma	2	6.1
Hepatic Tumours	2	6.1
Germ Cell & Gonadal Neoplasm	2	6.1
Soft Tissue Sarcoma	1	3.0
Sympathetic Nervous System Tumours	1	3.0

Table 19: Frequency Distribution of Childhood Cancers in Oman (International Classification of Childhood Cancers)

Site	Male						Female					
	0-4	0-9	10-14	All	Crude Rate/Million	*ASR/ Million	0-4	5-9	10-14	All	Crude Rate/Million	*ASR/ Million
1. Leukaemia	7	7	2	16	40.8	43.2	4	4	3	11	29.0	29.7
a. Lymphoid	5	7	0	12	30.6	32.7	4	1	1	6	15.8	17.7
b. Acute non-lymphocytic	1	0	0	1	2.6	3.1	0	3	1	4	10.6	9.8
c. Chronic myeloid	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
d. Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
e. unspecified	1	0	2	3	7.7	7.4	0	0	1	1	2.6	2.2
2. Lymphomas	0	1	2	3	7.7	6.7	1	3	1	5	13.2	13.1
a. Hodgkin's disease	0	1	1	2	5.1	4.6	0	1	1	2	5.3	4.7
b. Non-Hodgkin lymphomas	0	0	1	1	2.6	2.1	1	1	0	2	5.3	5.8
c. Burkitt's lymphoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
d. Miscellaneous lymphoreticular neoplasms	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
e. unspecified	0	0	0	0	0.0	0.0	0	1	0	1	2.6	2.5
3. Brain and Spinal Neoplasms	1	5	4	10	25.5	23.9	1	1	3	5	13.2	12.4
a. Ependymoma	1	1	2	4	10.2	9.8	0	0	1	1	2.6	2.2
b. Astrocytoma	0	3	0	3	7.7	7.4	1	1	1	3	7.9	8.0
c. Primitive neuroectodermal tumours	0	1	2	3	7.7	6.7	0	0	0	0	0.0	0.0
d. Other gliomas	0	0	0	0	0.0	0.0	0	0	1	1	0.0	0.0
e. Other specified	0	0	0	0	0.0	0.0	0	0	0	0	2.6	2.2
f. Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
4. Sympathetic Nervous System Tumours	1	0	0	1	2.6	3.1	0	1	0	1	2.6	2.5
a. Neuroblastoma	1	0	0	1	2.6	3.1	0	1	0	1	2.6	2.5
b. Other	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
5. Retinoblastoma	1	1	0	2	5.1	5.6	1	1	0	2	5.3	5.8
6. Renal Tumours	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.2
a. Wilm's tumour	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.2
b. Renal carcinoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
c. 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	1	2	5.3	5.4
a. Hepatoblastoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
b. Hepatic carcinoma	0	0	0	0	0.0	0.0	1	0	1	2	5.3	5.4
c. Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
8. Malignant Bone Tumours	0	1	0	1	2.6	2.5	0	0	0	0	0.0	0.0
a. Osteosarcoma	0	1	0	1	2.6	2.5	0	0	0	0	0.0	0.0
b. Chondrosarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
c. Ewing's sarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
d. Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
e. Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
9. Soft Tissue Sarcomas	0	1	0	1	2.6	2.5	1	0	0	1	2.6	3.2
a. Rhabdomyosarcoma	0	1	0	1	2.6	2.5	0	0	0	0	0.0	0.0
b. Fibrosarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
c. Kaposi's sarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
d. Other specified	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.2
e. Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
10. Germ Cell and Gonadal Neoplasms	2	0	0	2	5.1	6.2	1	0	1	2	5.3	5.4
a. Intracranial and intraspinal germ cell	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
b. Other & unspecified non-gonadal germ cell	1	0	0	1	2.6	3.1	1	0	0	1	2.6	3.2
c. Gonada germ cell	1	0	0	1	2.6	3.1	0	0	1	1	2.6	2.2
d. Gonadal carcinoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
e. 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	0	1	1	2.6	2.2
a. Adrenocortical	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
b. Thyroid	0	0	0	0	0.0	0.0	0	0	1	1	2.6	2.2
c. Nasopharyngeal	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
d. Melanoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
e. Skin	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
f. 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	1	1	2	5.3	4.7
a. Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
b. Other unspecified	0	0	0	0	0.0	0.0	0	1	1	2	5.3	4.7
Total	12	9	16	37	94.4	95.9	11	11	11	33	87.1	87.7

* Age-Standardized Rate per Million

Lymphomas

There were 69 cases of lymphomas reported in 1998. Of these 49 cases (71.0%) were Non-Hodgkin's lymphomas and 20 cases (29.0%) were Hodgkin's lymphomas. Non-Hodgkin's lymphomas formed the fourth most common cancer among the Omani population. The male : female ratio was 1.9:1 for Non-Hodgkin's lymphomas and 4:1 for Hodgkin's lymphomas.

The highest incidence rate for Non-Hodgkin's Lymphoma was seen in North Sharqiyah region (7.0 per 100,000) followed by South Batinah (5.1per 100,000). The highest incidence rate for Hodgkin's lymphomas was seen in Musandam (4.0 per 100,000) followed by South Batinah (2.6 per 100,000). The regional distribution, sex distribution and the histology of the lymphomas reported are presented in Tables 20 - 22 respectively.

Table 20: Regional Distribution Of Lymphomas

Region	Hodgkin's Lymphoma		Non-Hodgkin's Lymphoma	
	Frequency	Incidence/100,000	Frequency	Incidence/100,000
Dakhiliya	0	0.0	6	2.7
Dhahira	3	2.0	1	0.7
Dhofar	2	1.4	5	3.5
Muscat	4	1.2	7	2.0
North Batinah	3	0.9	9	2.7
North Sharqiyah	2	1.7	8	7.0
South Batinah	5	2.6	10	5.1
South Sharqiyah	0	0.0	2	1.5
Musandam	1	4.0	1	4.0
Al-Wousta	0	0.0	0	0.0
Total	20		49	

Table 21: Sex Distribution Of Lymphomas

	Hodgkin's Lymphoma		Non-Hodgkin's Lymphoma	
Sex	Frequency	Incidence†	Frequency	Incidence†
Female	4	0.5	17	2.1
Male	16	1.9	32	3.7
Total	20		73	

†Incidence per 100,000 per year

Table 22: Histology Of Hodgkin's Disease

ICD-O Code	Histology	Percentage(%)
96503	Hodgkin's disease (NOS)*	85.0%
96523	Hodgkin's disease, mixed cellularity (NOS)*	10.0%
96633	Hodgkin's disease, lymphocytic depletion (NOS)*	8.5%

Table 23: Histology Of Non-Hodgkin's Disease

ICD-O Code	Histology	Percentage(%)
95913	Malignant lymphoma, non-Hodgkin's (NOS)*	77.6
95903	Malignant lymphoma (NOS)*	16.3
96963	Malignant lymphoma, lymphocytic, poorly differenciated, nodular	2
96853	Malignant lymphoma, lymphoblastic	2
96803	Malignant lymphoma, large cell, diffuse (NOS)*	2

* NOS, Not Otherwise Specified

Gastric Cancer

Gastric cancer formed the most common cancer among the Omanis. In 1998, there were 72 cases of gastric cancer. Among these 43 were males and 29 were females, giving the male : female ratio of 1.5:1. The highest incidence rate was seen in Musandam (19.8 per 100,000) followed by South Sharqiyah (6.8 per 100,000) and Al-Wousta (6.5 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 24 - 26 respectively.

Table 24: Regional Distribution Of Gastric Cancer

Region	Frequency	Incidence/100,000
Musandam	5	19.8
South Sharqiyah	9	6.8
Al-Wousta	1	6.5
North Batinah	19	5.7
Dakhiliya	12	5.4
Dhofar	6	4.2
North Sharqiyah	4	3.5
Dhahira	4	2.6
Muscat	8	2.3
South Batinah	4	2.1
Total	72	

Table 25: Sex Distribution Of Gastric Cancer

Sex	Frequency	Incidence/100,000
Male	43	5.0
Female	29	3.5
Total	72	

Table 26: Histology Of Gastric Malignancies

ICD-O Code	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	70.8
80103	Carcinoma (NOS)*	8.3
80003	Neoplasm, malignant	5.6
80213	Carcinoma, anaplastic (NOS)*	4.2
84903	Signet ring cell carcinoma	2.8
84803	Mucinous adenocarcinoma	2.8
82603	Papillary adenocarcinoma	1.4
81443	Adenocarcinoma intestinal type	1.4
81423	Linitis plastica	1.4
80703	Squamous cell carcinoma, (NOS)*	1.4

*(NOS), Not otherwise specified

Breast Cancer

Breast cancer was the most common cancer among Omani females. In total there were 52 cases of breast cancers, 50 cases were among females and only 2 among males. The highest incidence rate was seen in Muscat and South Batinah (10.4 per 100,000) Dhofar (8.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 27- 29 respectively.

Table 27: Regional Distribution Of Breast Cancer

Region	Frequency	Incidence/100,000
Muscat	17	10.4
South Batinah	10	10.4
Dhofar	6	8.7
Dakhiliya	6	5.3
North Sharqiyah	3	5.2
South Sharqiyah	3	4.6
North Batinah	5	3.0
Dhahira	2	2.7
Musandam	0	0
Al-Wousta	0	0
Total	52	

Table 28: Sex Distribution Of Breast Cancer

Sex	Frequency	Incidence/100,000
Female	50	6.0
Male	2	0.2
Total	52	

Table 29: Histology Of Breast Cancer

ICD-O Code	Histology	Percentage (%)
85003	Infiltrating ductal carcinoma	59.6
80213	Carcinoma,anaplastic, (NOS)*	13.5
80103	Carcinoma (NOS)*	13.5
85103	Medullary carcinoma (NOS)*	3.8
85223	Infiltrating duct and lobular carcinoma	1.9
85203	Lobular carcinoma (NOS)*	1.9
82113	Tubular carcinoma	1.9
81403	Adenocarcinoma (NOS)*	1.9
80003	Malignant neoplasm (NOS)*	1.9

*(NOS), Not otherwise specified

Cancer of Lung & Bronchus

In 1998 there were 34 cases of cancer of the lung & bronchus. Of these 27 were males and 7 were females, with the male : female ratio being 3.8:1. Cancer of the lung and bronchus formed the sixth commonest cancer among Omani males. The highest incidence rate was seen in North Sharqiyah (4.4 per 100,000) followed by Musandam (4.0 per 100,000) and South Sharqiyah (3.8 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 30 - 32 respectively.

Table 30: Regional Distribution Of Lung & Bronchus Cancer

Region	Frequency	Incidence/100,000
North Sharqiyah	5	4.4
Musandam	1	4.0
South Sharqiyah	5	3.8
North Batinah	10	3.0
Dhofar	3	2.1
South Batinah	3	1.5
Muscat	5	1.5
Dhahira	2	1.3
Dakhiliya	0	0
Al-Wousta	0	0
Total	34	

Table 31: Sex Distribution Of Lung & Bronchus Cancer

Sex	Frequency	Incidence/100,000
Male	27	3.2
Female	7	0.8
Total	34	

Table 32: Histology Of Lung & Bronchus Cancer

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	26.5
80703	Squamous cell carcinoma (NOS)*	17.6
82503	Bronchio-alveolar adenocarcinoma	11.8
81403	Adenocarcinoma (NOS)*	11.8
80213	Carcinoma, anaplastic	11.8
80413	Small cell carcinoma (NOS)*	8.8
80003	Neoplasm,malignant	5.9
84803	Mucinous adenocarcinoma	2.9

*(NOS), Not otherwise specified

Malignancies Of The Urinary Bladder

In 1998, there were 32 cases of carcinoma of the urinary bladder. Among these there were 24 males and 8 females, with the male : female ratio being 3 : 1. The highest incidence rate was seen in Al-Wousta (6.5 per 100,000) followed by Dhofar (4.2 per 100,000) and Dhahira (2.6 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 33-35 respectively. Transitional cell carcinomas constituted 56.3% of the tumours whereas squamous cell carcinomas constituted only 12.5%.

Table 33: Regional Distribution Of Malignancies Of The Urinary Bladder

Region	Frequency	Incidence/100,000
Al-Wousta	1	6.5
Dhofar	6	4.2
Dhahira	4	2.6
South Sharqiyah	3	2.3
South Batinah	4	2.1
North Batinah	7	2.1
Muscat	5	1.5
North Sharqiyah	1	0.9
Dakhiliya	1	0.4
Musandam	0	0
Total	32	

Table 34: Sex Distribution Of Malignancies Of The Urinary Bladder

Sex	Frequency	Incidence/100,000
Male	24	2.8
Female	8	1.0
Total	32	

Table 35: Histology Of Malignancies Of The Urinary Bladder

ICD-O Code	Histology	Percentage (%)
81203	Transitional cell carcinoma (NOS)*	56.3
80703	Squamous cell carcinoma (NOS)*	12.5
81303	Papillary transitional cell carcinoma	9.4
80003	Malignant Neoplasm	9.4
81403	Adenocarcinoma (NOS)*	6.3
89633	Rhabdoid sarcoma	3.1
80103	Carcinoma (NOS)*	3.1

*(NOS), Not otherwise specified

Carcinoma Of The Prostate

Carcinoma of the prostate was the second commonest cancer among Omani males, with 37 cases being reported in 1998. The highest incidence rate was seen in Dhofar (8.2 per 100,000) followed by South Sharqiyah (7.6 per 100,000) and Dakhiliya (5.4 per 100,000). The Regional distribution, and the histology of the cancer cases reported are presented in Tables 36 & 37 respectively.

Table 36: Regional Distribution Of Carcinoma Of The Prostate

Region	Frequency	Incidence/100,000
Dhofar	6	8.2
South Sharqiyah	5	7.6
Dakhiliya	6	5.4
South Batinah	5	5.1
Muscat	9	5.0
North Batinah	6	3.6
North Sharqiyah	0	0.0
Musandam	0	0.0
Dhahira	0	0.0
Al-Wousta	0	0.0
Total	37	

Table 37: Histology of carcinoma of the prostate

ICD-O Code	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	54.1
80103	Carcinoma (NOS)*	27.0
81203	Transitional cell carcinoma	8.1
80213	Carcinoma, anaplastic	8.1
80003	Neoplasm, malignant	2.7

*(NOS), Not otherwise specified

Cancer among the Omani Population

Skin Cancer

There were 32 cases of skin cancer in 1998. Among these 19 were males and 13 were females, with the male : female ratio being 1.5:1. Skin cancer was the 9th commonest cancer among the Omani males. The highest incidence rate was seen in Musandam (4.0 per 100,000) followed by South Batinah (3.6 per 100,000) and North Sharqiyah (3.5 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 38-40 respectively. Basal cell carcinomas constituted 62.5%,and squamous cell carcinomas 12.5%of the skin tumours.

Table 38: Regional Distribution Of Skin Cancer

Region	Frequency	Incidence/100,000
Musandam	1	4.0
South Batinah	7	3.6
North Sharqiyah	4	3.5
Dhofar	3	2.1
Muscat	6	1.8
Dakhiliya	4	1.8
North Batinah	5	1.5
Dhahira	2	1.3
South Sharqiyah	0	0
Al-Wousta	0	0
Total	32	

Table 39: Sex Distribution Of Skin Cancer

Sex	Frequency	Incidence/100,000
Male	18	2.1
Female	12	1.5
Total	32	

Table 40: Histology Of Skin Cancer

ICD-O Code	Histology	Percentage (%)
80903	Basal cell carcinoma (NOS)*	62.5
80703	Squamous cell carcinoma (NOS)*	12.5
80003	Neoplasm,malignant	6.3
88323	Dermatofibrosarcoma	3.1
83903	Skin appendage carcinoma	3.1
80513	Verrucous carcinoma	3.1
80213	Carcinoma anaplastic	3.1
87203	Malignant Melanoma (NOS)*	3.1
87303	Amelanotic Melanoma	3.1

*(NOS), Not otherwise specified

Carcinoma Of The Colon

There were 25 cases of carcinoma of the colon in 1998. Of these 14 were males and 11 were females, with the male : female ratio being 1.3 : 1. Adenocarcinomas constituted the majority of these cancers (56%). The highest incidence rate was seen in Musandam (4 per 100,000) followed by Dhofar (3.5 per 100,000) and North Batinah (2.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 41 - 43.

Table 41: Regional Distribution Of Carcinoma Of The Colon

Region	Frequency	Incidence/100,000
Musandam	1	4.0
Dhofar	5	3.5
North Batinah	7	2.1
Muscat	6	1.8
South Batinah	3	1.5
Dhahira	2	1.3
South Sharqiyah	1	0.8
North Sharqiyah	0	0.0
Dakhiliya	0	0.0
Al-Wousta	0	0.0
Total	25	

Table 42: Sex Distribution Of Carcinoma Of The Colon

Sex	Frequency	Incidence/100,000
Male	14	1.6
Female	11	1.3
Total	25	

Table 43: Histology Of Carcinoma Of The Colon

ICD-OCode	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	56.0
80213	Carcinoma,anaplastic	12.0
80103	Carcinoma(NOS)*	12.0
80003	Neoplasm,malignant	8.0
84903	Signet ring cell carcinoma	4.0
84813	Mucin-producing adenocarcinoma	4.0
82403	Carcinoid tumour	4.0

*(NOS), Not otherwise specified

Carcinoma Of The Rectum and Anal Canal

There were 20 cases of carcinoma of the rectum and anal canal in 1998. Among these,10 were males and 10 were females, with the male : female ratio being 1:1. Adenocarcinomas constituted the majority of these cancers (60%). The highest incidence rate was seen in Musandam (4.0 per 100,000) followed by South Batinah (2.1 per 100,000) and Dhofar (2.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 44 - 46 respectively.

Table 44: Regional Distribution Of Carcinoma Of The Rectum and Anal Canal

Region	Frequency	Incidence/100,000
Musandam	1	4.0
South Batinah	4	2.1
Dhofar	3	2.1
Dhahira	3	2.0
North Sharqiyah	2	1.7
South Sharqiyah	2	1.5
Muscat	3	0.9
Dakhiliya	1	0.4
North Batinah	1	0.3
Al-Wousta	0	0.0
Total	20	

Table 45: Sex Distribution Of Carcinoma Of The Rectum and Anal Canal

Sex	Frequency	Incidence/100,000
Male	10	1.2
Female	10	1.2
Total	20	

Table 46: Histology Of Carcinoma Of The Rectum and Anal Canal

ICD-OCode	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	60.0
80003	Neoplasm,malignant	15.0
88013	Spindle cell sarcoma	5.0
84813	Mucin-producing adenocarcinoma	5.0
82603	Papillary adenocarcinoma	5.0
80213	Carcinoma,anaplastic	5.0
80103	Carcinoma (NOS)*	5.0

*(NOS), Not otherwise specified

Bone Cancer

There were 9 cases of bone cancer in 1998. Among these,there were 5 males and 4 females, with the male : female ratio being 1.3:1. Chondrosarcoma constituted 33.3% and Ewing's Sarcoma 22.2%. The highest incidence rate was seen in South Sharqiyah (2.3 per 100,000) followed by Muscat (0.9 per 100,000) and Dhofar (0.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 47 - 49 respectively.

Table 47: Regional Distribution Of Bone Cancer

Region	Frequency	Incidence/100,000
South Sharqiyah	3	2.3
Muscat	3	0.9
Dhofar	1	0.7
Dhahira	1	0.7
North Batinah	1	0.3
South Batinah	0	0.0
North Sharqiyah	0	0.0
Musandam	0	0.0
Dakhiliya	0	0.0
Al-Wousta	0	0.0
Total	9	

Table 48: Sex Distribution Of Bone Cancer

Sex	Frequency	Incidence/100,000
Male	5	0.6
Female	4	0.5
Total	9	

Table 49: Histology Of Bone Cancer

ICD-OCode	Histology	Percentage (%)
92203	Chondrosarcoma	33.3
92603	Ewing's sarcoma	22.2
91803	Osteosarcoma	22.2
80003	Neoplasm, malignant (NOS)*	22.2

*(NOS), Not otherwise specified

Carcinoma Of The Thyroid

There were 32 cases of carcinoma of the thyroid in 1998. Among these there were 26 females and 6 males, with the male : female ratio being 1 : 4.3. Carcinoma of the thyroid formed the 4th commonest tumour among Omani women. The highest incidence rate was seen in Musandam (4.0 per 100,000) followed by Dhofar (2.8 per 100,000) and Dhahira (2.6 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 50 - 52 respectively. The commonest thyroid neoplasm was papillary carcinoma which constituted 59.4% followed by follicular carcinoma which constituted 25%.

Table 50: Regional Distribution Of Thyroid Cancers

Region	Frequency	Incidence/100,000
Musandam	1	4.0
Dhofar	4	2.8
Dhahira	4	2.6
South Sharqiyah	3	2.3
Muscat	7	2.0
North Batinah	6	1.8
Dakhiliya	4	1.8
South Batinah	2	1.0
North Sharqiyah	1	0.9
Al-Wousta	0	0.0
Total	32	

Table 51: Sex Distribution Of Thyroid Cancers

Sex	Frequency	Incidence/100,000
Male	6	0.7
Female	26	3.1
Total	32	

Table 52: Histology Of Thyroid Cancers

ICD-O Code	Histology	Percentage (%)
80503	Papillary carcinoma (NOS)*	59.4
83303	Follicular adenocarcinoma (NOS)*	25.0
80213	Carcinoma,anaplastic (NOS)*	6.3
83403	Papillary carcinoma follicular variant	3.1
80203	Carcinoma, undifferenciated	3.1
80103	Carcinoma (NOS)*	3.1

*(NOS), Not otherwise specified

Leukemia

There were 58 cases of leukemia in 1998. Among these, 36 were males and 22 were females, with the male : female ratio being 1.6 : 1. Leukemias formed the commonest cancer in children 14 years and below. The highest incidence rate was seen in Dakhiliya (5.4 per 100,000) followed by South Batinah (5.2 per 100,000) and Dhofar (4.9 per 100,000). The regional distribution, sex distribution and the histology of the cases reported are presented in Tables 53 - 55 respectively.

Table 53: Regional Distribution Of Leukemia

Region	Frequency	Incidence/100,000
Dakhiliya	12	5.4
South Batinah	10	5.2
Dhofar	7	4.9
South Sharqiyah	4	3.0
North Batinah	10	3.0
Muscat	9	2.6
Dhahira	4	2.6
North Sharqiyah	2	1.7
Musandam	0	0
Al-Wousta	0	0
Total	58	

Table 54: Sex Distribution Of Leukemia

Sex	Frequency	Incidence/100,000
Male	36	4.2
Female	22	2.6
Total	58	

Table 55: Types Of Leukemia

ICD-O Code	Histology	Percentage (%)
98213	Acute lymphoblastic leukemia (NOS)*	43.1
98603	Myeloid leukemia (NOS)*	24.1
98633	Chronic myeloid	6.9
98233	Chronic lymphocytic leukemia	6.9
98003	Leukemia (NOS)*	6.9
98013	Acute leukemia (NOS)*	5.2
99303	Myeloid sarcoma	1.7
98643	Aleukemic monocytic leukemia	1.7
98263	Burkitt's cell leukemia	1.7

*(NOS), Not otherwise specified

Tumors of Brain and Spinal Cord

There were 39 cases of brain and spinal cord tumours in 1998. They formed the 2nd commonest tumour in children aged 14 years and below. Glioblastomas constituted 24.3%, followed by Astrocytoma (16.2%) and Ependymoma (16.2%). The highest incidence rate was seen in South Sharqiyah (3.8 per 100,000) followed by Muscat (2.9 per 100,000) and Dakhiliya (2.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 56- 58 respectively.

Table 56: Regional Distribution Of Brain & Spinal Cord Tumors

Region	Frequency	Incidence/100,000
South Sharqiyah	5	3.8
Muscat	10	2.9
Dakhiliya	6	2.7
Dhahira	4	2.6
North Sharqiyah	2	1.7
South Batinah	3	1.5
North Batinah	4	1.2
Dhofar	1	0.7
Musandam	0	0.0
Al-Wousta	0	0.0
Unknown	2	
Total	37	

Table 57: Sex Distribution Of Brain & Spinal Cord Tumors

Sex	Frequency	Incidence/100,000
Male	23	2.7
Female	14	1.7
Total	37	

Table 58: Histology Of Brain & Spinal Cord Tumors

ICD-O Code	Histology	Percentage (%)
94403	Glioblastoma (NOS)*	24.3
93913	Ependymoma (NOS)*	16.2
94003	Astrocytoma (NOS)*	16.2
93803	Glioma, malignant	8.1
94013	Astrocytoma, anaplastic	8.1
94213	Pilocytic astrocytoma	5.4
94503	Oligodendroglioma	5.4
95303	Meningioma, malignant	5.4
94733	Primitive neuroectodermal tumour	2.7
94703	Medulloblastoma	2.7
94423	Gliosarcoma	2.7
94713	Desmoplastic medulloblastoma	2.7

*(NOS), Not otherwise specified

Carcinoma Of The Cervix

There were 21 cases of cervical carcinoma in 1998. Carcinoma of the cervix formed the sixth commonest cancer among Omani females. The highest incidence rate was seen in Dhofar (5.8 per 100,000) followed by South Sharqiyah (4.6 per 100,000) and South Batinah (3.1 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 59 & 60 respectively.

Table 59: Regional Distribution Of Carcinoma Of The Cervix

Region	Frequency	Incidence/100,000
Dhofar	4	5.8
South Sharqiyah	3	4.6
South Batinah	3	3.1
North Batinah	5	3.0
Dakhiliya	3	2.7
Muscat	3	1.8
North Sharqiyah	0	0.0
Musandam	0	0.0
Dhahira	0	0.0
Al-Wousta	0	0.0
Total	21	

Table 60: Histology Of Carcinoma Of The Cervix

ICD-O Code	Histology	Percentage (%)
80703	Squamous cell carcinoma (NOS)*	47.6
80103	Carcinoma (NOS)*	14.3
80713	Squamous cell carcinoma keratinizing (NOS)*	9.5
80213	Carcinoma, anaplastic	9.5
81403	Adenocarcinoma (NOS)*	9.5
80513	Verrucous carcinoma	4.8
83103	Clear cell adenocarcinoma	4.8

*(NOS), Not otherwise specified

Liver Cancers

There were 44 cases of liver cancer in 1998. Among these, 29 were males and 15 were females, giving the male : female ratio of 1.9:1. Hepatocellular carcinoma was the commonest cancer and constituted 75%. The highest incidence rate was seen in Dakhiliya (4.5 per 100,000) followed by Musandam (4.0 per 100,000) and Muscat (3.2 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 61 - 63 respectively.

Table 61: Regional Distribution Of Liver Cancer

Region	Frequency	Incidence/100,000
Dakhiliya	10	4.5
Musandam	1	4.0
Muscat	11	3.2
South Batinah	6	3.1
South Sharqiyah	4	3.0
North Batinah	6	1.8
Dhofar	2	1.4
Dhahira	2	1.3
North Sharqiyah	1	0.9
Al-Wousta	0	0
Unknown	1	
Total	44	

Table 62: Sex Distribution Of Liver Cancer

Sex	Frequency	Incidence/100,000
Male	29	3.4
Female	15	1.8
Total	44	

Table 63: Histology Of Liver Cancer

ICD-O Code	Histology	Percentage (%)
81703	Hepatocellular carcinoma (NOS)*	75.0
81403	Adenocarcinoma (NOS)*	13.6
80213	Carcinoma,anaplastic	4.5
80003	Neoplasm,malignant	2.3
81603	Cholangiocarcinoma	2.3
80103	Carcinoma (NOS)*	2.3

*(NOS), Not otherwise specified

Carcinoma Of The Esophagus

There were 20 cases of carcinoma of the esophagus in 1998. Among these there were 9 males and 11 females, with the male : female ratio being 1:1.2. The highest incidence rate was seen in Musandam (4.0 per 100,000) followed by Muscat (1.8 per 100,000) and South Sharqiyah (1.5 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 64 - 66 respectively. The majority of cancers were squamous cell carcinoma (75%). Adenocarcinomas constituted 10.0%.

Table 64: Regional Distribution Of Carcinoma Of The Esophagus

Region	Frequency	Incidence/100,000
Musandam	1	4.0
Muscat	6	1.8
South Sharqiyah	2	1.5
North Batinah	5	1.5
Dhofar	2	1.4
Dhahira	2	1.3
South Batinah	2	1.0
North Sharqiyah	0	0.0
Dakhiliya	0	0.0
Al-Wousta	0	0.0
Total	20	

Table 65: Sex Distribution Of Carcinoma Of The Esophagus

Sex	Frequency	Incidence/100,000
Male	9	1.1
Female	11	1.3
Total	20	

Table 66: Histology Of Carcinoma Of The Esophagus

ICD-O Code	Histology	Percentage (%)
80703	Squamous cell carcinoma (NOS)*	75.0
80103	Carcinoma (NOS)*	10.0
81403	Adenocarcinoma (NOS)*	10.0
84903	Signet ring cell carcinoma	5.0

*(NOS), Not otherwise specified

Carcinoma Of The Kidney & Ureter

There were 11 cases of kidney & ureter cancers in 1998. Among these there were 4 males and 7 females with the male : female ratio being 1:1.8. Renal cell carcinoma constituted 72.7% and nephroblastomas 9.1 %. The highest incidence rate was seen in South Batinah (1.5 per 100,000) followed by North Batinah (1.2 per 100,000) and Dhahira (0.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 67 - 69 respectively.

Table 67: Regional Distribution Of Carcinoma Of The Kidney & Ureter

Region	Frequency	Incidence/100,000
South Batinah	3	1.5
North Batinah	4	1.2
Dhahira	1	0.7
Muscat	2	0.6
Dakhiliya	1	0.4
South Sharqiyah	0	0.0
North Sharqiyah	0	0.0
Musandam	0	0.0
Dhofar	0	0.0
Al-Wousta	0	0.0
Total	11	

Table 68: Sex Distribution Of Carcinoma Of The Kidney & Ureter

Sex	Frequency	Incidence/100,000
Male	4	0.5
Female	7	0.8
Total	11	

Table 69: Histology Of Carcinoma Of The Kidney & Ureter

ICD-O Code	Histology	Percentage (%)
83123	Renal cell carcinoma	72.7
89603	Nephroblastoma (NOS)*	9.1
80003	Neoplasm, malignant	9.1
81403	Adenocarcinoma,(NOS)*	9.1

*(NOS), Not otherwise specified

Carcinoma Of The Pancreas

There were 12 cases of pancreatic cancers in 1998. Of these, 4 were in males and 8 in females, with the male : female ratio being 1:2. The highest incidence rate was seen in Dhofar (1.4 per 100,000) followed by Dakhiliya (1.3 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 70 - 72 respectively.

Table 70: Regional Distribution Of Carcinoma Of The Pancreas

Region	Frequency	Incidence/100,000
Dhofar	2	1.4
Dakhiliya	3	1.3
South Batinah	2	1.0
North Batinah	3	0.9
Muscat	2	0.6
South Sharqiyah	0	0.0
North Sharqiyah	0	0.0
Musandam	0	0.0
Dhahira	0	0.0
Al-Wousta	0	0.0
Total	12	

Table 71: Sex Distribution Of Carcinoma Of The Pancreas

Sex	Frequency	Incidence/100,000
Male	4	0.5
Female	8	1.0
Total	12	

Table 72: Histology Of Carcinoma Of The Pancreas

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	33.3
81403	Adenocarcinoma (NOS)*	33.3
80003	Neoplasm, malignant	25.0
80213	Carcinoma,anaplastic	8.3

*(NOS), Not otherwise specified

Ovarian Cancer

There were 31 cases of ovarian cancers in 1998. These constituted the 2nd commonest cancer among Omani females. The highest incidence rate was seen in Musandam (16.5 per 100,000) followed by South Batinah (6.2 per 100,0000) and North Sharqiyah (5.2 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 73 & 74 respectively.

Table 73: Regional Distribution Of Ovarian Cancer

Region	Frequency	Incidence/100,000
Musandam	2	16.5
South Batinah	6	6.2
North Sharqiyah	3	5.2
South Sharqiyah	3	4.6
Dakhiliya	4	3.5
Muscat	5	3.1
North Batinah	5	3.0
Dhofar	2	2.9
Dhahira	1	1.3
Al-Wousta	0	0.0
Total	31	

Table 74: Histology Of Ovarian Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	16.1
81403	Adenocarcinoma (NOS)*	16.1
82603	Papillary adenocarcinoma (NOS)*	12.9
84603	Papillary serous cystadenocarcinoma	9.7
83803	Endometrioid carcinoma	6.5
90603	Dysgerminoma	6.5
80213	Carcinoma,anaplastic	6.5
90803	Teratoma, malignant (NOS)*	3.2
80703	Squamous cell carcinoma (NOS)*	3.2
84703	Mucinous cystadenocarcinoma (NOS)*	3.2
84813	Mucin- producing adenocarcinoma	3.2
88103	Fibrosarcoma,(NOS)*	3.2
89803	Carcinosarcoma	3.2
80103	Carcinoma (NOS)*	3.2
90003	Brenner tumour,malignant	3.2

*(NOS), Not otherwise specified

Carcinoma Of The Larynx & Trachea

There were 11 cases of carcinoma of the larynx and trachea in 1998. Nine cases were among males and two among females, constituting a male : female ratio being 4.5 : 1. The highest incidence rate was seen in North Sharqiyah (1.7 per 100,000) followed by Dhofar (1.4 per 100,000) and Dhahira (1.3 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 75 - 77 respectively. Squamous cell carcinoma was the commonest malignancy constituting 81.8% of the tumours.

Table 75: Regional Distribution Of Carcinoma Of The Larynx & Trachea

Region	Frequency	Incidence/100,000
North Sharqiyah	2	1.7
Dhofar	2	1.4
Dhahira	2	1.3
Muscat	4	1.2
South Sharqiyah	1	0.8
South Batinah	0	0.0
North Batinah	0	0.0
Musandam	0	0.0
Dakhiliya	0	0.0
Al-Wousta	0	0.0
Total	11	

Table 76: Sex Distribution Of Carcinoma Of The Larynx & Trachea

Sex	Frequency	Incidence/100,000
Male	9	1.1
Female	2	0.2
Total	11	

Table 77: Histology Of Carcinoma Of The Larynx & Trachea

ICD-O Code	Histology	Percentage (%)
80703	Squamous cell carcinoma (NOS)*	81.8
80213	Carcinoma,anaplastic	9.1
80103	Carcinoma,(NOS)*	9.1

*(NOS), Not otherwise specified

Uterine Cancer

There were 11 cases of uterine cancer in 1998. The highest incidence rate was seen in South Sharqiyah (3.0 per 100,000) followed by North Batinah (2.4 per 100,000) and South Batinah (2.1 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 78 & 79 respectively. Adenocarcinoma constituted 27.3% and Choreocarcinomas constituted 18.2% of the uterine tumours.

Table 78: Regional Distribution Of Uterine Cancer

Region	Frequency	Incidence/100,000
South Sharqiyah	2	3.0
North Batinah	4	2.4
South Batinah	2	2.1
Muscat	2	1.2
Dakhiliya	1	0.9
North Sharqiyah	0	0.0
Musandam	0	0.0
Dhofar	0	0.0
Dhahira	0	0.0
Al-Wousta	0	0.0
Total	11	

Table 79: Histology Of Uterine Cancer

ICD-O Code	Histology	Percentage (%)
81403	Adenocarcinoma	27.3
80703	Squamous cell carcinoma	18.2
91003	Choriocarcinoma (NOS)*	18.2
82603	Papillary adenocarcinoma	9.1
80003	Neoplasm,malignant	9.1
84403	Cystadenocarcinoma (NOS)*	9.1
85603	Adenosquamous carcinoma	9.1

*(NOS), Not otherwise specified

Cancer among Expatriates

Expatriates constitute 26.3% of the total population of Oman. In 1998 there were 97 cases of cancer among the expatriate population giving a crude incidence rate of 16.1 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 leukemia and carcinoma of the thyroid. 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 80 - 85.

Table 80: Sex Distribution of Cancer Cases among Expatriates

Sex	Frequency
Female	36
Male	61
Total	97

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

Topography	Frequency	Percentage (%)
Breast	14	14.4
Leukemia	7	7.2
Skin	6	6.2
Lung & Bronchus	5	5.2
Bladder	5	5.2
Non – Hodgkin's Lymphoma	4	4.1
Hodgkin's Disease	4	4.1
Thyroid	3	3.1
Rectum	3	3.1
Colon	3	3.1

Cancer among Expatriates

Table 82: Ten Most Common Cancers among Expatriates (Males)

Topography	Frequency	Percentage (%)
Lung & Bronchus	5	8.2
Leukemia	5	8.2
Bladder	5	8.2
Hodgkin's Disease	4	6.6
Rectum	4.	4.9
Skin	3	4.9
Nose,Sinuses	3	4.9
Non.Hodgkin's Lymphoma	3	4.9
Colon	3	4.9
Prostate	2	3.3

Table 83: Ten Most Common Cancers among Expatriates (Females)

Topography	Frequency	Percentage (%)
Breast	13	36.1
Thyroid	3	8.3
Skin	3	8.3
Cervix	3	8.3
Uterus	2	5.6
Ovary	2	5.6
Leukemia	2	5.6
Stomach	1	2.7
Non-Hodgkin'sLYmphoma	1	2.7
Multiple Myeloma	1	2.7

Cancer among Expatriates

Table 84: Regional Distribution Of Cancer Cases Among Expatriates

Region	Frequency	Incidence/100,000
Muscat	68	23.3
Dhofar	12	16.4
Dakhiliya	0	0.0
North Sharqiyah	2	10.8
South Sharqiyah	1	3.8
North Batinah	6	8.8
South Batinah	3	7.8
Dhahira	3	5.7
Musandam	1	13.9
Al-Wousta	0	0.0
Unknown	1	
Total	97	

Table 85: Distribution Of Cancer Cases Among Expatriates By Country Of Origin

Country	Frequency
India	40
Egypt	13
Pakistan	10
Sudan	7
Philippines	6
Bangladesh	4
Morocco	3
United Kingdom	2
Srilanka	2
United States of America	1
United Arab Emirates	1
Tunisia	1
Nigeria	1
Lebanon	1
Jordan	1
Japan	1
Iran	1
Indonesia	1
China	1
Total	97

Members of the National Cancer Control Committee

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Dr. Mohammed Ali Jaffer	Head, Division of Surgery, Royal Hospital	Co-ordinator
	Director of International Relations	Member
	WHO Representative, Oman	Member
Dr. Saadia Al-Riyami	Head, Dept. of Obs/Gyn, Royal Hospital	Member
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