Ministry of Health
Sultanate of Oman

Cancer Incidence in Oman 1997

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

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Prepared by

Dr. Ali Jaffer Mohammed
Dr. Jawad Al-Lawati
Dr. Mathew Koshy
Mrs. Zareentaj Haider Ali
Mr. Bader Al-Shaksy

Preface

Available data indicate that the health burden of cancer is of a significant proportion in Oman. For example, cancer was the second leading cause of inpatient mortality in Ministry of Health hospitals among those above the age of 15 years in 1995 and 1996.

Infact the Ministry of Health has realized the importance of this problem sometime ago when a National Cancer Control Programme (NCCP) was established and a multi-disciplinary committee was formed by the ministerial decision No. 30/93.

One of the main aims of the NCCP was to capitalize the cancer registry, which was first established in 1985, as a hospital based registry. In 1996, this was shifted to the Non-Communicable Diseases Control Section under the Directorate General of Health Affairs, and its scope was widened. Today, the Oman National Cancer Registry is a population-based registry covering the entire Sultanate.

The growing cancer burden, calls for greater investment in health facilities specific to cancer treatment and for preventive strategies. However rational planning of the use of resources depends on the knowledge of the frequency of and distribution of the disease in the population concerned. The first issue of Cancer Incidence in Oman, published in 1996, was an attempt to provide health care planners and decision makers with such data. This second publication summarizes the available data for the year 1997, and for the first time includes age-adjusted incidence rate to make our data comparable with published international figures such as those of International Agency for Research on Cancer (IARC) publication, “Cancer Incidence in Five Continents”.

In bringing out this issue I wish to thank all staff working in the regional hospitals, as well as sister institutions of the Ministry of Health for promptly notifying the 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 issue in time. I sincerely hope that this book 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
Director General of Health Affairs &
Chairman, National Cancer Control Programme

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 southeastern 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 Persian 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 population in 1997 was 2,255,630 of which 1,641,940 were Omanis and 613,690 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 47% 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.

Table 1: Age Structure Of The Omani Population

Age	Male		Female		Total	
Group	Number	Percentage	Number	Percentage	Number	Percentage
0 - 4	125,690	15.05	120,940	14.99	246,630	15.02
5 - 9	133,390	15.97	128,840	15.97	262,230	15.97
10 - 14	134,870	16.15	130,710	16.20	265,580	16.17
15 - 19	114,950	13.76	109,760	13.61	224,710	13.69
20 - 24	79,910	9.57	74,400	9.22	154,310	9.40
25 - 29	51,340	6.15	47,180	5.85	98,520	6.00
30 - 34	37,430	4.48	37,610	4.66	75,040	4.57
35 - 39	30,700	3.68	32,870	4.07	63,570	3.87
40 - 44	26,770	3.21	30,130	3.73	56,900	3.47
45 - 49	22,180	2.66	22,000	2.73	44,180	2.69
50 - 54	21,140	2.53	20,630	2.56	41,770	2.54
55 - 59	18,330	2.19	16,710	2.07	35,040	2.13
60 - 64	12,780	1.53	10,420	1.29	23,200	1.41
65 - 69	11,810	1.41	9,860	1.22	21,670	1.32
70 - 74	5,410	0.65	5,210	0.65	10,620	0.65
75 - 79	4,590	0.55	5,050	0.63	9,640	0.59
80 - 84	1,600	0.19	1,700	0.21	3,300	0.20
85 +	2,310	0.28	2,720	0.34	5,030	0.31
Total	835,200	100.00	806,740	100.00	1,641,940	100

Table 2: Population Distribution Of Omanis By Regions And Sex

Governorate / Region	No. of Males	No. of Females	Total Population
Muscat	174,140	158,610	332,750
Dhofar	71,720	67,640	139,360
Dakhiliya	109,220	110,580	219,800
North Sharqiyah	56,270	56,260	112,530
South Sharqiyah	64,570	64,560	129,130
North Batinah	165,830	163,270	329,100
South Batinah	95,780	94,300	190,080
Dhahira	76,830	72,630	149,460
Musandam	12,890	11,860	24,750
Al-Wousta	7,950	7,030	14,980
Total	835,200	806,740	1,641,940

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 worldwide. 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 specialty at the regional hospital completes the notification forms and sends 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, (see Table 3) with topography 'C' and morphology 'M' codes. Duplicate entry checking is done by name, age and by Wilayat code. This avoids the same case being registered more than once.

Table 3: Site Specific Codes Used To Define Various Sites (Reference: ICD-O, 2nd Edition, World Health Organization, Geneva)

C00.0 - C00.9 = Lip	C37.0 - C37.9 = Thymus
C01.0 - C02.9 = Tongue	C39.0 - C39.9 = Other Respiratory System
C07.0 - C08.9 = Salivary Gland	C40.0 - C41.9 = Bone
C03.0 - C03.9 = Gum	C49.0 - C49.9 = Connective Tissue
C04.0 - C04.9 = Floor of Mouth	C44.0 - C44.9 = Skin
C05.0 - C06.9 = Other Mouth & Palate	C50.0 - C50.9 = Breast
C10.0 - C10.9 = Oropharynx	C61.0 - C61.9 = Prostate
C09.0 - C09.9 = Tonsil	C62.0 - C62.9 = Testis
C11.0 - C11.9 = Nasopharynx	C60.0 - C60.9 = Penis
C13.0 - C13.9 = Hypopharynx	C67.0 - C67.9 = Urinary Bladder
C14.0 = Pharynx (NOS)*	C54.0 - C55.9 = Uterus
C15.0 - C15.9 = Oesophagus	C53.0 - C53.9 = Cervix
C16.0 - C16.9 = Stomach	C58.0 - C58.9 = Placenta
C17.0 - C17.9 = Small Intestine	C56.0 - C56.9 = Ovary
C18.0 - C18.9 = Colon	C52.0 - C52.9 = Vagina
C19.0 - C21.9 = Rectum & Anus	C64.0 - C66.9 = Kidney & Ureter
C22.0 - C22.9 = Liver	C69.0 - C69.9 = Eye
C23.0 - C24.9 = Gall Bladder/Bile Duct	C70.0 - C72.9 = Brain & Spinal Cord
C25.0 - C25.9 = Pancreas	C73.0 - C73.9 = Thyroid
C48.0 - C48.9 = Retroperitoneum	C74.0 - C75.9 = Other Endocrine Glands
C26.0 - C26.9 = Other Digestive System	C76.0 - C76.9 = Ill Defined Site
C30.0 - C31.9 = N.Cavity/M.Ear/Sinuses	C77.0 - C77.9 = Lymph Node
C32.0 - C33.9 = Larynx & Trachea	C80.0 - C80.9 = Primary Unknown
C34.0 - C34.9 = Lung & Bronchus	C42.1 = Leukemia
C38.0 - C38.9 = Pleura/Mediastinum	Else = Others

*(NOS), Not otherwise specified.

4. Completeness of Data Reporting

Data are obtained from pathology laboratories for all cases diagnosed as cancer and 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 Dbase IV programme and analysis is done using EPI Info version 6.0 (Centre for Disease Control & Prevention, Georgia, Atlanta). Steps have already been initiated for data entry and analysis using the CanReg version 3 programme developed by the International Agency for Research on Cancer (IARC) Lyon, France.

Due to the "skewed" distribution of the Omani population, the **World Standard Population,**

(Table 4 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, 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 4: 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

Overall Results

The total number of cancer cases registered in 1997 in the Oman National Cancer Registry was 1,046 (Table 5). Of these, 922 (88.1%) cases were among Omanis, and 123 (11.8%) cases were expatriates. In one case (0.1%), the nationality was unknown.

Table 5: **Distribution Of Cancer Cases In Oman By Nationality**

Nationality	Frequency	Percentage (%)
Omanis	922	88.1
Expatriates	123	11.8
Unknown	1	0.1
Total	1,046	100

Age & Sex

Of the total of 922 cases, males accounted for 518 cases (56.2%), and females accounted for 404 cases (43.8%) (Table 6); the male: female ratio being 1.3: 1. Fifty-nine cases (6.4%) were reported in children aged 12 years and below. The median age at diagnosis was 55 years. This was higher in males (median age 57 years) than in females (median age 50 years).

Table 6: Distribution Of Cancer Cases Among Omanis By Gender

Sex	Frequency	Percentage (%)
Female	404	43.8
Male	518	56.2
Total	922	100

Tables 7 and 8 give the frequency distribution of incident cases of cancer by site and age group in Omani males and females respectively.

Incidence Rates

In 1997, the crude incidence rates for all cancers among Omanis was 56.2 per 100,000 (62.0 per 100,000 for males and 50.1 per 100,000 for females). The age standardised rates, adjusted to the world standard population, was 124.8 per 100,000 for males and 98.8 per 100,000 for females (Tables 9 and 10).

Basis Of Diagnosis

Tables 11 and 12 give the most valid basis of diagnosis of the various cancers for males and females. The vast majority of cases 86% were diagnosed by histology of the primary. Clinical investigation was the second most common method of diagnosis among both sexes (2% and 3% of cases in males and females respectively). Cases diagnosed clinically alone constituted only 1% in males and 0.7% in females.

Table 7: Frequency Of Incident Cases Among Omanis By Age, Males

	00-	05-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+	Total
Lip	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	**2**
Tongue	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	1	0	0	**5**
Salivary Gland	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	**3**
Gum	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	**2**
Floor of Mouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Other Mouth & Palate	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	**2**
Oropharynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Nasopharynx	0	0	0	0	0	2	1	1	1	0	0	0	1	0	0	0	1	0	**7**
Hypopharynx	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Pharynx (NOS)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
Tonsil	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
Oesophagus	0	0	0	0	0	0	0	0	1	0	1	1	3	1	1	0	1	1	**10**
Stomach	1	0	1	0	0	0	1	0	1	3	5	8	13	3	9	1	6	1	**53**
Small Intestine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Colon	0	0	0	0	0	0	0	1	1	2	3	3	2	0	0	2	0	0	**14**
Rectum & Anus	0	0	0	2	1	1	0	0	0	1	3	1	2	0	2	1	0	0	**14**
Liver	1	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	2	**17**
Gall Bladder /Bile Duct	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Pancreas	0	0	0	0	0	0	0	0	0	1	3	1	1	1	1	0	0	1	**9**
Retroperitoneum	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	**3**
Other Digestive System	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Nasal Cavity/M.Ear/Sinuses	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	**2**
Larynx & Trachea	0	0	0	0	0	0	1	0	1	2	0	0	0	1	0	0	1	0	**6**
Lung & Bronchus	0	0	0	0	0	1	0	2	6	0	9	2	10	8	7	0	1	0	**46**
Pleura & Mediastinum	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	**3**
Bone	0	0	2	2	0	0	0	0	1	0	1	0	2	0	0	0	0	0	**8**
Connective Tissue	0	0	0	0	0	1	1	0	2	0	1	1	0	1	0	1	0	1	**9**
Skin	0	0	0	1	2	1	1	0	0	3	4	3	5	2	5	0	2	1	**30**
Breast	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	**4**
Prostate	0	0	0	0	0	0	0	0	0	1	5	5	10	6	7	5	4	5	**48**
Testis	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	**3**
Penis	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Urinary Bladder	0	0	0	0	0	0	2	1	0	0	2	1	7	3	5	1	0	2	**24**
Kidney & Ureter	0	0	0	0	0	1	1	0	0	1	0	0	1	1	0	1	0	0	**6**
Eye	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	**4**
Brain & Spinal Cord	1	1	1	1	0	2	1	3	2	1	4	1	2	2	0	0	0	0	**22**
Thyroid	0	0	0	0	0	3	1	0	0	2	0	0	2	1	0	0	0	0	**9**
Other Endocrine Glands	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Ill Defined Sites	1	0	0	0	0	1	0	1	0	1	1	0	1	1	1	0	0	0	**8**
Lymph Node	1	0	1	0	0	0	0	0	1	2	1	0	0	0	0	0	1	1	**8**
Primary Unknown	1	0	0	0	0	2	0	2	0	1	1	4	4	2	1	3	0	0	**21**
Hodgkin's Lymphoma	0	5	4	0	0	0	2	0	2	0	1	1	0	0	1	0	0	1	**17**
Non-Hodgkin's Lymphoma	2	4	1	4	3	2	1	3	1	2	4	4	5	1	3	1	1	1	**43**
Leukemia	2	4	1	4	0	0	3	1	1	1	4	1	7	1	3	4	0	0	**37**
Others	0	2	0	1	0	2	0	0	0	0	1	1	1	2	0	0	0	1	**11**
Total	**11**	**16**	**11**	**15**	**7**	**20**	**17**	**17**	**24**	**30**	**61**	**43**	**87**	**43**	**53**	**22**	**21**	**20**	**518**

*(NOS), Not otherwise specified

Table 8: Frequency Of Incident Cases Among Omanis By Age, Females

	00-	05-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+	Total
Lip	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tongue	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	**2**
Salivary Gland	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Gum	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	**2**
Floor of Mouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Other Mouth & Palate	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	1	**5**
Nasopharynx	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Hypopharynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
Oesophagus	0	0	0	0	0	0	0	0	0	0	0	1	2	0	4	1	0	1	**9**
Stomach	0	0	0	0	1	0	1	2	3	1	6	2	4	2	4	0	1	0	**27**
Small Intestine	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Colon	0	0	0	0	1	0	0	0	0	0	2	0	2	1	0	1	0	1	**8**
Rectum & Anus	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	1	**6**
Liver	1	0	0	0	0	0	0	2	0	1	1	1	1	2	4	0	0	0	**13**
Gall Bladder /Bile Duct	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	**4**
Pancreas	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	**3**
Retroperitoneum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Other Digestive System	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	**3**
Nasal Cavity/M.Ear/Sinuses	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Larynx & Trachea	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Lung & Bronchus	0	0	0	0	0	1	0	0	0	0	2	4	1	0	1	0	1	1	**11**
Pleura & Mediastinum	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	**3**
Bone	0	0	1	3	0	3	0	0	0	0	0	1	0	0	0	0	0	0	**8**
Connective Tissue	0	0	1	3	0	1	1	1	0	2	0	0	0	0	0	0	1	0	**10**
Skin	0	0	0	0	0	1	0	0	1	1	0	0	3	0	3	0	1	0	**10**
Breast	0	0	0	0	2	2	3	8	11	5	5	6	7	0	4	2	1	0	**56**
Uterus	0	0	0	1	0	1	3	0	1	3	1	0	0	0	0	0	1	0	**11**
Cervix	0	0	0	0	0	1	1	3	2	4	4	1	4	0	3	1	2	2	**28**
Placenta	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Ovary	0	0	0	2	4	0	1	0	1	1	0	2	3	0	1	0	0	0	**15**
Vagina	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Urinary Bladder	0	0	0	0	0	1	0	0	0	1	1	0	1	0	3	0	1	1	**9**
Kidney & Ureter	1	0	0	0	0	0	0	1	1	0	3	1	0	0	0	0	0	0	**7**
Eye	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	**3**
Brain & Spinal Cord	0	0	3	0	0	2	0	4	0	3	1	0	1	0	0	0	2	0	**16**
Thyroid	0	0	0	1	0	6	3	4	3	1	1	1	3	3	2	1	1	1	**31**
Other Endo Gld	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	**2**
Ill Defined Sites	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1	1	0	0	**5**
Lymph Node	1	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	**6**
Primary Unknown	1	1	0	0	0	0	0	0	1	1	2	5	2	5	2	1	0	1	**22**
Hodgkin's Lymphoma	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	**4**
Non-Hodgkin's Lymphoma	4	2	0	2	0	3	0	1	0	1	8	1	3	0	4	1	0	0	**30**
Leukemia	3	1	0	0	1	1	0	0	1	1	1	0	6	2	0	2	0	0	**19**
Others	2	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	**7**
Total	**15**	**6**	**5**	**13**	**11**	**23**	**14**	**30**	**29**	**29**	**52**	**33**	**52**	**18**	**39**	**11**	**13**	**11**	**404**

Table 9: Age-Specific, Crude & Standardized Incidence Rates Per 100,000 Of Various Cancers By Site - Males

	00-	05-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+	CR †	ASR ‡
Lip	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.5	43.3	**0.2**	**0.5**
Tongue	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	4.7	0.0	7.8	0.0	18.5	21.8	0.0	0.0	**0.6**	**1.2**
Salivary Gland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	4.7	0.0	0.0	8.5	0.0	0.0	0.0	0.0	**0.4**	**0.8**
Gum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	**0.2**	**0.5**
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Other Mouth & Palate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	18.5	0.0	0.0	0.0	**0.2**	**0.6**
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.0**
Nasopharynx	0.0	0.0	0.0	0.0	0.0	3.9	2.7	3.3	3.7	0.0	0.0	0.0	7.8	0.0	0.0	0.0	62.5	0.0	**0.8**	**1.5**
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	**0.1**	**0.3**
Pharynx (NOS)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.5	0.0	**0.1**	**0.3**
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Oesophagus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	4.7	5.5	23.5	8.5	18.5	0.0	62.5	43.3	**1.2**	**2.8**
Stomach	0.8	0.0	0.7	0.0	0.0	0.0	2.7	0.0	3.7	13.5	23.7	43.6	101.7	25.4	166.4	21.8	375.0	43.3	**6.3**	**14.8**
Small Intestine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.3	**0.1**	**0.2**
Colon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.7	9.0	14.2	16.4	15.6	0.0	0.0	43.6	0.0	0.0	**1.7**	**3.4**
Rectum & Anus	0.0	0.0	0.0	1.7	1.3	1.9	0.0	0.0	0.0	4.5	14.2	5.5	15.6	0.0	37.0	21.8	0.0	0.0	**1.7**	**3.2**
Liver	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	4.5	9.5	10.9	15.6	16.9	37.0	21.8	62.5	86.6	**2.0**	**4.3**
Gall Bladder /Bile Duct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.3**
Pancreas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	14.2	5.5	7.8	8.5	18.5	0.0	0.0	43.3	**1.1**	**2.4**
Retroperitoneum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	7.8	8.5	0.0	0.0	0.0	0.0	**0.4**	**0.8**
Other Digestive System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.3**
Nasal Cavity/M.Ear/Sinus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	18.5	0.0	0.0	0.0	**0.2**	**0.6**
Larynx & Trachea	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	3.7	9.0	0.0	0.0	0.0	8.5	0.0	0.0	62.5	0.0	**0.7**	**1.5**
Lung & Bronchus	0.0	0.0	0.0	0.0	0.0	1.9	0.0	6.5	22.4	0.0	42.6	10.9	78.2	67.7	129.4	0.0	62.5	0.0	**5.5**	**12.5**
Pleura & Mediastinum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	7.8	8.5	0.0	0.0	0.0	0.0	**0.4**	**0.8**
Bone	0.0	0.0	1.5	1.7	0.0	0.0	0.0	0.0	3.7	0.0	4.7	0.0	15.6	0.0	0.0	0.0	0.0	0.0	**1.0**	**1.4**
Connective Tissue	0.0	0.0	0.0	0.0	0.0	1.9	2.7	0.0	7.5	0.0	4.7	5.5	0.0	8.5	0.0	21.8	0.0	43.3	**1.1**	**1.9**
Skin	0.0	0.0	0.0	0.9	2.5	1.9	2.7	0.0	0.0	13.5	18.9	16.4	39.1	16.9	92.4	0.0	125.0	43.3	**3.6**	**7.8**
Breast	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	5.5	7.8	0.0	0.0	0.0	0.0	0.0	**0.5**	**1.1**
Prostate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	23.7	27.3	78.2	50.8	129.4	108.9	250.0	216.5	**5.7**	**13.2**
Testis	0.0	0.0	0.0	0.0	0.0	1.9	2.7	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.4**	**0.5**
Penis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	0.0	5.3	3.3	0.0	0.0	9.5	5.5	54.8	25.4	92.4	21.8	0.0	86.6	**2.9**	**6.7**
Kidney & Ureter	0.0	0.0	0.0	0.0	0.0	1.9	2.7	0.0	0.0	4.5	0.0	0.0	7.8	8.5	0.0	21.8	0.0	0.0	**0.7**	**1.4**
Eye	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	37.0	0.0	0.0	0.0	**0.5**	**1.1**
Brain & Spinal Cord	0.8	0.7	0.7	0.9	0.0	3.9	2.7	9.8	7.5	4.5	18.9	5.5	15.6	16.9	0.0	0.0	0.0	0.0	**2.6**	**4.4**
Thyroid	0.0	0.0	0.0	0.0	0.0	5.8	2.7	0.0	0.0	9.0	0.0	0.0	15.6	8.5	0.0	0.0	0.0	0.0	**1.1**	**2.0**
Other Endocrine Glands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Ill Defined Sites	0.8	0.0	0.0	0.0	0.0	1.9	0.0	3.3	0.0	4.5	4.7	0.0	7.8	8.5	18.5	0.0	0.0	0.0	**1.0**	**1.9**
Lymph Node	0.8	0.0	0.7	0.0	0.0	0.0	0.0	0.0	3.7	9.0	4.7	0.0	0.0	0.0	0.0	0.0	62.5	43.3	**1.0**	**1.7**
Primary Unknown	0.8	0.0	0.0	0.0	0.0	3.9	0.0	6.5	0.0	4.5	4.7	21.8	31.3	16.9	18.5	65.4	0.0	0.0	**2.5**	**5.0**
Hodgkin's Lymphoma	0.0	3.7	3.0	0.0	0.0	0.0	5.3	0.0	7.5	0.0	4.7	5.5	0.0	0.0	18.5	0.0	0.0	43.3	**2.0**	**2.5**
Non-Hodgkin's Lymphoma	1.6	3.0	0.7	3.5	3.8	3.9	2.7	9.8	3.7	9.0	18.9	21.8	39.1	8.5	55.5	21.8	62.5	43.3	**5.1**	**8.5**
Leukemia	1.6	3.0	0.7	3.5	0.0	0.0	8.0	3.3	3.7	4.5	18.9	5.5	54.8	8.5	55.5	87.1	0.0	0.0	**4.4**	**7.6**
Others	0.0	1.5	0.0	0.9	0.0	3.9	0.0	0.0	0.0	0.0	4.7	5.5	7.8	16.9	0.0	0.0	0.0	43.3	**1.3**	**2.0**
Total	**8.8**	**12.0**	**8.2**	**13.0**	**8.8**	**39.0**	**45.4**	**55.4**	**89.7**	**135.3**	**288.6**	**234.6**	**680.8**	**364.1**	**979.7**	**479.3**	**1312.5**	**865.8**	**62.0**	**124.8**

*(NOS), Not otherwise specified

†CR, Crude incidence rate per 100,000 per year

‡ASR (W), World population age-adjusted incidence rate per 100,000 per year

Table 10: Age-Specific, Crude & Standardized Incidence Rates Per 100,000 Of Various Cancers By Site - Females

	00-	05-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+	CR †	ASR ‡
Lip	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.0**
Tongue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**	**0.4**
Salivary Gland	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.1**
Gum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	**0.2**	**0.6**
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.0**
Other Mouth & Palate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	4.8	0.0	19.2	0.0	0.0	0.0	0.0	36.8	**0.6**	**1.4**
Nasopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.2	0.0	0.0	0.0	**0.1**	**0.4**
Oesophagus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	19.2	0.0	76.8	19.8	0.0	36.8	**1.1**	**2.9**
Stomach	0.0	0.0	0.0	0.0	1.3	0.0	2.7	6.1	10.0	4.5	29.1	12.0	38.4	20.3	76.8	0.0	58.8	0.0	**3.3**	**7.4**
Small Intestine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.3**
Colon	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	9.7	0.0	19.2	10.1	0.0	19.8	0.0	36.8	**1.0**	**2.0**
Rectum & Anus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	6.0	9.6	0.0	0.0	0.0	0.0	36.8	**0.7**	**1.5**
Liver	0.8	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	4.5	4.8	6.0	9.6	20.3	76.8	0.0	0.0	0.0	**1.6**	**3.7**
Gall Bladder /Bile Duct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	19.2	10.1	0.0	0.0	0.0	0.0	**0.5**	**1.3**
Pancreas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	19.2	0.0	58.8	0.0	**0.4**	**0.9**
Retroperitoneum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Other Digestive System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.0	9.6	0.0	0.0	0.0	0.0	0.0	**0.4**	**0.9**
Nasal Cavity/M.Ear/Sinus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Larynx & Trachea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Lung & Bronchus	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	9.7	23.9	9.6	0.0	19.2	0.0	58.8	36.8	**1.4**	**2.9**
Pleura & Mediastinum	0.8	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.4**	**0.5**
Bone	0.0	0.0	0.8	2.7	0.0	6.4	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.0**	**1.1**
Connective Tissue	0.0	0.0	0.8	2.7	0.0	2.1	2.7	3.0	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	58.8	0.0	**1.2**	**1.7**
Skin	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	3.3	4.5	0.0	0.0	28.8	0.0	57.6	0.0	58.8	0.0	**1.2**	**3.2**
Breast	0.0	0.0	0.0	0.0	2.7	4.2	8.0	24.3	36.5	22.7	24.2	35.9	67.2	0.0	76.8	39.6	58.8	0.0	**6.9**	**13.6**
Uterus	0.0	0.0	0.0	0.9	0.0	2.1	8.0	0.0	3.3	13.6	4.8	0.0	0.0	0.0	0.0	0.0	58.8	0.0	**1.4**	**2.3**
Cervix	0.0	0.0	0.0	0.0	0.0	2.1	2.7	9.1	6.6	18.2	19.4	6.0	38.4	0.0	57.6	19.8	117.6	73.5	**3.5**	**7.4**
Placenta	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.1**
Ovary	0.0	0.0	0.0	1.8	5.4	0.0	2.7	0.0	3.3	4.5	0.0	12.0	28.8	0.0	19.2	0.0	0.0	0.0	**1.9**	**3.2**
Vagina	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.4**
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	4.5	4.8	0.0	9.6	0.0	57.6	0.0	58.8	36.8	**1.1**	**2.7**
Kidney & Ureter	0.8	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.3	0.0	14.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**1.4**
Eye	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	36.8	**0.4**	**0.5**
Brain & Spinal Cord	0.0	0.0	2.3	0.0	0.0	4.2	0.0	12.2	0.0	13.6	4.8	0.0	9.6	0.0	0.0	0.0	117.6	0.0	**2.0**	**3.3**
Thyroid	0.0	0.0	0.0	0.9	0.0	12.7	8.0	12.2	10.0	4.5	4.8	6.0	28.8	30.4	38.4	19.8	58.8	36.8	**3.8**	**7.2**
Other Endo Gld	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**	**0.4**
Ill Defined Sites	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.3	0.0	4.8	0.0	0.0	0.0	19.2	19.8	0.0	0.0	**0.6**	**1.2**
Lymph Node	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	6.0	9.6	0.0	0.0	0.0	0.0	0.0	**0.7**	**1.4**
Primary Unknown	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	3.3	4.5	9.7	29.9	19.2	50.7	38.4	19.8	0.0	36.8	**2.7**	**5.8**
Hodgkin's Lymphoma	0.0	0.8	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.5**	**0.7**
Non-Hodgkin's Lymphoma	3.3	1.6	0.0	1.8	0.0	6.4	0.0	3.0	0.0	4.5	38.8	6.0	28.8	0.0	76.8	19.8	0.0	0.0	**3.7**	**6.7**
Leukemia	2.5	0.8	0.0	0.0	1.3	2.1	0.0	0.0	3.3	4.5	4.8	0.0	57.6	20.3	0.0	39.6	0.0	0.0	**2.4**	**4.7**
Others	1.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	9.6	10.1	19.2	0.0	0.0	0.0	**0.9**	**1.6**
Total	**12.4**	**4.7**	**3.8**	**11.8**	**14.8**	**48.7**	**37.2**	**91.3**	**96.2**	**131.8**	**252.1**	**197.5**	**499.0**	**182.6**	**748.6**	**217.8**	**764.7**	**404.4**	**50.1**	**98.8**

†CR, Crude incidence rate per 100,000 per year

‡ASR (W), World population age-Standardized incidence rate per 100,000 per year.

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

Topography	Basis of Diagnosis†									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Bone	0	0	0	0	0	0	8	0	0	0
Brain & Spinal Cord	0	0	0	1	0	0	21	0	0	0
Breast	0	1	0	0	0	1	2	0	0	0
Colon	0	0	0	0	0	1	13	0	0	0
Connective Tissue	0	0	0	1	0	0	7	1	0	0
Eye	0	0	0	0	0	0	4	0	0	0
Gall Bladder /Bile Duct	0	0	0	0	0	0	1	0	0	0
Gum	0	0	0	0	0	0	2	0	0	0
Hypopharynx	0	0	0	0	0	0	1	0	0	0
Ill Defined Sites	0	0	0	0	0	2	6	0	0	0
Kidney & Ureters	0	0	0	0	0	2	4	0	0	0
Larynx & Trachea	0	0	0	0	0	0	6	0	0	0
Leukemia	0	0	0	0	0	4	33	0	0	0
Lip	0	0	0	0	0	0	2	0	0	0
Liver	0	1	2	0	0	1	13	0	0	0
Lung & Bronchus	1	1	3	1	0	7	31	2	0	0
Lymph Node	0	0	0	0	0	1	6	1	0	0
Nasopharynx	0	0	0	0	0	0	6	1	0	0
Nasal Cavity/M.Ear/Sinus	0	0	0	0	0	0	2	0	0	0
Oesophagus	0	0	1	0	0	0	9	0	0	0
Oropharynx	0	0	0	0	0	0	0	0	0	0
Other Digestive System	0	0	1	0	0	0	0	0	0	0
Other Endocrine Gland	0	0	0	0	0	0	1	0	0	0
Other Mouth & Palate	0	0	0	0	0	0	2	0	0	0
Others	0	1	0	0	0	1	9	0	0	0
Pancreas	0	0	1	0	0	0	8	0	0	0
Penis	0	0	0	0	0	0	1	0	0	0
Pharynx (NOS)*	0	0	0	0	0	0	1	0	0	0
Pleura & Mediastinum	0	0	1	0	0	2	0	0	0	0
Primary Unknown	0	0	0	0	0	1	10	10	0	0
Prostate	0	0	0	0	1	0	47	0	0	0
Rectum & Anus	0	0	0	0	0	0	13	1	0	0
Retroperitoneum	0	0	0	0	0	0	3	0	0	0
Salivary Gland	0	0	0	0	0	1	2	0	0	0
Small Intestine	0	0	0	0	0	0	1	0	0	0
Skin	0	0	0	0	0	0	30	0	0	0
Stomach	1	0	0	1	0	2	49	0	0	0
Testis	0	0	0	0	0	0	3	0	0	0
Thyroid	0	0	0	0	0	1	8	0	0	0
Tongue	0	0	0	0	0	0	5	0	0	0
Tonsil	0	0	0	0	0	0	1	0	0	0
Urinary Bladder	1	0	0	0	0	3	19	1	0	0
Hodgkin's Lymphoma	0	0	0	0	0	0	17	0	0	0
Non-Hodgkin's Lymphoma	0	1	1	0	0	1	40	0	0	0
Total	**3**	**5**	**10**	**4**	**1**	**31**	**447**	**17**	**0**	**0**
Percent	**0.8**	**1**	**2**	**0.8**	**0.8**	**6**	**86.3**	**3.3**	**0**	**0**

*(NOS), Not otherwise specified

†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 12: Incident Cases By Most Valid Basis Of Diagnosis Among Omani Females

Topography	Basis of Diagnosis†									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Bone	0	0	0	0	0	0	8	0	0	0
Brain & Spinal Cord	0	0	1	0	0	0	15	0	0	0
Breast	0	0	1	0	0	6	48	0	0	1
Cervix	0	0	0	0	0	4	24	0	0	0
Colon	0	0	0	0	0	0	8	0	0	0
Connective Tissue	0	0	0	0	0	1	9	0	0	0
Eye	0	0	0	0	0	0	3	0	0	0
Gall Bladder /Bile Duct	0	0	0	0	0	0	4	0	0	0
Gum	0	0	0	0	0	0	2	0	0	0
Hypopharynx	0	0	0	0	0	0	1	0	0	0
Ill Defined Site	1	0	0	0	0	0	4	0	0	0
Kidney & Ureter	0	0	1	0	0	0	6	0	0	0
Larynx & Trachea	0	0	1	0	0	0	0	0	0	0
Leukemia	0	0	0	0	0	3	15	0	0	1
Liver	0	0	2	0	0	1	7	3	0	0
Lung & Bronchus	0	0	0	0	0	2	8	1	0	0
Lymph Node	0	0	0	0	0	1	5	0	0	0
Nasopharynx	0	0	0	0	0	0	1	0	0	0
Nasal Cavity/M.Ear/Sinus	0	0	0	0	0	0	1	0	0	0
Oesophagus	0	0	0	0	0	0	9	0	0	0
Other Digestive System	0	1	0	0	0	0	2	0	0	0
Other Endocrine Gland	0	0	0	0	0	0	2	0	0	0
Other Mouth & Palate	1	0	0	0	0	0	4	0	0	0
Others	0	0	0	0	0	2	5	0	0	0
Ovary	0	0	0	1	0	0	14	0	0	0
Pancreas	0	0	0	0	0	0	3	0	0	0
Placenta	0	0	0	0	0	0	1	0	0	0
Pleura & Mediastinum	0	0	0	0	0	1	2	0	0	0
Primary Unknown	0	0	2	1	0	0	15	4	0	0
Rectum & Anus	0	1	2	0	0	0	3	0	0	0
Retroperitoneum	0	0	0	0	0	0	1	0	0	0
Salivary Gland	0	0	0	0	0	1	0	0	0	0
Small Intestine	0	0	0	0	0	0	1	0	0	0
Skin	0	0	0	0	0	0	10	0	0	0
Stomach	0	0	2	0	0	0	25	0	0	0
Thyroid	0	0	0	0	0	2	29	0	0	0
Tongue	0	1	0	0	0	0	1	0	0	0
Urinary Bladder	0	0	0	0	0	0	9	0	0	0
Uterus	0	0	0	0	0	0	11	0	0	0
Vagina	0	0	0	0	0	0	1	0	0	0
Hodgkin's Lymphoma	0	0	0	0	0	0	4	0	0	0
Non-Hodgkin's Lymphoma	1	0	0	0	0	1	28	0	0	0
Total	**3**	**3**	**12**	**2**	**0**	**25**	**349**	**8**	**0**	**2**
Percent	**0.7**	**0.7**	**3**	**0.5**	**0**	**6.2**	**86.4**	**2**	**0**	**0.5**

†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

Common Cancers Among Omanis

Overall, the commonest cancer in the Omani population was stomach cancer followed by Non-Hodgkin's Lymphoma and breast cancer (Table 13). The most common cancer in males was cancer of the stomach followed prostate cancer, lung cancer and Non-Hodgkin's Lymphoma (Table 14). In females, the most common cancer was breast cancer followed by Non-Hodgkin's lymphoma and Thyroid cancer (Table 15).

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

Topography	Frequency	Percentage (%)
Stomach	80	8.7
NonHodgkin's Lymphoma	73	7.9
Breast	60	6.5
Lung & Bronchus	57	6.2
Leukemia	56	6.1
Prostate	48	5.2
Primary unknown	43	4.7
Skin	40	4.4
Thyroid	40	4.4
Brain &Spinal cord	38	4.1

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

Topography	Frequency	Percentage (%)
Stomach	53	10.3
Prostate	48	9.3
Lung & Bronchus	46	8.9
Non-Hodgkin's Lymphoma	43	8.3
Leukemia	37	7.1
Skin	30	5.8
Bladder	24	4.6
Brain & Spinal Cord	22	4.3
Primary unknown	21	4.1
Liver	17	3.3

Table 15: Ten Most Common Cancers In The Omani Population (Females)

Topography	Frequency	Percentage (%)
Breast	56	13.9
Non-Hodgkin's Lymphoma	30	7.4
Thyroid	30	7.4
Cervix	28	6.9
Stomach	27	6.7
Primary Unknown	22	5.5
Leukemia	19	4.7
Brain & Spinal Cord	16	4.0
Ovary	15	3.7
Liver	13	3.2

Regional Distribution Of Cancer Cases

The incidence rate in the various regions varies from 6.7 per 100,000 population to 78.2 per 100,000 population. The highest incidence is seen in Dhofar region and the lowest in Al-Wousta region. Table 16 gives the incidence rates and number of cases of cancer reported from each region. The incidence rate, especially the higher rate 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 16: Regional Distribution Of Cancer Cases Among Omanis

Region	Frequency	Incidence rate (per 100,000)
Al-Wousta	1	6.7
Dakhiliya	92	41.9
Dhahira	66	44.2
Dhofar	109	78.2
Musandam	8	32.3
Muscat	237	71.2
North Batinah	154	46.8
N.Sharqiya	56	49.8
South Batinah	115	60.5
South Sharqiyah	72	55.8
Unknown	12	
Total	922	

Figure 1: Frequency Distribution of Ten Most Common Cancers among the Omani Population (Males & Females)

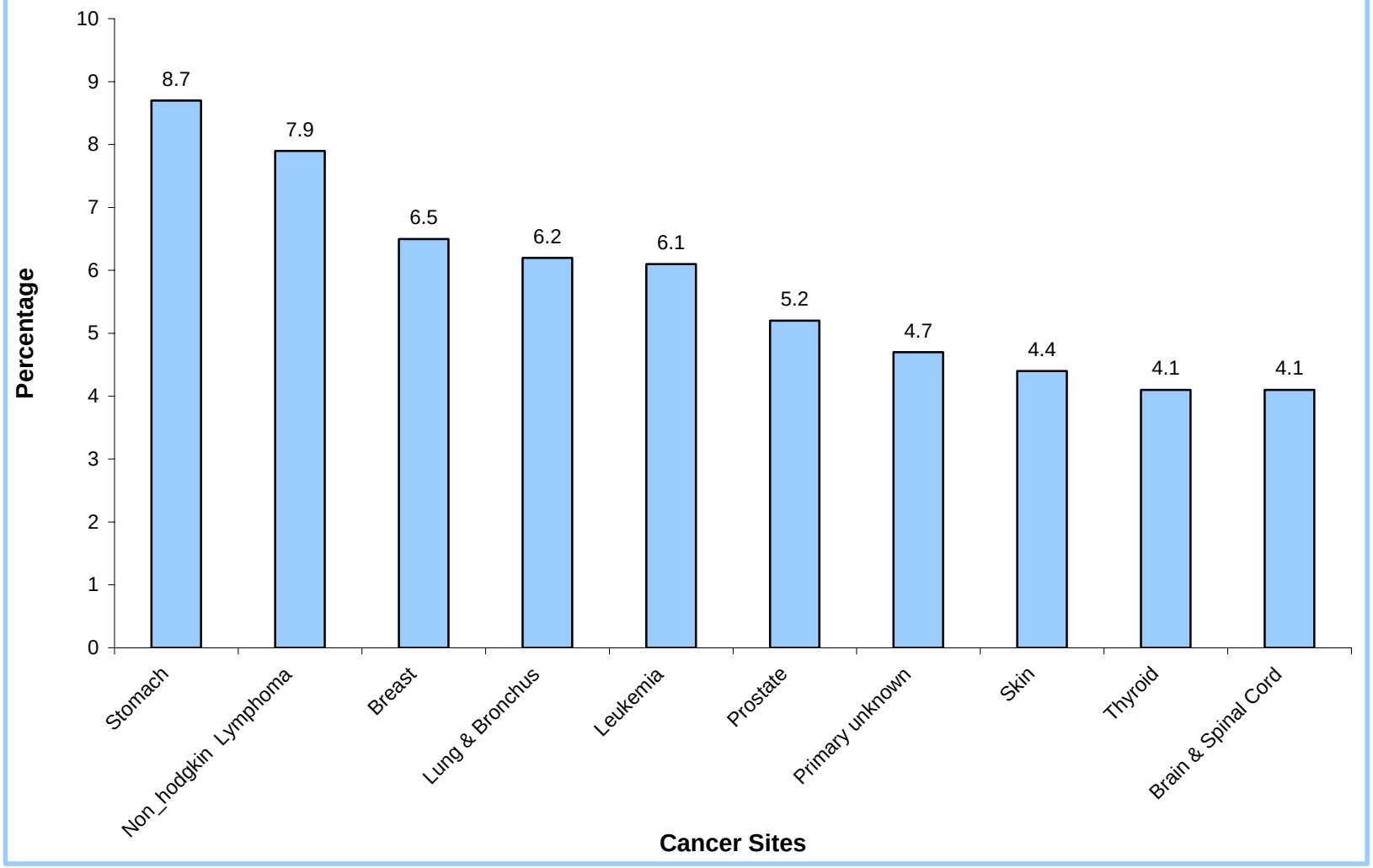
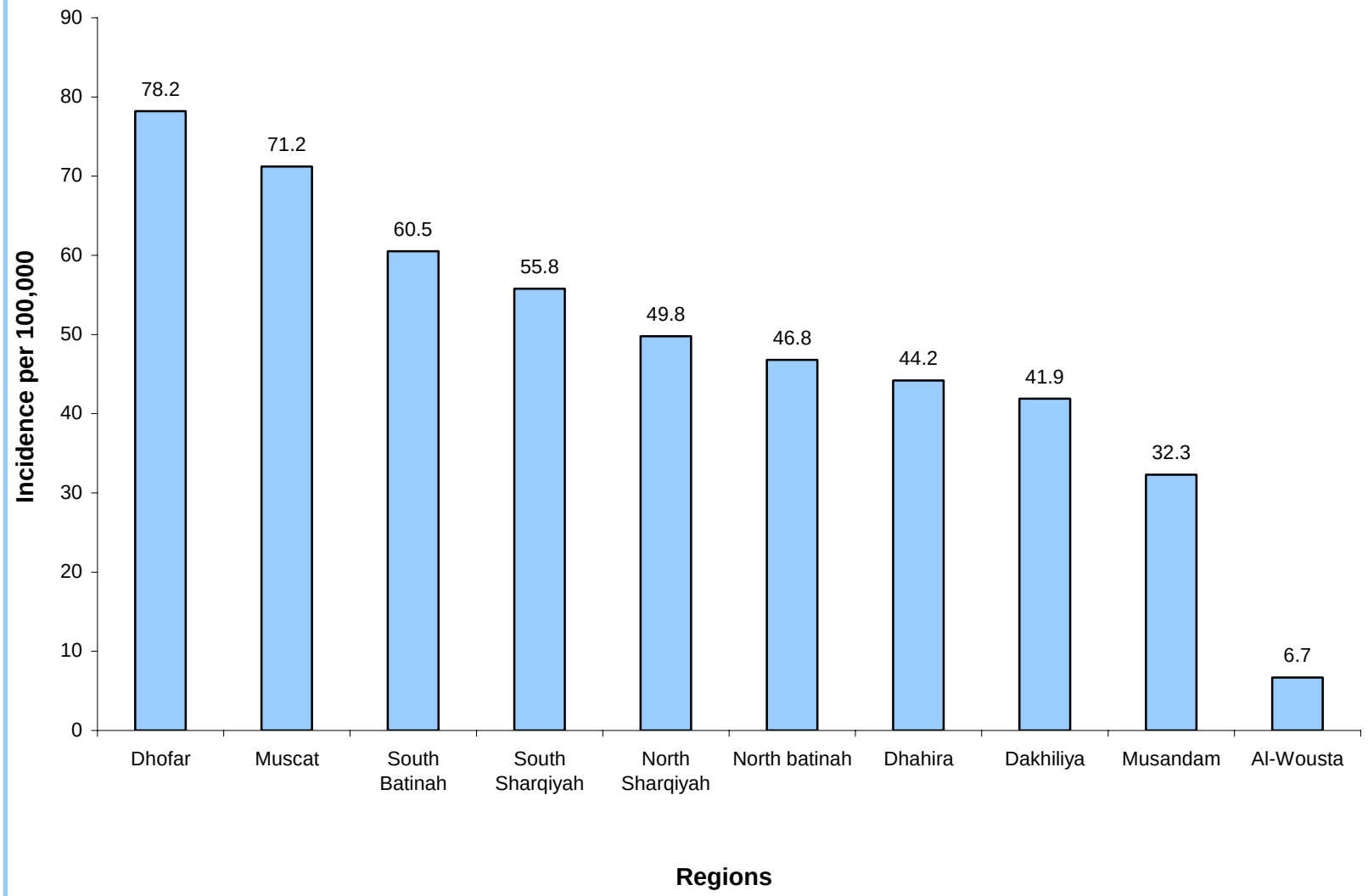


Figure 2: Incidence Rates of Cancer Cases By Region



Childhood Cancers

Of the 922 cases reported during 1997, 59 cases were among children aged 12 years and below, constituting 6.4% of the total cancers reported. Non-Hodgkin's Lymphoma, leukemias, followed by Hodgkin's Disease were the commonest tumours seen in this age group. Tables 17 - 19 list the common childhood cancers in Omani children.

Table 17: Common Cancers In Omani Children (Boys & Girls)

Topography	Frequency	Percentage (%)
Non-Hodgkin's Lymphoma	12	20.3
Leukemia	11	18.6
Hodgkin's Disease	10	17
Brain & Spinal Cord	5	8.5
Primary Unknown	3	5.1
Bone	2	3.4
Eye	2	3.4
Liver	2	3.4
Stomach	2	3.4
Lymph Node	2	3.4

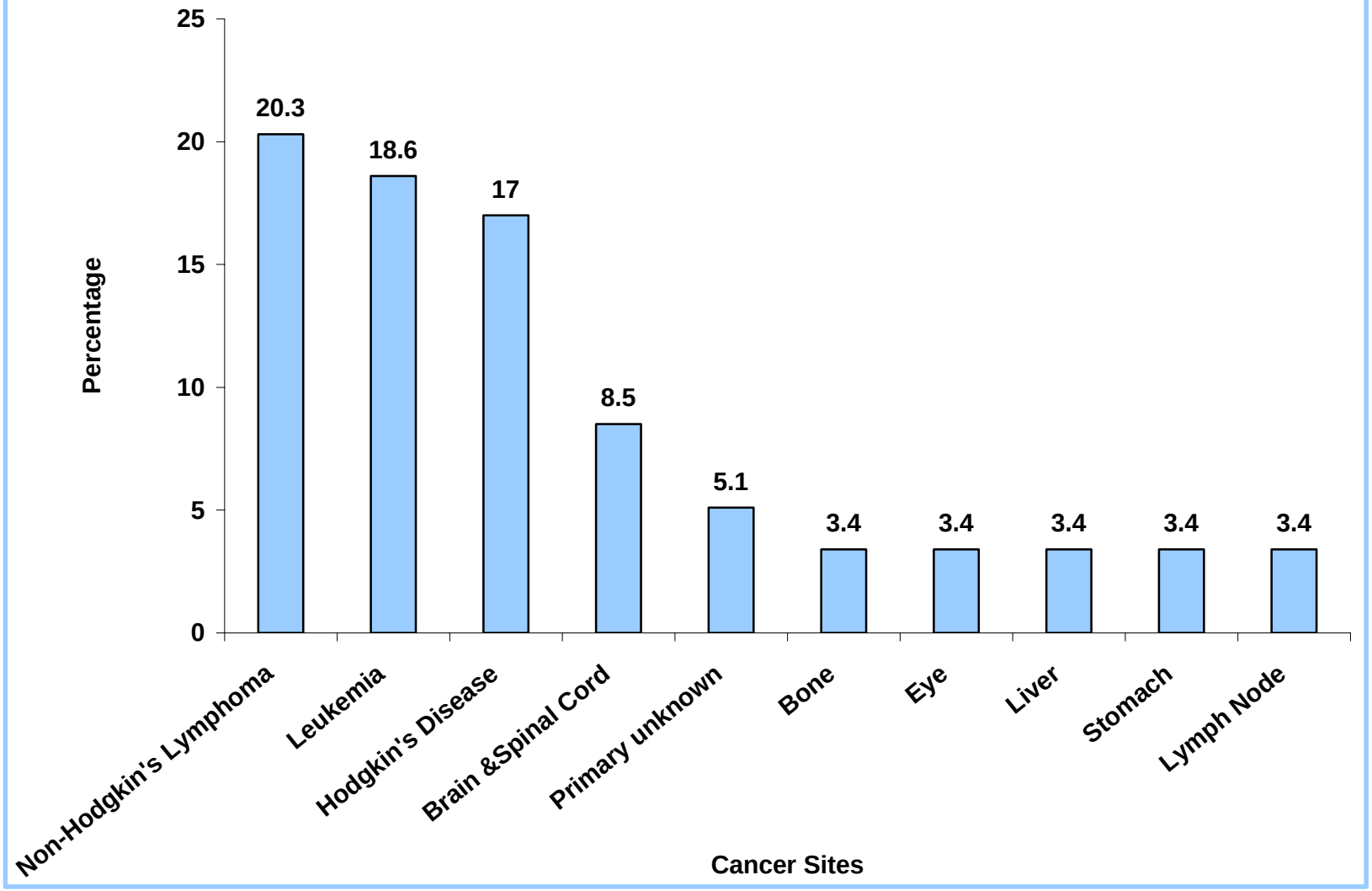
Table 18: Common Cancers In Omani Children (Boys)

Topography	Frequency	Percentage (%)
Hodgkin's Disease	9	25.7
Leukemia	7	20
Non-Hodgkin's Lymphoma	6	17.2
Brain & Spinal Cord	2	5.7
Bone	2	5.7
Stomach	2	5.7
Eye	1	2.9
Liver	1	2.9

Table 19: Common Cancers In Omani Children (Girls)

Topography	Frequency	Percentage (%)
Non-Hodgkin's Lymphoma	6	25.0
Leukemia	4	16.7
Brain & Spinal Cord	3	12.5
Primary Unknown	2	8.3
Hodgkin's Disease	1	4.2
Eye	1	4.2
Kidney	1	4.2

Figure 3: Frequency Distribution of Common Cancers among Omani Children (Boys & Girls)



Lymphomas

There were 94 cases of lymphomas reported in 1997. Of these 73 cases (77.7%) were Non-Hodgkin's lymphomas and 21 cases (22.3%) were Hodgkin's lymphomas. Non-Hodgkin's lymphomas formed the second most common cancer among the Omani population. The male : female ratio was 1.4:1 for Non-Hodgkin's lymphomas and 4.3:1 for Hodgkin's lymphomas.

The highest incidence rate for Non-Hodgkin's Lymphoma was seen in Dhofar region (10.0 per 100,000) followed by South Sharqiyah (6.2 per 100,000). The highest incidence rate for Hodgkin's lymphomas was seen in South Sharqiyah (2.3 per 100,000) followed by Dhofar (2.2 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	3	1.4	6	2.7
Dhahira	3	2.0	4	2.7
Dhofar	3	2.2	14	10.0
Muscat	6	1.8	16	4.8
North Batinah	3	0.9	13	4.0
North Sharqiyah	0	0	5	4.4
South Batinah	0	0	6	3.2
South Sharqiyah	3	2.3	8	6.2
Unknown	0		1	
Total	21		73	

Table 21: Sex Distribution Of Lymphomas

	Hodgkin's Lymphoma		Non-Hodgkin's Lymphoma	
Sex	Frequency	Incidence†	Frequency	Incidence†
Female	4	0.5	30	3.7
Male	17	2.0	43	5.1
Total	21		73	

†Incidence per 100,000 per year

Table 22: Histology Of Lymphomas

ICD-O Code	Histology	Percentage(%)
95903	Malignant lymphoma (NOS)*	18.1
95913	Malignant lymphoma, non-Hodgkin's (NOS)*	51.1
95923	Lymphosarcoma (NOS)*	1.1
96503	Hodgkin's disease (NOS)*	11.7
96523	Hodgkin’s disease, mixed cellularity (NOS)*	1.1
96633	Hodgkin's disease, nodular sclerosis (NOS)*	8.5
96643	Hodgkin's disease, nodular sclerosis, cellular phase	1.1
96703	Malignant lymphoma, small lymphocytic (NOS)*	1.1
96803	Malignant lymphoma, large cell, diffuse (NOS)*	1.1
96823	Malignant lymphoma, large cell, noncleaved, diffuse	1.1
96873	Burkitt's lymphoma (NOS)*	1.1
97003	Mycosis fungoides	1.1
97113	Monocytoid B-cell lymphoma	1.1
97203	Malignant histiocytosis	1.1

* NOS , Not Otherwise Specified

Figure 4: Incidence of Hodgkin's Lymphoma by Region

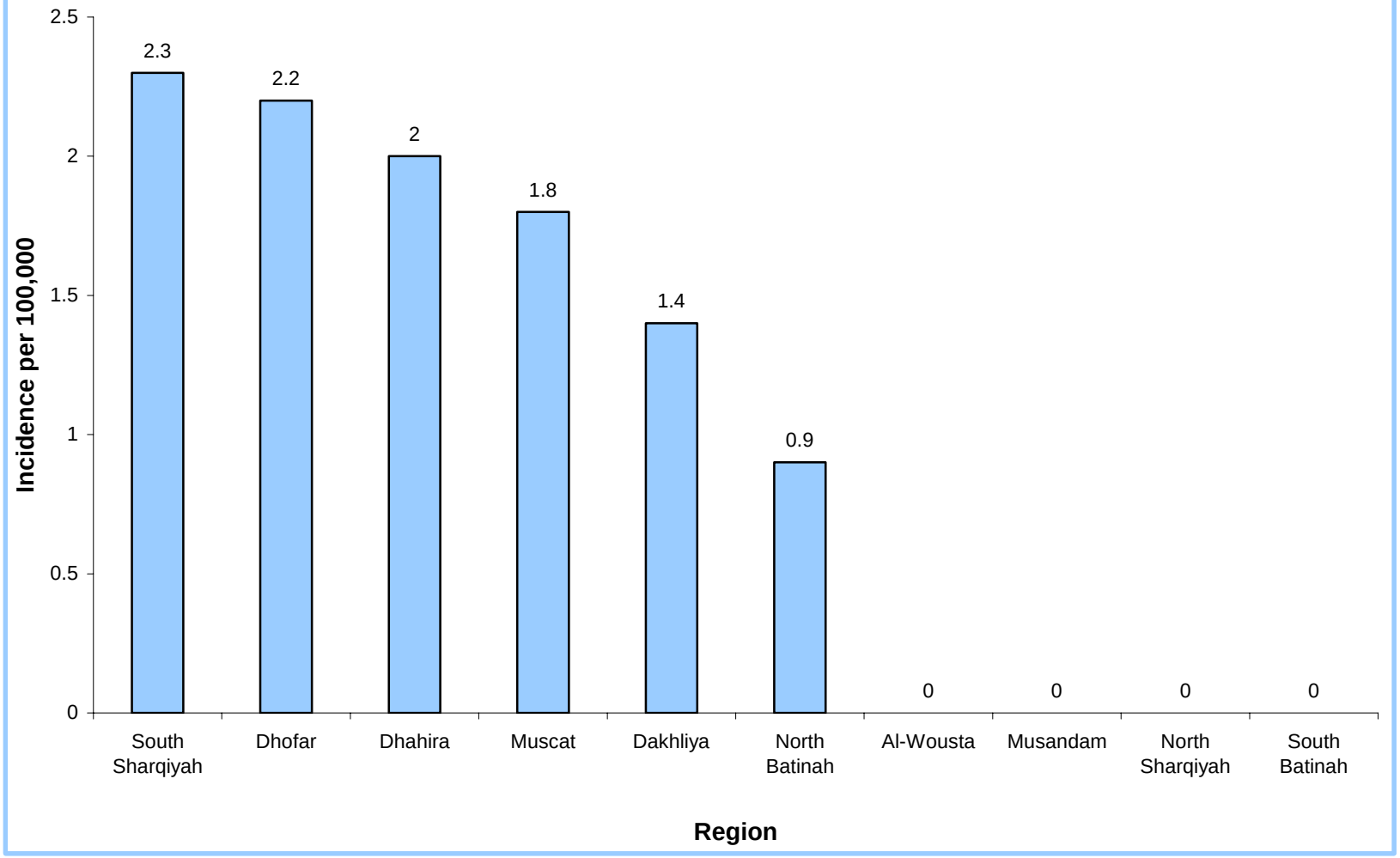
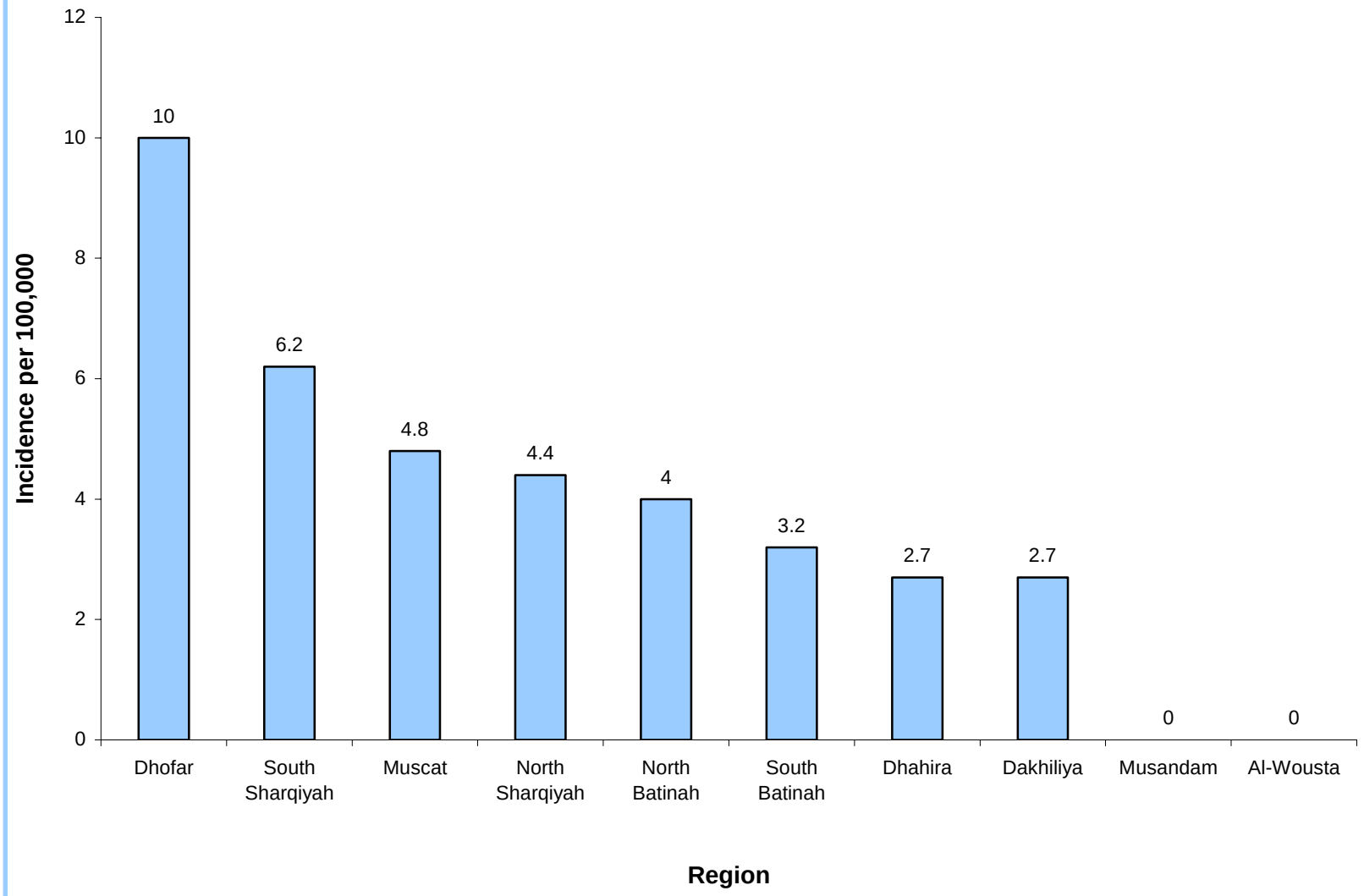


Figure 5: Incidence of Non-Hodgkin's Lymphoma by Region



Gastric Cancer

Gastric cancer formed the most common cancer among the Omanis. In 1997, there were 84 cases of gastric cancer. Among these, 55 were males and 29 were females, giving the male : female ratio of 1.9 : 1. Interestingly 4.8% of the total cancers of the stomach were lymphomas. The highest incidence rate was seen in South Batinah (8.4 per 100,000) followed by Muscat (7.8 per 100,000) and Dhofar (6.5 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	4	1.8
Dhahira	1	0.7
Dhofar	9	6.5
Musandam	0	0.0
Muscat	26	7.8
North Batinah	16	4.9
North Sharqiyah	4	3.6
South Batinah	16	8.4
South Sharqiyah	8	6.2
Total	84	

Table 24: Sex Distribution Of Gastric Cancer

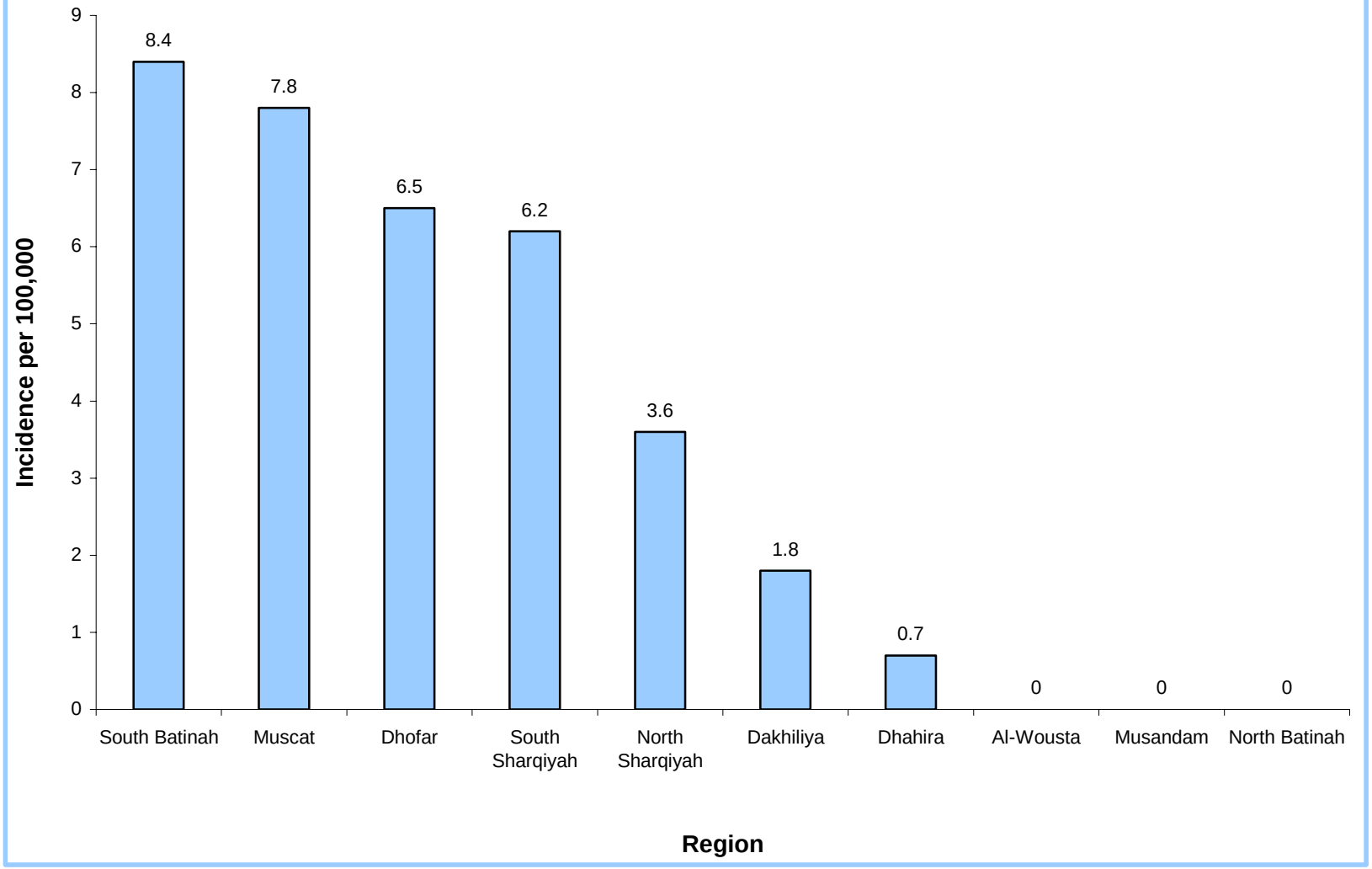
Sex	Frequency	Incidence/100,000
Female	29	3.6
Male	55	6.6
Total	84	

Table 25: Histology Of Gastric Malignancies

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	1.2
80103	Carcinoma (NOS)*	9.5
81403	Adenocarcinoma (NOS)*	76.2
84803	Mucinous adenocarcinoma	1.2
84813	Mucin-producing adenocarcinoma	6.0
84903	Signet ring cell carcinoma	1.2
95903	Malignant lymphoma (NOS)*	2.4
95913	Malignant lymphoma, non-Hodgkin's, (NOS)*	2.4

*(NOS), Not otherwise specified

Figur 6: Incidence of Gastric Cancers By Region



Breast Cancer

Breast cancer was the most common cancer among Omani females. In total there were 60 cases of breast cancers, 56 cases were among females and only 4 among males. The highest incidence rate was seen in Muscat (19.5 per 100,000) followed by Dhofar (11.8 per 100,000) and North Sharqiyah (10.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 26 - 28 respectively.

Table 26: Regional Distribution Of Breast Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	1	0.9
Dhahira	0	0.0
Dhofar	8	11.8
Musandam	0	0.0
Muscat	31	19.5
North Batinah	9	5.5
North Sharqiyah	6	10.7
South Batinah	2	2.1
South Sharqiyah	3	4.6
Total	60	

Table 27: Sex Distribution Of Breast Cancer

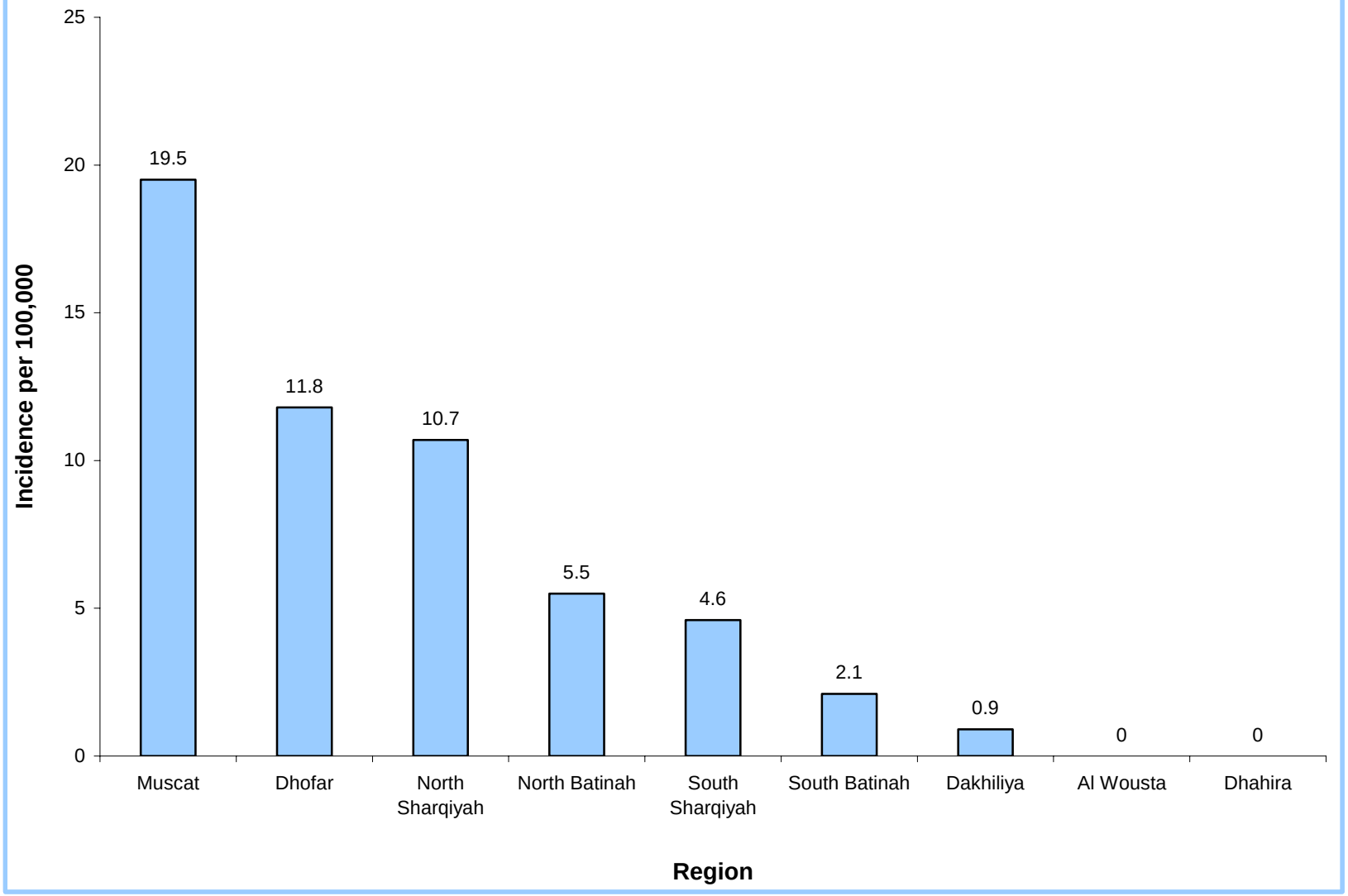
Sex	Frequency	Incidence/100,000
Female	56	6.9
Male	4	0.5
Total	60	

Table 28: Histology Of Breast Cancer

ICD-O Code	Histology	Percentage (%)
80003	Malignant neoplasm	3.3
85003	Infiltrating ductal carcinoma	58.3
80103	Carcinoma (NOS)*	18.3
85203	Lobular carcinoma (NOS)*	6.7
81403	Adenocarcinoma (NOS)*	1.7
82003	Adenocystic carcinoma	1.7
84803	Mucinous adenocarcinoma	1.7
88113	Fibromixosarcoma	1.7
90201	Cystosarcoma phyllodes	1.7
80503	Papillary carcinoma (NOS)*	1.7
85403	Paget's disease of the breast	1.7
85413	Paget's disease & infiltrating ductal carcinoma of the breast	1.7

*(NOS), Not otherwise specified

Figure 7: Incidence of Breast Cancers by Region



Cancer of Lung & Bronchus

In 1997 there were 58 cases of cancer of the lung & bronchus. Of these 47 were males and 11 were females, with the male : female ratio being 4.3 : 1. Cancer of the lung and bronchus formed the fourth commonest cancer among the Omani population. The highest incidence rate was seen in Muscat (5.7 per 100,000) followed by Dhofar (5.0 per 100,000) and South Batinah (4.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 29 - 31 respectively.

Table 29: Regional Distribution Of Lung & Bronchus Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	2	0.9
Dhahira	1	0.7
Dhofar	7	5.0
Musandam	0	0.0
Muscat	19	5.7
North Batinah	13	4.0
North Sharqiyah	4	3.6
South Batinah	9	4.7
South Sharqiyah	3	2.3
Total	58	

Table 30: Sex Distribution Of Lung & Bronchus Cancer

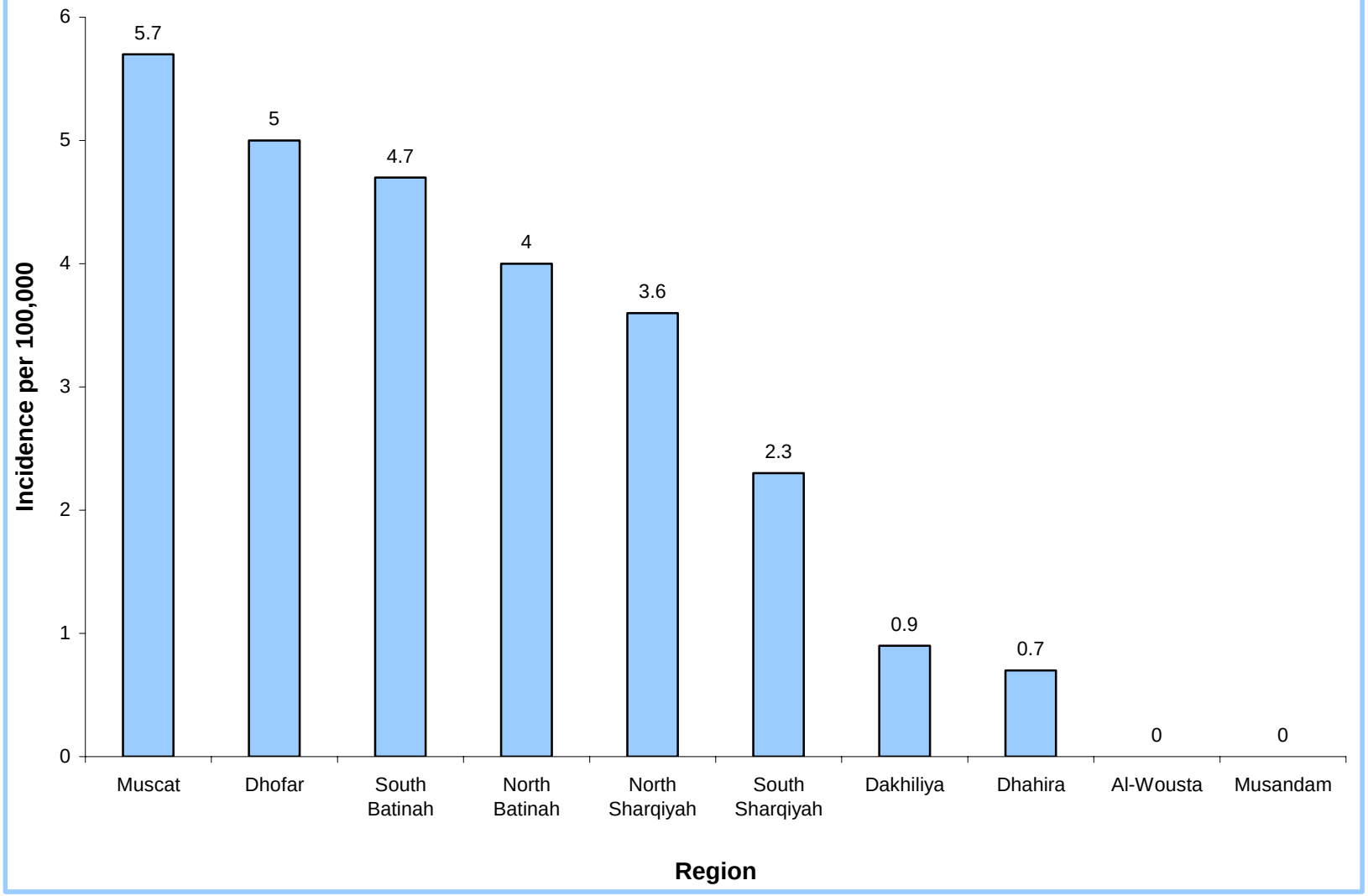
Sex	Frequency	Incidence/100,000
Female	11	1.4
Male	47	5.6
Total	58	

Table 31: Histology Of Lung & Bronchus Cancer

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	31.0
80223	Pleomorphic carcinoma	1.7
80703	Squamous cell carcinoma (NOS)*	24.1
80413	Small cell carcinoma (NOS)*	2
80123	Large cell carcinoma (NOS)*	1.7
80713	Squamous cell Carcinoma non-keratinizing	1.7
81403	Adenocarcinoma (NOS)*	27.6
82503	Bronchio-alveolar adenocarcinoma	1.7
82513	Alvolar adenocarcinoma	1.7
84813	Mucin producing adenocarcinoma	3.4
95903	Malignant Lymphoma (NOS)*	1.7

*(NOS), Not otherwise specified

Figure 8: Incidence of Cancers of Lung & Bronchus by Region



Malignancies Of The Urinary Bladder

In 1997, there were 33 cases of carcinoma of the urinary bladder. Among these there were 24 males and 8 females, with the male : female ratio being 4.3 : 1. The highest incidence rate was seen in Al-Wousta (6.7 per 100,000) followed by North Sharqiyah (4.4 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 32-34 respectively. Transitional cell carcinomas constituted 54.5% of the tumours whereas squamous cell carcinomas constituted only 12.1%.

Table 32: Regional Distribution Of Malignancies Of The Urinary Bladder

Region	Frequency	Incidence/100,000
Al-Wousta	1	6.7
Dakhiliya	6	2.7
Dhahira	2	1.3
Dhofar	2	1.4
Musandam	0	0.0
Muscat	8	2.4
North Batinah	4	1.2
North Sharqiyah	5	4.4
South Batinah	2	1.1
South Sharqiyah	3	3
Total	33	

Table 33: Sex Distribution Of Malignancies Of The Urinary Bladder

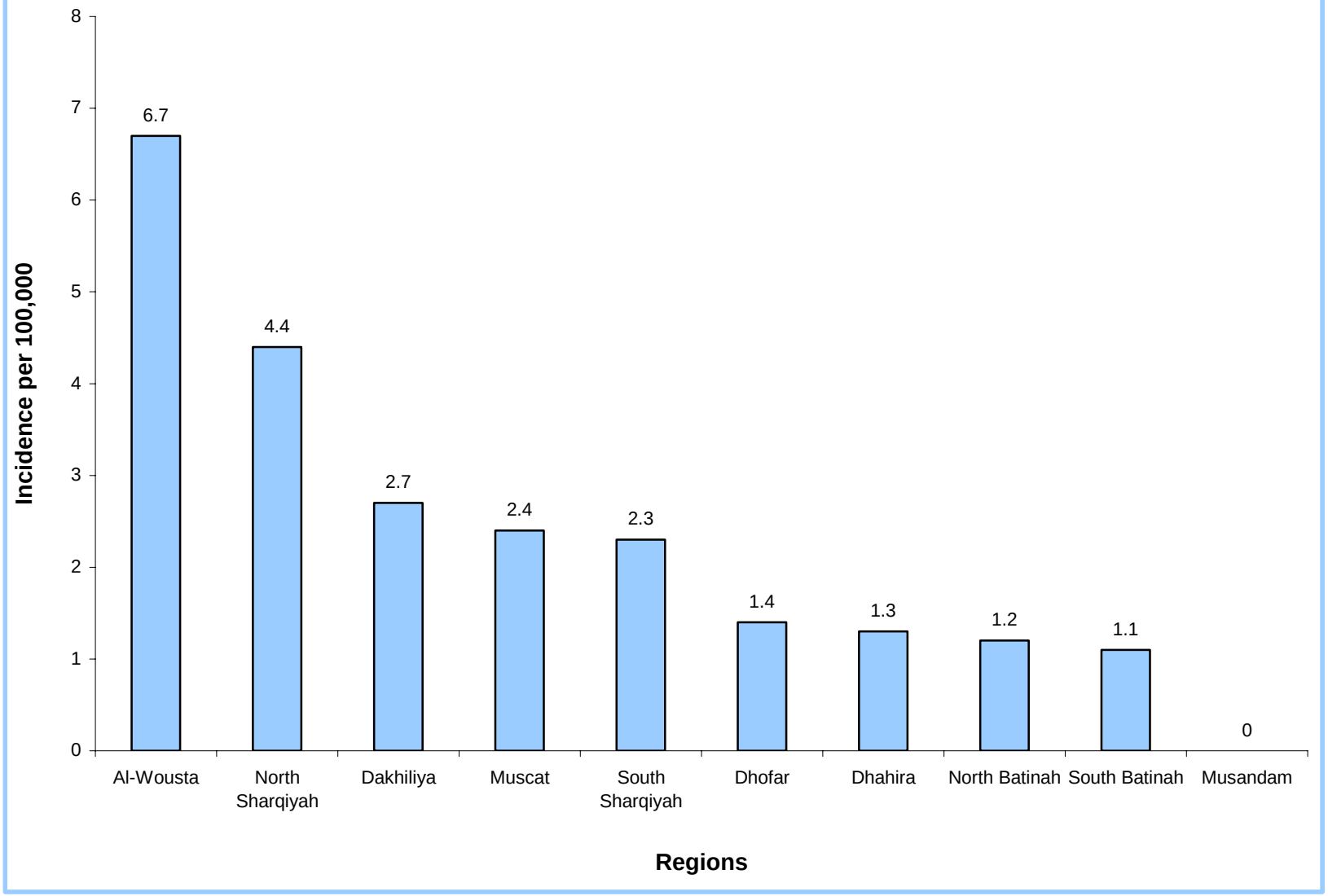
Sex	Frequency	Incidence/100,000
Female	9	1.1
Male	24	2.9
Total	33	

Table 34: Histology Of Malignancies Of The Urinary Bladder

ICD-O Code	Histology	Percentage (%)
80003	Malignant Neoplasm	3.0
81203	Transitional cell carcinoma (NOS)*	54.5
80103	Carcinoma (NOS)*	6.1
80703	Squamous cell carcinoma (NOS)*	12.1
81403	Adenocarcinoma (NOS)*	12.1
82603	Papillary adenocarcinoma	3.0
81303	Papillary transitional cell carcinoma	9.1

*(NOS), Not otherwise specified

Figure 9: Incidence of Cancers of the Urinary Bladder by Region



Carcinoma Of The Prostate

Carcinoma of the prostate was the second commonest cancer among Omani males, with 48 cases being reported in 1997. The highest incidence rate was seen in Dhofar (9.8 per 100,000) followed by Muscat (7.5 per 100,000) and Dhahira (6.5 per 100,000). The Regional distribution, and the histology of the cancer cases reported are presented in Tables 35 & 36 respectively.

Table 35: Regional Distribution Of Carcinoma Of The Prostate

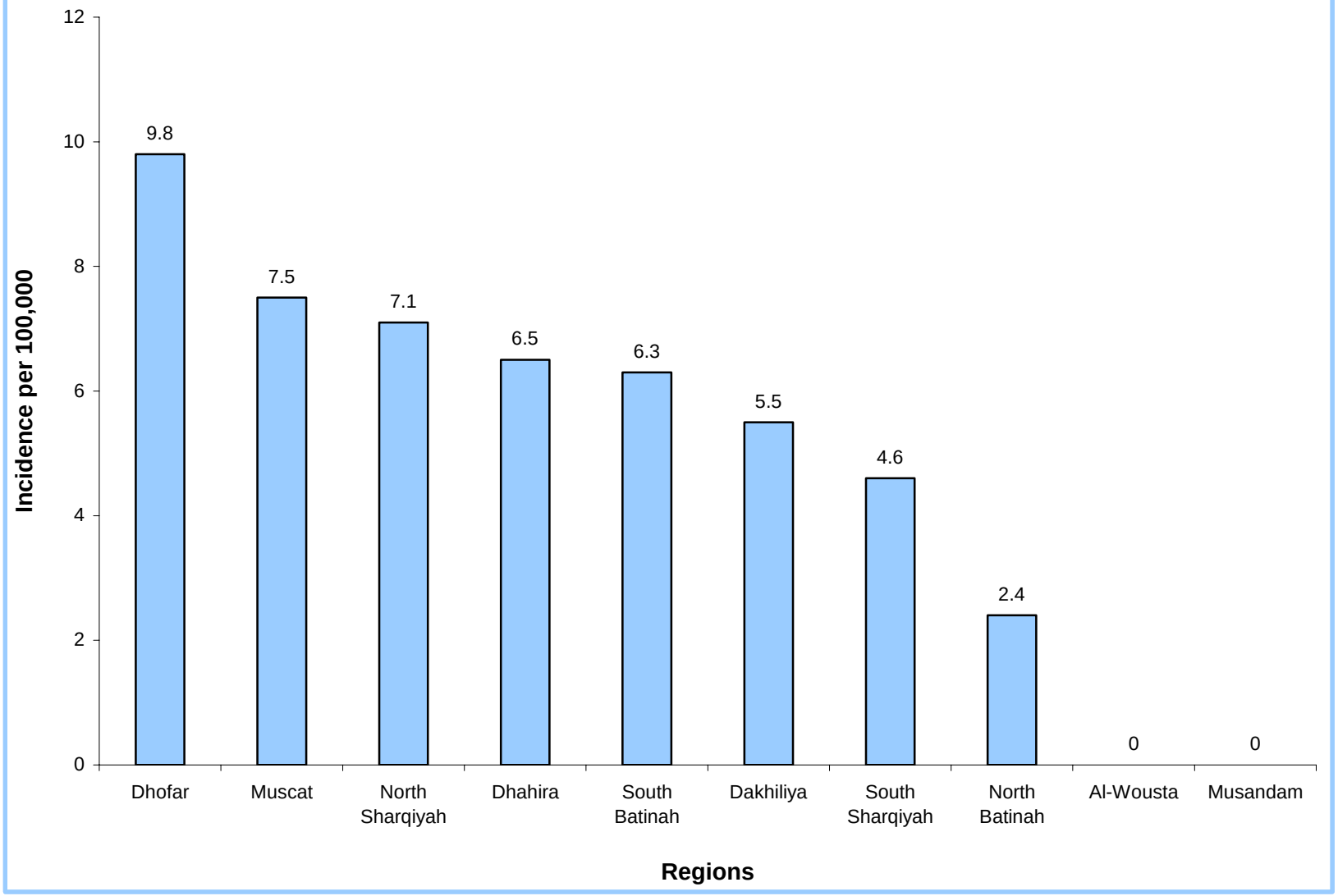
Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	6	5.5
Dhahira	5	6.5
Dhofar	7	9.8
Musandam	0	0.0
Muscat	13	7.5
North Batinah	4	2.4
North Sharqiyah	4	7.1
South Batinah	6	6.3
South Sharqiyah	3	4.6
Total	48	

Table 36: Histology of carcinoma of the prostate

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	2.1
81403	Adenocarcinoma (NOS)*	91.7
80103	Carcinoma (NOS)*	6.3

*(NOS), Not otherwise specified

Figure 10: Incidence of Prostatic Carcinomas by Region



Skin Cancer

There were 42 cases of skin cancer in 1997. Among these 32 were males and 10 were females, with the male : female ratio being 3.2 : 1. Skin cancer was the 8th commonest cancer among the Omani population. The highest incidence rate was seen in South Sharqiyah (4.6 per 100,000) followed by Dakhiliyah (4.1 per 100,000) and Dhahira (4.0 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 37-39 respectively. Basal cell carcinomas constituted 50.0% of the skin tumours. Kaposis sarcoma constituted 2.4% and malignant melanomas 7.1%.

Table 37: Regional Distribution Of Skin Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	9	4.1
Dhahira	6	4.0
Dhofar	3	2.2
Musandam	0	0.0
Muscat	6	1.8
North Batinah	8	2.4
North Sharqiyah	3	2.7
South Batinah	1	0.5
South Sharqiyah	6	4.6
Total	42	

Table 38: Sex Distribution Of Skin Cancer

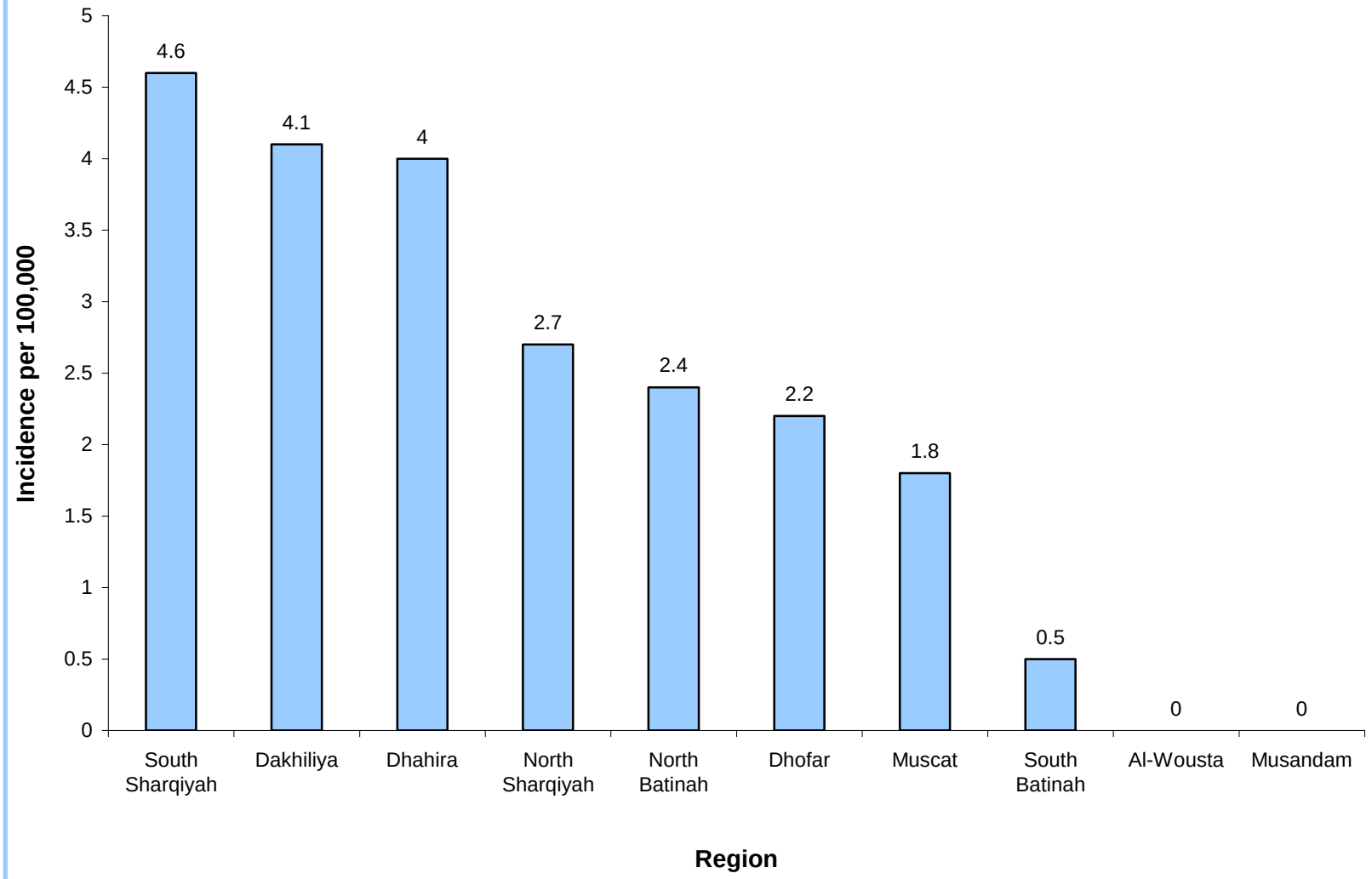
Sex	Frequency	Incidence/100,000
Female	10	1.2
Male	32	3.8
Total	42	

Table 39: Histology Of Skin Cancer

ICD-O Code	Histology	Percentage (%)
80043	Malignant tumour, fusiform cell type	2.4
80503	Papillary carcinoma	2.4
80903	Basal cell carcinoma (NOS)*	50.0
80703	Squamous cell carcinoma (NOS)*	16.7
88903	Leiomyosarcoma (NOS)*	2.4
91403	Kaposi's sarcoma	2.4
88323	Dermatofibrosarcoma	2.4
88940	Angiomyoma	2.4
83103	Clear cell adenocarcinoma	2.4
95903	Malignant Lymphoma	2.4
82473	Merkel cell carcinoma	2.4
87443	Acral lentiginous melanoma	2.4
87203	Malignant melanoma (NOS)*	7.1
97003	Mycosis fungoides	2.4

*(NOS), Not otherwise specified

Figure 11: Incidence of Skin Cancers by Region



Carcinoma Of The Colon

There were 23 cases of carcinoma of the colon in 1997. Of these 15 were males and 8 were females, with the male : female ratio being 1.9 : 1. Adenocarcinomas constituted the majority of these cancers. However, non-Hodgkin's lymphoma constituted 4.3%, and carcinoid tumour 4.3%. The highest incidence rate was seen in Dakhiliya (2.3 per 100,000) followed by Dhofar (2.2 per 100,000) and South Batinah (2.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 40 - 42.

Table 40: Regional Distribution Of Carcinoma Of The Colon

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	5	2.3
Dhahira	0	0.0
Dhofar	3	2.2
Musandam	0	0.0
Muscat	3	0.9
North Batinah	4	1.2
North Sharqiyah	2	1.8
South Batinah	4	2.1
South Sharqiyah	2	1.5
Total	23	

Table 41: Sex Distribution Of Carcinoma Of The Colon

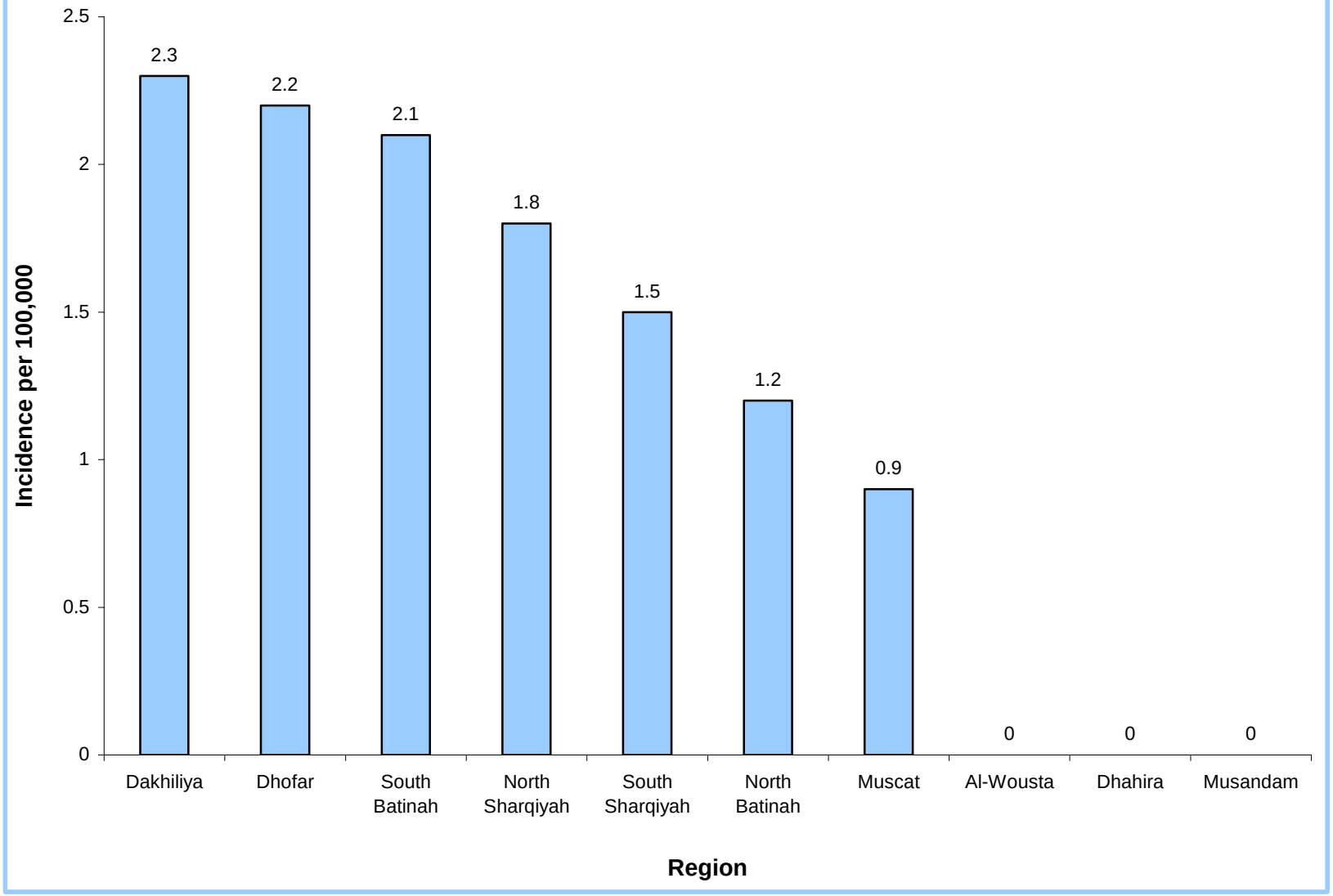
Sex	Frequency	Incidence/100,000
Female	8	1.0
Male	15	1.8
Total	23	

Table 42: Histology Of Carcinoma Of The Colon

ICD-OCode	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	69.1
82603	Papillary adenocarcinoma	13.0
82401	Carcinoid tumour NOS of appendix	4.3
84803	Mucinous adenocarcinoma	4.3
84813	Mucin-producing adenocarcinoma	4.3
95913	Malignant Lymphoma, non-Hodgkin's (NOS)*	4.3

*(NOS), Not otherwise specified

Figure 12: Incidence of Cancers of the Colon by Region



Carcinoma Of The Rectum and Anal Canal

There were 20 cases of carcinoma of the rectum and anal canal in 1997. Among these, 14 were males and 6 were females, with the male : female ratio being 2.3:1. Adenocarcinomas constituted the majority of these cancers. The highest incidence rate was seen in Dhahira (3.3 per 100,000) followed by Dakhiliya (1.8 per 100,000) and South Batinah (1.6 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 43 - 45 respectively.

Table 43: Regional Distribution Of Carcinoma Of The Rectum and Anal Canal

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	4	1.8
Dhahira	5	3.3
Dhofar	1	0.7
Musandam	0	0.0
Muscat	2	0.6
North Batinah	3	0.9
North Sharqiyah	1	0.9
South Batinah	3	1.6
South Sharqiyah	1	0.8
Total	20	

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

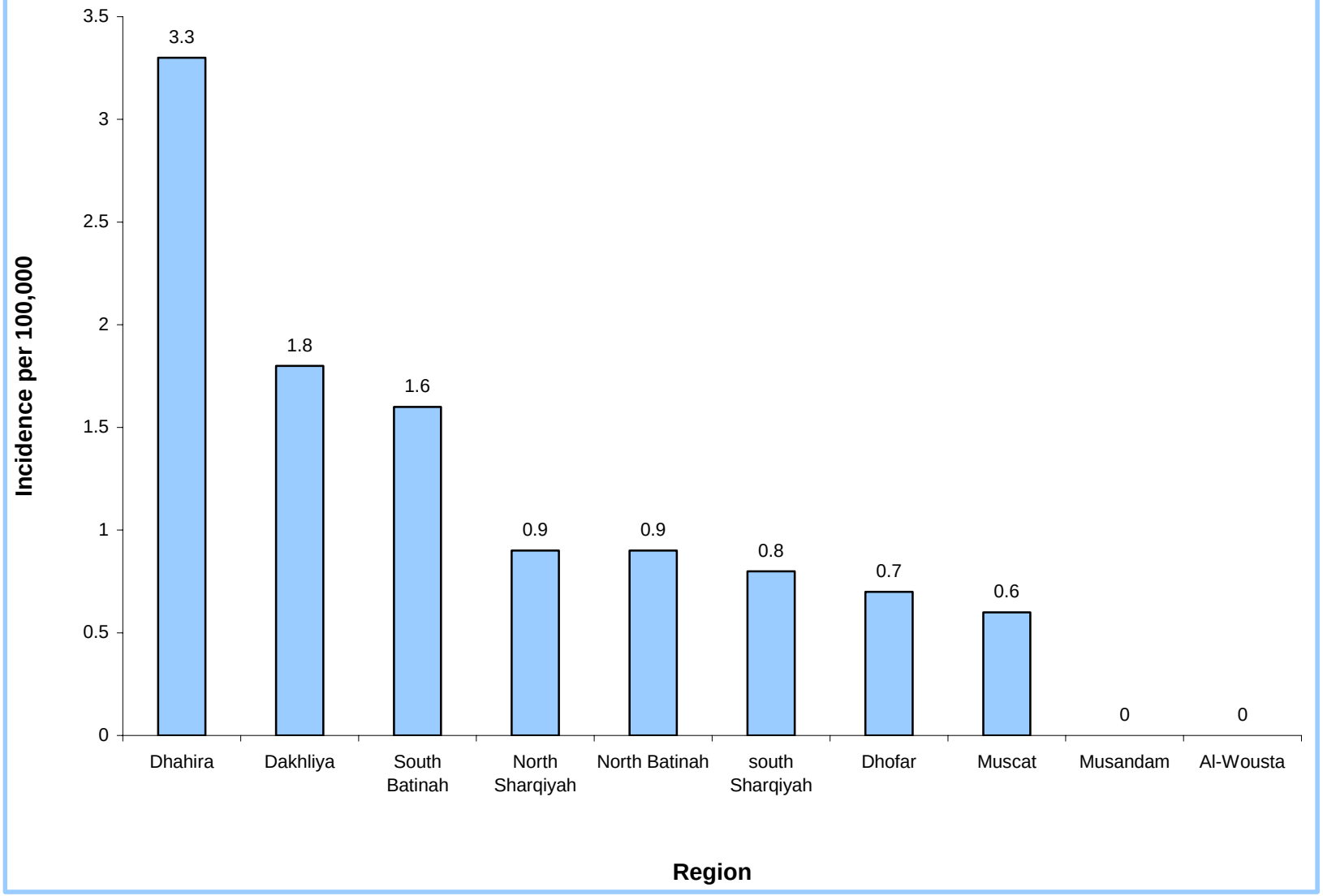
Sex	Frequency	Incidence/100,000
Female	6	0.7
Male	14	1.7
Total	20	

Table 45: Histology Of Carcinoma Of The Rectum and Anal Canal

ICD-OCode	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	65
82603	Papillary adenocarcinoma	10
80103	Carcinoma (NOS)*	20
84903	Signet ring cell carcinoma	5

*(NOS), Not otherwise specified

Figure 13: Incidence of Rectal & Anal Cancers by Region



Bone Cancer

There were 16 cases of bone cancer in 1997. Among these, there were 8 males and 8 females, with the male : female ratio being 1:1. Malignant Giant cell tumour constituted 25% and osteosarcoma 18.8% The highest incidence rate was seen in South Sharqiyah (2.3 per 100,000) followed by Dhahira (2.0 per 100,000) and Dhofar (1.4 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 46 - 48 respectively.

Table 46: Regional Distribution Of Bone Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	0	0.0
Dhahira	3	2.0
Dhofar	2	1.4
Musandam	0	0.0
Muscat	2	0.6
North Batinah	4	1.2
North Sharqiyah	0	0.0
South Batinah	2	1.1
South Sharqiyah	3	2.3
Total	16	

Table 47: Sex Distribution Of Bone Cancer

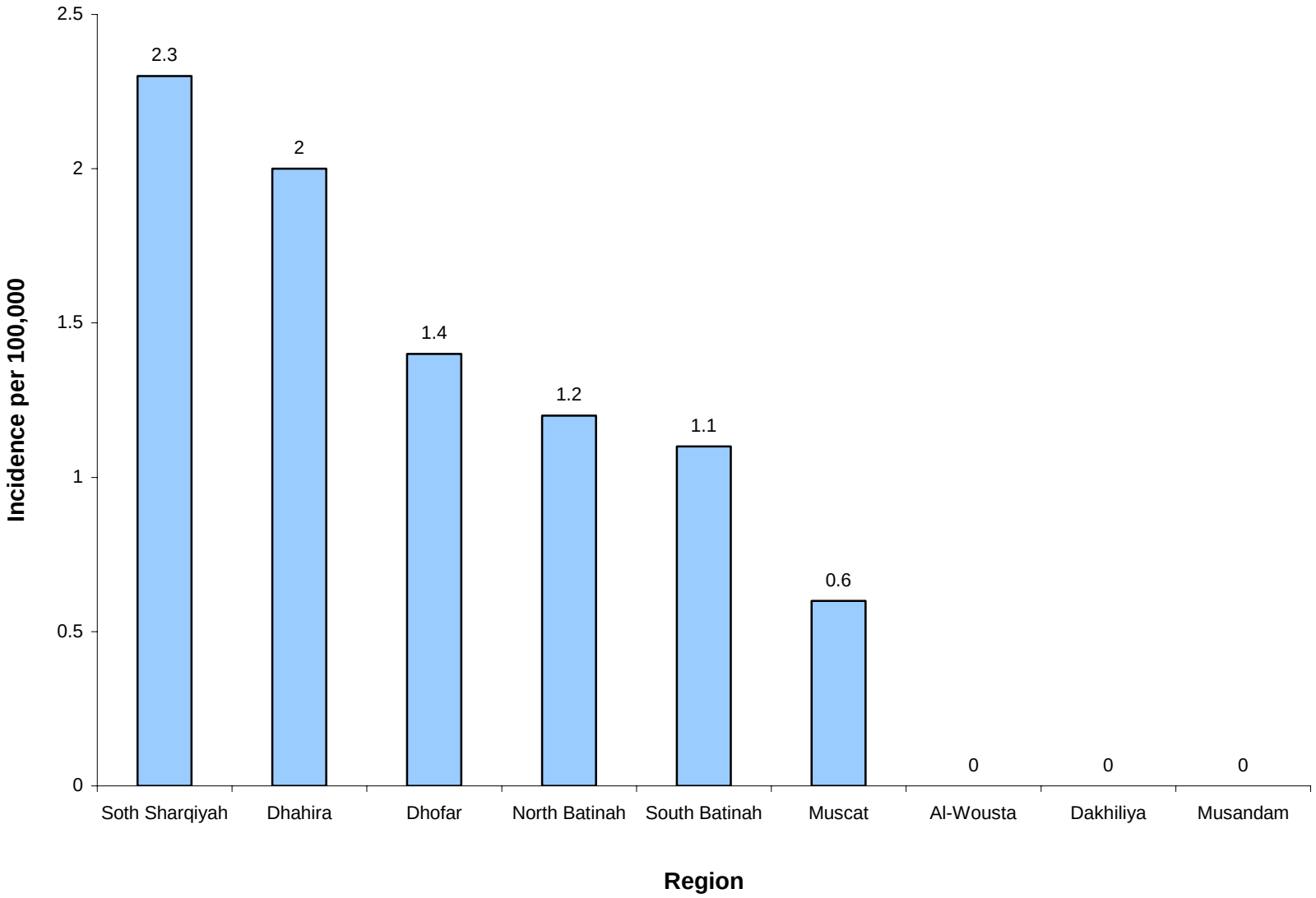
Sex	Frequency	Incidence/100,000
Female	8	1.0
Male	8	1.0
Total	16	

Table 48: Histology Of Bone Cancer

ICD-OCode	Histology	Percentage (%)
92503	Giant Cell tumour of bone , malignant	25.0
91803	Osteosarcoma	18.8
92203	Chondrosarcoma	12.5
92603	Ewing's sarcoma	12.5
80003	Neoplasm, malignant (NOS)*	12.5
92703	Odentogenic tumour, malignant	6.3
93103	Ameloblastoma, malignant	6.3
93300	Ameloblastic fibroma	6.3

*(NOS), Not otherwise specified

Figure 14: Incidence of Bone Cancers by Region



Carcinoma Of The Thyroid

There were 40 cases of carcinoma of the thyroid in 1997. Among these there were 31 females and 9 males, with the male : female ratio being 1 : 3.4. Carcinoma of the thyroid formed the 3rd commonest tumour among Omani women. The highest incidence rate was seen in Musandam (12.1 per 100,000) followed by Dhofar (4.3 per 100,000) and Muscat (2.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 49 - 51 respectively. The commonest thyroid neoplasm was papillary carcinoma which constituted 47.5% followed by follicular carcinoma which constituted 32%. Medullary carcinoma of the thyroid constituted 2.5%.

Table 49: Regional Distribution Of Thyroid Cancers

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	3	1.4
Dhahira	3	2.0
Dhofar	6	4.3
Musandam	3	12.1
Muscat	9	2.7
North Batinah	7	2.1
North Sharqiyah	1	0.9
South Batinah	6	3.2
South Sharqiyah	1	0.8
Unknown	1	
Total	40	

Table 50: Sex Distribution Of Thyroid Cancers

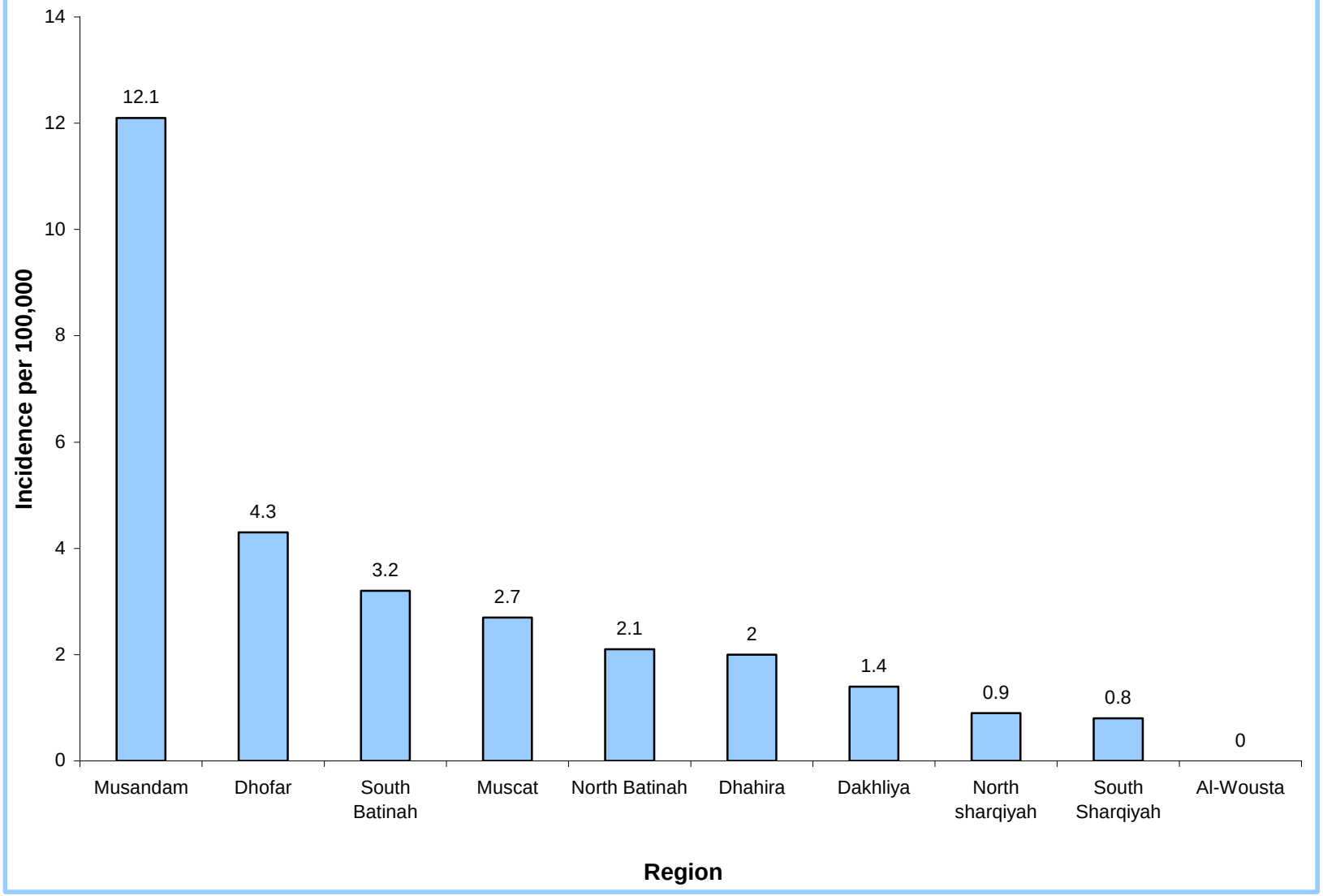
Sex	Frequency	Incidence/100,000
Female	31	3.8
Male	9	1.1
Total	40	

Table 51: Histology Of Thyroid Cancers

ICD-O Code	Histology	Percentage (%)
80503	Papillary carcinoma (NOS)*	47.5
83303	Follicular adenocarcinoma (NOS)*	32.5
83403	Papillary carcinoma follicular variant	10.0
80103	Carcinoma (NOS)*	2.5
82903	Oxyphilic adenocarcinoma	5.0
85103	Medullary Carcinoma	2.5

*(NOS), Not otherwise specified

Figure 15: Incidence of Thyroid Cancers by Region



Leukemia

There were 64 cases of leukemia in 1997. Among these, 45 were males and 19 were females, with the male : female ratio being 2.4 : 1. Leukemias formed the second commonest cancer in children below 12 years. The highest incidence rate was seen in Muscat (5.1 per 100,000) followed by Dakhiliya (5.0 per 100,000) Dhahira and South Batinah (4.7 per 100,000). The regional distribution, sex distribution and the histology of the cases reported are presented in Tables 52 - 54 respectively.

Table 52: Regional Distribution Of Leukemia

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	11	5.0
Dhahira	7	4.7
Dhofar	3	2.2
Musandam	1	4.0
Muscat	17	5.1
North Batinah	8	2.4
North Sharqiyah	3	2.7
South Batinah	9	4.7
South Sharqiyah	4	3.1
Unknown	1	
Total	64	

Table 53: Sex Distribution Of Leukemia

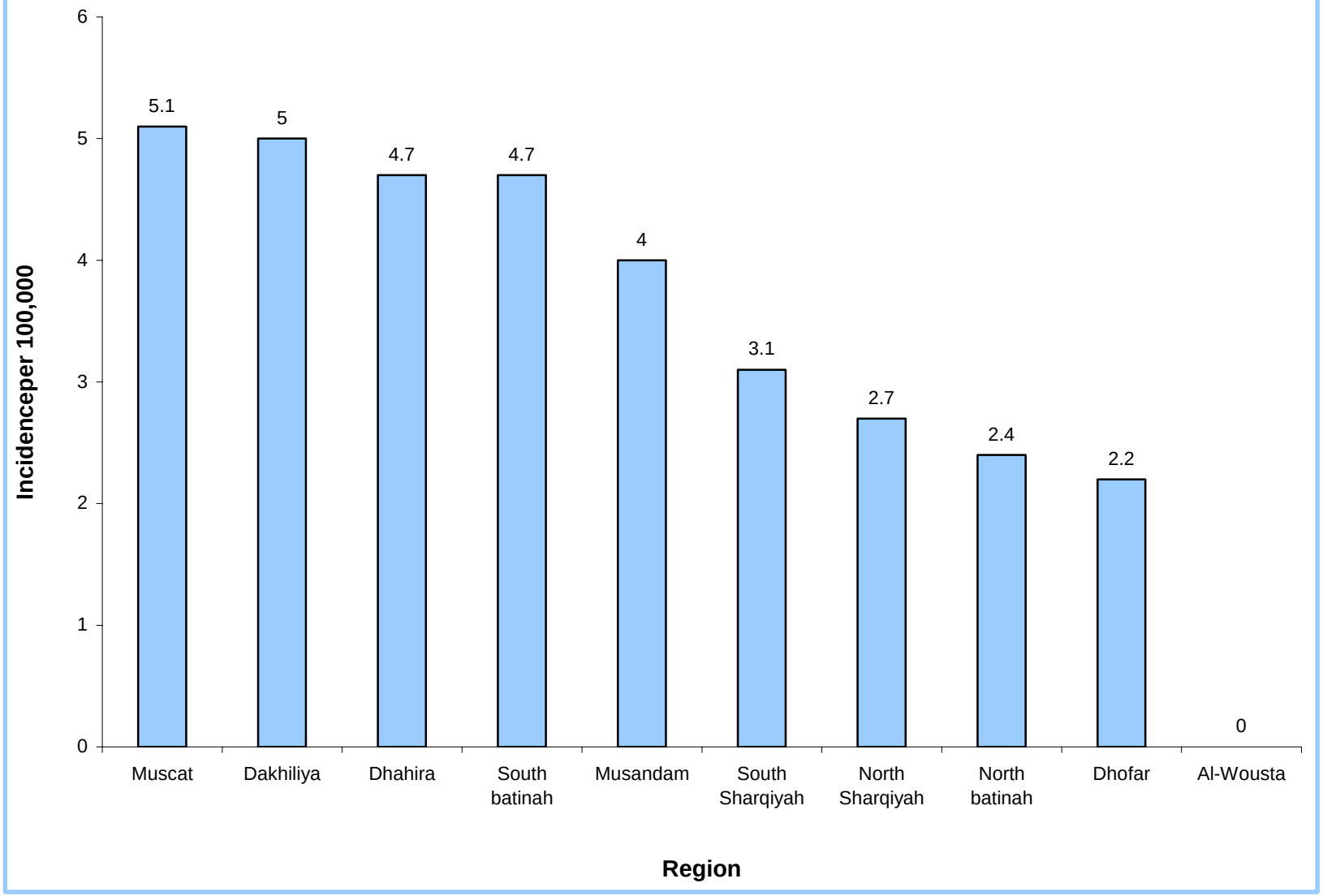
Sex	Frequency	Incidence/100,000
Female	19	2.4
Male	45	5.4
Total	64	

Table 54: Types Of Leukemia

ICD-O Code	Histology	Percentage (%)
98213	Acute lymphoblastic leukemia (NOS)*	25.0
98003	Leukemia (NOS)*	6.3
97323	Multiple myeloma	28.1
98613	Acute myeloid	10.9
97313	Plasmacytoma (NOS)*	1.6
95903	Malignant lymphoma (NOS)*	4.7
98273	Adult T-cell leukemia	1.6
98233	Chronic lymphocytic leukemia	4.7
98633	Chronic myeloid	7.8

*(NOS), Not otherwise specified

Figure 16: Incidence of Leukemias by Region



Tumors of Brain and Spinal Cord

There were 39 cases of brain and spinal cord tumours in 1997. They formed the 4th commonest tumour in children below the age of 12 years, and ranked as the 4th commonest tumour in boys and the 3rd commonest tumour in girls. Glioblastomas constituted 23.1% and Meningiomas constituted 17.7%. The highest incidence rate was seen in South Sharqiyah (3.9 per 100,000) followed by South Batinah (3.2 per 100,000) and Dhahira (2.0 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Table 55 - 57 respectively.

Table 55: Regional Distribution Of Brain & Spinal Cord Tumors

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	4	1.8
Dhahira	3	2.0
Dhofar	1	0.7
Musandam	0	0.0
Muscat	8	2.4
North Batinah	6	1.8
North Sharqiyah	2	1.8
South Batinah	6	3.2
South Sharqiyah	5	3.9
Unknown	4	
Total	39	

Table 56: Sex Distribution Of Brain & Spinal Cord Tumors

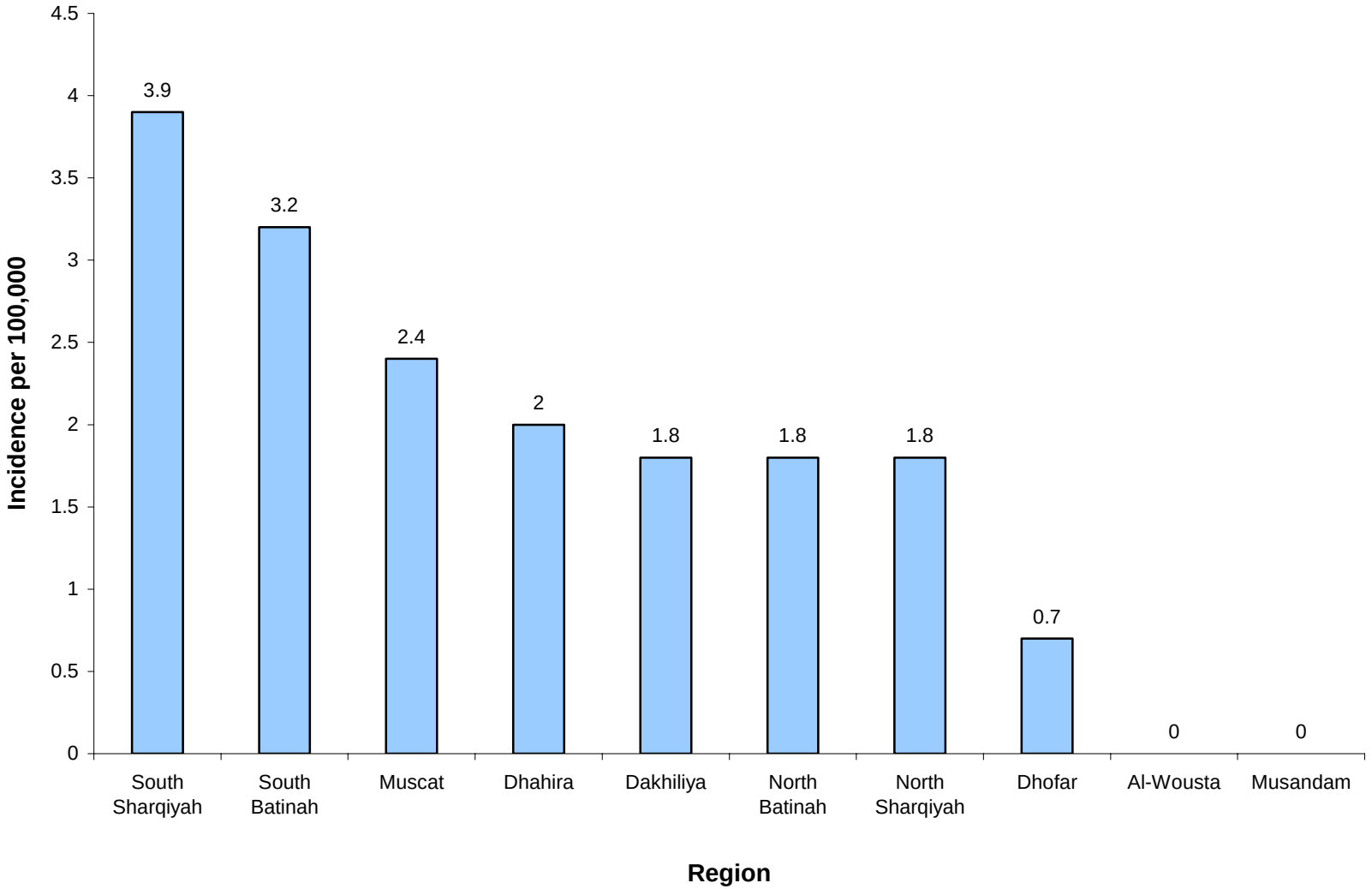
Sex	Frequency	Incidence/100,000
Female	16	1.9
Male	23	2.7
Total	39	

Table 57: Histology Of Brain & Spinal Cord Tumors

ICD-O Code	Histology	Percentage (%)
80003	Malignant Neoplasm	10.3
94703	Medulloblastoma (NOS)*	10.3
93803	Glioma, malignant	7.7
94003	Astrocytoma (NOS)*	15.4
95003	Neuroblastoma (NOS)*	2.6
94403	Glioblastoma (NOS)*	23.1
95350	Haemangioblastic Meningioma	2.6
95370	Transitional meningioma	2.6
95913	Malignant Lymphoma NHL† (NOS)*	2.6
95303	Meningioma, malignant	17.7
93913	Ependymoma (NOS)*	5.1

†NHL, Non-Hodgkin's Lymphoma
*(NOS), Not otherwise specified

FIgure 17: Incidence of Tumours of Brain & Spinal Cord by Region



Carcinoma Of The Cervix

There were 28 cases of cervical carcinoma in 1997. Carcinoma of the cervix formed the fourth commonest cancer among Omani females. The highest incidence rate was seen in Dhofar (7.4 per 100,000) followed by Muscat (5.7 per 100,000) and South Batinah (4.2 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 58 & 59 respectively.

Table 58: Regional Distribution Of Carcinoma Of The Cervix

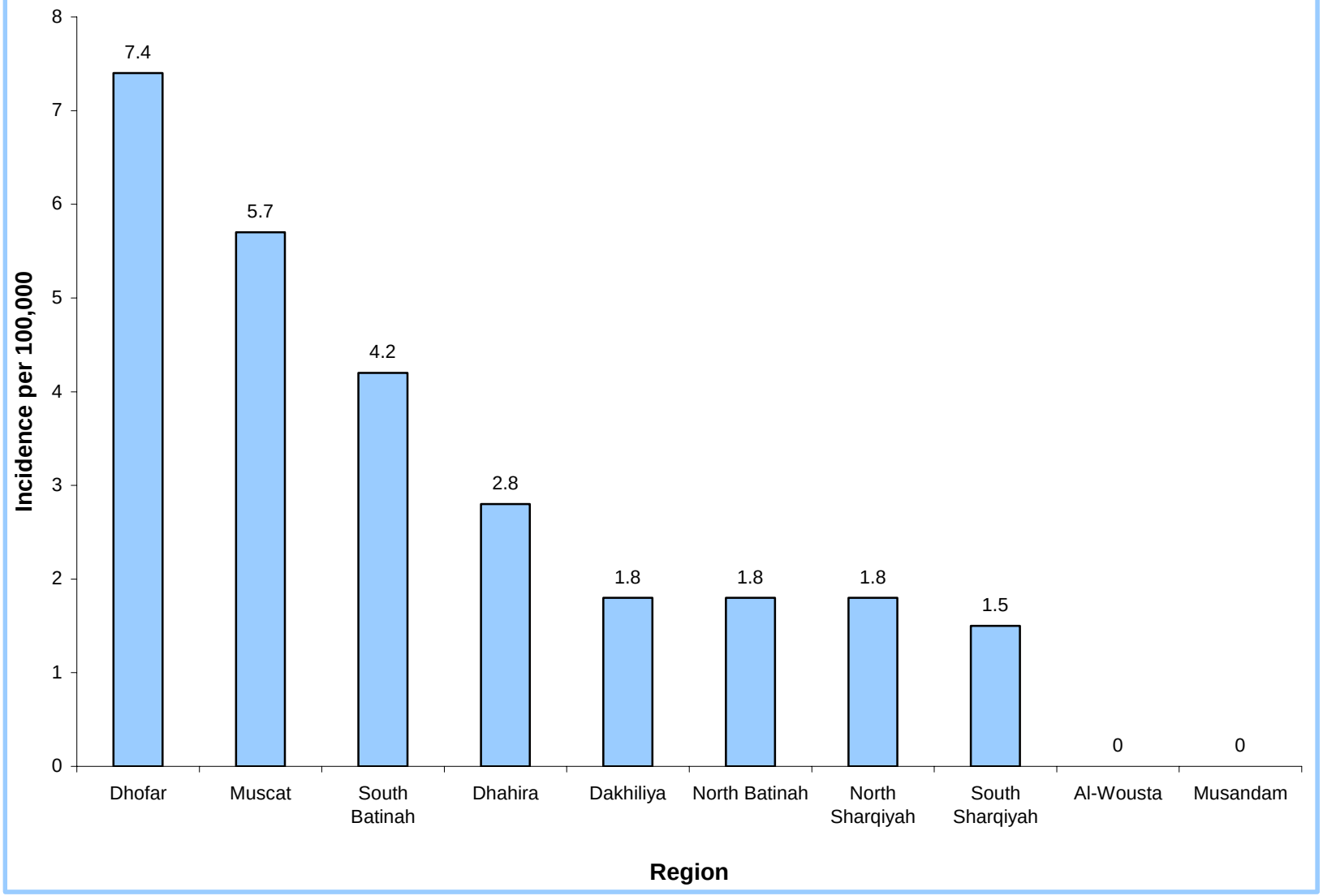
Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	2	1.8
Dhahira	2	2.8
Dhofar	5	7.4
Musandam	0	0.0
Muscat	9	5.7
North Batinah	3	1.8
North Sharqiyah	1	1.8
South Batinah	4	4.2
South Sharqiyah	1	1.5
Unknown		
Total	28	

Table 59: Histology Of Carcinoma Of The Cervix

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	14.3
80323	Spindle cell carcinoma	7.1
80703	Squamous cell carcinoma (NOS)*	50.0
80713	Squamous cell carcinoma keratinizing (NOS)*	3.6
80723	Squamous cell carcinoma, large cell, nonkeratinizing	7.1
80772	Intraepithelial neoplasia, grade III, of cervix	3.6
81403	Adenocarcinoma (NOS)*	7.1
82603	Papillary adenocarcinoma (NOS)*	3.6
85603	Adenosquamous carcinoma	3.6

*(NOS), Not otherwise specified

Figure 18: Incidence of Cervical Cancers by Region



Liver Cancers

There were 35 cases of liver cancer in 1997. Among these, 20 were males and 15 were females, giving the male : female ratio of 1.3:1. Hepatocellular carcinoma was the commonest cancer and constituted 57%. The highest incidence rate was seen in North Sharqiyah (4.4 per 100,000) followed by South Batinah (4.2 per 100,000) and Dhofar (3.6 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 60 - 62 respectively.

Table 60: Regional Distribution Of Liver Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	0	0
Dhahira	5	3.3
Dhofar	5	3.6
Musandam	0	0
Muscat	5	1.5
North Batinah	5	1.5
North Sharqiyah	5	4.4
South Batinah	8	4.2
South Sharqiyah	2	1.5
Unknown		
Total	35	

Table 61: Sex Distribution Of Liver Cancer

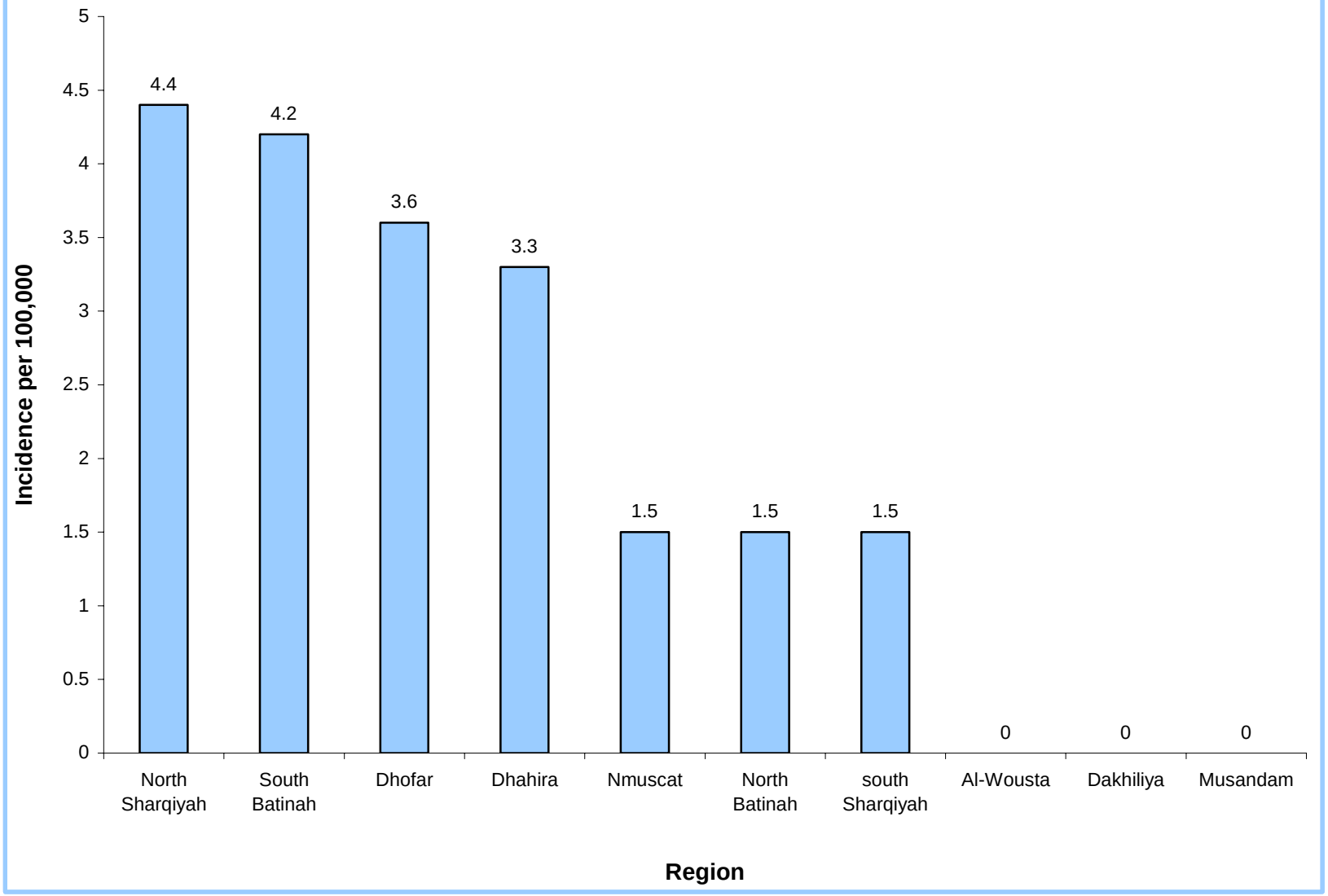
Sex	Frequency	Incidence/100,000
Female	15	1.9
Male	20	2.4
Total	35	

Table 62: Histology Of Liver Cancer

ICD-O Code	Histology	Percentage (%)
80006	†Metastatic neoplasms	2.9
80103	Carcinoma (NOS)*	5.7
81403	Adenocarcinoma (NOS)*	5.7
81603	Cholangiocarcinoma	11.4
81703	Hepatocellular carcinoma (NOS)*	57.1
91333	Epithelioid hemangioendothelioma (NOS)*	2.9
95913	Malignant lymphoma, non-Hodgkin's (NOS)*	8.6
96503	Hodgkin's disease (NOS)*	2.9
96633	Hodgkin's disease, nodular sclerosis (NOS)*	2.9

† These are metastatic tumors where the primary site have not been reported
*(NOS), Not otherwise specified

Figure 19: Incidence of Liver Cancers by Region



Carcinoma Of The Esophagus

There were 19 cases of carcinoma of the esophagus in 1997. Among these there were 12 males and 7 females, with the male : female ratio being 1.7 : 1. The highest incidence rate was seen in Musandam (8.1 per 100,000) followed by South Batinah (1.6 per 100,000) and Dhofar (1.4 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 63 - 65 respectively. The majority of cancers were squamous cell carcinoma (78.9%). Adenocarcinomas constituted 10.5%.

Table 63: Regional Distribution Of Carcinoma Of The Esophagus

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	2	0.9
Dhahira	1	0.7
Dhofar	2	1.4
Musandam	2	8.1
Muscat	2	0.6
North Batinah	5	1.5
North Sharqiyah	0	0.0
South Batinah	3	1.6
South Sharqiyah	1	0.8
Unknown	1	
Total	19	

Table 64: Sex Distribution Of Carcinoma Of The Esophagus

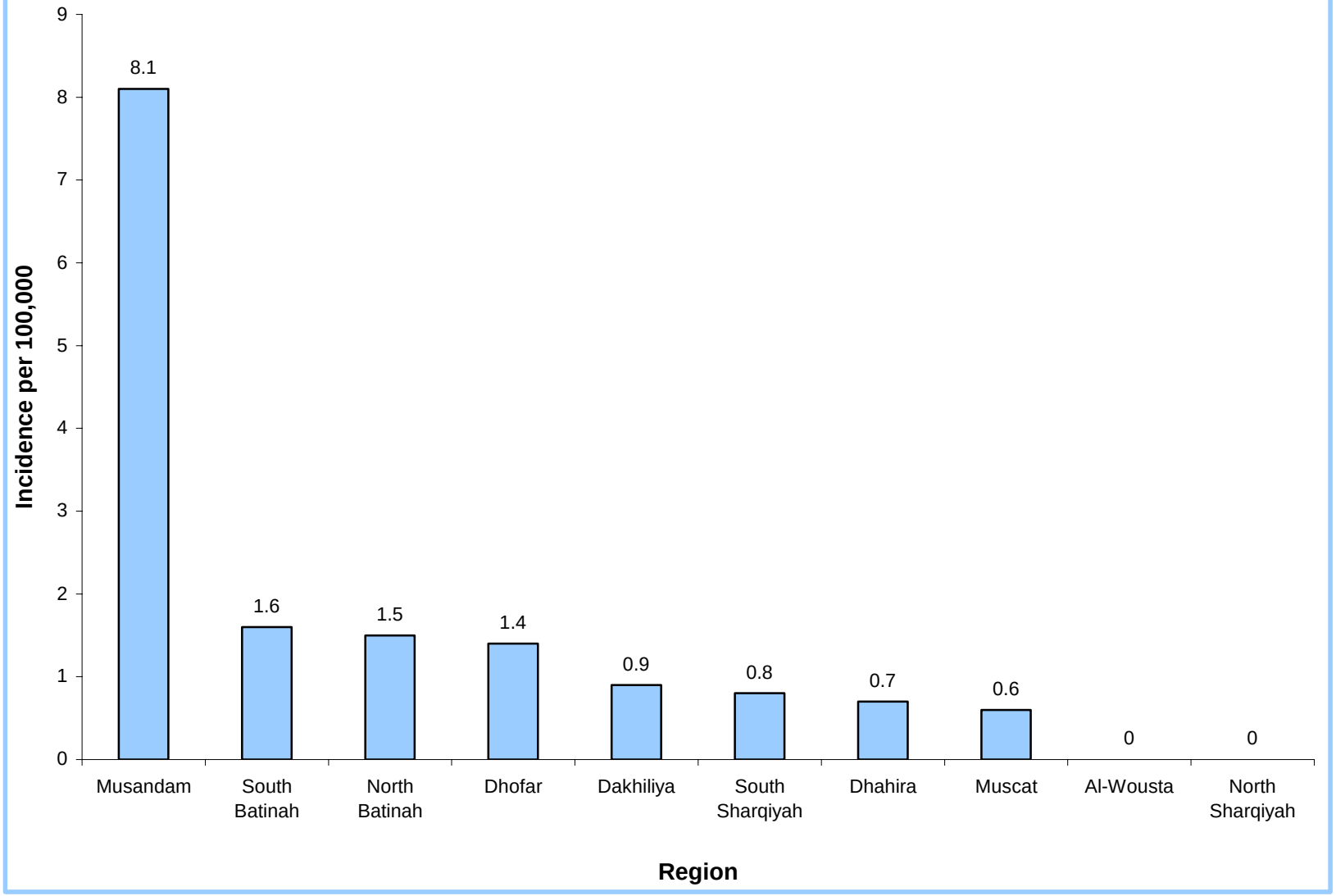
Sex	Frequency	Incidence/100,000
Female	9	1.1
Male	12	1.4
Total	10	

Table 65: Histology Of Carcinoma Of The Esophagus

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	10.5
80703	Squamous cell carcinoma (NOS)*	78.9
81403	Adenocarcinoma (NOS)*	10.5

*(NOS), Not otherwise specified

Figure 20: Incidence of Esophageal Cancers by Region



Carcinoma Of The Kidney & Ureter

There were 13 cases of kidney & ureter cancers in 1997. Among these there were 7 females and 6 males with the male : female ratio being 1:1.2. Renal cell carcinoma constituted 46.2% and transitional cell carcinomas 15.4 %. The highest incidence rate was seen in South Sharqiyah (1.5 per 100,000) followed by Dhahira (1.3 per 100,000) and South Batinah (1.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 66 - 68 respectively.

Table 66: Regional Distribution Of Carcinoma Of The Kidney & Ureter

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	2	0.9
Dhahira	2	1.3
Dhofar	1	0.7
Musandam	0	0.0
Muscat	0	0.0
North Batinah	3	0.9
North Sharqiyah	1	0.9
South Batinah	2	1.1
South Sharqiyah	2	1.5
Unknown		
Total	13	

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

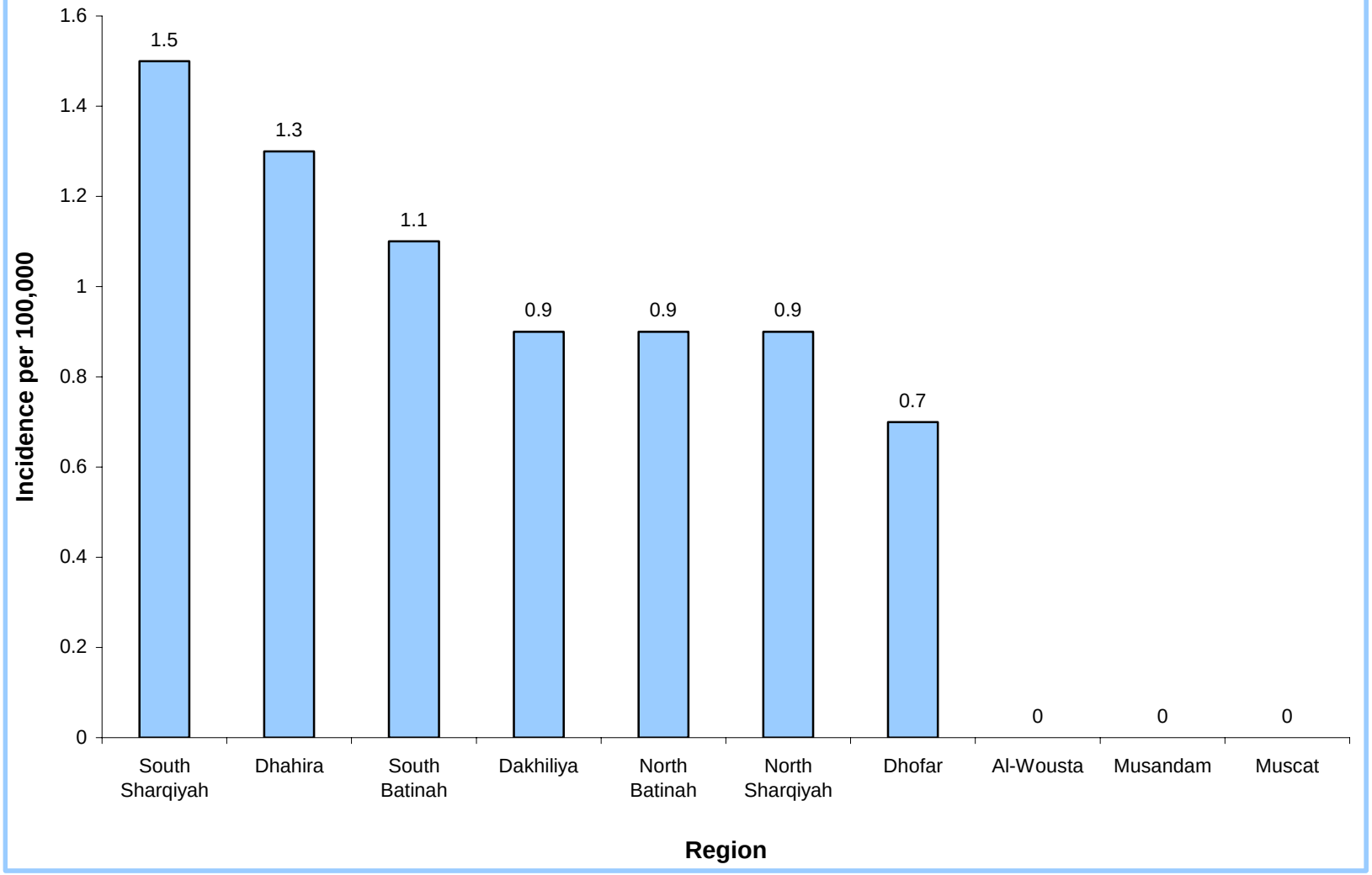
Sex	Frequency	Incidence/100,000
Female	7	0.9
Male	6	0.7
Total	13	

Table 68: Histology Of Carcinoma Of The Kidney & Ureter

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	7.7
80103	Carcinoma (NOS)*	7.7
81203	Transitional cell carcinoma (NOS)*	15.4
81303	Papillary transitional cell carcinoma	7.7
83103	Clear cell adenocarcinoma (NOS)*	7.7
83123	Renal cell carcinoma	46.2
89603	Nephroblastoma (NOS)*	7.7

*(NOS), Not otherwise specified

Figure 21: Incidence of Kidney & Ureter Cancers by Region



Carcinoma Of The Pancreas

There were 12 cases of pancreatic cancers in 1997. Of these, 9 were in males and 3 in females, with the male : female ratio being 3 : 1. The highest incidence rate was seen in Dakhiliya (1.4 per 100,000) followed by Dhahira (1.3 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 69 - 71 respectively.

Table 69: Regional Distribution Of Carcinoma Of The Pancreas

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	3	1.4
Dhahira	2	1.3
Dhofar	1	0.7
Musandam	0	0.0
Muscat	2	0.6
North Batinah	2	0.6
North Sharqiyah	0	0.0
South Batinah	2	1.1
South Sharqiyah	0	0.0
Unknown		
Total	12	

Table 70: Sex Distribution Of Carcinoma Of The Pancreas

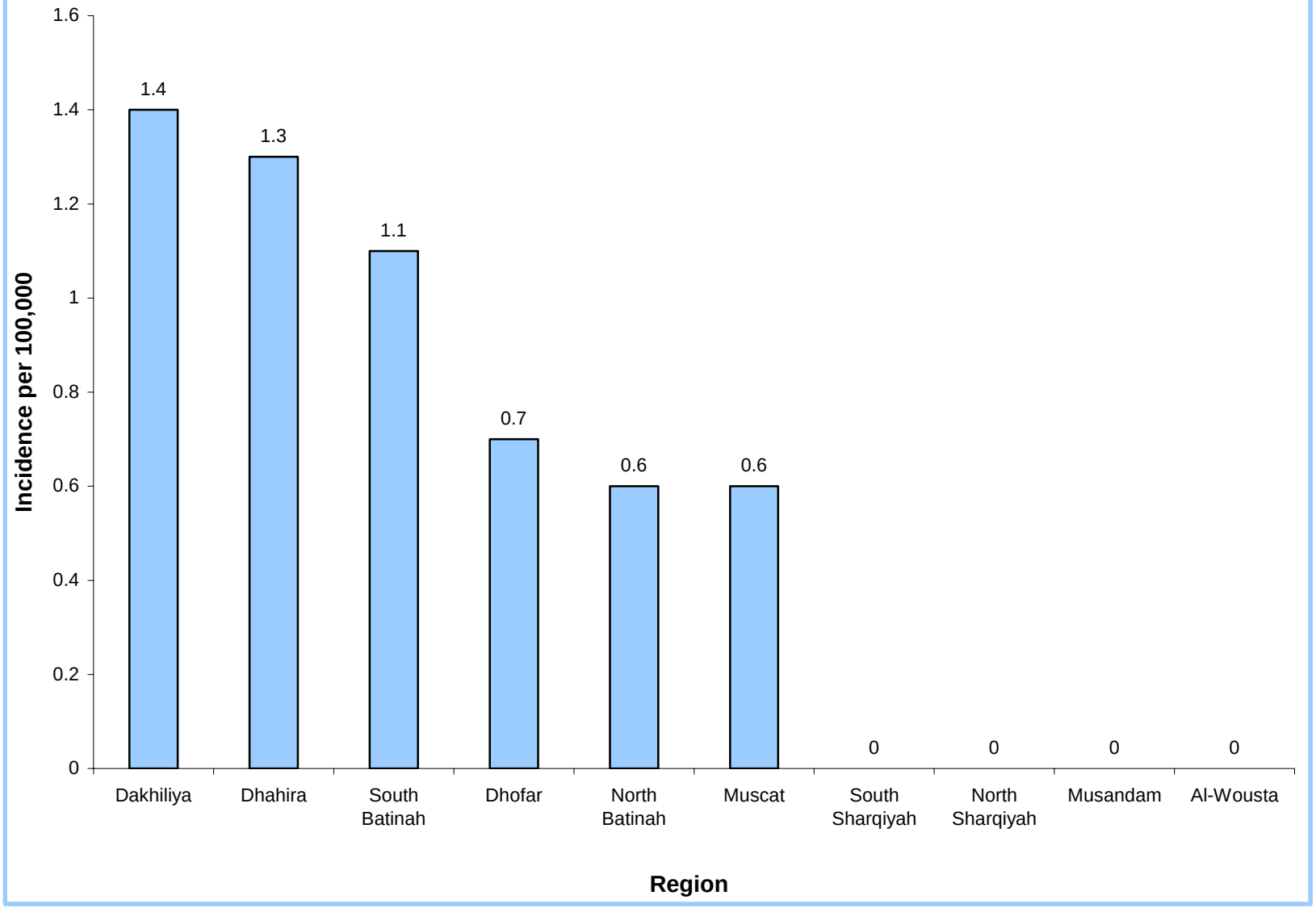
Sex	Frequency	Incidence/100,000
Female	3	0.4
Male	9	1.1
Total	12	

Table 71: Histology Of Carcinoma Of The Pancreas

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	8.3
80103	Carcinoma (NOS)*	25.0
81403	Adenocarcinoma (NOS)*	66.7

*(NOS), Not otherwise specified

Figure 22: Incidence of Pancreatic Cancers by Region



Ovarian Cancer

There were 15 cases of ovarian cancers in 1997. These constituted the 9th commonest cancer among Omani females. The highest incidence rate was seen in Dhofar (5.9 per 100,000) followed by Muscat (2.5 per 100,0000) and South Sharqiyah (1.5 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 72 & 73 respectively.

Table 72: Regional Distribution Of Ovarian Cancer

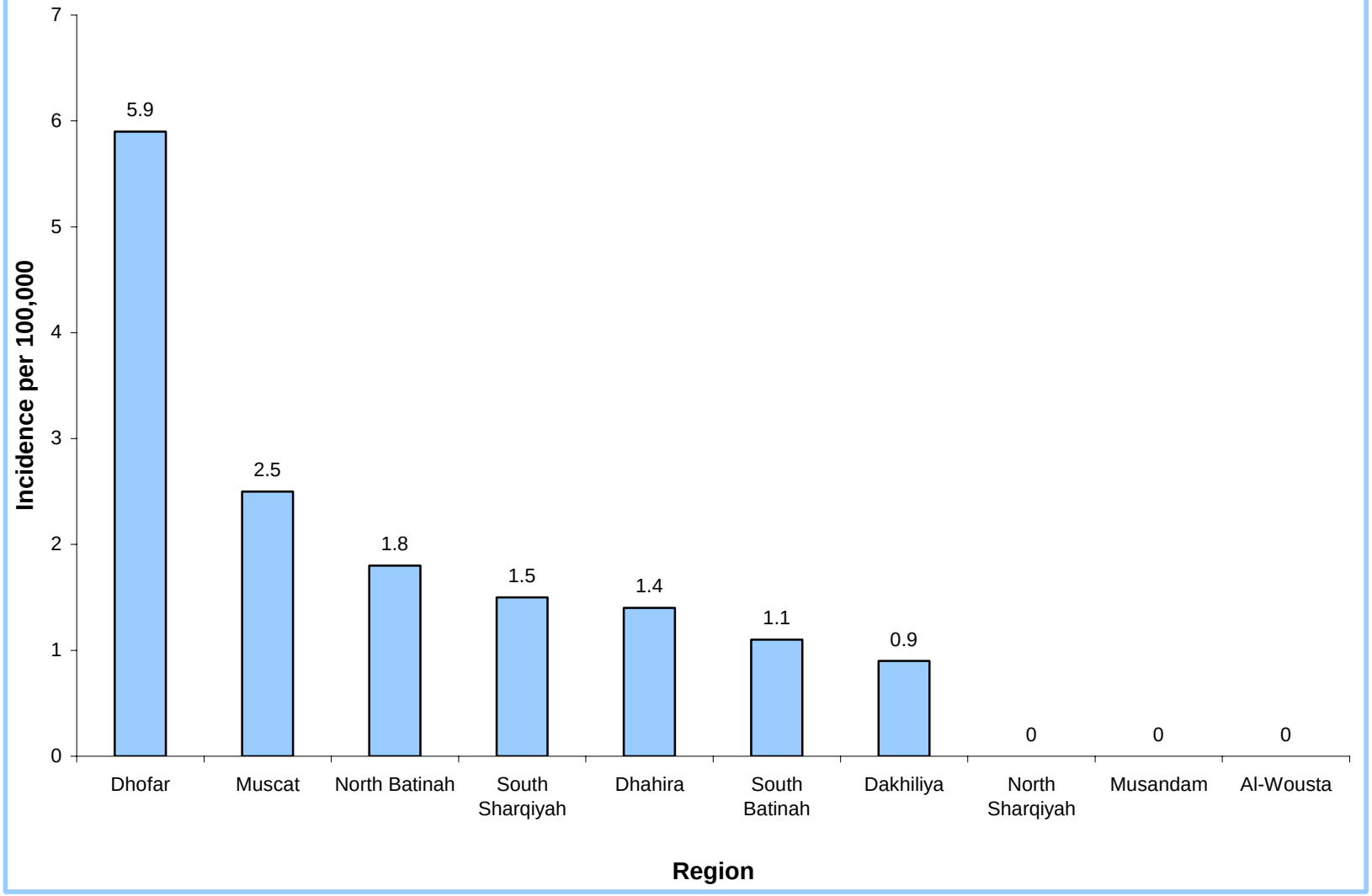
Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	1	0.9
Dhahira	1	1.4
Dhofar	4	5.9
Musandam	0	0.0
Muscat	4	2.5
North Batinah	3	1.8
North Sharqiyah	0	0.0
South Batinah	1	1.1
South Sharqiyah	1	1.5
Unknown		
Total	15	

Table 73: Histology Of Ovarian Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	26.7
80103	Carcinoma (NOS)*	13.3
80703	Squamous cell carcinoma (NOS)*	6.7
81403	Adenocarcinoma (NOS)*	6.7
82603	Papillary adenocarcinoma (NOS)*	6.7
83803	Endometrioid carcinoma	6.7
84703	Mucinous cystadenocarcinoma (NOS)*	6.7
90603	Dysgerminoma	6.7
90713	Endodermal sinus tumour	6.7
90803	Teratoma, malignant (NOS)*	13.3

*(NOS), Not otherwise specified

Figure 23: Incidence of Ovarian Cancers by Region



Carcinoma Of The Larynx & Trachea

There were 7 cases of carcinoma of the larynx and trachea in 1997. Six cases among males and one among females, constituting a male : female ratio being 6 : 1. The highest incidence rate was seen in Muscat (0.9 per 100,000) followed by Dhahira (0.7 per 100,000) and North Batinah (0.7 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 74 - 76 respectively. Squamous cell carcinoma was the commonest malignancy constituting 71.4% of the tumours.

Table 74: Regional Distribution Of Carcinoma Of The Larynx & Trachea

Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	1	0.5
Dhahira	1	0.7
Dhofar	0	0.0
Musandam	0	0.0
Muscat	3	0.9
North Batinah	2	0.6
North Sharqiyah	0	0.0
South Batinah	0	0.0
South Sharqiyah	0	0.0
Total	7	

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

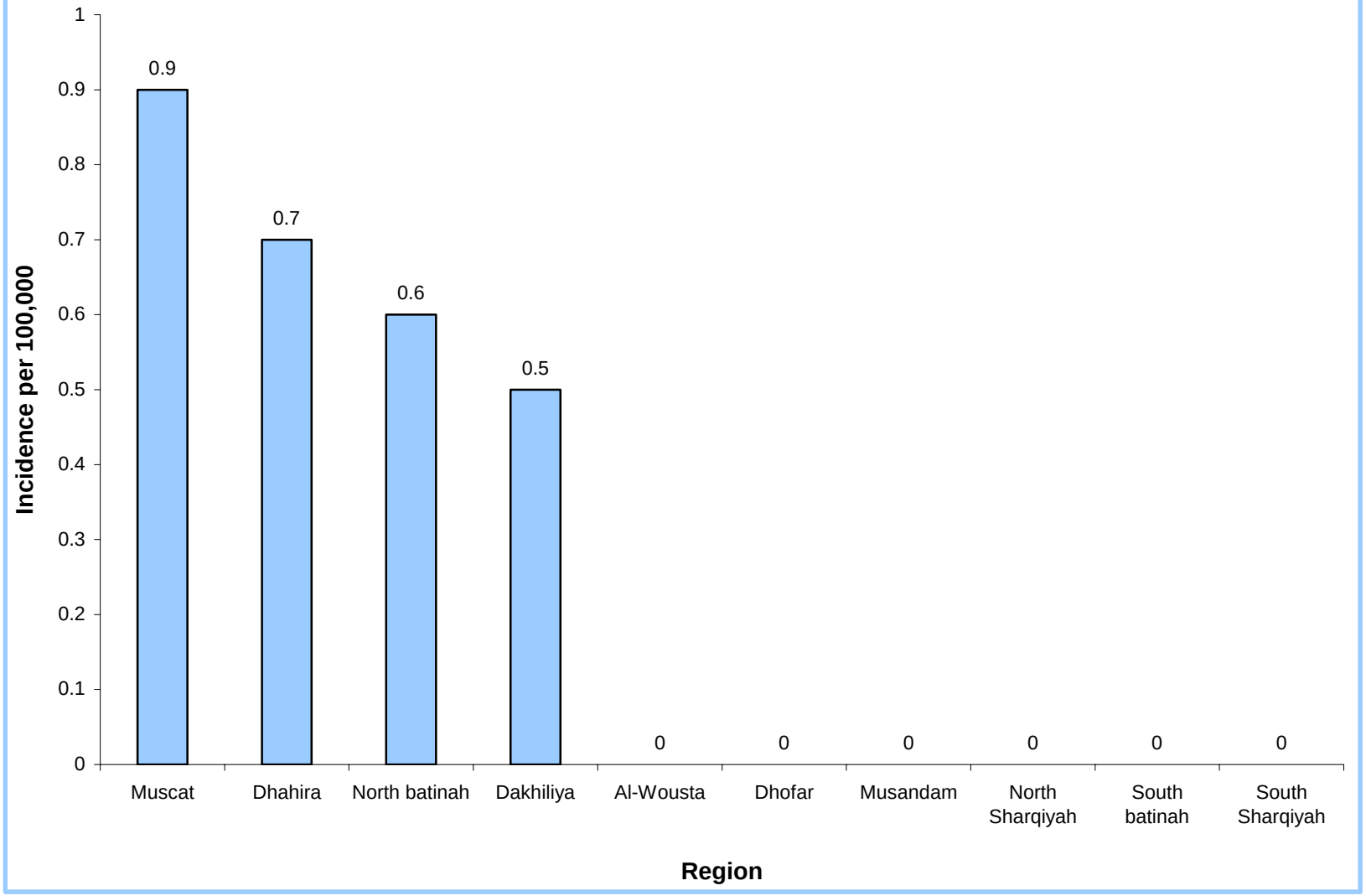
Sex	Frequency	Incidence/100,000
Female	1	0.1
Male	6	0.7
Total	7	

Table 76: Histology Of Carcinoma Of The Larynx & Trachea

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	14.3
80703	Squamous cell carcinoma (NOS)*	71.4
80903	Basal cell carcinoma (NOS)*	14.3

*(NOS), Not otherwise specified

Figure 24: Incidence of Larynx & Trachea Cancers by Region



Uterine Cancer

There were 11 cases of uterine cancer in 1997. The highest incidence rate was seen in Dhofar (5.9 per 100,000) followed by Muscat (1.3 per 100,000) and North Batinah (1.2 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 77 & 78 respectively. Choreocarcinomas constituted 54.5% of the uterine tumours.

Table 77: Regional Distribution Of Uterine Cancer

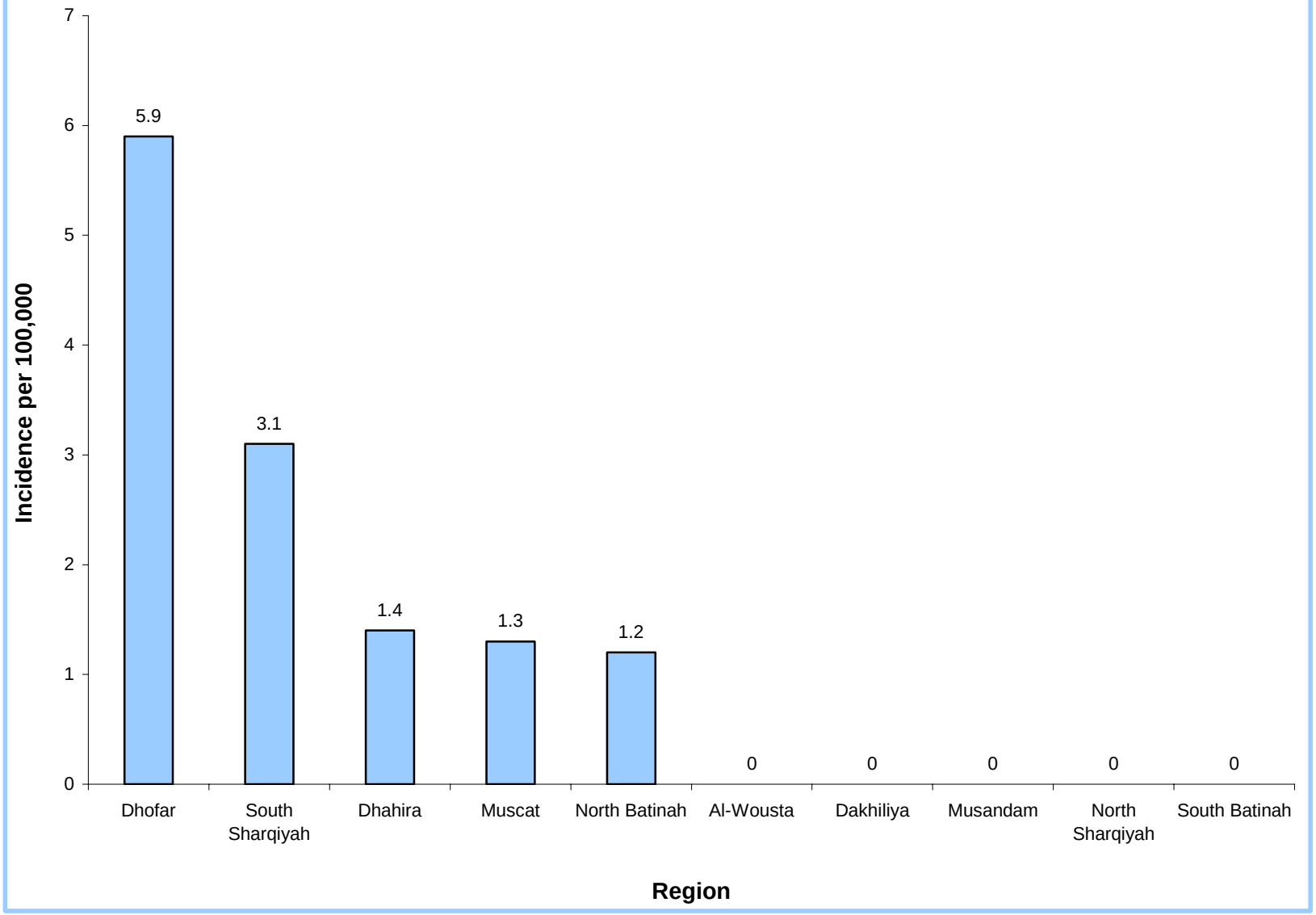
Region	Frequency	Incidence/100,000
Al-Wousta	0	0
Dakhiliya	0	0
Dhahira	1	1.4
Dhofar	4	5.9
Musandam	0	0.0
Muscat	2	1.3
North Batinah	2	1.2
North Sharqiyah	0	0
South Batinah	0	0
South Sharqiyah	2	3.1
Total	11	

Table 78: Histology Of Uterine Cancer

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	9.1
88900	Leiomyoma (NOS)*	9.1
89303	Endometrial stromal sarcoma	9.1
89803	Carcinosarcoma (NOS)*	18.2
91003	Choriocarcinoma (NOS)*	54.5

*(NOS), Not otherwise specified

Figure 25: Incidence of Uterine Cancers by Region



Cancer among Expatriates

Expatriates constitute 27.2% of the total population of Oman. In 1997 there were 123 cases of cancer among the expatriate population giving a crude incidence rate of 20 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 non-hodgkin's lymphoma. 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 79 - 84.

Table 79: Sex Distribution of Cancer Cases among Expatriates

Sex	Frequency
Female	60
Male	63
Total	123

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

Topography	Frequency	Percentage (%)
Breast	21	17.1
Thyroid	10	8.1
Non-Hodgkin's Lymphoma	9	7.3
Rectum & Anal canal	8	6.5
Stomach	5	4.1
Uterus	5	4.1
Colon	4	3.3
Cervix	4	3.3
Tongue	4	3.3
Bladder	4	3.3

Cancer among Expatriates

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

Topography	Frequency	Percentage (%)
Non-Hodgkin's Lymphoma	9	14.3
Skin	4	6.3
Stomach	4	6.3
Rectum & Anal canal	4	6.3
Tongue	4	6.3
Brain & Spinal cord	4	6.3
Bone	3	4.8
Colon	3	4.8
Hodgkin's disease	3	4.8
Urinary Bladder	3	4.8

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

Topography	Frequency	Percentage (%)
Breast	21	35
Thyroid	10	16.7
Uterus	5	8.3
Cervix	4	6.7
Rectum & Anal canal	4	6.7
Ovary	3	5
Oesophagus	2	3.3
Vagina	2	3.3
Leukemia	2	3.3
Colon	1	1.7

Cancer among Expatriates

Table 83: Regional Distribution Of Cancer Cases Among Expatriates

Region	Frequency	Incidence/100,000
Muscat	70	24.1
Dhofar	18	24.7
Dakhiliya	5	14.3
North Sharqiyah	3	16.2
South Sharqiyah	1	3.8
North Batinah	2	2.9
South Batinah	7	18.3
Dhahira	8	15.1
Musandam	1	13.9
Al-Wousta	2	51.2
Unknown	6	
Total	123	

Table 84: Distribution Of Cancer Cases Among Expatriates By Country Of Origin

Country	Frequency
India	38
Pakistan	16
Egypt	11
Philippines	10
Bangladesh	10
Srilanka	7
United Kingdom	6
Yemen	4
Jordan	4
United States of America	2
Morocco	2
Australia	2
Tunisia	1
Neutral Zone	1
Malaysia	1
Germany	1
Algeria	1
Afganistan	1
Not specified	5
Total	123

Members of the National Cancer Control Committee

Dr. Ali Jaffer Mohammed	Director General of Health Affairs	Chairman
Dr. Mohammed Ali Jaffer	Head, Division of Surgery, Royal Hospital	Co-ordinator
Mrs. Fatima Al-Ghazali	Director of International Relations	Member
Dr. Ahmed Ali Abdullatif	WHO Representative, Oman	Member
Dr. Saadia Al-Riyami	Head, Dept. of Obs/Gyn, Royal Hospital	Member
Dr. Samir H. Motawi	Head, Oncology Dept., Royal Hospital	Member
Dr. Jawad Al-Lawati	Head, Non-Communicable Diseases Control Section, DGHA	Member
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