

MALIGNANT NEOPLASMS IN MOZAMBIQUE

A FREQUENCY RATIO SURVEY FROM 1944–DECEMBER 31, 1957
AND A COMPARISON WITH OTHER PARTS OF AFRICA

M. D. PRATES

*From the Hospital Central Miguel Bombarda, Lourenço Marques,
Portuguese East Africa*

Received for publication April 2, 1958

DURING the last 25 years, several reports on the frequency ratio of malignant neoplasms among the African people have appeared from different parts of the African Continent (Pirie, 1921; Smith and Elmes, 1934; Strachan, 1934; Berman, 1935; Vint, 1935; des Ligneris, 1936; Prates, 1938; Elmes and Baldwin, 1947; Gelfand, 1948; Davies, 1948; Findlay, 1949; Higginson, 1951; Thijs, 1957; Wainwright, 1957). Apart from the study on liver cancer and cirrhosis (Prates, 1938), up to the present no information has been forthcoming concerning the cancer frequency ratios in Africans living in the Portuguese province of Mozambique on the East Coast of Africa.

Through the generous assistance of the National Cancer Association of South Africa, a cancer survey unit was established in Lourenço Marques almost two years ago in order to ascertain the risk to cancer for the African population in and around Lourenço Marques. As an essential preliminary to the main survey all the histological material collected in the pathological laboratory during the previous 13 years was analysed. It was hoped that such a preliminary analysis might indicate the kinds of cancers to be expected in this city.

In view of the limited medical services and the paucity of cancer registries in the underdeveloped Continent of Africa, the greatest amount of information about cancer in Africa will continue to be derived, in the immediate future, from post-mortem and hospital statistics. Although these statistics cannot allow any predictions to be made about the risk to cancer for the population as a whole, nevertheless, a comparison of the data accumulated in the hospital at Lourenço Marques over the last 13 years with the preliminary data of the rates survey conducted over a period of 19 months, will afford some indication of the site frequency of certain types of cancers and the potential value which can be attached to the data derived from conventional routine services of pathological laboratories and hospitals in regions where special cancer units and registries are still not available.

Accordingly, it is proposed :

1. To report the kinds of cancers and their frequency ratios in all the material collected in Lourenço Marques during the past 13 years,
2. to compare these data with those accumulated during the 19-month period following the establishment of the Cancer Unit when interest in cancer was greatly stimulated, and
3. to compare the data from Lourenço Marques with those available from other territories in Africa. From this comparison, it will become

apparent that although there are some similarities, there are also marked differences in the site frequency of cancer in different parts of Africa suggesting that environmental influences may be operating in predisposing some sites to cancer more than others.

MATERIAL AND METHODS

The Province of Mozambique is situated between longitude 30° and 42° East and latitude 10° and 27° South and covers 297,731 square miles (771,255 square kilometres). According to the census of 1950, the population comprises 5,647,000 Africans (2,692,863 males and 2,954,137 females); 50,000 Europeans; 26,000 Coloureds; and 15,000 Asiatics. The medical service, including hospitalisation, is provided free for all Africans, for all the other racial groups earning a salary of less than £30 per month and for all civil servants.

TABLE I.—*The Number of In-patients and Out-patients of the Lourenço Marques Hospital for the Year 1956*

<i>In-patients</i>	
Europeans . . .	3,263
Africans . . .	13,246
Coloured . . .	1,258
Total . . .	17,767
<i>Out-patients</i>	
Europeans . . .	26,374
Africans . . .	47,560
Coloured . . .	7,629
Total . . .	81,563

The largest hospital in the Province is located in Lourenço Marques and has about 1000 beds for Africans. The in-patients' turnover in 1956 was 13,246 Africans, 3263 Europeans and 1258 Coloureds and Asiatics. Of the female in-patients 5230 were admitted to the maternity wards. If allowance is made for maternity cases, then three-quarters of the in-patients are males, and only one-quarter females.

47,560 Africans, 26,374 Europeans, and 7629 Coloureds and Asiatics sought treatment in the outpatients' department during 1956 (Table I). It should be mentioned that all the pathological material from Mozambique is sent to the hospital "Miguel Bombarda" (Lourenço Marques' hospital) for examination. The greatest number of examinations are conducted for in-patients as well as out-patients in the Lourenço Marques Hospital, and, to a lesser extent, for patients distributed widely throughout the entire province. It follows that the greatest number of cancers are derived from patients treated in and around Lourenço Marques. The material as a whole is more representative of the people inhabiting the South than of those living in the Central and Northern regions.

The rates survey is being conducted on a population of African people numbering approximately 100,000, living in the city and environs of Lourenço Marques.

Prior to the middle of 1956, a total of 1606 malignant neoplasms was diagnosed from autopsy and histological examination. In May 1956, the special survey was

initiated. During the past 19 months, a total of 371 malignant tumours was diagnosed by autopsy and histological examination. Tumours diagnosed by any other method, e.g. radiological or clinical, are not considered in the present study. Of the total of 371 tumours, 210 were found in patients not belonging to the population of Lourenço Marques under survey. That is to say, three groups of material were accumulated; the first from 1944 to 1956; the second obtained from all cancer patients seeking treatment at the Lourenço Marques Hospital from May 1956 to December 1957; while the third group included patients with malignant neoplasms belonging strictly to the area under survey from May 1956 to December 1957, inclusive. The total number of tumours recorded in Africans from May 1944 to December 31, 1957 was 1273. In addition, 580 tumours were identified in Europeans and 124 tumours in Coloureds and Asiatics making a total of 1977 malignant neoplasms.

RESULTS

Table II summarizes the distribution by sex and race of 1977 malignant tumours accumulated over a period of 13 years, and diagnosed at autopsy and by histological examination. Of these tumours 580 were derived from Europeans, 1273 from Africans and 124 from the other races.

Amongst the European males, 303 malignant neoplasms were found. The skin accounted for 30.0 per cent of all tumours and thereafter, in order of frequency, the stomach for 8.9 per cent, the large intestine and rectum together for 8.9 per cent and malignancies of lymphoid tissue (8.9 per cent) and larynx and lung (9.5 per cent) (Table III). Amongst the European females, 23.8 per cent of all carcinomas occurred in the breast, 24.8 per cent in the cervix and the uterus and 15.1 per cent in the skin. That is to say, in females, 63.7 per cent of all cancers were obtained from the breast, uterus (including the cervix) and skin. The ratio of carcinoma of the body of the uterus to carcinoma of the cervix in European women was 1 : 4.6. Three Kaposi tumours were diagnosed in Europeans, two in males and one in a female. One chorionepithelioma, two gliomata of the brain, one glioma of the eye, three sarcomata of the connective tissue and bone and two lymphosarcomata occurred in Europeans under the age of 20 years. Breast carcinoma and carcinoma of the body of the uterus and skin cancer did not appear in European women in Lourenço Marques under the age of 20 years (Table II).

As far as the Africans are concerned, it is evident from Table II that of a total of 842 malignant neoplasms amongst males, 43.1 per cent were primary in the liver. Liver cancer, therefore, was at least three times as common as any other tumour. The skin (13.9 per cent), the lymphatic tumours (8.6 per cent) and the bladder (7.9 per cent) were next in order of frequency. Cancers of these four sites accounted for 73.6 per cent of all cancers in African males as compared with 40.5 per cent for the same sites in European males. Carcinoma of the stomach (1.0 per cent), of the oesophagus (0.4 per cent), colon (0.3 per cent), rectum (0.1 per cent) as well as carcinoma of the larynx (0.2 per cent), lung and bronchus (0.3 per cent) occurred less frequently in the African male than comparable tumours in the European male.

Amongst the African females, carcinoma of the cervix uteri (20.6 per cent), carcinoma of the liver (14.6 per cent), carcinoma of the skin (13.9 per cent) and carcinoma of the bladder (7.2 per cent) comprised 56.3 per cent of all cancers, as compared with 36.6 per cent for tumours in comparable sites in European females.

TABLE II—cont.

No. Int. Nom.	Site	Type	Race	Sex	Age groups								Total	Grand		
					1-10	10-20	20-30	30-40	40-50	50-60	Over 60	?		Total	Coloured	
154	Rectum	Ca.	Eur.	M.	0	0	0	0	0	2	7	1	10	16	+	
				F.	0	0	0	0	0	1	1	0	2			
				Afr.	M.	0	0	0	0	0	1	0	0			1
				F.	0	0	0	0	0	3	0	0	3			
155	Liver	Ca. Primary	Eur.	M.	0	0	0	0	4	1	3	0	8	437	+	6
				F.	0	0	0	0	0	2	1	0	3			
				Afr.	M.	2	67	113	83	53	26	15	4			
				F.	1	7	21	16	7	5	5	1	63			
155C	Gall bladder	Ca.	Eur.	M.	0	0	0	0	0	2	2	0	4	12	+	2
				F.	0	0	0	1	0	3	2	1	7			
				Afr.	M.	0	0	0	1	0	0	0	0			
				F.	0	0	0	0	0	0	0	0	0			
157	Pancreas	Ca.	Eur.	M.	0	0	0	0	1	1	0	1	3	12	+	2
				F.	0	0	0	0	0	0	0	0	0			
				Afr.	M.	0	0	0	3	3	1	1	0			
				F.	0	0	0	0	0	0	1	0	1			
158	Abdominal cavity	Ca.	Eur.	M.	0	0	0	0	0	2	0	0	2	11	+	1
				F.	0	0	0	0	0	1	2	0	3			
				Afr.	M.	0	0	1	0	0	1	1	0			
				F.	0	0	1	1	0	0	1	0	3			
160A	Nose	Ca.	Eur.	M.	0	0	0	0	0	2	0	0	2	3		
				F.	0	0	0	0	0	0	0	0	0			
				Afr.	M.	0	0	0	1	0	0	0	0			
				F.	0	0	0	0	0	0	0	0	0			
161	Larynx	Ca.	Eur.	M.	0	0	0	1	1	5	7	1	15	18	+	2
				F.	0	0	0	1	0	0	0	0	1			
				Afr.	M.	0	0	0	0	2	0	0	0			
				F.	0	0	0	0	0	0	0	0	0			
162B 162C	Lung Bronchus	Ca.	Eur.	M.	0	0	0	0	3	3	7	1	14	18	+	2
				F.	0	0	0	0	0	1	0	0	1			
				Afr.	M.	0	0	0	0	0	0	3	0			
				F.	0	0	0	0	0	0	0	0	0			
170	Breast	Ca.	Eur.	M.	0	0	0	0	0	0	0	0	0	99	+	12
				F.	0	0	3	12	22	18	8	3	66			
				Afr.	M.	0	0	0	0	1	0	0	0			
				F.	0	0	3	6	9	6	7	1	32			
171	Cervix uteri	Ca.	Eur.	M.	0	0	0	0	0	0	0	0	0	144	+	21
				F.	0	0	0	11	20	14	9	1	55			
				Afr.	M.	0	0	0	0	0	0	0	0			
				F.	0	0	9	18	28	20	10	4	89			
172	Corpus uteri	Ca., 21 Sarcoma, 2	Eur.	M.	0	0	0	0	0	0	0	0	0	18	+	5
				F.	0	0	2	1	1	4	5	1	14			
				Afr.	M.	0	0	0	0	0	0	0	0			
				F.	0	0	0	1	1	1	0	1	4			
173	Uterus	Chorion-epithelioma	Eur.	M.	0	0	0	0	0	0	0	0	0	12	+	4
				F.	0	1	0	6	2	0	0	1	10			
				Afr.	M.	0	0	0	0	0	0	0	0			
				F.	0	0	2	0	0	0	0	0	2			

TABLE II—cont.

No. Int. Nom.	Site	Type	Race	Sex	Age groups							Total	Grand			
					1-10	10-20	20-30	30-40	40-50	50-60	Over 60		?	Total	Coloured	
192C	Eye	Various neoplasms	Eur.	M.	0	1	0	0	1	0	0	1	3	34	+	1
				F.	0	0	0	0	0	0	0	0	0			
			Afr.	M.	1	2	3	5	2	1	0	0	14			
				F.	3	0	3	4	4	1	2	0	17			
193A	Brain	Glioma	Eur.	M.	2	0	0	0	2	1	1	2	8	24		
				F.	0	0	0	0	0	0	0	0	0			
			Afr.	M.	2	4	3	3	2	0	0	0	14			
				F.	1	0	0	0	1	0	0	0	2			
194	Thyroid gland	Ca.	Eur.	M.	0	0	1	0	0	0	0	0	1	11	+	1
				F.	0	0	0	0	1	0	0	0	1			
			Afr.	M.	0	1	2	0	0	0	0	0	3			
				F.	0	0	2	1	2	1	0	0	6			
196	Jawbone	Various neoplasms	Eur.	M.	0	0	2	0	1	0	0	0	3	24		
				F.	0	0	0	0	0	0	0	1	1			
			Afr.	M.	0	6	1	3	1	0	1	0	12			
				F.	0	1	2	4	1	0	0	0	8			
196C	Other bones	Sarcoma	Eur.	M.	0	1	0	0	0	1	0	0	2	13	+	2
				F.	0	0	0	0	0	0	0	0	0			
			Afr.	M.	1	2	3	2	0	0	0	0	8			
				F.	0	0	1	1	0	0	1	0	3			
197	Connective tissue	Sarcoma	Eur.	M.	1	1	1	3	2	1	0	1	10	84	+	6
				F.	0	0	2	4	3	1	3	0	13			
			Afr.	M.	3	7	9	9	4	2	3	46				
				F.	2	2	2	4	3	2	0	15				
198	Lymph nodes	Secondary : Ca. Sarcoma	Eur.	M.	0	0	0	1	1	2	5	1	10	31	+	2
				F.	0	0	0	1	0	1	1	0	3			
			Afr.	M.	0	2	5	1	2	2	2	1	15			
				F.	0	0	0	1	1	0	1	0	3			
200.0	Various sites	Reticulum cell sarcoma	Eur.	M.	0	0	0	0	0	1	1	0	2	14	+	2
				F.	1	0	0	2	0	0	0	0	3			
			Afr.	M.	3	0	0	0	1	0	0	1	5			
				F.	3	0	1	0	0	0	0	0	4			
200.1	Ditto	Lympho-sarcoma	Eur.	M.	2	0	0	1	2	1	3	0	9	52	+	3
				F.	0	0	0	0	0	0	0	0	0			
			Afr.	M.	10	4	3	4	3	2	0	0	26			
				F.	6	3	2	2	1	1	2	0	17			
201	Lymph nodes	Hodgkin's disease	Eur.	M.	0	1	4	1	3	1	0	2	12	60	+	6
				F.	0	1	3	1	0	0	1	0	6			
			Afr.	M.	0	7	9	9	6	2	1	0	34			
				F.	0	1	1	1	2	2	1	0	8			
203 204B 204E	Various sites	Myeloma Lymphatic and myeloid leukaemia	Eur.	M.	0	0	0	1	0	0	0	0	1	13		
				F.	0	0	0	0	0	0	0	0	0			
			Afr.	M.	1	1	0	5	1	0	0	0	8			
				F.	0	0	0	1	1	1	1	0	4			
Totals			Eur.	M.	5	6	13	20	57	76	106	20	303			
Afr.	F.	2		3	12	48	68	76	56	12	277					
				Afr.	M.	28	115	182	176	174	87	61	19	842		
			Afr.		F.	19	18	67	92	99	60	65	11	431		

Eur.—European.
Afr.—African.

TABLE III.—*Distribution by Site, Type and Sex, of all Malignant Neoplasms in Europeans, Africans and Coloureds* from April 1944–December 31, 1957*

No. Int. Nom.	Site	Type	European				African				Coloured		Total	Percentage of all neoplasms
			M.	%	F.	%	M.	%	F.	%	M.	F.		
140	Lip	Ca.	8	2.64	0	0	3	0.36	7	1.62	0	0	18	0.91
141	Tongue	"	5	1.65	0	0	4	0.47	0	0	1	0	11	0.56
		Sarcoma	0	0	0	0	0	0	0	0	0	1		
142.1	Salivary gland parotid	Ca.	1	0.33	0	0	0	0	5	1.16	1	0	8	0.40
		Sarcoma	0	0	0	0	1	0.12	0	0	0	0		
144	Mouth	Ca.	4	1.32	1	0.36	12	1.54	8	2.1	1	0	28	1.42
		Sarcoma	0	0	0	0	1	0.12	1	0	0	0		
145A	Tonsil	Ca.	3	0.99	0	0	3	0.36	0	0	2	0	8	0.40
146	Nasopharynx	"	2	0.66	1	0.36	0	0	0	0	0	0	3	0.15
150	Oesophagus	"	1	0.33	1	0.36	4	0.47	0	0	2	0	8	0.40
151	Stomach	"	27	8.91	13	4.7	9	1.06	0	0	2	1	52	2.63
152C	Small intestine	"	2	0.66	3	1.08	1	0.12	1	0.23	0	0	7	0.35
153A	Large intestine	"	15	5.61	5	2.17	3	0.36	0	0	3	1	31	1.57
		Carcinoid	2		1		0	0	0	0	0	0		
154	Rectum	Ca.	10	3.31	2	0.72	1	0.12	3	0.70	1	3	20	1.02
155A	Liver	Ca. (Primary)	8	2.64	3	1.09	363	43.11	63	14.62	5	1	443	22.42
155C	Gall bladder	Ca.	4	1.32	7	2.51	1	0.12	0	0	1	1	14	0.70
157	Pancreas	"	3	0.99	0	0	8	0.95	1	0.23	1	1	14	0.70
158	Abdominal cavity	"	2	0.66	3	1.09	3	0.36	3	0.70	0	1	12	0.61
160A	Nose	"	2	0.66	0	0	1	0.12	0	0	0	0	3	0.15
161	Larynx	"	15	4.95	1	0.36	2	0.24	0	0	2	0	20	1.02
162C	Lung	"	14	4.62	1	0.36	3	0.36	0	0	1	1	20	1.02
	Bronchus	"												
170	Breast	"	0	0	66	23.83	1	0.12	32	7.42	0	12	111	5.61
171	Cervix uteri	"	0	0	55	19.87	0	0	89	20.65	0	21	165	8.36
172	Corpus uteri	"	0	0	13	5.05	0	0	4	0.93	0	3	22	1.11
		Sarc.	0	0	1		0	0	0		0	0		
173	Uterus	Chorion-epithelioma	0	0	10	3.6	0	0	2	0.46	0	4	16	0.81
175A	Ovary	Ca.	0	0	9	3.25	0	0	5	1.16	0	0	14	0.70
176	Vagina	"	0	0	6	2.17	0	0	24	5.57	0	0	30	1.52
177	Prostate	"	10	3.31	0	0	10	1.2	0	0	2	0	22	1.11
178	Testes	Seminoma	2	1.32	0	0	1	0.12	0	0	0	0	5	0.25
		Sarcoma	2		0	0	0	0	0	0	0	0		
179A	Scrotum	Ca.	1	0.33	0	0	2	0.24	0	0	0	0	3	0.15
179B	Penis	"	2	0.66	0	0	29	3.44	0	0	4	0	35	1.77
180	Kidney	Various neoplasms	3	0.99	2	0.72	4	0.47	3	0.70	0	2	14	0.70
181A	Bladder	Ca.	3	0.99	2	0.72	67	7.96	31	7.19	7	0	110	5.56
190	Skin	Melanoblastoma	0	0	2	0.72	16	1.9	10	2.3	0	0	28	1.42
191A	"	Basal cell Ca.	73	24.08	32	11.55	14	1.66	15	3.48	5	1	140	7.09
191D	"	Other ca.	16	5.27	7	2.51	65	7.72	34	7.89	2	1	125	6.33
191D	"	Kaposi's tumour	2	0.66	1	0.36	22	2.61	1	0.23	0	0	26	1.32
192A	Eye	Glioma	0	0	2	0.72	3	0.36	2	0.46	0	0	7	0.35
192C	"	Various neoplasms	3	0.99	0	0	14	1.66	17	3.94	0	1	35	1.77
193A	Brain	Ditto	8	2.64	0	0	14	1.66	2	0.46	0	0	24	1.21
194	Thyroid gland	Ca.	1	0.33	1	0.36	3	0.36	6	1.4	1	0	12	0.61
196	Jawbone	Adamantinoma	1	0.99	0	0.36	5	1.43	4	1.86	0	0	24	1.21
		Sarcoma	2		1		7		4		0	0		
196C	Other bones	Sarcoma	2	0.66	0	0	8	0.95	3	0.70	2	0	15	0.76
197	Connective tissue	"	10	3.31	13	4.7	46	5.46	15	3.48	2	4	90	4.55

TABLE III—*cont.*

No. Int. Nom.	Site	Type	European				African				Coloured		Total	Percentage of all neoplasms
			M.	%	F.	%	M.	%	F.	%	M.	F.		
198	Lymph nodes	Secondary ca. Sarcoma	9 } 1 }	3.31	2 } 1 }	1.09	14 } 1 }	1.78	3 } 0 }	0.70	1 } 0 }	1 } 0 }	33	1.67
200.0	Various sites	Reticulum cell sarcoma	2	0.66	3	1.09	5	0.59	4	0.93	1	1	16	0.81
200.1	Ditto	Lympho-sarcoma	9	2.97	0	0	26	3.08	17	3.94	3	0	55	2.78
201	Lymph nodes	Hodgkin's disease	12	3.95	6	2.17	34	4.04	8	1.86	3	3	66	3.34
203	Bones	Myeloma	1	0.33	0	0	2	0.24	1	0.23	0	0	4	0.20
204B	Blood	Lymphatic leukaemia	0	0	0	0	0	0	3	0.70	1	0	4	0.20
204A	"	Myeloid leukaemia	0	0	0	0	6	0.71	0	0	0	0	6	0.30
Totals			303	100	277	100	842	100	431	100	57	67	1977	100

* As a total of only 124 neoplasms were observed amongst Coloured peoples, the percentage frequency of these tumours has not been included.

From this analysis, several trends in the tumour ratio frequency can be recognized in Lourenço Marques, namely,

1. A predilection of cancer for the liver in African males and females as compared with the European ;
2. carcinoma of the cervix uteri is relatively more frequent than carcinoma of the corpus uteri in African as compared with European women ;
3. breast carcinoma appears to be less common in African than in European women ;
4. skin cancer in the European male is more common than in the African male although the types of skin tumours developed by the two races are not the same ;
5. carcinoma of the lung, oesophagus, stomach, large bowel and rectum are relatively uncommon in the African as compared with the European (Table II).

Data for the Indian, Chinese and Coloured groups are too limited for analysis and are merely included in Table II as additional information on tumour frequency.

Preliminary information from our rates survey discloses that only a small percentage of Africans live beyond the age of 65 years. The age structure of the population may influence profoundly the site incidence of cancer. Nevertheless, one fact is outstanding, namely, that as far as liver cancer is concerned, it occurs with unusual frequency under the age of 40 years (Table VI). Of a total of 363 cases of primary carcinoma of the liver in males, no less than 182 occurred under the age of 30 years while in females, 29 of 63 were present under the age of 30 years. It may well be that when corrected for the age distribution of the population, carcinoma of the liver may increase still further with age. But, at present, the early development of liver carcinoma in young people cannot be disputed.

TABLE IV.—*Primary Carcinoma of the Liver, by Race, Sex and Age*

No. Int. Nom.	Site	Type	Race	Sex	Age groups								Total		
					1-10	10-20	20-30	30-40	40-50	50-60	Over 60	?			
155a	Liver	Carcinoma (Primary)	European	M.	0	0	0	0	4	1	3	0	0	8	
				F.	0	0	0	0	0	2	1	0	0	3	
			African	M.	2	67	113	83	53	26	15	4	363		
				F.	1	7	21	16	7	5	5	1	63		
			Coloured	M.	1	0	0	2	0	1	1	0	5		
				F.	0	1	0	0	0	0	0	0	1		
			Total				4	75	134	101	64	35	25	5	443

The frequency ratio of malignant neoplasms in Africans since the establishment of the Cancer Survey Unit (Table VII)

As already mentioned above, a special cancer survey was initiated in May 1956. As a result, interest in the cancer problem grew rapidly amongst the doctors in the city of Lourenço Marques and in the hospital. This did not affect to any extent the number of specimens sent to the laboratory from outlying regions but it did increase the number of histological examinations of material obtained at operation in the hospital. The number of autopsies increased to over 80 per cent of all patients dying in the hospital.

During the past 19 months, 210 malignant neoplasms found in Africans were diagnosed histologically. In the male African, the liver accounted for 45 per cent, the skin for 11.4 per cent and the urinary bladder for 8.2 per cent of all cancers. That is to say, 64.6 per cent of all tumours occurred in these three sites. In females, 18.1 per cent of carcinomata were observed in the cervix uteri, 11.3 per cent in the liver, 11.36 per cent in the bladder and 11.5 per cent in the skin. These tumours represented 52 per cent of all neoplasms in African women. Up to the present, 16 carcinomata of the cervix uteri have been detected and not a single carcinoma of the body of the uterus. Carcinoma of the oesophagus and of the lung and bronchus were uncommon. Only 2 cases occurred in 210 malignant growths in both sexes. Sarcoma of the jaw and other regions of the skeleton yielded 9.8 per cent of tumours, while primary malignant neoplasms of the lymphoid tissues were found in 9.0 per cent of cases. The frequency of carcinoma of the pancreas remained low (0.82 per cent).

A comparison of the data collected over the 19-month period with that accumulated over the entire previous 13 years reveals that while the frequency ratios were not always identical, the general trend in site incidence remained the same. A relatively small series of 210 neoplasms collected over a period of 19 months, therefore, can yield useful suggestive information about the frequency ratio of the more commonly occurring tumours.

Cancer rates in the population of Lourenço Marques

The cancer rates survey was also initiated 19 months ago and relates to the African population numbering approximately 100,000. One hundred and sixty-one tumours have been studied. As previously mentioned, unless confirmed histolo-

gically, all malignant cases diagnosed radiologically and clinically were excluded from the above analysis.

If the maternity cases are also excluded, four times as many males were admitted to hospital as females, indicating that some sociological factor may have determined the male preference for seeking medical attention and admission to

TABLE V.—*Ratio Survey of Malignant Neoplasms in Africans of Lourenço Marques from May 1956–December 1957*

No. Int. Nom.	Site	Type	Male		Female		Total M. and F.	Per-centage M. and F.
			Actual number	%	Actual number	%		
141	Tongue	Ca.	1	0.82	0	0	1	0.48
142.1	Salivary gland	"	0	0	1	1.14	1	0.48
144	Mouth	"	1	0.82	1	1.14	2	0.95
153A	Large intestine	"	1	0.82	0	0	1	0.48
155A	Liver	"	55	45.06	10	11.36	65	30.96
157	Pancreas	"	1	0.82	0	0	1	0.48
158	Abdominal cavity	"	0	0	2	2.27	2	0.95
161	Larynx	"	2	1.64	0	0	2	0.95
162C	Lung and bronchus	"	2	1.64	0	0	2	0.95
170	Breast	"	0	0	10	11.36	10	4.77
171	Cervix uteri	"	0	0	16	18.18	16	7.62
175A	Ovary	Sarcoma	0	0	1	1.14	1	0.48
176	Vagina	Ca.	0	0	3	3.41	3	1.43
177	Prostate	"	1	0.82	0	0	1	0.48
179B	Penis	"	1	0.82	0	0	1	0.48
180	Kidney	"	1	0.82	0	0	2	0.95
		Sarcoma	0	0	1	1.14		
181	Bladder	Ca.	10	8.2	10	11.36	20	9.52
190	Skin	Malignant melanoma	1	0.82	1	1.14	2	0.95
191A	"	Basal cell ca.	4	3.28	3	3.41	7	3.33
191B	"	Miscellaneous ca.	6	4.92	6	6.80	12	5.71
191D	"	Kaposi	3	2.40	0	0	3	1.43
192C	Eye	Ca.	1	0.82	2	2.27	5	2.38
		Sarcoma	1	0.82	1	1.14		
193A	Brain	Glioma	3	2.46	0	0	3	1.43
194	Thyroid gland	Ca.	0	0	2	2.27	2	0.95
196	Jawbone	Sarcoma	8	6.56	7	7.95	15	7.14
196C	Other bones	"	4	3.28	1	1.14	5	2.38
197	Connective tissue	"	1	0.82	3	3.41	4	1.90
198	Lymph nodes	Secondary ca.	2	1.64	0	0	2	0.95
200.0	Various sites	Reticulo-endothelial sarcoma	2	1.64	2	2.27	4	1.90
200.1	"	Lympho-sarcoma	4	3.28	1	1.14	5	2.38
201	Lymph nodes	Hodgkin's disease	3	2.46	1	1.14	4	1.9
203	Bones	Myeloma	0	0	1	1.14	1	0.48
204B	Blood	Lymphatic leukaemia	1	0.82	1	1.14	2	0.95
204E	"	Myeloid leukaemia	2	1.64	1	1.14	3	1.43
Total			122	100	88	100	210	100

hospital. While the data collected during the first 19 months of our rates survey in a relatively small population can only afford an indication of the trends to be expected, nevertheless, even at this early stage, it is evident that the frequency of even the common tumours is further emphasized (Table VI). Thus, of 110 malignant neoplasms in males, 71 (64.54 per cent) were primary in the liver and of 51 malignant neoplasms in females, 13 (25.5 per cent) were primary in the liver. The bladder accounted for 8.18 per cent of tumours, and the skin for 7.27 per cent in males, these sites together with the liver accounting for 71.81 per cent of all malignant neoplasms. Again, the low frequency of lung carcinoma is noteworthy. However, almost one-third of all cancers in women were primary in the cervix uteri.

In general, the first 19 months of the intensive rates survey confirmed the trend observed in the cancer frequency ratios in all the material obtained in the past 13 years. As the survey progresses, it may well be that the frequency ratio of liver cancer will decline a little but, at present, there can be little doubt that amongst males, the liver is still the most frequent site of cancer. In females

TABLE VI.—*Rates Survey of Malignant Neoplasms in Africans of Lourenço Marques from May 1956–December 1957*

No. Int. Nom.	Site	Type	Male		Female		Total M. and F.	Per-centage M. and F.
			Actual number	%	Actual number	%		
142.1	Salivary gland	Ca.	0	0	1	1.96	1	0.62
	Parotid							
144	Mouth	„	1	0.91	1	1.96	2	1.24
151	Stomach	„	1	0.91	0	0	1	0.62
153A	Large intestine	„	1	0.91	0	0	1	0.62
155A	Liver	„	71	64.54	13	25.5	84	52.17
146	Nasopharynx	„	1	0.91	0	0	1	0.62
170	Breast	„	0	0	1	1.96	1	0.62
171	Cervix uteri	„	0	0	15	29.42	15	9.31
176	Vulva	„	0	0	1	1.96	1	0.62
177	Prostate	„	4	3.63	0	0	4	2.48
179B	Penis	„	3	2.73	0	0	3	1.85
180	Kidney	Various neoplasms	1	0.91	1	1.96	2	1.24
181	Bladder	Ca.	9	8.18	4	7.84	13	8.07
190	Skin	Melano-blastoma	2	1.82	0	0	2	1.24
191A,B	„	Ca.	5	4.54	2	3.92	7	4.44
191D	„	Kaposi	1	0.91	0	0	1	0.62
192C	Eye	Ca.	1	0.91	1	1.96	2	1.24
		Sarcoma	0	0	1	1.96	1	0.62
193A	Brain	Glioma	3	2.73	2	3.92	5	3.10
194	Thyroid gland	Ca.	0	0	2	3.92	2	1.24
196	Jawbone	Sarcoma	1	0.91	0	0	1	0.62
		Adamantinoma	1	0.91	0	0	1	0.62
197	Connective tissue	Sarcoma	1	0.91	2	3.92	3	1.85
200.1	Various sites	Lymphosarcoma	1	0.91	1	1.96	2	1.24
201	Lymph nodes	Hodgkin's disease	0	0	1	1.96	1	0.62
204A	Blood	Myeloid leukaemia	2	1.82	2	3.92	4	2.48
		Total	110	100	51	100	161	100

carcinoma of the cervix occurs more frequently than all other cancers, with cancer of the liver ranking next in order of importance and this despite the smaller number of women seeking hospital treatment. Both in males and females, cancer of the bladder is equally common, being second in order of frequency in males and third in the females. It is hoped that when the cancer rates survey is completed, it will be possible to know, with greater confidence whether carcinoma of the stomach, oesophagus, breast and lung are indeed lower in the African in Lourenço Marques, as the frequency ratio study seems to suggest. However, there is sufficient information to show that primary cancer of the liver is a particular problem in Lourenço Marques and justifies an intensive study into the aetiological factors.

Comparison of cancer frequency ratios in Mozambique with that in other parts of Africa

With the exception of Kampala (1952-53) and Durban (1950-56), carcinoma of the liver in male Africans is the commonest tumour in all cancer surveys thus far reported from Johannesburg, Mozambique, Belgian Congo and Nigeria and reaches the highest frequency ratio in Lourenço Marques where liver carcinoma is twice as common as in Johannesburg and three times as common as in Kampala. It is of interest to note that Findlay (1940-45) reported 60 tumours in West African soldiers aged 18 to 40 years and of these 37 were primary cancer of the liver. Moreover, calculations made from the data presented by Elmes and Baldwin (1947) for Nigeria reveal a frequency ratio of 11.9 per cent for primary carcinoma of the liver.

The frequency ratio of carcinoma of the skin ranges from 11.2 to 16.3 per cent and is the commonest cancer in Kampala and Durban, second in order of frequency in Mozambique and Johannesburg (Higginson and Oettlé, 1958, personal communication) and third in the Stanleyville and in the data submitted by Berman (1935) for Johannesburg. Tumours of the bladder constitute between 4 and 8 per cent of all neoplasms in Mozambique, Johannesburg and Kampala but less than 1 per cent in Stanleyville. In Mozambique, bladder tumours are almost twice as frequent as in Johannesburg and Kampala.

The relatively high frequency ratio of carcinoma of the lung and bronchus in Johannesburg (7.7 per cent) (Higginson and Oettlé, 1958, personal communication) and in Durban (7.7 per cent) contrasts with the lower frequency of tumours of this organ in Kampala (1.95 per cent) and the rarity of this tumour in Mozambique (less than 1 per cent) and in Dakar (Camain, 1954). Similarly, the high frequency ratio of carcinoma of the rectum in Johannesburg (8.0 per cent) differs from the lower frequency in Kampala (2.3 per cent) and the still lower frequency ratio (less than 1 per cent) in Mozambique and Stanleyville. Apparently, tumours of the gastro-intestinal tract are more common in Johannesburg and Kampala than in Mozambique and Stanleyville. The frequency of carcinoma of the penis appears to be considerably higher in Kampala (10.0 per cent) than in any other African territory (1-4 per cent).

Females.—The high frequency ratio of carcinoma of the cervix is a feature of all reports from Africa with the exception of Dakar. In Nigeria, tumours of the uterus ranked second in order of frequency.

Skin tumours were found first in order of frequency in Durban and second in Johannesburg (12.1 per cent) and Stanleyville (13.2 per cent) and third in Mozambique (13.9 per cent in both sexes). In Kampala, skin tumours constituted only

8 per cent of all tumours and only 3 per cent in the figures published by Berman (1935) for Johannesburg.

The frequency ratio of liver carcinoma in African females was only slightly higher (14.6 per cent) than that of skin carcinoma (13.8 per cent) in Mozambique and was at least twice as high as the frequency ratio of liver carcinoma in Johannesburg (Higginson and Oettlé (6.0 per cent), Berman (5.0 per cent), Stanleyville (4.5 per cent) and Kampala (4.1 per cent). Carcinoma of the liver was consistently lower amongst females than in males in all the surveys presented in Tables VII and VIII.

The frequency ratio of breast tumours was variable. Whereas breast carcinoma constituted 7.4 and 9.0 per cent of all tumours in Mozambique and Kampala respectively, the percentage frequency was 11.3 and 12.0 per cent in Johannesburg (Higginson and Oettlé) and Stanleyville (Thijs, 1957) and 25.3 and 21.4 per cent in Johannesburg (Berman, 1935) and Nigeria respectively. Squamous cell carcinoma of the vagina was consistently higher in Mozambique (5.5 per cent) than elsewhere while tumours of the ovary appeared to be unusually high in Stanleyville (8.8 per cent) and in Kampala (11.5 per cent). Carcinoma of the gastro-intestinal canal was unusual and involved mainly the stomach, the highest frequency ratio being reported in Johannesburg by Berman. Carcinoma of the rectum occurred in less than 1 per cent of tumours in all surveys, except in Kampala. Except in Durban (Wainwright and Roach, 1957) cancer of the lung and bronchus comprised 1.4 per cent or less of all tumours in females in all the surveys reported.

As in the African male, carcinoma of the bladder was high (7.9 per cent) in African females in Mozambique but was far less frequent in the other African territories. Camain (1954) from Dakar, reported on 1884 malignant neoplasms in Africans over an 11-year period. Unfortunately, he did not separate the sexes and therefore it is not possible to compare the Lourenço Marques tumours with those in Dakar. However, Camain does mention that two-thirds of the tumours were obtained from males and one-third from females. It would appear that the frequency ratio of primary liver cancer in Dakar is a little lower than in Lourenço Marques. Noteworthy in Dakar, as in Lourenço Marques, are the low frequency ratios of pancreatic, large bowel, lung and breast cancers. The ratio of cancer of the body to cancer of the cervix uteri in Dakar is as 1 : 5.7, which contrasts with the reported ratios from other parts of Africa.

From this comparative survey, whatever the limitations thereof, it is evident that in several territories south of the Sahara, primary liver cancer is the predominant malignant neoplasm in males, the only anomalous report being from Kampala. With the exception of Dakar and possibly also of Nigeria, carcinoma of the cervix uteri in females ranks first in importance amongst all neoplasms in African women. Both in males and in females, primary carcinoma of the liver, bladder and skin show a markedly higher frequency ratio in Mozambique than elsewhere in Africa. With the exception of Johannesburg and Kampala, carcinoma of the gastro-intestinal canal amongst Africans appears to be infrequent. At present, cancer of the lung and bronchus does not appear to be a problem of any significance amongst African females and, with the exception of Johannesburg, these tumours are also uncommon in African males.

The comparative analysis of the tumour frequency ratio reveals that primary liver cancer in males and cancer of the bladder in both sexes in Lourenço Marques

TABLE VII.—Order of Frequency of Malignant Neoplasms in African Males in Different Parts of the Continent of Africa ‡

Lourenço Marques 1944-57 (Prates)					
European†			African		
Site	Total	%	Site	Total	%
Skin	91	30.0	Liver	363	43.1
Stomach	27	8.9	Skin	117	13.9
Colon	17	5.6	Lymphomata	73	8.6
Larynx	15	4.9	Bladder	67	7.9
Lung and bronchus	14	4.6	Sarcoma	46	5.5
Hodgkin's disease	12	3.9	Penis	29	3.4
Sarcoma	10	3.3	Kaposi's tumour	22	2.6
Lymph nodes	10	3.3	Bones	20	2.3
Rectum	10	3.3	Eye	17	2.0
Prostate	10	3.3	Lymph nodes : (secondary)	15	1.7
Lip	8	2.6	Brain	14	1.6
Liver	8	2.6	Mouth	13	1.5
Brain	8	2.6	Prostate	10	1.2
Tongue	5	1.6	Stomach	9	1.0
Bones	5	1.6			
Mouth	4	1.3			
Gall bladder	4	1.3			
Testis	4	1.3			

Johannesburg 1953-55 (Higginson and Oettlé)					
Rural, 1953-55			Urban, 1953-55		
Site	Total	%	Site	Total	%
Liver	36	20.5	Liver	114	22.0
Skin	25	14.2	Oesophagus	53	10.2
Rectum	14	8.0	Stomach	41	7.9
Lung and bronchus	13	7.4	Lung and bronchus	40	7.7
Bones	11	6.3	Hodgkin's disease	27	5.4
Prostate	8	4.5	Prostate	21	4.0
Bladder	8	4.5	Lymph nodes : (secondary)	20	3.8
Sinuses	6	3.4	Leukaemia	18	3.4
Leukaemia	6	3.4	Mouth	18	3.4
Lymphomata	6	3.4	Bladder	17	3.2
Kaposi's tumour	5	2.8	Salivary gland	15	2.8
Salivary gland	5	2.8	Brain	14	2.7
Oesophagus	4	2.3	Skin	14	2.7
Stomach	4	2.3	Kaposi's tumour	11	2.1
Kidney	4	2.3	Pancreas	10	1.9
Mouth	3	1.7	Penis and scrotum	9	1.7
Testis	3	1.7	Sinuses	9	1.7
Pancreas	2	1.1	Larynx	8	1.5
Larynx	2	1.1	Colon	7	1.3
Breast	2	1.1	Bones	6	1.1
Eye	2	1.1			
Penis and scrotum	2	1.1			

Durban 1950-56 (Wainwright)					
Site	Total	%	Site	Total	%
Skin*	271	14.1	Liver*	128	7.2
Liver*	128	7.2	Oesophagus*	119	6.1
Oesophagus*	119	6.1	Lung and bronchus*	89	4.5
Lung and bronchus*	89	4.5	Prostate	63	3.2
Prostate	63	3.2	Bladder*	54	2.8
Bladder*	54	2.8	Penis	54	2.8
Penis	54	2.8	Mouth, tongue*	50	2.5
Mouth, tongue*	50	2.5	Stomach*	44	2.2
Stomach*	44	2.2	Naso-pharynx*	44	2.2
Naso-pharynx*	44	2.2	Intestine, colon*	38	1.9
Intestine, colon*	38	1.9	Kaposi's tumour*	25	1.3
Kaposi's tumour*	25	1.3			

Stanleyville 1939-55 (Thijs)					
Site	Total	%	Site	Total	%
Reticulo-endothelial tumours	190	16.3	Skin	69	16.3
Liver	185	16.0	Liver	43	10.1
Skin	179	15.5	Penis	42	10.0
Kaposi's tumour	155	13.3	Bladder	20	4.7
Sarcoma	68	5.9	Prostate	19	4.5
Penis	45	3.8	Stomach	19	4.5
Salivary gland	33	2.9	Colon	15	3.5
Stomach	19	1.6	Eye	13	3.0
Eye	19	1.6	Oesophagus	11	2.6
Breast	18	1.5	Rectum	10	2.3
Testis	12	1.0	Lung and bronchus	8	1.9
Scrotum	12	1.0	Pancreas	5	1.1

Kampala 1952-53 (Davies)					
Site	Total	%	Site	Total	%
Skin	69	16.3	Liver	43	10.1
Liver	43	10.1	Penis	42	10.0
Penis	42	10.0	Bladder	20	4.7
Bladder	20	4.7	Prostate	19	4.5
Prostate	19	4.5	Stomach	19	4.5
Stomach	19	4.5	Colon	15	3.5
Colon	15	3.5	Eye	13	3.0
Eye	13	3.0	Oesophagus	11	2.6
Oesophagus	11	2.6	Rectum	10	2.3
Rectum	10	2.3	Lung and bronchus	8	1.9
Lung and bronchus	8	1.9	Pancreas	5	1.1
Pancreas	5	1.1			

Nigeria 1935-44 (Elmes and Baldwin)					
Site	Total	%	Site	Total	%
Liver	57	11.9	Liver	57	11.9
Kaposi's tumour	22	4.6	Kaposi's tumour	22	4.6
Stomach	13	2.7	Stomach	13	2.7
Penis	10	2.1	Penis	10	2.1
Prostate	8	1.7	Prostate	8	1.7
Breast	7	1.5	Breast	7	1.5
Testis	7	1.5	Testis	7	1.5
Scrotum	5	1.0	Scrotum	5	1.0

‡ Tumours less than 1.0 per cent are not included in this table.

† Europeans from Lourenço Marques included for comparison.

* Denotes both sexes.

TABLE VIII.—*Order of Frequency of Malignant Neoplasms in African Females in Different Parts of the Continent of Africa †*

Lourenço Marques					
European †			African		
Site	Total	%	Site	Total	%
Breast	66	23.8	Cervix uteri	89	20.6
Cervix uteri	55	19.8	Liver	63	14.6
Skin	42	15.1	Skin	60	13.9
Corpus uteri	14	5.0	Breast	32	7.4
Stomach	13	4.7	Bladder	31	7.2
Sarcoma	13	4.7	Lymphomata	25	5.8
Chorion-epithelioma	10	3.6	Vagina	24	5.5
Ovary	9	3.2	Eye	19	4.4
Gall bladder	7	2.5	Sarcoma	15	3.4
Vagina	6	2.1	Bones	11	2.5
Colon	6	2.1	Mouth	9	2.1
Hodgkin's disease	6	2.1	Lip	7	1.6
Small intestine	3	1.0	Thyroid	6	1.4
Liver	3	1.0	Ovary	5	1.1
Lymph nodes : (secondary)	3	1.0	Salivary gland	5	1.1

Johannesburg					
1926-33 (Berman)					
Site	Total	%	Site	Total	%
Cervix uteri	27	27.3	Cervix uteri	27	27.3
Breast	25	25.3	Breast	25	25.3
Corpus uteri	15	15.2	Corpus uteri	15	15.2
Ovary	6	6.1	Ovary	6	6.1
Stomach	6	6.1	Stomach	6	6.1
Liver	5	5.0	Liver	5	5.0
Skin	3	3.0	Skin	3	3.0
Thyroid	3	3.0	Thyroid	3	3.0
Lip	1	1.0	Lip	1	1.0
Salivary gland	1	1.0	Salivary gland	1	1.0
Colon	1	1.0	Colon	1	1.0
Rectum	1	1.0	Rectum	1	1.0
Pancreas	1	1.0	Pancreas	1	1.0
Nose	1	1.0	Nose	1	1.0
Vulva	1	1.0	Vulva	1	1.0
Kidney	1	1.0	Kidney	1	1.0
Lymph nodes	1	1.0	Lymph nodes	1	1.0

Johannesburg					
1953-55 (Higginson and Oettlé)					
Rural, 1953-55			Urban, 1953-55		
Site	Total	%	Site	Total	%
Cervix uteri	68	27.4	Cervix uteri	198	41.6
Skin	30	12.1	Breast	50	10.5
Breast	28	11.3	Liver	25	5.2
Liver	15	6.0	Ovary	19	4.0
Bones	14	5.6	Stomach	17	3.5
Salivary gland	12	4.8	Leukaemia	16	3.3
Corpus uteri	9	3.6	Lymphomata	16	3.3
Lymphomata	9	3.6	Lymph nodes :		
Stomach	8	3.2	(secondary)	13	2.7
Sinuses	7	2.8	Brain	12	2.5
Ovary	5	2.0	Skin	12	2.5
Bladder	5	2.0	Salivary gland	12	2.5
Adamantinoma	4	1.6	Large intestine	9	1.8
Kidney	4	1.6	Thyroid	7	1.4
Eye	4	1.6	Lung and bron-	7	1.4
Pharynx	3	1.2	chus		
Vulva	3	1.2	Rectum	6	1.2
Leukaemia	3	1.2	Chorion-	5	1.0
			epithelioma		

Durban					
1950-56 (Wainwright)					
Site	Total	%	Site	Total	%
Cervix uteri	374	19.2	Cervix uteri	374	19.2
Skin*	271	14.1	Skin*	271	14.1
Liver*	128	7.2	Liver*	128	7.2
Oesophagus*	119	6.1	Oesophagus*	119	6.1
Breast	113	5.8	Breast	113	5.8
Lung and bron-	89	4.5	Lung and bron-	89	4.5
chus*			chus*		
Bladder*	54	2.8	Bladder*	54	2.8
Mouth, tongue*	50	2.5	Mouth, tongue*	50	2.5
Stomach*	44	2.2	Stomach*	44	2.2
Nasopharynx*	44	2.2	Nasopharynx*	44	2.2
Intestine, colon*	38	1.9	Intestine, colon*	38	1.9
Ovary	30	1.5	Ovary	30	1.5
Vulva	25	1.3	Vulva	25	1.3
Kaposi's tumour *	25	1.3	Kaposi's tumour *	25	1.3

Stanleyville					
1939-55 (Thijs)					
Site	Total	%	Site	Total	%
Cervix uteri	162	17.9	Cervix uteri	58	18.5
Skin	120	13.2	Ovary	36	11.5
Breast	109	12.0	Breast	28	9.0
Ovary	77	8.8	Skin	25	8.0
Reticulo-endo-	67	7.4	Corpus uteri	19	6.0
thelial tumours			Liver	13	4.1
Sarcoma	44	4.9	Colon	11	3.5
Salivary gland	41	4.5	Oesophagus	6	2.0
Liver	41	4.5	Rectum	6	2.0
Vulva	27	2.9	Eye	6	2.0
Kaposi's tumour	18	1.9	Stomach	5	1.6
Stomach	14	1.5	Vagina	4	1.2
Eye	13	1.4	Vulva	4	1.2
Corpus uteri	11	1.2	Thyroid	4	1.2
Chorion-epithe-	10	1.1	Salivary gland	1	1.2
lioma					
Mouth	9	1.0			

Kampala					
1952-53 (Davies)					
Site	Total	%	Site	Total	%
Cervix uteri	58	18.5	Cervix uteri	58	18.5
Ovary	36	11.5	Ovary	36	11.5
Breast	28	9.0	Breast	28	9.0
Skin	25	8.0	Skin	25	8.0
Corpus uteri	19	6.0	Corpus uteri	19	6.0
Liver	13	4.1	Liver	13	4.1
Colon	11	3.5	Colon	11	3.5
Oesophagus	6	2.0	Oesophagus	6	2.0
Rectum	6	2.0	Rectum	6	2.0
Eye	6	2.0	Eye	6	2.0
Stomach	5	1.6	Stomach	5	1.6
Vagina	4	1.2	Vagina	4	1.2
Vulva	4	1.2	Vulva	4	1.2
Thyroid	4	1.2	Thyroid	4	1.2
Salivary gland	1	1.2	Salivary gland	1	1.2

Nigeria					
1935-44					
(Elmes and Baldwin)					
Site	Total	%	Site	Total	%
Breast	77	21.4	Breast	77	21.4
Uterus	68	16.4	Uterus	68	16.4
Ovary	20	5.5	Ovary	20	5.5
Chorion-epithe-	9	2.5	Chorion-epithe-	9	2.5
lioma			lioma		
Vulva	7	1.9	Vulva	7	1.9
Vagina	5	1.4	Vagina	5	1.4
Stomach	5	1.4	Stomach	5	1.4

† Tumours less than 1.0 per cent are not included in this table.

† Europeans from Lourenço Marques included for comparison.

* Denotes both sexes.

are more frequent than in any other part of Africa from which information is available. Furthermore, having regard to the imperfections of the statistical information, there is more than suggestive evidence that liver cancer in males and primary carcinoma of the cervix in females still constitute a pan-African problem in such remotely separated regions as Kampala and Johannesburg. The surprisingly high frequency ratio of cancer of the stomach in African males in Johannesburg and of carcinoma of the oesophagus, bronchus and lungs in males in Johannesburg and Durban suggest that an environmental rather than a genetic factor is at play in the aetiology of these cancers.

Although there are many features in common in the frequency ratio of cancer in various parts of Africa, there is also sufficient diversity to suggest that selection of specific areas for more intensive study might provide much valuable information about the possible aetiological factors responsible for the difference in the susceptibility to cancer of the various organs of the body. In view of the rapidly changing socio-economic conditions in Africa, it is urgent that aetiological studies be initiated without delay lest the opportunity be lost of probing the aetiology of those types of tumours which are afflicting populations not only in the western world but also in Africa and in Asia.

SUMMARY

An analysis has been presented of 1977 malignant neoplasms diagnosed at autopsy and by histological examination and accumulated over a period of 13 years in the Province of Mozambique, Portuguese East Africa. Of these tumours, 1273 were derived from Africans, 580 from Europeans and 124 from other ethnic groups.

Attention was drawn to the high frequency ratio of carcinoma of the liver in African males and to the fact that 73.5 per cent of all malignant neoplasms occurred in four sites, namely, the liver (43.1 per cent), the skin (13.9 per cent), lymphoid tissues (8.6 per cent) and urinary bladder (7.9 per cent). Carcinoma of the oesophagus, stomach, colon and rectum, lung and bronchus were remarkably low in the African as compared with European males living in Mozambique. Carcinoma of the cervix uteri was the commonest tumour (20.6 per cent) in African females and together with carcinoma of the liver (14.6 per cent), skin (13.9 per cent), and bladder (7.2 per cent) was responsible for 56.3 per cent of all malignancies as compared with 36.6 per cent of tumours in comparable sites in European females. Noteworthy was the high frequency of cervical carcinoma as compared with carcinoma of the body of the uterus and the relatively low frequency of breast cancer (7.4 per cent) in African females.

This analysis disclosed that primary carcinoma of the liver was occurring with unusual frequency in young people although the age of maximum incidence could not be established before completion of the rates survey now in progress.

It became evident that in the absence of well established cancer registries, data accumulated from the hospital and routine pathology laboratory could provide a useful guide to the frequency ratio of various cancers in Africa. From a comparison of the data compiled in Lourenço Marques with that derived from other African territories, it was apparent (1) that amongst African males, primary liver cancer and in females, carcinoma of the cervix uteri, with two exceptions were the most frequently occurring malignant neoplasms and (2) that there were notable

differences in the frequency ratios of malignant neoplasms in different regions in Africa. The urgency for initiating aetiological studies to explore the basis for these differences was emphasized.

I wish to acknowledge my indebtedness to Professor Joseph Gillman for his stimulating encouragement and helpful advice and criticism during the progress of this work, and to Dr. Christine Gilbert for her invaluable assistance in the preparation of the manuscript.

I wish to thank the National Cancer Association of South Africa for a generous grant which is facilitating the accomplishment of the present study.

REFERENCES

- BERMAN, C.—(1935) *S. Afr. J. med. Sci.*, **1**, 12.
 CAMAIN, R.—(1954) *Bull. Mem. de l'Ecole Med et Pharm. Dakar*, **2**, 208.
 DAVIES, J. N. P.—(1948) *E. Afr. med J.*, **25**, 117.
 DES LIGNERIS, M. J. A.—(1936) *S. Afr. med. J.*, **10**, 478.
 ELMES, B. G. T. AND BALDWIN, R. E. T.—(1947) *Ann. trop. Med. Parasit.*, **41**, 321.
 FINDLAY, G. M.—(1949) *J. R. micr. Soc.*, **69**, 166.
 GELFAND, M.—(1948) 'The Sick African'. Capetown (Stewart).
 HIGGINSON, J.—(1951) *Cancer*, **4**, 1224.
 PIRIE, J. H.—(1921) *Med. J. S. Afr.*, **17**, 87.
 PRATES, M.—(1938) 'Actas do 1° Cong. Med. de Lourenço Marques'. Set.
 SMITH, E. C. AND ELMES, B. G. T.—(1934) *Ann. trop. Med. Parasit.*, **28**, 461.
 STRACHAN, A. G.—(1934) *J. Path. Bact.*, **39**, 209.
 THUJS, A.—(1957) *Ann. Soc. belge Med. trop.*, **37**, 483.
 VINT, F. W.—(1935) *Lancet*, ii, 628.
 WAINWRIGHT, J. AND ROACH, G. G.—(1957) *S. Afr. Cancer Bull.*, **1**, 162.
-