

## THE INCIDENCE OF MALIGNANT NEOPLASMS IN JAMAICA

G. BRAS, D. C. WATLER AND A. ASHMEADE-DYER

*From the Jamaica Cancer Registry, Department of Pathology, University of the West Indies, Jamaica*

Received for publication June 24, 1965

To determine cancer incidences accurately it is necessary to have adequate diagnostic facilities available to the population at risk, as well as demographic data on that population. The Jamaica Cancer Registry therefore restricts its activity to that region of Jamaica where these desiderata are fulfilled. Figures accumulated over a six-year period—1958–1963 inclusive—are now presented.

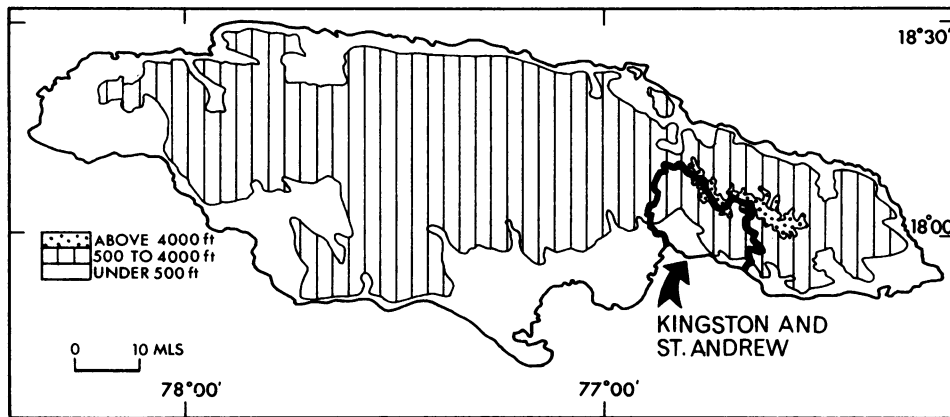


FIG. 1.—The island of Jamaica; elevations above sea level are shown.

*Geographical data.*—Fig. 1 shows an outline of Jamaica giving elevations above sea level, Fig. 2 gives details on the parishes served by the Cancer Registry; these data include rock types, rainfall, background gamma radiation in micro roentgen per hour. Some climatological data are grouped in Table I.

Kingston is in the rain shadow of the Blue Mountains (peak 7430 ft high), where moist North East trade winds lose most of their water. Consequently

TABLE I.—*Climatological Data for Kingston\**

Temperature in degrees F.		Humidity		Sunshine	
Mean . . . . .	79	Mean . . . . .	80%	Jan.—March	70–72% (Max.)
Hottest monthly average . . . . .	81	Highest month (Oct.)	84%	Sept.—Nov.	50–57% (Min.)
Coolest „ . . . . .	76	Lowest „ (July)	76%		
Annual range . . . . .	5				
Highest ever . . . . .	97				
Coolest ever . . . . .	50				

\* Average of readings over 33 years, 4 times daily, at elevation of 100 ft.

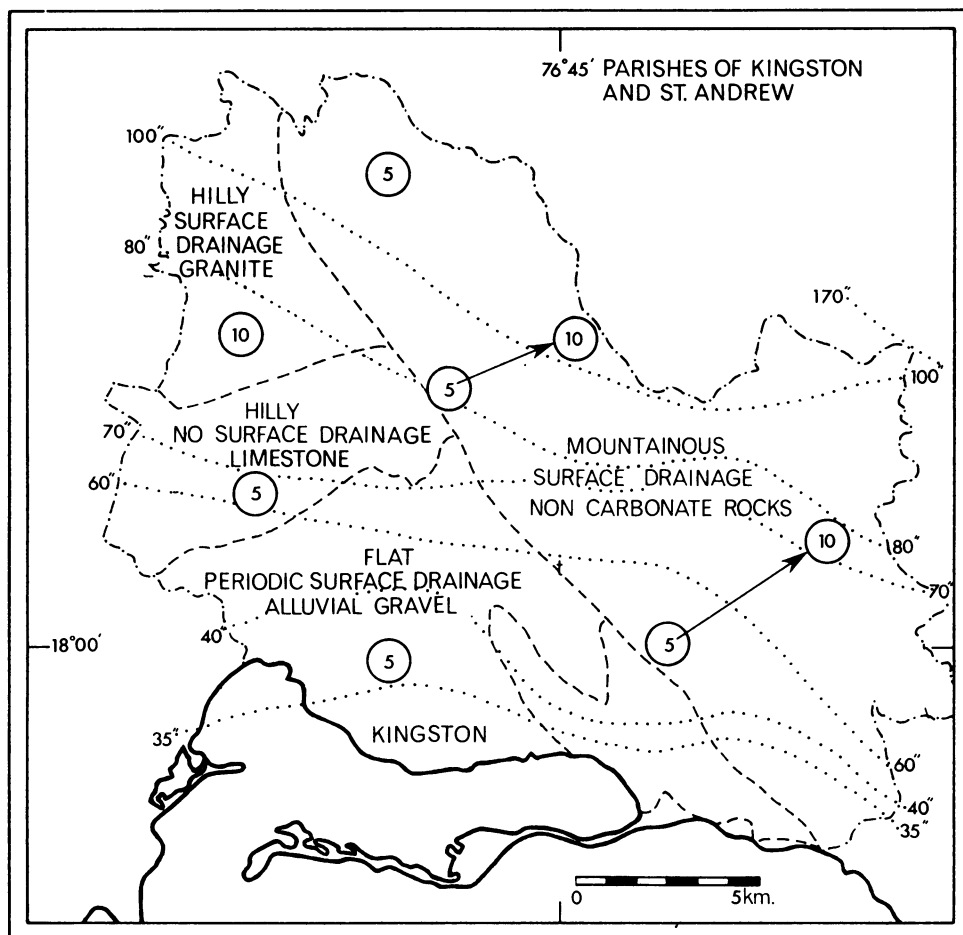


FIG. 2. Some data on the parishes of Kingston and St. Andrew including rock types, rainfall in inches per annum, and (circled) background gamma radiation in micro roentgen per hour.

whereas the rainfall in the Blue Mountains is 200 in. per annum it is less than 40 in. per annum in the city of Kingston.

Two rainy periods occur respectively in May and October and most rain falls in torrential downpours. Droughts causing serious water shortages occurred frequently before modern hydrological methods came into use approximately 30 years ago.

*Demographical data.*—Data provided by Roberts (1957) show that the population of Jamaica has since 1844 retained a greater degree of homogeneity than most of the other populations of the West Indies; there was only a small amount of migration after cessation of the slave trade. Ever since 1881, when full racial breakdowns first became available, 96% in the population returns were made up by those groups designated as black (Negroes) and as coloured (mainly the product of Negro and European inter mixture); these groups have consistently made up

respectively 78% and 18% of the total population, which between 1844 and 1960 rose from 377,433 to 1.6 million.

TABLE II.—*Population of Kingston and St. Andrew Census, 1960*

Age group	Male	Female
0-4	32,373	32,078
5-9	23,197	23,933
10-14	17,032	19,012
15-19	17,108	22,816
20-24	17,865	23,712
25-29	16,151	21,654
30-34	13,145	17,155
35-39	11,805	15,743
40-44	10,343	12,222
45-49	9,342	11,085
50-54	7,387	9,084
55-59	5,091	6,565
60-64	3,686	5,012
65-69	2,051	3,277
70-74	1,451	2,538
75-79	904	1,775
80+	837	1,987
Total = 189,768		Total = 229,648

Of special interest for our Cancer Registry is an analysis of racial elements in the Kingston and St. Andrew area. Roberts' figures show that Whites are the most urban with 60% of their numbers in Kingston and St. Andrew, followed by Chinese (50%), Coloured (30%), East Indian (20%), Negroes (16%). This means that in the Kingston and St. Andrew population—having approximately  $\frac{1}{5}$  of the total island's population—Negroes make up 65% and Coloured 30% of the

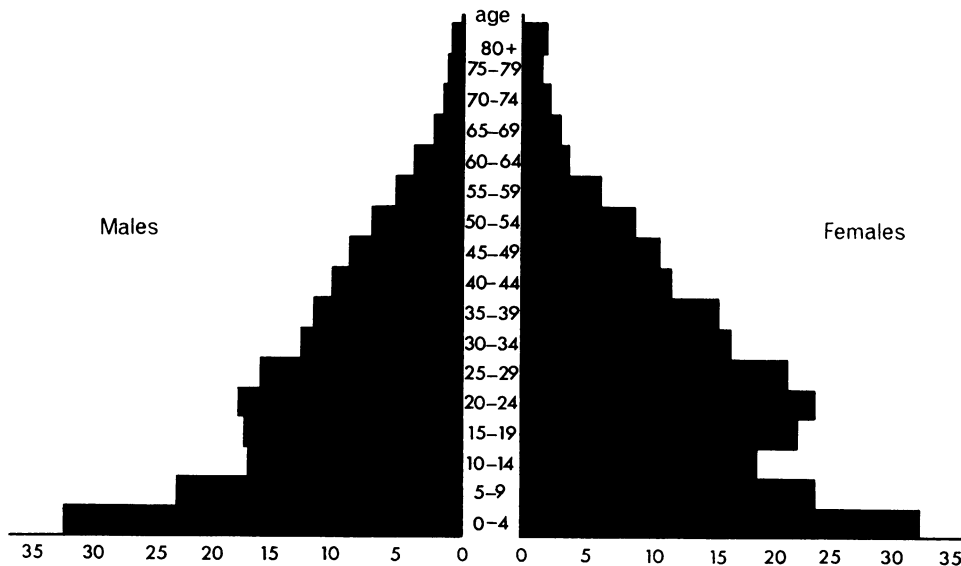


FIG. 3.—The Jamaican population (in thousands) during the 1960 census.

TABLE III.—Data on All Cancer Cases (1958-63)

Year	Sex	Kingston Public Hospital				University Hospital				Private cases (including T.B. Sanatorium)				Total number of all cases			
		Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow	Total No. confirmed by histology and bone marrow	Percentage confirmed by histology and bone marrow		
1958	M.	43	64.2	59	81.9	20	18	18	90.0	159	75.5	120	75.5				
	F.	107	80.5	95	93.1	28	21	21	75.0	263	84.8	223	84.8				
1959	M.	79	68.4	64	86.5	24	19	19	79.2	177	77.4	137	77.4				
	F.	154	79.2	94	95.9	30	22	22	73.3	282	84.4	238	84.4				
1960	M.	94	80.9	54	96.4	33	17	17	51.5	183	80.3	147	80.3				
	F.	169	75.7	108	92.3	51	35	35	68.6	337	80.4	271	80.4				
1961	M.	84	66.7	83	94.3	35	13	13	37.1	207	73.4	152	73.4				
	F.	134	81.3	98	89.9	44	29	29	65.9	287	82.2	236	82.2				
1962	M.	79	84.8	72	91.1	14	6	6	42.9	172	84.3	145	84.3				
	F.	141	90.0	130	95.6	35	24	24	68.6	312	90.1	281	90.1				
1963	M.	77	93.5	76	90.5	41	20	20	48.8	202	83.2	168	83.2				
	F.	155	90.3	119	98.3	41	25	25	61.0	317	89.6	284	89.6				
1958-63	M.	480	77.1	409	90.3	167	95	95	56.9	1100	79.0	869	79.0				
Totals	F.	836	82.7	644	94.3	229	156	156	68.1	1798	85.3	1533	85.3				

population in this area. The remaining 5% is made up approximately as follows : Chinese 1.2%, East Indians 0.4%, Europeans 0.3%, others 3.1%.

*Occupational data.*—"Unfortunately, in analysing occupational data, we enter a domain in which census material proves often treacherous and unrewarding" (Roberts, 1957, p. 85). Figures available show the following sub-division of the working force: professional 5%, domestic (personal) 14%, commercial 11%, agricultural 44%, industrial 26%. Industrialization, however, is progressing rapidly and the agricultural labour force decreasing concurrently.

Literacy proportions (percentage of population over 5 able to read and write) is above 90% of the Kingston and St. Andrew area, but even in the most backward parishes the figure is not below 60%.

#### *Organization of the Registry and Results*

The Registry is centred at the University—just outside Kingston. It records all cases diagnosed in the Kingston and St. Andrew hospitals. This area is served by several well equipped hospitals and the Registry staff collects data on cancer from all hospitals, nursing homes and medical practitioners (Table III).

Returns from the Registrar General are compared with and provide a cross-check with the figures so obtained.

Histological confirmation for the cancer diagnosis was obtained in 79% of the male cases and 85% of the female cases (Table IV). Where no histology was available the diagnosis was only accepted on combined clinical and radiological evidence.

The patient's permanent address was carefully checked and, for purposes of the incidence study reported here, only residents of Kingston and St. Andrew were included.

During 1958–1963 a total of 2898 malignant neoplasms were registered (Table V); Table VI gives data for each year of operation.

#### *Comparison with other countries*

Tables VII and VIII compare some of our findings with data from Denmark (Clemmesen and Nielsen, 1952) and from African Bantus (Higginson and Oettlé, 1960).

The following seem worthy of further comment: *Oesophageal carcinoma* has a high incidence, as in the Bantu. *Primary carcinoma of the liver* is much rarer than in the Bantu, but more common than in Denmark. *Carcinoma of stomach* is the single most frequent tumour in the Jamaican male; gastro-intestinal cancers are more frequent than in the Bantu but below the Danish figures. *Cancer of the skin* is remarkably common in Jamaica when compared with the Bantus. *Reproductive organs.* Penis carcinoma is common in Jamaica as it is in the Bantu and so is carcinoma of the cervix uteri; (circumcision is not common in Jamaican males). Testis cancers are rare in Jamaicans and Bantus. Breast cancer is common in Jamaica and Denmark, rarer in the Bantu.

#### SUMMARY

The Cancer Registry in Jamaica has accumulated complete data on a population of 420,000 in whom, during 1958–1963 inclusive, a total of 2898 malignant neoplasms were observed. Table V shows the distribution of these tumours by

TABLE IV.—*Basis of Diagnosis made on all Cancer Cases by Primary Site and Sex (1958-63)*

Site No.	Primary site	Sex	Total No. of cases	Basis of diagnosis (No. of cases)					Percentage verified by histology and bone marrow
				Clinical only	X-ray	Operation without Histology	Histology and bone marrow	Autopsy with histology	
140-204	. All sites	. M. . . . .	1100	127	78	26	701	168	79.0
		. F. . . . .	1798	201	36	28	1421	112	85.3
140	. Lip	. M. . . . .	3	—	—	—	3	—	100
		. F. . . . .	5	1	—	—	4	—	80
141	. Tongue	. M. . . . .	20	3	—	—	16	1	85
		. F. . . . .	10	—	—	—	10	—	100
142	. Salivary glands	. M. . . . .	7	—	—	—	7	—	100
		. F. . . . .	11	2	—	—	9	—	81.8
143	. Floor of mouth	. M. . . . .	4	—	—	—	4	—	100
		. F. . . . .	4	—	—	—	4	—	100
144	. Mouth unspecified	. M. . . . .	9	—	—	—	9	—	100
		. F. . . . .	11	1	—	—	10	—	90.9
145	. Mesopharynx	. M. . . . .	2	—	—	—	2	—	100
		. F. . . . .	1	—	—	—	1	—	100
146	. Nasopharynx	. M. . . . .	9	2	—	—	7	—	77.8
		. F. . . . .	5	1	1	—	3	—	60
147	. Hyphopharynx	. M. . . . .	3	—	—	—	3	—	100
		. F. . . . .	1	—	—	—	1	—	100
148	. Pharynx unspecified	. M. . . . .	9	1	—	—	8	—	88.9
		. F. . . . .	1	—	—	—	1	—	100
150	. Oesophagus	. M. . . . .	87	2	14	1	60	10	80.5
		. F. . . . .	39	3	5	—	29	2	79.5
151	. Stomach	. M. . . . .	160	13	22	10	83	32	71.9
		. F. . . . .	91	11	9	6	54	11	71.4
152	. Small intestine	. M. . . . .	1	—	—	—	—	—	100
		. F. . . . .	0	—	—	—	—	—	—
153	. Colon	. M. . . . .	48	4	4	4	28	8	75.0
		. F. . . . .	80	8	5	10	50	7	71.3
154	. Rectum	. M. . . . .	28	2	—	5	21	—	75.0
		. F. . . . .	51	2	1	1	44	3	92.2
155A	. Primary liver	. M. . . . .	26	1	—	—	11	14	96.2
		. F. . . . .	11	—	—	—	2	9	100
155B	. Biliary passages	. M. . . . .	13	1	—	1	3	8	84.6
		. F. . . . .	24	1	—	—	16	7	95.8
156	. Liver (secondary) with primary unspecified	. M. . . . .	7	—	—	—	4	3	100
		. F. . . . .	2	—	—	—	1	1	100

157	. Pancreas . . . . .	M.	19	.	2	—	3	10	4	73.7
158	. Peritoneum . . . . .	F.	14	.	4	—	2	3	5	57.1
159	. Unspecified digestive organs	F.	0	.	—	—	—	1	—	100
160	. Nose, nasal cavities, middle ear, sinuses	F.	0	.	—	—	—	—	—	—
161	. Larynx . . . . .	M.	5	.	—	1	—	4	—	80
162	. Bronchus lung primary	F.	10	.	2	—	—	10	2	100
164	. Mediastinum . . . . .	M.	24	.	—	—	—	20	—	91.7
170	. Breast . . . . .	F.	2	.	—	—	—	2	—	100
171	. Cervix uteri . . . . .	M.	83	.	3	20	1	37	23	72.3
172	. Corpus uteri . . . . .	F.	24	.	1	5	1	9	8	70.8
173	. Chorio carcinoma . . . . .	M.	3	.	—	1	—	1	1	66.7
174	. Uterus unspecified . . . . .	F.	1	.	1	—	—	4	—	80
175	. Ovary, tube and broad ligament	M.	5	.	1	—	—	270	5	87.3
176	. Other unspecified female organs	F.	315	.	39	—	1	—	—	—
177	. Prostate . . . . .	F.	0	.	40	—	—	477	5	92.3
178	. Testis . . . . .	M.	522	.	—	—	—	—	—	—
179	. Penis . . . . .	F.	0	.	4	—	—	35	1	90.0
180	. Kidney . . . . .	M.	40	.	—	—	—	16	4	100
181	. Bladder urethra and other urinary organs	F.	20	.	—	—	—	—	—	—
190	. Malignant melanoma of skin	F.	0	.	—	—	—	—	—	—
191	. Skin . . . . .	M.	0	.	—	—	—	—	—	—
192	. Eye . . . . .	F.	0	.	—	—	—	—	—	—
193	. Nervous system. . . . .	M.	0	.	—	—	—	—	—	—
		F.	11	.	—	1	1	—	—	—
		M.	0	.	—	—	—	—	—	—
		F.	78	.	1	—	4	64	9	93.6
		M.	0	.	—	—	—	—	—	—
		F.	29	.	3	—	—	26	8	89.7
		M.	72	.	18	9	—	37	8	62.5
		F.	0	.	—	—	—	—	—	—
		M.	5	.	—	—	—	4	1	100
		F.	0	.	—	—	—	—	—	—
		M.	62	.	5	—	—	53	4	91.9
		F.	0	.	—	—	—	—	—	—
		M.	18	.	—	—	—	13	5	100
		F.	13	.	—	—	—	11	2	100
		M.	36	.	2	1	—	27	6	91.7
		F.	32	.	1	1	1	25	4	90.6
		M.	7	.	—	—	—	7	—	100
		F.	12	.	1	—	1	9	1	83.3
		M.	103	.	45	—	—	58	—	56.3
		F.	109	.	45	—	—	63	1	58.7
		M.	8	.	—	—	—	8	—	100
		F.	10	.	1	—	—	9	—	90
		M.	22	.	1	—	—	13	8	95.5
		F.	11	.	—	1	—	5	4	81.8

TABLE IV—*contd.*

Site No.	Primary site	Sex	Total No. of cases	Basis of diagnosis (No. of cases)				Autopsy with histology	Percentage verified by histology and bone marrow
				Clinical only	X-ray	Operation without histology	Histology and bone marrow		
194	Thyroid gland	M.	8	1	—	—	5	87.5	
		F.	20	2	—	—	17	90.0	
195	Other endocrine glands	M.	2	—	—	—	2	100	
		F.	2	—	1	—	1	50	
196	Bone	M.	12	1	—	—	9	91.7	
		F.	9	2	—	—	6	77.8	
197	Connective tissue, muscle	M.	15	—	—	—	14	100	
		F.	24	—	—	—	23	100	
198	Secondary in lymph node (primary unspecified)	M.	9	—	—	—	9	100	
		F.	11	2	—	—	9	81.8	
199	Other unspecified sites	M.	41	16	4	2	16	46.3	
		F.	66	24	5	—	32	56.1	
200.0	Reticulum cell sarcoma	M.	3	—	—	—	3	100	
		F.	6	—	—	—	5	100	
200.1	Lymphosarcoma	M.	21	—	—	—	14	100	
		F.	18	—	—	—	14	100	
200.2	Malignant lymphomatype unspecified	M.	3	—	—	—	3	100	
		F.	3	—	—	—	3	100	
201	Hodgkin's disease	M.	27	—	—	—	24	100	
		F.	3	—	—	—	2	100	
202	Giant follicular lymphoma	M.	3	—	—	—	3	100	
		F.	2	—	—	—	2	100	
203	Multiple myeloma	M.	10	—	2	—	5	80	
		F.	9	1	1	—	4	77.8	
204.0	Chronic lymphatic leukaemia	M.	6	—	—	—	4	100	
		F.	9	—	—	—	8	100	
204.1	Chronic myeloid leukaemia	M.	10	—	—	—	9	100	
		F.	6	—	—	—	6	100	
204.3	Acute leukaemia	M.	22	1	—	—	17	95.5	
		F.	19	—	—	—	15	100	
140-204	All sites	M.	1100	127	78	26	701	79.0	
		F.	1798	201	36	28	1421	85.3	
210	Mixed salivary gland (benign)	M.	10	—	—	—	10	100	
		F.	14	1	—	—	13	92.9	









TABLE VI.—*Total Number of New Cancer Cases Diagnosed for the Period 1958–63 by Primary Site, Sex and Year*

Site		1958	1959	1960	1961	1962	1963	Total
140 . Lip . . . . .	M.	1	—	—	1	1	—	3
	F.	0	2	1	1	—	1	5
141 . Tongue . . . . .	M.	4	2	5	3	2	4	20
	F.	1	3	3	1	2	—	10
142 . Salivary glands . . . . .	M.	0	2	3	—	—	2	7
	F.	1	—	3	2	2	3	11
143 . Floor of mouth . . . . .	M.	0	1	—	2	—	1	4
	F.	1	1	1	—	—	1	4
144 . Mouth unspecified . . . . .	M.	2	1	—	2	—	4	9
	F.	5	1	—	2	1	2	11
145 . Mesopharynx . . . . .	M.	2	—	—	—	—	—	2
	F.	0	—	1	—	—	—	1
146 . Nasopharynx . . . . .	M.	0	1	1	5	—	2	9
	F.	1	—	—	2	1	1	5
147 . Hyphopharynx . . . . .	M.	2	—	—	1	—	—	3
	F.	1	—	—	—	—	—	1
148 . Pharynx unspecified . . . . .	M.	1	3	3	1	1	—	9
	F.	0	—	—	—	—	1	1
150 . Oesophagus . . . . .	M.	11	12	18	17	14	15	87
	F.	7	5	10	5	6	6	39
151 . Stomach . . . . .	M.	21	21	29	35	26	28	160
	F.	18	16	12	9	21	15	91
152 . Small intestine . . . . .	M.	1	—	—	—	—	—	1
	F.	0	—	—	—	—	—	0
153 . Colon . . . . .	M.	5	8	5	9	11	10	48
	F.	10	14	13	12	20	11	80
154 . Rectum . . . . .	M.	4	3	6	5	3	7	28
	F.	7	5	12	11	8	8	51
155 <sup>A</sup> . Liver (1°) . . . . .	M.	6	4	5	4	2	5	26
	F.	0	1	3	1	4	2	11
155 <sup>B</sup> . Biliary passages . . . . .	M.	6	2	2	1	—	2	13
	F.	5	7	3	1	3	5	24
156 . Liver (2°) . . . . .	M.	3	1	—	—	3	—	7
	F.	0	1	—	1	—	—	2
157 . Pancreas . . . . .	M.	5	3	2	—	5	4	19
	F.	3	—	4	6	—	1	14
158 . Peritoneum . . . . .	M.	—	—	—	—	—	—	0
	F.	—	—	—	1	—	—	1
159 . Unspecified digestive organs	M.	—	—	—	—	—	—	0
	F.	—	—	—	—	—	—	0
160 . Nose, nasal cavities, middle ear, sinuses . . . . .	M.	0	1	1	1	2	—	5
	F.	3	1	2	—	2	2	10
161 . Larynx . . . . .	M.	3	3	4	3	6	5	24
	F.	1	—	—	—	—	1	2
162 . Bronchus, lung (1°) . . . . .	M.	14	14	11	9	19	16	83
	F.	1	2	6	6	4	5	24
164 . Mediastinum . . . . .	M.	—	—	1	1	1	—	3
	F.	—	—	—	1	—	—	1
170 . Breast . . . . .	M.	—	1	—	2	2	—	5
	F.	39	53	58	54	55	56	315
171 . Cervix uteri . . . . .	M.	—	—	—	—	—	—	0
	F.	85	83	97	82	92	83	522
172 . Corpus uteri . . . . .	M.	—	—	—	—	—	—	0
	F.	8	3	7	6	10	6	40
173 . Chorio carcinoma . . . . .	M.	—	—	—	—	—	—	0
	F.	4	3	4	5	1	3	20
174 . Uterus unspecified . . . . .	M.	—	—	—	—	—	—	0
	F.	—	—	—	—	—	—	0
175 . Ovary, tube and broad ligament . . . . .	M.	0	—	—	—	—	—	0
	F.	14	12	12	9	9	22	78
176 . Other unspecified female organs . . . . .	M.	—	—	—	—	—	—	0
	F.	1	4	2	7	6	9	29



TABLE VII.—*Comparison of Cancer Incidence in All Sites by Age Groups*

Age groups	Males			Females		
	K. & St. A. (1958-1963)	Denmark (1943-1947)	S.A. Bantu (1953-1955)	K. & St. A. (1958-1963)	Denmark (1943-1947)	S.A. Bantu (1953-1955)
	No. observed	No. expected	No. expected	No. observed	No. expected	No. expected
0-14	44	103.6	44.0	31	95	31.8
15-24	30		35.6	40		44.3
25-34	50	65.4	59.9	138	137.3	106.6
35-44	90	104.3	93.2	279	302.1	224.7
45-54	238	217.7	181.5	480	433.5	296.3
55-64	299	283.8	172.8	364	427.7	393.3
65-74	230	233.9	122.4	270	360.5	225.6
75+	104	188.7	63.8	165	367.7	112.1
Unknown	15	—	—	31	—	—
Total	1100	1197.4	773.2	1798	2123.8	1434.7

TABLE VIII.—*Comparison of Cancer Incidence in Kingston and St. Andrew (1958-1963) with Denmark (1943-1947)*

Site	Males		Females	
	No. of cases K. & St. A.	Cases expected at Danish rates	No. of cases K. & St. A.	Cases expected at Danish rates
	Buccal cavity & pharynx	66	21.2	49
Oesophagus	87	29.9	39	24.2
Stomach	160	236	91	268.7
Large intestine and rectum	76	200	131	246.9
Liver (1°)	26	3.6	11	3.3
Lung	83	80.3	24	24.3
Breast	5	—	315	419.0
Cervix	—	—	522	297.2
Body of uterus	—	—	40	78.3
Testes	5	32.9	—	—
Penis	62	7.1	—	—
Skin	103	93.5	109	96.9
Leukaemias	38	56.4	34	53.4
Other sites	389	436.8	433	589.8
Total	1100	1197.7	1798	2123.8

primary site and by sex. Table VII compares the total cancer incidence with those in Denmark and in the South African Bantu; Table VIII compares Jamaica and Denmark regarding certain cancer types.

This Registry is supported by the British Empire Cancer Campaign for Research.

## REFERENCES

- ROBERTS, G. W.—(1957) 'The Population of Jamaica'. Cambridge University Press.  
 CLEMMESSEN, J. AND NIELSEN, A.—(1952) *Acta. Un. int. Cancr.*, **8**, 140.  
 HIGGINSON, J. AND OETTLÉ, A. G.—(1960) *J. natn. Cancer Inst.*, **24**, 589.