

For major salivary gland total, the largest numbers of patients in any single decade are seen in the age groups of 50-59 years (116 patients or 19.4 per cent. of 597 cases) and 60-69 years (113 patients or 18.9 per cent. of 597 cases) (Table 70). About 16.1 per cent. of patients are seen below the age of 40 years, and only 5.8 per cent. are 80 and over years of age.

SITE OF OCCURRENCE

The parotid gland is by far more frequently involved in cancer than the other two major salivary glands (Table 98). Of the 597 patients in this study, 542 (90.8 per cent.) have malignancy of the parotid gland, 53 (8.9 per cent.) have cancer of the submaxillary gland, and only 2 patients (0.3 per cent.) are with malignant neoplasms of the sublingual gland. This compares closely with the findings of others:

	Parotid Gland %	Submaxillary Gland %	Sublingual Gland %	Total No. of Cases
FOOTE and FRAZELL ⁹⁷	80.8	18.0	1.2	323
RAWSON et al.. ²⁸³	86.5	10.8	2.7	37
LATHROP ¹⁶³	81.2	16.7	2.1	96
PRESENT SERIES	90.8	8.9	0.3	597

Similar findings are noted by Vellios and Davidson,³⁸⁵
Bauer and Bauer,³³ and Lucas.¹⁷⁰

Table 99 is an attempt to allocate the lesions

TABLE 98

CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA
(1959-1964 INCLUSIVE)
SITE DISTRIBUTION

SITE	NUMBER	PERCENTAGE
PAROTID SALIVARY GLAND	542	90.8
SUBLINGUAL SALIVARY GLAND	2	0.3
SUBMAXILLARY SALIVARY GLAND	53	8.9
MAJOR SALIVARY GLAND, TOTAL	597	100.0

TABLE 99
CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA BY SEX, SITE, and LATERALITY. (1959-1964 inclusive).

SEX	MALE										FEMALE							
	LATERALITY		LEFT SIDE		RIGHT SIDE		SIDE UNSPECIFIED		TOTAL		LEFT SIDE		RIGHT SIDE		SIDE UNSPECIFIED		TOTAL	
SITE	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%	
PAROTID SALIVARY GLAND	133	44.9	141	47.6	22	7.4			296		102	21.5	118	48.0	26	10.5	246	
SUBLINGUAL SALIVARY GLAND	1	100.0	-	-	-	-			1		1	100.0	-	-	-	-	1	
SUBMAXILLARY SALIVARY GLAND	8	28.6	6	21.4	14	50.0			28		6	24.0	7	28.0	12	48.0	25	
MAJOR SALIVARY GLAND, TOTAL	142	43.7	147	45.2	36	11.1			325		109	40.1	125	46.0	38	13.9	272	

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into the right or left of these paired salivary glands. Of 325 male patients with the disease, the left (43.7 per cent.) and the right (45.2 per cent.) glands are involved with almost equal frequency. A similar trend of site distribution is seen in the group of 272 female patients - left glands, 40.1 per cent. and right glands, 46 per cent.

When the individual paired salivary glands are taken into consideration, for 296 male patients with cancer of the parotid gland, the left (44.9 per cent.) and the right (47.6 per cent.) glands are involved in almost the same number of instances, whereas in the group of 246 female patients, the right parotid gland (48 per cent.) seems to be more frequently involved than the left parotid gland (21.5 per cent.). In the group of patients with malignancy of the submaxillary salivary gland, the left submaxillary (male 28.6 per cent., female 24 per cent.) and the right submaxillary (male 21.4 per cent, female 28 per cent.) glands in both sexes are involved with almost equal frequency. In the two patients with cancer of the sublingual gland, both have the lesions on the left gland.

HISTOPATHOLOGIC TYPE

From Table 100, it can be seen that a great many of the patients case histories in the present

TABLE 100
CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA BY SEX, SITE, and DIAGNOSIS (1959 - 1964 INCLUSIVE).

SEX		MALE										FEMALE										MALE and FEMALE TOTAL	
SITE	DIAGNOSIS	PAROTID		SUBLINGUAL		SUB-MAXILLARY		MAJOR SALIVARY GLAND, TOTAL		PAROTID		SUBLINGUAL		SUB-MAXILLARY		MAJOR SALIVARY GLAND, TOTAL		FEMALE					
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%				
	SQUAMOUS CELL CARCINOMA	33	11.4	-	-	3	10.7	36	11.1	12	4.9	-	-	2	8.0	14	5.1	50	8.4				
	MALIGNANT PLEOMORPHIC ADENOMA	15	5.1	-	-	1	3.6	16	4.9	17	6.9	-	-	2	8.0	19	7.0	35	5.9				
	ADENOID CYSTIC CARCINOMA	2	0.7	-	-	-	-	2	0.6	3	1.2	-	-	2	8.0	5	1.8	7	1.2				
	MUCOEPIDERMOID CARCINOMA	8	2.7	-	-	-	-	8	2.5	7	2.8	-	-	1	4.0	8	2.9	16	2.7				
	ACINIC CELL ADENO-CARCINOMA	3	1.0	-	-	-	-	3	0.9	2	0.8	-	-	-	-	2	0.7	5	0.8				
	ADENOCARCINOMA	28	9.5	-	-	2	7.1	30	9.2	27	11.0	-	-	3	12.0	30	11.0	60	10.1				
	UNSPECIFIED MIXED SALIVARY GLAND TUMOUR	120	40.1	-	-	8	28.6	128	39.4	141	57.3	-	-	9	36.0	150	55.2	278	46.6				
	CARCINOMA, UNSPECIFIED	83	28.0	1	100.0	14	50.0	98	30.2	34	13.8	1	100.0	6	24.0	41	15.1	139	23.2				
	MALIGNANT NEOPLASM, UNSPECIFIED	4	1.5	-	-	-	-	4	1.2	3	1.3	-	-	-	-	3	1.2	7	1.1				
	TOTAL	296	100.0	1	100.0	28	100.0	325	100.0	246	100.0	1	100.0	25	100.0	272	100.0	597	100.0				

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study are unsatisfactory with regards to specific diagnosis of the lesions encountered. There is a large group of patients with mixed salivary gland tumours in which the malignancy or otherwise of the lesions is not specified. After carefully studying the case histories of this group of patients, the author has included 278 such cases in the study to avoid an under reporting of malignancy in these salivary glands. There is also a large group of patients (139 cases or 23.2 per cent. of 597 cases) whose case histories simply record a diagnosis of "carcinoma" in which the histological type is not specified. This again reflects inadequacy in the case histories to allow a better table to be compiled.

It is worthy of note that there are only 50 patients (8.4 per cent.) with squamous cell carcinoma in these salivary glands as compared to the large number of histologic salivary gland type of tumours. In this later group, more specifically, there are 278 patients (69.3 per cent. of 401 cases of salivary gland type of tumours) with unspecified mixed salivary gland tumour, 60 (15 per cent.) with adenocarcinoma, 35 (8.7 per cent.) with specified malignant mixed tumour (malignant pleomorphic adenoma), 16 (4 per cent.) with mucoepidermoid carcinoma, 7 (1.7 per

cent.) with adenoid cystic carcinoma, and 5 (1.2 per cent.) with acinic cell adenocarcinoma.

Foote and Frazell,⁹⁷ in a study of 325 cases of malignancy of the major salivary glands, noted the following histopathologic types:

	<u>No. of cases</u>
MUCOEPIDERMOID CARCINOMA	98
ADENOCARCINOMA	94
MALIGNANT PLEOMORPHIC ADENOMA	57
SQUAMOUS CARCINOMA	39
UNSPECIFIED	37

TREATMENT

Table 101 shows the type of treatment used in the management of patients with cancer of the major salivary gland in Australia. Of the 585 patients treated, 345 (59 per cent.) had surgery, only 44 (7.5 per cent.) received radiotherapy, and 196 (33.5 per cent.) were treated by a combination of surgery and radiotherapy. In this later group, a great majority of the patients were treated with adequate surgery first, followed by a tumour dose of post-irradiation therapy. Surgery was used more often than radiotherapy in the treatment of all histologic types of malignancy encountered in these salivary glands. Surgery took the form of parotidectomy (total, subtotal or partial) and in some instances of very advanced

TABLE 101

CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA (1959-1964 INCLUSIVE) DIAGNOSIS VS. TREATMENT

TYPE OF TREATMENT	RADIOTHERAPY		SURGERY		RADIOTHERAPY and SURGERY		TOTAL
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE	
SQUAMOUS CELL CARCINOMA	3	6.0	26	52.0	21	42.0	50
MALIGNANT PLEOMORPHIC ADENOMA	3	8.8	7	20.6	24	70.6	34
ADENOID CYSTIC CARCINOMA	—	—	6	85.7	1	14.3	7
MUCOEPIDERMOID CARCINOMA	2	13.3	6	40.0	7	46.7	15
ACINIC CELL ADENOCARCINOMA	—	—	3	60.0	2	40.0	5
ADENOCARCINOMA	5	8.6	29	50.0	24	41.4	58
UNSPECIFIED MIXED SALIVARY GLAND TUMOUR	10	3.6	206	74.9	59	21.5	275
CARCINOMA, UNSPECIFIED	20	14.9	60	44.8	54	40.3	134
MALIGNANT NEOPLASM UNSPECIFIED	1	14.3	2	28.6	4	57.1	7
TOTAL	44	7.5	345	59.0	196	33.5	585

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diseases, in addition to total parotidectomy and facial nerve excision, removal of the pinna , partial excision of the temporal bone, partial mandibulectomy, and radical neck dissection were performed.

Table 102 shows the types of treatment related to the occurrence of the disease in the three different salivary glands. Of 289 male patients with malignancy of the parotid gland, 167 (57.8 per cent.) had surgery , 16 (5.5 per cent.) received radiotherapy, and 106 (36.7 per cent.) were treated by surgery plus supplementary irradiation. A similar trend in the choice of therapy is seen for 243 female patients with cancer of the parotid gland.-145 (59.7 per cent.) treated by surgery, 21 (8.6 per cent.) had radiotherapy, and 77 (31.7 per cent.) had surgery and radiotherapy.

In the group of 27 male patients with malignant involvements of the submaxillary gland, 16 (59.3 per cent.) were treated by surgery, 5 (18.5 per cent.) received radiotherapy, and 6 (22.2 per cent.) had surgery and radiotherapy. Compared to the 24 female patients with cancer in this gland, 17 (70.8 per cent.) had surgery, 1 (4.2 per cent.) received radiotherapy, and 6 (25 per cent.) were treated by surgery and radiotherapy. In the two patients with malignancy of the sublingual salivary gland, one had radiotherapy

TABLE 102
CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA BY SEX, SITE and TREATMENT. (1959-1964 INCLUSIVE)

SEX		MALE						FEMALE									
TREATMENT TO PRIMARY		RADIOOTHERAPY		SURGERY		RADIOOTHERAPY and SURGERY		TOTAL		RADIOOTHERAPY		SURGERY		RADIOOTHERAPY and SURGERY		TOTAL	
SITE		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PAROTID SALIVARY GLAND		16	5.5	167	57.8	106	36.7	289		21	8.6	145	59.7	77	31.7		243
SUBLINGUAL SALIVARY GLAND		1	100.0	-	-	-	-	1		-	-	-	-	1	100.0		1
SUBMAXILLARY SALIVARY GLAND		5	18.5	16	59.3	6	22.2	27		1	4.2	17	70.8	6	25.0		24
MAJOR SALIVARY GLAND TOTAL		22	6.9	183	57.7	112	35.4	317		22	8.2	162	60.4	84	31.4		268

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and the other was treated by surgery with supplementary radiotherapy.

Of 245 patients who received some form of radiotherapy (that is, those who were treated solely by radiotherapy and those having supplementary irradiation after surgery), there is a large group of 132 patients (53.9 per cent.) whose case histories indicate that some form of unspecified X-ray irradiation was given. (Table 103). DXRT was used in 72 patients (29.4 per cent.), MVT in 24 patients (9.4 per cent.) and Cobalt 60 in 6 patients (3.7 per cent.). The remaining small number of cases was treated by combinations of these.

When the individual states in Australia are taken into consideration, the types of treatment used in the management of patients with cancer of the major salivary gland in the different states are as follows:

	Radio- therapy %	Surgery %	Radiotherapy and Surgery %	Total No. of Cases
NEW SOUTH WALES	3.6	82.6	13.8	225
VICTORIA	8.2	67.1	24.7	146
QUEENSLAND	1.0	18.8	80.2	96
SOUTH AUSTRALIA	9.2	55.4	35.4	65
WESTERN AUSTRALIA	42.8	21.5	35.7	28
TASMANIA	16.1	9.7	74.2	31

TABLE 103
CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA BY SEX, SITE, and TREATMENT BY RADIOTHERAPY (1959-1964 INCL.).

SEX	SITE	MALE						FEMALE						MALE and FEMALE TOTAL					
		PAROTID GLAND		SUBLINGUAL GLAND		SUBMAXILLARY GLAND		MAJOR SALIVARY GLAND, TOTAL		PAROTID GLAND		SUBLINGUAL GLAND			SUBMAXILLARY GLAND		MAJOR SALIVARY GLAND, TOTAL		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%	
TYPE OF RADIOTHERAPY TO PRIMARY																			
SXRT		1	0.8	-	-	-	-	1	0.7	-	-	-	-	-	-	-	-	1	0.4
MVT		13	10.5	-	-	4	33.3	17	12.4	7	7.1	-	-	-	-	7	6.5	24	9.8
DXRT		31	25.0	-	-	5	41.7	36	26.3	33	33.3	-	-	3	42.9	36	33.3	72	29.4
SXRT and DXRT		1	0.8	-	-	-	-	1	0.7	-	-	-	-	-	-	-	-	1	0.4
MVT and DXRT		-	-	1	100.0	-	-	1	0.7	-	-	-	-	-	-	-	-	1	0.4
XRT, UNSPECIFIED		71	57.3	-	-	1	8.3	72	52.6	56	56.6	1	100.0	3	42.9	60	55.6	132	53.9
IMPLANT		-	-	-	-	-	-	-	-	1	1.0	-	-	1	14.2	2	1.8	2	0.8
IMPLANT and XRT		2	1.6	-	-	-	-	2	1.5	-	-	-	-	-	-	-	-	2	0.8
RADIOTHERAPY, UNSPECIFIED		-	-	-	-	1	8.3	1	0.7	-	-	-	-	-	-	-	-	1	0.4
COBALT 60		5	4.0	-	-	1	8.3	6	4.4	3	3.0	-	-	-	-	3	2.8	9	3.7
TOTAL		124	100.0	1	100.0	12	100.0	137	100.0	99	100.0	1	100.0	7	100.0	108	100.0	245	100.0

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A review of the literature indicates that surgical extirpation is the generally accepted treatment of choice for patients with primary malignant tumours of the major salivary glands and, in some instances, a combination of surgery and radiotherapy has been used.^{4, 97, 99, 101, 163, 217, 332} For the treatment of cervical lymph node metastases, surgery is also the preferred treatment. In the present study, of 54 patients treated for metastases, 36 patients (66.7 per cent.) had surgery to the secondary disease and 18 (33.3 per cent.) had radiotherapy (Table 104).

PROGNOSIS

The prognosis of patients with cancer of the major salivary gland is summarised in Table 105. The crude cumulative five year survival rate for 326 male patients with the disease is 74.8 per cent. and that for 271 female patients is 75.7 per cent. The corresponding relative five year survival ratios for the two groups are 0.893 and 0.840 respectively, indicating that the five year survivals are about the same in male patients and in female patients.

In the group of patients with malignancy of the parotid gland, for 291 men, the crude cumulative five year survival rate is 64.2 per cent., and for 244 women, this is 75.6 per cent. For male, the

TABLE 104

CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA.
TREATMENT TO METASTASES

Site	Parotid Salivary Gland		Submaxillary Salivary Gland		Sublingual Salivary Gland		Major Salivary Gland, Total	
	No.	%	No.	%	No.	%	No.	%
TYPE OF TREATMENT TO SECONDARY								
RADIOTHERAPY	12	28.6	5	45.5	1	100.0	18	33.3
SURGERY	30	71.4	6	54.5	—	—	36	66.7
TOTAL	42	100.0	11	100.0	1	100.0	54	100.0

TABLE 105

CANCER OF THE MAJOR SALIVARY GLAND IN AUSTRALIA*
PROGNOSIS

	Total No. of cases		Crude cumu- lative five year survi- val rate %		Expected five year survival rate %		Relative five year survival ratio	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
CANCER OF THE MAJ- OR SALIVARY GLAND, TOTAL	326	271	74.8	75.7	83.7	90.0	0.893	0.840
CANCER OF THE PAROTID GLAND	291	244	64.2	75.6	68.8	89.9	0.934	0.840
CANCER OF THE SUB- MAXILLARY GLAND	*	*	—	—	—	—	—	—
CANCER OF THE MAJ- OR SALIVARY GLAND — TOTAL CASES TREATED BY RADIO- THERAPY	*	*	—	—	—	—	—	—
CANCER OF THE MAJ- OR SALIVARY GLAND — TOTAL PATIENTS TREATED BY SURGERY	185	161	65.6	74.9	84.4	89.9	0.776	0.834
CANCER OF THE MAJ- OR SALIVARY GLAND — TOTAL PATIENTS TREATED BY SURGERY AND RADIOTHERAPY	113	83	67.4	87.6	86.9	91.8	0.775	0.954
CANCER OF THE MAJ- OR SALIVARY GLAND — TOTAL SALIVARY GLAND TYPE TUMOURS	185	212	63.8	77.3	88.0	91.8	0.725	0.842
CANCER OF THE MAJ- OR SALIVARY GLAND — TOTAL SQUAMOUS CELL CARCINOMA	*	*	—	—	—	—	—	—
CANCER OF THE MAJ- OR SALIVARY GLAND — CARCINOMA, UNSPECIFIED	101	41	55.8	59.9	77.8	87.2	0.717	0.687

*Number of patients in the group too small for working out accurate five year survival rate.

relative five year survival ratio is 0.934, and that for female is 0.840, reflecting a better five year survivals in the male group. Unfortunately, the group of patients with cancer of the submaxillary gland is too small to permit the calculation of an accurate five year survival rate.

When prognosis is related to types of treatment used, of 185 male patients treated by surgery, the cumulative survival rate for five years is 65.6 per cent. and that for 161 female patients is 74.9 per cent. The five year survivals is better for the female group than the male group as is indicated by the relative five year survival ratio of 0.834 for female as compared to 0.776 for male. In the group of patients who were treated by surgery and radiotherapy, the crude cumulative survival rate for 113 male patients at the end of five years is 67.4 per cent. and that for 83 female patients is 87.6 per cent. The corresponding relative five year survival ratios for the two groups are 0.775 and 0.954, indicating a much better five year survivals for female patients. An accurate five year survival rate is not available for those patients treated by radiotherapy, because of the small number of patients in this group.

When relating prognosis to the histopathologic type of the tumours seen in these glands, for 185 male patients with salivary gland type of tumours, the crude cumulative five year survival rate is 63.8 per cent. and that for 212 female patients is 77.3 per cent. The relative five year survival ratios are 0.725 and 0.842 respectively, reflecting a better five year survivals in the female group of patients. The crude cumulative survival rate for 101 male patients with carcinoma unspecified is 55.8 per cent. and that for 41 female patients is 59.9 per cent. A better five year survivals is obtained for the male group than for the female group as is indicated by the relative five year survival ratios of 0.717 and 0.687 respectively.

In the series investigated by Frazell,¹⁰¹ he reports that for the group of 201 determinant patients with malignancy of the major salivary gland, the cure rate is 40.5 per cent., with a very high cure rate (93.1 per cent.) for patients with low grade mucoepidermoid carcinoma and a low cure rate (19.2 per cent.) for those with squamous cell carcinoma. The relatively favourable prognosis of patients with cancer of the major salivary gland in the present study is undoubtedly partly influenced by the inclusion of a large group of patients with unspecified mixed

salivary gland tumours in the series.

CANCER OF THE MINOR (ACCESSORY) SALIVARY GLAND

GENERAL INCIDENCE

During the six year period from 1959 to 1964, there are 48 cases of cancer of the minor salivary gland registered in the major hospitals around Australia. Five hundred and ninety-seven patients with malignancy of the major salivary gland are seen in the same period. Thus, cancer of the intraoral accessory salivary gland comprises approximately 7.4 per cent. of malignancy of all salivary glands. The findings of other investigators in this regard are as follows:

	Percentage of Access- ory salivary gland cancer to malignancy of all salivary glands	Total no. of cases of malignant tumours of salivary gland
VELLIOS and DAVIDSON ³⁸⁵	25.6	43
LATHROP ¹⁶³	5	101
RAWSON et al. ²⁸³	16	44
PRESENT SERIES	7.4	645

SEX INCIDENCE

Of the 48 patients with malignancy of the minor salivary gland, there are 26 men and 22 women, giving a male to female ratio of 1.2:1 in favour of men (Table 106). According to other investigators, the sex

TABLE 106

CANCER OF THE ACCESSORY (MINOR) SALIVARY GLAND IN AUSTRALIA
 (1959-1964 INCLUSIVE).
 SEX DISTRIBUTION

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
ACCESSORY SALIVARY GLAND	26	54.2	22	45.8	48	1.2:1

distribution of this disease is as follows:

	<u>Male/Female Ratio.</u>	<u>Total no. of cases</u>
CHAUDHRY, VICKERS and GORLIN ⁶⁹	1.7:1	48
BROWN, BISHOP and GIRARDEAU ³⁸	1:1.4	24
VELLIOS and SHAFER ³⁸⁷	1:1	27
SMITH ³³³	1:1.8	14
FINE, MARSHALL and HORN ¹⁰²	1:1.6	37
PRESENT SERIES	1.2:1	48

AGE INCIDENCE

The average age of 26 male patients with cancer of the minor salivary gland is 52.4 years and that for 22 female patients is 51 years, whereas the average age for male and female total is 51.5 years. This closely parallels the findings of 52.4 years reported by Smith³³³ in his investigation of 14 patients with this disease. Fine, Marshall and Horn,¹⁰² in an analysis of 37 cases, indicate that the average age of the patients was 54.4 years, whereas Chaudhry, Vickers and Gorlin⁶⁹ report an average age of 58.6 years in their study of 51 cases.

In the present study, the median age of the male patients is 53.2 years and that for female patients is 51.4 years, whereas for male and female together, the median age is 52 years. This is higher than the

median age of 47 years reported by Vellios and Shafer³⁸⁷ in their study of 27 cases.

SITE OF OCCURRENCE

Table 107 shows the site of occurrence of this disease. The palate is the most frequently involved site - 29 cases, or 60.4 per cent. of 48 cases. Involvements of the hard palate are more common than the soft palate. The lip is the next most frequent site involved - 10 cases, or 20.9 per cent. The upper lip is slightly more than twice as commonly involved as the lower lip. The third most commonly involved site is the buccal mucosa of the cheek (6 cases, or 12.4 per cent.), then the floor of the mouth (2 cases or 4.2 per cent.), and tongue (1 case, or 2.1 per cent.).

The site distribution of the disease according to other investigators is as follows:

CHAUDHRY, VICKERS and GORLIN⁶⁹ - palate 269 cases, tongue 117 cases, cheek 65 cases, alveolar region 50 cases, lip 35 cases, and 34 cases unspecified (total 571 cases).

FINE, MARSHALL and HORN¹⁰² - palate 14 cases, floor of the mouth 8 cases, cheek 6 cases, lip 5 cases, and tongue 4 cases (total 37 cases).

TABLE 107

CANCER OF THE ACCESSORY (MINOR) SALIVARY GLAND IN
AUSTRALIA. (1959-1964 INCLUSIVE). SITE DISTRIBUTION

SITE	No.	%
SALIVARY GLAND OF:-		
HARD PALATE	12	25.0
SOFT PALATE	6	12.5
PALATE, UNSPECIFIED	11	22.9
UPPER LIP	7	14.6
LOWER LIP	3	6.3
BUCCAL MUCOSA OF CHEEK	6	12.4
FLOOR OF THE MOUTH	2	4.2
TONGUE	1	2.1
TOTAL	48	100.0

VELLIOS and SHAFER³⁸⁷ - palate 12 cases, alveolar region 7 cases, lip 5 cases, cheek 1 case, and 2 cases unspecified (total 27 cases).

BROWN, BISHOP and GIRARDEAU³⁸ - palate 8 cases, cheek 6 cases, tongue 6 cases, alveolar region 3 cases, and floor of the mouth 1 case (total 24 cases).

SMITH³³³ - palate 6 cases, cheek 3 cases, alveolar region 2 cases, tongue 1 case, and floor of the mouth 1 case (total 13 cases).

VELLIOS and DAVIDSON³⁸⁵ - palate 3 cases, and 8 cases unspecified (total 11 cases).

BAUER and BAUER³³ - palate 5 cases, and lip 1 case (total 6 cases).

HISTOPATHOLOGIC TYPE

Of the 48 patients with malignancy of the intra-oral accessory salivary gland, there are 19 patients (39.6 per cent.) with adenocarcinoma, 4 (8.3 per cent.) with mucoepidermoid carcinoma, 4 (8.3 per cent.) with adenoid cystic carcinoma, and 2 (4.2 per cent.) with malignant pleomorphic adenoma (Table 108). There are 19 patients (39.6 per cent.) whose case histories record a diagnosis of mixed salivary gland tumour in which the malignancy or otherwise of the lesion is not specified.

TABLE 108

CANCER OF THE ACCESSORY (MINOR) SALIVARY GLAND IN AUSTRALIA.
 HISTOLOGIC TYPE.
 (1959-1964 INCLUSIVE)

SITE	ACCESSORY SALIVARY GLAND					
SEX	MALE		FEMALE		MALE and FEMALE	
DIAGNOSIS	No.	%	No.	%	No.	%
MALIGNANT PLEOMORPHIC ADENOMA	1	3.8	1	4.5	2	4.2
ADENOID CYSTIC CARCINOMA	1	3.8	3	13.6	4	8.3
MUCOEPIDERMOID CARCINOMA	2	7.7	2	9.0	4	8.3
ADENOCARCINOMA	11	42.3	8	26.4	19	39.6
UNSPECIFIED MIXED SALIVARY TUMOUR	11	42.3	8	26.4	19	39.6
TOTAL	26	100.0	22	100.0	48	100.0

TABLE 109

CANCER OF THE ACCESSORY (MINOR) SALIVARY GLAND IN AUSTRALIA
 (1959-1964 INCLUSIVE).
 TREATMENT TO PRIMARY

SITE	ACCESSORY SALIVARY GLAND					
SEX	MALE		FEMALE		MALE and FEMALE	
TREATMENT	No.	%	No.	%	No.	%
RADIOTHERAPY	6	23.1	3	15.8	9	20.0
SURGERY	17	65.4	14	73.7	31	68.9
RADIOTHERAPY and SURGERY	3	11.5	2	10.5	5	11.1
TOTAL	26	100.0	19	100.0	45	100.0

The study of Brown, Bishop and Girardeau³⁸ indicates that there are 16 patients with adenocarcinoma, 5 with mucoepidermoid carcinoma, and 3 with malignant mixed tumour of a total of 24 cases. Chaudhry, Vickers and Gorlin,⁶⁹ in a study of 51 cases, report that 19 patients have cylindromatous adenocarcinoma, 17 with adenocarcinoma, 10 with mucoepidermoid carcinoma, 3 with malignant mixed tumour, 1 with undifferentiated carcinoma, and 1 with carcinoma unclassified. Similar findings of various different histologic type of tumours as seen in these intraoral minor glands are to be found in the studies of Vellios and Shafer,³⁸⁷ Fine, Marshall and Horn,¹⁰² and Smith.³³³

TREATMENT

Table 109 is a summary of the types of treatment used in the management of patients with primary cancer of the accessory salivary gland in Australia. As in cancer of the major salivary gland, surgery is the main type of treatment used. Of 45 treated patients, 31 (68.9 per cent.) were treated by surgery, 5 (11.1 per cent.) by radiotherapy, and 9 (20 per cent.) by a combination of surgery and radiotherapy.

A review of the literature indicates that surgery is the preferred treatment of choice for patients with this disease.^{38, 69, 333}

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA

GENERAL INCIDENCE

From 1959 to 1964 inclusive, there are 329 patients with cancer of the floor of the mouth registered in the major hospitals around Australia (Table 59). This is made up of 264 men and 65 women in the series. Throughout the six year period, the number of cases per year varies irregularly with no particular trend, and the corresponding incidence rates per 100,000 population per year (Table 61) show a similar irregular distribution throughout the years with no major changes in the rates from 1959 to 1964 for male and female separately and for the two sexes together.

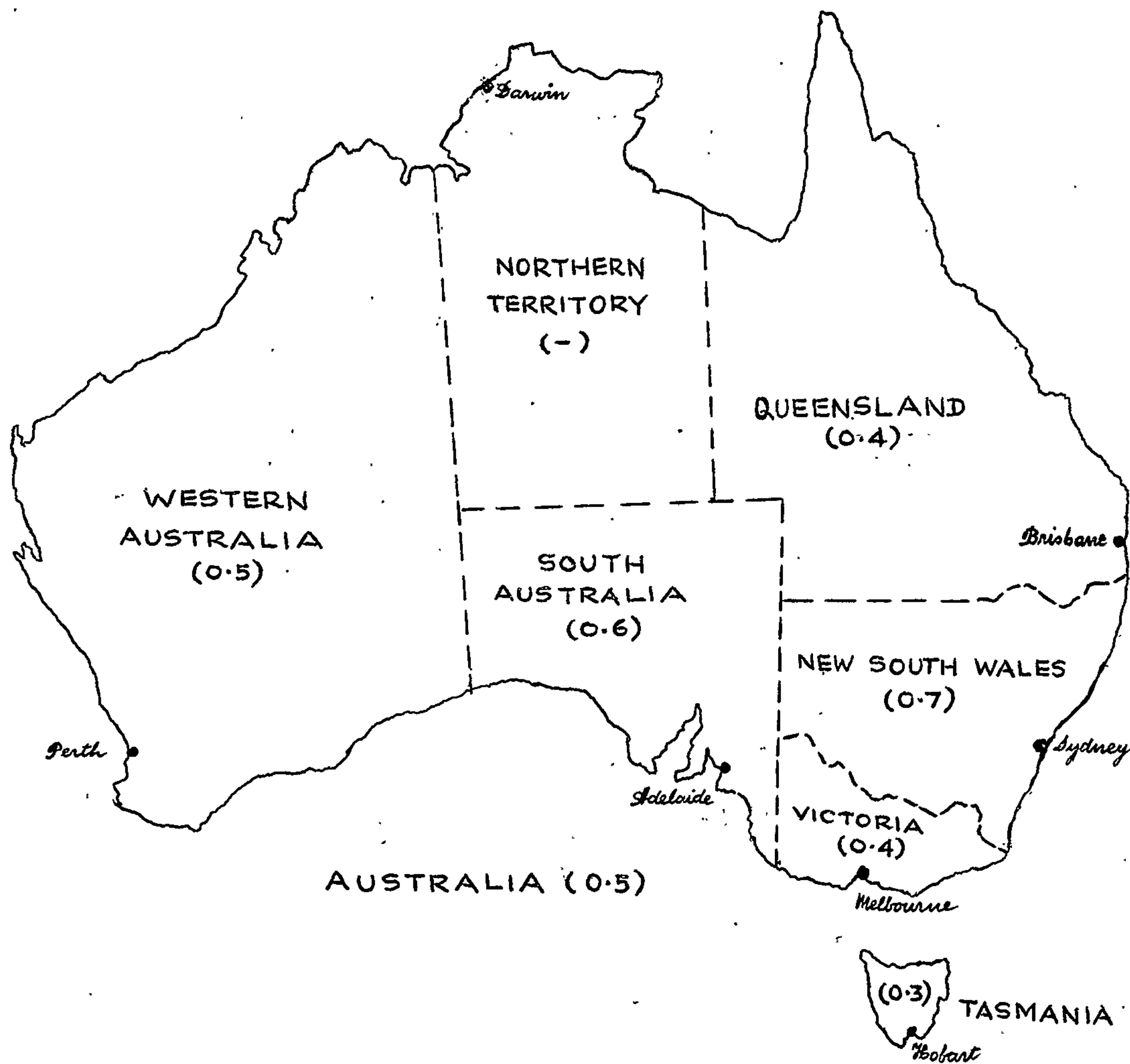
When considering the number of patients with this disease in the different states, Table 62 indicates that for male and female total, New South Wales has by far the most number of patients with this condition - 160 cases. Next is Victoria with 72 cases, then South Australia with 35 cases, Queensland with 32 cases, Western Australia with 23 cases, and Tasmania with 7 cases. In all the states, there are more males with this disease than females.

The rate per 100,000 population for male and female patients with this disease for the whole of

Australia is 0.5, whereas for male and female separately the rates are 0.8 and 0.2 per 100,000 respectively (Table 64). When individual states are being considered, New South Wales has a rate of 0.7 per 100,000 for male and female together, South Australia 0.6, Western Australia 0.5, Victoria and Queensland 0.4, and Tasmania 0.3. In considering the two sexes separately, the rate per 100,000 for male in New South Wales and South Australia is 1.0, Western Australia 0.9, for Victoria, Queensland and Tasmania, the rates are 0.7, 0.5, and 0.4 respectively. For female, New South Wales and Tasmania have a rate of 0.3 per 100,000, Queensland and South Australia 0.2, and Victoria and Western Australia 0.1.

According to the Victorian Central Cancer Registry, there are 30,837 cases of cancer between 1959 and 1964. Of these, there are 76 patients with malignancy of the floor of the mouth, representing about 0.2 per cent. of all human cancer. This is much lower than estimates reported by other overseas investigators. Thus, Martin and Sugarbaker¹⁹⁷ indicate that cancer at this site of the oral cavity comprises 1.4 per cent. of all admissions for cancer at the Memorial Hospital in New York. Similarly, Hauser¹³⁵ reports that malignancy of the floor of the mouth represents 1.5 per cent. of

FIGURE 12



() INDICATES RATE PER 100,000 POPULATION PER YEAR

CANCER OF THE FLOOR OF THE MOUTH AS SEEN
IN THE MAJOR HOSPITALS IN AUSTRALIAN
STATES 1959-1964

all human cancer. On the other hand, Mattick, Meehan and Häberlin²⁰⁴ indicate that, according to the record of the Rosswell Park Memorial Institute, New York, carcinoma of the floor of the mouth makes up 0.6 per cent. of all cancer admission seen in that institution.

In the present study, cancer of the floor of the mouth comprises 5.7 per cent. of all cases of oral malignancy (International Classification Numbers 140-144, and 191.0) and is the fourth most common mouth cancer in Australia (Table 62). When individual states are being considered, the percentage of malignancy in this intraoral site to all oral cancer in the different states are as follows: New South Wales 10.8 per cent., South Australia 6.6 per cent., Victoria 4.6 per cent., Western Australia 4.1 per cent., Tasmania 2.5 per cent., and Queensland 2.4 per cent. The relatively high percentage obtained for New South Wales as compared to the other states has slightly been influenced by the smaller number of patients with lip cancer (due to under-reporting) recorded for New South Wales.

A review of the literature indicates that cancer in this intraoral site comprises from 6.5 per cent. (as given by Castigliano⁵¹) to 22 per cent. (as indicated by Gardner¹¹⁷ in his study) of all oral cancer. In between these two estimates, Hauser¹³⁵ indicates that it is

7 to 9 per cent., Sharp, Bullock and Hazlet 13 per cent., Shafer, Hine and Levy³¹⁸ 15 per cent., Martin and Sugarbaker¹⁹⁷ 17 per cent., and Mattick, Meehan and Häberlin²⁰⁴ 17 per cent. All these could have been special studies influenced by special selections.

If cancer of the floor of the mouth is related to malignancy of the intraoral cavity proper (International Classification Numbers 141, 143 and 144 - that is, minus cancer of the lip and salivary gland), it ranks as the second most common form of mouth cancer and comprises 20.8 per cent. of all malignancy of the intraoral cavity proper in Australia (Table 65). When a breakdown of individual states is being considered, for Tasmania, New South Wales, South Australia and Victoria, this is much the same - 22.6 per cent., 22.4 per cent., 22.2 per cent. and 21.5 per cent. respectively - whereas for Queensland and Western Australia it is slightly lower, 15.8 per cent. for the former state and 16.8 per cent. for the latter state.

SEX INCIDENCE

In the present study, of 329 patients with cancer of the floor of the mouth, there are 264 men and 65 women in the series, giving a male to female ratio of 4.1 to 1 in favour of men (Table 110). From a review of the literature, the male to female ratio of this

TABLE 110
 CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA
 (1959-1964 INCLUSIVE)*
 SEX DISTRIBUTION

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
FLOOR OF THE MOUTH	264	80.2	65	19.8	329	4.1:1

disease as reported by overseas investigators are much higher for men:

	<u>Year</u>	<u>Male/ Female Ratio</u>	<u>Total No. of cases</u>
WELCH and NATHANSON ⁴⁰³	1937	31.3:1	250
MARTIN and SUGARBAKER ¹⁹⁷	1940	33.3:1	103
MATTICK, MEEHAN and HABERLIN ²⁰⁴	1950	32.7:1	98
WINDEYER ^{407*}	1953	11.8:1	131
ASH and MILLAR ¹⁰	1955	12.7:1	110
ERICH and KRAGH ⁹⁰	1959	10.3:1	102
HAUSER ¹³⁵	1959	20.0:1	-
PRESENT SERIES	1967	4.1:1	329

*including 16 cases of carcinoma of the lower alveolus.

In the present study, if individual state is being considered, the sex distribution of this disease in the different states is as follows:

	<u>Male/Female Ratio</u>	<u>Total No. of cases</u>
NEW SOUTH WALES	3.4:1	160
VICTORIA	5.0:1	72
QUEENSLAND	3.6:1	32
SOUTH AUSTRALIA	6.0:1	35
WESTERN AUSTRALIA	10.5:1	23
TASMANIA	1.3:1	7
AUSTRALIA	4.1:1	329

AGE INCIDENCE

The average age of 261 male patients with cancer of the floor of the mouth in the present series is 62.5 years, and for 65 female patients, the average age is higher - 66.8 years. In the male group, the youngest patients is 36 years old and the oldest, 91 years of age. For female, the age range is 43 years to 87 years. For total male and female, the average age is 63.9 years. This is just slightly higher than the reported average age of 61 years in the series investigated by Martin and Sugarbaker¹⁹⁷ (103 cases), and Hauser.¹³⁵ Ash and Millar,¹⁰ in an analysis of 110 patients with this disease, indicate that the average age was 67 years, whereas in the series investigated by Erich and Kragh,⁹⁰ and Tiecke and Bernier,³⁶⁰ the average age of the patients was about 57 years.

In the present study, the median age of male patients with this disease is 63.4 years and that for the group of female patients is 66.3 years, whereas for male and female total, the median age is 63.8 years. This is slightly higher than the median age of 61 years and 62 years in the series investigated by Mattick, Meehan and Haberlin²⁰⁴ (total of 98 patients), and Welch and Nathanson⁴⁰³ (250 cases) respectively.

The greatest number of patients in the present

series is seen between the age of 50 and 80 years - 80.7 per cent. of the total 326 cases - and only 10.4 per cent. of the patients are less than 50 years of age, with 8.9 per cent. above 80 years old (Tables 67 and 70). When male and female are considered separately, 81.5 per cent. of the female patients are between 50 and 80 years of age, 10.4 per cent. are below the age of 50 years, and 13.9 per cent. are more than 80 years old. The corresponding percentages for male patients with this disease are 80.5, 11.9, and 7.6 respectively.

Windeyer,⁴⁰⁷ in a study of 131 patients with cancer of the floor of the mouth, indicates that about one half of the total number of cases was seen in the age group of 60-69 years, whereas Mattick, Meehan and Haberlin,²⁰⁴ in a study of 98 cases, report that the greatest number of patients was seen in the age group 51-60 years. In the present series, the number of patients seen in the 60-69 year age group is 112 (almost one-third of the total cases and is the peak incidence for any one single decade), whereas the number of patients belonging to the age group of 50-59 years is 85.

The rates per 100,000 population for patients with this disease in the different age groups are contained in Table 69. For male and female total, the rate per 100,000 population increases gradually with the

age, from 0.2 for patients in the age group of 35-39 to 4.1 for patients above 80 years of age. When male and female are considered separately, similar trends are noted - the rate per 100,000 population for male ranges from 0.3 for patients in the 35-39 year age group to 6.3 for patients above 80 years old, whereas for female, the range is from 0.05 for patients belonging to the age group of 40-44 years to 2.9 for those over 80 years of age.

HISTOPATHOLOGIC TYPE

In the floor of the mouth, as in most parts of the oral cavity, the most frequent histological type of cancer is squamous cell carcinoma (Table 111). Of the 329 patients with cancer involving this region of the mouth, a diagnosis of squamous cell carcinoma is given in 68.7 per cent. of cases, adenoid cystic carcinoma in 0.3 per cent. of cases, adenocarcinoma in 0.3 per cent. of cases, and "carcinoma" in 30.7 per cent. of cases. In the last group (30.7 per cent.), it must be presumed that a large majority are squamous cell carcinoma. The two cases of malignancy of salivary gland type origin are from the group of male patients. The overwhelming majority of squamous cell carcinoma seen in the present study is in accord with the findings of other investigators.^{90, 197, 204, 407}

TABLE 111

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA
 BY SEX AND DIAGNOSIS.
 (1959-1964 INCLUSIVE)

SITE	FLOOR OF THE MOUTH					
SEX	MALE		FEMALE		MALE and FEMALE	
DIAGNOSIS	No.	%	No.	%	No.	%
SQUAMOUS CELL CARCINOMA	188	71.2	38	58.5	226	68.7
ADENOID CYSTIC CARCINOMA	1	0.4	—	—	1	0.3
ADENOCARCINOMA	1	0.4	—	—	1	0.3
CARCINOMA, UNSPECIFIED	74	28.0	27	41.5	101	30.7
TOTAL	264	100.0	65	100.0	329	100.0

TREATMENT

Table 112 shows that radiotherapy is the main form of treatment used in the management of patients with primary cancer of the floor of the mouth in Australia. Of 317 patients treated for this disease, 237 (74.8 per cent.) received radiotherapy, 53 (16.7 per cent.) had surgery, and in 27 (8.5 per cent.) cases, a combination of both radiotherapy and surgery was used. There appears to be not much difference in the choice of treatment for male patients (radiotherapy 75.0 per cent, surgery 15.6 per cent., and radiotherapy and surgery 9.4 per cent.) and female patients (radiotherapy 73.8 per cent., surgery 21.3 per cent., and radiotherapy and surgery 4.9 per cent.) with this disease.

If individual states are being considered, the treatment of patients with malignancy of the floor of the mouth in the different states are as follows:

	Radio- therapy %	Surgery %	Radiotherapy and surgery %	Total no. of cases
NEW SOUTH WALES	78.2	17.3	4.5	156
VICTORIA	69.6	15.9	14.5	69
QUEENSLAND	100.0	-	-	30
SOUTH AUSTRALIA	53.1	25.0	21.9	32
WESTERN AUSTRALIA	73.9	17.4	8.7	23
TASMANIA	42.9	42.9	14.2	7

Table 113 is a breakdown of the different types of

TABLE 112

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA
BY SEX AND TREATMENT
(1959-1964 INCLUSIVE)

SITE	FLOOR OF THE MOUTH					
SEX	MALE		FEMALE		MALE and FEMALE	
TREATMENT to PRIMARY	No.	%	No.	%	No.	%
RADIOTHERAPY	192	75.0	45	73.8	237	74.8
SURGERY	40	15.6	13	21.3	53	16.7
RADIOTHERAPY and SURGERY	24	9.4	3	4.9	27	8.5
TOTAL	256	100.0	61	100.0	317	100.0

TABLE 113

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA
BY SEX AND TREATMENT BY RADIOTHERAPY
(1959-1964 INCLUSIVE)

SITE	FLOOR OF THE MOUTH					
SEX	MALE		FEMALE		MALE and FEMALE	
TYPE OF RADIOTHERAPY TO PRIMARY	No.	%	No.	%	No.	%
MVT	38	17.2	5	10.4	43	16.0
DXRT	49	22.3	9	18.8	58	21.6
MVT and DXRT	1	0.5	—	—	1	0.4
XRT, UNSPECIFIED	14	6.4	8	16.7	22	8.2
IMPLANTS	53	24.1	7	14.6	60	22.4
IMPLANTS and XRT	3	1.4	1	2.1	4	1.5
RADIOTHERAPY, UNSPECIFIED	10	4.5	1	2.1	11	4.1
COBALT 60	52	23.6	17	35.3	69	25.8
TOTAL	220	100.0	48	100.0	268	100.0

TABLE 114

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA
 BY SEX AND TYPE OF IMPLANT TO PRIMARY
 (1959-1964 INCLUSIVE)

SITE	FLOOR OF THE MOUTH					
SEX	MALE		FEMALE		MALE and FEMALE	
TYPE OF IMPLANT TO PRIMARY	No.	%	No.	%	No.	%
RADON	46	82.1	7	87.5	53	82.8
RADIUM	5	8.9	1	12.5	6	9.4
RADIOACTIVE GOLD	2	3.6	—	—	2	3.1
IMPLANT, UNSPECIFIED	3	5.4	—	—	3	4.7
TOTAL	56	100.0	8	100.0	64	100.0

radiotherapy used to treat patients with this disease. As can be seen, Cobalt 60 is used most frequently - 25.8 per cent. of patients received this method of treatment out of 268 cases who had radiotherapy. It appears that relatively more women patients were treated by Cobalt 60 (35.3 per cent. out of 48 cases) than men patients (23.6 per cent. out of 220 cases) in the series.

Implant is the second most common form of radiotherapy used - 22.4 per cent. In this instance relatively more males were treated by implants (24.1 per cent.) than females (14.6 per cent.) Implant would be used for small lesions (2.5 cmn diameter), whereas larger lesions are treated by beam therapy. (Cobalt 60, DXRT, and MVT). Table 114 shows that radon is by far the most common type of implant used - 82.8 per cent. of the 64 cases treated by the technique of implantation had radon, next is radium 9.4 per cent. of cases, then radioactive gold 3.1 per cent.

Third in frequency of usage is DXRT - 21.6 per cent. For male and female separately, 22.3 per cent. of men patients were treated by DXRT as compared to 18.8 per cent. of women who received this form of treatment.

MVT is the fourth most common type of radiotherapy used - 17.2 per cent. for male, 10.4 per cent. for female, and for male and female together, 16 per

cent. of the patients received MVT.

The remainder of cases received various combinations of the four main types of radiotherapy used, but they are not significant as in each instance the number of patients treated is small.

A review of the literature indicates that several authorities^{60, 84, 135, 197, 318, 407} are of the opinion that in general, primary cancer of the floor of the mouth is best treated by radiologic methods. However, they concede that surgery has also a part in the treatment of this disease, especially in cases where the lesion has extended to involve the adjacent bone. The advocates of surgery in the management of this disease are Erich and Kragh,⁹⁰ and Thoma,³⁶⁸ but the later author indicates that irradiation may be used when the floor of the mouth is extensively involved.

The consensus of opinion in the treatment of lymph-node involvement is by block dissections if the primary growth is controlled and the lymph nodes operable.^{60, 84, 90, 345, 407} Cade⁶⁰ indicates that when the glands are adherent or fixed, surgery is not likely to control the metastases and, in such instances, radiotherapy may be used on a palliative basis. In the present study, of 82 patients who had cervical lymph-node metastases and who received treatment, 63.4 per

cent. had surgery (neck dissections) and 36.6 per cent. received radiotherapy to the secondaries (Table 115).

PROGNOSIS

The prognosis of patients with cancer of the floor of the mouth is contained in Table 116. Of 261 male patients who received treatment, the crude cumulative five year survival rate is 31.3 per cent. and that for 65 female patients is 27.4 per cent. The corresponding relative five year survival ratios are 0.394 for male and 0.274 for female, indicating a better five year survivals for male.

In the group of patients who were treated by radiotherapy, of 190 men, the crude cumulative five year survival rate is 28.1 per cent., and for 44 women, 25.9 per cent. The respective relative five year survival ratios are 0.355 and 0.322, reflecting virtually no difference in the five year survivals for men and for women. The relative five year survival ratio for the group of male patients treated by radiotherapy is slightly lower than that for the overall male group. The better five year survival rate for the latter could be partly due to the five patients in the 190 total radiotherapy cases who had palliative radiotherapy for their terminal care as compared to the same five patients in 261 overall male cases.

TABLE 115

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA.
TREATMENT TO METASTASES.

TYPE OF TREATMENT TO SECONDARY	RADIOTHERAPY		SURGERY		TOTAL
	No.	%	No.	%	
FLOOR OF THE MOUTH	30	36.6	52	63.4	82

TABLE 116

CANCER OF THE FLOOR OF THE MOUTH IN AUSTRALIA .
PROGNOSIS

	Total No. of cases		Crude cumu- lative five year survi- val rate %		Expected five year survival rate %		Relative five year survival ratio	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
FLOOR OF THE MOUTH, TOTAL	261	65	31.3	27.4	79.4	80.7	0.394	0.274
PATIENTS TREATED BY RADIOTHERAPY	190	44	28.1	25.2	79.1	78.1	0.355	0.322
PATIENTS TREATED BY SURGERY	*	*	—	—	—	—	—	—

* Number of patients in the group is too small to work out accurate five year survival rate.

The two groups of male patients and female patients with cancer of the floor of the mouth and who were treated by surgery are too small for a calculation of an accurate five year crude cumulative survival rate.

From a review of the literature, the prognosis of patients with this disease in terms of five year survival rate and five year cure rate, as reported by other investigators, are as follows:

	Total No. of cases	Five Year Survivals	Five Year Cures	Remarks
MARTIN and SUGARBAKER ¹⁹⁷	103	-	25.0	Radiotherapy, and surgery
CADE ⁶⁰	89	27.0	-	Radiotherapy
ASH and MILLAR ¹⁰	95	-	43.2	Radiotherapy
ERICH and KRAGH ⁹⁰	102	46.0	-	Surgery, Electro- coagulation, radiotherapy
DOBBIE ⁸⁴	427	32.0	-	Radiotherapy

CANCER OF THE GINGIVA IN AUSTRALIA

GENERAL INCIDENCE

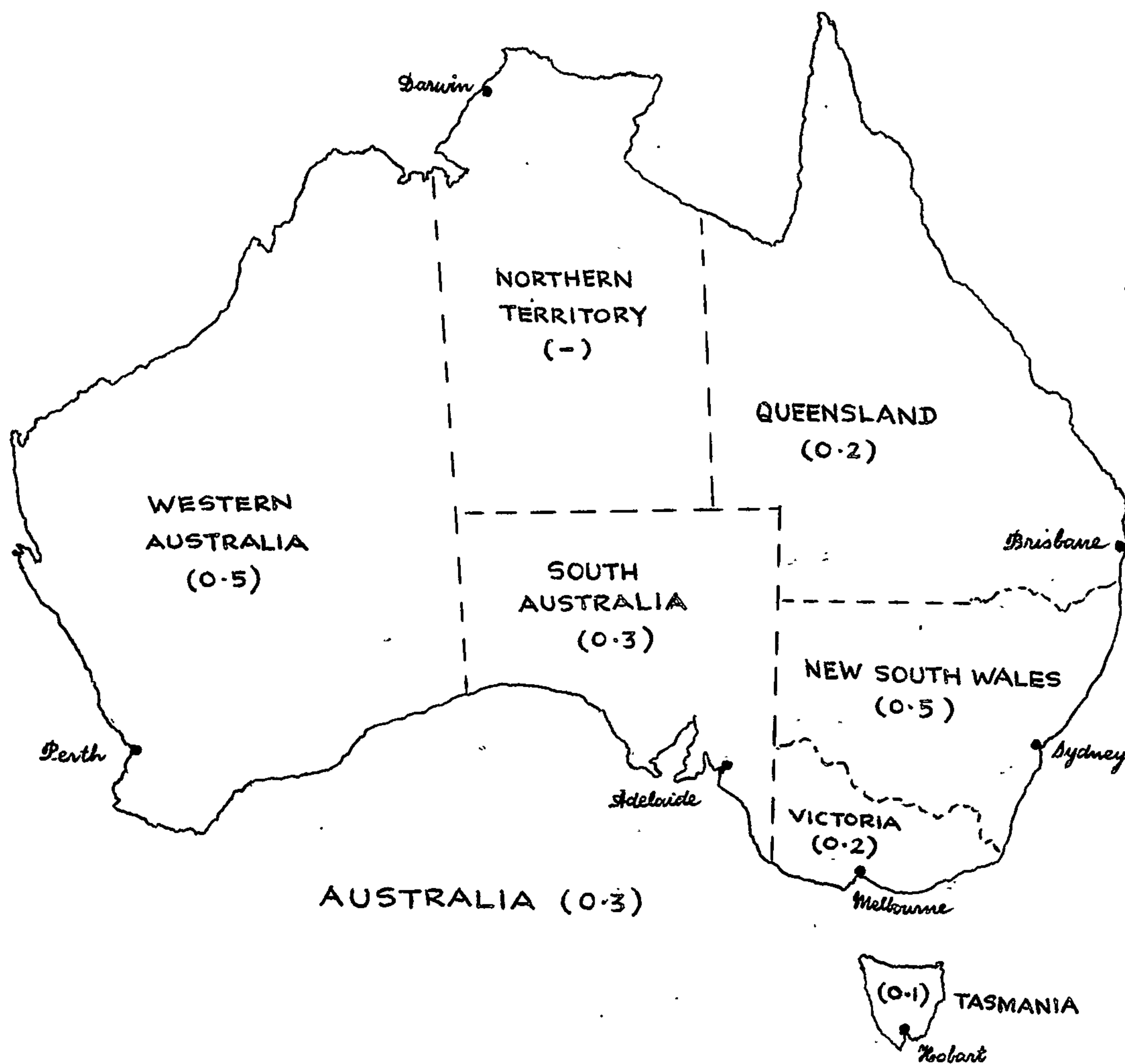
There are 141 male patients and 70 female patients with cancer of the gingiva registered in the major hospitals in Australia for the six year period from 1959 to 1964, giving a total of 211 patients with the disease (Table 59). For male and female total, the number of patients seen in each of the six years remains fairly constant. When taking male and female separately into consideration, similar trends are observed for the two sexes, the number in each year varies only from a few cases in each instance.

The rates per 100,000 population for patients with this disease over the six years for male and female total remain very much a constant with 0.4 per 100,000 population in 1959 and 0.3 per 100,000 for each of the other five years (Table 61). Exactly similar trend is seen for female separately, the rate in 1959 is 0.3 per 100,000, and for each of the remaining five years, the rate is 0.2 per 100,000. For male, the change in rate is slightly irregular, but with no big differences from year to year - 0.6 per 100,000 population in 1959 and 0.4 per 100,000 population in 1964 with a change of either 0.1 or 0.2 per 100,000 for consecutive years.

From Table 62, it can be seen that over the six years, New South Wales has the most number of patients with this disease, 112 cases (76 men and 36 women) in all. Next is Victoria with 40 cases (20 men and 20 women), but this is only slightly more than one third of the cases seen in New South Wales. For Western Australia, the number of patients seen over the same period is 21 (15 men and 6 women), then comes South Australia with 19 cases (15 men and 4 women), Queensland with 17 cases (13 men and 4 women), and Tasmania with two cases (both are men). Thus, except for Victoria, there are more men with this disease than women in all the other states.

The corresponding rates per 100,000 for patients with gingival cancer in the different states are contained in Table 64. For male and female total, New South Wales and Western Australia have a rate of 0.5 per 100,000, South Australia 0.3, Victoria and Queensland 0.2, and Tasmania 0.1. When male and female are considered separately, for male, Western Australia has a rate of 0.7 per 100,000, New South Wales 0.6, South Australia 0.5, Queensland 0.3, and Victoria and Tasmania 0.2. For female, the rates per 100,000 for New South Wales and Western Australia are 0.3, Victoria 0.2, and Queensland and South Australia 0.1.

FIGURE 13



() INDICATES RATE PER 100,000 POPULATION PER YEAR

CANCER OF THE GINGIVA AS SEEN IN THE MAJOR
HOSPITALS IN AUSTRALIAN STATES
1959 - 1964

RTH.

For Australia as a whole, the rates per 100,000 population for male is 0.4, for female 0.2, and for the two sexes together 0.3.

In Australia, gingival cancer comprises about 3.7 per cent. of all oral malignancy (International Classification Numbers 140-144, and 191.0) and is the fifth most common form of mouth cancer (Table 62). When individual states are taken into consideration, for New South Wales, cancer at this intraoral site makes up 7.5 per cent. of all oral cancer, whereas for all the other states, the figures are much lower. This is partly due to the lower number of patients with cancer of the lip recorded in New South Wales, due to an under reporting of cases.

When cancer of the gingiva is related to malignancy of the intraoral cavity proper (International Classification Numbers 141, 143, and 144 - that is, excluding cancer of the lip and salivary gland), it comprises 9.7 per cent. of all malignant neoplasms encountered in the oral cavity proper in Australia, and ranks as the third most common form of intraoral cavity cancer (Table 65). A breakdown of individual states shows that 15.7 per cent. and 15.3 per cent. of cancer of the intraoral cavity proper in New South Wales and Western Australia are to be found on the gingiva. For the rest of the states, the figures are

12.0 per cent. for South Australia, 11.9 per cent. for Victoria, 8.4 per cent. for Queensland, and 6.5 per cent. for Tasmania.

From a review of the literature, Martin¹⁹⁸ indicates that according to the admission record of the Memorial Hospital in New York, cancer of the gingiva constitutes 10 per cent. of all intraoral malignancy. This closely parallels the findings of 12 per cent. reported by Bernier and Tiecke³⁶⁰ in their investigation, while in the series studied by Wilkins and Vogler,⁴⁰⁶ they indicate that the figure is 15 per cent. On the other hand, Sharp, Bullock and Hazlet³²³ claim that about 25 per cent. of all intraoral squamous cell carcinoma are encountered on the gingiva.

SEX INCIDENCE

In the group of 211 patients with cancer of the gingiva, there are 141 men and 70 women in the series, giving a male to female ratio of 2 to 1 in favour of men (Table 117). When the upper gingiva and the lower gingiva are considered separately, of 39 patients with malignancy of the upper gingiva, there are 24 men and 15 women to give a male to female ratio of 1.6:1 in favour of men, whereas for the lower gingiva, this ratio is 2:1 in favour of men out of 168 cases.

TABLE 117

CANCER OF THE GINGIVA IN AUSTRALIA (1959-1964 INCLUSIVE)
SEX DISTRIBUTION

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
UPPER GINGIVA	24	61.5	15	38.5	39	1.6:1
LOWER GINGIVA	113	67.3	55	32.7	168	2:1
UPPER and LOWER GINGIVAE	1	100.0	—	—	1	
GINGIVA, UNSPECIFIED	3	100.0	—	—	3	
GINGIVA, TOTAL	141	66.8	70	33.2	211	2:1

Similar findings are noted from the studies of Sharp, Bullock and Hazlet³²³ (2:1 in favour of men), Sharp and Wood³¹² (1.7:1 in favour of men out of 46 cases), Johnson and Daniel¹⁴³ (1.9:1 in favour of men out of 23 cases), and Wilkins and Vogler⁴⁰⁶ (1.2:1 in favour of men out of 45 cases). On the other hand, other investigators found a higher male to female ratio in the series studied by them - Martin¹⁹⁸ (4.7:1 in favour of men out of 113 cases), Welch and Nathanson⁴⁰³ (4.7:1 in favour of men out of 137 cases of malignancy of the upper gingiva), Erich and Kragh⁸⁹ (5.9:1 in favour of men for 118 patients with lower gingival cancer), and Lampe¹⁷⁶ (5.5:1 in favour of men out of 39 cases with cancer of the lower gingiva).

In the present study, if individual states are being considered, the sex distribution of patients with gingival cancer in the different states are as follows:

	Male/Female Ratio	Total No. of cases
SOUTH AUSTRALIA	3.8:1	19
QUEENSLAND	3.3:1	17
WESTERN AUSTRALIA	2.5:1	21
NEW SOUTH WALES	2.1:1	112
VICTORIA	1 :1	40
TASMANIA	all men	2
AUSTRALIA	2.0:1	211

AGE INCIDENCE

For 140 male patients with cancer of the gingiva, the average age is 64.8 years, whereas for 68 female patients, a higher average age of 70.6 years is noted (Table 67). In the group of male patients, the age range is from 38 years to 89 years, whereas in the female group, the youngest patient is 24 years old and the oldest 91 years of age. The average age for 208 male and female patients together is 66.7 years. The findings of other overseas investigators regarding the average age for patients with malignancy of this intra-oral site is as follows:

	Average age (years)	Total no. of cases
GARDNER, BOWEN and BROWN ¹⁰⁶	59	39
SHARP, BULLOCK and HAZLET ³²³	60	-
MARTIN ¹⁹⁸	61	113
MARTIN and CRAFFEY ²¹²	64	87
SHARP and WOOD ³¹²	65	46
ERICH and KRAGH ⁸⁹	66	118 (lower gingiva)
PRESENT SERIES	66.7	208

In the present study, the median age for male patients is 64.6 years and that for female patients is 71.8, whereas for male and female patients together, the

median age is 67.7 years.

Martin,¹⁹⁸ in a study of 113 patients with this disease, indicates that almost 70 per cent. of the cases occurred after the age of 60 years and only 2 per cent. were under 40 years of age. Similar findings are noted in the present study - about 72 per cent. of 208 patients are over 60 years old and about 2.4 per cent. are below 40 years of age (Table 70).

Martin and Craffey²¹² report that of the 87 patients in their study, 35.6 per cent. were 70 or more years of age. Comparing this with the present series, 35 per cent. of 140 male patients are over 70 years old. However, there are considerably more female patients with gingival malignancy who are above this age - 60.3 per cent. of 68 cases. For male and female total, 43.3 per cent. of 208 patients are over the age of 70 years.

In the study of William and Vogler⁴⁰⁶ (81 cases), they indicate that the largest number of patients was seen in the seventh decade and that when age and sex distributions were co-ordinated, cancer developed in 50 per cent. of the women before the age of 60 years and only 30 per cent. of men, suggesting that women might be affected at an earlier age than men in their series. In the present study, the sixth and seventh

decades have about the same number of cases and are the peak incidence for patients with this disease for any single decade. When age and sex distributions are co-ordinated, only 14.7 per cent. of the women patients are below the age of 60 years and 30 per cent. of the men are below this age, suggesting that men might be affected at an earlier age than women, a contrast to the findings of Wilkins and Vogler.⁴⁰⁶

SITE OF OCCURRENCE

The lower gingiva is more frequently involved by cancer than the upper gingiva as is indicated in Table 118.

Of 211 patients with cancer of the gingiva, there were 39 patients (18.5 per cent.) with involvements of the upper gingiva as compared to 168 patients (79.6 per cent.) with malignancy of the lower gingiva, indicating that the lower gingiva is involved about 4 times more commonly than the upper gingiva. This is in accord with the findings of Tiecke and Bernier³⁶⁰ (lower gingiva about 4 times more commonly involved than the upper gingiva out of 47 cases), Sharp, Bullock and Hazlet³²³ (4:1 in favour of the mandibular gingiva), Beiswanger and Stenstrom³² (about 60 per cent. in the lower gingiva and 40 per cent. on the upper gingiva out of 55 cases), Johnson

TABLE 118

CANCER OF THE GINGIVA IN AUSTRALIA (1959-1964 INCLUSIVE)
SITE DISTRIBUTION

SITE	NUMBER	PERCENT AGE
UPPER GINGIVA	39	18.5
LOWER GINGIVA	168	79.6
UPPER and LOWER GINGIVAE	1	0.5
GINGIVA, UNSPECIFIED	3	1.4
GINGIVA, TOTAL	211	100.0

and Daniel¹⁴³ (28 patients had lower gingival malignancy and 2 patients had cancer of the upper gingiva out of 30 cases).

On the other hand, the findings of Martin¹⁹⁸ (46 per cent. on the upper gingiva and 54 per cent. on the lower gingiva out of 113 cases), and Mattick and Meehan²⁰⁵ (45 per cent. had involvements of the upper gingiva and 54 per cent. had cancer of the lower gingiva out of 101 cases) indicate that the frequency of occurrence in the upper and lower gingivae is about the same.

In the present study, for gingiva total, of 141 male patients with this disease, the right side (32.6 per cent.) and the left side (33.3 per cent.) of the gingiva are involved with equal frequency, and there are 48 patients (34.1 per cent.) in whom the case histories are not good enough to permit such an allocation of site of occurrence of the disease (Table 119). A similar trend is seen for 70 female patients with this disease - involvements of the left side is 32.9 per cent., right side is 31.4 per cent., and side unspecified is 35.7 per cent. Martin,¹⁹⁸ in a study of 113 cases, noted that the left side (58 per cent.) of the gingiva is slightly more commonly involved by the disease than the right side (42 per cent.).

TABLE 119
CANCER OF THE GINGIVA IN AUSTRALIA BY SEX, SITE, and LATERALITY. (1959-1964 INCLUSIVE)

SEX		MALE						FEMALE							
LATERALITY		LEFT SIDE			RIGHT SIDE			SIDE, UNSPECIFIED			TOTAL				
SITE		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
UPPER GINGIVA		6	25.0	10	41.7	8	33.3	24	3	20.0	7	46.7	5	33.3	15
LOWER GINGIVA		40	35.3	36	31.9	37	32.8	113	20	36.4	15	27.3	20	36.3	55
UPPER and LOWER GINGIVAE		-	-	-	-	1	100.0	1	-	-	-	-	-	-	-
GINGIVA, UNSPECIFIED		1	33.0	-	-	2	66.6	3	-	-	-	-	-	-	-
GINGIVA, TOTAL.		47	33.3	46	32.6	48	34.1	141	23	32.9	22	31.4	25	35.7	70

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When upper and lower gingiva are considered separately, for the lower gingiva, of 113 male patients with this disease, the right side (35.3 per cent.) and the left side (31.9 per cent.) are involved about the same number of instances, with 32.8 per cent. of the patients in whom the side involved are not specified in the case histories. Erich and Kragh,⁸⁹ in a study of 118 patients with lower gingival malignancy, report that the left side (58 cases) and the right side (58 cases) are similarly involved with equal regularity, with two patients whose lesions are sited on the anterior midline of the gingiva. For 55 female patients with cancer of the lower gingiva in the present study, 20 (36.4 per cent.) had their lesions on the left side, 15 (27.3 per cent.) had involvements of the right side, and in 20 (36.3 per cent.) cases, the side involved is not specified in the case histories.

For the upper gingiva, in male, of 16 cases in which the sides involved are known, 6 had involvements of the left side and 10 had their lesions sited on the right side. There are 8 patients in which the sides involved are unknown. For female, of 10 patients in whom the involvement of the side by the disease is known, 3 had the cancer involving the left side, and 7 had involvements of the right side. There are 5

patients with the side involved not specified in the case histories.

HISTOPATHOLOGIC TYPE

Table 120 shows the histologic diagnosis of patients with cancer of the gingiva. Of the 211 patients, a diagnosis of squamous cell carcinoma is recorded in the case histories of 153 of them (72.5 per cent.), whereas in the remaining 58 patients (27.5 per cent.), the diagnosis recorded is simply "carcinoma". Since there are no other histopathologic types recorded, it is reasonable to assume that in the latter group (58 patients), practically all the lesions are squamous cell carcinoma.

The studies of other investigators^{156, 198, 212} indicate that like malignancy in other intraoral sites, squamous cell carcinoma constitutes the main, if not all, histopathologic type of tumours in cancer of the gingiva.

TREATMENT

Table 121 shows the type of treatment used in the management of patients with primary gingival cancer in Australia. Of 136 male patients who were treated for this condition, 62.5 per cent. received radiotherapy, 23.5 per cent. had surgery, and 14 per cent. were treated by a combination of radiotherapy and

TABLE 120
CANCER OF THE GINGIVA IN AUSTRALIA BY SEX, SITE, and DIAGNOSIS. (1959-1964 INCLUSIVE).

TABLE 1. THE QUANTIFICATION OF SEX, SITE AND DIAGNOSIS (1955-1964 INCLUSIVE)

SEX	DIAGNOSIS	MALE				FEMALE							
		SQUAMOUS CELL CARCINOMA		CARCINOMA, UNSPECIFIED		SQUAMOUS CELL CARCINOMA		CARCINOMA, UNSPECIFIED					
		No.	%	No.	%	No.	%	No.	%				
		SITE		TOTAL		TOTAL		TOTAL					
UPPER GINGIVA		13	54.2	11	45.8	24		11	73.3	4	26.7	15	
		87	77.0	26	23.0	113		41	74.5	14	25.5	55	
UPPER and LOWER GINGIVAE				1	100.0	1							
GINGIVA, UNSPECIFIED		1	33.3	2	66.7	3							
GINGIVA, TOTAL		101	71.6	40	28.4	141		52	74.3	18	25.7	70	

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TABLE 121
CANCER OF THE GINGIVA IN AUSTRALIA BY SEX, SITE, and TREATMENT. (1959-1964 INCLUSIVE).

SEX	MALE						FEMALE					
	RADIO THERAPY			SURGERY			RADIO THERAPY			SURGERY		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TREATMENT TO PRIMARY	RADIO THERAPY			SURGERY			RADIO THERAPY			SURGERY		
SITE	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
UPPER GINGIVA	15	65.2	4	17.4	4	17.4	9	62.3	4	28.6	1	7.1
LOWER GINGIVA	67	61.5	27	24.8	15	13.7	32	61.5	13	25.0	7	13.5
UPPER and LOWER GINGIVAE	1	100.0	-	-	-	-	-	-	-	-	-	-
GINGIVA, UNSPECIFIED	2	66.7	1	33.3	-	-	-	-	-	-	-	-
GINGIVA, TOTAL.	85	62.5	32	23.5	19	14.0	41	62.1	17	25.8	8	12.1

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surgery. For 66 female patients with this disease, the choice of therapy is very similar - 62.1 per cent. were treated by radiotherapy, 25.8 per cent. by surgery, and 12.1 per cent. by a combination of radiological and surgical techniques.

The treatment of 109 male patients and 52 female patients with malignancy of the lower gingiva is much the same - in each case, about 61 per cent. of the patients were treated by radiotherapy, 25 per cent. by surgery, and 14 per cent. by a combination of both methods. For patients with cancer of the upper gingiva, of 23 male patients, 15 (65.2 per cent.) had radiotherapy, 4 (17.4 per cent.) had surgery, and another 4 (17.4 per cent.) were treated by a combination of surgery and radiotherapy. For the 14 female patients, 9 (62.3 per cent.) received radiotherapy, 4 (28.6 per cent.) had surgery and 1 (7.1 per cent.) was treated by radiotherapy and surgery combined.

When individual states are being considered, the main types of treatment used in the management of patients with this disease in the different states are as follows:

	Radio- therapy %	Surgery %	Radiotherapy and Surgery %	Total No. of Cases
NEW SOUTH WALES	64.5	28.0	7.5	107
VICTORIA	48.6	24.3	27.1	37
QUEENSLAND	100.0	-	-	17
SOUTH AUSTRALIA	47.4	10.5	42.1	19
WESTERN AUSTRALIA	55.0	40.0	5.0	20
TASMANIA	100.0	-	-	2

A breakdown in the types of radiotherapy used in the treatment of patients with gingival malignancy is contained in Table 122. Cobalt 60 was used in 29.7 per cent. of the 155 patients who received radiotherapy. It was used with almost equal frequency in male (30.7 per cent. of 104 cases) and female (27.5 per cent. of 51 cases) patients with this disease. It was also used with almost equal frequency for patients with lower gingival malignancy (30.9 per cent. of 123 cases) and those with upper gingival cancer (27.6 per cent. of 29 cases).

Next in common usage was DXRT (20 per cent. of 155 cases) and MVT (20 per cent. of 155 cases). More male patients (24 per cent.) received DXRT than female patients (11.8 per cent.) and more patients with cancer of the upper gingiva (27.6 per cent.) had this form of

TABLE 122
CANCER OF THE GINGIVA IN AUSTRALIA BY SEX, SITE, and TREATMENT BY RADIOTHERAPY (1959-1964 INCLUSIVE)

SEX		MALE												FEMALE												MALE and FEMALE TOTAL							
SITE	TYPE OF RADIOTHERAPY TO PRIMARY	UPPER GINGIVA			LOWER GINGIVA			BOTH GINGIVAE			GINGIVA, UNSPECIFIED			GINGIVA, TOTAL			UPPER GINGIVA			LOWER GINGIVA			BOTH GINGIVAE			GINGIVA, UNSPECIFIED			GINGIVA, TOTAL				
		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%			
SXRT		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		1	1.9	1	0.6	
MVT		2	10.5		15	18.3		-	-		-	-		17	16.3		2	20.0		12	29.3		-	-		-	-		14	27.5	31	20.0	
DXRT		6	31.6		18	21.9		-	-		-	1	50.0		25	24.0		2	20.0		4	9.8		-	-		-	-		6	11.8	31	20.0
MVT and DXRT		-	-		2	2.4		-	-		-	-		2	1.9		-	-		-	-		-	-		-	-		-	-	2	1.3	
XRT UNSPECIFIED		4	21.1		8	9.8		-	-		-	-		12	11.5		2	20.0		4	9.8		-	-		-	-		6	11.8	18	11.6	
IMPLANT		-	-		6	7.3		-	-		-	-		6	5.8		2	20.0		5	12.2		-	-		-	-		7	13.7	13	8.4	
IMPLANT and XRT		1	5.3		-	-		-	-		-	-		1	1.0		-	-		1	2.4		-	-		-	-		1	1.9	2	1.3	
RADIOTHERAPY UNSPECIFIED		-	-		7	8.5		1	100.0		-	-		9	8.7		-	-		2	4.9		-	-		-	-		2	3.9	11	7.1	
COBALT 60		6	31.5		26	31.8		-	-		-	-		32	30.7		2	20.0		12	29.2		-	-		-	-		14	27.5	46	29.7	
TOTAL		19	100.0		82	100.0		1	100.0		2	100.0		104	100.0		10	100.0		41	100.0		-	-		-	-		51	100.0	155	100.0	

mm.

radiotherapy treatment than patients with lower gingival cancer (17.9 per cent.). For MVT, more female patients (27.5 per cent. were treated by this radiological method than male patients (16.3 per cent.), and more patients with lesions on the lower gingiva (22 per cent.) received this form of irradiation than patients with malignancy of the upper gingiva (13.8 per cent.).

There is a group of 18 patients (11.6 per cent. of the total of 155 patients who had radiotherapy) who received some form of X-ray irradiation which is not specified in the case histories.

Implant was used in 8.4 per cent. of the 155 patients who received radiologic treatment. It was used more frequently in female patients (13.7 per cent.) than in male patients (5.8 per cent.), and slightly more patients with lower gingival cancer (8.9 per cent.) were treated by this method than those with upper gingival malignancy (6.9 per cent.). Radon (used in 8 patients) was the main type of implant used, and next is radium (used in 3 cases), then radioactive gold (used in 2 patients.)

These are the four main types of radiotherapy (that is, Co 60, DXRT, MVT, and implant) that have been used in the treatment of the vast majority of patients

(121 patients, or 78.1 per cent., of the total 155 cases) treated radiologically.

From a review of the literature, Martin,¹⁹⁸ Wilkins and Vogler,⁴⁰⁶ and Sharp and Wood³¹² indicate that radiotherapy, surgery, and a combination of the two methods all have a definite place in the management of patients with gingival malignancy. However, the later authors (Wilkins and Vogler,⁴⁰⁶ and Sharp and Wood³¹²) feel that surgery is the preferred treatment for extensive malignant lesions in this intraoral site, particularly when bone is involved. Other advocates of surgery in the treatment of patients with this disease include Shafer, Hine and Levy,³¹⁸ and Thoma.³⁶⁸

Lampe¹⁷⁶ does not support the view that involvement of bone by cancer of the lower gingiva is a serious disadvantage as to preclude the use of radiotherapy in the treatment of such patients. Martin and Craffey²¹² indicate that contact radium therapy administered with bulky moulds using gamma rays gives good results to patients with lesions that are relatively small, superficially sited, and limited to the gums. They are of the opinion that in some cases, invasion of bone by the disease can be controlled successfully by the use of irradiation, thus avoiding jaw resection. Other advocates of radiotherapy in the

treatment of this disease are Mattick and Meehan,²⁰⁵ while Krishnamurthi and Shanta¹⁵⁶ indicate that carefully planned irradiation, followed by discriminate surgery, is the preferred treatment of choice for patients with advanced gingival malignancy.

In the treatment of metastases, surgery is generally preferred to radiotherapy.^{406, 368, 312, 143} In the present study, of 65 patients treated for metastatic lymph node involvement, 73.8 per cent. had surgery and 26.2 per cent. received radiotherapy (Table 123).

PROGNOSIS

Table 124 shows the prognosis of patients with cancer of the gingiva. Of 140 male patients treated for this disease, the crude cumulative five year survival rate is 25 per cent. and that for 68 female patients is 23.5 per cent. The corresponding relative five year survival ratios are 0.328 for male and 0.313 for female, indicating that the five year survivals for the two groups are much the same.

When considering malignancy of the lower gingiva separately, of 112 male patients treated for this condition, the crude cumulative five year survival rate is 20.7 per cent. and that for 53 female patients is 26.3 per cent. The respective relative five year

TABLE 123

CANCER OF THE GINGIVA IN AUSTRALIA*
TREATMENT TO METASTASES*

SITE	UPPER GINGIVA		LOWER GINGIVA		GINGIVA TOTAL	
	No*	%	No*	%	No*	%
TYPE OF TREATMENT TO SECONDARY						
RADIOTHERAPY	2	28*6	15	25*9	17	26*2
SURGERY	5	71*4	43	74*1	48	73*8
TOTAL	7	100*0	58	100*0	65	100*0

TABLE 124

CANCER OF THE GINGIVA IN AUSTRALIA. PROGNOSIS

	Total No. of cases		Crude cumulative five year survival rate		Expected five year survival rate		Relative five year survival ratio	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
GINGIVA, TOTAL	140	68	25.0	23.5	76.2	75.1	0.328	0.313
GINGIVA, LOWER	112	53	20.7	26.3	74.5	73.9	0.279	0.356
GINGIVA, UPPER	*	*	—	—	—	—	—	—
GINGIVA, TOTAL - PATIENTS TREATED BY RADIOTHERAPY	81	*	14.1	—	72.2	—	0.196	—
GINGIVA, TOTAL - PATIENTS TREATED BY SURGERY	*	*	—	—	—	—	—	—

* Number of patients in the group is too small to work out accurate five year survival rate.

survival ratios are 0.279 and 0.356, reflecting a better five year survivals for the group of female patients.

The two groups of male patients and female patients with cancer of the upper gingiva are too small for a calculation of the five year survival rate.

In 81 male patients who were treated by radiotherapy, the crude cumulative five year survival rate is 14.1 per cent., and the corresponding relative five year survival ratio is 0.196. Comparing this with the relative five year survival ratio of 0.328 for the overall group of 140 male patients with this disease, the higher survival ratio in the overall male group reflects distinctly a better five year survivals.

This is partly due to the three patients in the 81 total male radiotherapy cases who had palliative radiotherapy for their terminal case as compared to the same three patients in the larger overall 140 male patients. Also, the number of patients lost during the five years following treatment is greater in the overall male group than that in the group receiving radiotherapy and this tends to give a slightly better five year survival rate to the former group.

From a review of the literature, the prognosis of patients with this disease as indicated by other investigators in terms of five year survivals, or five

year cures, are as follows:

	Total no. of cases	Five year survivals %	Five year cures %	Remarks
LAMPE ¹⁷⁶	39	33.4	-	Irradiation
MARTIN ¹⁹⁸	113	-	25.7	Radiotherapy, surgery and a combination of both methods
MATTICK and MEEHAN ²⁰⁵	101	-	19	Radiotherapy
MARTIN and CRAFFEY ²¹²	87	-	40	Radiotherapy
ERICH and KRAGH ⁵²	94 (lower gingiva)	52	-	Surgery, Electrocoagu- lation, Radio- therapy, or combination of these
SHARP and WOOD ³¹²	30	-	36	

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK
IN AUSTRALIA

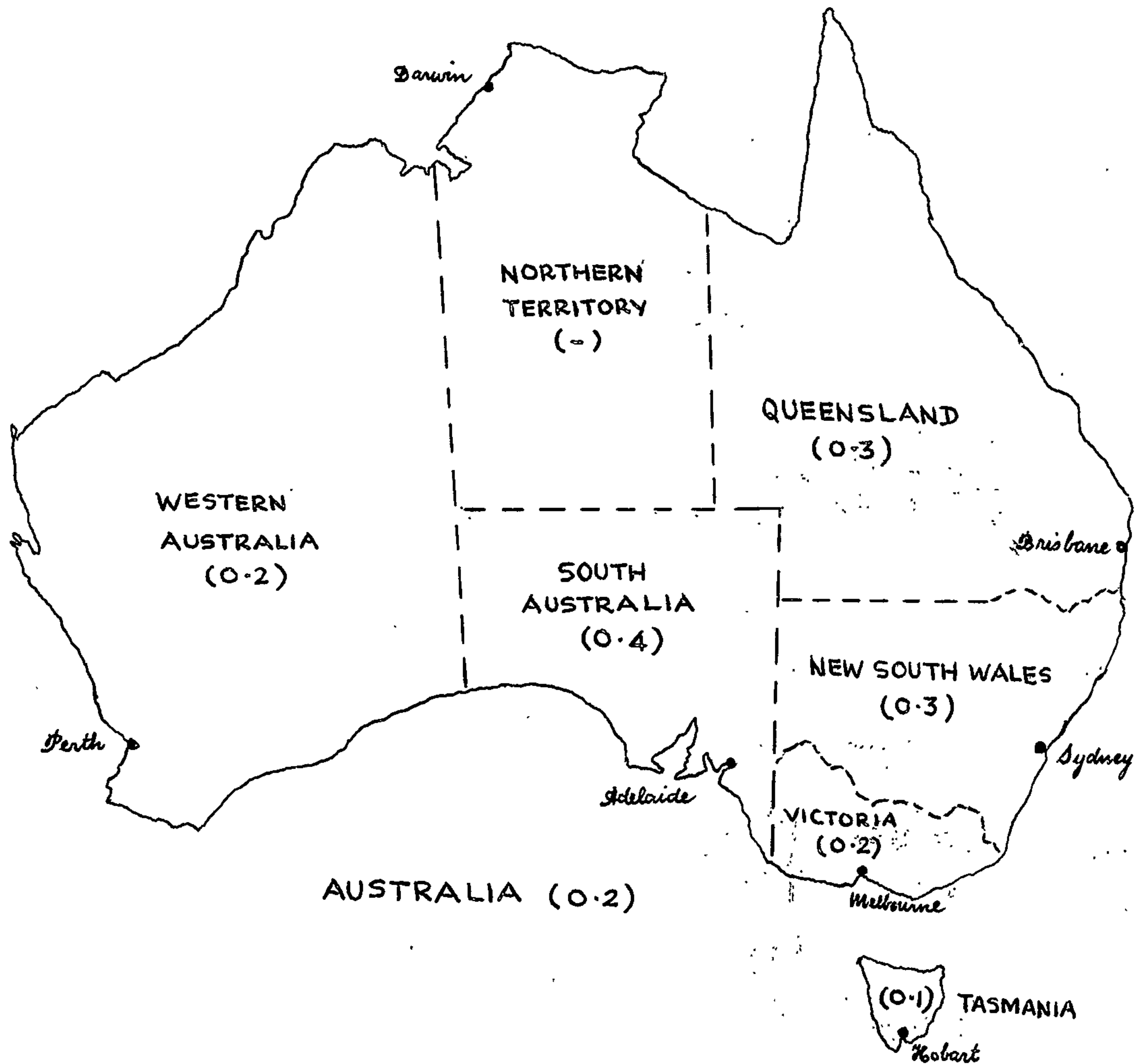
GENERAL INCIDENCE

There are 153 patients with cancer of the buccal mucosa of the cheek registered in the major hospitals in Australia during the six year period from 1959 to 1964 inclusive. Of these, there are 95 men and 58 women in the series. There appears to be a gradual decrease in the number of patients over the six years (Table 59). This trend is more clearly seen when male and female patients are considered together - 32 patients in 1959 to 16 patients in 1964. For male and female separately, although the decrease is slightly irregular, there is a drop in the number of cases in each instance when comparing the number of patients seen in 1959 (male 18 cases, and female 14 cases) and that seen in 1964 (male 10 cases, and female 6 cases). In Table 61, the rates per 100,000 population for patients with this disease in each of the six years remain fairly constant with only slight changes throughout the years. For male and female patients together, the rates per 100,000 in 1959 is 0.3 and this gradually drops to 0.1 in 1964. Similar trends are seen when male and female are considered separately, and in each instance there is a

drop of 0.2 in the rates per 100,000 from 1959 to 1964.

The number of patients with cancer of the buccal mucosa of the cheek over the six years in each of the different states are seen in Table 62. For male and female patients together, New South Wales has the largest number of patients, 68 cases in all, and this is slightly more than twice the number seen in Victoria (31 cases) which has the second largest group of patients. Next is Queensland with 23 cases, then South Australia 21 cases, Western Australia 7 cases, and Tasmania 3 cases. Except for Tasmania (2 female patients and 1 male patient), all the other states have more men with this condition than women. The corresponding rates per 100,000 population for patients with malignancy of the buccal mucosa of the cheek in the different states are as shown in Table 64. For male and female together, South Australia has a rate of 0.4 per 100,000, New South Wales and Queensland 0.3, Victoria and Western Australia 0.2, and Tasmania 0.1. For female separately, the rates are fairly constant in all the states - New South Wales, Victoria, South Australia, and Tasmania have a rate of 0.2 per 100,000, and Queensland and Western Australia, a rate of 0.1. For male, South Australia has a rate of 0.5 per 100,000, New South Wales and Queensland 0.4, Western Australia 0.2, and Victoria and Tasmania 0.1.

FIGURE 14



() INDICATES RATE PER 100,000 POPULATION PER YEAR

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK
AS SEEN IN THE MAJOR HOSPITALS IN AUSTRALIAN
STATES 1959-1964

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For Australia as a whole, the rates per 100,000 population are 0.3 for male, 0.2 for female, and 0.2 for male and female together.

In the present Australian study, cancer of the buccal mucosa of the cheek comprises about 2.7%^{per cent.} of all malignancy of the oral cavity (International Classification Numbers 140 to 144 and 191.0) (Table 62.) When individual states are considered, cancer at this intraoral site accounts for 4.6 per cent. of all oral cancer in New South Wales, 4.0 per cent. in South Australia, 2.0 per cent. in Victoria, 1.7 per cent. in Queensland, 1.2 per cent. in Western Australia, and 1.1 per cent. in Tasmania. The figure for New South Wales would have been slightly lower if the number of patients with lip cancer in the state is higher, but because of an under reporting of lip cases, the figure for cancer of the lip for New South Wales is comparatively lower than for the other states.

If cancer of the buccal mucosa of the cheek is related to malignancy of the intraoral cavity proper (International Classification Number 141, 143, and 144 - that is, excluding cancer of the lip and salivary gland), it comprises 9.7 per cent. of all cancer of the oral cavity proper and ranks fifth in frequency of mouth cancer (Table 65).. A breakdown of individual states

shows that in South Australia, cancer at this intraoral site makes up about 13.3 per cent. of all malignant neoplasms of the intraoral cavity proper, and in Queensland, this percentage is 11.3, for New South Wales, Victoria, and Tasmania, it is 9.5 per cent., 9.3 per cent., and 9.7 per cent. respectively, whereas in Western Australia it is 5.1 per cent.

A review of the literature indicates that the findings of Richards and Ash,²⁷³ Martin and Pflueger,²⁰⁰ Tiecke and Bernier³⁶⁰ and Gardner¹¹⁷ are fairly constant in this regard - 10.9 per cent., 9.5 per cent., 9 per cent. and 9 per cent. of all oral cancer as indicated in their respective studies. On the other hand, the findings of Paymaster²⁴¹ for Indian patients seen at the Tata Memorial Hospital in Bombay, India, is higher. He reports that cancer of the buccal mucosa of the cheek comprises 18 per cent. of all intraoral malignant tumours. A still much higher figure is reported by Atkinson et al.⁷ in their study of this disease in the Territory of Papua and New Guinea. They indicate that malignancy of the buccal mucosa of the cheek represents 43.5 per cent. of all oral cancer among New Guineans. Similarly, Farago⁹² reports that cancer at this intraoral site comprises 65.5 per cent. of all oral malignancy in New Guinea. The much higher incidence of cancer of

the buccal mucosa in India and New Guinea may be partly attributed to the prevalence of betel nut chewing in these communities.

SEX INCIDENCE

In the present series, of 153 patients with cancer of the buccal mucosa of the cheek, there are 95 men and 58 women, giving a male to female ratio of 1.6 to 1 in favour of men (Table 125). This is a much lower male to female ratio when compared to the findings of other overseas investigators:

	<u>Year</u>	<u>Male/Female Ratio</u>	<u>Total No. of cases</u>
MARTIN and PFLUEGER ²⁰⁰	1935	9:1	99
WELCH and NATHANSON ⁴⁰³	1937	9:1	371
JORSTAD ¹⁴⁴	1942	6:1	70
JACKSON and NEW ¹⁴²	1950	20:1	107
O'BRIEN and CATLIN ²³⁸	1965	3:1	248
PRESENT SERIES	1967	1.6:1	153

In the study of Atkinson et al.,⁷ they report a male to female ratio of 3.3:1 for 91 patients with this disease in the Territory of Papua and New Guinea. Farago,⁹² in an analysis of 77 New Guinean patients with buccal mucosa cancer, indicates the sex distribution is 2:1 in favour of men, whereas Paymaster²⁴¹ reports a 5:3 male to female ratio for 650 patients investigated by him.

TABLE 125

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA
 (1959-1964 INCLUSIVE)*
 SEX DISTRIBUTION

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
BUCCAL MUCOSA OF CHEEK	95	62.1	58	37.9	153	1.6:1

In these studies, the relatively higher proportions of women with this disease giving rise to a lower male to female ratio may be partly attributed to the active indulgence in betel nut chewing in India and New Guinea.

In the present study, when individual states are being considered, the sex distribution of this disease in the different states are as follows:

	<u>Male/Female Ratio</u>	<u>Total No. of cases</u>
QUEENSLAND	6.7:1	23
WESTERN AUSTRALIA..	2.5:1	7
SOUTH AUSTRALIA	2.0:1	21
NEW SOUTH WALES	1.7:1	68
VICTORIA	1:1.6	31
TASMANIA	1:2	3
AUSTRALIA	1.6:1	153

AGE INCIDENCE

The average age of 95 male patients (age range, 34 years to 91 years) with cancer of the buccal mucosa of the cheek in the present study is 68.1 years and that for 58 female patients (age range, 24 years to 95 years) is 64.7 years, whereas for male and female together, the average age of the 153 patients is 66.8 years (Table 67). This is slightly higher than the

reported average age of 64.7 years and 64.5 years in the studies of Richards and Ash²⁷³ (205 cases) and Jorstad¹⁴⁴ (70 cases) respectively. Jackson and New,¹⁴² in an analysis of 107 cases, report that the average of the patients was 62 years, whereas the findings of Martin and Pflueger²⁰⁰ indicate an average age of 59 years for 99 patients with this disease. These studies are conducted in Western countries, and the average age of the patients is much higher than the average age of 45 years for 650 Indian patients with this disease reported by Paymaster.²⁴¹

In the present series, the median age for male patients with malignancy of this intraoral site is 69.2 years and that for female patients is 65.6 years, whereas for the total of 153 male and female patients, the median age is 68.3 years. This is a higher median age when compared to the findings of Welch and Nathanson⁴⁰³ for 330 patients with a median age of 60 years.

The study of Martin and Pflueger²⁰⁰ (99 cases) indicates that about 50 per cent. of the patients are found in the fifth and sixth decades of life. This is comparable to the findings of about 46 per cent. of patients who belong to the age of from 50 to 69 years in the present series (Table 70). Jackson and New,¹⁴²

in an analysis of 107 patients with this disease, report that about 85 per cent. of the patients were encountered in between the age of 50-79 years. In the present study, about 77.1 per cent. of 153 patients are seen between these ages (for male, 77.9 per cent of 95 patients, and for female, 75.9 per cent. of 58 patients). Only 9.8 per cent. of the patients are below 50 years of age (for male 8.4 per cent., and for female 12.1 per cent.) and 14.4 per cent. are 80 years and over (male 13.7 per cent., and female 12.1 per cent.).

Table 69 contains the rates per 100,000 population of patients with this disease in the different age groups. The rate increases gradually with an increase in age from 0.02 per 100,000 for male and female patients in the age group of 20-24 years to 3.3 per 100,000 in patients over 80 years of age. Considering male patients separately, the rate per 100,000 shows a similar gradual increase from 0.04 for patients in the age group of 30-34 years to 1.9 for patients in the age group of 70-74 years, after which there is a sharp increase of 4.8 per 100,000 for patients belonging to the age group of 75-79 years to 6.3 for patients over 80 years old. For female patients, a gradual increase in the rate is seen throughout the different age groups, from 0.05 per 100,000 for patients in the age group of 20-24 years to 1.7 per 100,000 for patients above 80 years of age.

SITE OF OCCURRENCE

Table 126 shows the distribution of the disease as occurring on the left or right side of the cheek. Of the 114 cases in which such an allocation of site is possible, there are 69 patients with cancer of the left buccal mucosa of the cheek as compared to 52 patients who had the disease on the right buccal mucosa of the cheek. In 32 patients, the case histories are not good enough to allow such an allocation of site.

When male and female are considered separately, for male, of 70 patients in whom the involvement of the disease on the left or right buccal mucosa of the cheek is known, there are 38 patients with malignancy of the left cheek as compared to 32 with lesions sited on the right cheek. Thus there is no appreciable differences in the group, whereas for female, of the 51 patients in whom such an allocation of site is possible, the left cheek (31 cases) appears to be involved slightly more often than the right cheek (20 cases).

In the study of 99 patients with this disease by Martin and Pflueger,²⁰⁰ they indicate that the right and left cheeks were involved in almost the same number of instances, whereas Richards and Ash²⁷³ report a slightly greater involvement of the left cheek (101 cases) than the right cheek (89 cases) by the disease.

TABLE 126

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA
BY SEX AND LATERALITY
(1959-1964 INCLUSIVE)

SITE	BUCCAL MUCOSA OF CHEEK					
SEX	MALE		FEMALE		MALE and FEMALE	
LATERALITY	No.	%	No.	%	No.	%
LEFT SIDE	38	40.0	31	53.4	69	45.1
RIGHT SIDE	32	33.7	20	34.5	52	44.0
SIDE UNSPECIFIED	25	26.3	7	12.1	32	20.9
TOTAL	95	100.0	58	100.0	153	100.0

On the other hand, the findings of O'Brien and Catlin²³⁸ indicate that 139 patients had lesions on the right cheek as compared to 114 who had involvement of the left cheek. However, they feel that this is not significant.

HISTOPATHOLOGIC TYPE

The main histopathologic type of tumours seen in 153 patients with malignancy of the buccal mucosa of the cheek is squamous cell carcinoma, 77.1 per cent. of the total (Table 127). In the case histories of 28 patients (18.4 per cent.), a diagnosis of "carcinoma" only is recorded. It is reasonable to assume that most of these are squamous cell carcinoma. There are 6 patients with malignancy of salivary gland origin. The distribution of histopathologic types of tumours is much the same for male and female separately, except that in the 6 cases of salivary gland malignancy, 5 are seen in the male group of patients.

The findings of other investigators^{142, 238, 241, 273} similarly indicate that the majority of patients with this disease have squamous cell carcinoma, with a few cases of tumours of the accessory salivary glands.

TREATMENT

The preferred method of treatment for patients with primary cancer of the buccal mucosa of the cheek in Australia is by radiotherapy (Table 128). Of 138

TABLE 127

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA
BY SEX AND DIAGNOSIS
(1959-1964 INCLUSIVE)

SITE	BUCCAL MUCOSA OF CHEEK					
SEX	MALE		FEMALE		MALE and FEMALE	
DIAGNOSIS	No.	%	No.	%	No.	%
SQUAMOUS CELL CARCINOMA	73	76.8	45	77.6	118	77.1
MALIGNANT PLEOMORPHIC ADENOMA	1	1.1	-	-	1	0.6
ADENOCARCINOMA	2	2.1	1	1.7	3	2.0
UNSPECIFIED MIXED SALIVARY GLAND TUMOUR	2	2.1	-	-	2	1.3
CARCINOMA, UNSPECIFIED	16	16.8	12	20.7	28	18.4
MALIGNANT NEOPLASM, UNSPECIFIED	1	1.1	-	-	1	0.6
TOTAL	95	100.0	58	100.0	153	100.0

TABLE 128

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA
 BY SEX AND TREATMENT.
 (1959-1964 INCLUSIVE)

SITE	BUCCAL MUCOSA OF CHEEK					
SEX	MALE		FEMALE		MALE and FEMALE	
TYPE OF TREATMENT TO PRIMARY	No.	%	No.	%	No.	%
RADIOTHERAPY	65	74.7	37	72.5	102	73.9
SURGERY	15	17.2	10	19.6	25	18.1
RADIOTHERAPY and SURGERY	7	8.1	4	7.9	11	8.0
TOTAL	87	100.0	51	100.0	138	100.0

patients with this disease in whom treatment was given, 73.9 per cent. were treated by radiotherapy, 18.1 per cent. by surgery, and 8 per cent. by a combination of both methods. There is virtually no difference in the choice of therapy for male patients and female patients. For male, 74.7 per cent. of the patients received radiotherapy, 17.2 per cent. had surgery, and 8.1 per cent. were treated by a combination of radiotherapy and surgery. The corresponding percentages for female are 72.5 per cent., 19.6 per cent., and 7.9 per cent. respectively.

When individual states are taken into consideration, the major type of treatment given to patients with this disease in the different states are as follows:

	Radio- therapy %	Surgery %	Radiotherapy and surgery %	Total no. of cases
NEW SOUTH WALES	80.7	14.5	4.8	62
VICTORIA	58.6	27.6	13.8	29
QUEENSLAND	88.8	5.6	5.6	18
SOUTH AUSTRALIA	52.6	31.6	15.8	19
WESTERN AUSTRALIA	85.7	14.3	-	7
TASMANIA	100.0	-	-	3

Table 129 shows the different modalities of radiotherapy used in the treatment of patients with cancer of the buccal mucosa of the cheek. The most

TABLE 129

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA
BY SEX AND TREATMENT BY RADIOTHERAPY*
(1959-1964 INCLUSIVE)

SITE	BUCCAL MUCOSA OF CHEEK					
SEX	MALE		FEMALE		MALE and FEMALE	
TYPE OF RADIOTHERAPY TO PRIMARY	No.	%	No.	%	No.	%
SXRT	3	4.1	1	2.3	4	3.4
MVT	11	14.9	11	25.0	22	18.6
DXRT	14	18.9	5	11.4	19	16.1
SXRT and DXRT	1	1.4	—	—	1	0.8
MVT and DXRT	—	—	1	2.3	1	0.8
XRT, UNSPECIFIED	15	20.3	4	9.1	19	16.1
IMPLANT	11	14.9	9	20.4	20	16.9
RADIOTHERAPY, UNSPECIFIED	2	2.7	2	4.5	4	3.4
COBALT 60	17	22.9	11	25.0	28	23.8
TOTAL	74	100.0	44	100.0	118	100.0

common form of radiotherapy used is Cobalt 60 - 23.8 per cent. of 118 patients who had radiotherapy received cobalt treatment. It was used with almost equal frequency in male patients (22.9 per cent. of 74 cases) and female patients (25.0 per cent of 44 cases).

Next of common usage is MVT - 22 per cent. of the patients received this form of radiotherapy treatment. There appears to be more female patients (25 per cent.) who were treated by MVT than male patients (14.9 per cent.) in the group.

Implant was the third most common form of radiotherapy used - 16.9 per cent. of the patients were treated by implant (male 14.9 per cent., and female 20.4 per cent.). The most common type of implant used was radon, next was radium, and then radioactive gold.

DXRT was given to 19 (16.1 per cent.) of the 118 patients who had radiotherapy. Slightly more male patients (18.9 per cent.) received this form of radiotherapy treatment than female patients (11.4 per cent.).

Altogether, 89 patients (75.4 per cent.) were treated by these four main types of radiotherapy. Of the remaining 29 patients, 19 had some form of X-ray irradiation not specified in their case histories, 4 had SXRT, and the rest were treated by combinations of SXRT and DXRT, and MVT and DXRT.

A review of the literature indicates that Paymaster,²⁴¹ Guiss and Macdonald,¹¹² Meyer,¹⁸³ and Shafer, Hine and Levy³¹⁸ are of the opinion that both radiotherapy and surgery have a place in the treatment of this disease, and that in early cases, equally successful results may be attained by either surgical procedures or radiologic techniques.

Thoma,³⁶⁸ Jorstad,¹⁴⁴ and Weaver⁴⁰⁹ favour the use of surgical or diathermy excision and electro-coagulation in the management of patients with well localized primary lesions, whereas O'Brien and Catlin²³⁸ indicate that the treatment of malignancy in this intraoral site is surgical excision in all resectable cancers.

The advocates of radiotherapy in the treatment of patients with this disease are Richards and Ash,²⁷³ Martin and Pflueger²⁰⁰ are of the opinion that a combination of irradiation and surgical intervention is valuable in the management of patients with cancer of this intraoral site. However, they indicate that most primary lesions should be treated almost entirely by irradiation.

The consensus of opinion in the treatment of operable positive metastatic lymph nodes is by neck dissection performed on the affected side.^{45, 112, 142, 144, 200, 238} This opinion is shared by Paymaster,²⁴¹

but he indicates that when the patient refuses surgery, or when the case is unsuitable for surgical treatment, radiotherapy may be used. In the present study, of 28 patients who were treated for cervical lymph node metastases, surgery and radiotherapy were used with equal frequency (Table 130).

PROGNOSIS

The crude cumulative five year survival rate of 95 male patients treated for cancer of the buccal mucosa of the cheek is 48.1 per cent. and that for 58 female patients is 42.3 per cent. The corresponding relative five year survival ratios for male is 0.679, and for female 0.512, reflecting a better five year survival in the group of male patients (Table 131).

Of 65 male patients treated by radiotherapy, the crude cumulative five year survival rate is 38.1 per cent. and the relative five year survival ratio is 0.536. In comparison to the overall male group of patients, the five year survivals for the radiotherapy treated group is lower, partly due to the three patients in the 65 total male radiotherapy cases who had palliative radiotherapy for their terminal cases as compared to the same three patients in 95 overall male cases.

From a review of the literature, the five year

TABLE 130

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA.
TREATMENT TO METASTASES

TYPE OF TREATMENT TO SECONDARY	RADIO- THERAPY		SURGERY		TOTAL
SITE	No.	%	No.	%	
BUCCAL MUCOSA OF CHEEK	14	50.0	14	50.0	28

TABLE 131

CANCER OF THE BUCCAL MUCOSA OF THE CHEEK IN AUSTRALIA.
PROGNOSIS

	Total No. of cases		Crude cumulative five year survival rate %		Expected five year survival rate %		Relative five year survival ratio	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
BUCCAL MUCOSA OF THE CHEEK, TOTAL	95	58	48.1	42.3	70.9	82.6	0.679	0.512
PATIENTS TREATED BY RADIOTHERAPY	65	*	38.1	-	71.1	-	0.536	-
PATIENTS TREATED BY SURGERY	*	*	-	-	-	-	-	-

* Number of patients in the group is too small to work out accurate five year survival.

survivals for patients with this disease as reported by other investigators are as follows:

	<u>Year of Report</u>	<u>Total No. of Cases</u>	<u>% of Five Year Survivals</u>	<u>Remarks</u>
MARTIN and PFLUEGER ²⁰⁰	1935	99	30	Mainly radiation therapy
JORSTAD ¹⁴⁴	1942	70	22	Mainly surgical and diathermy excision
BEISWANGER and STENSTROM ³²	1945	28	18	Radiation and surgery
NEW and JACKSON ¹⁴²	1950	107	51.6	Mainly surgery
LAMPE ¹⁷⁶	1955	50	46.4	Surgery and . irradiation
MODLIN and JOHNSON ²⁰⁶	1955	27	47	Mainly surgery
BYARS ⁴⁵	1959	---	50	Surgery
GUISS and MACDONALD ¹¹²	1960	28	47	Surgery and irradiation
O'BRIEN and CATLIN ²³⁸	1965	248	42	Mainly surgery.

CANCER OF THE PALATE IN AUSTRALIA

GENERAL INCIDENCE

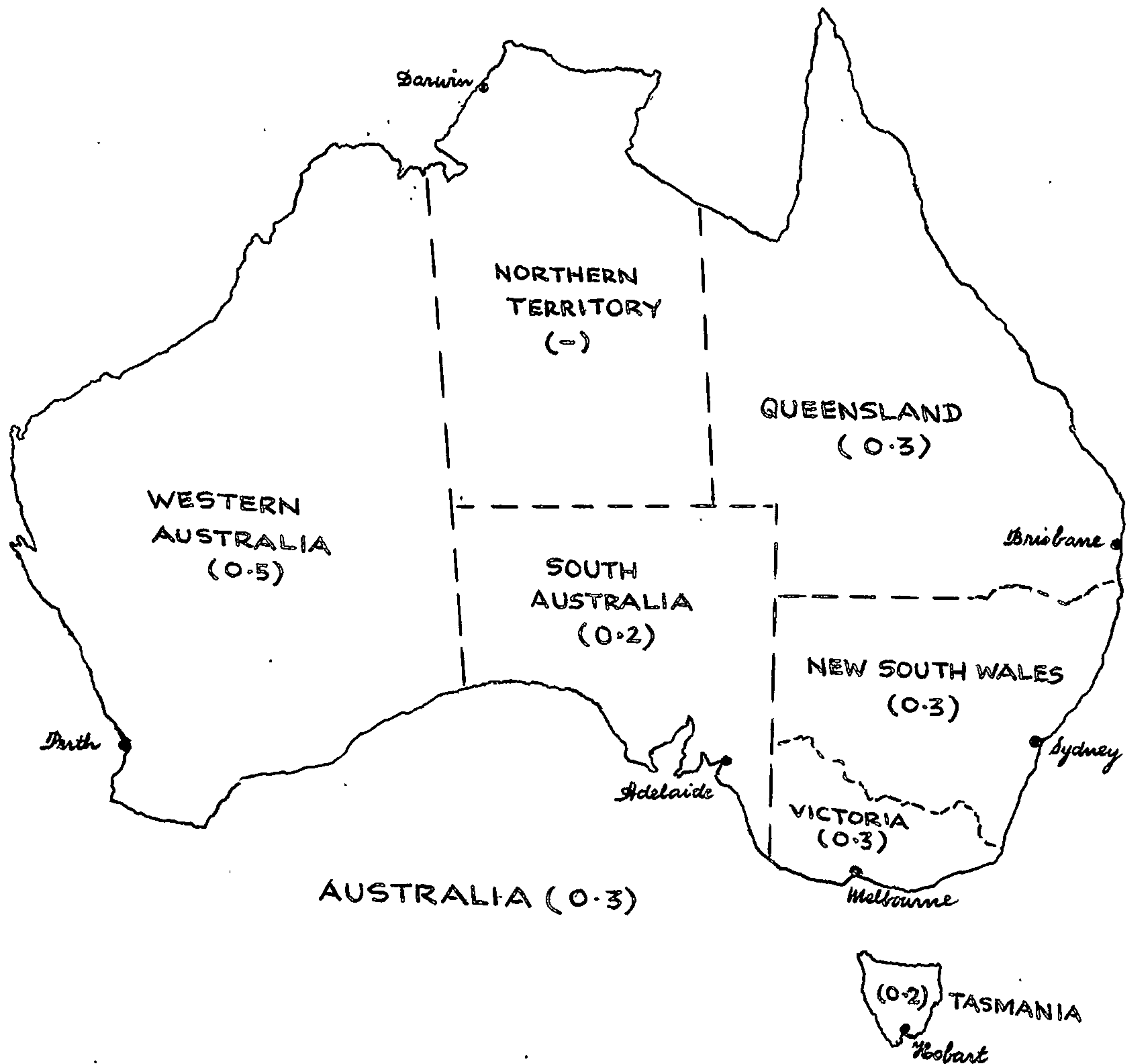
For the six year period from 1959 to 1964 inclusive, the number of patients with cancer of the palate as seen in the major hospitals in Australia is 180. This is comprised of 113 men and 67 women in the series.

Table 59 shows the number of new cases registered in each of the six years and Table 61 gives the corresponding rates per 100,000 population for the different years. For the year 1959, there are 24 male patients with this disease and there is a gradual decrease in the number through the six years with only 15 cases registered in 1964. However, the corresponding rates per 100,000 population remain fairly constant over the years with little changes seen - 0.5 per 100,000 in 1959 and 0.3 per 100,000 in 1964. For female patients, the number of new cases registered each year did not vary very much, and the rates per 100,000 remain much a constant - 0.3 per 100,000 in 1959 with a drop of only 0.1 for the next four years and a return to 0.3 per 100,000 in 1964. For male and female total, the rates per 100,000 exhibit a similar trend, but the number of cases registered show

a slight decrease from 37 cases in 1959 to 26 cases in 1961. In the following year, the number of cases registered is 31, in 1963 it is 25, and in 1964 29 cases are recorded.

In Table 62 is contained the number of patients with palatal malignancy as registered in the different states over the six years, whereas Table 64 shows the rates per 100,000 in each of the states. New South Wales has the most number of patients with this disease seen over the six year period (74 cases), next is Victoria (44 cases), then Queensland (25 cases), Western Australia (21 cases), South Australia (11 cases), and Tasmania (11 cases). Except for Tasmania, there are more men with palatal cancer than women in all the other states. With the exception of New South Wales (male and female have equal rates of 0.3 per 100,000) and Tasmania (male 0.2 and female 0.3 per 100,000), the rates per 100,000 population for male are higher than that for female in the other states. For Victoria, male has a rate of 0.4 per 100,000 population and female 0.1, for Queensland 0.3 per 100,000 in male and 0.2 for female, for South Australia 0.3 and 0.1 per 100,000 for male and female respectively, and for Western Australia 0.6 for male and 0.4 for female per 100,000. For Australia as a whole, the rates per

FIGURE 15



() INDICATES RATE PER 100,000 POPULATION PER YEAR

CANCER OF THE PALATE AS SEEN IN THE MAJOR
HOSPITALS IN AUSTRALIAN STATES
1959-1964

KTN.

100,000 population is 0.4 for male, 0.2 for female, and 0.3 for male and female total.

Cancer of the palate in Australia comprises about 3.1 per cent. of all oral malignancy and is the sixth most common form of cancer of the oral cavity as defined by the International Classification Numbers 140-144, and 191.0 (Table 62). When taking individual states into consideration, this figure for New South Wales is 5.0 per cent., Western Australia 3.7 per cent., Victoria 2.9 per cent., South Australia 2.1 per cent., Queensland 1.9 per cent., and Tasmania 1.8 per cent.

If palatal malignancy is related to cancer of the intraoral cavity proper (International Classification Numbers 141, 143, and 144 - that is, excluding cancer of the lip and salivary gland), as seen in Table 65, the palate is the fourth most frequent site of mouth cancer, accounting for 11.4 per cent. of all malignant tumours encountered in the intraoral cavity proper. A breakdown of the states shows that this figure for Tasmania is 16.1 per cent., Western Australia 15.3 per cent., Victoria 13.1 per cent., Queensland 12.3 per cent., New South Wales 10.4 per cent., and South Australia 7.0 per cent.

According to Bernier,¹⁶ Tiecke and Bernier,³⁶⁰ and Sharp, Bullock and Hazlet,³²³ squamous cell carcinoma of the palate comprises 10 to 11 per cent. of all

intraoral cancer. Martin¹⁹⁹ indicates that malignant tumours of the palate represent about 8 per cent. of all oral cancer according to the admission record of the Memorial Hospital in New York. This is in accord with the findings of Gardner¹¹⁷ in his study of 167 cases of oral malignancy. On the other hand, New and Hallberg²³⁴ report that, according to the admission records of the Mayo Clinic in Rochester, Minnesota, palatal cancer comprises only 3.5 per cent. of all oral malignant tumours, whereas the finding of Shirokov³⁶³ indicates that cancer of this intraoral site represents about 40 per cent. of all oral cancer in the Santo Tomas Hospital in Panama City. He ascribed this high incidence to the prevalence of reverse-smoking in the Panama. Gardner, Schwartz and Pallen,¹¹⁹ in their study of 258 cases of intraoral malignancy, report that 6.9 per cent. of the lesions are encountered on the palate. This approximates the claim by Castigliano⁵¹ that malignancy of this intraoral site comprises 7.2 per cent. of all oral cancer. Atkinson et al.,⁷ in a study of this disease in the Territory of Papua and New Guinea, report that palatal malignancy comprises 5.2 per cent. of all oral cancer among New Guineans.

SEX INCIDENCE

Of 180 patients with cancer of the palate in

the present study, there are 113 men and 67 women, giving a male to female ratio of 1.6:1 in favour of men. A break down of the palate shows that the male to female ratio for patients with malignancy of the hard palate is 1:1.5 in favour of women (out of 55 cases), whereas for those with cancer of the soft palate, the ratio is 3.8:1 in favour of men (Table 132). This is because most lesions on the soft palate are usually squamous cell carcinoma which is more commonly encountered in men, whereas tumours of the salivary gland type, more commonly encountered on the hard palate, are seen slightly more frequently in women. In the group of 56 patients with malignancy of the palate unspecified, the male to female ratio is 2:1 in favour of men. A similar ratio of 2:1 in favour of men is seen in the 6 patients with cancer involving the hard and the soft palate - probably this is not significant because of the small number of cases.

The findings of other investigators show that for patients with squamous cell carcinoma, there are definitely more men than women,^{106, 199, 234, 323} whereas for those with cancer of the salivary gland type, the male to female ratio is slightly in favour of women.^{199, 234} In the study of Shirokov,³¹³ he reports that of the 14 patients with carcinomas at this intra-oral site, 13 were women with 1 man in the series. He

TABLE 132

CANCER OF THE PALATE IN AUSTRALIA (1959-1964 INCLUSIVE)
SEX DISTRIBUTION

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
HARD PALATE	22	40.0	33	60.0	55	1:1.5
SOFT PALATE	50	79.4	13	20.6	63	3.8:1
HARD and SOFT PALATE	4	66.7	2	33.3	6	2:1
PALATE, UNSPECIFIED	37	66.1	19	33.9	56	2:1
PALATE, TOTAL	113	62.8	67	37.2	180	1.6:1

is of the opinion that the prevalent practice of reverse-smoking by women in the Panama is responsible for the high female incidence of the disease.

AGE INCIDENCE

The average age of 112 male patients (age range, 29 years to 88 years) with cancer of the palate is 64.1 years and that for 65 female patients (age range, 25 years to 98 years) is 63.9 years, whereas for male and female total (177 cases), the average age is 64.0 years (Table 67). This corresponds closely to the findings of Gardner, Brown and Bowen,¹⁰⁶ and Sharp, Bullock and Hazlet³²³ who indicate that the average age of patients with this disease is 65 years and 62 years respectively. A much lower average age of 57 years and 58 years are reported by Martin¹⁹⁹ and Tiecke and Bernier.³⁶⁰ In the series investigated by Martin,¹⁹⁹ the average age of patients with epidermoid carcinomas was 61 years and that for patients with adenocarcinomas 48 years. A similar lower average age for patients with adenocarcinoma (50 years for men and 42 years for women) as compared to those who have squamous cell carcinoma (58.2 years) is noted in the study of 160 cases of palatal malignancy by New and Hallberg.²³⁴ In the present study, the average age of 71 male patients with squamous cell carcinoma is 60.1 years (median age, 61.5 years) and that for 23

female patients is 67.1 years (median age, 70 years), whereas for male and female total (94 cases), the average age is 61.8 years (median 62.5 years). In contrast, the average age of 13 male patients with malignant tumours of the salivary gland type is 52.1 years (median age, 50 years) and that for 16 female patients is 54.1 years (median age, 52.5 years), whereas for male and female total (29 cases), the average age is 53.2 years (median age, 51.7 years).

The median age for all male patients (112 cases) with palatal cancer in the present series is 66.4 years and that for all female patients (65 cases) is 65.7 years, whereas for male and female total (177 cases), the median age is 66.3 years. This is higher than the median age of 61 years in 174 patients investigated by Welch and Nathanson.⁴⁰³

In the present study, the largest number of patients with this disease seen in any one single decade is between the age group of 60 to 69 years - about 31 per cent. of 177 cases (Table 70). Only about 10.7 per cent. of the patients are seen below 45 years of age and about 11.9 per cent. above 80 years of age.

Table 69 shows the rates per 100,000 population for patients with malignancy of the palate in the

different age groups. The rate per 100,000 increases steadily with increase in age from 0.02 for patients in the age group of 20-24 years to 3.3 for patients in the age group of 80-84 years, followed by a sharp drop to 1.5 for patients 85 and over years old. A similar trend is seen for female patients with this disease (from 0.05 per 100,000 for age group 20-24 to 3.2 per 100,000 population for age group 80-84 years, followed by a sharp drop to 0.6 for patients 85 and over years of age). For male patients, a similar steady increase in the rate is noted (0.05 per 100,000 population for age group 25-29 years) with the peak at the age group of 80-84 years (3.5 per 100,000 population) but after which the drop in rate is not marked (3.2 per 100,000 population for patients 85 and over years of age).

SITE OF OCCURRENCE

Of 180 cases of palatal cancer in the present study, there are 63 (35 per cent.) patients with malignancy of the soft palate, 55 (30.6 per cent.) patients with the lesion sited on the hard palate, 6 (3.3 per cent.) patients have involvements of the hard and soft palate, and there are 56 (31.1 per cent.) patients whose case histories are unsatisfactory to allow such an allocation of site (Table 133). Thus, in the group of patients whose case histories give a specific indication of the site involved, it appears that the soft

TABLE 133

CANCER OF THE PALATE IN AUSTRALIA (1959-1964 INCLUSIVE)
SITE DISTRIBUTION

SITE	NO.	PERCENTAGE
HARD PALATE	55	30.6
SOFT PALATE	63	35.0
HARD and SOFT PALATE	6	3.3
PALATE, UNSPECIFIED	56	31.1
PALATE, TOTAL	180	100.0

palate is slightly more frequently involved by the disease than the hard palate. This is in contrast to the findings of Bernier,¹⁶ Shirokov³¹³ (13:1 in favour of the hard palate of 14 cases) and Beiswanger and Stenstrom³² (1.3:1 in favour of the hard palate of 18 cases). With the exception of Shirokov's study,³¹³ the series investigated by Beiswanger and Stenstrom,³² and Bernier¹⁶ might have more patients with malignancy of the salivary gland type which tend to occur more often on the hard palate than the soft palate, whereas in the present study, there is a greater number of patients with squamous cell carcinoma, which are usually seen more often on the soft palate than the hard palate. In the series investigated by Shirokov,³¹³ a special etiologic factor was in play, that of reverse-smoking, and the heat from the lighted end of the cigarette held in close proximity to the hard palate would be responsible for the preponderance of carcinomas of this structure.

Martin,¹⁹⁹ and New and Hallberg,²³⁴ in their respective studies, indicate that for patients with squamous cell carcinoma, the soft palate is more frequently involved than the hard palate, whereas for patients with adenoid tumours, the reverse is true, that is the hard palate is slightly more commonly involved. This is in accord with the findings of the present study.

HISTOPATHOLOGIC TYPE

The present study indicates that squamous cell carcinoma comprises the major histopathologic type of tumours in patients with palatal malignancy - 52.8 per cent. of 180 cases, whereas 16.1 per cent. are malignancy originating from the accessory salivary glands of the palate (Table 134). There is a group of 56 patients (31.1 per cent.) in whom a diagnosis of "carcinoma" only was recorded in the case histories. Since there are more patients with squamous cell carcinoma than those with tumours of the salivary gland type, it is reasonable to assume that in the group of 56 patients with a diagnosis of carcinoma unspecified, the majority of them have tumours of the epidermoid carcinoma variety.

More specifically, in the group of patients with malignancy of the accessory salivary gland origin, 3 had adenoid cystic carcinoma (all women), 2 had mucoepidermoid carcinoma (both women), 13 had adenocarcinoma (8 men and 5 women), and 11 had unspecified mixed salivary gland tumour (5 men and 6 women). In this group of 29 patients, 12 had their lesions sited on the hard palate, 6 had the cancer on the soft palate, 1 had involvements of both hard and soft palate, and the remaining 10 patients' case histories are inadequate to permit such an allocation of site. In contrast, of the

HISTOPATHOLOGIC TYPE

The present study indicates that squamous cell carcinoma comprises the major histopathologic type of tumors in patients with palatal malignancy - 52.8 per cent. of 180 cases, whereas 16.1 per cent. are malignancy originating from the accessory salivary glands of the palate (Table 134). There is a group of 26 patients (31.1 per cent.) in whom a diagnosis of "carcinoma" only was recorded in the case histories. Since there are more patients with squamous cell carcinoma than those with tumors of the salivary gland type, it is reasonable to assume that in the group of 26 patients with a diagnosis of carcinoma unspecified, the majority of them have tumors of the epidermoid carcinoma variety.

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