

CLINICAL FEATURES

Metastatic malignancies of the jaws produce variable signs and symptoms. Shafer, Hine and Levy³¹⁸ indicate that the patient is usually aware of a slight discomfort or pain followed by paresthesia of the lip or chin in many instances due to the involvement of the mandibular nerve.

Castigliano and Rominger⁶⁷ report that in some cases, there may be a loosening of the teeth in the involved segment of the jaws with eventual exfoliation, while in others, pain or 'toothache' may be the first important symptom.

Other signs and symptoms reported include swelling, trismus or interference with the function of the jaws, numbness of the affected jaw, and jaw fracture.^{64, 68, 216}

In 45 cases in which the extent of involvement of the lesion could be ascertained, Clausen and Poulsen⁶⁴ indicate that the tumour infiltrated into the surrounding soft tissues in 37 instances, while in 8 patients the growths were still confined to the jaw bone proper when presented for examination.

HISTOPATHOLOGIC TYPES

Cash, Royer and Dahlin⁶⁸ indicate that histologically, most of the metastatic tumours studied by them bore a strong resemblance to the parent tumours

with recognizable squamous cell or glandular elements.

Meyer and Skhlar,²¹⁶ in a study of 25 cases, report that metastatic tumours to the jaws are adenocarcinomas in a high proportion of cases (about 70 per cent. in their series). They interpret hypernephromas as also adenocarcinomas in their study. They indicate that sarcomas and epidermoid carcinomas are unusual.

RADIOGRAPHIC FEATURES

According to Cash, Royer and Dählin,⁶⁸ and Shafer, Hine and Levy,³¹⁸ the radiographic appearance of these tumours is not pathognomonic, there being extreme variation encountered. They remark that in most instances, a radiolucent lesion is seen reflecting osteolytic activity, while occasionally a radio-opaque appearance or sclerotic areas are seen in the roentgenogram indicating osteoblastic activity. The roentgenogram may show a fairly diffuse ill-defined lesion, or it may show a relatively well demarcated localised lesion.

Meyer and Shklar²¹⁶ indicate that the margins of radiolucent lesions are frequently of an irregular scalloped pattern, and that in cases of involvement in areas about the teeth, the findings may simulate periapical lesions or severe periodontal disease. They add that multiple, small, irregular, radiolucent spots and areas of altered trabeculation have been observed in some cases.

TREATMENT

Castigliano and Rominger⁶⁷ are of the opinion that the treatment in all cases of metastatic jaw tumours is largely palliative, and in most instances, moderate dosages from conventional radiotherapeutic devices will suffice. Shafer, Hine and Levy³¹⁸ indicate that palliation in such cases can also be achieved by the administration of sex hormones, adrenalectomy, folic acid antagonists or nitrogen mustard and, in more recent years, hypophysectomy has been attempted.

Meyer and Shklar²¹⁶ have attempted surgical resection of the mandible in cases where the primary lesion appears to be controlled and other metastatic foci rule out. They indicate that mandibulectomy resulted in temporary palliation, but unfortunately other metastatic foci soon appeared. They add that radiation for palliation is used more frequently than surgical methods, and recently telecobalt (Co^{60}) therapy has been used with benefit. Alcohol blocks and neurosurgical procedures, ranging from neurectomy of local innervation to retrogasserian neurectomy, have been used by them palliatively.

PROGNOSIS

The consensus of opinion is that the prognosis of the patient is extremely poor.^{64, 67, 68, 216} Frequently, other metastases are either present or soon develop in the lymph nodes, other bones, lungs, liver, and kidney.²¹⁶

Clausen and Poulsen⁶⁴ indicate that of 70 patients in whom there was adequate follow-up, 49 died in one year, 6 in two years and two in four years. Seventy per cent. of the patients died within the first year after detection of the disease.

MULTIPLE OR MULTICENTRIC ORAL MALIGNANT TUMOURS

The problem of multiple or multicentric oral malignancies has attracted much attention. It is of interest in relation to the complex etiology of oral cancer and the prognosis and management of this disease.

Slaughter³⁵¹ states that the term "multicentric origin" refers to the origin of tumour cells at multiple sites in an area of the mucous membrane, whereas the term "lateral cancerization" refers to growth at the edges of a tumour by a process of progressive transformation into cancer of the epithelium, rather than progressive destruction of the epithelium by pre-existing cancer cells. He and Cahn⁴⁷ are of the opinion that squamous cell carcinoma originates not from a single cell that becomes malignant but by a process of "field cancerization" wherein a whole area of epithelium undergoes neoplastic change at multiple points. These separate foci of neoplastic change may be close together and may coalesce as growth proceeds to form a single tumour, or they may be widely separated and remain as independent multiple tumours.

Moertel and Foss²⁰⁸ indicate that the concept of this phenomenon of multiple carcinomas is best expressed in the following words of Willis: "In human as in experimental carcinogenesis, the effective stimuli are applied,

not to one cell or one small group of cells, but to a more or less extensive area of the epithelial tissue. All the epithelium in that area is acted upon similarly, though of course usually not equally. Neoplasia will commence where the stimuli have been maximal, but the neoplastic response will later be manifested by neighbouring tissue that was subjected to the same original stimuli".

Several investigators^{170, 185, 208, 251, 350, 368, 395} share the opinion that multiple malignancies of the oral mucosa are not incidental occurrences but are distinct, separate primary tumours. Lund (quoted by Meyer and Shklar¹⁸⁵) indicates that the occurrence of oral multiple cancer is approximately fifteen times as common as would be expected by chance occurrence alone.

The studies of Slaughter,³⁵¹ and Slaughter, Southwick and Smejkal³⁵⁰ demonstrate that the multicentric origin of epidermoid carcinoma in the oral cavity is by no means rare. In one study, he reports that of 80 patients with oral cancer, 14 had multiple independent malignant tumours involving the oral or pharyngeal mucosa, an incidence of approximately 18 per cent. In another study, he and his associates indicate that of 783 patients with intraoral malignancy, 80 were found to have two or more independent squamous cell carcinomas involving the mucosa of the upper alimentary and respiratory tracts, an incidence of 11.2 per cent. Study of many microscopic

sections by them revealed that oral cancer spreads laterally rather than infiltrates, that the transition to cancer from normal tissue is indefinite, and that a definite precancerous field surrounds the frank cancer.

The findings of other investigators in this aspect has reinforced the concept of multifocal growth of oral malignancies. Wynder, Bross and Feldman,³⁹⁵ in a study of 543 male patients with cancer of the oral cavity, report that 59 had more than one primary cancer representing 11 per cent. This closely approximates the findings of Sharp, Bullock and Helsper,³⁴⁹ who, in a review of 275 consecutive cases of oral carcinoma, indicate that 28 patients (10 per cent.) had multiple primary lesions.

Moertel and Foss²⁰⁸ report an incidence of 8.7 per cent. of patients with two or more discrete oral cancers out of 732 patients with this disease, while Meyer and Shklar,¹⁸⁵ in an investigation of 768 cases of carcinoma of the oral cavity, indicate that 48 patients (6.3 per cent.) had multiple primary malignancies of the oral cavity and gastrointestinal tract. Of these, 36 patients presented multiple, separate, and distinct foci of carcinoma of the oral mucosa. On the basis of these findings, they conclude that there is an increased risk for a person with one oral malignancy to develop another malignant tumour in the oral mucosa, and that there is also a tendency for such a person to develop malignant tumours elsewhere in the gastrointestinal tract.

Further evidence to support the concept of multicentric growth in the oral cavity, according to various investigators, are summarised in the following table (Table 58).

TABLE 58

INCIDENCE OF MULTIPLE PRIMARY MALIGNANCIES IN
PATIENTS WITH INTRAORAL CANCER

Author	Site of malignancy	No. of Cases	Primary multiple tumours	
			No.	%
SCHREINER and CHRISTY ³⁰²	Lip	636	6	1.9
CADE and LEE ⁶¹	Tongue	653	27	4.1
FRAZELL and LUCAS ⁹⁶	Tongue	1554	170	11
PAYMASTER and SCHROFF ²⁴⁴	Tongue	700	10	1.4
ERICH and KRAGH ⁹⁰	Floor of mouth	102	18	17.6
MARTIN ¹⁹⁸	Gingiva	113	8	7
WILKINS and VOLGER ⁴⁰⁶	Gingiva	81	14	17
ERICH and KRAGH ⁸⁹	Gingiva	118	13	11

Wynder, Bross and Feldman,³⁹⁵ and Moertel and Foss²⁰⁸ indicate that there is a correlation between the development of multiple oral cancer and smoking or syphilis. On the other hand, Meyer and Shklar¹⁸⁵ did not find adequate correlation between such a relationship in their study. Pindborg^{248, 251} states that patients with Plummer Vinson's syndrome have a tendency to develop multiple cancers in the oral cavity

and that the development of multicentricity in oral carcinoma suggests that an underlying factor may predispose the oral epithelium toward development of cancer.

Moertel and Foss²⁰⁸ indicate that when oral cancer develops, all of the contiguous squamous mucous membrane must be regarded as susceptible to future malignant change, and it is the responsibility of those who are treating the patient to insist on frequent and regular follow-up examinations so that any second lesion may be detected and treated in its early stages. They add that appropriate prophylactic measures to eliminate any possible sources of carcinogenic irritation to these regions should be undertaken.

ORAL SARCOMAS

Thoma³⁶⁸ broadly classifies sarcomas as those malignant tumours which arise from mesenchymal tissue cells of the body. He indicates that these tumours may form from the various soft tissues, or from osteogenic and non-osteogenic cells in the bone and, therefore, they vary greatly depending on the tissues from which they are derived.

The consensus of opinion is that this group of malignancies is relatively rare in the oral cavity.^{28, 240, 265, 368} Ueno,³⁷² in a review of 608 cases of oral malignant neoplasms reports that the ratio of carcinoma to sarcoma in the series is 8:1. Pindborg,²⁴⁹ in estimating the incidence of this disease in Denmark, indicates that one can expect to find one oral sarcoma per one million of inhabitants per year in a population similar in age distribution and living conditions to that in Denmark.

There is general agreement that sarcomas are more likely to be found in young persons than in elderly people and this is in marked contrast to the carcinomas.^{265, 318, 368} In a review of 24 cases of oral soft tissue sarcomas, O'Day, Soule and Gores²⁴⁰ report that the mean age of the patients in the series was 26 years of age.

The problems encountered in the clinical and histological diagnosis of oral sarcomas have been discussed by Krüger.¹⁵⁵ He points out that oral sarcomas which grow deep in the tissues usually do not produce destruction and ulceration of the mucosa in the early stages of the disease, in contrast to oral carcinomas which ulcerate rather early because they are derived from the epithelial layer of the mucosa. In analysing the case histories of 64 patients with this disease, Krüger¹⁵⁵ indicates that 37 of these had been diagnosed as inflammation by the doctors consulted in the first instance. In the remaining 27 cases, the doctors consulted recognized the disease as tumours, and in six of these a biopsy was performed by them to establish a diagnosis.

Pekarsky²⁶⁵ indicates that radiographic procedures may be used to aid in the diagnosis of oral sarcomas of the jaw bones. He advocates the inclusion of a radiographic chest X-ray in such cases since metastasis to the lungs is not uncommon. He shares the opinion with Bernier,¹⁵ Castigliano,⁵¹ and Thoma³⁶⁸ that metastasis usually occurs via the blood stream rather than the lymphatics.

The treatment of most types of oral sarcomas, especially those occurring on the jaws, is mainly radical surgical resection. However, those that are classified as radio-sensitive such as the lymphosarcomas are best

treated by radiotherapeutic means. A combination of surgery and radiotherapy has also been used.

A perusal of the literature reveals that articles concerning oral sarcomas usually appear in the form of reports of single cases. And because of the relative rare occurrence of this group of malignancies in the oral cavity, the writer will only discuss briefly the different types of tumours which are normally indicated as belonging to this group.

MALIGNANT TUMOURS OF CONNECTIVE TISSUE ORIGIN

FIBROSARCOMA

Bernier¹⁵ indicates that the fibrosarcoma is a malignant tumour of fibroblastic cells and that two forms can be distinguished - the central or endosteal type originating within the medullary cavity of a bone, and the peripheral or periosteal form which originates in the covering of the soft tissues.

The consensus of opinion is that fibrosarcomas are rare in the oral cavity.^{170, 318, 336, 368} According to Bhaskar,²⁸ the oral sites commonly involved by this tumour are the cheek, lip, posterior portion of the mandible, and the maxilla.

Shafer, Hine and Levy³¹⁸ state that this neoplasm is most frequently encountered in persons before the age of fifty, while Waldron³⁸⁸ claims that the peripheral variants are usually seen in older patients while those arising in the bone are found more often in

children and young adults.

According to Shafer, Hine and Levy,³¹⁸ the clinical course of the disease is non specific, frequently producing an asymmetric swelling and distortion, and ulceration, haemorrhage, and secondary infection may sometimes be seen. They indicate that the tumour does not exhibit a high frequency of metastases.

The treatment advocated by most authorities^{15, 28, 318, 368} for fibrosarcomas is radical surgical excision. Some^{15, 318} indicate that the prognosis of this disease in the mouth is favourable, while Waldron³⁸⁸ claims that the prognosis is poor when there is bone invasion by the tumour.

HEMANGIOENDOTHELIOMA

This tumour, according to Shafer, Hine and Levy,³¹⁸ is of low grade malignancy, is of mesenchymal origin, and is derived from endothelial cells. It is uncommon in the oral cavity although it has been reported to occur in the lip, palate, gingiva, tongue and centrally within the maxilla and the mandible.

Thoma³⁶⁸ states that the tumour may occur in persons of any age, and that it frequently starts as a small reddish-pink lesion to grow rapidly and metastasize freely.

Both surgery and X-ray radition have been used in the treatment of this tumour.

HEMANGIOPERICYTOMA

Shafer, Hine and Levy³¹⁸ indicate that the hemangiopericytoma, a malignant neoplasm involving the blood vessels, is rarely encountered in the oral cavity. Clinically, they report that the tumour is firm, nodular, and may or may not exhibit any redness indicative of its vascular nature and most of the reported cases (mainly in patients below fifty years of age) had been surgically treated.

HEMORRHAGIC OR KAPOSI'S SARCOMA

According to different authorities,^{16, 318} the Kaposi's sarcoma is an uncommon malignancy of unknown etiology frequently seen in persons between 50 to 70 years of age and with a predilection for males.

The surgical management of this disease has been reported to be unsatisfactory, while X ray radiation has been used with considerable success.

ANGIOSARCOMA

Lucas¹⁷⁰ indicates that this malignant tumour of the blood vessels rarely occurs in the oral cavity, although cases have been reported to occur in the lip, palate, tongue, gingiva, mandible, and maxilla.

According to Thoma,³⁶⁸ the treatment of this condition is by wide excision or resection of the parts involved.

EWING'S SARCOMA

The Ewing's sarcoma, first described by James Ewing, is a primary malignancy of bone.³¹⁸ However, its occurrence in the mandible and maxilla is rare.^{16, 170}

Thoma³⁶⁸ indicates that the origin of this tumour is believed to be from the endothelial lining of blood vessels or lymphatics, while Waldron³⁸⁸ is of the opinion that it is derived presumably from young reticular cells of the bone marrow.

The consensus of opinion is that the tumour is frequently encountered in persons under twenty-five years of age.^{14, 318, 388} Frequently, the earliest signs and symptoms of this disease are pain, usually of an intermittent nature, and swelling of the involved bone.

Thoma,³⁶⁸ Waldron,³⁸⁸ and Shafer, Hine and Levy³¹⁸ indicate that although the neoplasm is radiosensitive, in many instances it does not respond to radiotherapy, and usually surgical excision is used in conjunction with radiation. They share the opinion with Stones³³⁷ that the prognosis of this malignancy is poor.

CHONDROSARCOMA

Stones³³⁷ indicates that chondrosarcomas of the jaws are rare. According to certain authorities,^{14, 16} the mandible is more often involved than the maxilla with a predilection for the angle of the body and ramus of the mandible.

Shafer, Hine and Levy³¹⁸ distinguish between a primary and a secondary form of chondrosarcoma, the latter being more common and developing in a pre-existing benign cartilaginous tumour. Both forms appear as an expanding lesion which is frequently painless, but in some instances may cause resorption and exfoliation of teeth. They add that, in general, these lesions are invasive and destructive, metastasize readily, and their treatment is by wide surgical excision

OSTEOSARCOMA (OSTEOGENIC SARCOMA)

According to Thoma,³⁶⁸ this malignant neoplasm is derived from cells of the osteoblastic family, whether fully or incompletely differentiated. Hence, the tumour may be made up of such cells in their various stages of differentiation and their cellular products with a predominance of one or the other element in some cases. He and Lucas¹⁷⁰ indicate that this disease occurs rarely in the mandible and the maxilla.

Most authorities^{14, 170, 318, 388} are in agreement that osteosarcomas of the jaws affect young persons between the ages of ten and thirty years.

Waldron³⁸⁸ and Thoma³⁶⁸ indicate that pain is an early symptom of the disease, and swelling of the bone produces an asymmetry of the face. The teeth in the

involved region may become loosened and in some instances paresthesia is present.

Thoma³⁶⁸ regards the following criteria as important in the diagnosis of this lesion:

1. Rapidly growing lesion
2. Symptoms of short duration
3. X-ray evidence of osteolytic and osteoblastic nature or the presence of periosteal reaction with spicules formation.
4. Pathologic report will include histologic findings of sarcomatous formations; osteoid, cartilage, or bone.

The treatment of this condition, according to Waldron,³⁸⁸ Thoma,³⁶⁸ and Shafer, Hine and Levy,³¹⁸ is by radical surgical excision including a large margin of normal bone and any soft tissues involved.

The estimated five year survival rate of patients treated for osteosarcoma, as indicated by Thoma³⁶⁸ ranges from two to twenty per cent., while Waldron³⁸⁸ claims that it is around the five per cent. mark. Both authors regard the prognosis as poor, whereas Bernier¹⁴ claims that patients with osteogenic sarcoma have a favourable prognosis. Shafer, Hine and Levy³¹⁸ state that the prognosis depends considerable upon the condition of the patient and the duration of the lesion when treatment is instituted.

MALIGNANT LYMPHOMA

Shafer, Hine and Levy³¹⁸ indicate that diverse classifications of this entity are seen in the literature, but none of them is satisfactory because of the fairly common transition which occurs between one form and another, and because of the frequent occurrence of intermediate types.

For simplicity and convenience, they and Bhaskar²⁸ regard the giant follicle lymphoma, the reticulum cell sarcoma, the lymphosarcoma, and Hodgkin's disease as comprising this group. These tumours are derived from the basic cells of the lymphoid tissue, the lymphocytes and the reticulum cells, and they are therefore intimately related to each other.

Steg et al.,³³⁶ in a review of 47 cases of malignant lymphomas involving the mandible and maxilla, report that 34 cases occurred in the maxilla, 12 cases in the mandible, and in one case both jaws were involved.

In the series, there were 34 men and 13 women with an average age of 48.8 years. The five year survival rate for the group was 26 per cent.

At this juncture, a separate consideration will be given only to the lymphosarcoma and the reticulum cell sarcoma since the other two types (giant follicle lymphoma and Hodgkin's disease), according to Bhaskar,²⁸ are very rarely seen in the oral cavity.

A. LYMPHOSARCOMA: According to Shafer, Hine and Levy,³¹⁸ numerous cases of this condition had been encountered in the mouth, the sites involved include the palate, gingiva and alveolar ridge, buccal mucosa, mandible, floor of the mouth, and tonsils. Lucas¹⁷⁰ indicates that oral lesions are either elements of disseminated lesions from other parts of the body, or they occur primarily in the oral tissues.

Clinically, the disease takes on a rapid course and the swelling progresses to a large ulcerating and necrotic lesion. With involvement of the jaw, teeth frequently become loosened although pain may or may not be present.

Since such tumours are highly radiosensitive, the treatment of choice is radiotherapy.^{28, 318, 368}

At this point, a consideration of a special variant of the lymphosarcoma which occurs as a definite clinical and pathological entity in children in Africa is appropriate. This is the so-called Burkitt's tumour named after its discoverer in 1958.

According to a W.H.O. technical report,⁴¹⁶ this tumour assumes a high proportion of childhood cancer in Africa and in New Guinea. Lucas¹⁷⁰ reports that this condition accounts for nearly 50 per cent. of all malignancies in children in a wide area of Central Africa from the age of two to fourteen years. In a study of

560 cases, the W.H.O. group⁴¹⁶ reports a mean peak incidence of seven years.

The W.H.O. report⁴¹⁶ states that the disease is not restricted to any ethnic group, and it has been encountered in children living in the 'tumour belt' not pertaining only to Africans.

The etiology of this disease is still rather obscure although a virus, transmitted by a vector, has been suggested. The viral agent, Herpes hominis, has been indicted because of its demonstration in tumour cells, in certain areas, but the W.H.O. group questions its etiological significance because this virus is found so commonly in Africa.⁴¹⁶ The group indicates that other viral agents have been isolated from cases of Burkitt's tumour in recent years:- strain EB₁, strain EB₂, and a reovirus type 3.

Clinically, the tumour pursues a rapid and destructive course. Wright³⁹⁷ remarks that the earliest indication of jaw involvement is the loosening of teeth which are eventually pushed out of their sockets. He adds that following the shedding of teeth, ulceration and infection set in and, in a large proportion of cases, two or more quadrants of the jaws are involved; the tumour not infrequently is found to involve all four quadrants.

The W.H.O. group⁴¹⁶ indicates that the treatment of Burkitt's tumour has been mainly by chemotherapy as

radiological facilities are not available in most of the reported areas. They add that in cases that were treated with radiotherapy, there was rapid but temporary regression of the lesion.

The prognosis of this condition is extremely poor, and Lucas¹⁷⁰ reports that the disease terminates fatally, usually within six months.

B. RETICULUM CELL SARCOMA: Bernier,¹⁶ and Shafer, Hine and Levy³¹⁸ indicate that this neoplastic condition is derived from the reticulum cell which is identical with the histiocyte and the large wandering mononuclear macrophage cell. Although their occurrence in the oral cavity is regarded as rare, cases have been reported to occur in the buccal mucosa, palate, gingiva, the mandible, and the maxilla. Thoma³⁶⁸ remarks that the mandible is more frequently involved than the maxilla.

According to Shafer, Hine and Levy,³¹⁸ the sex ratio of the disease is approximately 2:1 in favour of men, and the majority of cases occur after the age of 50 years. Clinically, they indicate that frequently the teeth are loosened when there is jaw involvement. Those involving the soft tissues give rise to ulceration, and in many initial cases they have been confused with Vincent's infection.

The treatment of choice is X-ray radiation since such tumours are radiosensitive, but the prognosis is

rather poor because of recurrences and widespread dissemination of the disease.³¹⁸

MYELOMA

Bernier¹⁶ states that the term myeloma is generally applied to tumours arising from any of the bone marrow cells. He adds that two forms are identified, the solitary and the multiple myelomas.

Waldron³⁸⁸ indicates that involvement of the jaw bones by this disease is not infrequent, and that men are affected twice as often as women. He and Bernier¹⁴ are of the opinion that the multiple form frequently occurs in individuals about 50 years of age, while Shafer, Hine and Levy³¹⁸ indicate that most cases are encountered between the ages of 40 to 70 years. They add that the multiple form involving the jaws are seen more frequently in the mandible, particularly at the ramus, the angle, and the molar region. Some of the signs and symptoms encountered are pain, swelling, expansion of the jaw, numbness, and mobility of the teeth.

Shafer, Hine and Levy³¹⁸ indicate that certain laboratory findings are of considerable help in establishing the diagnosis of multiple myeloma - these include the presence of Bence-Jones protein in the urine, a hyperglobulinemia, and an anemia. Since not all patients with this condition exhibit these laboratory findings, an

absence of such findings does not rule out a diagnosis of multiple myeloma.

They indicate that solitary myeloma has been reported to occur on the gingiva, palate, floor of the mouth, tongue, and the jaws, and in contrast, few patients with solitary myeloma exhibit the laboratory findings as in cases of multiple myeloma.

In the case of multiple myeloma, Shafer, Hine and Levy³¹⁸ advocate the use of X-ray therapy palliatively as the treatment of choice, since the disease invariably terminates fatally in an average of two to three years. However, in the case of solitary myeloma, they indicate that the treatment of choice is conservative eradication of the lesion using surgery, radiotherapy, or a combination of both. The prognosis of solitary myeloma is excellent in their opinion.

MALIGNANT TUMOURS OF MUSCLE TISSUE ORIGIN

RHABDOMYOSARCOMA

This is a malignant tumour of striated muscle and is rarely encountered in the oral cavity.^{16, 318, 368} Lucas¹⁷⁰ indicates that lesions on the tongue, soft palate, uvula, lip, and floor of the mouth have been reported, usually in children under ten years of age. O'Day, Soule and Gores,²³⁹ in perusing through the files of the Mayo Clinic, found eleven cases that met the histologic criteria of this condition out of 219 malignant mesenchymal tumours of the jaws, face, nasal sinuses, and the oral cavity.

The eleven tumours are sited as follows - 4 in the soft palate, 3 in the cheeks, and one each in the superior labial fold, inferior labial fold, inferior buccal fold, and the lateral aspect of the tongue. The mean age of the patients was 16 years and the median age 13 years.

They indicate that the usual complaint is simply the presence of a non-ulcerated painless swelling of relatively short duration.

Thoma,³⁶⁸ Bernier,¹⁶ and Shafer, Hine and Lévy³¹⁸ recommend wide surgical excision in the treatment of rhabdomyosarcoma. They indicate that there is a remarkable tendency to recur. In the 11 oral cases reviewed by O'Day, Soule and Gores,²³⁹ the treatment rendered included the use of surgical diathermy, radium (including radon seeds), and external roentgen therapy.

The consensus of opinion is that the rhabdomyosarcoma has a poor prognosis.

LEIOMYOSARCOMA

According to Lucas¹⁷⁰ and Thoma,³⁶⁸ this malignant neoplasm of smooth muscle origin is extremely rare in the oral cavity.

MALIGNANT GRANULAR CELL MYOBLASTOMA (ALVEOLAR SOFT-PART SARCOMA)

Shafer, Hine and Levy³¹⁸ point out that some investigators regard this tumour as originating from striated muscle. It is a rare tumour, and is generally

encountered in young persons. They and Bernier¹⁶ indicate that cases have been reported on the tongue and floor of the mouth.

They are of the opinion that radical surgery is the treatment of choice because of its high frequency of recurrences and metastases, and that prognosis is extremely poor.

MALIGNANT TUMOURS OF NERVE TISSUE ORIGIN

MALIGNANT SCHWANNOMA

The consensus of opinion is that this malignant neoplasm is extremely rare in the oral cavity^{16, 170, 318}

Bernier¹⁶ indicates that as a rule, patients with this condition suffer from von Recklinghausen's disease or neurofibromatosis.

Shafer, Hine and Levy³¹⁸ remark that most recorded cases occurred in patients in the third to the sixth decades of life, and that the mandible, or mandibular nerve is more frequently affected than the maxilla. They indicate that the treatment of this disease is by surgery or radiation, but there is a tendency of recurrences with distant metastases, especially to the lungs. The overall prognosis vary greatly depending on several factors.

ORAL CANCER
PART TWO
AUSTRALIAN STUDY

METHOD

In undertaking this study, the first step was the listing of the major hospitals in the following cities in Australia where facilities exist for the treatment of patients with intraoral malignancy - Sydney (New South Wales), Melbourne (Victoria), Brisbane (Queensland), Adelaide (South Australia), Perth (Western Australia), Hobart (Tasmania), Darwin (Northern Territory), Canberra (Australian Capital Territory in New South Wales), and Launceston (Tasmania). Permission was sought from hospital boards, medical superintendents, or heads of certain departments of these hospitals for access to medical case records of patients with oral cancer first seen during the six year period from 1959 to 1964 inclusive.

The author then travelled to these cities and visited all the hospitals listed for the study, except the Princess Alexandra Hospital (Brisbane), the Canberra Community Hospital, the Darwin Hospital (for these three hospitals, information

obtained was through correspondence*), the Royal Melbourne Hospital, and the Austin Hospital in Melbourne (for the later two hospitals, information acquired was through the Victorian Central Cancer Registry). The relevant information was collected in survey form by a personal examination of individual case histories of patients with this disease. In this study, the term oral cancer refers to malignancy in the following oral sites - lip, tongue, salivary gland, floor of the mouth, buccal mucosa of the cheek, gingiva, and palate. These sites are covered by the coded numbers of 140, 141, 142, 143, 144, and 191.0 (skin of the lip) according to the International Classification of Diseases.

In obtaining the information, usually the case histories of oral cancer patients treated in the radiotherapy department were consulted first, and this was followed by an examination of the case histories of patients with this disease in the general medical record department for surgical cases only. A list of names of patients treated in the radiotherapy unit was cross-checked with those in the general medical record department to avoid over-lapping of cases.

* Information from the Princess Alexandra Hospital was obtained through correspondence with Dr. B. Kynaston, Senior Radiotherapist.

Similarly, in a city where there were more than one major hospitals included in the study, lists of names of patients in the different hospitals were usually cross-checked to avoid over-lapping of cases between hospitals. On the whole, the medical records of patients in radiotherapy units were found to be superior and better kept than those in the general medical record departments.

The survey form used in the study was provided for obtaining the following type of information - state (example, Queensland), hospital (example, Royal Brisbane Hospital), date of first admission, age of the patient at last birthday on date of admission, sex of the patient, site of the lesion (example, lower lip), diagnosis (example, squamous cell carcinoma), type of treatment received by the patient (example, wedge excision), date when patient was seen last alive, date when patient was known to be dead, and whether death was due to oral cancer or to extraneous disease. Although an attempt has been made to collect information regarding the metastatic capacity of this disease in the study, unfortunately the information collected for the whole of Australia as such is incomplete and, hence, the incidence of metastasis in this disease cannot be assessed.

When all information from the various hospitals

had been collected, a punch card coding system was formulated, and the data collected was transferred from the survey forms onto IBM cards which were subsequently sorted for results. The punch card coding system used is as follows:

COLUMNS 3, 4

STATE and HOSPITAL

NEW SOUTH WALES

- 10. Royal Prince Alfred Hospital
- 11. St. Vincents Hospitals
- 12. Sydney Hospital
- 13. Royal North Shore Hospital
- 14. Prince of Wales Hospital
- 15. Mater Hospital (Sydney)
- 16. Mater Hospital (Waratah)
- 17. Royal Newcastle Hospital
- 18. Canberra Community Hospital

VICTORIA

- 20. Peter MacCallum Clinic
- 21. Royal Melbourne Hospital
- 22. St. Vincent's Hospital
- 23. Alfred Hospital
- 24. Prince Henry's Hospital
- 25. Royal Victorian E.N.T.
Hospital
- 26. Austin Hospital

QUEENSLAND

- 30. Royal Brisbane Hospital
(Queensland Radium Institute)
- 31. Mater Hospital
- 32. Princess Alexandra Hospital

SOUTH AUSTRALIA

- 40. Royal Adelaide Hospital
- 41. Queen Elizabeth Hospital

WESTERN AUSTRALIA

- 50. Royal Perth Hospital
- 51. Perth Radiological Clinic

TASMANIA

- 60. Royal Hobart Hospital
- 61. Peter MacCallum Clinic
(Hobart and Launceston)

NORTHERN TERRITORY

- 70. Darwin Hospital

COLUMNS 5, 6

YEAR OF FIRST ADMISSION

The last two digits are
coded: 59, 60, 61, 62, 63, 64.

Example, 1963 = 63;
1959 = 59

COLUMNS 9, 10

AGE OF THE PATIENT

The age of patient's last
birthday at the time of first
admission.

Example, 60 years old,
code 60

COLUMN 13

SEX OF THE PATIENT

For male, code 1; for
female, code 2.

COLUMNS 19, 20, 21, 22, 23, 24 SITES OF MALIGNANT NEOPLASMS OF
THE BUCCAL CAVITY (140-144,
and 191.0)

COLUMNS 19, 20 coded as a constant 14

<u>COLUMN 21</u>	<u>COLUMN 22</u>	<u>COLUMN 23</u>	<u>COLUMN 24</u>
0 LIP	0 Upper Lip 1 Lower lip 8 Both lips 9 Lip, unspecified	0 Centre 1 Left side 2 Right side 3 Left and right sides 4 Entire lip 9 Side, unspecified	Blank
1 TONGUE	0 Base of tongue (posterior 1/3 rd.) 7 Other specified parts of tongue (anterior 2/3 rd.) 8 Multiple specified parts of tongue 9 Part unspecified	Blank	Blank
2 SALIVARY GLAND	0 Parotid gland 7 Other salivary gland 8 Multiple salivary glands 9 Salivary gland, unspecified	1 Left side 2 Right side 9 Side, unspecified	1 Sublingual gland 2 Submaxillary gland
3 FLOOR OF THE MOUTH	Blank	Blank	Blank
4 OTHER PARTS OF MOUTH, AND MOUTH UNSPECIFIED	0 Buccal Mucosa of cheek 1 Upper gingiva 2 Lower gingiva 3 Upper and lower gingivae 4 Gingiva, unspecified 5 Hard palate 6 Soft palate 7 Hard and soft palate 8 Palate, unspecified 9 Oral cavity, unspecified	0 Anterior (for gingiva) 1 Left side 2 Right side 3 Left and right side 9 Side, unspecified	Blank

According to the International Classification of Diseases, the coded number for lesion site on the mucosa part of the lip is 140., and that on the skin border of the lip is 191.0. In most hospitals, no differentiation is made between the two in the case histories of patients with this disease and, hence, in the punch card coding system 140 is taken to represent all cases of lip cancer (mucosa and skin of the lip).

In the present study, 142 is taken to represent malignancy of the major salivary gland only. Cancer of the intraoral accessory (minor) salivary gland is being considered according to its specific site - example, malignant neoplasm arising from accessory salivary gland of the lip is being included as cancer of the lip. Also, in the coding system, 143 is taken to represent cancer of the floor of the mouth only, and lower gingival malignancy is included in the coded number 144.

COLUMN 31 DIAGNOSIS

- 0 Squamous cell carcinoma (SCC)
- 1 Basal cell carcinoma (BCC)
- 2 Malignant Pleomorphic adenoma
(malignant mixed tumour)
- 3 Adenoid cystic carcinoma (adenocystic carcinoma)
- 4 Mucoepidermoid carcinoma
- 5 Acinic cell adenocarcinoma (acinic cell carcinoma)
- 6 Adenocarcinoma
- 7 Mixed salivary gland tumour, unspecified*
- 8 Carcinoma, unspecified
- 9 Malignant neoplasm, unspecified

* In many instances, there are no specific inferences made in the diagnosis as to whether the tumour is malignant or benign. After carefully studying the case histories of patients in this group, the author has included quite a number of these in the present study to avoid under reporting.

COLUMN 41 to 45, and 47, 48 TREATMENT

- COLUMN 41 Treatment
- 1 No treatment (patient refused treatment)
 - 2 No treatment attempted
 - 3 Treatment, palliative specified
 - 4 Treatment, curative
 - 9 No information

COLUMN 42	Type of treatment to primary	1 Radiotherapy 2 Surgery 3 Chemotherapy 4 Radiotherapy and surgery 5 Radiotherapy and chemotherapy 6 Surgery and chemotherapy 7 Radiotherapy, surgery, and chemotherapy 9 Unspecified
COLUMN 43	Type of radio-therapy	1 SXRT (Sperficial X-ray therapy) 2 MVT (Megavoltage therapy) 3 DXRT (Deep X-ray therapy) 4 SXRT and MVT 5 SXRT and DXRT 6 MVT and DXRT 7 XRT unspecified 8 Implant 9 Implant and XRT 10 Radiotherapy unspecified C Cobalt 60
COLUMN 44	Type of implants	1 Radon 2 Radium 3 Radioactive gold 9 Unspecified
COLUMN 45	Type of chemo-therapy	1 Methotrexate (Amethopterin) 2 5 Flouracil (5.FU) 3 Cyclophosphamide (Cytosan) 9 Unspecified
COLUMN 47	Type of treatment to secondary	1 Radiotherapy 2 Surgery (Neck dissection) 3 Radiotherapy and surgery 9 Treatment, doubtful
COLUMN 48	Type of radio-therapy to secondary	1 MVT 2 DXRT 3 Implant C Cobalt 9 Radiotherapy unspecified
COLUMNS 61, 62, 63 <u>SURVIVAL</u>		
COLUMN 61	D	Patients with number of full years between first diagnosis and death.
COLUMN 62	O	Patient with number of full years between first diagnosis and time last observed

when last observation is within 12 months prior to analysis of records.

COLUMN 63 L Patient with number of full years observed between first diagnosis and last observation when last observation is more than 12 months prior to record analysis.

The transference of information from survey sheets onto IBM cards was achieved by the author using an IBM card punching machine, and the subsequent sorting was done using an IBM card sorter. The information sorted is recorded in specially prepared work-sheets, A and B (Figure 5) for calculation of five year survival rates and for working out the mean age and median age of the patients. The survival rate is calculated using the life table method - an example is seen in the work sheet.

Five-year age groups are used and the number of patients in each of the five-year age groups is recorded in work sheet A. The five year survival rate for a normal population in these different five-year age groups is obtained from the Australian Life Tables 1960-1962. $P_x - (x+5)$ is the cumulative five year survival rate for the mid-age group of a five year age grouping. For example, the expected chance of survival to the age of 67 for a 62 year old male is 0.85066. The expected survival in five years for patients with cancer in these age-groups is the product of $P_x - (x+5)$

FIGURE 5.

SAMPLE CALCULATION OF FIVE YEAR SURVIVAL RATES

GROUP: CANCER OF THE TONGUE. MALE, ALL CASES

WORK SHEET A

AGE GROUP	TOTAL	<20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALE	479	—	1	3	9	12	14	31	49	52	70	71	63	52	35	17
FIVE YEAR SURVIVAL RATE $P_x - (x+5)^*$		0.99199	0.99237	0.99234	0.99078	0.98631	0.97793	0.96388	0.94034	0.90419	0.85066	0.78156	0.68652	0.56464	0.41445	0.26731
EXPECTED SURVIVAL IN FIVE YEARS	368.075	—	0.992	2.977	8.917	11.836	13.691	29.880	46.077	47.018	59.546	55.491	43.238	29.361	14.506	4.545
MEAN AGE	63.9															
MEDIAN AGE	64.9															

$$\text{EXPECTED FIVE YEAR SURVIVAL RATE} = \frac{368.075}{479} = 0.76842$$

* Five year survival rate ($P_x - (x+5)$) for normal population taken from Australian Life Tables 1960-1962

WORK SHEET B

YEAR AFTER TREATMENT	a NUMBER ALIVE AT BEGINNING OF THE YEAR	b NUMBER LOST DURING THE YEAR	c NUMBER ALIVE BUT OBSERVED ONLY PART OF THE YEAR	d NUMBER EXPOSED TO RISK OF DYING DURING THE YEAR ($a - \frac{b+c}{2}$)	e TOTAL DEATHS DURING THE YEAR	f CRUDE ANNUAL SURVIVAL RATE $P_x (1 - e/a)$	g CRUDE CUMULATIVE SURVIVAL RATE
0 —	479	85	3	435.0	177	0.59310	0.59310
1 —	214	30	12	193.0	61	0.68393	0.40564
2 —	111	15	18	94.5	20	0.78836	0.31979
3 —	58	9	8	49.5	8	0.83838	0.26811
4 —	33	3	7	28.0	2	0.92857	0.24895

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$$\text{RELATIVE FIVE YEAR SURVIVAL RATIO} = \frac{\text{CRUDE CUMULATIVE FIVE YEAR SURVIVAL RATE}}{\text{EXPECTED FIVE YEAR SURVIVAL RATE}} = \frac{0.24895}{0.76842} = 0.324$$

for a particular five-year age group and the number of patients in the same five-year age group. The expected five year survival rate for a group of patients is obtained by dividing the total expected survival in five years by the total number of patients in the group.

In work sheet B, column 'a' gives the number of patients alive at the beginning of the year, column 'b' the number of patients lost sight of during the year, L, column 'c' the number of patients alive but observed only part of the year, O, and column 'e' the total number of patients died during the year. Column 'd' indicates the number of patients exposed to risk of dying during the year and this is obtained by the following manner:

$$\text{Number of patients alive at beginning of the year} - \frac{\text{Number of patients lost sight of during the year (L)} + \text{Number of patients alive but observed only part of the year (O)}}{2}$$

Column 'f' is the crude annual survival rate, px , and is equal to

$$1 - \frac{\text{Total number of patients died during the year}}{\text{Number of patients exposed to risk of dying during the year}}$$

The crude cumulative survival rate for the first year is the same as the crude annual survival rate of the first year. At the end of the second year, the crude cumulative survival rate is the product of the crude cumulative survival rate of the first year and the

crude annual survival rate of the second year. Similarly, the crude cumulative survival rate at the end of the third year is the crude cumulative survival rate of the second year times the crude annual survival rate of the third year.

The relative five year survival ratio is obtained by dividing the crude cumulative five year survival rate by the expected five year survival rate (refer work sheet A). In the present study, the prognosis of patients with intraoral malignancy is summarised in table form giving the crude cumulative five year survival rate (in per cent.); the expected five year survival rate (in per cent.), and the relative five year survival ratio. For the calculation of an accurate five year survival rate, the number of patients in a group should be at least 50. Hence, in the present study, five year survivals for groups of patients less than 50 in number are not presented.

The results are presented in table form expressed in terms of number of cases, percentages, ratios, and rate per 100,000 population. For the calculation of rates per 100,000 for patients with oral cancer in each of the six years (1959-1964 inclusive), as seen in Table 61, the population figures of Australia by sex for those years are used (Table 60). In calculating the

rates per 100,000 for patients with this disease in the different states (Tables 64 and 66), an average of the total number of cases for six years in each instance (for male, female, and male and female together, and for each state) is obtained first (by dividing by six) before applying the population figures of Australia by state and sex of the 1961 June census (Table 63). Similarly, the rates per 100,000 for patients in each of the different age groups (Table 69) are calculated in the same manner and using the population of Australia by age group and sex of the June 1961 census (Table 68).

RESULTS AND DISCUSSION

ORAL CANCER IN AUSTRALIA

At present, there is no national cancer registry in Australia and, with the exception of Victoria, there is no state cancer registry. The Victorian Central Cancer Registry covers the ten major hospitals in the city of Melbourne and, presumably, patients with various malignant diseases not seen in these hospitals in the state are not reported to the Registry.

The present study of oral cancer morbidity in Australia is based solely on the examination of the case histories of patients with the disease registered in the major hospitals around Australia. The author wishes to emphasize that patients not referred to or seen in these hospitals are not included in the study. Undoubtedly, there is a considerable and unknown number of patients with oral malignancy in the different states which are not seen in the hospitals covered by the present survey and, hence, the morbidity of the disease obtained in each instance is not truly representative of a state. This means that the morbidity of oral cancer in Australia is higher than that reported in the study. However, it is the author's belief that, with the exception of lip cancer,

the great majority of patients with malignancy of the tongue, floor of the mouth, gingiva, buccal mucosa of the cheek, palate, and salivary gland are seen in the major hospitals surveyed. This is because frequently patients with intraoral malignancy require treatment of such a nature which can be best carried out in these hospitals which have optimal treatment facilities.

In the case of cancer of the lip, there is probably a considerable proportion treated solely in private practice by dermatologists, surgeons, and radiologists in the various state capital cities. Also, smaller hospitals (not included in the survey) with adequate surgical facilities may have undertaken to treat a certain percentage of these patients. Therefore, the morbidity of lip cancer in Australia can reasonably be expected to be much higher than the present study reveals.

Information concerning the mortality of oral cancer patients in Australia are obtained from publications of the Commonwealth Bureau of Census and Statistics, Canberra. Reporting of deaths in Australia is compulsory and causes of death have been reported adequately in accordance with the International Classification of Diseases. Therefore, the mortality of patients with cancer or other diseases can be taken

to be reliably representative of the country.

In the morbidity study of oral cancer in Australia, the author has observed that in the majority of cases, there is no distinction made in the medical case records of patients with lip cancer between lesions arising from the skin part of the lip (International Classification Number 191.0) and those from the mucosa part of the lip (International Classification Number 140). Publications of oral cancer mortality from the Commonwealth Bureau of Census and Statistics indicate that deaths from lip cancer are entered under the coded number 140. From the Commonwealth Bureau of Census and Statistics in Sydney, the author was informed that if the medical death certificate of a patient does not specifically indicate that the cancer is from the skin part of the lip, the death is automatically entered under the coded number 140, but if there is such a specification, then the death is entered under coded number 191, other malignant neoplasm of the skin - that is, the cause of death is from skin cancer. The author was also informed that at present, in the majority of cases, the death certificates do not specify that the lesions are from the skin part of the lip, although in Australia most of lip cancer arises from such a site. Therefore, the

mortality figures obtained for lip cancer for the period 1959-1964 include most of the patients with lesions arising from the skin part of the lip and all those with lesions from the mucosa part of the lip.

MORBIDITY OF ORAL CANCER

For the six year period from 1959 to 1964 inclusive, there are 4,523 men and 1,231 women with oral cancer (International Classification Number 140-144, and 191.0) seen in the major hospitals in Australia, giving a total of 5,754 cases. This gives an average of 959 new cases per year - 754 men and 205 women.

Table 59 shows that there is a progressive decrease in the number of new cases seen over the six years. For male, in 1959, there are 854 cases and this drops to 681 cases by 1964, representing a 20 per cent. decrease. A similar trend is seen for female - 220 cases in 1959 to 180 cases in 1964, a decrease of 18 per cent. There is a corresponding decrease in the rates per 100,000 population in the same period as seen in Table 61. For male, in 1959, the rate is 16.8 per 100,000 and this progressively drops to 12.1 in 1964. Similarly, for female, the rate is 4.4 per 100,000 in 1959 and gradually decreases to 3.3 in 1964. The decrease in the rate for male and female together is from 10.7 per 100,000 in 1959 to 7.7 in 1964.

TABLE 59
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and YEAR
NUMBER OF NEW CASES DIAGNOSED FOR 1959-1961 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191.0

INTERNATIONAL CLASSIFICATION SITE	140 and 191.0			141			142			143			1 4 4						TOTAL								
	LIP			TONGUE			SALIVARY- GLAND			FLOOR OF THE MOUTH			GINGIVA			BUCCAL MUCOSA OF CHEEK						PALATE			TOTAL		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
1959	597	76	655	95	39	134	62	54	116	47	9	56	28	15	43	18	14	32	24	13	37	70	42	112	854	220	1074
1960	512	82	594	89	42	131	71	52	123	42	14	56	22	9	31	20	9	29	22	10	32	64	28	92	779	218	997
1961	498	94	592	80	29	109	49	40	89	54	18	72	16	11	27	15	13	28	16	10	26	47	34	81	728	215	943
1962	515	89	604	73	40	113	55	49	104	40	7	47	24	12	36	16	9	25	20	11	31	60	32	92	743	217	969
1963	509	75	584	78	38	116	55	30	85	38	12	50	28	10	38	16	7	23	16	9	25	60	26	86	740	181	921
1964	477	68	545	75	26	101	38	48	86	43	5	48	23	13	36	10	6	16	15	14	29	48	33	81	681	180	861
TOTAL	3090	484	3574	490	214	704	330	273	603	264	65	329	141	70	211	95	58	153	113	67	180	349	195	544	4523	1231	5754

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TABLE 60

POPULATION OF AUSTRALIA BY SEX FOR YEARS 1959-1964

YEAR	MALE	FEMALE	MALE and FEMALE
1959	5,080,235	4,976,244	10,056,479
1960	5,192,285	5,082,735	10,275,020
1961	5,312,252	5,195,934	10,508,186
1962	5,402,432	5,302,689	10,705,121
1963	5,506,466	5,409,783	10,916,249
1964	5,615,020	5,520,489	11,135,509

SOURCE: Demography 1964. Bulletin No. 82. Commonwealth Bureau of Census and Statistics, Canberra, Australia.

TABLE 61
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and YEAR
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191-0
INCIDENCE RATE PER 100,000 POPULATION

INTERNATIONAL CLASSIFICATION	140 and 191-0		141		142		143		144						TOTAL										
	LIP		TONGUE		SALIVARY GLAND		FLOOR OF THE MOUTH		GINGIVA		BUCCAL MUCOSA OF CHEEKS		PALATE												
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F									
1959	11.4	1.5	6.5	1.9	0.8	1.3	1.2	1.1	1.2	0.9	0.2	0.6	0.3	0.4	0.3	0.3	0.5	0.3	0.4	1.4	0.8	1.1	16.8	4.4	10.7
1960	9.9	1.6	5.8	1.7	0.8	1.3	1.4	1.0	1.2	0.8	0.3	0.5	0.4	0.2	0.3	0.3	0.4	0.2	0.3	1.2	0.6	0.9	15.0	4.3	9.7
1961	9.4	1.8	5.6	1.5	0.6	1.0	0.9	0.8	0.8	1.0	0.3	0.7	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.9	0.7	0.8	13.7	4.1	9.0
1962	9.5	1.7	5.6	1.4	0.8	1.1	1.0	0.9	1.0	0.7	0.1	0.4	0.4	0.2	0.3	0.3	0.4	0.2	0.3	1.1	0.6	0.9	13.8	4.1	9.0
1963	9.2	1.4	5.3	1.4	0.7	1.1	1.0	0.6	0.8	0.7	0.2	0.5	0.5	0.2	0.3	0.3	0.3	0.2	0.2	1.1	0.5	0.8	13.4	3.3	8.4
1964	8.5	1.2	4.9	1.3	0.5	0.9	0.7	0.9	0.8	0.8	0.1	0.4	0.4	0.2	0.3	0.2	0.1	0.3	0.3	0.9	0.6	0.7	12.1	3.3	7.7
TOTAL*	9.6	1.5	5.6	1.5	0.7	1.1	1.0	0.9	0.9	0.8	0.2	0.5	0.4	0.2	0.3	0.3	0.4	0.2	0.3	1.1	0.6	0.8	14.1	3.9	9.1

* Average per year = $\frac{\text{Total number of cases } 1959 - 1964}{\text{Total population } 1959 + 1960 + \dots + 1964} \times 100,000$

mm.

Male patients with oral cancer in Australia have a rate of 14.1 per 100,000 population and for female patients 3.9, whereas for male and female combined, the rate is 9.1 per 100,000. When cancer of the intraoral cavity proper (International Classification Number 141, 143, and 144 - that is, excluding cancer of the lip and the salivary gland) is considered, the rate per 100,000 for male is 3.4, for female 1.5, and for male and female together 2.4 (Table 66).

Table 62 shows the number of patients with oral cancer (International Classification Number 140-144, and 191.0) in the different states in Australia for the six year period. Due to an under reporting of lip cancer in New South Wales by the author, the total oral cancer figure for the state is lower than that for Victoria. From the present study, Victoria has 1,564 cases, New South Wales 1,485 cases, Queensland 1,329 cases, South Australia 529 cases, Western Australia 562 cases, Tasmania 280 cases, and Northern Territory 7 cases. The corresponding rates per 100,000 population are contained in Table 64. Queensland appears to have the highest rate, 14.5 per 100,000, then Tasmania 13.3, Western Australia 12.7, South Australia 9.1, Victoria 8.8, New South Wales 6.1, and Northern Territory 4.3. The high rates in Queensland, Tasmania, and Western Australia are undoubtedly influenced by

TABLE 62
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and STATE
NUMBER OF NEW CASES DIAGNOSED FOR 1959-1960 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191.0

INTERNATIONAL CLASSIFICATION	140 and 191.0						141						142						143						144						TOTAL											
SITE	LIP						TONGUE						SALIVARY GLAND						FLOOR OF THE MOUTH						GINGIVA						BUCCAL MUCOSA OF CHEEK						PALATE					
	M	F	TOTAL	#	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL											
NEW SOUTH WALES	462	83	545	367	206	91	297	20.1	136	91	227	153	124	36	160	108	76	36	112	7.5	43	25	68	4.6	40	34	74	5.0	1089	396	1485											
VICTORIA	866	208	1074	687	88	60	148	9.5	83	72	155	9.9	60	12	72	4.6	20	20	40	2.6	12	19	31	2.0	34	10	44	2.9	1163	401	1564											
QUEENSLAND	958	72	1034	776	78	28	106	8.0	56	40	96	7.2	25	7	32	2.4	13	4	17	1.3	20	3	23	1.7	16	9	25	1.9	1166	163	1329											
SOUTH AUSTRALIA	271	35	306	579	60	12	72	13.6	28	37	65	12.2	30	5	35	6.6	15	4	19	3.6	14	7	21	4.0	8	3	11	2.1	426	103	529											
WESTERN AUSTRALIA	328	68	396	704	49	16	65	11.6	16	13	29	5.2	21	2	23	4.1	15	6	21	3.7	5	2	7	1.2	13	8	21	3.7	447	115	562											
TASMANIA	201	17	218	779	7	7	14	5.0	11	20	31	11.1	4	3	7	2.5	2	2	2	0.7	1	2	3	1.1	2	3	5	1.8	228	52	280											
NORTHERN TERRITORY	4	1	5	714	2	-	2	28.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	1	7											
AUSTRALIA	3090	484	3574	621	490	214	704	12.3	330	273	603	10.5	264	65	329	5.7	141	70	211	3.7	95	58	153	2.7	113	67	180	3.1	4523	1231	5754											

* PERCENTAGE TO ALL ORAL CANCER

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TABLE 63
POPULATION OF AUSTRALIA BY STATE AND SEX. JUNE 1961

SITE	MALE	FEMALE	MALE and FEMALE
NEW SOUTH WALES*	2,003,767	1,972,074	3,975,841
VICTORIA	1,474,395	1,455,718	2,930,113
QUEENSLAND	774,579	744,249	1,518,828
SOUTH AUSTRALIA	490,225	479,115	969,340
WESTERN AUSTRALIA	375,452	361,177	736,629
TASMANIA	177,628	172,712	350,340
NORTHERN TERRITORY	16,206	10,889	27,095
AUSTRALIA	5,312,252	5,195,934	10,508,186

* Including Australian Capital Territory

SOURCE: Commonwealth Bureau of Census and Statistics, Canberra,
Australia. Census of the Commonwealth, 30th June 1961.

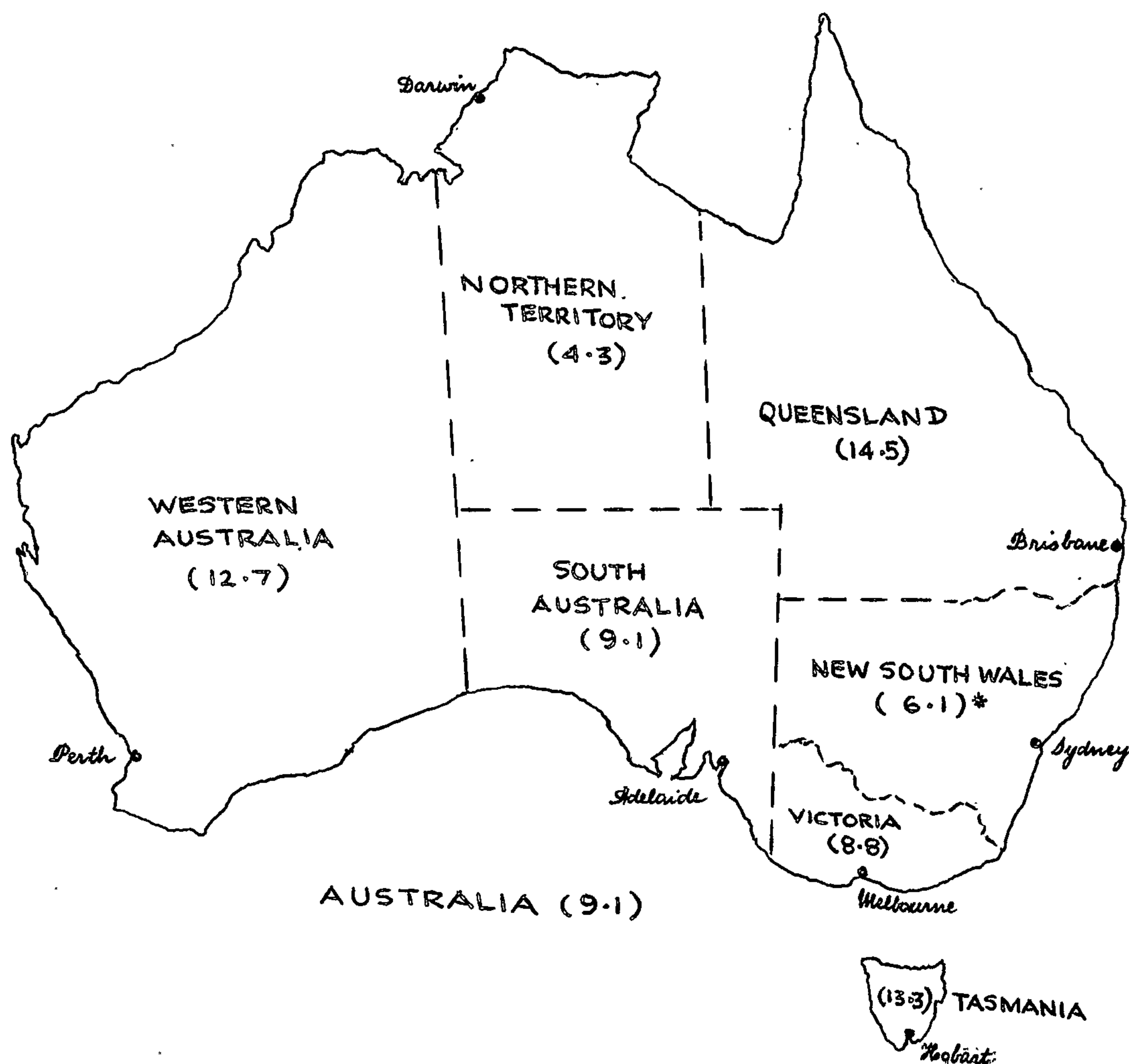
TABLE 64
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and STATE
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191-0
INCIDENCE RATE PER 100,000 POPULATION

INTERNATIONAL CLASSIFICATION		140 and 191-0		141		142		143		1 4 4												TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		LIP		TONGUE		SALIVARY GLAND		FLOOR OF THE MOUTH		GINGIVA		BUCCAL MUCOSA OF CHEEK				PALATE		TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M

CENSUS POPULATION - JUNE 30th. 1961

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FIGURE 6



() INDICATES RATE PER 100,000 POPULATION PER YEAR
 * Figure is low, due to under reporting of lip cancer by the author.

ORAL CANCER (INTERNATIONAL CLASSIFICATION
 NUMBER 140-144, and 191.0) AS SEEN IN THE
 MAJOR HOSPITALS IN AUSTRALIAN STATES
 1959-1964

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the large number of lip cancer cases in these three states, whereas the comparatively low rate for New South Wales is the result of under reporting of lip cancer by the author in the state.

When malignancy of the intraoral cavity proper (International Classification Number 141, 143, and 144 - that is, excluding cancer of the lip and the salivary gland) is considered, the number of patients with the disease for the six years in the different states is shown in Table 65. New South Wales has by far the largest number of patients, 713 cases, followed by Victoria 335 cases, then Queensland 203 cases, South Australia 158 cases, Western Australia 137 cases, Tasmania 31 cases, and Northern Territory 2 cases. The corresponding rates per 100,000 population for the different states are as follows (Table 66): Western Australia 3.1, New South Wales 2.9, South Australia 2.7, Queensland 2.2, Victoria 2.0, Tasmania 1.5, and Northern Territory 1.2.

Oral cancer (International Classification Number 140-144, and 191.0) is a disease of men, the male to female ratio is 3.7:1 in favour of men in Australia. Throughout the six years, there appears to be no change in the sex distribution of the disease - in 1959 the male to female ratio is 3.9:1, 1960 3.6:1, 1961 3.4:1, 1962 3.4:1, 1963 4.1:1, and 1964 3.8:1 (Table 59). In all states, there is a preponderance of male to female

TABLE 65
MORBIDITY OF CANCER OF THE ORAL CAVITY PROPER BY SITE, SEX, and STATE
INTERNATIONAL CLASSIFICATION NUMBER 141, 143, and 144
NUMBER OF NEW CASES DIAGNOSED FOR 1959-1964 INCLUSIVE

INTERNATIONAL CLASSIFICATION	141			143			144			TOTAL													
SITE	TONGUE			FLOOR OF THE MOUTH			GINGIVA			BUCCAL MUCOSA OF CHEEK			PALATE			TOTAL							
STATE	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL	*	M	F	TOTAL				
NEW SOUTH WALES	206	91	297	41.9	124	36	160	22.4	76	36	112	15.7	43	25	68	9.5	40	34	74	10.4	491	222	713
VICTORIA	88	60	148	44.2	60	12	72	21.5	20	20	40	11.9	12	19	31	9.3	34	10	44	13.1	214	121	335
QUEENSLAND	78	28	106	52.2	25	7	32	15.8	13	4	17	8.4	20	3	23	11.3	16	9	25	12.3	152	51	203
SOUTH AUSTRALIA	60	12	72	45.6	30	5	35	22.2	15	4	19	12.0	14	7	21	13.3	8	3	11	7.0	127	31	158
WESTERN AUSTRALIA	49	16	65	47.4	21	2	23	16.8	15	6	21	15.3	5	2	7	5.1	13	8	21	15.3	103	34	137
TASMANIA	7	7	14	45.2	4	3	7	22.6	2	-	2	6.5	1	2	3	9.7	2	3	5	16.1	16	15	31
NORTHERN TERRITORY	2	-	2	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2
AUSTRALIA	490	214	704	44.7	264	65	329	20.8	141	70	211	13.4	95	58	153	9.7	113	67	180	11.4	1103	474	1577

* PERCENTAGE TO ALL ORAL CANCER

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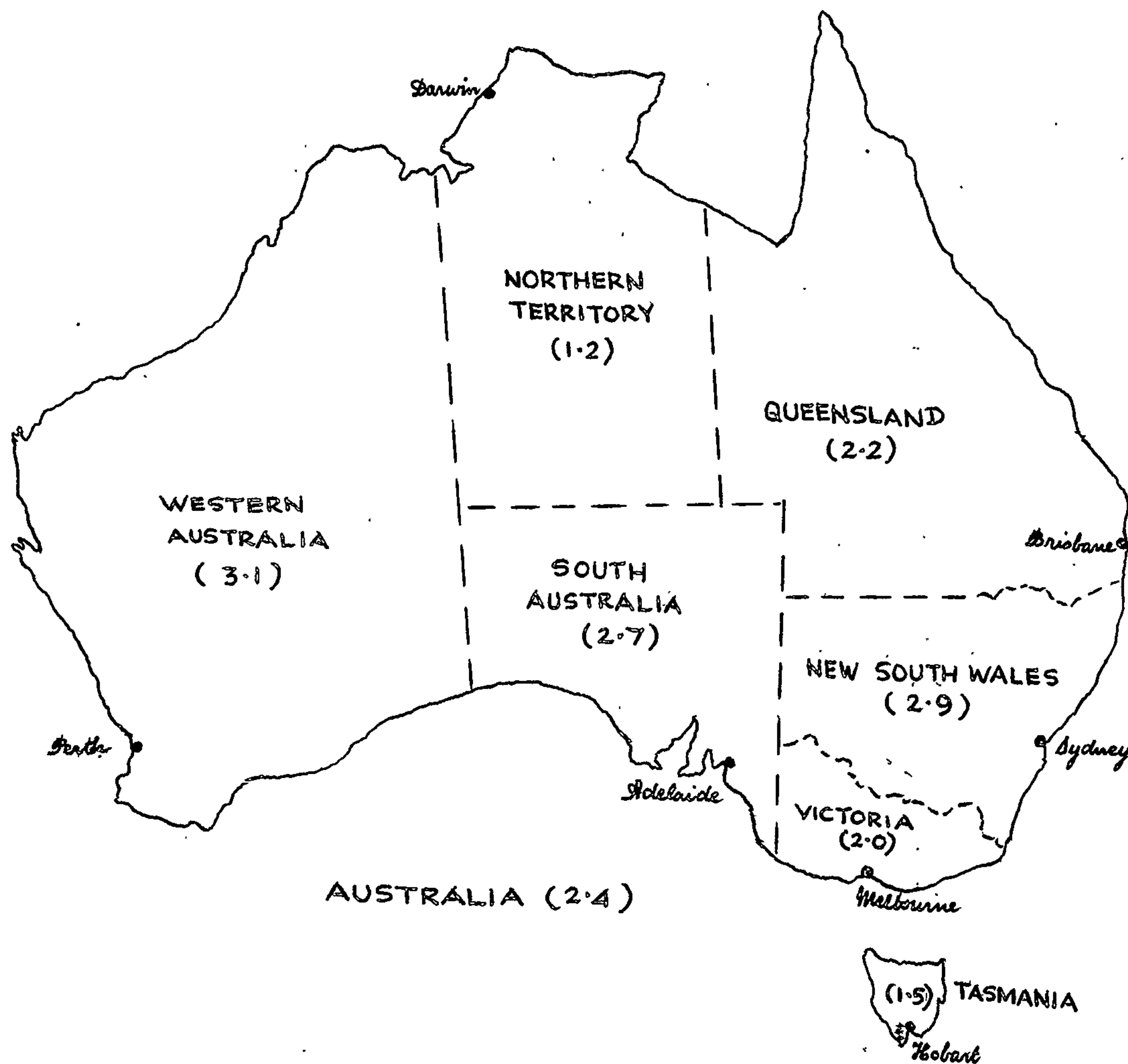
TABLE 66
MORBIDITY OF CANCER OF THE ORAL CAVITY PROPER BY SITE, SEX, and STATE
INTERNATIONAL CLASSIFICATION NUMBER 141, 143, and 144
INCIDENCE RATE PER 100,000 POPULATION

INTERNATIONAL CLASSIFICATION	141			143			144												TOTAL		
SITE	TONGUE			FLOOR OF THE MOUTH			GINGIVA			BUCCAL MUCOSA OF CHEEK			PALATE			TOTAL			TOTAL		
STATE	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
NEW SOUTH WALES	1.7	0.8	1.2	1.0	0.3	0.7	0.6	0.3	0.5	0.4	0.2	0.3	0.3	0.3	0.3	1.3	0.8	1.0	4.1	1.9	2.9
VICTORIA	1.0	0.7	0.8	0.7	0.1	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.4	0.1	0.3	0.7	0.6	0.6	2.4	1.4	2.0
QUEENSLAND	1.7	0.6	1.2	0.5	0.2	0.4	0.3	0.1	0.2	0.4	0.1	0.3	0.3	0.2	0.3	1.1	0.4	0.7	3.3	1.1	2.2
SOUTH AUSTRALIA	2.0	0.4	1.2	1.0	0.2	0.6	0.5	0.1	0.3	0.5	0.2	0.4	0.3	0.1	0.2	1.2	0.5	0.9	4.3	1.1	2.7
WESTERN AUSTRALIA	2.2	0.7	1.5	0.9	0.1	0.5	0.7	0.3	0.5	0.2	0.1	0.2	0.6	0.4	0.5	1.2	0.7	1.1	4.6	1.6	3.1
TASMANIA	0.7	0.7	0.7	0.4	0.3	0.3	0.2	-	0.1	0.1	0.2	0.1	0.2	0.3	0.2	0.5	0.5	0.5	1.5	1.5	1.5
NORTHERN TERRITORY	2.1	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	1.2
AUSTRALIA	1.5	0.7	1.1	0.8	0.2	0.5	0.4	0.2	0.3	0.3	0.2	0.2	0.4	0.2	0.3	1.1	0.6	0.8	3.4	1.5	2.4

CENSUS POPULATION - JUNE 30th. 1961

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FIGURE 7



() INDICATES RATE PER 100,000 POPULATION PER YEAR

CANCER OF THE ORAL CAVITY PROPER (INTERNATIONAL CLASSIFICATION NUMBER 141, 143, and 144 - EXCLUDING CANCER OF THE LIP and THE SALIVARY GLAND) AS SEEN IN THE MAJOR HOSPITALS IN AUSTRALIAN STATES 1959 - 1964

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with the disease. The sex incidence of the disease in the different states is as follows (Table 62):

	<u>Male/Female Ratio</u>	<u>Total No. of cases</u>
NEW SOUTH WALES	2.8:1	1,485
VICTORIA	2.9:1	1,564
QUEENSLAND	7.2:1	1,329
SOUTH AUSTRALIA	4.1:1	529
WESTERN AUSTRALIA	3.9:1	562
TASMANIA	4.4:1	280
NORTHERN TERRITORY	6.0:1	7

In New South Wales, the male to female ratio can be reasonably expected to be slightly higher because of an under reporting of lip cancer which occurs at least five times more commonly in men than in women in the state. The relatively high ratio for Queensland is undoubtedly influenced by the large number of patients with lip cancer which has a male to female ratio of about 13:1 in the state. The 6:1 male to female ratio of the disease in the Northern Territory is not significant because of the small number of 7 cases.

Table 64 shows the rates per 100,000 population for male and for female with the disease in the different states. For male, Queensland has the highest rate,

25.1 per 100,000, followed by Tasmania 21.4, then Western Australia 19.1, South Australia 14.4, Victoria 13.1, New South Wales 9.0 (partly due to under reporting of lip cancer), and the Northern Territory 6.2. For female, the rates per 100,000 population in descending order of magnitude are as follows: Western Australia 5.3, Tasmania 5.0, Victoria 4.6, Queensland 3.6, South Australia 3.6, New South Wales 3.3, and the Northern Territory 1.5. For Australia as a whole, male patient with oral cancer has a rate of 14.2 per 100,000, and female 3.9.

When malignancy of the intraoral cavity proper (International Classification Number 141, 143, and 144) is considered, the male to female ratio of the disease for Australia is 2.4:1 in favour of men. The sex distribution of the disease in the different states are as follows:

	<u>Male/Female Ratio</u>	<u>Total No. of Cases</u>
NEW SOUTH WALES	2.2:1	713
VICTORIA	1.7:1	335
QUEENSLAND	3.0:1	203
SOUTH AUSTRALIA	4.1:1	158
WESTERN AUSTRALIA	3.0:1	137
TASMANIA	1.1:1	31
NORTHERN TERRITORY	Both men	2

Table 66 shows the rates per 100,000 population of patients with cancer of the intraoral cavity proper in the different states. For male, Western Australia has the highest rate, 4.6 per 100,000, followed by South Australia 4.3, New South Wales 4.1, Queensland 3.3, Victoria 2.4, Northern Territory 2.1 (not significant because of only two cases), and Tasmania 1.5. For female, the rates are as follows: New South Wales 1.9, Western Australia 1.6, Tasmania 1.5, Victoria 1.4, Queensland 1.1, ^{and} South Australia 1.1. For Australia as a whole, the rate for male is 3.4 per 100,000 and for female 1.5.

The average age of 4,478 men with oral cancer in Australia is 59.1 years and that for 1,215 women is 62.6 years, whereas for male and female together (5,693 cases), this is 59.8 years (Table 67). The corresponding median age is 60.6 years for male, 64.8 years for female, and 61.4 years for the two sexes together. The peak incidence of the disease for any one single decade is between the age group of 60-69 years for male and female together (25.2 per cent. of 5,693 cases). For male, the same age group represents the peak incidence of the disease in any one single decade (25.5 per cent. of 4,478 cases), whereas for female, the peak incidence is seen in the age groups

TABLE 67
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and AGE DISTRIBUTION
NUMBER OF NEW CASES DIAGNOSED FOR 1959-1964 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191-0

INTERNATIONAL CLASSIFICATION		140 and 191-0		141		142		143		1 4 4						TOTAL	
SITE	AGE GROUP	LIP		TONGUE		SALIVARY GLAND		FLOOR OF THE MOUTH		GINGIVA		BUCCAL MUCOSA OF CHEEK		PALATE		TOTAL	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
< 20		12	1	13	-	-	4	9	13	-	-	-	-	-	-	16	10
20 — 24		50		50	1	2	9	8	17		1	1	1	1		60	12
25 — 29		73	7	80	3	3	17	14	31			2	1		94	23	
30 — 34		122	8	130	9	5	14	19	35				3	1	154	30	
35 — 39		179	15	194	12	2	28	16	44		3	2	2	2	234	36	
40 — 44		246	25	271	14	8	21	23	44		4	2	2	4	299	61	
45 — 49		259	35	294	31	15	27	26	53		9	3	4	6	352	90	
50 — 54		339	26	365	49	16	30	24	54		16	5	4	4	472	83	
55 — 59		336	48	384	52	13	29	33	62		16	7	11	6	495	122	
60 — 64		393	59	452	70	34	37	20	57		24	6	9	8	595	147	
65 — 69		340	66	406	71	21	29	27	56		19	11	16	7	546	148	
70 — 74		301	81	382	63	35	28	25	53		21	19	13	7	474	185	
75 — 79		222	49	271	52	22	27	16	43		10	8	20	8	360	117	
80 — 84		131	32	163	35	22	10	8	18		10	7	7	10	214	87	
85 +		62	24	86	17	18	11	6	17		8	7	6	1	113	64	
ALL AGES		3065	476	3541	479	212	326	271	597		140	68	95	65	4478	1215	
AVERAGE AGE		57.6	63.9	58.5	63.9	66.4	55.2	53.6	54.7		64.8	70.6	68.1	63.9	65.5	59.1	62.6
MEDIAN AGE		58.8	66.1	60.0	64.9	67.9	56.4	55.0	55.7		64.6	71.8	69.2	65.7	68.1	60.6	64.8

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of 60-69 years (24.3 per cent. of 1,215 cases) and 70-79 years (24.9 per cent. of 1,215 cases). About 80 per cent. of the patients are seen between the age of 40 years and 70 years (Table 70). Only 11.8 per cent. of the patients are below 40 years old, and about 8.4 per cent. above 80 years of age.

The rates per 100,000 population for patients with oral cancer in the different age groups are contained in Table 69. For male patients, the rate increases progressively with age from 0.1 per 100,000 for patients less than 20 years old to 119.3 per 100,000 for patients 85 years of age and over. A similar trend is seen for female patients - from 0.1 per 100,000 for patients less than 20 years old to 36.7 per 100,000 for patients 85 years of age and above. For male and female together, the corresponding increase in rates from the lower to upper age groups is from 0.1 to 65.8 per 100,000 respectively.

For Australia as a whole, the most common site of oral cancer is the lip, accounting for about 62.1 per cent. of 5,754 cases, then the tongue 12.3 per cent., salivary gland 10.5 per cent., floor of the mouth 5.7 per cent., gingiva 3.7 per cent., palate 3.1 per cent., and buccal mucosa of the cheek 2.7 per cent. (Table 62). If cancer of the intraoral cavity proper is considered,

TABLE 68

POPULATION OF AUSTRALIA BY AGE AND SEX. JUNE 1961

AGE GROUP	MALE	FEMALE	MALE and FEMALE
0-14	1,626,195	1,550,803	3,176,998
15-19	414,788	394,145	808,933
20-24	361,531	335,907	697,438
25-29	342,443	313,628	656,071
30-34	386,175	351,793	737,968
35-39	395,247	372,669	767,916
40-44	343,973	334,554	678,527
45-49	335,890	321,941	657,831
50-54	293,004	275,023	568,027
55-59	238,051	225,330	463,381
60-64	190,805	210,048	400,853
65-69	149,130	184,654	333,784
70-74	116,939	148,048	264,987
75-79	69,223	95,724	164,947
80-84	33,069	52,627	85,696
85-89	12,216	21,736	33,952
90-94	3,087	6,114	9,201
95-99	446	1,099	1,545
100 +	40	91	131
ALL AGES	5,312,252	5,195,934	10,508,186

SOURCE: Commonwealth Bureau of Census and Statistics, Canberra, Australia. Census of the Commonwealth, 30th June 1961.

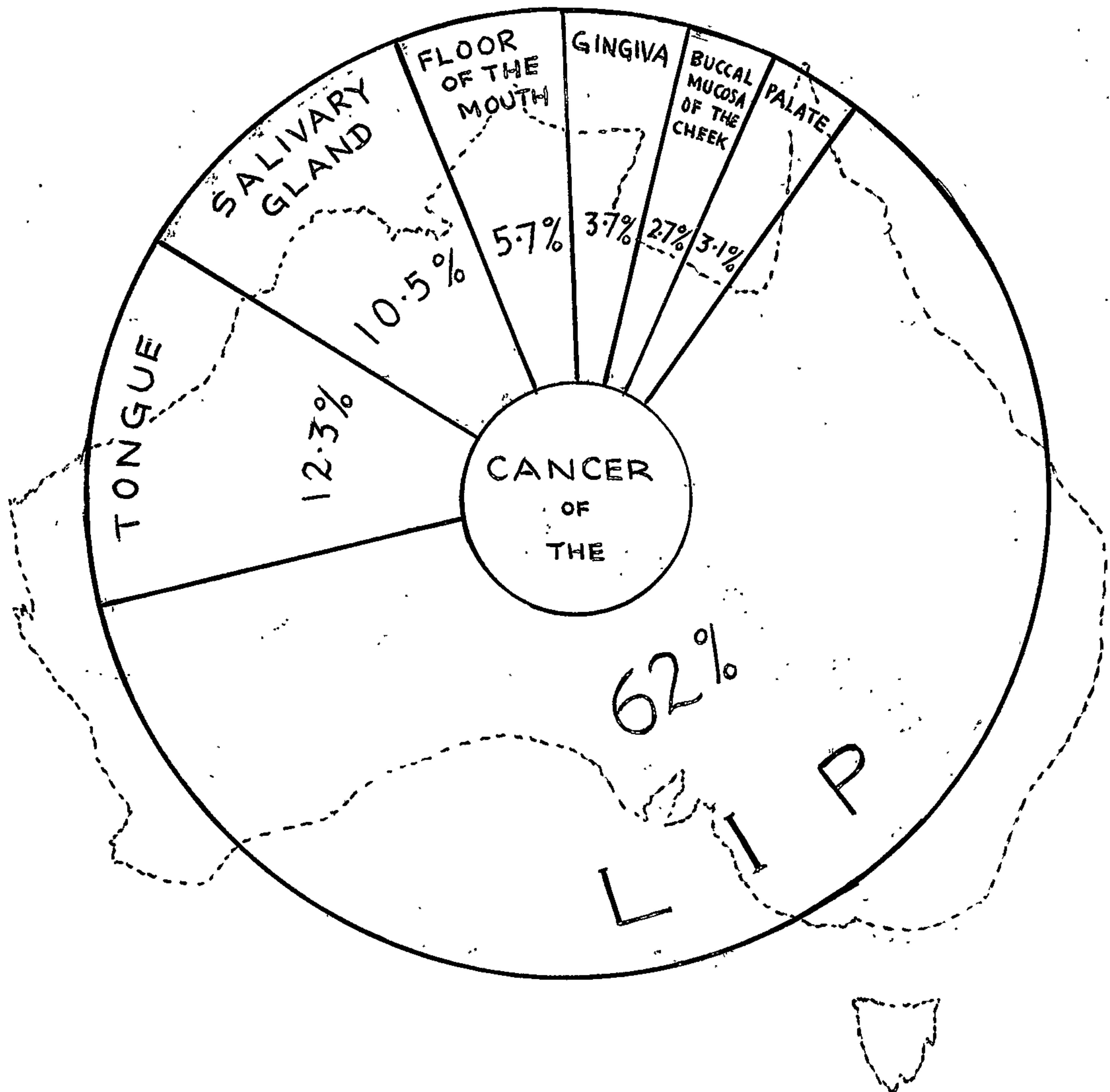
TABLE 69
MORBIDITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and AGE DISTRIBUTION
INTERNATIONAL CLASSIFICATION NUMBER 140-144, and 191-0
INCIDENCE RATE PER 100,000 POPULATION

INTERNATIONAL CLASSIFICATION		140 and 191-0		141		142		143		1 4 4						TOTAL	
SITE		LIP		TONGUE		SALIVARY GLAND		FLOOR OF THE MOUTH		GINGIVA		BUCCAL MUCOSA OF CHEEK		PALATE		TOTAL	
AGE GROUP		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<20		0.1	0.01	0.05	-	-	0.03	0.08	0.05	-	-	-	-	-	-	0.1	0.1
20 — 24		2.3	-	1.2	0.05	0.05	0.4	0.4	0.4	-	0.05	0.02	-	0.05	0.02	2.8	0.6
25 — 29		3.6	0.4	2.0	0.1	-	0.05	0.8	0.8	-	-	-	-	0.05	0.1	4.6	1.2
30 — 34		5.3	0.4	2.9	0.4	0.2	0.3	0.8	0.8	-	-	-	0.04	0.1	0.05	6.6	1.4
35 — 39		7.5	0.7	4.2	0.5	0.1	0.3	1.2	0.7	0.3	0.1	0.04	0.09	0.08	0.1	9.9	1.6
40 — 44		11.9	1.2	6.7	0.7	0.4	0.5	1.0	1.1	0.3	0.1	0.2	0.2	0.2	0.2	14.5	3.0
45 — 49		12.9	1.8	7.4	1.5	0.8	1.2	1.3	1.3	0.5	0.4	0.1	0.3	0.3	0.3	17.5	4.7
50 — 54		19.3	1.6	10.7	2.8	1.0	1.9	1.7	1.5	1.1	0.9	0.06	0.5	0.3	0.2	26.8	5.0
55 — 59		23.5	3.6	13.8	3.6	1.0	2.3	2.0	2.4	1.7	1.1	0.4	0.8	0.5	0.6	34.7	9.0
60 — 64		34.3	4.7	18.8	6.1	2.7	4.3	3.2	1.6	2.4	2.1	0.5	1.2	0.8	0.8	52.0	11.7
65 — 69		38.0	6.0	20.3	7.9	1.9	4.6	3.2	2.4	2.8	2.1	1.0	1.5	1.8	0.7	61.0	13.4
70 — 74		42.9	9.1	24.0	9.0	3.9	6.2	4.0	2.8	3.3	3.0	2.1	2.5	1.9	1.1	67.6	20.8
75 — 79		53.5	8.5	27.4	12.5	3.8	7.5	6.5	2.8	4.3	2.4	1.4	1.8	4.8	0.9	86.7	20.4
80 — 84		66.0	10.1	31.7	17.6	7.0	11.1	5.0	2.5	3.5	5.0	2.2	3.3	3.5	3.2	107.9	27.6
85 +		65.4	13.8	32.0	17.9	10.3	13.0	6.3	3.4	6.3	8.4	4.0	5.6	6.3	1.7	119.3	36.7
ALL AGES		9.6	1.6	5.6	1.5	0.7	1.1	0.9	0.9	0.5	0.4	0.2	0.3	0.3	0.2	14.0	3.9

CENSUS POPULATION - JUNE 30 M. 1961

EN

FIGURE 8



ORAL CANCER (INTERNATIONAL NUMBER 140-144 and 191.0)
AS SEEN IN THE MAJOR HOSPITALS IN AUSTRALIA.

1959 - 1964.

BN.

that is, excluding malignancy of the lip and the salivary gland, the tongue is the most frequent site of intraoral cancer, accounting for 44.7 per cent. of 1,577 cases, then the floor of the mouth 20.8 per cent., gingiva 13.4 per cent., palate 11.4 per cent., and buccal mucosa of the cheek 9.7 per cent. (Table 65).

MORTALITY OF ORAL CANCER

From 1959 to 1964 inclusive, there are 996 patients who died from oral cancer (International Classification Number 140-144, and 191) in Australia (Table 71). This is comprised of 665 men and 331 women. The corresponding mortality rate of patients with the disease is 2.1 per 100,000 population per year for male, 1.1 for female, and 1.6 for both sexes together.

Taking malignancy of specific oral sites into consideration for the period 1959-1964, lip cancer is responsible for 83 deaths (65 men and 18 women), lingual malignancy 412 deaths (271 men and 141 women), cancer of the salivary gland 179 deaths (106 men and 73 women), malignancy of the floor of the mouth 120 deaths (86 men and 34 women), and cancer of other oral sites 202 deaths (137 men and 65 women). The corresponding death rate per 100,000 population per year for patients with lip cancer is 0.1 (male 0.2, female 0.1), cancer of the

TABLE 71
MORTALITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and YEAR
NUMBER OF DEATHS REPORTED FOR 1959 - 1964 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140 - 144

INTERNATIONAL CLASSIFICATION	140			141			142			143			144			TOTAL		
SITE	LIP			TONGUE			SALIVARY GLAND			FLOOR OF THE MOUTH			*					
YEAR	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
1959	10	4	14	44	27	71	18	16	34	10	2	12	26	11	37	108	60	168
1960	8	5	13	42	21	63	16	12	28	15	4	19	20	6	26	101	48	149
1961	12	3	15	46	23	69	17	7	24	17	7	24	14	10	24	106	50	156
1962	8	1	9	51	20	71	18	11	29	15	7	22	24	8	32	116	47	163
1963	13	1	14	45	16	61	16	16	32	19	5	24	26	19	45	119	57	176
1964	14	4	18	43	34	77	21	11	32	10	9	19	27	11	38	115	69	184
TOTAL	65	18	83	271	141	412	106	73	179	86	34	120	137	65	202	665	331	996

SOURCES: Commonwealth Bureau of Census and Statistics Publication. Demography. 1959 - 1962
Bulletin No. 77-80. and Causes of Death, 1963 and 1964. Bulletin No. 1 and 2
Canberra: Commonwealth Bureau of Census and Statistics.

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED

RM.

TABLE 72
MORTALITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX AND YEAR.
INTERNATIONAL CLASSIFICATION NUMBER 140-144.
DEATH RATE PER 100,000 POPULATION PER YEAR

INTERNATIONAL CLASSIFICATION	140			141			142			143			144			TOTAL		
SITE	LIP			TONGUE			SALIVARY GLAND			FLOOR OF THE MOUTH			#					
YEAR	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
1959	0.2	0.1	0.1	0.9	0.5	0.7	0.4	0.3	0.3	0.2	0.04	0.1	0.5	0.2	0.4	2.1	1.2	1.7
1960	0.2	0.1	0.1	0.8	0.4	0.6	0.3	0.2	0.3	0.1	0.2	0.3	0.4	0.1	0.3	1.9	0.9	1.5
1961	0.2	0.1	0.1	0.9	0.4	0.7	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.2	0.2	2.0	1.0	1.5
1962	0.1	0.02	0.1	0.9	0.4	0.7	0.3	0.2	0.3	0.3	0.1	0.2	0.4	0.2	0.3	2.1	0.9	1.5
1963	0.2	0.02	0.1	0.8	0.3	0.6	0.3	0.3	0.3	0.3	0.1	0.2	0.5	0.4	0.4	2.2	1.1	1.6
1964	0.2	0.1	0.2	0.8	0.6	0.7	0.4	0.2	0.3	0.2	0.2	0.2	0.5	0.2	0.3	2.0	1.2	1.7
TOTAL*	0.2	0.1	0.1	0.9	0.4	0.7	0.3	0.2	0.3	0.3	0.1	0.2	0.4	0.2	0.3	2.1	1.1	1.6

* *Average per year* = $\frac{\text{Total number of cases } 1959-1964}{\text{Total population } 1959 + 1960 + \dots + 1964} \times 100,000$

MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

AW.

tongue 0.7 (male 0.9, female 0.4), malignancy of the salivary gland 0.3 (male 0.3, female 0.2), cancer of the floor of the mouth 0.2 (male 0.3, female 0.1), and malignancy of other oral sites 0.3 (male 0.4, female 0.1). Comparing this with the morbidity data, it can be seen that relatively few patients with lip cancer died from the disease, whereas many patients with lingual cancer succumbed to the disease.

The mortality rate for patients with oral cancer remains relatively constant throughout the six years with virtually no changes seen. This applies both for male patients and for female patients. For cancer of specific oral sites, the mortality rate in each instance also remains fairly stable with very little change.

Table 73 shows the number of patients who died from the disease over the six years in the different states, and Table 74 gives the corresponding mortality rate per 100,000 population. In New South Wales, there are 401 deaths (266 men and 135 women), in Victoria 280 deaths (184 men and 96 women), in Queensland 141 deaths (97 men and 44 women), in South Australia 85 deaths (59 men and 26 women), in Western Australia 69 deaths (49 men and 20 women), in Tasmania 19 deaths (9 men and 10 women), and in the Northern Territory 1 death (man).

The corresponding mortality rates per 100,000 population

TABLE 73
MORTALITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and STATE
NUMBER OF DEATHS REPORTED FOR 1959-1964 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140-144

INTERNATIONAL CLASSIFICATION	140			141			142			143			144			TOTAL		
SITE	LIP			TONGUE			SALIVARY GLAND			FLOOR OF THE MOUTH			*					
STATE	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
NEW SOUTH WALES	30	10	40	99	56	155	51	26	77	35	15	50	51	28	79	266	135	401
VICTORIA	14	4	18	67	40	107	34	25	59	24	7	31	45	20	65	184	96	280
QUEENSLAND	7	-	7	49	21	70	14	10	24	9	5	14	18	8	26	97	44	141
SOUTH AUSTRALIA	3	2	5	30	9	39	5	7	12	5	2	7	16	6	22	59	26	85
WESTERN AUSTRALIA	8	2	10	24	9	33	2	3	5	10	3	13	5	3	8	49	20	69
TASMANIA	3	-	3	2	6	8	-	2	2	3	2	5	1	-	1	9	10	19
NORTHERN TERRITORY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1
AUSTRALIA	65	18	83	271	141	412	106	73	179	86	34	120	137	65	202	665	331	996

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED

RM.

TABLE 74
MORTALITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and STATE
INTERNATIONAL CLASSIFICATION NUMBER 140 - 144
DEATH RATE PER 100,000 POPULATION PER YEAR

INTERNATIONAL CLASSIFICATION	140			141			142			143			144			TOTAL		
SITE	LIP			TONGUE			SALIVARY GLAND			FLOOR OF THE MOUTH			*					
STATE	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
NEW SOUTH WALES	0.2	0.1	0.2	0.8	0.5	0.6	0.4	0.3	0.3	0.3	0.1	0.2	0.4	0.2	0.3	2.2	1.1	1.7
VICTORIA	0.2	0.05	0.1	0.8	0.5	0.6	0.3	0.3	0.3	0.3	0.1	0.2	0.5	0.2	0.4	2.1	1.1	1.6
QUEENSLAND	0.2	-	0.1	1.1	0.5	0.8	0.3	0.2	0.3	0.2	0.1	0.2	0.4	0.2	0.3	2.1	1.0	1.5
SOUTH AUSTRALIA	0.1	0.1	0.1	1.0	0.3	0.7	0.2	0.2	0.2	0.2	0.1	0.1	0.5	0.2	0.4	2.0	1.0	1.5
WESTERN AUSTRALIA	0.4	0.1	0.2	1.1	0.4	0.7	0.1	0.1	0.1	0.4	0.1	0.3	0.2	0.1	0.2	2.2	1.0	1.6
TASMANIA	0.3	-	0.1	0.2	0.6	0.4	-	0.2	0.1	0.3	0.2	0.2	0.1	-	0.05	0.8	1.0	0.9
NORTHERN TERRITORY	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	0.6	1.0	-	0.6
AUSTRALIA	0.2	0.1	0.1	0.9	0.5	0.7	0.3	0.2	0.3	0.3	0.1	0.2	0.4	0.2	0.3	2.1	1.1	1.6

CENSUS POPULATION - JUNE 30th. 1961

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

EN.

in the different states are - New South Wales 1.7 (male 2.2, female 1.1), Victoria 1.6 (male 2.1, female 1.1), Queensland 1.5 (male 2.1, female 1.0), South Australia 1.5 (male 2.0, female 0.9), Western Australia 1.6 (male 2.2, female 1.0), Tasmania 0.9 (male 0.8, female 0.1), and Northern Territory 0.6 (male 1.0). Except for Tasmania and the Northern Territory, the mortality rate for male patients with the disease in all the states is much the same, whereas for female, it is virtually the same in all states.

Considering malignancy of specific oral sites, lip cancer is responsible for 40 deaths in New South Wales (M.R.*, 0.2), 18 deaths in Victoria (M.R., 0.1), 7 deaths in Queensland (M.R., 0.08), 5 deaths in South Australia (M.R., 0.1), 10 deaths in Western Australia (M.R., 0.2), and 3 deaths in Tasmania (M.R., 0.1).

The greater number of death cases reported in New South Wales shows that there are proportionately more patients with lip cancer in the state than in others, because there is not much difference in the mortality rate in all states. This substantiates the author's

* M.R. = Mortality Rate per 100,000 population.

remark that the relatively small number of patients with lip cancer in New South Wales in the present survey is due to an under reporting of lip cases.

Tongue cancer in New South Wales accounts for 155 deaths (M.R., 0.6), in Victoria 107 deaths (M.R., 0.6), in Queensland 24 deaths (M.R., 0.8), in South Australia 39 deaths (M.R., 0.7), in Western Australia 33 deaths (M.R., 0.7), and in Tasmania 8 deaths (M.R., 0.4). The mortality rate for patients with lingual malignancy appears to be slightly high in Queensland and relatively low in Tasmania. In all the states, except Tasmania, the number of deaths and the mortality rate for male are higher than for female, because of the greater number of male patients with the disease.

Malignancy of the salivary gland accounts for 77 deaths (51 men and 26 women) in New South Wales (M.R., 0.3), 59 deaths (34 men and 25 women) in Victoria (M.R., 0.3), 24 deaths (14 men and 10 women) in Queensland (M.R., 0.3), 12 deaths (5 men and 7 women) in South Australia (M.R., 0.2), 5 deaths (2 men and 3 women) in Western Australia (M.R., 0.1), and 2 deaths (both women) in Tasmania (M.R., 0.1). Comparing the mortality rate for male and that for female in the different states, there is virtually no difference in the rates between the two sexes in each instance.

For cancer of the floor of the mouth, the number of patients who died from the disease is 50 (35 men and 15 women) in New South Wales (M.R., 0.2), 31 (34 men and 7 women) in Victoria (M.R., 0.2), 14 (9 men and 5 women) in Queensland (M.R., 0.2), 7 (5 men and 2 women) in South Australia (M.R., 0.1), 13 (10 men and 3 women) in Western Australia (M.R., 0.3), and 5 (3 men and 2 women) in Tasmania (M.R., 0.2). In all states, the number of deaths and the corresponding mortality rates for male are higher than those for female, because of the preponderance of male with the disease.

In New South Wales, cancer of other oral sites (I.C.N.144) accounts for 79 deaths (51 men and 28 women), in Victoria 65 deaths (45 men and 20 women), in Queensland 26 deaths (18 men and 8 women), in South Australia 22 deaths (16 men and 6 women), in Tasmania 8 deaths (5 men and 3 women), and in the Northern Territory 1 death (man). The mortality rates per 100,000 population per year for male in Victoria, South Australia (0.5 in each state), New South Wales and Queensland (0.4 in each instance) are similar, whereas in Western Australia the male rate is lower (0.2). For Tasmania and the Northern Territory, the rates are not significant, because there is only one male patient in each of the states. The female

mortality rates for the first five states mentioned are similar - about 0.2 per 100,000 population.

When considering cancer of the oral cavity proper (International Classification Number 141, 143, and 144), there are 284 patients (185 men and 99 women) for the six years who died from the disease in New South Wales, whereas for Victoria, there are 203 deaths (136 men and 67 women), Queensland 110 deaths (76 men and 34 women), South Australia 68 deaths (51 men and 17 women), Western Australia 54 deaths (39 men and 15 women), Tasmania 14 deaths (6 men and 8 women), and Northern Territory 1 death (man) (Table 75). The mortality rate for male patients is much the same in all the states, except for Tasmania and the Northern Territory (Table 76). For female, there is also very little difference in the death rate in all the states. For male and female together, the mortality rate is the same (1.2 per 100,000 population) in all the states, except in Tasmania (0.7 per 100,000) and the Northern Territory (0.6 per 100,000).

The average age of 665 male patients who died from oral cancer is 68 years (median age, 69.2 years) and that for 331 female patients is 69.8 years (median age, 71.6 years), whereas for 996 total deaths, the average age of the patients is 68.6 years (median age 69.9 years) (Table 77). Comparing

TABLE 75
MORTALITY OF CANCER OF THE ORAL CAVITY PROPER BY SITE, SEX, and STATE
NUMBER OF DEATHS REPORTED FOR 1959-1964 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 141, 143, and 144.

INTERNATIONAL CLASSIFICATION	141			143			144			TOTAL		
SITE	TONGUE			FLOOR OF MOUTH			*					
STATE	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
NEW SOUTH WALES	99	56	155	35	15	50	51	28	79	185	99	284
VICTORIA	67	40	107	24	7	31	45	20	65	136	67	203
QUEENSLAND	49	21	70	9	5	14	18	8	26	76	34	110
SOUTH AUSTRALIA	30	9	39	5	2	7	16	6	22	51	17	68
WESTERN AUSTRALIA	24	9	33	10	3	13	5	3	8	39	15	54
TASMANIA	2	6	8	3	2	5	1	-	1	6	8	14
NORTHERN TERRITORY	-	-	-	-	-	-	1	-	1	1	-	1
AUSTRALIA	271	141	412	86	34	120	137	65	202	494	240	734

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

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TABLE 76
MORTALITY OF CANCER OF THE ORAL CAVITY PROPER BY SITE, SEX, and STATE.
INTERNATIONAL CLASSIFICATION NUMBER 141, 143, and 144.
DEATH RATE PER 100,000 POPULATION PER YEAR.

INTERNATIONAL CLASSIFICATION	141			143			144			TOTAL		
SITE	TONGUE			FLOOR OF MOUTH			*					
STATE	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
NEW SOUTH WALES	0.8	0.5	0.6	0.3	0.1	0.2	0.4	0.2	0.3	1.5	0.8	1.2
VICTORIA	0.8	0.5	0.6	0.3	0.1	0.2	0.5	0.2	0.4	1.5	0.8	1.2
QUEENSLAND	1.1	0.5	0.8	0.2	0.1	0.2	0.4	0.2	0.3	1.6	0.8	1.2
SOUTH AUSTRALIA	1.0	0.3	0.7	0.2	0.1	0.1	0.5	0.2	0.4	1.7	0.6	1.2
WESTERN AUSTRALIA	1.1	0.4	0.7	0.4	0.1	0.3	0.2	0.1	0.2	1.7	0.7	1.2
TASMANIA	0.2	0.6	0.4	0.3	0.2	0.2	0.1	—	0.05	0.6	0.8	0.7
NORTHERN TERRITORY	—	—	—	—	—	—	1.0	—	0.6	1.0	—	0.6
AUSTRALIA	0.9	0.5	0.7	0.3	0.1	0.2	0.4	0.2	0.3	1.5	0.8	1.2

CENSUS POPULATION : 30th. JUNE, 1961

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

RM.

TABLE 77
MORTALITY OF ORAL CANCER IN AUSTRALIA BY SITE, SEX, and AGE DISTRIBUTION
NUMBER OF DEATHS REPORTED FOR 1959 - 1964 INCLUSIVE
INTERNATIONAL CLASSIFICATION NUMBER 140-144

INTERNATIONAL CLASSIFICATION	140			141			142			143			144			TOTAL		
	LIP			TONGUE			SALIVARY GLAND			FLOOR OF THE MOUTH			*					
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
< 20	-	-	-	1	-	1	-	1	1	-	-	-	2	1	3	3	2	5
20 — 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25 — 29	1	-	1	-	-	-	-	-	-	-	-	-	1	1	2	2	1	3
30 — 34	-	-	-	3	-	3	1	-	1	-	-	-	-	-	-	4	-	4
35 — 39	1	-	1	3	-	3	1	3	4	4	-	4	1	-	1	10	3	13
40 — 44	2	-	2	4	2	6	6	2	8	-	1	1	6	-	6	18	5	23
45 — 49	4	-	4	10	7	17	4	6	10	3	1	4	3	4	7	24	18	42
50 — 54	6	1	7	18	12	30	7	5	12	4	1	5	6	5	11	41	24	65
55 — 59	6	1	7	24	4	28	11	5	16	7	5	12	17	5	22	65	20	85
60 — 64	7	-	7	31	16	47	11	9	20	6	5	11	9	4	13	64	34	98
65 — 69	8	-	8	66	18	84	15	12	27	13	4	17	20	8	28	122	42	164
70 — 74	5	5	10	32	17	49	19	10	29	20	8	28	20	13	33	96	53	149
75 — 79	7	1	8	38	26	64	13	3	16	12	4	16	23	11	34	93	45	138
80 — 84	9	4	13	24	18	42	5	8	13	10	1	11	17	6	23	65	37	102
85 +	9	6	15	17	21	38	13	9	22	7	4	11	12	7	19	58	47	105
ALL AGES	65	18	83	271	141	412	106	73	179	86	34	120	137	65	202	665	331	996
AVERAGE AGE	67.9	78.1	70.1	67.6	71.4	68.9	67.5	66.1	66.9	69.5	68.7	69.3	68.5	68.9	68.6	68.0	69.8	68.6
MEDIAN AGE	68.7	81.3	72.5	68.2	73.5	69.2	69.0	67.5	68.3	71.5	70.0	71.1	71.0	71.9	71.2	69.2	71.6	69.9

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

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this to the average age of patients with the disease during their first admissions (Table 67), it appears that the difference in average age between the two groups is 8.9 years for male, 7.2 years for female, and 8.8 years for male and female together.

When malignancy of specific oral sites is considered, the average age of patients who died from the disease and the difference in average age between this group and the group of patients with the disease at the time of admission are as follows:

Site of Cancer	Aver. age of patients who died#(years)	Aver. age of patients at time of admission* (years)	Difference in aver. age (years)
LIP	67.9 (65 men)	57.6 (3,065 men)	10.3
	78.1 (18 women)	63.9 (476 women)	14.2
	70.1 (83 total)	58.5 (3,541 total)	11.6
TONGUE	67.6 (271 men)	63.9 (479 men)	3.7
	71.4 (141 women)	66.4 (212 women)	5.0
	68.9 (412 total)	64.7 (691 total)	4.2
SALIVARY GLAND	67.5 (106 men)	55.2 (326 men)	12.3
	66.1 (73 women)	53.6 (271 women)	12.5
	66.9 (179 total)	54.7 (597 total)	12.2
FLOOR OF MOUTH	69.5 (86 men)	62.5 (261 men)	7.0
	68.7 (34 women)	66.8 (65 women)	2.1
	69.3 (120 total)	63.9 (326 total)	5.4
OTHER ORAL SITES	68.5 (137 men)	65.5 (347 men)	3.0
	68.9 (65 women)	66.5 (191 women)	2.4
	68.6 (202 total)	65.8 (538 total)	2.8

From Table 77

* From Table 67.

Table 77 also shows the number of patients who died

TABLE 78
MORTALITY OF ORAL CANCER IN AUSTRALIA, BY SITE, SEX AND AGE DISTRIBUTION
INTERNATIONAL CLASSIFICATION NUMBER 140-144
DEATH RATE PER 100,000 POPULATION PER YEAR

INTERNATIONAL CLASSIFICATION SITE AGE GROUP	140			141			142			143			144			TOTAL		
	LIP			TONGUE			SALIVARY GLAND			FLOOR OF MOUTH			*			M	F	TOTAL
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL			
< 20	-	-	-	0.01	-	0.004	-	0.01	0.004	-	-	-	0.02	0.01	0.01	0.02	0.02	0.02
20 — 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25 — 29	0.05	-	0.03	-	-	-	-	-	-	-	-	-	0.05	0.05	0.05	0.1	0.05	0.1
30 — 34	-	-	-	0.1	-	0.1	0.04	-	0.02	-	-	-	-	-	-	0.2	-	0.1
35 — 39	0.04	-	0.02	0.1	-	0.1	0.04	0.1	0.1	0.2	-	0.1	0.04	-	0.02	0.4	0.1	0.3
40 — 44	0.1	-	0.05	0.2	0.1	0.1	0.3	0.1	0.2	-	0.05	0.02	0.3	-	0.1	0.9	0.2	0.6
45 — 49	0.2	-	0.1	0.5	0.4	0.4	0.2	0.3	0.3	0.1	0.1	0.1	0.1	0.2	0.2	1.2	1.0	1.1
50 — 54	0.3	0.1	0.2	1.0	0.7	0.9	0.4	0.3	0.4	0.2	0.1	0.1	0.3	0.3	0.3	2.3	1.5	1.9
55 — 59	0.4	0.1	0.3	1.7	0.3	1.0	0.8	0.4	0.6	0.5	0.4	0.4	1.2	0.4	0.8	4.6	1.5	3.1
60 — 64	0.6	-	0.3	2.7	1.3	2.0	0.6	0.7	0.7	0.5	0.4	0.5	1.0	0.3	0.5	5.6	2.7	4.1
65 — 69	0.9	-	0.4	7.4	1.6	4.2	1.7	1.1	1.3	1.5	0.4	0.9	2.2	0.7	1.4	13.7	3.8	8.2
70 — 74	0.7	0.6	0.6	4.6	1.9	3.1	2.7	1.1	1.8	2.8	0.9	1.7	2.8	1.5	2.1	13.7	6.0	9.4
75 — 79	1.7	0.2	0.8	9.1	4.5	6.5	3.1	0.5	1.6	2.9	0.7	1.6	5.5	1.9	3.4	22.4	7.8	13.9
80 — 84	4.5	1.3	2.5	12.1	5.7	8.2	2.5	2.5	2.5	5.0	0.3	2.1	8.6	1.9	4.5	32.8	11.7	19.8
85 +	9.5	3.4	5.6	17.9	12.1	14.1	13.7	5.2	8.2	7.4	2.3	4.1	12.7	4.0	7.1	61.2	26.9	39.0
ALL AGES	0.2	0.1	0.1	0.9	0.5	0.7	0.3	0.2	0.3	0.3	0.1	0.2	0.4	0.2	0.3	2.1	1.1	1.6

CENSUS POPULATION - JUNE 30th. 1961

* MALIGNANT NEOPLASM OF OTHER PARTS OF MOUTH, AND OF MOUTH, UNSPECIFIED.

mm.

from the disease in the different age groups. For male and female together, most of the patients with oral cancer died in the age group of 70 to 80 years. For male, most of the deaths are seen in the sixth and seventh decades of life, whereas for female, most deaths occurred in the age group of 70 to 80 years. Table 78 gives the mortality rates per 100,000 population in the different age groups. As can be seen, the death rate increases with an increase in age.

CANCER OF THE LIP IN AUSTRALIA

GENERAL INCIDENCE

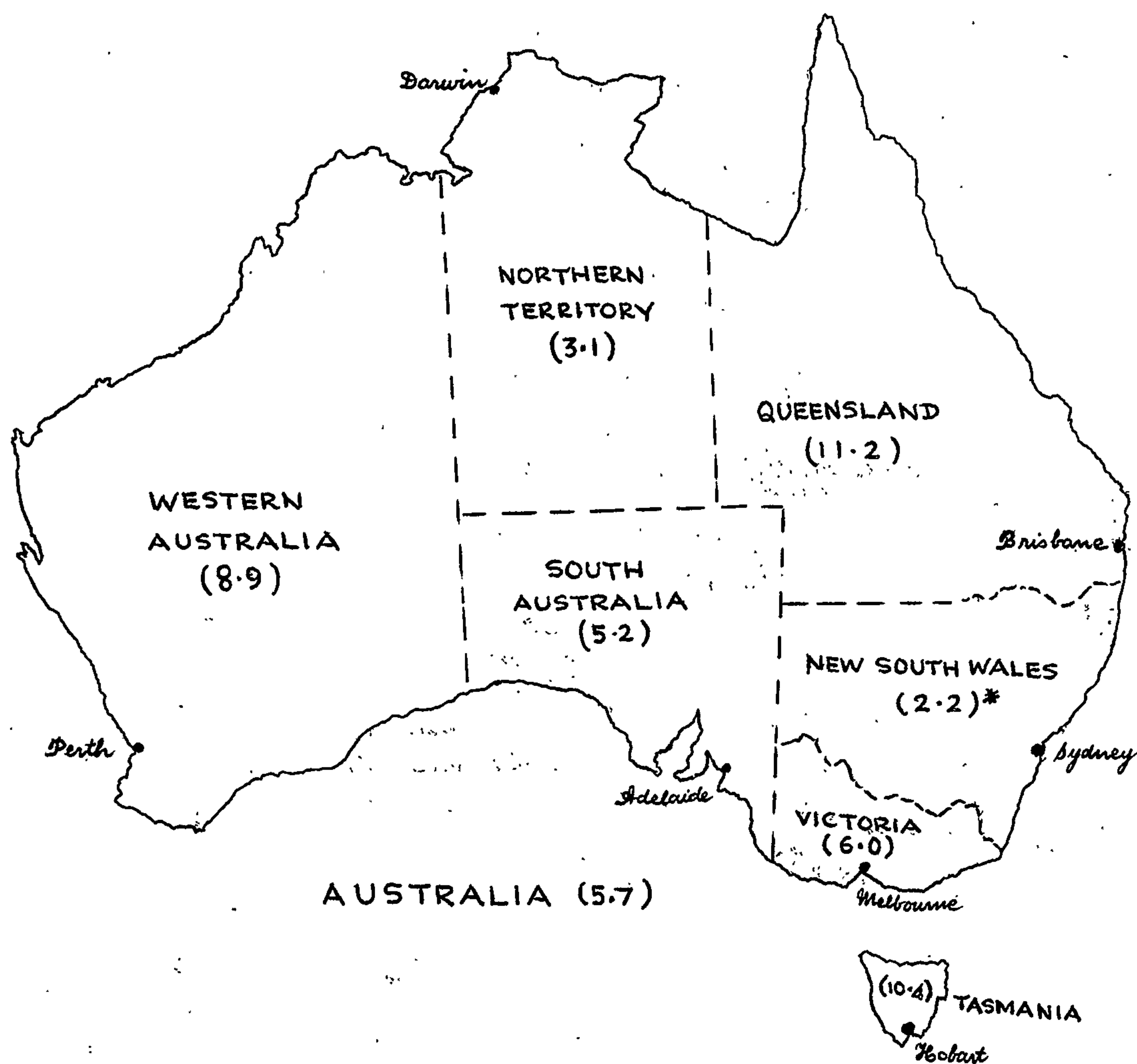
For the six year period from 1959 to 1964 inclusive, the number of new cases of patients with cancer of the lip as seen in the major hospitals covered in the survey around Australia is 3,574. This is comprised of 3,090 men and 484 women. Table 59 shows the number of new cases for each year for the six year period, and Table 61 gives the corresponding rates per 100,000 population. There appears to be a gradual reduction in the total number of cases and, hence, a corresponding decrease in the rate per 100,000 population from 1959 (total number of cases is 655, and rate per 100,000 is 6.5) to 1964 (total number of cases is 545, and rate per 100,000 is 4.9). This gradual decrease is possibly more consistent in the male patients with this disease than in the female patients.

Table 62 shows the number of cases of patients with malignancy of the lip in each state in the hospitals covered by the survey during the six year period, and Table 64 gives the rates per 100,000 population. The findings indicate that the rate for female patients with this disease is considerably lower

than that for male patients in all the states. In descending order of magnitude, the rate per 100,000 population for total male and female patients in the different states are as follows: Queensland 11.2, Tasmania 10.4, Western Australia 8.9, Victoria 6.0, South Australia 5.2, Northern Territory 3.1, and New South Wales 2.2

The comparatively small number of cases and, hence, the low rate for New South Wales is most probably due to an under-reporting of cases by the author. Although the major hospitals are included in the survey, there are a few hospitals in the suburban districts of Sydney which have surgical facilities for the treatment of this disease and which are not included in the survey. Another possible explanation is that private surgeons, dermatologists, and radiologists in Sydney may have undertaken the treatment of a fair proportion of patients with early lip cancer, and these are not seen in the major hospitals covered by the survey. For the Northern Territory, the low rate obtained is not significant as there are only five cases registered and, presumably, there are patients with this disease referred to centres in Queensland and South Australia for treatment.

FIGURE 9



() INDICATES RATE PER 100,000 POPULATION PER YEAR

* Figure is low, due to under reporting by the author.

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

An attempt is made to correlate the incidence of this disease to the amount of sunshine in the various state capital cities. From the Commonwealth Bureau of Meteorology, the mean annual hours of sunshine per day in the different capital cities are as follows: Perth 7.8 hours per day, Brisbane 7.5 hours per day, Adelaide 7.0 hours per day, Sydney 6.7 hours per day, Hobart 5.9 hours per day, Melbourne 5.6 hours per day, and Darwin no information available. The relatively higher incidence of lip cancer in Queensland (11.2 per 100,000 population) and Western Australia (8.9 per 100,000 population) may be partly attributed to the greater hours of sunshine per day in these two states as compared to the other states. However, the high incidence of this disease in Tasmania (10.4 per 100,000 population) is not in accord with the shorter hours of sunshine daily in the state.

According to the Victorian Central Cancer Registry which covers the ten major hospitals in the metropolis of Melbourne, there are 30,837 cancer cases registered during the six year period from 1959 to 1964 and, of these, there are 996 patients with cancer of the lip, representing about 3.2 per cent. of all human malignancy reported to the Registry. This approximates the findings of Cross, Guralnik and

Daland⁶⁵ who report that lip cancer comprises about 2.9 per cent. of all cancer admission at the Ponds ville Hospital. According to Atkinson et al.,⁷ malignancy of the lip represents 2.2 per cent. of all cancer in Australian New Guinea in the male population, and 0.8 per cent. in the female population.

From Table 61, it can be seen that the lip is the most frequent site of oral cancer (International Classification Numbers 140-144, and 191.0) accounting for from 36.7 per cent. (New South Wales) to 77.9 per cent. (Tasmania) of cancer seen in the oral cavity. This is in accord with the views of Colby, Kerr and Robinson,⁵⁰ and Sharp, Bullock and Hazlet.³²³ In contrast, the findings of Gardner and his associates,^{117, 119} indicate that cancer of the lip comprises only 17.8 per cent. to 18 per cent. of all oral malignancy in the series investigated by them. A much lower figure is reported by Atkinson et al.,⁷ in their study of oral cancer in New Guinea. They indicate that lip cancer represents 9 per cent. of all oral malignancy in the native population.

The high incidence of lip cancer in Australia is to be expected in a land which has a good sunny climate all year round in most of the states, and whose people (Caucasians) lead an active out-door

life. Most of the lip cancer in Australia and other Western countries arises from the skin part of the lip (the vermillion border). In contrast, the majority of lip lesions seen among the natives of New Guinea are commisural and probably it is best to consider them as extensions of lesions arising from the buccal mucosa.⁷

SEX INCIDENCE

Table 79 shows distinctly that cancer of the lip is a disease of men, the male to female ratio for Australia as a whole being 6.4:1. Although there are more male patients with this disease than females in all states, there is variation in the male to female ratio for the different states. Thus, as is worked out from Table 61, the male to female ratio of this disease for individual states are as follows:

	<u>Male/female ratio..</u>	<u>Total No. of cases</u>
NEW SOUTH WALES	5.6:1	545
VICTORIA	4.2:1	1,074
QUEENSLAND	13.3:1	1,030
SOUTH AUSTRALIA	7.7:1	306
WESTERN AUSTRALIA	4.8:1	396
TASMANIA	11.8:1	218
NORTHERN TERRITORY	4.0:1	5
AUSTRALIA	6.5:1	3,569

TABLE 79

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

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
UPPER LIP	190	50.2	188	49.7	378	1:1
LOWER LIP	2891	90.8	292	9.2	3183	9.9:1
BOTH LIPS	4	66.7	2	33.3	6	2:1
LIP, UNSPECIFIED	1	50.0	1	50.0	2	1:1
LIP, TOTAL	3086	86.5	483	13.5	2569	6.4:1

The ratio of 4.8 male to 1 female for patients with this disease in Western Australia in the present study is relatively low when compared to the findings of Nelson²³³ in his study of 742 patients with this disease in the same state in 1955. In his study, there were 699 men and 43 women, giving a male to female ratio of 16.5:1. Similar higher male to female ratios are seen in the studies of Schreiner and Christy³⁰² (36.4M:1F out of 636 cases in 1942), Widman⁴⁰⁰ (89.7M:1F out of 363 cases in 1950), Ward and Hendrik⁴⁰¹ (31.4M:1F out of 259 cases in 1950), and Smith³³¹ (9.8M:1F out of 129 cases in 1960). Cross, Guralnik and Daland,⁶⁵ and Welch and Nathanson⁴⁰³ also report similar findings.

In Table 79, when a subdivision of upper lip and lower lip is made, it is interesting to note that the sex distribution of this disease is about the same for both sexes in the case of malignancy of the upper lip (male to female ratio is 1:1), in contrast to a male to female ratio of 9.9:1 in cancer of the lower lip. The majority of upper lip cancers in females are of the basal cell type. Similar observations of a relatively higher female incidence in upper lip malignancy are reported by Welch and Nathanson,⁴⁰³ Sharp, Bullock and Hazlet,³²³ and Nelson.²³³

AGE INCIDENCE

Cancer of the lip generally affects aged persons and this is borne out in Tables 67 and 70, which show the number and percentage of patients with this disease in the different age groups. For male, most of the patients with lip cancer are found between the age of 50 years and 70 years, whereas for female, the largest number are seen between the age of 55 years and 80 years. For male and female together, most of the patients are between the age of 55 years and 75 years, and this closely parallels the findings of Cross, Guralnik and Daland,⁶⁵ and Schreiner and Christy.³⁰²

Table 69 shows the rate per 100,000 population for patients with this disease in the different age groups. The rate increases steadily with an increase in the age group, from 0.05 per 100,000 for male and female patients together who are less than 20 years of age to 32.0 per 100,000 for those who are 85 years of age and over. The corresponding rate for male patients alone are from 0.1 to 65.4 per 100,000, whereas for female patients alone, it is from 0.05 to 13.8 per 100,000 population.

In the present study, the average age for the 3,541 patients with this disease is 58.5 years and the median age is 60.0 years. The corresponding

average age for 3,065 male patients is 57.6 years and the median age 58.8 years, as compared to a higher average and median age of 63.9 years and 66.1 years respectively for 476 female patients. In the male group, the youngest patient is 15 years old and the oldest 95 years of age, whereas in the female group, the age range is from 17 years to 93 years.

In the series reviewed by Cross, Guralnik and Daland,⁶⁵ they report an average and median age of 62 years. Welch and Nathanson⁴⁰³ indicate that in the group investigated by them, the mean age of the patients was 63.5 years, whereas Smith³³¹ reports an average age of 57 years in his series.

SITE OF OCCURRENCE

The lower lip is more frequently involved in cancer than the upper lip as is shown in Table 80, 89.2 per cent. of the patients have lesions sited on the lower lip as compared to 10.6 per cent. who have lesions on the upper lip. Similar findings are reported by Welch and Nathanson⁴⁰³ (95.9 per cent. of the patients had lesions on the lower lip), Schreiner and Christy³⁰² (96.5 per cent. had lesions on the lower lip), Ward and Hendrick⁴⁰¹ (92.3 per cent. had lesions on the lower lip), Nelson²³³ (93.3 per cent. had lesions on the lower lip) and Smith³³¹ (96.1 per cent. had lesions on the lower lip). Several other authorities,²⁶

TABLE 80

CANCER OF THE LIP IN AUSTRALIA* (1959-1964 INCLUSIVE).
SITE DISTRIBUTION

SITE	No.	%
UPPER LIP	378	10.6
LOWER LIP	3183	89.2
BOTH LIPS	6	0.2
LIP, UNSPECIFIED	2	0.06
LIP, TOTAL	3569	100.0

50, 51, 368 also indicate that the disease has a predilection for the lower lip.

Table 81 shows the distribution of this disease into the left and right sides and centre of the lip. For lip total, the left and right sides appear to be affected with equal frequency for both sexes (male - left side 34.7 per cent., right side 31.8 per cent; female - left side 33.1 per cent., right side 32.9 per cent.). There are slightly more lesions sited on the centre of the lip in male patients (11.4 per cent.) than in female patients (6.6 per cent.). In the series investigated by Cross, Guralnik and Daland,⁶⁵ they report that the left and right sides of the lip are affected with equal frequency.

In the present study, for the upper lip, the right side seems to be slightly more frequently involved than the left side in both sexes, whereas in the lower lip, the reverse is true.

HISTOPATHOLOGIC TYPE

From Table 82, it can be seen that for male and female total, squamous cell carcinoma accounted for 88.1 per cent. of the disease as compared to 9.3 per cent. of basal cell carcinoma and a few cases of salivary gland type of tumour. However, it is

TABLE 81
CANCER OF THE LIP IN AUSTRALIA BY SEX, SITE, and LATERALITY. (1959-1964 INCLUSIVE).

SEX	MALE														FEMALE													
LATERALITY	CENTRE		LEFT SIDE		RIGHT SIDE		LEFT and RIGHT SIDES		ENTIRE LIP		SIDE UNSPECIFIED		TOTAL		CENTRE		LEFT SIDE		RIGHT SIDE		LEFT and RIGHT SIDES		ENTIRE LIP		SIDE UNSPECIFIED		TOTAL	
SITE	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
UPPER LIP	11	5.8	51	26.8	66	34.7	-	-	-	-	62	32.6	190	-	9	4.8	55	29.3	89	47.3	-	-	-	-	35	18.6	188	-
LOWER LIP	340	11.8	1020	35.3	913	31.6	13	0.4	5	0.2	600	20.7	2891	1	23	7.9	105	36.0	70	24.0	1	0.3	-	-	93	31.8	292	-
UPPER and LOWER LIPS	-	-	-	-	1	25.0	-	-	-	-	3	75.0	4	-	-	-	-	-	-	-	-	-	-	-	2	100.0	2	-
LIP, UNSPECIFIED	-	-	-	-	-	-	-	-	-	-	1	100.0	1	-	-	-	-	-	-	-	-	-	-	-	1	100.0	1	-
LIP, TOTAL	351	11.4	1071	34.7	980	31.8	13	0.4	5	0.2	666	21.5	3086	-	32	6.6	160	33.1	159	32.9	1	0.2	-	-	131	27.1	483	-

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TABLE 82
CANCER OF THE LIP IN AUSTRALIA BY SEX, SITE, and DIAGNOSIS. (1959 - 1964 INCLUSIVE).

SEX	SITE	M A L E										F E M A L E										MALE and FEMALE TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		UPPER LIP		LOWER LIP		BOTH LIP		LIP, UNSPECIFIED		LIP, TOTAL		UPPER LIP		LOWER LIP		BOTH LIP		LIP, UNSPECIFIED		LIP, TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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interesting to note that when the upper lip is considered separately, 73.4 per cent. of this disease in women is comprised of basal cell carcinoma, and squamous cell carcinoma only makes up 25.5 per cent. In male, although there are still more squamous cell carcinomas (56.3 per cent.) on the upper lip than basal cell carcinomas (38.9 per cent.), the latter histopathologic type of lesions have a relatively higher incidence in the upper lip as compared to the same type of lesions on the lower lip. In considering the lower lip, there are more squamous cell carcinomas than basal cell carcinomas for both the sexes (male, SCC = 94.5 per cent., BCC = 3.1 per cent.; female, SCC = 87.0 per cent., BCC = 9.6 per cent.).

The large number of squamous cell carcinoma seen in the present study for lip as a whole is in accord with the findings of other investigators.^{2, 331, 401.}

TREATMENT

As can be seen in Table 83, radiotherapy is the main form of treatment for primary lip cancer in the hospitals covered by the survey. For male, there appears to be slightly more cases treated by radiotherapy in the lower lip (77.2 per cent.) than in the upper lip (63.5 per cent.), whereas the reverse is true

in the case of surgery for the treatment of lower lip (22.0 per cent.) and upper lip (34.4 per cent.) cancer. For female, there is virtually no difference in the choice of therapy in the treatment of upper lip and lower lip malignancy (upper lip - 74.8 per cent. treated by radiotherapy, and 24.1 per cent. treated by surgery; lower lip - 70.8 per cent. treated by radiotherapy, and 27.1 per cent. treated by surgery). It is noteworthy that there are only a few cases who received a combination of radiotherapy and surgery.

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	Radio- therapy and Surgery	Total No. of Cases
	%	%	%	%
NEW SOUTH WALES	56.6	41.0	2.4	542
VICTORIA	75.8	23.6	0.5	1,070
QUEENSLAND	90.5	9.5	-	1,024
SOUTH AUSTRALIA	56.7	40.3	3.0	305
WESTERN AUSTRALIA	71.7	26.8	1.5	396
TASMANIA	88.0	11.1	0.9	217

Table 84 indicates that, according to the diagnosis and the type of therapy given, 76.7 per cent.

TABLE 84

CANCER OF THE LIP IN AUSTRALIA (1959-1964 INCLUSIVE)
DIAGNOSIS vs. TREATMENT

Type of Treatment	Radiother- apy		Surgery		Radiother- apy and Surgery		Total
DIAGNOSIS	No.	%	No.	%	No.	%	
SQUAMOUS CELL CARCINOMA	2401	76.7	699	22.3	30	1.0	3130
BASAL CELL CARCINOMA	229	69.0	102	30.7	1	0.3	332
MALIGNANT PLEOMORPHIC ADENOMA	-	-	-	-	1	100.0	1
MUCOEPIDERMOID CARCINOMA	1	50.0	1	50.0	-	-	1
ADENOCARCINOMA	-	-	1	100.0	-	-	1
UNSPECIFIED MIXED SALIVARY GLAND TUMOUR	-	-	5	83.3	1	16.7	6
CARCINOMA, UNSPECIFIED	61	76.3	17	21.2	2	2.5	80
TOTAL	2692	75.8	825	23.2	35	1.0	3552

of patients with squamous cell carcinoma were treated by radiotherapy as compared to 69.0 per cent. of patients with basal cell carcinoma, while 22.3 per cent. of those with squamous cell carcinoma received surgery as compared to 30.7 per cent. of those with basal cell carcinoma. The small group of patients (80 cases) with carcinoma unspecified received similar treatment as those who were treated for squamous cell carcinoma. In the few cases of malignancy of the accessory salivary glands of the lip, the treatment of choice was surgery.

Table 85 shows a further breakdown of radiotherapy employed in the treatment of primary lip cancer. As can be seen, SXRT accounted for 78.0 per cent. of all the radiotherapy cases (that is, patients treated by radiotherapy exclusively as well as those who had radiotherapy in conjunction with surgery) for male and female total. For male, SXRT was used with equal frequency in the treatment of upper and lower lip cancer (upper lip 74.2 per cent., lower lip 78.8 per cent.), whereas for female, 83.1 per cent. of the patients with upper lip malignancy had SXRT as compared to 68.9 per cent. with cancer of the lower lip who received this form of irradiation. The table also indicates that 6.8 per cent. of male and female

TABLE 85
CANCER OF THE LIP 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 LIP		LOWER LIP		BOTH LIP		LIP, UNSPECIFIED		LIP, TOTAL		UPPER LIP		LOWER LIP		BOTH LIP		LIP, UNSPECIFIED		LIP, TOTAL		No.	%
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
SXRT		92	74.2	1770	78.8	1	50.0	1	100.0	1864	78.6	118	83.1	146	68.9	-	-	-	-	264	74.4	2128	78.0
MVT		-	-	32	1.4	-	-	-	-	32	1.3	1	0.7	1	0.5	-	-	-	-	2	0.6	34	1.2
DXRT		8	6.5	92	4.1	1	50.0	-	-	101	4.3	6	4.2	20	9.4	-	-	-	-	26	7.3	127	4.7
SXRT and DXRT		-	-	1	0.04	-	-	-	-	1	0.04	1	0.7	-	-	-	-	-	-	1	0.3	2	0.1
XRT UNSPECIFIED		15	12.1	193	8.6	-	-	-	-	208	8.8	12	8.5	26	12.3	-	-	-	-	38	10.7	246	9.0
IMPLANT		9	7.2	157	7.0	-	-	-	-	166	7.0	4	2.8	17	8.0	-	-	-	-	21	5.9	187	6.8
IMPLANT and XRT		-	-	-	-	-	-	-	-	-	-	-	-	2	0.9	-	-	-	-	2	0.6	2	0.1
RADIOTHERAPY, UNSPECIFIED		-	-	1	0.04	-	-	-	-	1	0.04	-	-	-	-	1	100.0	-	-	1	0.3	2	0.1
TOTAL		124	100.0	2246	100.0	2	100.0	1	100.0	2373	100.0	142	100.0	212	100.0	1	100.0	-	-	355	100.0	2728	100.0

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patients received some form of implant, 4.7 per cent. had DXRT, and 1.2 per cent. had MVT. Of 190 patients who were treated by implantation techniques, in 97 cases radon was used, and in 86 cases radium was the choice, whereas radioactive gold was used in 7 patients only (Table 86).

From a review of the literature, the advocates of surgery for the treatment of primary lip cancer include Bernier,¹⁵ Thoma,³⁶⁸ and Ward and Hendrick,⁴⁰¹ while Widman⁴⁰⁰ and Nelson²³³ prefer the use of radiotherapy in the management of this disease.

In the treatment of metastases in patients with lip cancer, surgery is the treatment of choice as is indicated in Table 87 - 79.8 per cent. of 124 patients treated for metastases received surgery as compared to 20.2 per cent. who had radiotherapy. This is in accord with the views of other authorities^{2, 233, 302, 368, 400} who indicate that surgery is generally accepted as the method of choice in the treatment of lymph node metastases in patients with this disease.

PROGNOSIS

The prognosis of patients with cancer of the lip is summarised in Table 88. On the whole, the prognosis is favourable, the crude cumulative five year survival rate for 3,065 male patients is 85.4

TABLE 86
CANCER OF THE LIP IN AUSTRALIA BY SEX, SITE, and TYPE OF IMPLANT TO PRIMARY (1959-1964 INCLUSIVE).

SEX	MALE							FEMALE							
	TYPE OF IMPLANT	RADON			RADIUM		RADIOACTIVE GOLD	TOTAL	RADON		RADIUM		RADIOACTIVE GOLD		TOTAL
		No.	%	No.	%	No.			%	No.	%	No.	%	No.	
SITE	UPPER LIP	8	88.9	1	1.1	-	-	9	2	50.0	2	50.0	-	-	4
	LOWER LIP	70	44.6	80	50.9	7	4.5	157	16	84.2	3	15.8	-	-	19
	UPPER and LOWER LIPS	-	-	-	-	-	-	-	1	100.0	-	-	-	-	1
	LIP, TOTAL	78	47.0	81	48.8	7	4.2	166	19	79.2	5	20.8	-	-	24

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TABLE 87

CANCER OF THE LIP IN AUSTRALIA
TREATMENT TO METASTASES

SITE	UPPER LIP		LOWER LIP		LIP, TOTAL	
TYPE OF TREATMENT TO SECONDARY	No.	%	No.	%	No.	%
RADIOTHERAPY	1	14.3	24	20.5	25	20.2
SURGERY	6	85.7	93	79.5	99	79.8
TOTAL	7	100.0	117	100.0	124	100.0

TABLE 88
CANCER OF THE LIP 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
LIP, TOTAL	3,065	476	85.4	85.6	83.1	82.7	1.028	1.036
LOWER LIP	2,871	288	86.3	85.4	83.5	82.4	1.034	1.036
UPPER LIP	189	185	76.8	87.1	70.9	87.1	1.084	1.049
LIP, TOTAL - PATIENTS TREATED BY RADIOTHERAPY	2,328	341	87.9	86.4	83.6	82.1	1.052	1.052
LIP, TOTAL - PATIENTS TREATED BY SURGERY	697	124	75.5	87.3	82.0	84.0	0.921	1.040
LIP, TOTAL - PATIENTS WITH SQUAMOUS CELL CARCINOMA	2,825	300	86.2	85.5	83.3	83.2	1.034	1.029
LIP, TOTAL - PATIENTS WITH BASAL CELL CARCINOMA	164	162	86.5	86.0	78.7	81.5	1.102	1.056

per cent. and that for 476 female patients is 85.6 per cent. The corresponding relative five year survival ratios for male is 1.028 and for female 1.036, indicating virtually no differences in the five year survivals of the two groups.

When the upper lip and lower lip are considered separately, the crude cumulative five year survival rate is much the same for 2,871 male patients with lower lip cancer (86.3 per cent.), 288 female patients with malignancy of the lower lip (85.4 per cent.), and 185 female patients with cancer of the upper lip (87.1 per cent.), whereas the crude cumulative survival rate for 189 male patients with upper lip malignancy is slightly lower, 76.8 per cent. In looking at the relative five year survival ratios of these respective groups (for lower lip, 1.034 for male, 1.036 for female; for upper lip, 1.084 for male, 1.049 for female), there is virtually no differences and, hence, the five year survivals for patients with lower lip cancer in male and female groups are as good as those with upper lip malignancy in the male and female groups.

In correlating prognosis and the type of treatment given, for female, radiotherapy and surgery achieved a crude cumulative five year survival rate of 86.4 per cent. (of 341 patients) and 87.3 per cent. (of 124

patients) respectively. The relative five year survival ratio for the surgery treated group is 1.040 and that for the group who were treated by radiotherapy is 1.052, showing no difference in the five year survivals of both groups. For male, the crude cumulative five year survival rate of 2,328 patients treated by radiotherapy is 87.9 per cent., and that for 697 cases treated by surgery is 75.5 per cent. The corresponding relative five year survival ratios are 1.052 and 0.921, indicating a slightly better five year survival in the group who received radiologic treatment.

The prognosis for patients with squamous cell carcinoma is as good as those with basal cell carcinoma, the crude cumulative five year survival rates for 2,825 male patients and 300 female patients with squamous cell carcinoma are 86.2 per cent. and 85.5 per cent. respectively, and the crude cumulative five year survival rates for 164 male patients and 162 female patients with basal cell carcinoma are 86.8 per cent. and 86 per cent. respectively. The corresponding relative five year survival ratios for patients with squamous cell carcinoma are 1.034 for male and 1.029 for female, and that for those with basal cell carcinoma are 1.102 for male and 1.056 for

female, reflecting a slightly better five year survival in the group of male patients with basal cell carcinoma.

From a review of the literature, the prognosis of patients with lip cancer in terms of five year cure rate are as follows:

	<u>Total No. of Cases</u>	<u>Cure Rate %</u>	<u>Remarks</u>
WIDMAN ⁴⁰⁰	259	83	Radiotherapy
SCHREINER and CHRISTY ³⁰²	636	58.3 (Absolute Cure Rate)	X-rays and radium
CROSS, GURALNIK and DALAND ⁶⁵	491	63.6 (5 yr.)	Radiotherapy, surgery
WARD and HENDRICK ⁴⁰¹	72	89 (5 yr.)	Surgery
	69	79 "	Irradiation
	39	51 "	Combination of Radiotherapy and Surgery
Total	180	72.1 "	

CANCER OF THE TONGUE IN AUSTRALIA

GENERAL INCIDENCE

The number of patients with cancer of the tongue seen in the major hospitals in Australia during the six year period from 1959 to 1964 inclusive is 704. Of these, there are 490 men and 214 women in the series.

The total number of patients registered in the year 1959 is 135 (Table 59) and the corresponding rate per 100,000 population is 1.3 (Table 61). During the six year span, there is a drop in the number of cases registered, and for the year 1964, the number of patients seen is 101, giving a rate of 0.9 per 100,000 population. When male and female patients are considered separately, this gradual decrease in the rates per 100,000 is more consistent and slightly greater in the male (from 1.9 in 1959 to 1.3 in 1964, a drop of 0.6) than in the female group (from 0.8 in 1959 to 0.5 in 1964, a drop of 0.3).

The number of patients with malignancy of the tongue in each state seen over the six years is contained in Table 62, whereas Table 64 gives the corresponding rates per 100,000 population in the different states. As is expected, New South Wales, which has the largest population, has the most number of patients with this

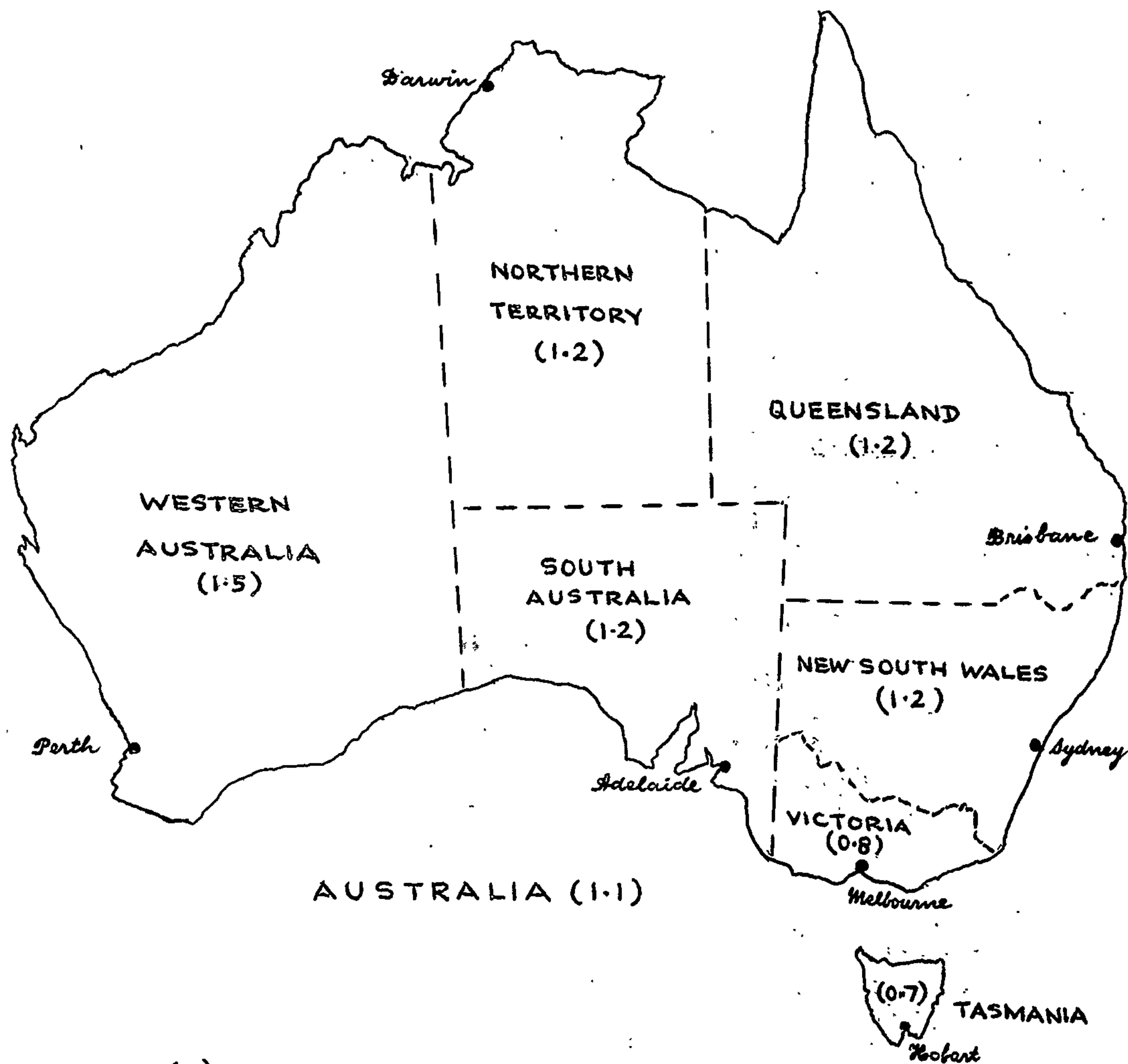
disease (297 cases); next is Victoria (148 cases), then Queensland (106 cases), South Australia (72 cases), Western Australia (65 cases), Tasmania (14 cases), and the Northern Territory (2 cases).

In the present study, the 65 cases registered in the major hospitals in Western Australia over the six years give an average of about 11 cases per year, whereas Nelson;²³³ in 1955, reported that there were 139 cases of patients with this disease seen in the Radiotherapy Department of the Royal Perth Hospital over a 20 year period to give an average of 7 cases per year.

When taking the rates per 100,000 population into consideration in the different states, New South Wales, Queensland, and South Australia have a rate of 1.2 for male and female together, whereas the rates for Victoria is 0.8, for Tasmania 0.7, and for Western Australia 1.5. For the Northern Territory, the rate of 1.2 per 100,000 population is not significant because only two cases were encountered.

Except for Tasmania (0.7 per 100,000 for male, and 0.7 per 100,000 for female), the rate per 100,000 population for male patients with this disease is higher than that for female patients in all the other states. In the state of Victoria, the difference in the rates of the two sexes is not great - for male 1.0 per 100,000,

FIGURE 10



() INDICATES RATE PER 100,000 POPULATION PER YEAR

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

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and for female 0.7 per 100,000. In South Australia and Western Australia, the differences between male and female rates are most marked - male 2.0 per 100,000 and female 0.4 per 100,000 for South Australia, whereas for Western Australia, the rates per 100,000 are 2.2 and 0.7 for male and female respectively. For New South Wales and Queensland, the differences are about the same - 1.7 and 0.8 per 100,000 for male and female respectively in New South Wales, and 1.7 for male and 0.6 for female per 100,000 in Queensland.

For Australia as a whole, the rate per 100,000 is 1.5 for male, 0.7 for female, whereas for male and female together, it is 1.1 per 100,000. Comparing this with other countries, the rates per 100,000 population in Sweden (1948), England (1948), and New York (1944) for this disease are 1-2, 3, and 3 respectively.³

According to the Victorian Central Cancer Registry, of the 30,837 cases of cancer registered in the state of Victoria over the six year period from 1959 to 1964, there are 155 cases of lingual cancer, representing about 0.5 per cent. of all human malignancies. From a review of the literature, the percentage of lingual malignancy to all human cancers in the various institutions in different parts of the world is as follows:

	<u>% of lingual cancer to all cancers</u>	<u>Place</u>
MARTIN, MUNSTER AND SUGARBAKER ²⁰¹	2-3	Memorial Hospital, New York, U.S.A.
PAYMASTER AND SHROFF ²⁴⁴	12	Tata Memorial Hospital, Bombay, India
MARCIAL ¹⁷⁹	2.2	Puerto Rico
RAHAUSEN AND SAYAGO ²⁸¹	1	Radium Institute, Santiago. Chile
WINDEYER ⁴⁰⁸	> 2	Middlesex Hospital, London, U.K.
ATKINSON et al. ⁷	5.1 (male) 2.8 (female)	Territory of Papua and New Guinea

For Australia as a whole, cancer of the tongue comprises about 12.3 per cent. (Table 62) of all malignancy of the oral cavity (International Classification Numbers 140-144, and 191.0). It is the second most frequent form of oral cancer, and this is in accord with the views of Castigliano,⁵¹ and Colby, Kerr, and Robinson.⁵⁰ When taking individual states into consideration, this appears true only for New South Wales (20.1 per cent.); Queensland (8.0 per cent.); South Australia (13.6 per cent.), and Western Australia (11.6 per cent), whereas in Victoria (9.5 per cent.) and Tasmania (5.0 per cent.), malignancy of the tongue seems to be the third most frequent form of oral cancer. The relatively high percentage of this disease to all oral cancer in

New South Wales as compared to the other states is because of a much lower percentage of lip cancer recorded in the survey in New South Wales due to an under-reporting of lip cases.

The findings of Gardner and his associates¹¹⁹,¹¹⁷ indicate that cancer of the tongue comprises about 28 per cent. of all oral malignancy and is the most common form of mouth cancer, while Ueno et al.,³⁷³ in an analysis of 770 cases of oral cancer, report that the tongue is involved in only 14 per cent. of the cases. In a study of oral cancer in the Territory of Papua and New Guinea, Atkinson et al.⁷ report that malignancy of the tongue comprises 22.9 per cent. of all oral cancer.

In the present study, if cancer of the tongue is considered in relation to malignancy of the intra-oral 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 tongue is the most frequent site of mouth cancer, accounting for from 41.9 per cent. of all malignancy of the intraoral cavity proper in New South Wales to 52.2 per cent. in Queensland, and for Australia as a whole, this is 44.7 per cent.

SEX INCIDENCE

Of 704 cases of tongue cancer found in the survey, there are 490 men and 214 women, giving a male to female ratio of 2.3 to 1 in favour of the former sex. This closely parallels the findings of Lyall and Schetlin¹⁷² (2.5:1 in favour of men out of 76 cases) and Stepanov³³⁵ (2.0:1 in favour of men out of 216 cases). The findings of other overseas investigators regarding the sex distribution of this disease are as follows:

	<u>Year of Report</u>	<u>Male/ Female Ratio</u>	<u>Total No. of Cases</u>
WELCH and NATHANSON ⁴⁰³	1937	12.7:1	835
MARTIN, MUNSTER and SUGARBAKER ²⁰¹	1940	6.7:1	556
RAHAUSEN and SAYAGO ²⁸¹	1954	6.5:1	113
ASH and MILLAR ¹⁰	1955	3.0:1	441
CADE and LEE ⁶¹	1957	3.5:1	653
PAYMASTER and SHROFF ²⁴⁴	1958	4.0:1	700
TRIEGER et al. ³⁶⁵	1958	5.4:1	198
FLAMANT et al. ⁹⁵	1964	6.7:1	904
UENO et al. ³⁷³	1964	1.9:1	109
PRESENT SERIES	1967	2.3:1	706

Cade and Lee,⁶¹ basing their observation on patients with cancer of the tongue seen at the Westminster Hospital in London, indicate that the sex incidence of this disease has altered significantly throughout the years. They report that the male to female ratio of

this disease in 1925 was 10:1 and this has gradually and progressively dropped to 2:1 in the period 1951-1955.

In the present Australian study, if the individual state is taken into consideration, the sex distribution of this disease is as follows:

	<u>Male/Female Ratio</u>	<u>Total No. of cases</u>
SOUTH AUSTRALIA	5.0:1	72
WESTERN AUSTRALIA	3.1:1	65
QUEENSLAND	2.8:1	106
NEW SOUTH WALES	2.3:1	299
VICTORIA	1.5:1	148
TASMANIA	1.0:1	14
AUSTRALIA	2.3:1	706

From Table 89, it is interesting to note that the male to female ratio for 137 patients with malignancy of the posterior one-third (base) of the tongue is 5.2:1, whereas for 97 patients with cancer of the anterior two-thirds of the tongue, this ratio is 1.6:1. Unfortunately, there is a large group of patients whose case histories are inadequate to allow a specific allocation of site of the disease on the tongue. In this group of 462 patients, the male to female ratio is 2.1:1 giving rise to speculation that probably a

TABLE 89

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

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
TONGUE, POST. ¹ /3RD. (BASE OF TONGUE)	115	83.9	22	16.1	137	5.2:1
TONGUE, ANT. ² /3RDS.	60	61.9	37	38.1	97	1.6:1
TONGUE, MULTIPLE PARTS (BASE and ANT. ² /3RDS.)	4	50.0	4	50.0	8	1:1
TONGUE, PART UNSPECIFIED	311	67.3	151	32.7	462	2.1:1
TONGUE, TOTAL	490	69.6	214	30.4	704	2.3:1

fairly large number of the cases involved the anterior two-thirds of the tongue.

AGE INCIDENCE

In this study, the average age of 479 male patients with cancer of the tongue is 63.9 years, whereas in 212 female patients, the average age is slightly higher, 66.4 years (Table 67). The age range in the male group of patients is from 21 years to 93 years, whereas for female, the youngest patient is 23 years old and the oldest, 91 years of age. For male and female patients together (691 cases), the average age is 64.7 years. This corresponds closely to the average age of 63.2 years in 441 patients with lingual malignancy investigated by Ash and Millar,¹⁰ whereas the findings of other overseas investigators are lower:

	<u>Year of Report</u>	<u>Aver. age in years</u>	<u>Total no. of cases</u>
MARTIN, MUNSTER and SUGARBAKER ²⁰¹	1940	58	556
TIECKE ³⁶¹	1957	55	-
BERNIER ¹⁴	1958	53	-
ARIEL ³	1959	55	-
FLAMANT et al. ⁹⁵	1964	59	904
UENO et al. ³⁷³	1964	53.1	103
PRESENT SERIES	1967	64.7	691

In the present series, the median age for male patients with this disease is 64.9 years, for female

patients 67.9 years, and for male and female together 65.6 years. This is higher than the median age of 61 years for 835 patients with tongue cancer investigated by Welch and Nathanson.⁴⁰³

From Tables 67 and 70, it can be seen that the largest number of patients are seen between the age of 50 and 80 years - about 72.1 per cent. of the total cases are found between this age range. Only about 4.8 per cent. of the patients are seen below the age of 40 years, and about 13.3 per cent. above 80 years of age. When male and female are considered separately, the corresponding findings are: for male, 74.5 per cent. are seen between the age of 50 and 80 years, 5.2 per cent. below 40 years, and 10.9 per cent. above 80 years; for female, 66.5 per cent. are encountered between the age of 50 and 80 years, 3.8 per cent. below 40 years, and 18.9 per cent. above 80 years.

Paymaster and Shroff,²⁴⁴ in a study of 700 Indian patients with cancer of the tongue, report that the highest incidence is in the age group of 40-45 years. In the present study, the number of Australian patients seen in the age group of 40-44 years is 22 (out of 691 cases) as compared to 104 cases in the age group of 60-64 years which is the highest incidence for any five year age group in the series. Rahaussen and

Sayago,²⁸¹ in an analysis of 113 patients with this disease seen in the Radium Institute in Santiago, Chile, indicate that the largest number of cases are seen in the age group of 50-59 years. Similar findings are reported by Voutilainen and Tuovinen³⁸¹ in their investigation of 137 cases seen in the Radiotherapy Clinic of the University of Helsinki, Finland. Comparing these two studies with the present Australian investigation, the largest number of patients for a comparable decade is seen in the age group of 60-69 years - 196 cases out of 691 patients - as compared to 130 patients in the age group of 50-59 years. The difference in the age distribution of the disease may be partly due to the different age structure of the population in these countries.

The rate per 100,000 population of patients with cancer of the tongue for the different age groups in the present series are contained in Table 69. The rate per 100,000 population increases progressively from 0.05 in the age group of 20-24 years to 13.0 for patients over 85 years of age for male and female together. For male, the corresponding rates are from 0.05 to 17.9 per 100,000, and for female, from 0.05 to 10.3 per 100,000.

SITE OF OCCURRENCE

The specific site of development of cancer of the tongue is of great importance, because tumours arising from the posterior portion of the tongue are usually of a higher grade of malignancy, metastasize earlier, and offer a poorer prognosis.

In the present Australian study, unfortunately, the case histories of a large proportion of patients with malignancy of the tongue are not good enough to permit a specific allocation of site of the lesion (Table 90). Of the 704 cases analysed, there are 462 (65.6 per cent.) patients in whom the specific site of the tongue involved is unknown from the case histories. Of the remainder, 137 patients (19.5 per cent.) have lesions sited on the posterior one-third (base) of the tongue, and there are 97 patients (13.8 per cent.) with cancer involving the anterior two-thirds of the tongue, with 8 cases (1.1 per cent.) having lesions on the base and anterior two-thirds of this organ.

A review of the literature indicates that some investigators^{179, 244, 361} found a larger proportion of cases involving the posterior portion or base of the tongue, while others^{34, 95, 96, 408} noted that the anterior two-thirds of the tongue is more commonly involved by cancer.

TABLE 90

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

SITE	NUMBER	PERCENTAGE
TONGUE, POST. $\frac{1}{3}$ RD. (BASE OF TONGUE)	137	19.5
TONGUE, ANT. $\frac{2}{3}$ RDS.	97	13.8
TONGUE, MULTIPLE PARTS (BASE and ANT. $\frac{2}{3}$ RDS.)	8	1.1
TONGUE, PART UNSPECIFIED	462	65.6
TONGUE, TOTAL	704	100.0

HISTOPATHOLOGIC TYPE

Table 91 shows the histopathologic type of tumours encountered in 704 patients with malignancy of the tongue. The large majority of lesions are squamous cell carcinoma and this is in accord with the studies of others.^{96, 201, 281, 381} In the present study, for tongue total, there is virtually no differences seen in the distribution of histopathologic type of tumours in both the sexes - 64.1 per cent. squamous cell carcinoma and 35.9 per cent. carcinoma unspecified for men, and for women, there are 67.3 per cent. squamous cell carcinoma and 32.2 per cent. carcinoma unspecified, with one case of adenocarcinoma (0.5 per cent.). Although there are 245 patients whose case histories give a diagnosis of "carcinoma" only, the majority of these must be presumed to be squamous cell carcinoma.

TREATMENT

Of the 457 male patients with primary cancer of the tongue, 74.8 per cent. received radiotherapy treatment, 16.0 per cent. had surgery, and 9.0 per cent. were treated by a combination of both methods (Table 92). There is only a very slight difference in the choice of therapy employed in the treatment of 206 female patients with this disease - 71.4 per cent. had radiotherapy, 20.9 per cent. were treated by surgery, and 7.8 per cent.

TABLE 91
CANCER OF THE TONGUE IN AUSTRALIA BY SEX, SITE, and DIAGNOSIS: (1959-1964 INCLUSIVE).

SEX	DIAGNOSIS	MALE						FEMALE					
		SQUAMOUS CELL CARCINOMA			ADENO-CARCINOMA			CARCINOMA, UNSPECIFIED			SQUAMOUS CELL CARCINOMA		
		No.	%		No.	%		No.	%		No.	%	TOTAL
	SITE												
	TONGUE, POSTERIOR 1/3RD. (BASE of TONGUE)	77	67.0	-	-	38	33.0	115	17	77.3	1	4.5	22
	TONGUE, ANTERIOR 2/3RD.	39	65.0	-	-	21	35.0	60	28	75.7	9	24.3	37
	TONGUE, MULTIPLE PARTS (BASE and ANTERIOR 2/3RDS.)	4	100.0	-	-	-	-	4	4	100.0	-	-	4
	TONGUE, PART UNSPECIFIED	194	62.4	-	-	117	37.6	311	95	62.9	56	37.1	151
	TONGUE, TOTAL	314	64.1	-	-	176	35.9	490	144	67.3	69	32.2	214

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TABLE 92

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

SEX	TREATMENT TO PRIMARY SITE	MALE						FEMALE					
		RADIOTHERAPY		SURGERY		RADIOTHERAPY and SURGERY		TOTAL	RADIOTHERAPY		SURGERY		TOTAL
		No.	%	No.	%	No.	%		No.	%	No.	%	
TONGUE, POSTERIOR 1/3RD, (BASE of TONGUE)	TONGUE, ANTERIOR 2/3RD.	95	88.0	5	4.6	8	7.4	108	18	90.0	1	5.0	20
		45	80.4	6	10.7	5	8.9	56	27	77.1	3	8.6	35
		2	66.7	-	-	1	33.3	3	4	100.0	-	-	4
TONGUE, PART UNSPECIFIED	TONGUE, TOTAL	201	69.3	62	21.4	27	9.3	290	98	66.7	39	26.5	14.7
		342	74.8	73	16.2	41	9.0	457	147	71.4	43	20.9	206

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by a combination of radiotherapy and surgery. When individual states are taken into consideration, the types of treatment given to patients with this disease in the different states are as follows:

	<u>Total No. of Cases</u>	<u>Radio- therapy %</u>	<u>Surgery %</u>	<u>Radiother- apy and Surgery</u>
NEW SOUTH WALES	283	71.0	21.2	7.8
VICTORIA	137	74.1	17.0	8.9
QUEENSLAND	96	97.9	2.1	-
SOUTH AUSTRALIA	70	50.0	30.0	20.0
WESTERN AUSTRALIA	64	79.7	10.9	9.4
TASMANIA	14	64.3	21.4	14.3

For Australia as a whole, of 128 male and female patients with malignancy of the anterior two-thirds of the tongue, 79.1 per cent. received radiotherapy treatment, 9.9 per cent. had surgery, and 11.0 per cent. were treated by a combination of the two methods. In the group of 128 patients with cancer of the posterior two-thirds (base) of the tongue, more patients were treated by radiotherapy (88.3 per cent.), whereas the numbers treated by surgery (4.7 per cent.) and a combination of surgery and radiotherapy (7.0 per cent.) are smaller. In the large group of patients (348 cases) with lingual malignancy in which the

specific site of involvement of the tongue is not known from the case histories, 68.4 per cent. were treated by radiotherapy, 23.1 per cent. by surgery, and 8.5 per cent. by a combination of both methods.

Table 93 shows the different modalities of radiotherapy used in the treatment of this disease in Australia. Implant (usually for anterior two-thirds lesion) appears to be the most frequent type of radiological method employed in patients treated by radiotherapy for cancer of the tongue - 35.8 per cent. (out of 391 cases) for male, 47.9 per cent. (out of 165 cases) for female, and for male and female together, 39.4 per cent. (out of 556 cases). Radon is by far the most common type of implant used (86.6 per cent. in male and 86.4 per cent. in female), next is radium (9.2 per cent. in male and 9.9 per cent. in female), and then permanent radioactive gold grains (4.2 per cent in male and 3.7 per cent in female) (Table 94). Of the group of 323 patients treated by implantation techniques, there are 17 patients (7.6 per cent.) with malignancy of the posterior one-third of the tongue, 45 patients (20.2 per cent.) with cancer of the anterior two-thirds of the tongue, and 161 patients (72.2 per cent.) with the disease in which the specific site of the tongue involved is not known. Usually, the technique of implantation, when used to treat this disease, is more frequently employed to treat patients

TABLE 93
CANCER OF THE TONGUE 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	TONGUE POST. Y3RD (BASE).			TONGUE ANT. 2/3RD.			TONGUE MULTIPLE PARTS (BASE + ANT. 2/3RD.)			TONGUE, PART UNSPECIFIED			TONGUE, TOTAL			TONGUE, POST Y3RD. (BASE)			TONGUE, ANT. 2/3RD.			TONGUE, MULTIPLE PARTS (BASE + ANT. 2/3RD.)			TONGUE, PART UNSPECIFIED			TONGUE, TOTAL										
		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%		No.	%									
SXRT		2	1.9		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		1	0.9		1	0.6		5	0.9
MVT		27	30.0		5	9.6		1	25.0		11	4.8		3	15.8		8	24.2		3	75.0		6	5.5		20	12.1		64	11.5									
DXRT		24	23.1		7	13.5		1	25.0		45	19.5		6	31.6		4	12.1		1	25.0		11	10.1		22	13.3		99	17.8									
MVT and DXRT		1	1.0		1	1.9		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		2	0.4			
XRT, UNSPECIFIED		22	21.1		11	21.2		2	50.0		27	11.7		2	10.5		4	12.1		-	-		5	4.6		11	6.7		73	13.1									
IMPLANT		12	11.5		26	50.0		-	-		102	44.2		4	21.1		16	48.5		-	-		59	54.1		79	47.9		219	39.4									
IMPLANT and XRT		1	1.0		2	3.8		-	-		-	-		-	-		1	3.0		-	-		2	1.8		3	1.8		6	1.1									
RADIOTHERAPY UNSPECIFIED		3	2.9		-	-		-	-		2	0.9		-	-		-	-		-	-		3	2.8		3	1.8		8	1.4									
COBALT 60		12	11.5		-	-		-	-		42	18.2		4	21.1		-	-		-	-		22	20.2		26	15.8		80	14.4									
TOTAL		104	100.0		52	100.0		4	100.0		231	100.0		19	100.0		33	100.0		4	100.0		109	100.0		165	100.0		556	100.0									

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TABLE 94
CANCER OF THE TONGUE IN AUSTRALIA BY SEX, SITE, and TYPE OF IMPLANT TO PRIMARY. (1959-1964 INCLUSIVE).

SEX	MALE						FEMALE					
	RADON.		RADIUM		RADIOACTIVE GOLD		RADON		RADIUM		RADIOACTIVE GOLD	
TYPE OF IMPLANT	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
SITE	TOTAL						TOTAL					
TONGUE, POSTERIOR 1/3RD (BASE of TONGUE)	11	84.6	2	15.4	-	-	3	75.0	1	25.0	-	-
TONGUE, ANTERIOR 2/3RD	26	92.9	2	7.1	-	-	15	88.2	1	5.9	1	5.9
TONGUE, MULTIPLE PARTS. (BASE and ANTERIOR 2/3RD)	-	-	-	-	-	-	-	-	-	-	-	-
TONGUE, PART UNSPECIFIED	86	85.1	9	8.9	6	5.9	52	86.7	6	10.0	2	3.3
TONGUE, TOTAL	123	86.6	13	9.2	6	4.2	70	86.4	8	9.9	3	3.7

MAN.

with cancer of the anterior two-thirds of the tongue than in those with lesions on the posterior one-third (base) of this organ. Therefore, in the group of 161 patients with cancer in which the specific site of the tongue involved by the disease is not known, it is reasonable to presume that most of the patients in this group have malignancy of the anterior two-thirds of the tongue.

The next most frequent form of radiotherapy used in the treatment of patients with this disease is DXRT - 19.7 per cent. in male, 3.3 per cent. in female, and for male and female together, 17.8 per cent. This form of radiotherapy is used more often on patients with malignancy involving the posterior one-third (base) of the tongue than those with lesions on the anterior two-thirds of the tongue. Third in frequency of usage is Cobalt 60 - for total male and female 14.4 per cent. of cases (male 13.8 per cent. and female 15.8 per cent.) - and, as Table 93 indicates, this is used almost exclusively to treat patients with cancer involving the posterior one-third of the tongue. Hence, in the group of 64 patients treated by Cobalt 60 in which the specific site of the lesion on the tongue is not known, a large proportion of the patients can reasonably be presumed to have cancer of the posterior one third of the tongue.

MVT is the fourth most common form of radiotherapy given to patients with lingual cancer - for total male and female, 11.5 per cent. of cases (male 11.3 per cent. and female 12.1 per cent.). Of the rest, there are 73 patients who were treated by some form of X-ray irradiation not specified in the case histories, and the remainder were treated by SXRT, or a combination of MVT and DXRT, or by implant combined with some form of X-ray irradiation. These are not significant because of the small number of cases in each instance. DXRT, Cobalt 60, and MVT are all external beams and the choice is probably dictated by availability of machines.

From a review of the literature, the advocates of radiotherapy in the treatment of patients with primary cancer of the tongue include Windeyer,⁴⁰⁸ Cade and Lee,⁶¹ Sharp and Spickerman,³⁴⁶ and Ash and Millar.¹⁰

The use of implants in treating lesions involving the anterior two-thirds of the tongue are favoured by Windeyer⁴⁰⁸ and Cade and Lee.⁶¹ They indicate that for cancer of the posterior part of the tongue, teletherapy is used, and where external radiation is indicated, supervoltage X-rays are used. The advocates of surgery in the treatment of this disease include Lyall and Schetlin,¹⁷² Rahausen and Sayago,²⁸¹ and Thoma.³⁶⁸ Ariel³ indicates that there are tumours

involving the tongue that are best treated exclusively by surgery, exclusively by irradiation, or by a combination of radiological and surgical methods.

The consensus of opinion is that surgery is in preference to radiotherapy in the treatment of lymph node metastases in patients with this disease.^{61, 78, 172, 281, 408} Martin, Munster and Sugarbaker²⁰¹ indicate that both surgery and irradiation are valuable in the management of cervical glandular metastases. In the present Australian study, for tongue total, of the 202 patients with metastatic lymph node involvement in which treatment was given, surgery was used in 69.3 per cent. of the cases and radiotherapy in 30.7 per cent. of cases (Table 95). In 35 patients with cancer of the posterior one-third (base) of the tongue and who had metastases, radiotherapy was used to treat the secondaries in 62.9 per cent. of cases and surgery in 37.1 per cent. of cases. On the other hand, in 32 patients with malignancy involving the anterior two-thirds of the tongue and who had cervical metastases, surgery was used to treat the secondary disease in 62.5 per cent. of cases and radiotherapy in 37.5 per cent. of cases. In the group of 135 patients with the disease in which the part of the tongue involved is not specified and who had secondaries in the cervical lymph nodes, 79.3 per cent.

TABLE 95

CANCER OF THE TONGUE IN AUSTRALIA.
TREATMENT TO METASTASES

SITE	Tongue, Post* 1/3RD (Base)		Tongue Ant* 2/3rd		Tongue Part Unspecified		Tongue, Total	
TYPE OF TREATMENT TO SECONDARY	No*	%	No*	%	No*	%	No*	%
RADIOTHERAPY	22	62.9	12	37.5	28	20.7	62	30.7
SURGERY	13	37.1	20	62.5	107	79.3	140	69.3
TOTAL	35	100.0	32	100.0	135	100.0	202	100.0

received surgery and 20.7 per cent. received radio-therapy to the metastatic nodes.

PROGNOSIS

Table 96 shows the prognosis of patients with cancer of the tongue. For tongue total, the crude cumulative five year survival rate for 479 male patients is 24.9 per cent. and that for 212 female patients is 33.7 per cent. The corresponding relative five year survival ratios for male and female are 0.324 and 0.426 respectively, indicating a better five year survivals in the group of female patients.

When the crude cumulative five year survival rate for 113 male patients with cancer of the base of the tongue is compared with that for 60 male patients with malignancy involving the anterior two-thirds of the tongue, there is a big difference in the survival rates for the two groups - 13.4 per cent. for the former group of patients and 37.9 per cent. for the latter group of patients, and the respective relative five year survival ratios are 0.172 and 0.494, reflecting a definite better five year survivals for patients with cancer of the anterior two-thirds of the tongue as compared with those with lesions involving the posterior one-third of the tongue. The two groups of female patients with malignancy of the base of the

TABLE 96

CANCER OF THE TONGUE 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
TONGUE, TOTAL	479	212	24.9	33.7	68.2	79.1	0.324	0.426
TONGUE, POST. 1/3RD. (BASE)	113	*	13.4	-	77.6	-	0.172	.. -
TONGUE, ANT. 2/3RD.	60	*	37.9	-	76.8	-	0.494	.. -
TONGUE, PART UNSPECIFIED	302	149	28.4	37.1	76.6	77.2	0.371	0.481
TONGUE, TOTAL - PATIENTS TREATED BY RADIOTHERAPY	333	146	22.9	32.2	76.3	79.6	0.300	0.404
TONGUE, TOTAL - PATIENTS TREATED BY SURGERY	72	43	47.2	47.6	79.0	79.1	0.597	0.602

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

tongue and the anterior two-thirds of this organ are too small for the calculation of an accurate five year survival rate.

In the group of 302 male patients in which the specific site of the tongue involved is not known from the case histories, the crude cumulative five year survival rate is 28.4 per cent. as compared to a crude cumulative five year survival rate of 37.1 per cent. in a similar group of 149 female patients. The relative five year survival ratios are 0.371 for male patients and 0.481 for female patients, indicating a better five year survival in the women patients.

An attempt is made to compare the five year survival rate of patients treated by radiotherapy and that of those treated by surgery. The crude cumulative five year survival rate for patients who had surgery (male 47.2 per cent. and female 47.6 per cent.) appears to be better than that for those who received radiotherapy (male 22.9 per cent., and female 32.2 per cent. - these five year survival rates are higher than the 20 per cent. five year survival rate reported by Nelson²³³ in 1955 for 100 patients treated by radium and radon implants in the Radiotherapy Department of the Royal Perth Hospital in Perth, Western Australia), and although the relative five year survival ratios

indicate that the five year survivals are better in those patients treated by surgery, no specific conclusions can really be drawn concerning the efficacy of surgery in comparison to radiotherapy, because there are a number of factors which can influence the five year survival rate and, of these, two are known in the present study -

1. In the group of patients who received radiotherapy treatment, there are slightly more patients with cancer of the posterior one-third of the tongue and, since, such patients have a rather poor prognosis, this tends to lower the overall five year survival rate of the group treated by radiotherapy.

2. In the present study, of 47 patients who were given only palliative therapy because of too advanced cancer, 44 received radiotherapy for palliation and since all these are terminal cases, the overall five year survival rate in the group treated by radiotherapy would be definitely lowered.

Two other important factors which have a marked influence on the prognosis are the presence of metastasis and the extensive involvement of adjacent structures by the disease - these tend to lower the five year survival rate.

From a review of the literature, the five year

survival rate of patients with cancer of the tongue as reported by overseas investigators are as follows:

	<u>Year</u>	<u>Total No. of cases</u>	<u>5 year Survival %</u>	<u>Remarks</u>
MARTIN, MUNSTER and SUGARBAKER ²⁰⁴	1940	556	25.0	Radiotherapy and Surgery
SHARP and SPICKERMAN ³⁴⁶	1947	81	31.3	Mainly radiotherapy
WINDEYER ⁴⁰⁸	1950	279	21.3	Mainly radiotherapy
BERVEN ³⁵	1950	178	15.2	Radiotherapy
LYALL and SCHETLIN ¹⁷²	1952	76	38.1	Mainly surgery
RAHAUSEN and SAYAGO ²⁸¹	1954	113	8.1	Radiotherapy and surgery
ASH and MILLAR ¹⁰	1955	394	27.3	Radiotherapy
CADE and LEE ⁶¹	1957	518	24.0	Mainly radiotherapy
PAYMASTER and SHROFF ²⁴⁴	1958	520*	25.0	Radiotherapy
VOUTILAINEN and TUOVINEN ³⁸¹	1960	137	41.0	Electrocoagulation, surgery, and radiotherapy
FRAZELL and LUCAS ⁹⁶	1960	1383	30.0	Radiotherapy and surgery
UENO et al. ³⁷³	1964	74	27.5	Radiotherapy and surgery

*All lesions sited on posterior one-third of tongue.

CANCER OF THE SALIVARY GLAND IN AUSTRALIA

CANCER OF THE MAJOR SALIVARY GLAND

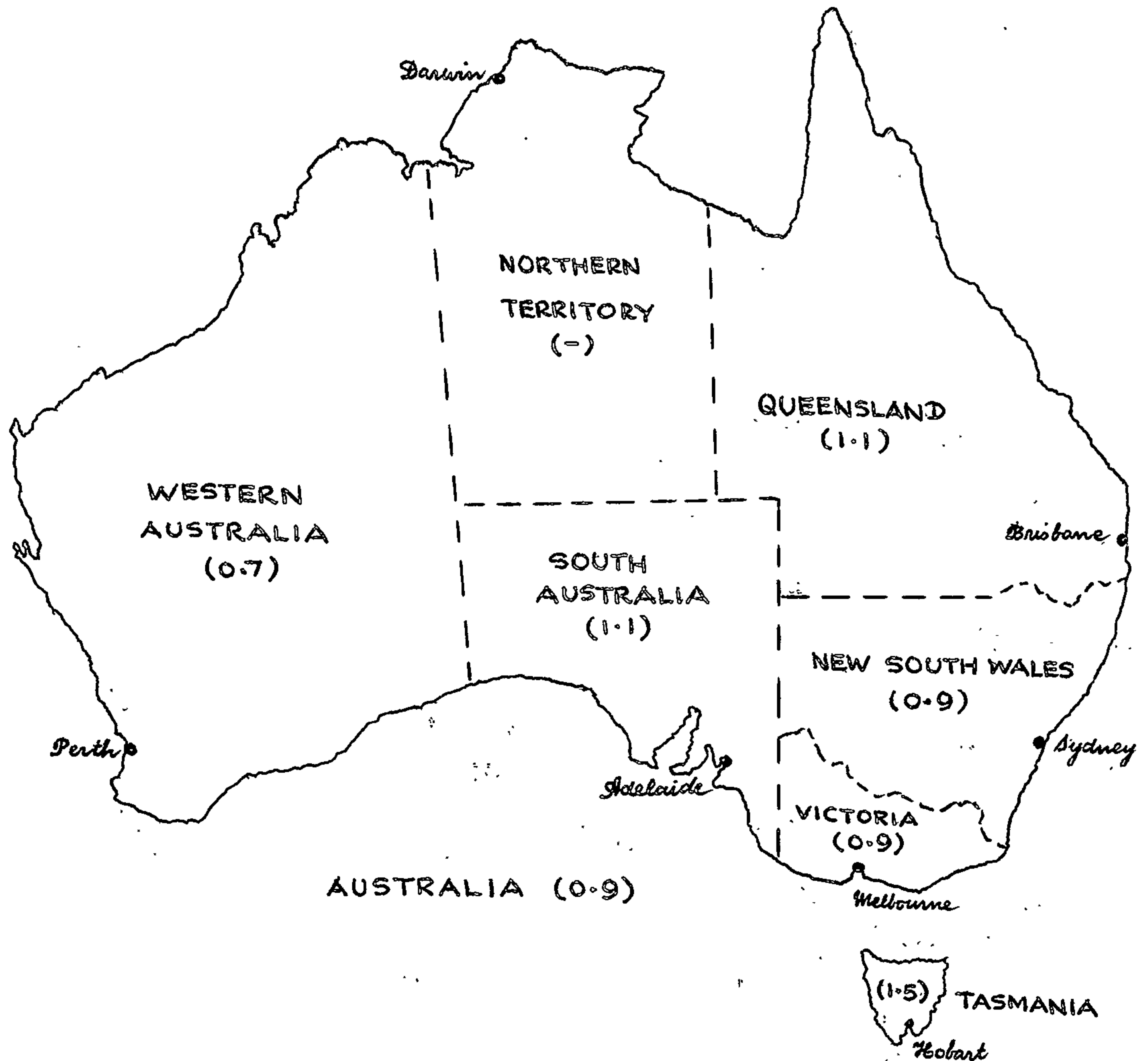
GENERAL INCIDENCE

Over the six year period from 1959 to 1964 inclusive, there are 603 patients with cancer of the salivary gland registered in the major hospitals around Australia. (Table 59). Except for the year 1960, which has the greatest number of cases (123), there appears to be a gradual decrease in the number of new cases registered over the years - from 116 in 1959 to 86 in 1964. This trend is observed in both sexes, but the decrease is more consistent and marked in male than in female. The corresponding rates per 100,000 population for patients with this disease in the different years are contained in Table 61. For male and female total, a rate of 1.2 per 100,000 is observed in 1959 and 1960, after which a steady rate of 0.8 per 100,000 is maintained in the other years, except in 1962 (1.0 per 100,000). When male and female are considered separately, for female, the rate in 1959 is 1.1 per 100,000 and this drops to 0.6 in 1963, with an increase to 0.9 per 100,000 in 1964. For male, the rates in 1959 and 1960 are 1.2 and 1.4 per 100,000 respectively, after which it is maintained at about 1.0 per 100,000 for the next three years,

with a drop to 0.7 in 1964. For Australia as a whole, the rates for male and for female are about the same, 1.0 and 0.9 per 100,000 population respectively.

In Table 62 is seen the number of patients with malignancy of the major salivary gland registered in the different states. For male and female total, New South Wales has the largest number of patients with this disease, 227 cases, and is followed by Victoria with 155 cases, then Queensland with 96 cases, South Australia 65 cases, Tasmania 31 cases, and Western Australia 29 cases. Except for South Australia and Tasmania, in which there are slightly more women than men in the series, in the other states, there is a preponderance of men although in most instances the differences are not great. The rates per 100,000 population for patients with malignancy of the salivary gland in the different states are contained in Table 64. For male and female total, Tasmania has a rate of 1.5 per 100,000, Queensland and South Australia 1.1, New South Wales and Victoria 0.9, and Western Australia 0.7. When male and female are considered separately, for male, Queensland and New South Wales have a rate of 1.2 and 1.1 per 100,000 respectively, South Australia and Tasmania have the

FIGURE 11



() INDICATES RATE PER 100,000 POPULATION PER YEAR

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

same rate, 1.0 per 100,000, whereas in Victoria the rate is 0.9, and in Western Australia 0.7. For female; Tasmania has a rate of 1.9 per 100,000, South Australia 1.3, Queensland 0.9, New South Wales and Victoria 0.8, and Western Australia 0.6.

According to the present study, for Australia, cancer of the salivary gland comprises about 10.5 per cent. of all oral malignancy (International Classification Numbers 140-144, and 191.0). This closely parallels the findings of Frazell¹⁰¹ and Lucas¹²⁰ who indicate that cancer of the major salivary glands comprises approximately 10 per cent. of all cancers involving the intraoral and neighbouring structures. For the different states in Australia, this figure for New South Wales is 15.3 per cent., South Australia 12.2 per cent., Tasmania 11.1 per cent., Victoria 9.9 per cent., Queensland 7.2 per cent., and Western Australia 5.2 per cent. (Table 62). The relatively higher figure obtained for New South Wales is undoubtedly partly influenced by the lower percentage of lip cancer in this state, due to an under reporting of cases.

SEX INCIDENCE

Of 597 patients with malignancy of the salivary gland, there are 325 men and 272 women, giving

a male to female ratio of 1.2:1 (Table 97). When individual paired salivary glands are being considered, this ratio is duplicated in the parotid glands (54.6 per cent. men, and 45.4 per cent. women of 296 cases), the submaxillary glands (52.8 per cent. men, and 47.2 per cent. women of 53 cases), and the sublingual glands (50 per cent. men, and 50 per cent. women of two cases), the number of men with the disease is slightly more than women or is the same. This is in accord with the findings of Frazell¹⁰¹ - parotid gland: 51.7 per cent. men, and 48.3 per cent. female of 269 cases, submaxillary gland: 51.6 per cent. men, and 48.4 per cent. women of 60 cases, and sublingual glands: 50 per cent. men, and 50 per cent. women of 4 cases. Similar findings of a slightly higher male incidence of the disease are noted by Ariel⁴ and Smith.³³²

When the histological type of malignancy in these glands is co-ordinated with the sex of the patients, there is a slight predominance of female in the group with histologic salivary gland type tumours (212 women, and 185 men), whereas in the group with squamous cell carcinoma, there are more men (36 cases) than women (15 cases). This is in accord with the findings of Frazell.¹⁰¹

TABLE 97

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

SEX	MALE		FEMALE		MALE and FEMALE TOTAL	MALE to FEMALE RATIO
SITE	No.	%	No.	%		
PAROTID SALIVARY GLAND	296	54.6	246	45.4	542	1.2:1
SUBLINGUAL SALIVARY GLAND	1	50.0	1	50.0	2	1:1
SUBMAXILLARY SALIVARY GLAND	28	52.8	25	47.2	53	1.1:1
MAJOR SALIVARY GLAND, TOTAL	325	54.4	272	45.6	597	1.2:1

AGE INCIDENCE

The average age of 326 male patients (age range, 13 years to 93 years) with cancer of the major salivary gland is 55.2 years and that for 271 female patients (age range, 14 years to 90 years) is 53.6 years, whereas for male and female together (597 cases), the average age is 54.7 years (Table 67). This closely parallels the findings of Marshall and Miles²¹⁷ (average age, 54.4 years for 24 cases) and Smith³³² (average age, 56 years for 62 patients). In the present series, the median age for the group of male patients is 56.4 years and that for female patients is 55.0 years, whereas for male and female patients together, this is 55.7 years.

When the histologic type of the lesion is co-ordinated with age, the average age and median age for patients with squamous cell carcinoma are much higher than that for those with histologic salivary gland type of malignancy. Of 185 male patients with the latter histologic type of tumours, the average age is 51 years (median age, 51.1 years) and that for 212 female patients is 51.9 years (median age, 51.1 years), whereas for male and female total (397 cases), the average age is 51 years (median age 51.1 years). In contrast, for 36 male patients with

squamous cell carcinoma, the average age is 61.3 years (median age, 62.5 years) and that for 15 female patients is 71.8 years (median age, 76 years), whereas for male and female together (51 cases), the average age is 64.4 years (median age, 67.9 years).

When age is related to the different major salivary glands involved, for 291 male patients with cancer of the parotid gland, the average age is 54.2 years (median age, 54.8 years) and that for 244 female patients is 53.6 years (median age, 55 years), whereas for male and female total (535 cases), this is 53.9 years (median age, 55 yrs.). For 25 female patients with malignancy of the submaxillary salivary gland, the average age is 53.7 years. In contrast, a much higher average age of 63.9 years (median age, 66.7 years) is obtained for 28 male patients with malignant involvement of this gland. This is apparently due to a greater percentage of patients with squamous cell carcinoma than with histologic salivary gland type of malignancy in the group. For male and female total (53 cases), the average age of patients with cancer of the submaxillary salivary gland is 59.1 years (median age, 62.5 years). In the two patients with malignancy of the sublingual salivary gland, one is aged 55.4 years and the other 51.3 years old.