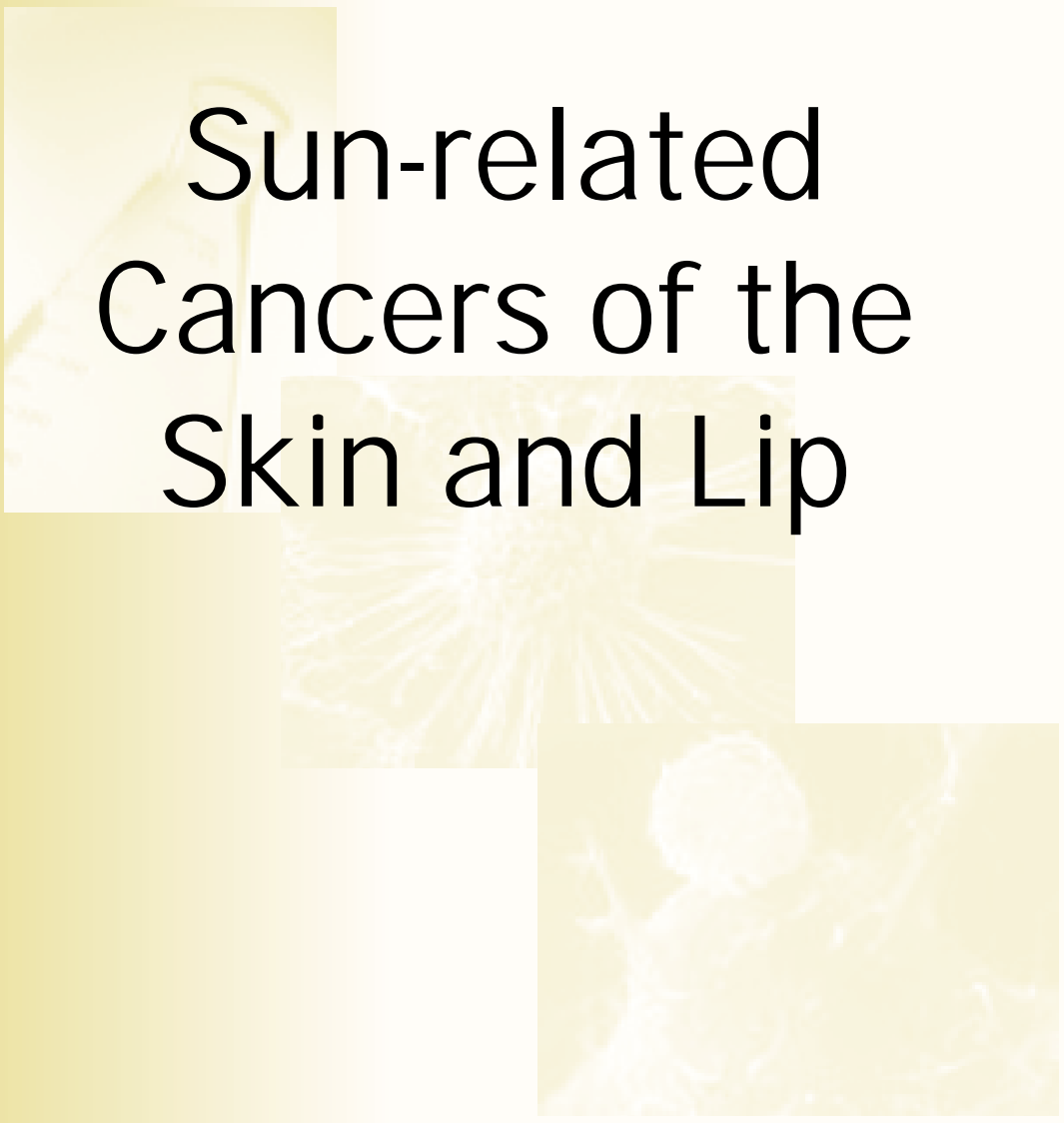


South Australian Cancer Statistics

Monograph No 2



Sun-related
Cancers of the
Skin and Lip

PREFACE TO

SUN-RELATED CANCERS OF THE SKIN & LIP

Our second monograph in the 'information series' addresses sun-related cancers of the skin and lip.

Australia has higher rates of these cancers than any other region of the world. In fact, each year, about 23,400 South Australians would be diagnosed with one or more sun-related cancers.

Melanoma is responsible for three quarters of the deaths from these cancers and often affects younger people.

Prevention and early detection are currently the best control measures available, as with many cancers.

Once again, principal author Dr David Roder has used publicly available data sources, listed in Appendix A, for the analyses presented in this volume.

Suggestions for future monograph topics would be welcome.



KERRY KIRKE
Executive Director
January 2002

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Assistance with editorial and readability matters was provided by: Kerri Beckmann, Peta Conor, Ellen Kerrins, Barbara Kirke, Cecilia Owens and Clara Tait.

ACKNOWLEDGEMENTS

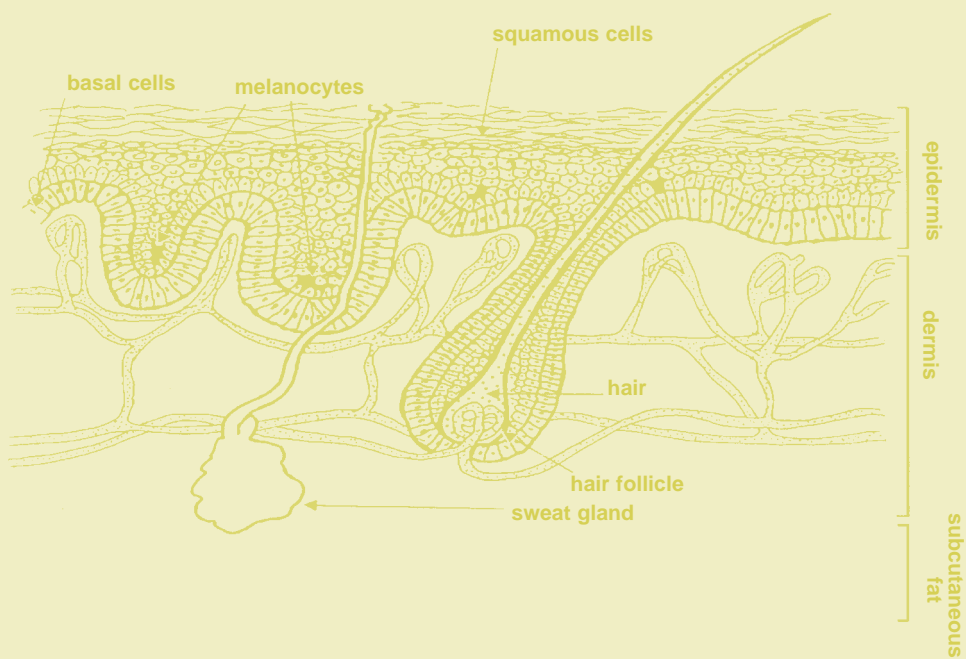
The South Australian cancer data presented in this monograph were extracted from annual reports published by the SA Cancer Registry, Department of Human Services, for the 1977-2000 period. The Foundation is indebted to the Registry for the collection and publication of these data. They appear in the text and in Figures 1-5, 8-17, and 21-25.

The Foundation also is indebted to: the Australian Institute of Health and Welfare for the provision of cancer registry data for other Australian States and Territories; the researchers cited in references 11, 13 and 25 (Appendix A) for Australian survey data on non-melanoma skin cancers; and the International Association for Research on Cancer and the International Association of Cancer Registries for cancer data for other countries around the world.

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What is happening and what can we do better?



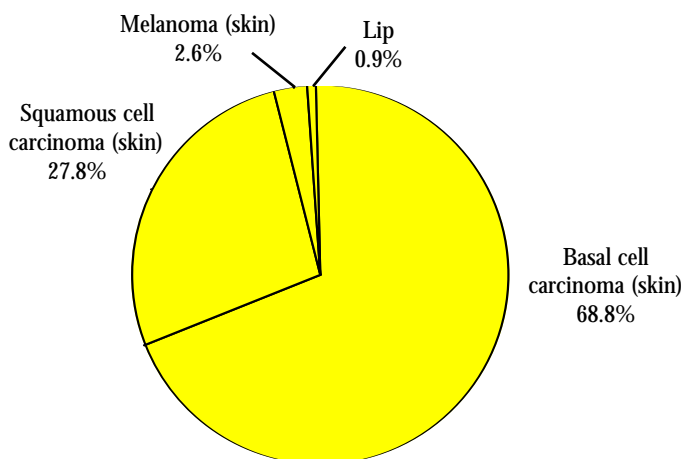
What is happening and what can we do better?

No other nation has recorded as high an incidence of skin and lip cancers as Australia. Over 1% of residents are treated for them annually. While the proportion of cases who survive these cancers is very high, these cancers are so common that substantial numbers of deaths still occur.

Sun exposure accounts for the great majority of cancers of the skin and lip. Lip cancers are mostly squamous cell carcinomas located on the outer "sun-exposed" border of the lower lip. They have a similar distribution in the population to non-melanoma skin cancers, particularly squamous cell carcinomas. Up to 90% of all skin and lip cancers are considered preventable through sun protection.

Each year, approximately 23,200 South Australians would be diagnosed with skin cancers. They would include about 16,100 with basal cell carcinomas, 6,500 with squamous cell carcinomas, and 600 with the more dangerous invasive melanomas. In addition, about 200 are diagnosed with lip cancers (Figure 1).

Figure 1: Estimated % of cancers by tumour type; South Australian sun-related cancers, circa 1996-2000



In addition, each year:

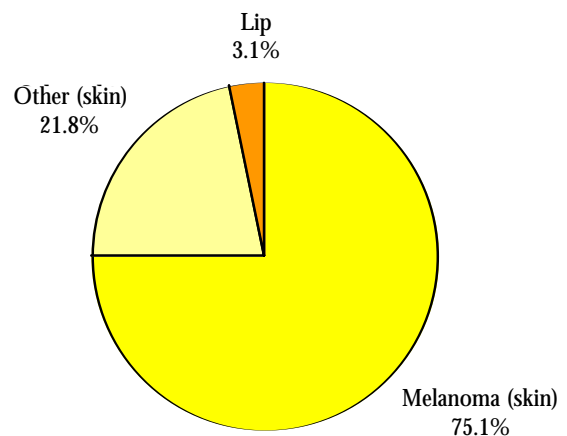
- About 90 South Australians die from cancers of the skin and lip. This accounts for approximately one in 35 cancer deaths.

- About 22 South Australians aged in their fifties or younger die from these cancers, accounting for one in 25 cancer deaths in this age range.

More males than females die from cancers of the skin and lip, the male-to-female ratio being 1.6 to one in South Australia.

Figure 2 shows that melanoma of the skin is responsible for approximately three quarters of these deaths.

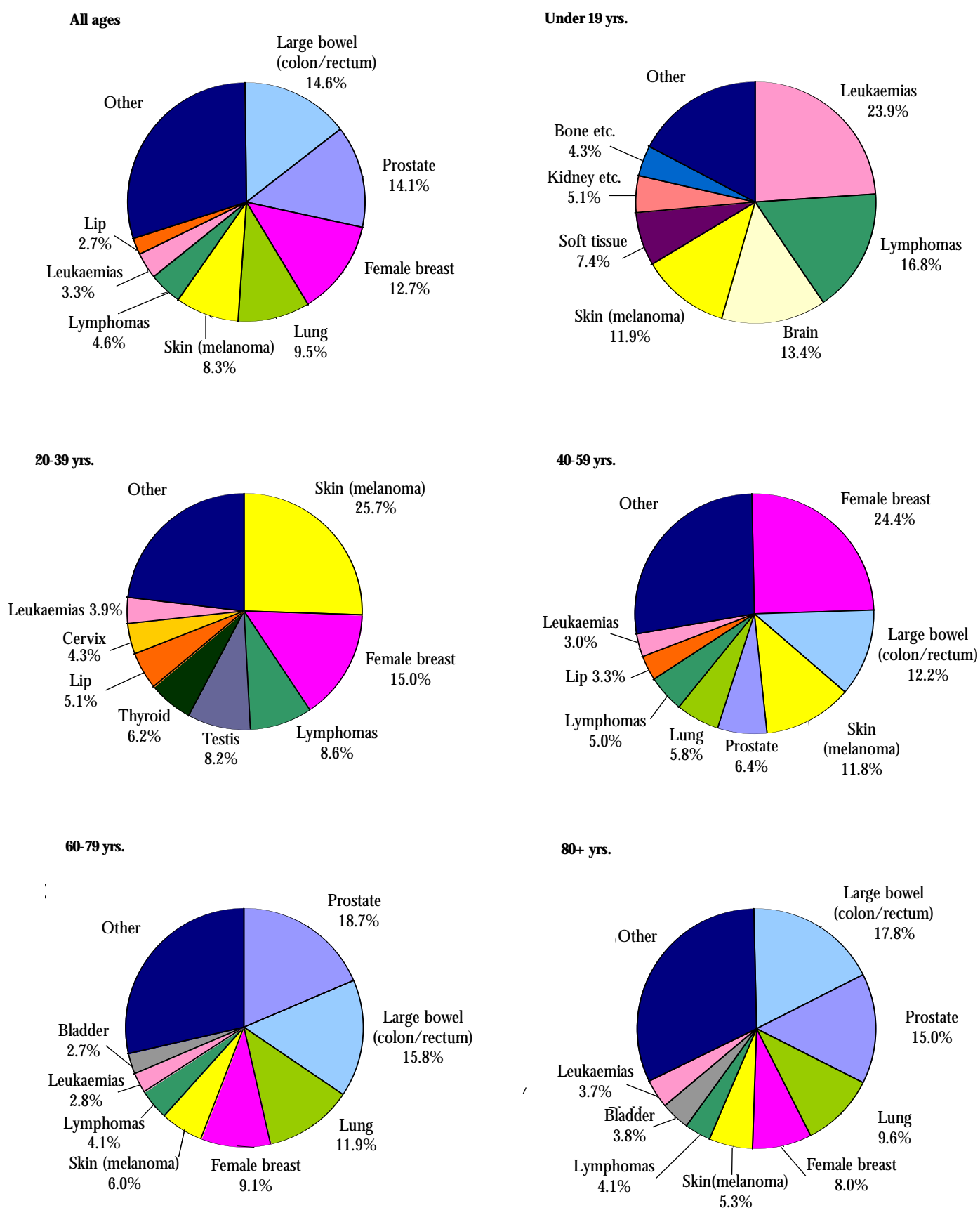
Figure 2: % cancer deaths by tumour type; South Australian sun-related cancers, circa 1996-2000



The relative incidence in South Australia of melanomas and lip cancers is shown in the context of other common cancers reported to the State Cancer Registry in Figure 3. Notably, melanomas are the most common cancers reported among 20-39 year olds.

While the incidence of skin and lip cancers has been increasing for many years in South Australia, there is evidence now that a plateau has been reached. This is likely a response to over 20 years of promoting sun protection.

Figure 3: % cancers by organ site for all ages combined and individual age categories; South Australia 1996-2000 (excluding non-melanoma skin cancers)



In addition, gains in case survivals have been recorded for the most dangerous of these cancers (invasive melanomas), such that approximately 93% of South Australians now survive these cancers five or more years from diagnosis. The gains would be mostly a result of earlier diagnosis brought about by the active promotion of early detection.

Deaths from sun-related cancers are avoidable through disease prevention and early diagnosis. More specifically, they could be largely eliminated through:

Prevention:

By avoiding sun exposure during periods of peak ultraviolet radiation (between 11am and 3pm during "daylight saving"), using shade, wearing protective clothing, applying SPF 30+ sunscreen to areas of the skin not covered by clothing, and using other means of sun protection.

Early diagnosis:

*By seeking medical advice promptly if a new or existing mole or freckle changes in colour, shape or size over a period of weeks or months; **or** there is persistence of another skin lesion or lump that is rough, dry, scaly, or prone to bleeding, or which develops a crust; **or** there is a sore that doesn't heal within a 4-6 week period.*

The data presented in this monograph have been drawn from the public documents listed in Appendix A.

What is happening and what can we do better?

No other region of the world has recorded as high an incidence of skin and lip cancers as Australia.

Sun exposure accounts for the great majority of these cancers.

Each year:

- **About 23,400 South Australians would be diagnosed with skin and lip cancers.**
- **About 90 South Australians die from these cancers.**
- **About 22 South Australians aged in their fifties or younger die from them.**

More males than females die from cancers of the skin and lip.

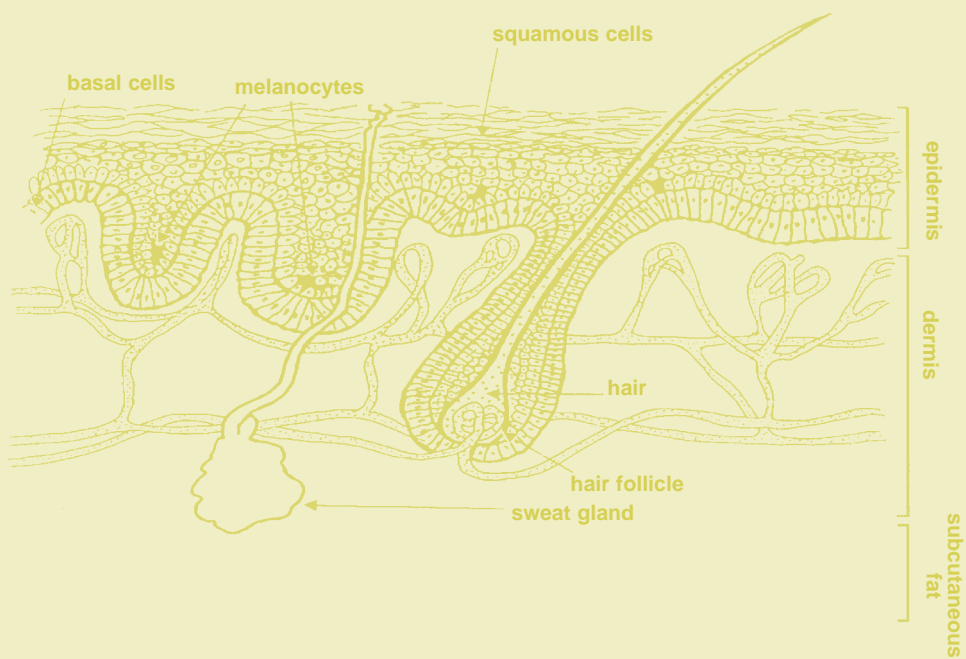
While the incidence of skin and lip cancers has been increasing for many years in South Australia, there is evidence now that a plateau has been reached.

In addition, gains in case survivals have been recorded for the most dangerous of these cancers (melanomas).

Deaths from skin and lip cancers are largely avoidable through:

- **Disease prevention.**
- **Early diagnosis.**

Melanomas



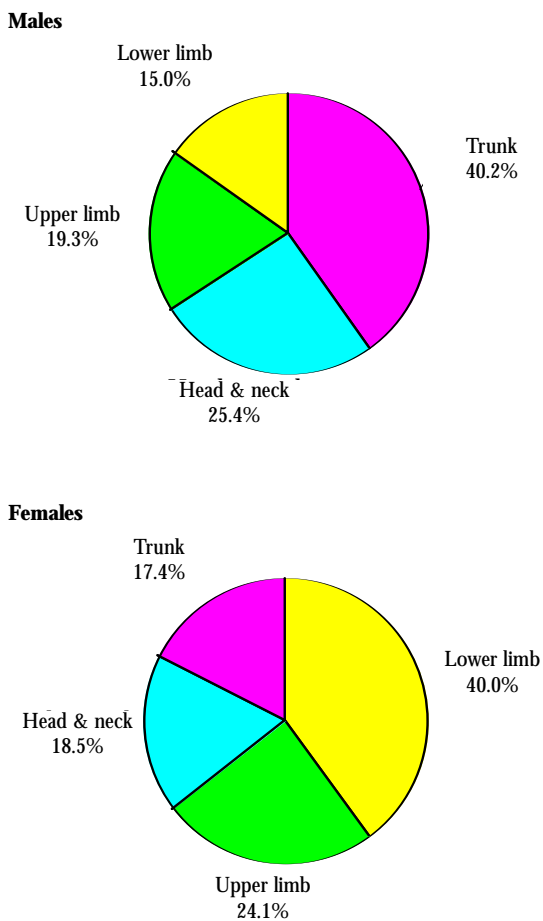
Introduction:

Melanomas of the skin are relatively common in South Australia. In the year 2000, they were the 3rd most common invasive cancer reported by the State Cancer Registry in females, and the 4th most commonly reported in males.

Melanomas develop from melanocytes, the cells in the skin that produce the pigment "melanin". While any skin surface can be affected, **the most common location in males is the trunk (40% of cases), and in females, the lower limbs (40% of cases) (Figure 4).**

Generally, melanomas present as a change in the colour, size and/or shape of a new or existing mole. The edges of the mole may become irregular, and ill-defined.

Figure 4: % melanomas by body site; South Australia 1977-2000



Risk factors:

- . A history of *excess chronic sun exposure, which may include small quick bursts.*
- . *Having a fair complexion and skin type that burns readily* when exposed to the sun. This often is associated with red hair, blue eyes, and freckling.
- . Having *multiple moles and atypical moles.*
- . *Living closer to the equator.*
- . *Being at an older age*, although melanomas are also common in young adults and can affect teenagers.
- . *Having a personal or family history of melanoma*, with multiple relatives affected on the same side of the family or with one or more affected first-degree relatives. This can be due to genetic inheritance, together with shared environmental risk factors (such as sun exposures). So far, inherited mutations in two genes have been discovered that confer risk in melanoma families.

Melanoma is largely a cancer of populations of European extraction.

Occurrence:

In South Australia:

From 1996 to 2000:

- . **An average of 607 South Australians were diagnosed with invasive melanoma annually.**
- . **An average 67 South Australians died from melanoma annually.**
- . About one in 46 cancer deaths were due to melanoma.

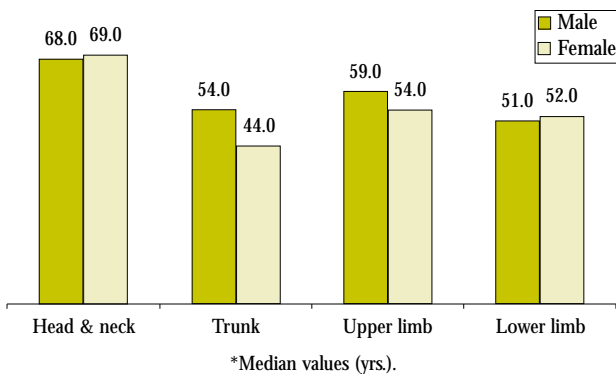
Similar numbers of males and females are diagnosed with melanoma, although the male-to-female incidence ratio varies with age. In the year 2000, the ratio was *0.8 to one* for people under 50 years (i.e., there was an excess in females), compared with *1.6 to one* for 50-69 year olds and *2.0 to one* for people aged 70 years or more. The higher incidence in

females in the younger age range is attributed to effects of sex hormones on cell division.

Melanomas, more than other cancers, affect the younger age groups. Almost 40% of South Australian cases are less than 50 years of age at diagnosis, whereas only 15% of all cancer cases recorded on the State Cancer Registry are diagnosed in this age range. Similarly, the proportion of melanoma deaths affecting individuals under 50 years of age (23%) is higher than the corresponding 8% for all cancers collectively. The average age at diagnosis is particularly low for trunk cases (*Figure 5*).

While invasive melanomas were the 5th most common cancers recorded by the State Cancer Registry during 1996-2000 for all ages collectively, they were the most common cancers recorded among 20-39 year olds, and the 3rd most commonly recorded among 40-59 year olds (*Figure 3*).

Figure 5: Average age at diagnosis of melanoma of the skin by affected body site; South Australia circa 1977-2000*

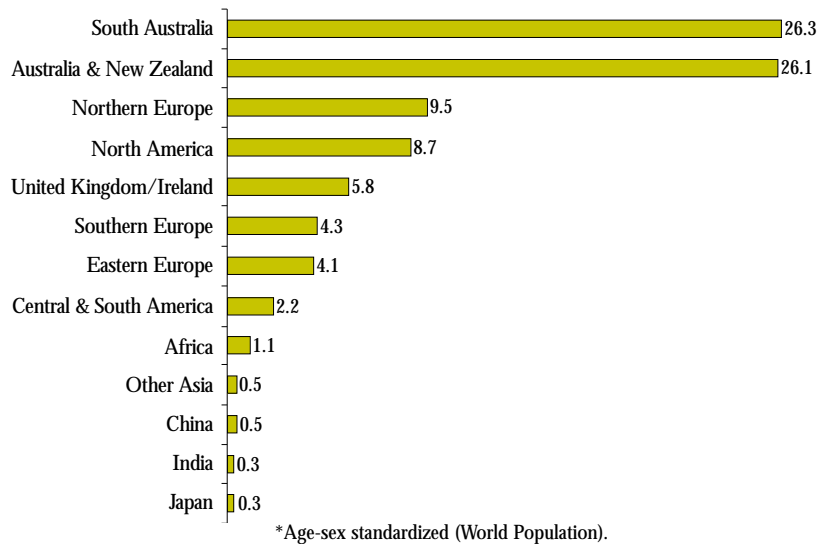


In the world:

Figure 6 shows that **South Australia, and Australia and New Zealand more generally, have a very high incidence of invasive melanoma by world standards.** Other European populations, or populations of European extraction, also have elevated rates, although much lower than for Australia and New Zealand. The positive geographic correlation between cancers of the lip and

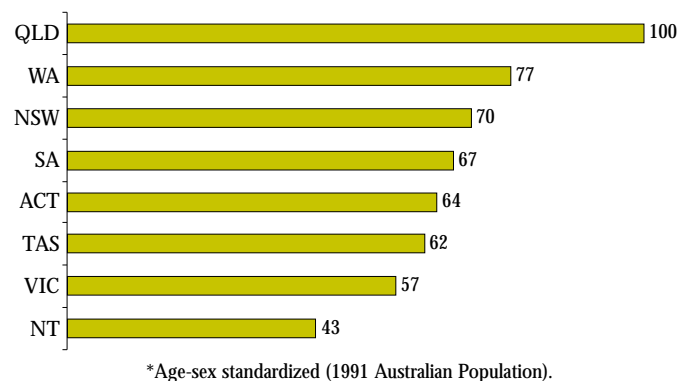
melanomas (Spearman $r=0.9$; $p=0.001$) points to a common risk factor (sun exposure).

Figure 6: Annual incidence of melanoma of the skin per 100,000, circa 1990*



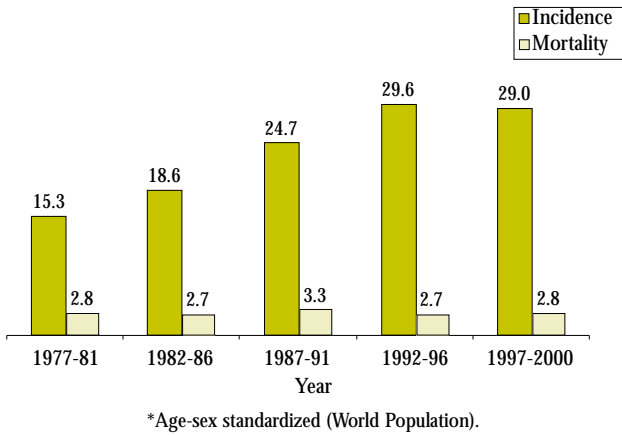
South Australia is middle-ranking within Australia in its melanoma incidence (*Figure 7*). Queensland has the highest incidence, which is consistent with its northerly location. While the Northern Territory is also located to the north of most major population centres, its incidence is low. This would be due - at least in part - to the relatively high proportion of its population comprising Aboriginal residents, who have a low susceptibility to melanoma.

Figure 7: Annual incidence of melanoma of the skin; Australia 1993-97*
Queensland rate set as the reference at "100"



Time trends:

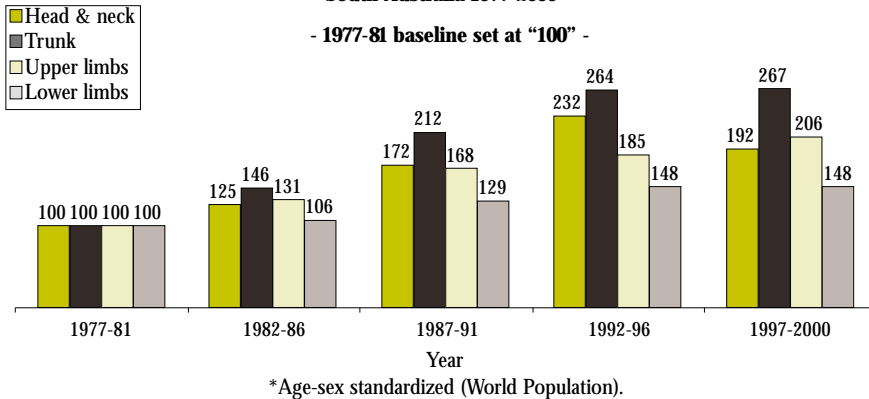
Figure 8: Annual incidence and mortality rates for melanoma of the skin per 100,000; South Australia 1977-2000*



The age-sex standardized incidence of melanoma almost doubled in South Australia between 1977-81 and 1992-96 (Figure 8). This equates with an average annual increase of 4.5%, which is similar to the increase reported for North American and several other populations of European extraction. It followed an average annual increase in age-sex standardized melanoma death rate of 4.6% in South Australia between 1953 and 1976, which also is attributed to an incidence increase.

No further increase in incidence was evident in South Australia, however, during 1992-2000 (Figure 8). It is plausible that after 20 years of promoting sun protection, preventive effects are showing, leading to an incidence "plateau". Hopefully, this will be followed by a decline as the scale of the impact increases.

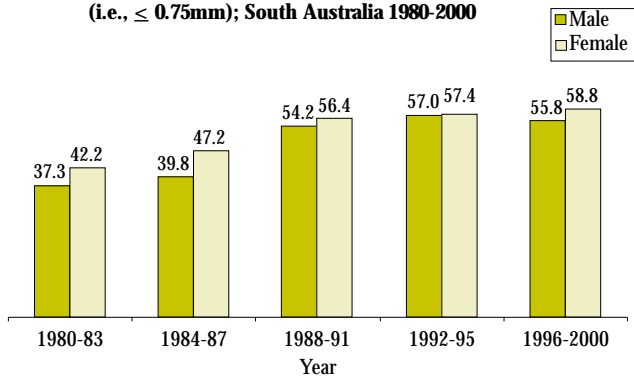
Figure 9: Annual incidence of melanoma of the skin per 100,000 by body site; South Australia 1977-2000*



As seen in other populations, **the increase in incidence was most pronounced for lesions on the trunk (Figure 9).** Nonetheless, an incidence "plateau" (or decline) was evident during 1992-2000 for all body areas, except the upper limbs.

The increases in incidence during 1977-96 mostly applied to superficial spreading melanomas, rather than to other melanomas (i.e., nodular or lentigo maligna varieties). A change in melanoma type towards a more innocuous variety has been suggested by some researchers, and held responsible - at least in part - for the stabilisation of melanoma death rates (Figure 8).

Figure 10: % melanomas of the skin diagnosed when thin (i.e., ≤ 0.75mm); South Australia 1980-2000



Melanoma mortality, unlike incidence, did not show an increase between 1977-81 and 1992-96 (Figure 8). It is plausible that earlier diagnosis, as evident from Figure 10, led to survival gains. Such gains would have had the effect of offsetting the incidence increase, leading to a stabilization of mortality rates. In addition, earlier diagnoses may have stopped the transformation of superficial spreading melanomas to the more dangerous nodular lesions (as believed to occur by some researchers).

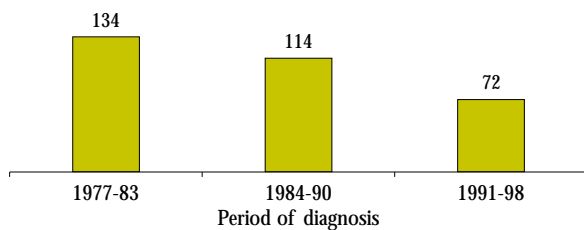
The stable mortality rate for all ages combined is reassuring, but it has masked an increase among older males. Between 1977-81 and 1987-91, the mortality rate in males aged 70 years and over approximately doubled, although it appeared to stabilize during 1992-99. This sub-group has been a priority target of early-detection campaigns.

By comparison, during 1977-99, mortality rates reduced in younger South Australians. Specifically, the mortality rate reduced by 17% in the age range under 70 years.

Case outcomes:

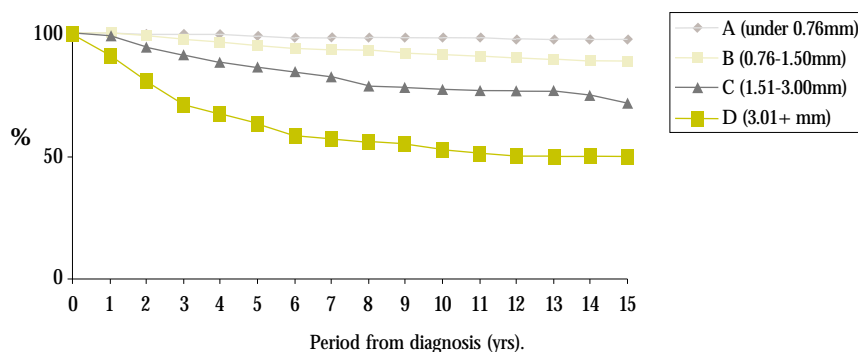
The proportion of South Australians dying from invasive melanoma of the skin within five years of diagnosis decreased from 13.4% for the 1977-83 diagnostic period to 11.4% for 1984-90 and 7.2% for 1991-98 (Figure 11).

Figure 11: Numbers per 1,000 cases dying from melanoma of the skin within five years of diagnosis; South Australia 1977-98*



*Date of censoring: December 31st, 1998.

Figure 12: Case survivals (%) from invasive melanoma of the skin by thickness of lesion at diagnosis; South Australia 1977-98



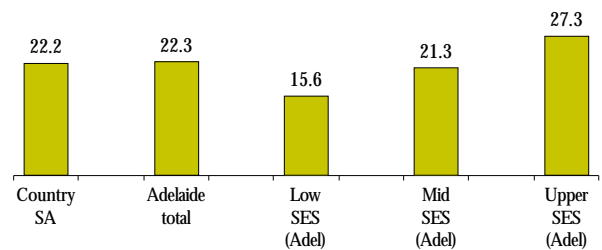
This reduction in deaths mostly has been attributed to earlier diagnosis. Surgery remains the mainstay of treatment, although adjuvant chemotherapy, radiation therapy and more recently, immunotherapy have been used.

Figure 12 shows the differences in percentages of South Australians surviving invasive melanomas by period from diagnosis, according to thickness of lesion at diagnosis. The differences in outcome are suggestive of the scale of benefit that might be achieved by earlier diagnosis.

Other trends:

Melanoma is observed in most countries to be more common in upper socio-economic groups. This has been attributed to indoor life-styles that are interspersed with intermittent acute sun exposures. A similar gradient applies in South Australia (Figure 13).

Figure 13: Annual incidence of melanoma of the skin per 100,000 by residential area; South Australia 1977-96*



*Age-sex standardized (World Population).

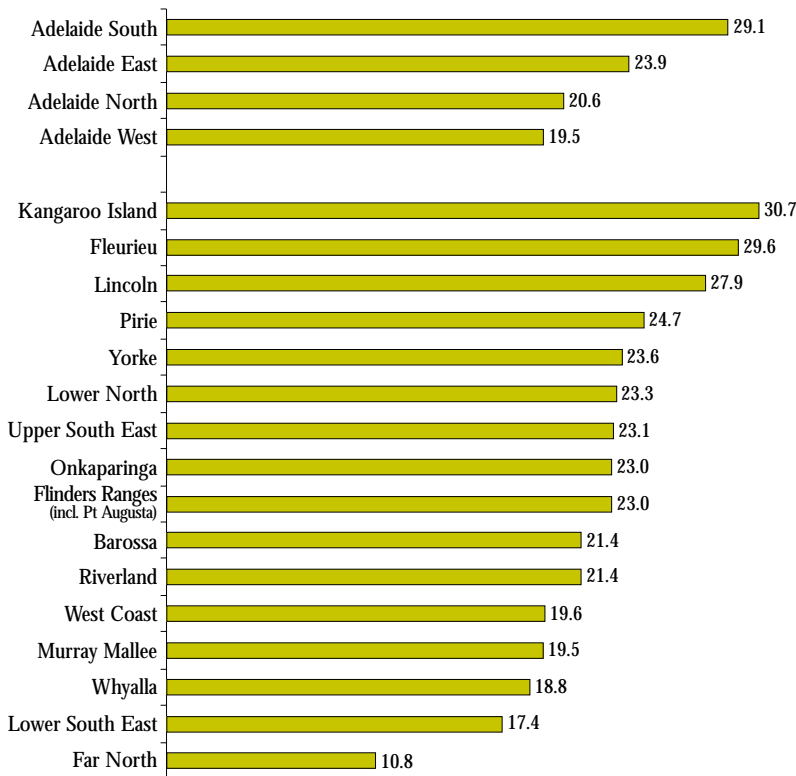
While the rate for males and females combined is similar in country South Australia to the Adelaide rate, this masks a difference by sex with males having a lower country incidence, but females a lower Adelaide incidence. This highlights the complex aetiology of melanoma. Perhaps country males more than females tend to have chronic outdoor exposures. Country females, by comparison, may tend to work indoors and experience more intermittent recreational sun exposures.

Figure 14 shows that Adelaide incidence rates are elevated in the South. This applies in particular to seaside suburbs. Relatively affluent eastern suburbs also have a comparatively high incidence. In country areas, the highest rates present in Kangaroo Island, the Fleurieu Peninsula, and Lincoln, whereas rates are relatively low for Whyalla, the Lower South East, and the Far North. The low incidence in the Far North is noteworthy. It probably was affected by a low susceptibility to this disease among Aboriginal residents.

Occupational data for South Australia show an elevation in melanoma incidence in farmers and graziers, and in medical practitioners, mechanical engineers, military personnel and clerical workers. By comparison, rates have been low among labourers, storemen and packers, metal workers, and the unemployed.

The elevated rates for farmers and military personnel probably reflect high outdoor occupational exposures, whereas the high rates for

Figure 14: Annual incidence of melanoma of the skin per 100,000 by residential region; South Australia 1977-2000*



*Age-sex standardized (World Population).

Figure 15: % melanomas of the skin diagnosed when thin (i.e., ≤ 0.75mm); South Australia 1980-98

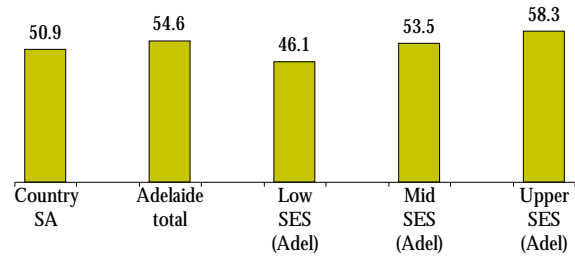
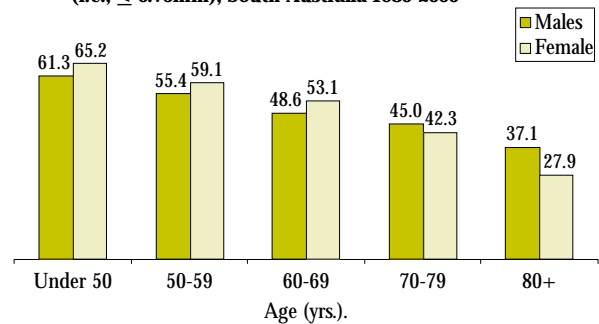


Figure 16: % melanomas of the skin diagnosed when thin (i.e., ≤ 0.75mm); South Australia 1980-2000



medical practitioners, mechanical engineers and (indoor) clerical workers may be due to intermittent recreational exposures.

In general, a higher proportion of melanomas are diagnosed early (when still thin) among Adelaide than country residents (Figure 15). A socio-economic gradient is evident, with melanomas being found earlier in residents of the upper than lower socio-economic suburbs of Adelaide. In particular, diagnosis appears to be more delayed in the western suburbs.

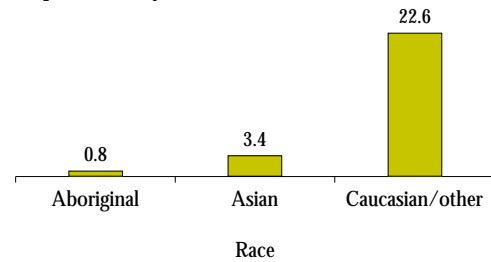
Delays in diagnosis have been evident in country areas, particularly among residents of the Fleurieu Peninsula, the West Coast, the Upper South East, and the Riverland.

Figure 16 shows that delays in diagnosis, as inferred from percentages of melanomas found when no longer thin, were more common in males than females for age groups under 70 years, whereas a reverse trend applied among older cases. The older the case, the lower was the percentage of lesions diagnosed when still thin.

The incidence of melanoma is very low in Aboriginal and Asian residents (Figure 17). This would partly reflect the protective effects of skin colouring. In addition, many Asian residents would have spent their childhood in other countries, avoiding exposure to the Australian sun. Also, cultural factors may apply in some instances that lead to a reduced exposure of Asian residents to the sun.

In general, **incidence rates are about two and a half times higher in the Australian-born than in residents born in other countries.** British-Irish migrants and (more so) residents born in Southern Europe have a low incidence. The earlier the age at

Figure 17: Annual incidence of melanoma of the skin per 100,000 by race; South Australia circa 1977-96*



*Age-sex standardized (World Population).

which people migrate to high-risk countries like Australia, the higher their incidence rates become.

Melanomas

Melanomas of the skin are common in South Australia. The most common bodily location in males is the trunk (40% of cases), and in females, the lower limbs (40% of cases).

Generally, melanomas present as a change in the colour, size and/or shape of a new or existing mole.

In South Australia from 1996 to 2000:

- . **An average of 607 residents were diagnosed with invasive melanomas annually.**
- . **An average of 67 residents died from melanoma annually.**

Melanomas, more than most other cancers, affect the younger age groups.

South Australians, and Australians and New Zealanders more generally, have a very high incidence by world standards. Within Australia, South Australia is middle-ranking in its melanoma incidence.

The incidence of melanoma increased almost two-fold in South Australia between 1977-81 and 1992-96, but no further increase was evident during 1992-2000.

Melanoma mortality, unlike incidence, did not show an increase between 1977-81 and 1992-96.

The proportion of South Australians dying from invasive melanoma of the skin within five years of diagnosis decreased from 13.4% for the 1977-83

diagnostic period to 11.4% for the 1984-90 and 7.2% for 1991-98. This is mostly attributed to earlier diagnosis.

Melanoma is more common in upper socio-economic groups in most countries. Adelaide incidence rates are elevated in the South and in the relatively affluent eastern suburbs. In country areas, the highest rates have presented in Kangaroo Island, the Fleurieu Peninsula, and Lincoln.

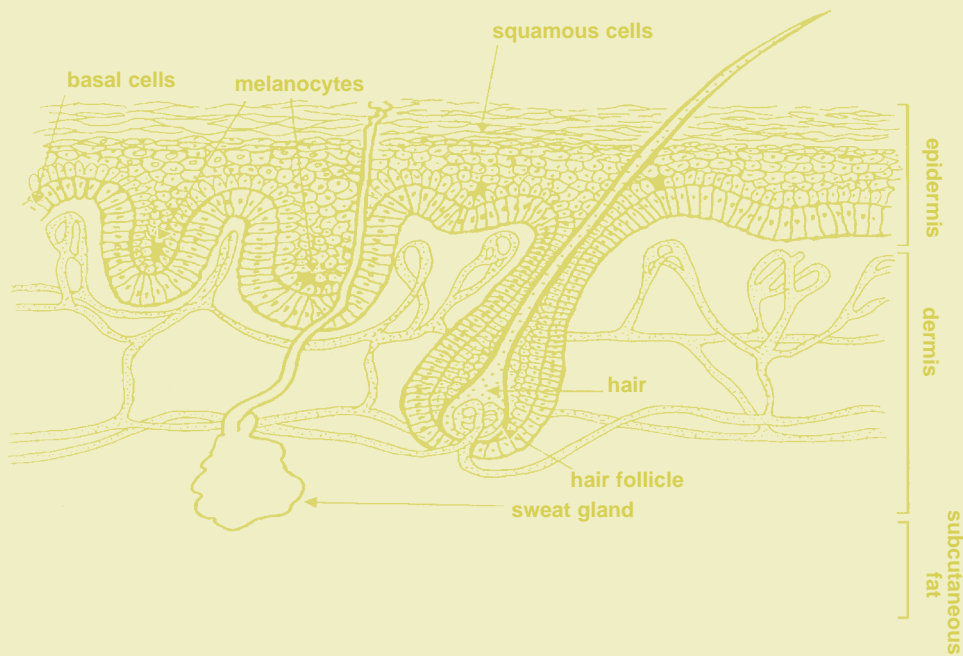
In general, a higher proportion of melanomas are diagnosed early (when still thin) among Adelaide than country residents. A socio-economic gradient is evident, with lesions being found earlier in residents of the upper than lower socio-economic suburbs of Adelaide.

Delays in diagnosis have been particularly evident in country areas among residents of the Fleurieu Peninsula, West Coast, Upper South East and Riverland.

In general, the more advanced the age, the lower is the percentage of lesions diagnosed when still thin.

The incidence of melanoma is about two and a half times higher in the Australian-born than among residents born in other countries. Aboriginal and Asian residents have a low incidence.

Non-melanoma skin cancers



Introduction:

These cancers comprise basal cell and squamous cell carcinomas, with a ratio of approximately 2.5 to one (*Figure 1*). Normally they occur on areas of the skin frequently exposed to the sun, such as the head and neck, arms and hands. **About 60% of Australian cancers of this type arise on the head and neck.**

They can present in many forms, sometimes as a small, smooth, shiny, pale or waxy lump, or alternatively as a firm red lump which may bleed or develop a crust. On other occasions, they appear as a persistent sore, or as a flat, red spot that is rough, dry and scaly.

Risk factors:

- . *Excess exposure to the sun* - the risk of these cancers increases with extent of cumulative exposure to the sun (i.e., to solar ultraviolet radiation). Chronic exposure is a risk factor for both basal cell and squamous cell carcinomas, whereas intermittent acute exposures also are thought to be important for basal cell lesions. Childhood exposure may be particularly hazardous, especially in relation to the latter lesions.
- . *Living closer to the equator.*
- . *Exposure to ultraviolet radiation sources other than the sun* - eg, solariums, sun lamps, welding, etc.
- . *A skin type that burns easily and rarely tans* - this often is associated with a fair complexion, fair or red hair, blue or light-coloured eyes, and a tendency to freckle, as often seen in people of Celtic origin.
- . *Evidence of precursor lesions, such as solar or other keratoses* (squamous cell carcinomas also may arise from tropical ulcers, burns and scars, and from other areas of chronic inflammation and infection).
- . *A genetic predisposition* - eg, as associated with xeroderma pigmentosa, albinism, dyskeratosis epidermolysis bullosa, dyskeratosis congenita, and nevoid basal carcinoma syndrome.
- . *Immunosuppression* - eg, as seen in kidney transplant patients.

- . Occupational exposures to inorganic arsenic, polycyclic hydrocarbons, and ionising radiation.
- . Potentially, exposures that increase skin sensitivity to the sun, such as the use of some medications.

Occurrence:

The incidence of non-melanoma skin cancers is exceptionally high among Australians, the white population of South Africa, and (less so) the Irish. Mostly they are cancers of populations of European extraction. Around 22,600 South Australians would acquire at least one of these cancers in a 12-month period. This is much higher than the corresponding number for other cancers in aggregate.

Skin cancers (predominantly non-melanoma lesions) have been reported to outnumber other forms of cancer in Australia by more than three to one. **Over 1% of Australians are treated for a non-melanoma skin cancer during a 12-month period.** Residents born in Australia have, on average, at least twice the risk experienced by British migrants, suggesting that childhood exposure is an important risk factor.

The male-to-female incidence ratio, as reported in 1985-95 Australian surveys, approximated 1.5 to one, with a higher ratio of *1.9 to one* applying for squamous cell carcinomas than the *1.4 to one* for basal cell lesions. The closer the place of residence to the equator, the higher was the incidence.

While virtually all cases survive their disease, **there were still close to 20 deaths from these cancers per annum in South Australia during 1995-99, with approximately two thirds of them affecting males.** The great majority occurred in elderly South Australians, although there were about two deaths per annum among residents in their fifties or younger.

While these cancers are rarely life threatening, they pose a major economic and health burden. A 1991-95 study showed that around 14% of hospital admissions for cancer in South Australia were due to these cancers, even though the great majority would have been treated on an outpatient basis.

South Australians are thought to be at a lower risk of getting these cancers than Australians living in more northerly latitudes. Their death rates from these cancers also are relatively low. For example, the age-standardized (World Population) rate for 1977-99 was about two thirds the national figure.

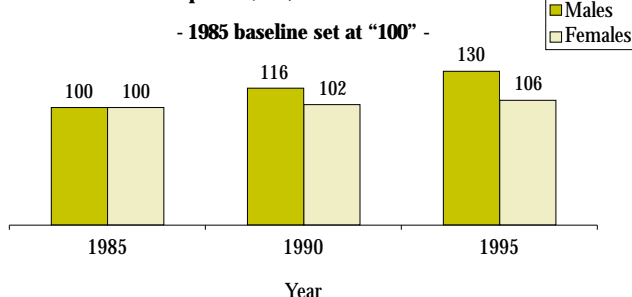
Solar keratoses, which are thought to lead to approximately 50% of squamous cell carcinomas of the skin, are also commonplace in Australia. They are rough, red or brown scaly patches on the skin, usually on sun-exposed areas, that affect up to 45% of people over 40 years of age. They also affect younger people, with the prevalence of this and related skin damage being reported 2-4 times more frequently in Australian than Scottish teenagers.

Time trends:

There was a 46% increase in age-standardized annual incidence of non-melanoma skin cancers among Australian males between 1985 and 1995. The corresponding increase was 20% for females. Time trends for basal cell and squamous cell carcinomas are indicated in *Figures 18 and 19*. Both cancers showed a larger increase in males than females. In general, the percentage increase was much more pronounced for squamous cell than basal cell lesions.

While an increase in incidence applied for squamous cell carcinomas in all age groups between 1985 and 1995, **the increase for basal cell lesions was confined to people aged 55 years and over.** The older the age, the greater was the increase. Meanwhile

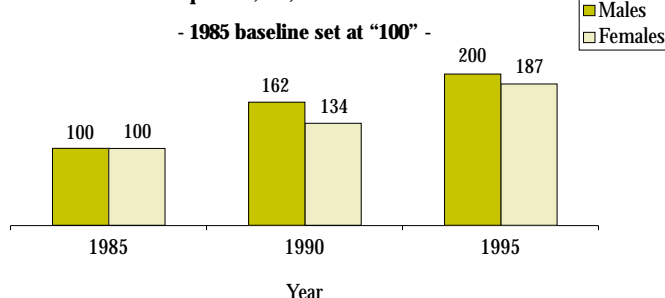
Figure 18: Annual incidence of basal cell carcinoma of the skin per 100,000; Australia 1985-95*



*Age-sex standardized (World Population).

Adapted from Staples, Marks and Giles (Appendix A).

Figure 19: Annual incidence of squamous cell carcinoma of the skin per 100,000; Australia 1985-95*



*Age-sex standardized (World Population).

Adapted from Staples, Marks and Giles (Appendix A).

the incidence of basal cell lesions decreased between 1985 and 1995 in people under 50 years of age, with the largest decreases applying at the younger end of the scale.

The decrease in incidence of basal cell carcinomas in the younger ages is attributed to over 20 years of promotion of sun protection. Older cases presumably retain high risks inherited from childhood sun exposures, such that effects of more recent sun-protection initiatives are less pronounced. Nonetheless, the reductions seen in the younger age groups hopefully are a cohort effect that will extend progressively into the older age groups as these people age.

While statistics specific to South Australia are not available from these surveys, it is likely that similar trends would apply here to those in Australia more generally.

Case outcomes:

The cure rate for non-melanoma skin cancers already exceeds 99%. Basal cell lesions normally are only locally invasive. While squamous cell lesions are more likely to metastasise to other parts of the body, this seldom occurs. With early detection, the survival from both types should be virtually 100%.

Treatment generally is by surgical excision. Sometimes curettage and electrodesiccation are preferred, or cryosurgery or laser therapy. Radiotherapy may be the treatment of choice, if surgical access is limited. Superficial cancers, and precancerous lesions like solar keratoses, sometimes are treated by chemotherapy (usually with fluorouracil (5-FU)).

Experimental research is being directed at new treatments, such as photodynamic therapy, and immunotherapy with interferon and/or other agents. By comparison, retinoids (Vitamin A derivatives) are being investigated as a means of preventing non-melanoma skin cancers, solar keratoses and keratoacanthomas.

Other:

While males are at a higher risk than females, and warrant special consideration in health-promotion initiatives, increased protection is required by both sexes. It is noteworthy that the reported incidence of basal cell carcinomas is higher for females than males in the age range under 40 years. The reasons for this require further investigation. It is interesting to observe that a similar difference by sex applies in the younger age groups for melanoma of the skin.

Non-melanoma skin cancers

These cancers comprise basal cell and squamous cell carcinomas. About 60% arise on the head and neck.

The incidence is exceptionally high in Australia. Around 22,600 members of the South Australian population would acquire at least one of these cancers in a 12-month period. Over 1% of Australians are treated for them in any one year.

The male-to-female incidence ratio, as reported in 1985-95, approximated 1.5 to one.

There were close to 20 deaths from these cancers per annum in South Australia during 1995-99, with approximately two thirds affecting males.

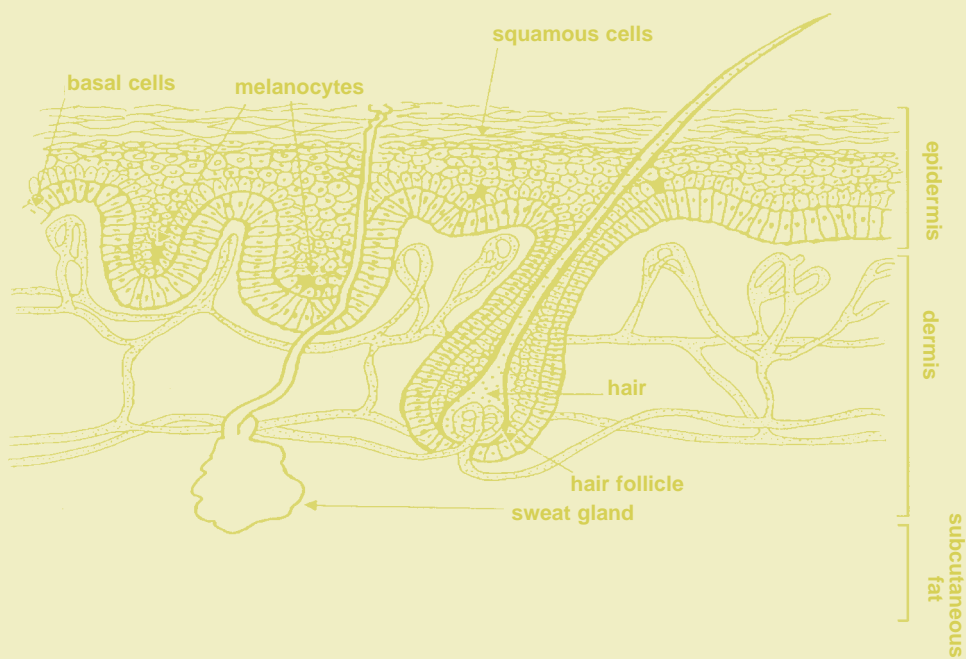
South Australians are thought to be at a lower risk than Australians living in the more northerly latitudes.

There was a 46% increase in annual incidence in Australian males between 1985 and 1995. The corresponding increase was 20% among females.

The increase for basal cell lesions was confined to people aged 55 years and over. Meanwhile, the incidence of basal cell lesions decreased between 1985 and 1995 in people under 50 years of age.

The cure rate for non-melanoma skin cancers exceeds 99%.

Lip cancers



Introduction:

These cancers are mostly located on the mucous membranes of the outer border (vermillion border) of the lower lip, often at the junction of the middle and outer third. Sometimes a raw area or sore persists for some months before the cancer is formed. Squamous cell carcinomas of the adjacent skin of the lip also are commonplace.

Risk factors:

- *Excess chronic exposure to the sun* - often there is associated solar keratosis (a scaly or crusty area or thickening of the mucous membrane or skin, resulting from chronic sun exposure), which may progress to a squamous cell carcinoma.
- *Outdoor occupations* - eg, farming, fishing and fruit growing.
- *A place of residence nearer to the equator.*
- *A fair complexion* and pre-disposition to sunburn.
- *Tobacco smoking*
- *Probably excesses in alcohol consumption* (for lip cancers originating inside the mouth).
- Possibly herpes simplex or other viral infections of the lip.

Sun exposure is the predominant risk factor for these cancers. This offers scope for prevention.

Occurrence:

In South Australia:

From 1996 to 2000:

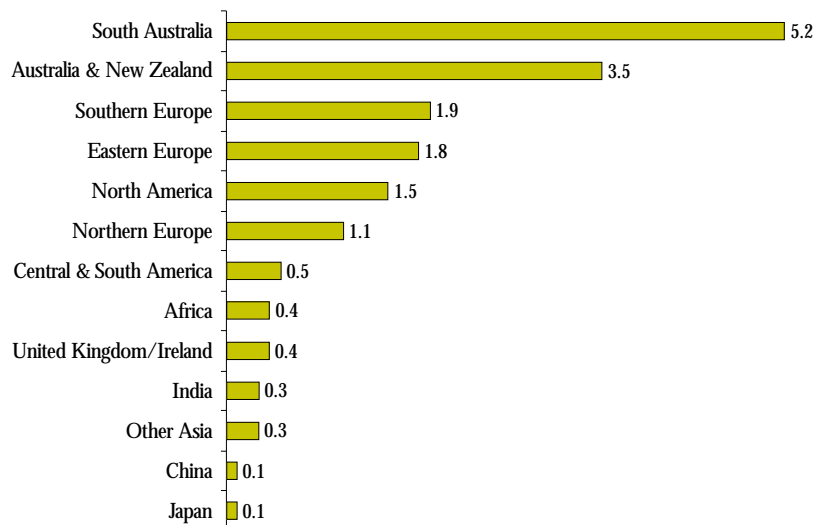
- **About 200 residents were diagnosed with a lip cancer each year.**
- **About three residents died from these cancers annually.**

Lip cancers accounted for almost 3% of all cancers recorded by the State Cancer Registry for 1996-2000, but only one in 1,111 cancer deaths. Only one death from lip cancer affected a resident under 60 years of age during that period. **Many more males than females get these cancers**, the ratio being about *3.1 to one* in South Australia.

In the world:

Cancers arising from mucous membranes of the lips (excluding cancers of the skin of the lips) are recorded by cancer registries in most regions of the world. **Figure 20 shows that Australia and New Zealand, and South Australia specifically, have a high incidence of these cancers by world standards.** European and North American rates also are relatively high, but they do not approach Australian and New Zealand levels.

Figure 20: Annual incidence of cancer of the mucous membranes of the lip per 100,000; circa 1990*



*Age-sex standardized (World Population).

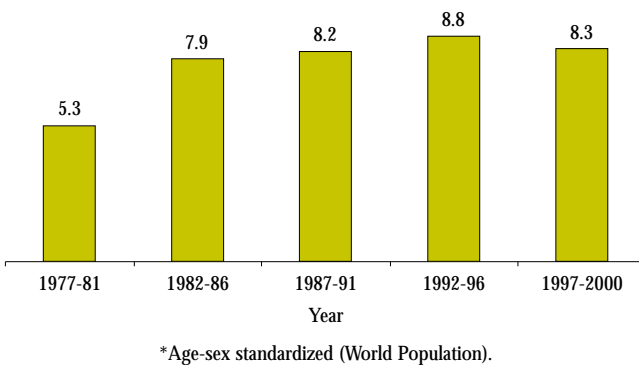
The higher incidence reported for South Australia than for Australia and New Zealand more generally circa 1990 was affected by differences in criteria used to differentiate lesions of the skin of the lip and mucous membranes. As a result, South Australia has assigned a higher proportion of these lesions to the mucous membranes.

Time trends:

An increase in age-sex standardized annual incidence was evident between 1977-81 and 1982-2000, but not a progressive increase within the latter period (Figure 21). In fact, a reduction in incidence has been recorded in some populations in recent decades. The plateau in South Australia, and the incidence decline in some other populations, are thought to be effects of sun-protection initiatives, and (less so) reduced tobacco smoking among males.

It is anticipated that the plateau in incidence in South Australia will be followed by a reduction, in response to continued sun-protection and (less so) tobacco-control initiatives.

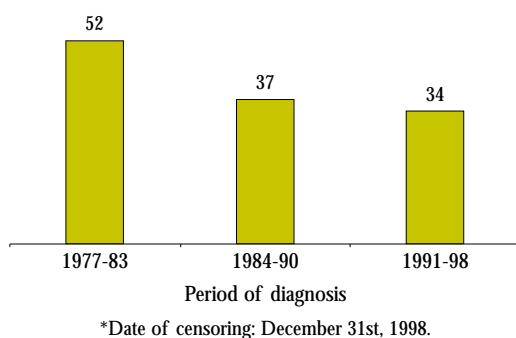
Figure 21: Annual incidence of lip cancer per 100,000; South Australia 1977-2000*



Case outcomes:

Case survivals are very high for these cancers. Of every 1,000 cases diagnosed in South Australia in 1977-83, 52 died of lip cancer in the five years

Figure 22: Numbers per 1,000 cases dying from lip cancer within five years of diagnosis; South Australia 1977-98*



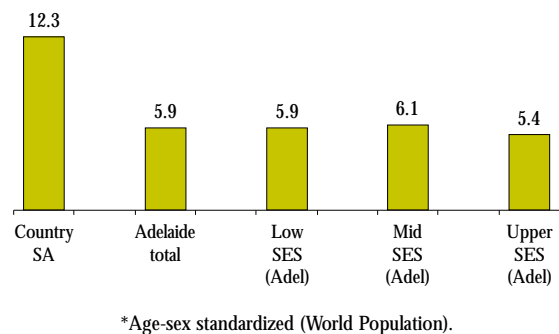
following diagnosis, whereas the corresponding number of deaths per 1,000 was 37 for 1984-90 and 34 for 1991-98 (Figure 22). This corresponds with survivals of 95% or more.

While treatment options exist, the most direct and efficient normally is surgical removal. Of cases treated at the Royal Adelaide Hospital during 1987-98, 95% had surgery, whereas the other 5% had radiotherapy without surgery. Where surgery was not provided, the cancer tended to be more advanced. In such cases, radiotherapy sometimes is preferred for cosmetic reasons.

Other trends:

The incidence of lip cancer is twice as high in country South Australia as in Adelaide, reflecting differences in sun exposure (Figure 23). In particular, high incidence rates apply to the West Coast, Lincoln, Upper Spencer Gulf, Riverland and Murray Mallee. By comparison, little difference is indicated within Adelaide by socio-economic status of place of residence.

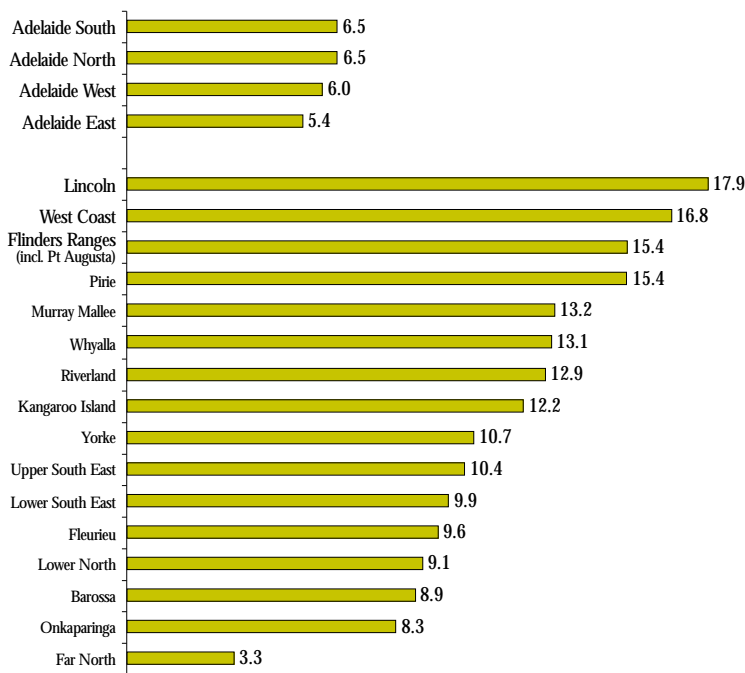
Figure 23: Annual incidence of lip cancer per 100,000 by residential area; South Australia 1977-96*



The demographic distribution of lip cancers has been observed in a number of studies to parallel the distribution of non-melanoma skin cancers. The variations in lip-cancer rates in South Australia are likely to be indicative, therefore, of variations for non-melanoma skin cancers, particularly squamous cell carcinomas. The distribution by region is shown in Figure 24.

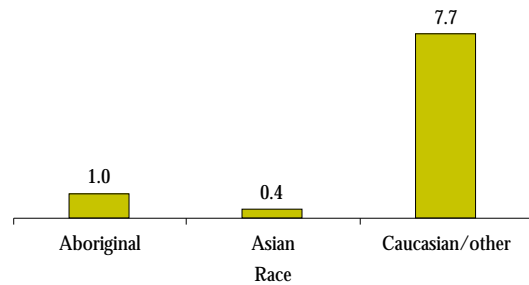
Compared with all occupations in aggregate, incidence rates are about three times higher for workers in the fishing industry, twice as high for fruit growers and pickers, 80% higher for truck, van and other drivers, and almost 40% higher for farmers and graziers. By comparison, indoor workers have low incidence figures. Self-employed managers and related white-collar workers and clerks, for example, have incidence rates about 35% lower than applying for all occupations in aggregate.

Figure 24: Annual incidence of lip cancer per 100,000 by residential region; South Australia 1977-2000*



*Age-sex standardized (World Population).

Figure 25: Annual incidence of lip cancer per 100,000 by race; South Australia circa 1977-96*



*Age-sex standardized (World Population).

Life-long exposure to the Australian sun is the main cause of the high incidence of lip cancer in this country. **Compared with the Australian-born, the incidence is only about a third as high in overseas-born members of the South Australian community.** More specifically, British/Irish migrants and those born in Southern Europe have comparatively low rates.

Higher levels of skin colouring have been shown in many countries to be protective. In South Australia, **Aboriginal and Asian residents have a very low incidence of lip cancer in comparison with other races (Figure 25).**

Lip cancers

Lip cancers usually occur on the mucous membranes of the outer border (vermilion border) of the lower lip.

Sun exposure is the predominant risk factor.

Each year in South Australia from 1996 to 2000:

- **About 200 residents were diagnosed with lip cancers.**
- **About three South Australians died from these cancers.**

More males than females are affected.

South Australia, and Australia and New Zealand more generally, have a high incidence of these cancers by world standards.

An increase in annual incidence was evident in South Australia between 1977-81 and 1982-2000, but not a progressive increase within the latter period.

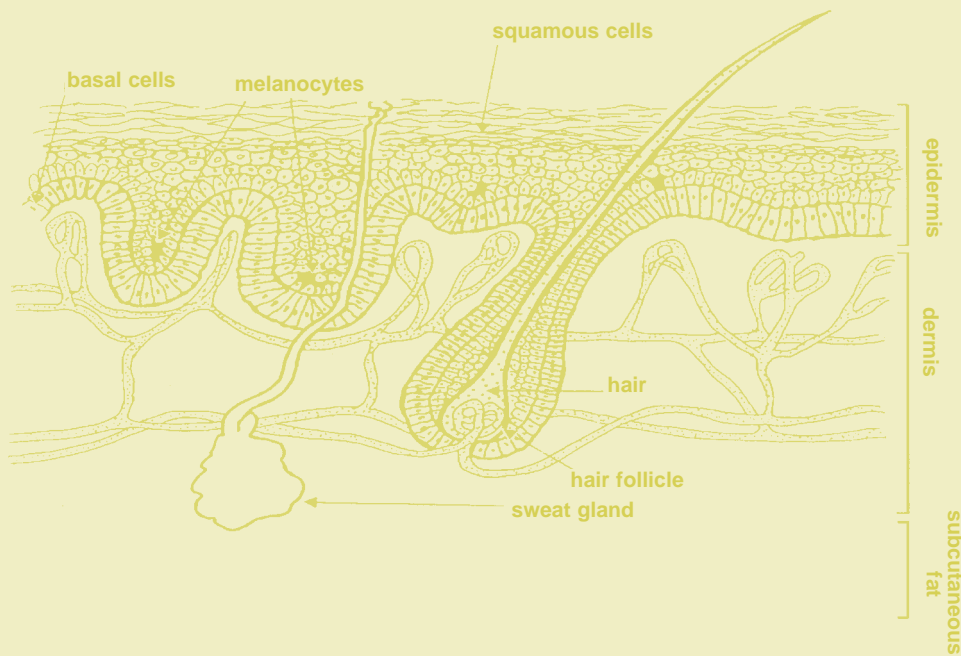
Clinical outcomes are good for these cancers, with over 95% of cases surviving five or more years from diagnosis.

The incidence of lip cancer is twice as high in country South Australia as in Adelaide. This is attributed to differences in sun exposure.

Compared with all occupations in aggregate, incidence rates are about three times higher for workers in the fishing industry, twice as high for fruit growers and pickers, 80% higher for truck, van and other drivers, and almost 40% higher for farmers and graziers.

Compared with the Australian-born, the incidence is only about a third as high in South Australia among the overseas born. Aboriginal and Asian residents have a very low incidence.

Control measures for sun-related cancers



Control measures for sun-related cancers

Progress is being made in the application of preventive measures for skin and lip cancers in South Australia, with increases in sunscreen use by adults. By comparison, there have been variable trends in the use of protective clothing.

While there have been substantial increases in the incidence of newly diagnosed cases, there is evidence that the increases are losing momentum, leading to an incidence "plateau". It is expected that this will be followed by a reduction.

Preventive measures would be strengthened by:

- *Avoiding sun exposure*, especially between 11.00am and 3.00pm during "daylight saving", when ultraviolet radiation is strongest.
- *Protecting against sun exposure by wearing a broad-brimmed hat and sunglasses* (sunglasses with an EPF of 10 or which comply with the "AS1067" standard), *and cover-up clothing with closely woven fabric*.
- *Applying SPF 30+ sunscreen* 20 minutes before going outdoors and reapplying it regularly to areas of the skin that are exposed to the sun.
- *Practising sun protection from early childhood.*
- *Developing, at a community level, policies that reduce sun exposure* of the population (eg, by increasing the creation of shade, rescheduling outdoor events, etc.). Such policies could be implemented by State government agencies, schools, sports clubs, and local councils.
- *Avoiding exposure to ultraviolet radiation from other sources*, such as sun lamps and tanning salons.
- *Reducing exposure to ultraviolet radiation in industry* (eg, from welding).
- In relation to lip cancers, *not smoking and avoiding excesses in alcohol consumption.*

- Limiting exposure to ionising radiation, polycyclic aromatic hydrocarbons, and inorganic arsenic.

In particular, sun protection should be directed at fair-skinned members of the population who are prone to sun-burn.

Australian evidence points to the beneficial effects of media campaigns in increasing sun-protective behaviours in the population.

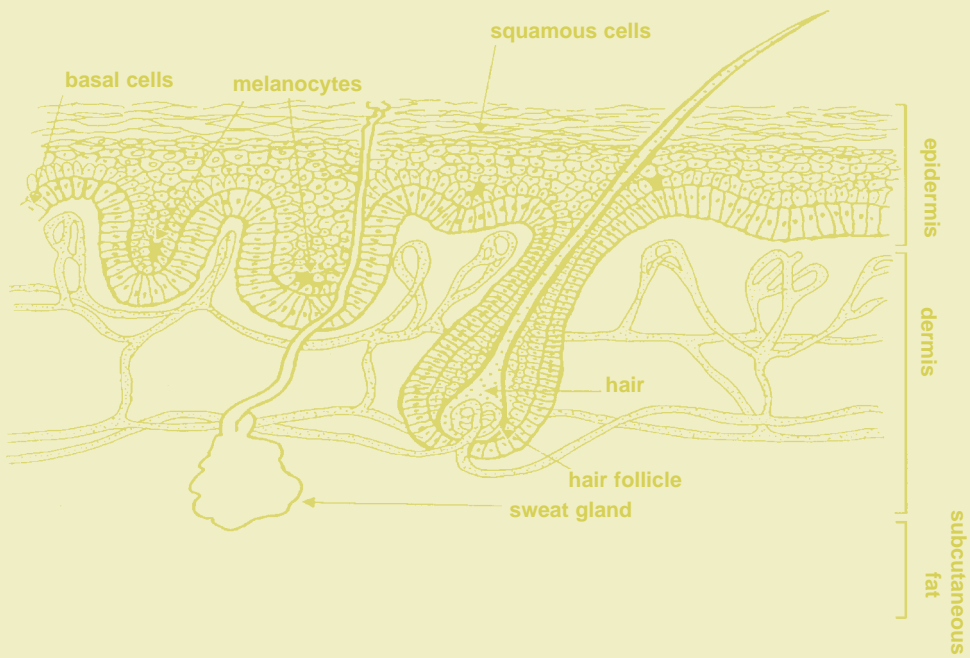
Early detection has led to gains in case survival, particularly for melanoma. As a result, although incidence rates have increased, mortality rates have been stable. Early detection should continue to be sought by:

- *Seeking prompt medical advice if a new or existing mole or freckle changes in colour, shape or size over a period of weeks or months, or* there is persistence of another skin lesion or lump that is rough, dry and scaly or prone to bleeding or developing a crust, *or* there is a sore that doesn't heal within a 4-6 week period.
- *Having regular examinations of the skin if assessed to be at "high risk".* High-risk people include those: (1) with a personal or family history of skin cancer and a large number of acquired or dysplastic naevi; (2) with a fair skin that is prone to burning rather than tanning when exposed to the sun, an age of 50 years or more, and with solar keratoses; or (3) with immunosuppression or with xeroderma pigmentosa.

Through increased attention to prevention and early detection, virtually all deaths from sun-related cancers could be avoided.

There is concern that depletion of the stratospheric ozone layer will lead to a greater penetration of ultraviolet radiation and an increased risk of sun-related cancers. This underscores the importance of giving increased attention to sun protection.

Appendix A



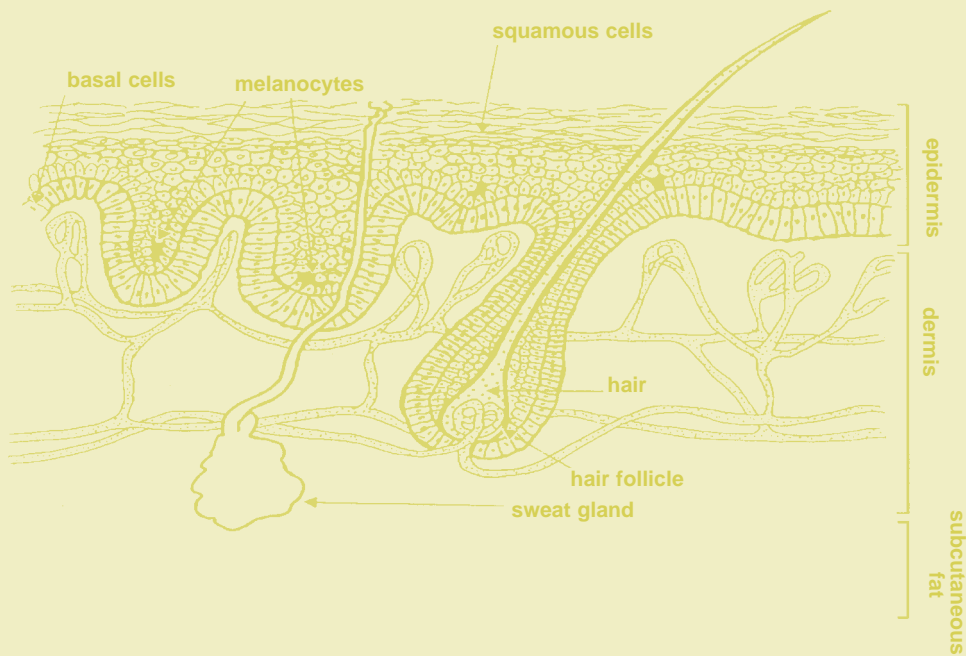
Appendix A

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Glossary of terms



Glossary of Terms

Adjuvant therapy:

"Adjuvant" means *assisting* or *aiding*. A patient may, for example, have surgery or radiotherapy as the main treatment. In addition, there may be drug treatment for any remaining microscopic disease. In this instance, the drug treatment would be *adjuvant therapy*.

Albinism:

An absence from birth, either totally or partially, of normal pigmentation of the skin, hair and eyes, due to a defect in melanin (skin pigment) production.

Atypical:

Not conforming to the normal (i.e., not typical).

Aetiology:

The science dealing with the causes of disease.

Age-standardized:

A statistical adjustment to make age distributions of different populations statistically equivalent. This enables comparisons of cancer rates between populations with different age distributions. The results show the differences in cancer rates that would have applied, had the age distributions of the populations been the same.

Anti-fungal agents:

Medications given to combat fungal infection.

Basal cell carcinoma (BCC):

The most common and least dangerous type of skin cancer. These cancers originate from the basal cells (i.e., small round cells located in the deeper part of the outer layer of the skin (i.e., the epidermis)).

Cancer (eg, invasive melanoma, carcinoma, etc.):

An uncontrolled growth of cells that invades the surrounding areas of the body, which has the ability to spread to distant sites through the blood stream or lymph vessels.

Carcinoma:

Cancer that starts in epithelial tissue (i.e., in tissue that forms the base of the skin and the lining of the body's inner surfaces, bowel, reproductive organs, etc.).

Chemotherapy:

Cancer treatment by chemical agents or drugs.

Cryosurgery:

Treatment by freezing and destroying abnormal tissue.

Curettage:

Removal of abnormal tissue with a sharp spoon-shaped instrument called a curette.

Diuretic:

An agent that is used to increase urine production.

Dyskeratosis:

The abnormal, premature and imperfect production of keratin (the main constituent of the outer layer of the skin) by keratin-forming cells (called keratinocytes). This may be associated with dyskeratosis epidermolysis bullosa, dyskeratosis congenita, or other medical conditions.

Dysplastic cells:

Cells with an abnormal structure. They are not cancerous, although they can be a step in the development of cancer.

Electrodesiccation:

The drying of tissue with a high-frequency electric current applied through a needle-shaped electrode.

EPF of 10:

The EPF scale measures the degree of eye protection from ultraviolet radiation. Sunglasses with an EPF reading of 10 are recommended by Australian cancer councils.

Familial cancers:

Cancers occurring in families (i.e., family members are at an increased risk).

First-degree relatives:

Immediate family members (i.e., parents, children, brothers and sisters).

Five-year cancer survival:

The percentage of patients surviving their cancers five years from diagnosis.

Herpes infection of the lip:

Infection with the *herpes simplex* virus, commonly causing blistering lesions (i.e., "cold sores").

Immunosuppression:

Suppression of the body's immune response, as may be caused by radiation or certain drug therapies.

Immunotherapy (cancer):

Treatment aimed at increasing immunity to a cancer.

Incidence rate (cancer):

The rate at which cancers arise in the population. It may be expressed as the number of new cases diagnosed annually per 100,000 people.

Invasive melanoma (i.e., malignant melanoma):

A malignant tumour usually developing from a naevus or mole. It frequently comprises a black mass of cells that are prone to metastasize. Common types include superficial spreading, nodular, and lentigo maligna melanomas.

Keratoacanthoma:

A round, rapidly growing non-malignant (not cancerous) skin growth with a hard white centre. It occurs mainly on the face and generally disappears in a few weeks.

Keratoses (solar, actinic, senile keratoses, etc.):

Thick, scaly patches on the skin that sometimes progress to a squamous cell carcinoma.

Lesion:

An area of damage or injury to an organ. It may be described as a wound, ulcer, sore or a cancer.

Malignant disease:

Cancerous. Has the ability to invade locally or spread to a distant part of the body.

Melanin:

The normal pigment of the skin, produced by skin cells called melanocytes. Melanin can absorb ultraviolet radiation and can offer some protection from its damaging effects.

Metastatic cancer:

A cancer that has spread from its place of origin to other more distant parts of the body. Cancer deposits in these more distant parts are called metastases.

Mortality rate (cancer):

The rate at which deaths from cancer occur in the population. It may be expressed as the number of deaths occurring annually per 100,000 people.

Naevus:

A circumscribed skin malformation. For example, a blue naevus is a dark blue nodular lesion composed of closely grouped skin cells called melanocytes. Epidermal naevi are skin malformations (originating at birth) that do not contain melanocytes.

Non-melanoma skin cancers:

Skin cancers arising from basal cells or squamous cells, but not from melanocytes.

Photodynamic therapy:

Treatment with drugs that are activated by exposure to light.

Polycyclic hydrocarbons:

Hydrocarbons are the simplest compounds of living matter, comprising carbon and hydrogen. Polycyclic hydrocarbons have multiple rings of carbon atoms. They have been implicated as a cause of cancer.

Positive correlation:

Two features are positively correlated if they tend to vary in unison (eg, height and weight).

Prevalence (cancer):

The number of people with a recent cancer diagnosis (eg, in the past five years) per 100,000 people.

Prognosis:

Estimation in advance of the likely course of a disease (eg, as may be indicated by the extent of the disease at diagnosis).

Radiological:

The use of X-rays, radioactive substances, and other forms of radiant energy for diagnosis and treatment.

Radiosensitive:

Sensitive to the effects of radiotherapy.

Radiotherapy:

Treatment by radiation (eg, by X-rays or gamma rays).

Retinoids:

Cells that resemble in form those in the retina (i.e., the surface of the back of the eye that receives and transmits visual messages).

Skin:

The outer protective surface of the body. It comprises an upper or outer layer (i.e., the epidermis) and a deeper layer (i.e., the dermis).

Socio-economic gradient of cancer:

Where cancer risk varies according to people's social or economic status.

Squamous cell carcinoma (SCC):

A cancer composed of squamous cells.

Stratospheric ozone layer:

Ozone is a naturally occurring gas made of oxygen molecules. There is a layer of ozone around the earth (i.e., in the stratosphere) that reduces the penetration of ultraviolet radiation to its surface.

SPF 30+:

"SPF" stands for sun-protection factor. This indicates the level of sun-burn protection provided by sunscreens. The higher the SPF, the greater the protection. SPF 15 indicates moderate protection, whereas SPF 30+ indicates a high level of protection.

Sunscreens:

Products which protect the skin from the damaging effects of the sun's ultraviolet rays. They contain compounds which either absorb or reflect ultraviolet rays which would otherwise burn and damage the skin.

Therapy (cancer):

Cancer treatment. This may comprise surgery, chemotherapy, radiotherapy, hormone therapy, immunotherapy, other treatments, or treatment combinations.

Xeroderma pigmentosa:

A rare hereditary disease in which the skin and eyes are extremely sensitive to light and to the damaging effects of ultraviolet radiation.