Canstat

The Cancer Council Victoria

Leading the fight...

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Canstat: A digest of facts and figures on cancer

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Skin Cancer

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Overview

Two out of three Australians will develop a skin cancer during their lifetime

Each year over 380,000 Australians are treated for skin cancer at a cost of over $300 million

Up to 90% of all skin cancer is attributable to sun exposure. It is the most preventable form of cancer in Australia. Our incidence and mortality rates are the highest in the world. Each year over 380,000 Australians are treated for skin cancer, outnumbering diagnoses of all other cancers combined[1]. Two in every three Australians will develop some form of skin cancer during their lifetime[2] and over 1,600 die from skin cancer each year[3].

Common skin cancers

There are three major types of skin cancer. In decreasing order of frequency these are **basal cell carcinoma** (BCC), **squamous cell carcinoma** (SCC) and **malignant melanoma** (MM). These account, respectively, for around 67%, 31% and 2% of the major skin cancers. BCC and SCC are often referred to collectively as non-melanocytic skin cancer (NMSC). Melanoma is the most dangerous type of skin cancer, but SCC also has the capacity to spread to other parts of the body and kill.

Cost of skin cancer

The overall cost of management of skin cancer in Australia is estimated to be almost $300 million per year ($264 million for NMSC and $30 million for MM)[4].

What is skin cancer?

Like all body tissues, the skin is composed of cells. These cells can sometimes become cancerous, for example under the influence of ultraviolet (UV) radiation.

The skin has two main layers (see Figure 1).

Epidermis: The epidermis is the top layer of the skin which protects the deeper skin layers and body organs from the environment. It is usually only about 0.2 mm thick and is mostly made of flat squamous cells. Under the squamous cells in the deepest part of the epidermis are round cells called basal cells. Cells called melanocytes make the pigment (colour) found in skin and are located in the lower part of the epidermis. The three common types of skin cancer originate from the cells of the same name.

Dermis: The dermis is under the epidermis. It contains blood vessels, lymph vessels, and glands. Some of these glands make sweat, which helps cool the body, and other glands make sebum, an oily substance that helps keep the skin from drying out. Sweat and sebum reach the surface of the skin through tiny openings called pores.

Skin cancers all originate in the cells of the epidermis but both SCC and, more commonly, MM may spread through the dermis to the lymphatic system. If the cancer has reached the lymph nodes, it may also spread, or metastasise, to other parts of the body such as the liver, lungs, or brain.

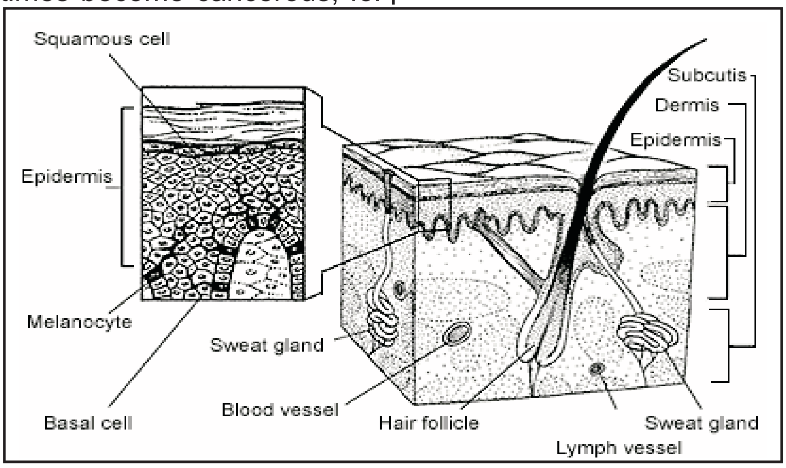


Figure 1: Cross-sectional diagram of skin

Cross-sectional diagram of the skin showing the layers and the organs within the dermis in which skin cancers may arise.

Other types of skin cancer

There are several other types of skin cancer that are much less common than SCC, BCC and MM and are often overlooked when talking about skin cancer. These, like the NMSC, are usually not reported in cancer incidence statistics. Each year in Victoria there are about 100 diagnoses of these rarer skin cancers, the more common of which are described below.

Merkel cell carcinoma (MCC), or primary cutaneous neuro-endocrine carcinoma is a rare, aggressive, primary skin cancer. The tumour arises in the Merkel cells, usually found close to hair follicles in the dermis, and is a type of neuroendocrine tumour similar to small cell carcinoma of the lung. MCC risk is increased in persons with immune suppression including those with HIV and solid organ transplant recipients. MCC occurs more commonly in males than females and cases are mostly aged over 60 years. There are about 50 cases of MCC each year in Victoria.

Dermatofibrosarcoma protuberans (DFSP) is a relatively uncommon and slow growing neoplasm arising in the dermis with intermediate to low grade malignancy. Although metastasis rarely occurs, DFSP is a locally aggressive tumour with a high recurrence rate. There are about 25 new cases of DFSP each year in Victoria, the majority of whom are aged under 60 years.

Adnexal and skin appendage tumours is a group of tumours that includes carcinomas of the sweat glands (eccrine and apocrine) and ducts, sebaceous glands and other skin appendages. These tumours are rare under the age of forty years and more common in men than women. There are around 22 new cases each year in Victoria.

In addition to these skin cancers there are about 50 **cutaneous lymphomas** diagnosed each year in Victoria. These are usually reported as lymphomas. These cancers are a heterogenous group of predominantly malignant T-cell lymphomas (CTCL) with primary manifestations in the skin. Mycosis fungoides (MF) is the most common type of CTCL.

Table 1 summarises the annual incidence of the various types of skin cancer in Victoria. NMSC incidence is described in more detail on pages 6–9 and MM incidence and mortality on pages 10–15.

Table 1: Incidence of skin cancer in Victoria 1999–2004

Average annual new cases by sex for malignant melanoma, non-melanocytic skin cancer and the rarer types of skin cancer.

** NMSC (SCC and BCC) cases are crude estimates using the age-standardised rates from a national skin cancer survey[2]. Age-specific rates were not available to calculate more precise estimates and these figures will underestimate the number of annual cases. However, the crude estimates presented highlight the scale of NMSC incidence compared to that of other types of skin cancer.*

	Cases per year in Victoria		
	Male	Female	Total
Malignant melanoma	1,149	979	2,128
Non-melanocytic skin cancer (see margin note)			
Squamous cell carcinoma	7,500	4,000	11,500
Basal cell carcinoma	15,500	11,500	27,000
Other skin cancer			
Merkel cell carcinoma	27	23	50
Dermatofibrosarcoma protuberans	10	15	25
Skin appendage tumours	13	9	22
Other	3	2	5
Cutaneous lymphoma	32	23	55

Epidemiology

Ultraviolet exposure plays the major role in the aetiology of skin cancer, both melanoma and non-melanocytic skin cancer

Although the majority of skin cancers are thought to be causally related to ultraviolet exposure in fair-skinned populations, there are differences between the epidemiology of melanoma (MM) and the non-melanocytic skin cancers, basal cell carcinoma (BCC) and squamous cell carcinoma (SCC).

Comprehensive reviews were conducted in the 1990s[5,6]. It is thought that the naevus (mole) is a precursor lesion of MM and solar keratosis is a precursor lesion of squamous cell carcinoma. The epidemiology of naevi and solar keratoses is thus closely linked with the epidemiology of skin cancers.

Trends

Figure 2 illustrates the trend over the last seventy-five years in mortality from NMSC and MM in Australia. It clearly shows the increasing size of the melanoma epidemic to its peak in the early 1990s with a subsequent decline in women and, less markedly, in men. The graph also shows the relatively low mortality experienced from NMSC with a small peak in males in the late 1980s and early 1990s attributed to the prevalence of HIV/AIDS. The mortality rates for NMSC are low but obviously underestimate the amount of morbidity associated with removing NMSC lesions which affect two out of three Australians during their lifetimes.

Age and sex

NMSCs are very age-dependent, SCC more than BCC, and are more common in men. They are rare before the age of 40. MM incidence starts in teenage years with rates increasing slowly with age to around age 40 and then more steeply, especially in men. The age-specific incidence curve has changed in recent years with stabilising, or even falling, rates in younger age groups as a result of sun protection campaigns. In the 1980s and early 1990s the steepest rise in age-specific incidence rates occurred before the age of 30 which is consistent with an important early life exposure followed by either a change in exposure to a carcinogenic agent or some other host response. Incidence rates have been higher in Victorian men than women since the mid-1980s.

Host factors

Both MM and NMSC reach their highest incidence in fair-skinned populations living in sunny climates. This high risk phenotype is further characterised by fair/red hair colour, blue eye colour and a propensity to burn rather than tan when exposed to strong sunlight. The number of acquired naevi (moles) is a major risk factor for MM, and the presence of dysplastic naevi increases the risk of MM to a very high level. Naevi frequency is also related to sun exposure in early life. Conditions such as Xeroderma pigmentosum (XP, a defect in DNA repair) increase the risk of skin cancer. Immune depression, as observed in renal transplant recipients, can also increase the risk of both NMSC and MM. A family history of MM has been shown to confer an increased risk of MM independent of other risk factors. One melanoma gene has been located on chromosome 9p, but this single gene is likely to explain only a small fraction of incidence. Genetic factors may also play a role in the development of acquired naevi, and dysplastic naevi are known to be present more often in cases of familial melanoma.

Sun exposure

The association between sun exposure and both NMSC and MM is observed in the incidence differences between (white) populations living at different latitudes with different levels of measured ultraviolet B radiation.

Non-melanocytic skin cancer

- cumulative exposure
- exposed body sites
- outdoor workers

Melanoma

- intermittent and recreational exposure
- susceptible skin types
- exposure in early childhood

It is also seen in the increasing incidence during this century as the zeal for sun tanning has waxed and (lately) waned.

The relationship with sun exposure is more straightforward in NMSC than that in MM. The incidence of NMSC (and also solar keratosis) is higher in men and increases as a power relationship with age, consistent with a cumulative exposure to an environmental agent. NMSC tends to occur on parts of the body that are chronically exposed to the sun (head and neck, backs of hands). Men are more likely than women to have outdoor occupations that lead to this pattern of exposure. NMSC is much less common in British migrants to Australia than in the Australian-born, British migrants not having usually had the opportunities for early life exposure to accumulate as much risk[7,8].

MM incidence, however, peaks at an earlier age, most commonly occurs on the male trunk and female legs, and is less common in outdoor than indoor workers. However, it too varies with latitude and increases in migrants from low to high risk populations. Scandinavian populations provide an exception to the latitudinal trend seen elsewhere, but this has been explained by their penchant for sunny holidays in Southern Europe.

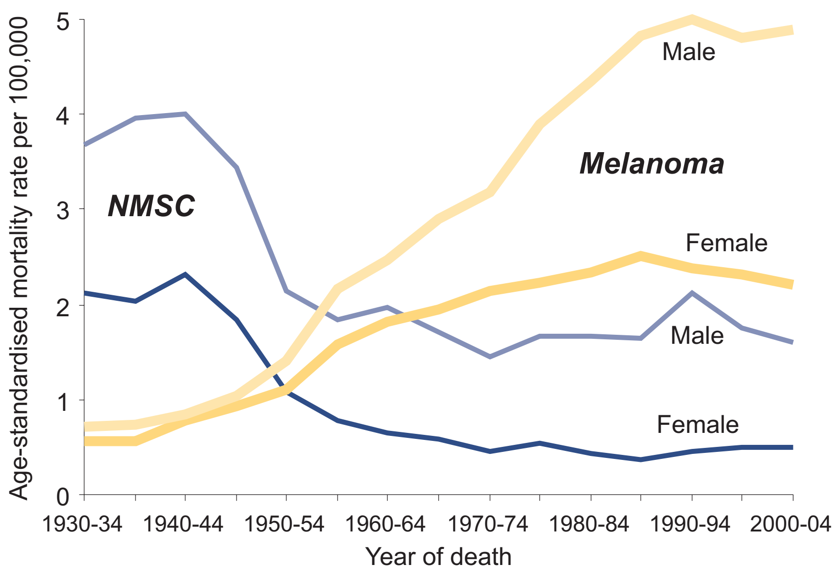
Armstrong proposed the "intermittent exposure hypothesis" to explain the epidemiology of MM in terms of sun exposure[9]. Broadly this proposes that the incidence of MM is determined as much by the pattern of exposure as by the total accumulated "dose", and infrequent (intermittent) exposure of the skin to high doses of sunlight is thought to be a major factor in increasing incidence of MM.

Other factors

Several other possible risk factors for melanoma have been investigated including exposure to fluorescent lights, anthropometric measures, reproductive factors, use of exogenous hormones, dietary fat or antioxidants, alcohol, hair dyes, skin infections etc. Generally, the findings have been weak and inconsistent and many probably result from uncontrolled confounding with sun exposure.

Figure 2: Skin cancer mortality trends: Australia 1930–2004

Age-standardised mortality rates by sex for malignant melanoma and non-melanocytic skin cancer



Australian NMSC rates increased between 1985 and 2002: SCC by 133% and BCC by 35%

Non-melanocytic skin cancer

Incidence

The incidence of NMSCs can only be estimated as they are not recorded by most cancer registries. The reason for this is that many are treated in doctors' surgeries using destructive techniques which preclude histological confirmation, and they vastly outnumber all other forms of cancer.

Australia-wide surveys were conducted in 1985[10], 1990[11], 1995[12] and 2002[2] to detect people who had recently been treated for skin cancers and to confirm their diagnoses with their doctors. This approach has limitations in estimating true incidence owing to the high prevalence of undiagnosed and untreated NMSCs. However the estimates obtained in the 1985 survey were the highest ever published at that time and subsequent regional surveys around Australia have obtained estimates similar to, and consistent with, those from the national surveys[13-16].

The following incidence statistics are those estimated from the results of these four national surveys.

The lifetime risk (to age 75 years) of being diagnosed with at least one NMSC (either BCC or SCC or both) is currently estimated to be two in every three Australians. The risk is higher in men (two in three) than in females (three in five)[2].

In the latest survey (2002) the national age-standardised incidence of BCC was 884 per 100,000 (1,041 in men and 745 in women) while the incidence of SCC was 387 per 100,000 (499 in men and 291 in women). The majority of NMSC were found to have been confirmed histologically (BCC 81% and SCC 84%). Both forms of NMSC are rare under the age of 30, increasing thereafter with age. The rate of increase is much steeper in SCC than BCC and, particularly in SCC, rises more slowly in women than in men with increasing age.

Between the 1985 and 2002 surveys there were increases in the rates of both SCC (133% with similar increases in men and women) and BCC (35% with higher increases in men (42%) than women (26%)). Figure 3 shows the rates of BCC and SCC by sex over the period of the four national surveys. It is not possible to discern whether this was a true increase in incidence or resulted from increased awareness of the problem.

The anatomical distribution of BCC is similar in men and women with over half occurring on the head and neck, a quarter on the trunk and smaller proportions on the upper and lower limbs. SCC, however, showed very different distribution patterns (Figure 4) with the majority of SCCs in men being diagnosed on the head and neck (49%) and fewer (25%) on the arms/shoulder whilst in women most were found on the arms/shoulders (37%) and fewer on the head and neck (33%).

NMSC showed a strong latitudinal gradient (as shown in Figure 5) with rates in latitudes <29°S more than three times those in latitudes >37°S. SCC increased between 1982 and 2002 across all regions but with the greatest increase in southern latitudes (378% in males and 298% in females).

The trends in rates of SCC and BCC were analysed for different age groups between the 1985 and 1995 surveys. In the southern latitudinal zone, within which Victoria lies, the increase in rates was similar across all age groups and in men and women. For BCC, however, the pattern was quite different, with reductions in rates for men and women under forty, stable rates for those between 40 and 59 years and thereafter

Figure 3: Trends in SCC and BCC rates, Australia 1985–2002.

Estimates from the national skin cancer survey for incidence of basal cell and squamous cell carcinoma by sex and national skin cancer survey year[2].

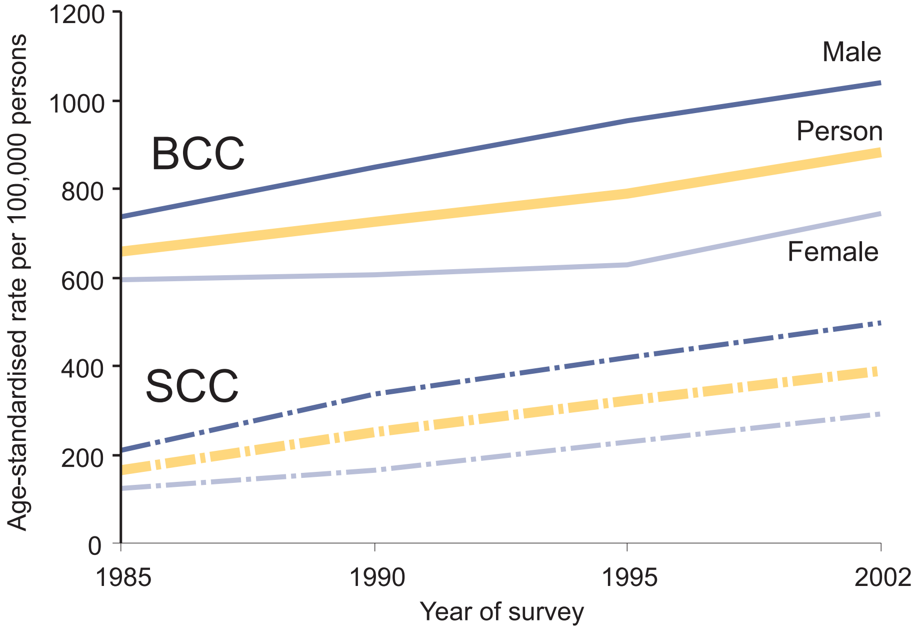
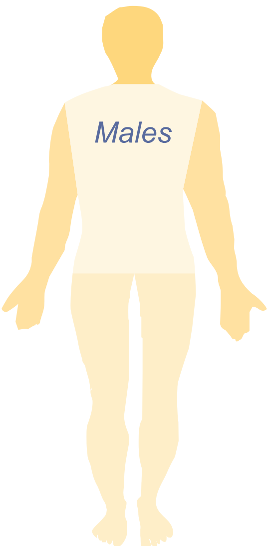


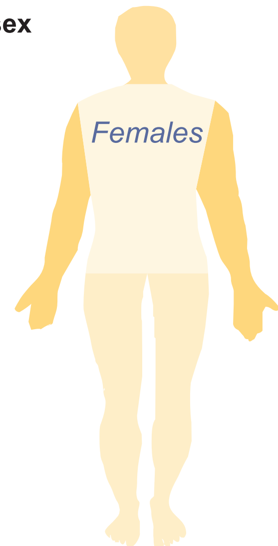
Figure 4: Distribution of SCC and BCC by body site and sex

Estimates from the national skin cancer survey for proportions of squamous cell carcinoma and basal cell carcinoma by body site and sex[2].

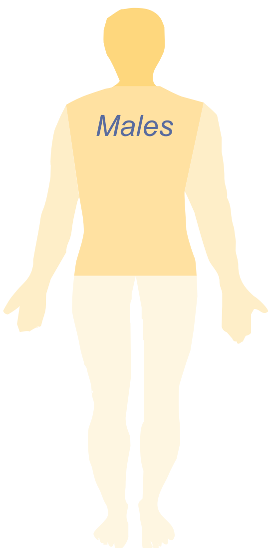
% of SCC by body site and sex



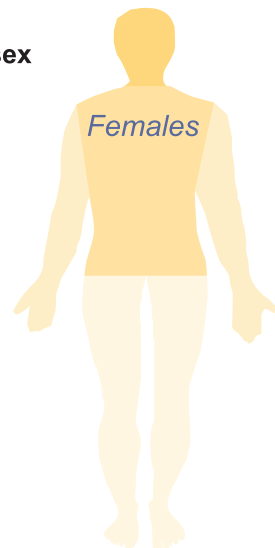
Males		Females
49%	Head & Neck	33%
10%	Trunk	5%
25%	Arms	37%
16%	Legs	25%



% of BCC by body site and sex



Males		Females
52%	Head & Neck	51%
31%	Trunk	22%
11%	Arms	16%
7%	Legs	10%



Note:
Unless otherwise stated, age-standardised incidence and mortality rates reported in this publication are all standardised using the direct method to the Segi World Standard Population.[17]

Each year in Australia about 256 men and 108 women die from non-melanocytic skin cancers

the change in rates increasing with increasing age. Figure 6 clearly shows this gradient in changing incidence of BCC and the reduction in rates for younger cohorts. The patterns for men and women were very similar. This is evidence that public health campaigns to reduce sun exposure may be beginning to have an effect on skin cancer rates.

The Australian born population has significantly higher rates of NMSC than those born elsewhere. Those people who on exposure to strong sunlight in summer have skin that usually burns before tanning (or skin that rarely tans) are nearly three times as likely to develop NMSC as those whose skin tans easily. Though this demonstrates that there are low-risk groups within those resident in Australia it should be noted that even within these subpopulations there is a high risk of NMSC. For example, in British born migrants and people whose skin tans easily, the estimated rates of NMSC are over 850 and 800 per 100,000 persons respectively, both higher than the combined rates of all other forms of cancer.

Mortality

Each year in Australia about 256 men and 108 women die from NMSC with age-standardised mortality rates of 1.6 and 0.5 per 100,000 men and women respectively[3].

Mortality from melanoma rose steadily from the 1940s but rates for NMSC have fallen gradually from their peak in the early 1940s, at which time rates were 4.0 and 2.3 per 100,000 for men and women respectively (Figure 7).

The rise in male rates in the late 1980s and 1990s may be attributed to the effect of the HIV/AIDS epidemic predominantly in younger men and recent falls are consistent with decreases in HIV/AIDS prevalence.

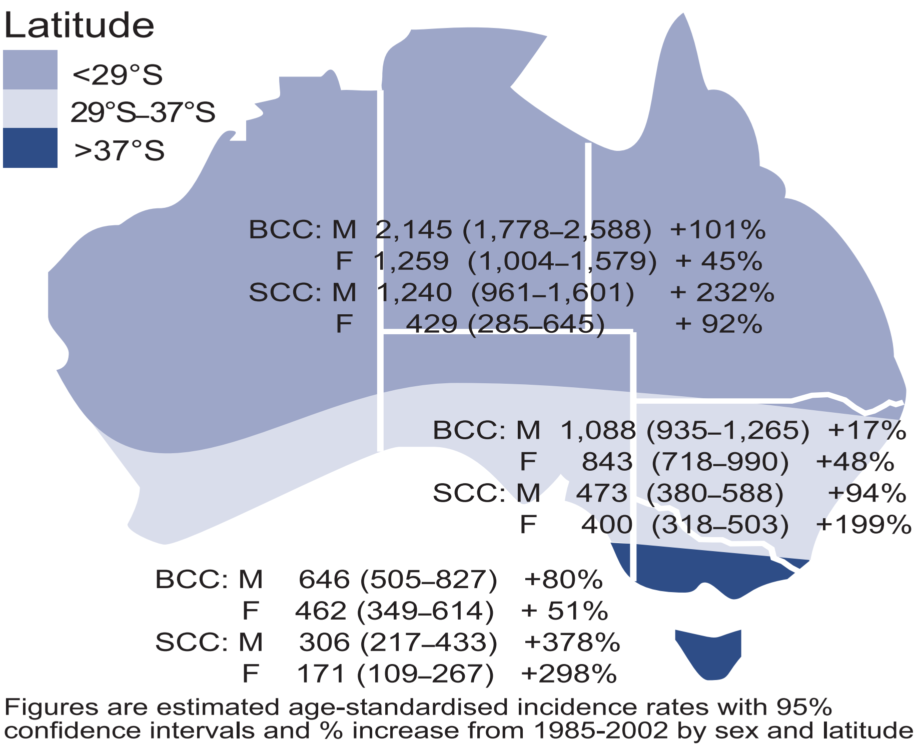


Figure 5: Latitudinal variation in non-melanocytic skin cancer in Australia 2002

Estimates from the national skin cancer survey for incidence of basal cell and squamous cell carcinoma by sex and latitudinal zone[2].

Figure 6: Trends in BCC rates by age group and sex in southern Australia (latitudes >37°S) 1985–1995

Estimates from the national skin cancer survey for incidence of basal cell and squamous cell carcinoma by sex and national skin cancer survey year[12].

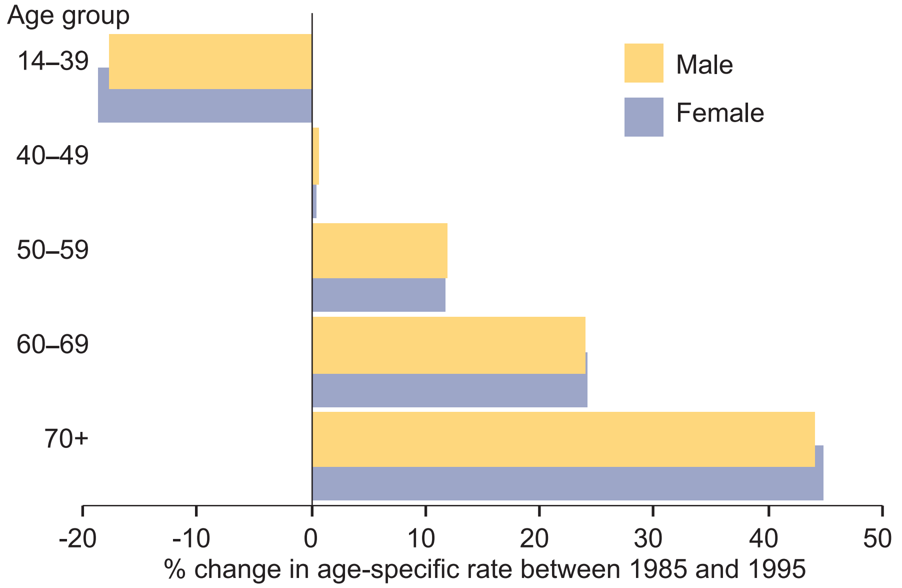
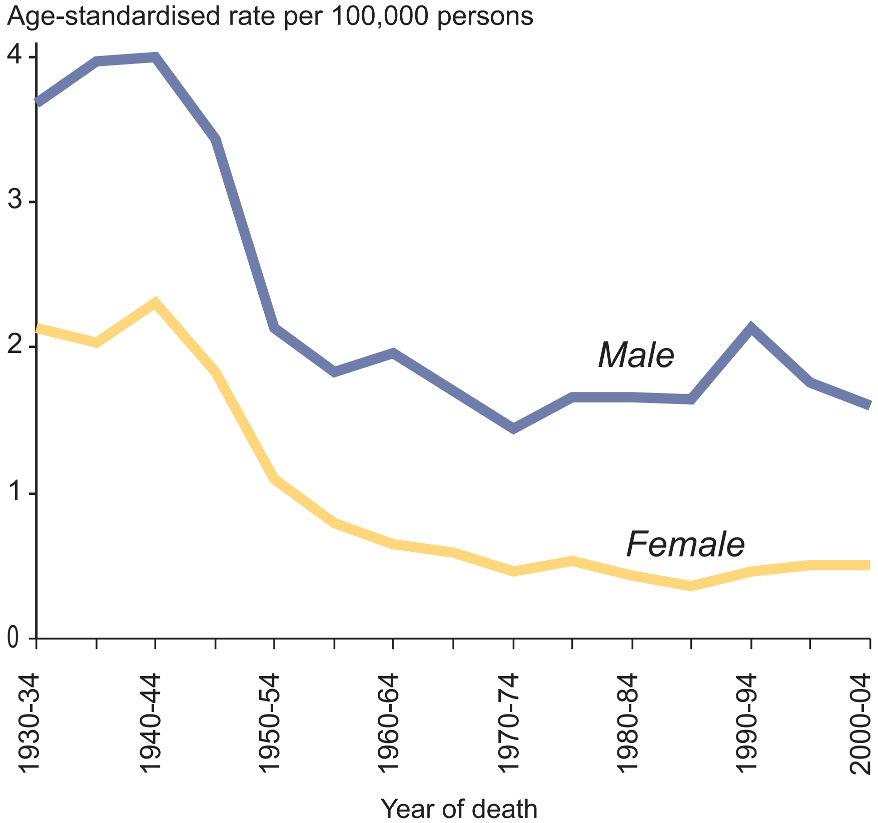


Figure 7: Trends in NMSC mortality by sex, Australia 1930–2004

Trends in death rates for NMSC (including the rarer types described on page 2) for Australian men and women[3].



Malignant melanoma

Malignant melanoma is now the fourth most common cancer in men and the third in women in Victoria

Incidence

In 2004 in Victoria, 1,090 men and 869 women were diagnosed with invasive MM for the first time. Persons who have a previous diagnosis of melanoma are not counted again in annual incidence figures so the actual number of melanomas diagnosed in 2004 will be somewhat higher.

The incidence rates in 2004 for MM were 30.5 and 24.1 per 100,000 men and women respectively with lifetime risks of 1 in 31 men and 1 in 39 women. MM is the fourth most common cancer in men (after cancers of the prostate, bowel and lung) and the third in women (after breast and bowel cancer). Melanoma incidence rates in Victoria rose between 1982 and 2004 by 1.6% annually in women and 3.2% annually in men. The rapid rise in incidence of melanoma in recent years is due in part to increased detection of early stage lesions. The trends, shown in Figure 9, parallel those of other predominantly Caucasian populations (see pages 14–15).

Figure 10 shows the age-specific incidence of melanoma in Victorian men and women. Rates in males and females are the same up to the age of fifty but increase much more rapidly in males thereafter. Incidence rates increase from 30 new cases per 100,000 persons per year in both men and women in their early 40s to almost 100 and 235 new cases per 100,000 women and men over 80 years respectively.

Figure 11 shows incidence trends from 1982–2004 in different age groups with a fitted trend line for 1995–2004. The annual percentage changes in rates over the past decade show that incidence rates are now falling in Victorian men and women aged under 60 years. Though rates continue to increase in those aged over 60 years, the rate of increase is slower than in the previous decade. Patterns are similar in both sexes though rates are decreasing faster in women than in men. These figures suggest that sun protection messages may be having an effect on incidence rates. The younger age groups include those who grew up with SunSmart whilst older Victorians are still experiencing incidence rates relating to pre-SunSmart sun behaviours in their early lives.

The distribution of lesions by body site (Figure 8) and type of melanoma is quite different in males and females, reflecting differences in patterns of sun exposure. The highest rates of melanoma occur on the trunk in men and on the legs in women, sites that are subject to intermittent recreational exposure. In males, rates of melanoma on the trunk are almost twice those on the head and neck, arms or legs. In women the difference is less marked but rates are highest on the legs followed by the arms, trunk and head and neck. Lentigo maligna melanoma (or melanoma arising in Hutchinson's melanotic freckle) has a distribution pattern more similar to that for NMSC than other types of melanoma. These melanomas are common on the head and neck in elderly men, reflecting areas of high cumulative sun exposure.

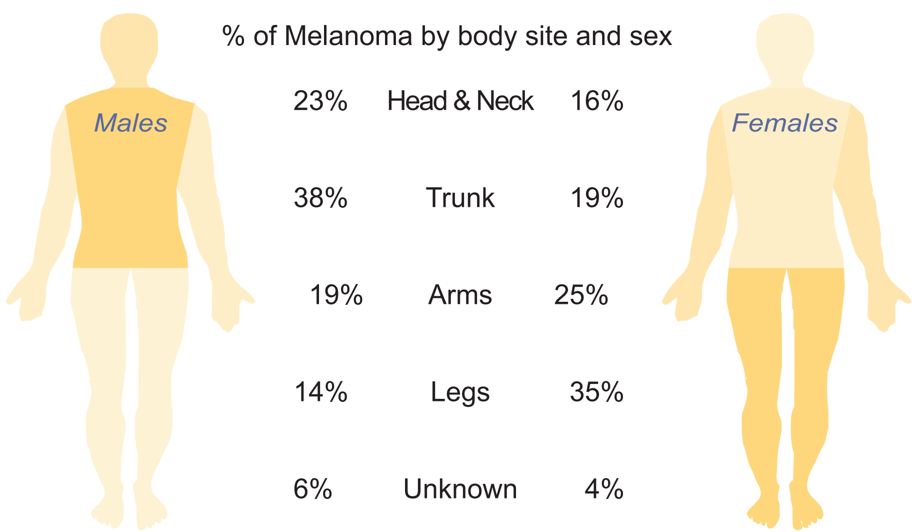


Figure 8: Distribution of melanoma by body site in men and women

Proportions of new melanomas by sex and body site in Victoria 2002–2004.

Figure 9: Melanoma incidence trends, Victoria 1982–2004

Age-standardised rates by year of diagnosis and sex for melanoma in Victorian men and women

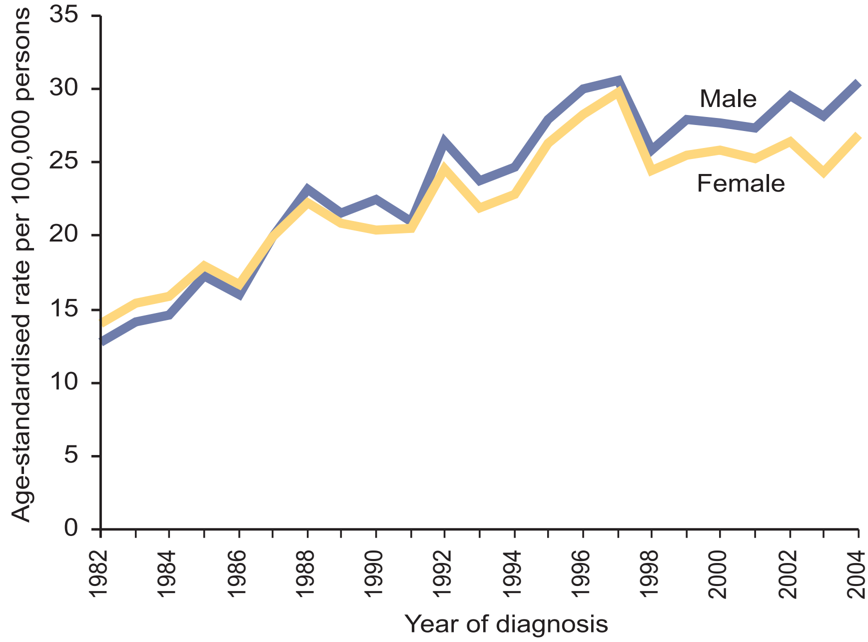


Figure 10: Age-specific incidence of melanoma

Age-specific rates of malignant melanoma in Victorian men and women, 2002–2004

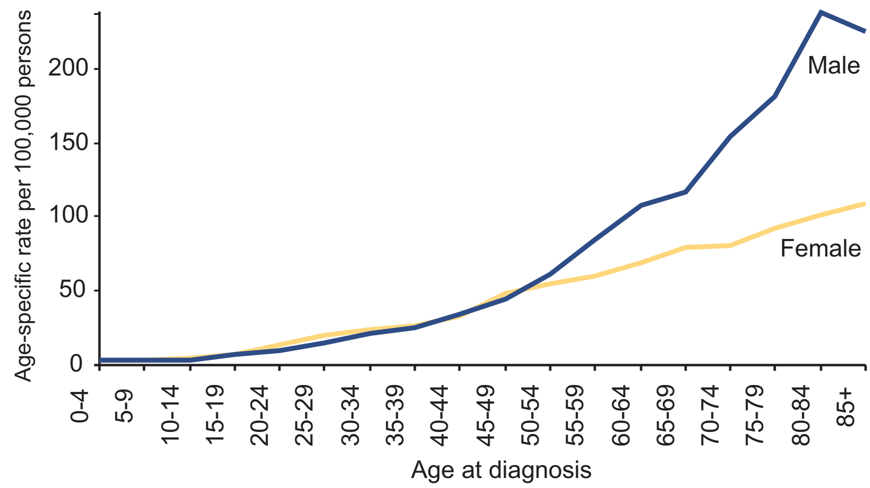
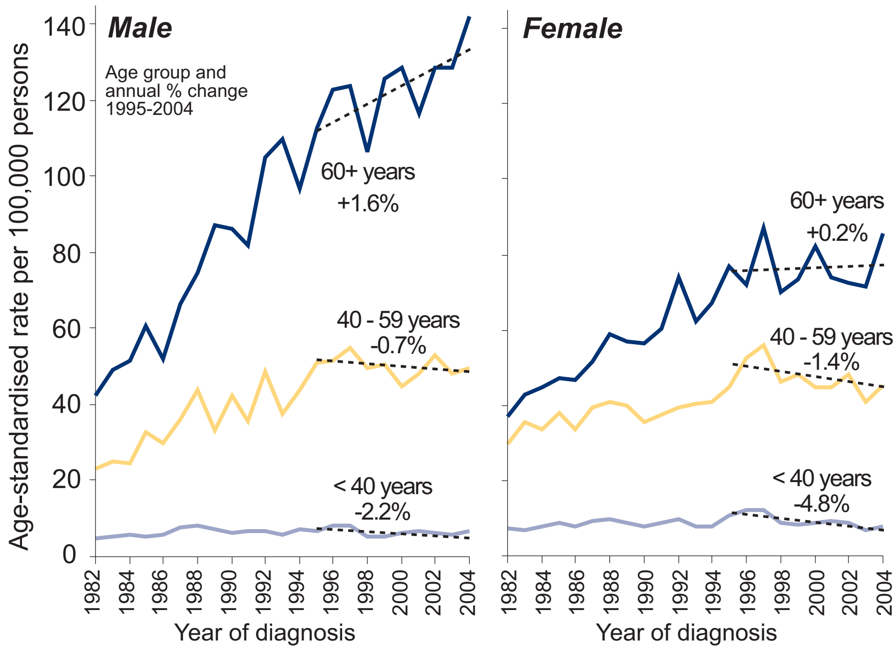


Figure 11: Melanoma incidence trends by age group and sex, 1982–2004

Each curve shows the age-standardised incidence rates by year from 1982–2004 for invasive melanoma for Victorians aged under 40, 40–59 and over 60 years.

The linear trend is shown for the last decade, 1995–2004, with the average percentage change in rates per annum.



Mortality and survival

Malignant melanoma caused the deaths of 245 Victorians (159 male and 86 female) in 2005

Mortality

In Victoria in 2005, 159 men and 86 women died from melanoma, giving age-standardised mortality rates of 4.0 and 1.9 per 100,000 respectively[3].

Trends in mortality rates are shown in Figure 12. For women there has been a steady decrease in mortality since the late 1980s. In men, though not declining , rates appear to have stabilised during the same period. Increasing incidence rates with stable or decreasing mortality rates may have been due in part to increased early detection, a hypothesis supported by an increasing proportion of early stage lesions. In 1985 52% of melanoma were thinner than 1 mm at diagnosis, a proportion that had increased to 64% by 2004 (having passed a peak of around 70% in the late 1990s).

As with incidence, male and female mortality rates are very close until the mid-40s but then rise much more steeply with age in men, reaching rates of 50 and 22 deaths per 100,000 Victorian men and women over 85 years respectively.

Survival

Ninety per cent of Victorians with invasive melanoma in 2004 can expect to survive their cancer for at least 5 years[18]. The survival is better in women (93%) than in men (88%). Melanoma has higher survival than any other cancer other than thyroid cancer in women (5-year survival 94%) and testicular cancer in men (5-year survival 99%). Australian rates generally compare very favourably with other regions because of the high proportions of thin lesions. In Victoria in 2004, less than 6% of melanomas were thicker than 4mm and around 5% were Level V lesions (tumour extending below the dermis into underlying tissue) at diagnosis. Greater awareness of melanoma in countries with higher incidence tends to correlate with earlier detection of lesions and better survival. Table 2 and Figure 13 show survival proportions in Victoria by sex and age group and by years.

Table 2: Melanoma survival by age group and sex, Victoria 2004, with earlier years for comparison

Period relative survival for Victorians with melanoma. The figures represent the estimated proportions of Victorians with melanoma in 2004 who survived at least 5 years from their diagnosis[18].

95% CI=95% confidence interval for survival.

All cases by years after diagnosis		Survival (%)	95% CI	
1		97	(97–98)	
2		94	(93–95)	
3		92	(91–94)	
4		91	(89–92)	
5		90	(88-92)	
5-year survival by subgroups		**Survival (%)**	**95% CI**	**p-value**
Sex	Male	88	(85–90)	<0.01
	Female	93	(91–95)	
Age at diagnosis	0–44	94	(92–96)	*<0.01*
	45–54	93	(91–96)	
	55–64	92	(90–95)	
	65–74	88	(84–91)	
	75+	82	(76–89)	
Specific years	1990	86	(84–88)	*<0.01*
	1995	90	(89–92)	
	2000	92	(90–93)	
	2004	90	(88–92)	

Figure 12: Victorian melanoma mortality 1970–2005

Age-standardised melanoma mortality per 100,000 Victorians by gender, 1970–2005[3].

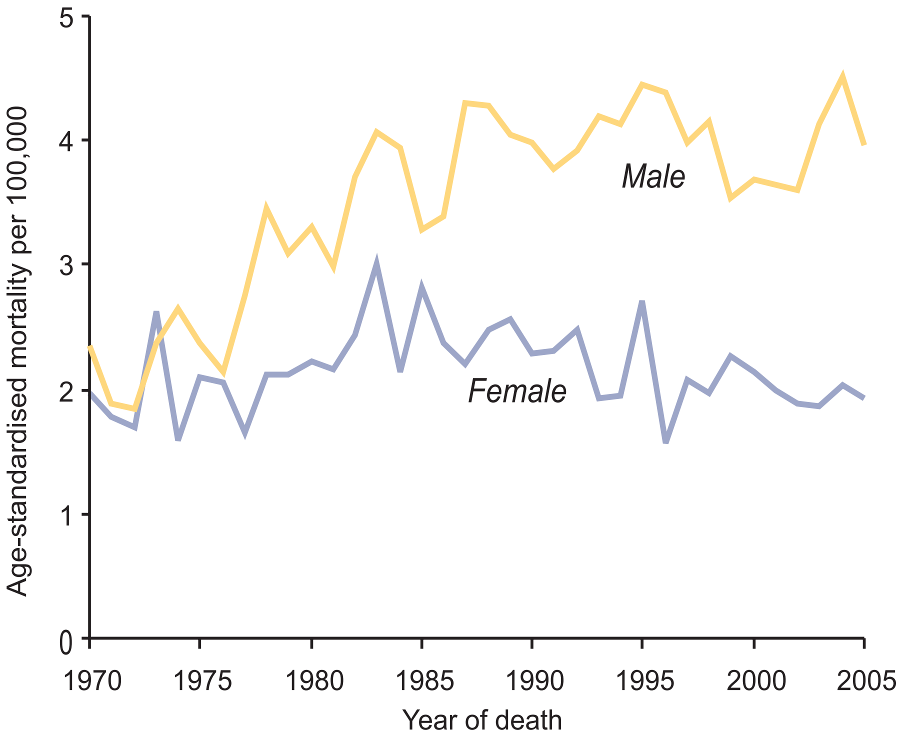
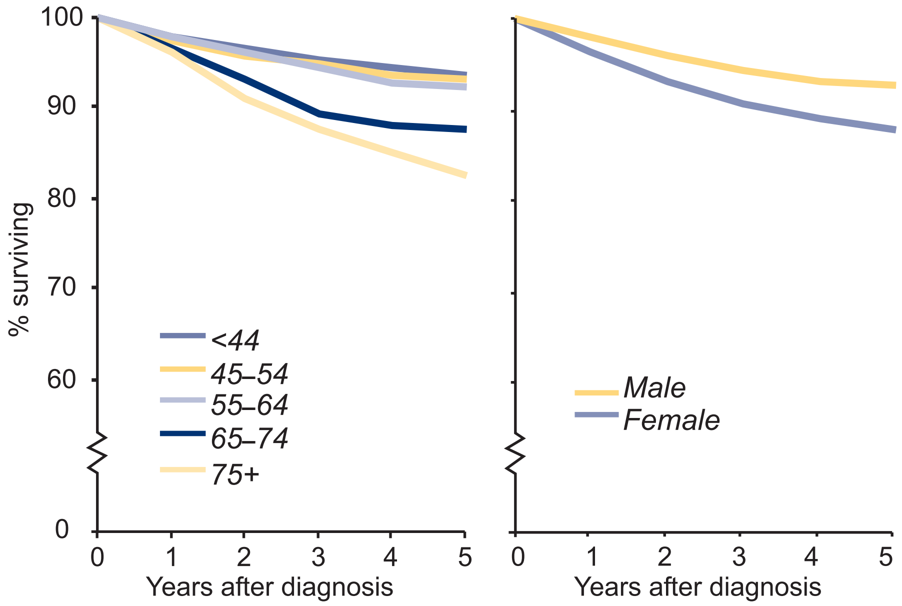


Figure 13: Melanoma survival by age group and sex, Victoria 2004

Period relative survival for Victorians with melanoma. The figures represent the estimated proportions of Victorians with melanoma in 2004 who survived at least 1, 2, 3, 4 or 5 years from their diagnosis for males and females and by age group at diagnosis[18].



Comparative Incidence

Australia has the highest rates of malignant melanoma in the world

Regional patterns

Figure 14 shows comparative incidence of melanoma in selected countries. The incidence varies widely with the highest rates being observed in white populations who are exposed, by habitation or recreational habits, to sunny climates. Australia has the highest incidence rates in the world with only New Zealand coming close to these. In Australia in 2002 the age-standardised rates were 38.5 and 29.5 per 100,000 men and women respectively. Interestingly, and most likely due to increased awareness of melanoma and earlier detection, the ratio of mortality to incidence is inversely related to incidence. The four countries with the lowest incidence rates in Figure 14 have mortality rates, more than 50% of incidence. Only the four countries with the highest incidence have mortality of less than 20% of incidence rates with Australia the lowest at 13%. The figures given here are for men but similar patterns are seen in women[19].

Australian melanoma incidence, as with NMSC, shows a strong latitudinal gradient. Figure 15 shows the incidence rates for the states for 2004 (NT and ACT are not yet available). Rates in Queensland are over 150% of those in the southern states with similar patterns in both sexes.

In Australia melanoma incidence shows a strong latitudinal gradient with rates in the north being significantly higher than those in southern states

Migrant incidence

The incidence of melanoma in Victoria was analysed by region of birth for cases diagnosed in the years 1993–1999. This analysis showed that no migrant group had a higher rate of melanoma than Australian born Victorians in either men or women. Figure 15 shows the rates for major migrant groups by sex. All groups had significantly lower rates than the Australian born, with migrants from "Other Europe" (i.e. those not from the British Isles or Mediterranean countries) having the closest rates. Though migrants from Britain and northern Europe are likely to possess some of the high risk characteristics for melanoma, such as fair skin or skin that burns easily when exposed to strong sunlight, they may have avoided sun exposure as small children, which is thought to be an important risk factor in the later development of melanoma.

The risk of melanoma has been shown to increase with age of arrival in migrants to Australia. The risk of developing superficial spreading melanoma (the most common type) approximated the native-born rate in migrants arriving before the age of 10 years, with a reduced risk among those arriving between ages of 10 and 14, and a further risk reduction to 25 per cent of the native-born rate among those arriving between the ages of 15 and 19 years. There was no further reduction in risk for those arriving after 19 years of age. Analysis of all melanoma types combined showed that arrival in Australia after 10 years of age was protective[20].

Incidence in Victorian regions

Age-standardised rates for melanoma varied between the eight Victorian Department of Human Services Integrated Cancer Services Regions. Rates in metropolitan Melbourne were lower than those for regional Victoria. The highest rates were observed in Gippsland (though these were not statistically different from those for Loddon-Mallee, Hume or Barwon regions) and lowest rates (significantly lower than any other region) in the Western & Central metropolitan region. Rates varied between the regions from 20–36 and 16–33 new cases per 100,000 men and women respectively. Differences may reflect higher proportions of migrants at low risk of melanoma living in metropolitan regions, but also the differences in sun exposure between urban and rural dwellers[18].

Figure 14: International melanoma incidence 2002

Estimates of melanoma incidence for men and women from selected countries. Age-standardised incidence rates per 100,000 persons (standardised to World Standard Population) from Globocan[19].

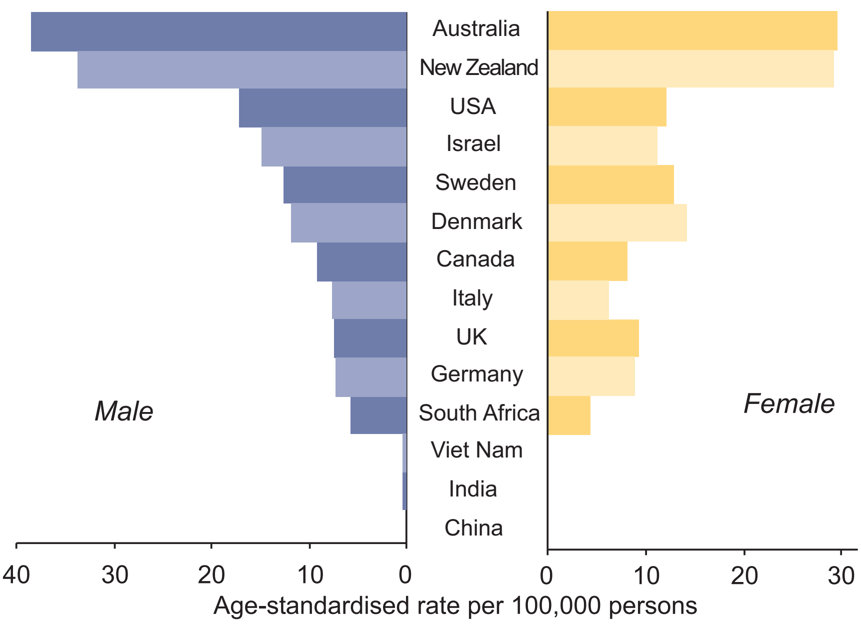


Figure 15: Melanoma incidence by Australian states, 2004

Age-standardised incidence per 100,000 persons (Australian 2001 standard population) of melanoma in Australian states in 2004 (Tasmania is 2003) showing the strong latitudinal gradient in rates for both men and women.

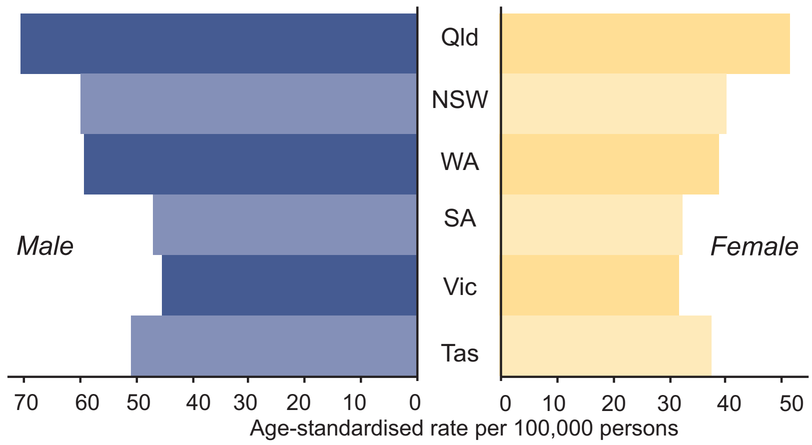
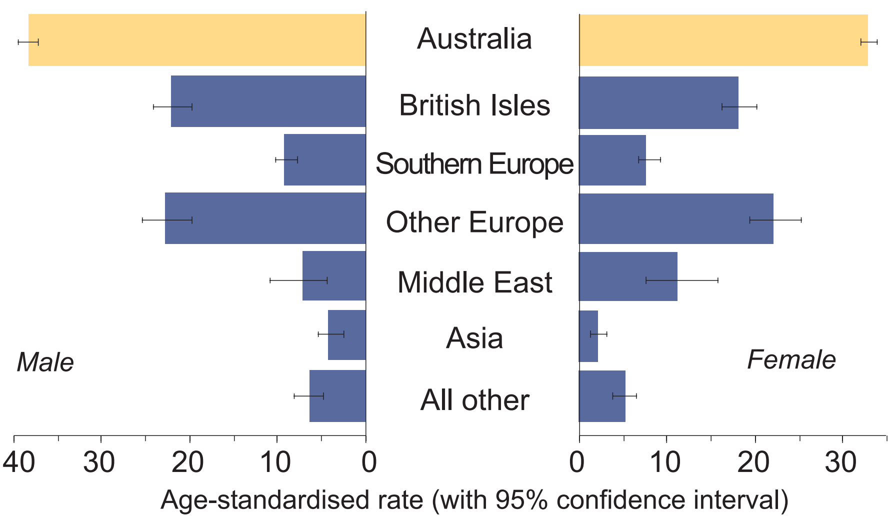


Figure 16: Melanoma incidence in Victoria by birthplace

The graph of migrant incidence rates shows age-standardised rates and their 95% confidence intervals for melanomas diagnosed in 1993–1999. No migrant group has a confidence interval that overlaps that for the Australian born, indicating that all groups have rates significantly lower than those for Australian born Victorians.



SunSmart

Evolution

In 1980 the Cancer Council Victoria launched the Slip! Slop! Slap! campaign to encourage people to reduce their exposure to ultraviolet (UV) radiation. The limited public education campaign, featuring Sid Seagull singing "Slip! Slop! Slap!", was funded through public donations income[21].

In 1988 the Victorian Health Promotion Foundation (VicHealth) funded the Cancer Council to launch the SunSmart program as a new multi-faceted skin cancer control program[22].

The SunSmart program and brand is now well recognised by the majority of Victorians[23].

Aims and objectives

SunSmart aims to develop, implement and evaluate effective sun protection programs that reduce the incidence of skin cancer morbidity and mortality in Victoria.

SunSmart specifically targets people at high risk of skin cancer – those who have inappropriate behaviour and attitudes towards sun protection in who intervention is most likely to reduce the years of life lost to skin cancer.

The SunSmart program helps communities – local government, schools, early childhood services, workplaces and sporting groups – with the development and implementation of sun protection policies and practices. SunSmart incorporates public awareness campaigns; professional education and strong components of program evaluation and research.

Research by the Cancer Council Victoria, in the form of regular population surveys, shows that SunSmart's messages have reached many Australians and had a strong impact on their attitudes and behaviour[24].

Evidence is now emerging that even though there is an overall increase in NMSC rates, in younger people this is beginning to plateau after decades of increase[2]. Melanoma mortality is also declining in younger age groups[26, 27]. The earlier detection of skin cancer is leading to better treatment and long-term survival rates[28]. The stabilisation in common skin cancer rates may be attributable to prevention efforts over the past two decades, while the overall increase points to the importance of maintaining and strengthening these programs[2].

SUNSMART UV ALERT

A recent initiative of SunSmart, in partnership with the Bureau of Meteorology and the Australian Radiation Protection and Nuclear Safety Agency, is the SunSmart UV Alert (see Figure 17).

The SunSmart UV Alert is a tool to alert Australians to potentially damaging levels of UV radiation on a daily basis. It is based on the Global Solar UV Index, a rating system adopted from the World Health Organisation. The higher the Index value, the greater the potential for damage to your skin.

UV levels are largely determined by latitude, cloud cover, time of year and time of day. For this reason it is important for Australians to understand that the UV index can change each day and is different for each month and each season (see Figure 18).

Also, because the northern states of Australia are closer to the equator they have a higher UV Index than the southern states.

Figure 17: How to read the UV Alert

Instructions for interpreting the daily UV Alert charts from the Bureau of Meteorology[29]

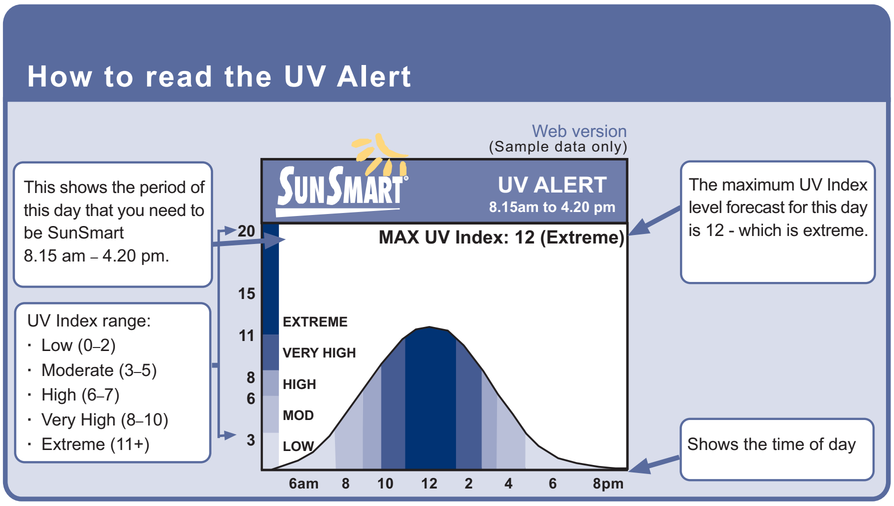
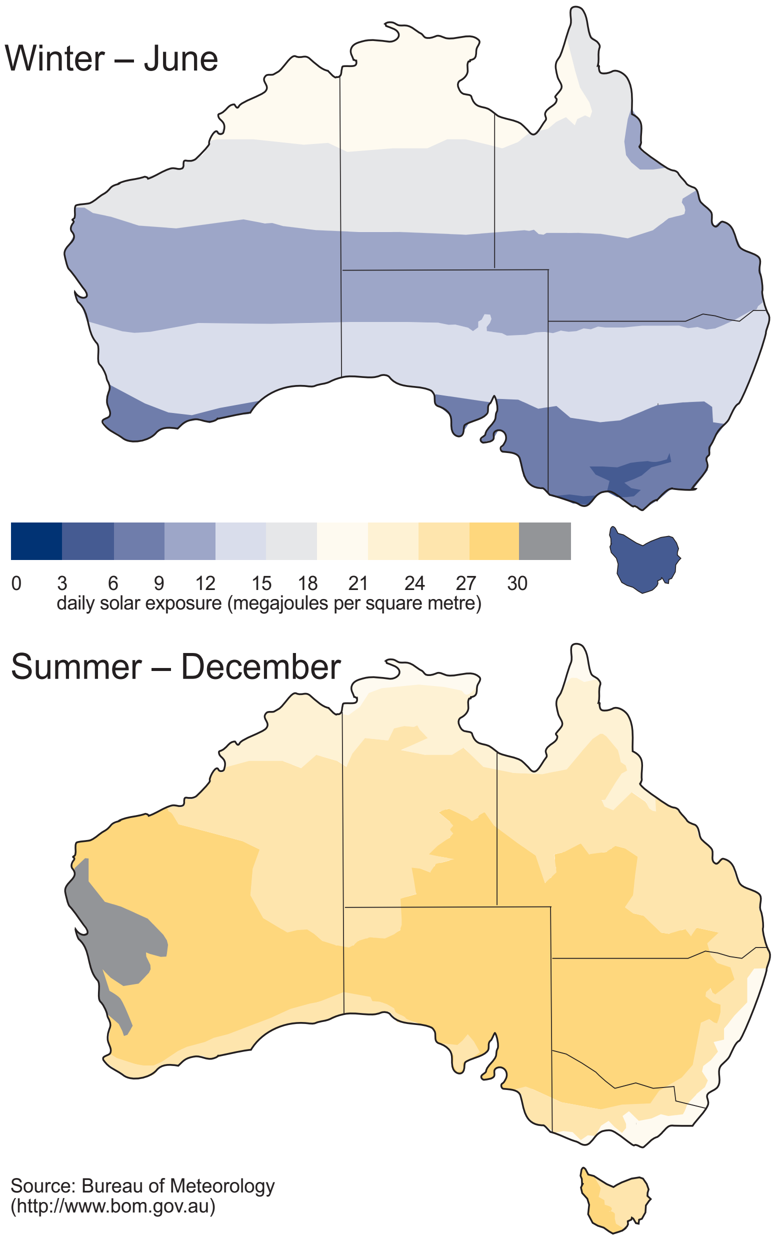


Figure 18: Average daily solar exposure, Australia, June and December

Maps showing the average total daily solar exposure in Australia in June (winter) and December (summer), revealing clearly the latitudinal and seasonal variation in exposure levels[30].

Other factors influencing exposure include cloud cover, altitude (the thinner atmosphere at higher altitudes absorbs less radiation), ozone layer depletion (ozone absorbs some UV radiation), and ground type (soil and grass reflect about 10% of radiation, snow 80%, sand 50% and sea foam 25%[31]



Source: Bureau of Meteorology (http://www.bom.gov.au)

The Alert is issued by the Bureau of Meteorology when the UV Index is forecast to reach 3, a level at which skin damage may occur ,increasing the risk of skin cancer. It identifies the hours during which the UV index will reach 3 or above. The alert is used to raise public awareness of the risk of exposure to UV radiation and to encourage people to adopt appropriate sun protection measures during times of high UV radiation.

The Cancer Council Australia recommends Australians take five steps to protect against sun damage when the SunSmart UV Alert indicates the UV Index is at 3 or above:

1. **Slip on sun-protective clothing** that covers as much skin as possible
2. **Slop on SPF30+ sunscreen** making sure it is broad spectrum and water resistant. Put it on 20 minutes before you go outdoors and every two hours afterwards. Sunscreen should never be used to extend the time you spend in the sun.
3. **Slap on a hat** that protects your face, head, neck and ears
4. **Seek shade**
5. **Slide on sunglasses** make sure they meet Australian Standards

Extra care should be taken between 10 am – 3 pm when UV Index levels reach their peak.

The SunSmart UV Alert is reported in most daily newspapers and some television and radio weather forecasts across Australia. SunSmart UV Alerts are also available on-line linked from the forecast pages for each state and territory. Web SunSmart Alerts will soon be available for many more Australian cities and towns. These will be linked from the state and territory 'UV Index Forecasts for Towns and Cities' pages of the Bureau of Meteorology website (www.bom.gov.au).

For more information about the SunSmart program see the website www.sunsmart.com.au.

SUNSMART®

UV ALERT

8:15am - 4:20 pm

Emerging issues in skin cancer control

In Victoria, adequate Vitamin D levels can be obtained in

Summer: by sun exposure to face, hands or arms for a few minutes daily either side of peak UV periods

Winter: by weekly accumulated sun exposure of 2–3 hours

Vitamin D

Evidence has been accumulating that in addition to maintaining bone health, Vitamin D has a positive role on many other aspects of our health, and prevalence of deficiency may be increasing. This is having an impact on the future of public health advice with regard to skin cancer prevention. The positive and negative effects of sunlight present challenges to public health practice and the provision of appropriate sun protection advice. A balance is required between avoiding an increase in the risk of skin cancer and achieving enough ultraviolet B (UVB) radiation exposure to maintain adequate vitamin D levels.

Dietary vitamin D can be obtained from foods such as milk, margarine, oily fish, eggs, liver and cheese, but is generally only present in small amounts. Most vitamin D is produced as a result of UVB radiation to the skin[32].

In Australia, where UV radiation levels are in the high to extreme range for most of the year, sun protective measures to reduce the risk of skin cancer must continue to be a public health priority. The majority of Australians generally have sufficient UVB radiation exposure to enable adequate vitamin D production (serum 25-hydroxy vitamin D levels >50 nmol/L) to form and maintain healthy, strong bones.

Most people achieve adequate vitamin D levels through the UVB exposure they receive during typical day-to-day outdoor activities. For example, it has been estimated that adequate vitamin D levels can be achieved in summer by the face, hands and arms being exposed to as little as a few minutes of sunlight either side of the peak UV periods on most days of the week. In winter, in the southern states where UV radiation is less intense, vitamin D levels can be maintained by 2-3 hours of sunlight exposure accumulated over a week.

Individuals at high risk of skin cancer – those who have had skin cancer, have received an organ transplant or are highly sun sensitive – need to be more rigorous in their sun protection practices and should discuss with their medical practitioner whether dietary supplementation with vitamin D is necessary.

There are also groups within the community who are at increased risk of vitamin D deficiency and may need dietary supplements. People at risk include the elderly, babies of vitamin D deficient mothers, people who are in institutional care or housebound, dark skinned people and those who cover their skin for religious or cultural reasons.

Vitamin D deficiency in children can cause rickets, characterised by bone deformities and muscle weakness. For adults with low vitamin D, problems may include osteoporotic fractures, bone and joint pain, muscle and bone weakness and difficulty walking.

There is no evidence to suggest that any type of solarium is less harmful than natural sun exposure and solariums may emit much higher concentrations of UV radiation than the sun.

Some recent studies have suggested possible beneficial effects of sun exposure in the prevention or improvement in outcome for a number of other diseases including breast, prostate and bowel cancer, non-Hodgkin lymphoma and multiple sclerosis[33-36]. However, the biological pathways underlying these associations are not in all cases clear and at this stage there is insufficient evidence to make any recommendations on the basis of these findings.

A position statement on "The risks and benefits of sun exposure", endorsed by the Australian and New Zealand Bone and Mineral Society, the Osteoporosis Australia, The Cancer Council Australia and The Australasian College of Dermatologists, can be obtained from the Cancer Council Australia website (http://www.cancer.org.au/Healthprofessionals/PositionStatements/sunsmart/risksandbenefitsofsunexposure.htm).

Other SunSmart position statements on a variety of issues such as fake tans, tinted windows, eye protection and sunscreen may also be found here.

Solariums

The desire to acquire a tan for fashion or cosmetic purposes has led to the development of an increasingly large solarium industry in Australian capital cities. Skin cancer experts are alarmed that the number of solariums across Australia has increased by over 300% in the past decade. Melbourne accounts for over 40% of all solariums in Australian capital cities and has shown a 576% increase in the last ten years[37].

All forms of ultraviolet radiation contribute to skin cancer[38] and a solarium tan is induced by ultraviolet radiation. In general solariums emit predominantly UVA but in recent years they have been manufactured to produce higher levels of UVB to mimic the solar spectrum and higher levels of UV intensity to speed the tanning process. There is good evidence to suggest that a small dose of UVB used in conjunction with UVA, as used in solariums, is a cause of skin cancer. A recent systematic review by the International Agency for Research on Cancer concluded that use of a solarium before the age of 35 boosted the risk of melanoma by 75%[39]. In the UK, it is estimated that around one quarter of all melanomas found in young women may be attributable to sunbed use[40]. There is no evidence to suggest that any type of solarium is less harmful than natural sun exposure and solariums may emit much higher concentrations of UV radiation than the sun[41, 42].

To date, solariums have operated under a voluntary standard. However, studies have shown that there is low compliance with the standard, in particular in restricting access to those under 18, and those with skin type 1 (fair skin which burns and does not tan)[43]. The recent research highlights the urgent need for government regulation of the solarium industry, as recommended by the World Health Organisation[44].

The issue of regulation of the solarium industry became very topical in August 2007, when a young Melbourne woman, Clare

Oliver, who had melanoma, went public with her story. Ms Oliver attributed her melanoma largely to her previous solarium use. Ms Oliver's case drew significant media attention, which resulted in considerable public and political interest. In response to her story, Victorian Health Minister Daniel Andrews announced he would introduce regulation of the solarium industry in Victoria.

Clare Oliver died on September 13, however her determination to raise awareness about the dangers of solarium use will have a lasting legacy.

A position statement on solariums endorsed by The Cancer Council Australia and its affiliated members, The Cancer Society of New Zealand and The Australasian College of Dermatologists is available at http://www.cancer.org.au/Healthprofessionals/PositionStatements/sunsmart/solariums.htm.

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Cancer Epidemiology Centre Publications

Canstats

Annual Victorian Cancer Registry statistical reports were produced for the years 1982-1990. From 1991 these annual reports have been published in the Canstat Series.

The latest annual report is No. 42: Cancer in Victoria 2004 (November 2006).

Other Canstat titles include:

Cancer in Adolescents and Young Adults
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Testicular Cancer
Trends in Cancer Mortality, Australia 1910-1999
Lung Cancer
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Breast Cancer
Ovarian Cancer

Reports

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