Skin Cancer Prevention Partnership

A Framework for Action 2023–28

Government of South Australia

Wellbeing SA

In partnership with Cancer Council SA

Foreword

The Skin Cancer Prevention Partnership– a Framework for Action 2023–2028 (the Framework) is a joint initiative between Wellbeing SA and Cancer Council SA to take forward their common interest in reducing the incidence and mortality from skin cancer.

Whilst this is the first formal document setting out our joint commitments for skin cancer prevention in South Australia it is important to acknowledge there has been significant collaborative work in this area for many years.

From this place of partnership, we recognise that we can achieve much more by working together than we can achieve on our own. This document sets out common objectives, priority populations most at risk, and evidenced-based strategies to guide the available investment and prevent skin cancer.

It is hoped that this multi-strategy approach will reduce overexposure to solar ultraviolet radiation (UVR), increase early detection of skin cancer, and save lives. At the same time, we will continue to monitor data to identify emerging trends and modify our approach if required.

Skin cancer accounts for 12% of the total cancer-related health system expenditure, and about 1% of the total health system costs for all diseases.[1] It is the most expensive type of cancer to treat, and overexposure to UVR is also estimated to account for the highest amount of spend on cancer attributed to a risk factor (31%).[2] A public health approach to skin cancer prevention will ultimately reduce costs and pressure on the health system and benefit individuals and the general population.

Through collaborative action on skin cancer prevention, we believe we can improve population health and strengthen existing alliances. We hope to forge new partnerships with organisations well placed to support sun protection behaviours.

We commend and endorse this document.

Lyn Dean
Chief Executive
Wellbeing SA

Kerry Rowlands
Chief Executive
Cancer Council SA

Contents

1.0 Plan on a page

Objectives · Priority populations · Priority settings · Strategies

An Action Plan accompanies this Framework and outlines commitments within available resources.

2.0 Data insights

The incidence of skin cancer has changed over the last 40 years. Whilst the rates of melanoma of the skin is declining in younger people who have been exposed to prevention messages, it continues to increase among older people and is higher among males aged 40 and over, who will be a priority for action in this Framework.

Skin cancer is a **major cause of illness and death in Australia** and a large burden on the health system.

MELANOMA IN AUSTRALIA[3]

1982	2018	
5th	4th	most diagnosed cancer
26.7	54.1	cases per 100,000 people

The improvement in melanoma incidence among younger people aged 25 years and younger[4,5] coincides with increased community awareness and implementation of early intervention which impacts on life-long skin cancer risk. Due to the latency period for skin cancer, the downward trend has not been observed in older populations. Cancer Council's Slip, Slop, Slap slogan was first introduced in 1981 (updated in 2007 to Slip, Slop, Slap, Seek, Slide) and is a core message which has supported a large change in sun protection attitudes and behaviours over the past 40 years.[6] It is important that younger people remain a key target group moving forward to continue to embed healthy sun protection behaviours into social norms.

The incidence of keratinocyte cancer in Australia has increased during the past 30 years at a rate of approximately 2–6% per year, mostly in older age groups. Sixty-nine per cent of Australians will have at least one excision for histologically confirmed keratinocyte cancer in their lifetime (60% to age 79 years).[7]

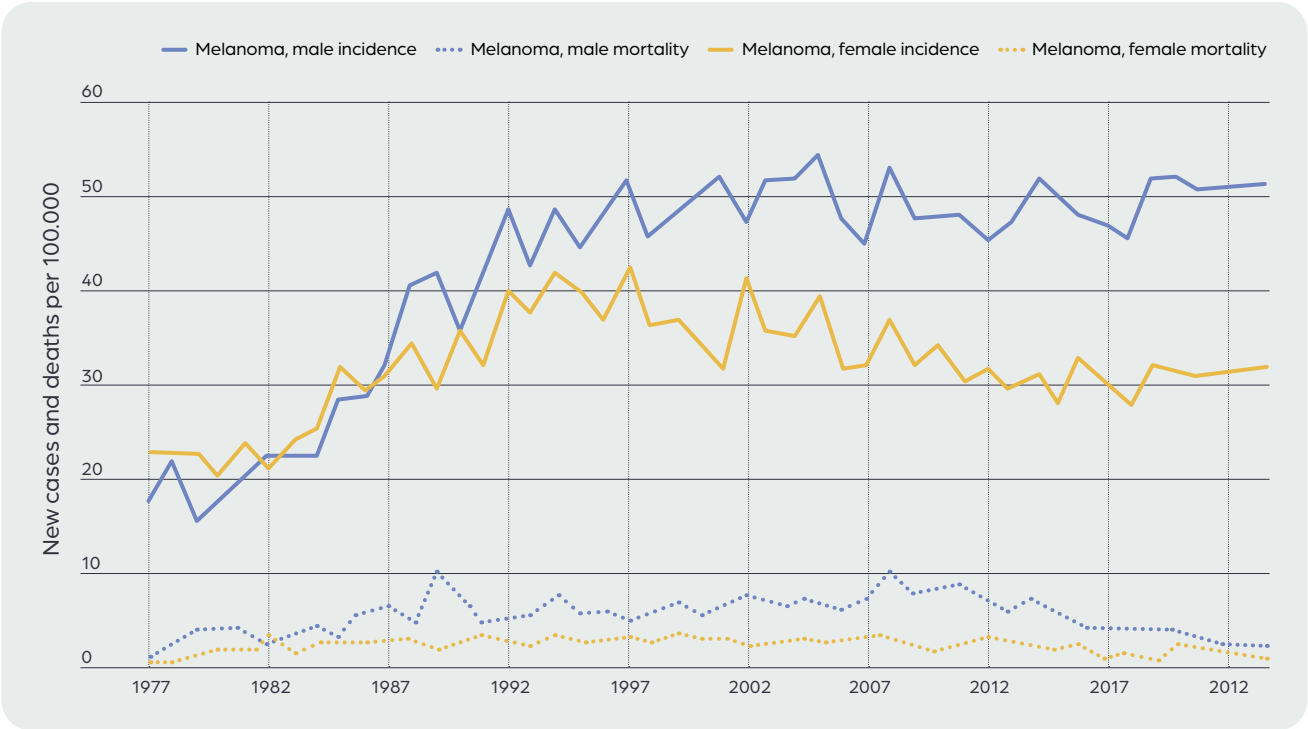
In 2018, **the age-standardised incidence rate of melanoma in South Australia** was 45.9 cases per 100,000 males and 28.6 cases per 100,000 females.[8]

MELANOMA IN SOUTH AUSTRALIA 2020

Melanoma incidence and mortality	Male	Female
Leading cancer type	4th	4th
Incidence rates between 2016 and 2020	▲ 2.7%	▼ 0.6%
Lifetime risk of dying from melanoma of the skin (2020, calculated to age 75)	1 in 393	1 in 721

Melanoma trends

Melanoma incidence and mortality, South Australian Cancer Registry, 1977–2020 with projections to 2023.



2.1 Sunburn rates over time

Data over time shows us that a significant proportion of South Australians are still getting sunburnt. July 2018 to March 2020 data is from the SA Population Health survey (SAPHS), 2021 and 2022 data are from the Population Health Survey Module System surveys (PHSMS).

More adult respondents in 2020 (January to March, SAPHS) reported sunburn (44.6%) while respondents in 2021 (June, PHSMS) reported the lowest rates of sunburn (31.4%).

Data are only available for children from SAPHS between 2018–2020. Almost half (48.5%) of the children in 2020 (January to March, SAPHS) reported a sunburn in the past 12 months while only 38.3% did so in 2019 (January to December, SAPHS).

Seasonal variation could potentially influence this question as people may be more likely to report sunburn in the past 12 months when asked in the summer months than in the winter months.

It is estimated that around **200 melanomas and 34,000 keratinocyte cancers** per year are caused by occupational exposures in Australia.[9]

Proportion of adults (18+ years) and children (0–17 years) who reported a sunburn in the past 12 months (SAPHS 2018–2020) PHSMS June 2021, PHSMS June–August 2022)

	Adults		Children	
	n/N	% (95% CI)	n/N	% (95% CI)
2018 July to Dec (SAPHS)	1413/4157	34.0(32.6–35.4)	466/1089	42.8(39.9–45.7)
2019 Jan to Dec (SAPHS)	2257/5505	41.0(39.7–42.3)	525/1372	38.3(35.7–40.9)
2020 Jan to March (SAPHS)	685/1465	44.6(42.0–47.1)	179/370	48.5(43.3–53.5)
2021 June (PHSMS)	936/2984	31.4(29.4–33.0)		
2022 June–August (PHSMS)	1020/2984	34.2(32.5–35.9)		

CI: Confidence Interval. Note: the weighting of the data can result in rounding discrepancies or totals not adding. Don't know/refused excluded.

3.0 Sun protection practices and skin cancer

The South Australian Population Health Survey (SAPHS) is a cross-sectional survey used to monitor the health of all South Australians (n = 7,000, each year). The survey includes questions about sun exposure and the protective measures being used by individuals to protect themselves from UVR overexposure.[10]

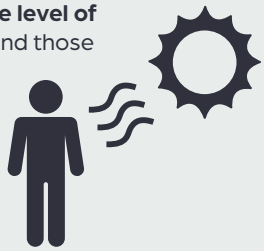
SUNBURN

41.0% of adults and **38.3% of children** reported having been sunburnt in the last 12 months.

Children aged 4 years and under were less likely to have been sunburnt.

Children living in **rural areas** and those **aged 10 to 14 years** were more likely to report having been sunburnt.

Males, younger respondents, those living in **rural areas,** those with a **TAFE, trade, or certificate level of education,** and those with **higher household income** were more likely to be sunburnt.



SUN PROTECTION

91.0% Children & 74.1% Adults

Use SPF 30+ sunscreen or face moisturiser that includes SPF 30+

78.3% Children & 55.7% Adults

Wear a broad brimmed hat

Sunglasses, sunscreen + shade

Most popular sun protection methods

82.3% Children & 83.0% Adults

Seek shade

91.0% Children & 74.1% Adults

wear clothing to protect from the sun (long sleeves, collars, long pants).

98.3% Children & 97.9% Adults

Use some form of sun protections in summer.

52.0% Children & 83.5% Adults

Wear sunglasses

3.1 Skin cancer and geographical location

High rates of melanoma and keratinocyte cancers have been reported amongst individuals residing in or within the vicinity of coastal areas both in metropolitan and regional South Australia. This can be attributed to individuals generally spending extended periods of time outdoors without appropriate sun protective measures, in turn increasing the risk of skin cancer. Moreover, high rates of keratinocyte cancer have also been reported amongst Australian farmers, attributed to the nature of their outdoor work.[11]

THE ECONOMIC COSTS OF SKIN CANCER

$1.7 billion

Cost of skin cancer in 2018–19.[12] ($0.4 billion for melanoma and $1.3 billion for keratinocyte cancer). The lower costs of melanoma are due to the substantially lower incidence rates compared to keratinocyte cancer.

Skin cancer is the most expensive cancer type to treat.

Of total cancer-related health system expenditure is due to skin cancer.

~1%

Of the total health system costs for all diseases is due to skin cancer.[13]

Overexposure to UVR is estimated to account for the highest amount of spend on cancer attributed to a risk factor (31%).[14]

Sun protection is recommended **to minimise skin cancer risk** when UVR levels are 3 and above.

3.2 Sun exposure and vitamin D

Although UVR has harmful effects on the eyes and skin and is the major cause of skin cancer in Australia, some sun exposure does have beneficial effects on health.

Exposure to UVB radiation allows the skin to synthesise Vitamin D which is essential for bone development in children and skeletal health in adults and may protect against dementia and autoimmune diseases such as multiple sclerosis.[15,16]

Additionally, independent to vitamin D levels, exposure to longer wavelengths in sunlight can influence circadian rhythm and improve mood and sleep. This sun exposure can be achieved through morning and late afternoon exposure when UVR levels are low.

For many people in Australia, a very small amount of time outdoors is needed to meet effective UVR exposure for vitamin D synthesis. Therefore, sun protection is recommended to minimise skin cancer risk when UVR levels are 3 and above. Those that are concerned about acquiring adequate UVR exposure for vitamin D synthesis due to residential, health, cultural, occupational or lifestyle reasons are encouraged to speak to their healthcare practitioners.

3.3 Climate change and skin cancer risk

There has been an increase in awareness of the impact of climate change on human health over recent years.

Australian research has demonstrated a strong link between high temperature and behaviours such as wearing clothes that do not provide a physical barrier from UVR. These result in greater skin cancer risk due to increased rate of sun damage, including sunburn. However, very high temperatures may in contrast prompt behaviours to avoid sun exposure.[17]

The impact of climate change highlights the need to place a high priority on the importance of both skin cancer prevention programs and monitoring of behaviours in the future.

3.4 The impact of COVID-19 on skin cancer diagnosis

The full impact of the COVID-19 pandemic on cancer diagnosis and treatment will not be known for several years.

We do know that it has led to fewer in-person consultations with general practitioners (GPs) and the implementation of telehealth consultations. This, alongside extended COVID-19 restrictions, may in turn lead to a reduction in skin checks and skin cancer diagnoses due to people delaying seeking medical advice about suspicious lesions and poor image quality of photographs. [18,19] Studies have shown that dermoscopy is more accurate when interpreted with the patient present rather than using dermoscopy images. Support for its use in primary care are limited, however it may assist GPs to correctly identify people with suspicious lesions who need to be seen by a specialist.[20]

Skin cancer checks peak in Australia in the late summer months but the impact of the pandemic and the move towards telehealth appear to have changed this pattern. An Australian study conducted by Roseleur et al. of 370 general practice electronic health records showed that the peak of any skin cancer diagnosis in quarter one of 2020 was 20% lower than that observed in the same quarter in three previous years and remained lower in quarter two of 2020. A similar pattern was observed for keratinocyte cancer, with a greater reduction for melanoma (32%). A change in pattern for skin cancer checks was also observed.[21]

An examination of 2020 Medicare Benefits Schedule claims data by Cancer Australia showed that the observed number of services nationally for melanoma-related therapeutic procedures was 14% lower than expected and there were 11,245 fewer services than expected. For South Australia, there were 650 fewer services related to melanoma, equating to a decrease of 15%.[22]

The impact of COVID-19 highlights the critical need for intervention to encourage early diagnosis and treatment of suspicious skin lesions.

4.0 Historical and current skin cancer prevention initiatives

Whilst this is the first Framework for South Australia, Cancer Council SA have been working to prevent skin cancer for many years.

4.1 Cancer Council SA initiatives

Cancer Council SA (CCSA) has had a leadership role in the development and implementation of skin cancer prevention campaigns and programs in South Australia since the 1980s, often drawing on the experience and expertise of other jurisdictions and Cancer Council Australia.

CANCER COUNCIL CAMPAIGNS AND PROGRAMS INCLUDE:

- **Sid Seagull – Slip, Slop, Slap, Seek and Slide**
  cancer.org.au/cancer-information/causes-and-prevention/sun-safety/campaigns-and-events/slip-slop-slap-seek-slide
- **UV Index campaign – When UV is 3 and above**
  myUV.com.au
- **UV. It all adds up**
  cancerwa.asn.au/prevention/sunsmart/sunsmartmediacampaigns/uv-it-all-adds-up/
- **Don't let the sun see your DNA**
  cancersa.org.au/dont-let-the-sun-see-your-dna/
- **When you cover things, they last longer. Same goes for you**
  cancersa.org.au/sunsmart-same-goes-for-you/
- **SunSmart Schools and Early Childhood Program**
  cancersa.org.au/prevention/sunsmart/sunsmart-program/

4.2 Wellbeing SA initiatives

To complement the Wellbeing SA dermoscopy training, CCSA funded 25 dermatoscopes in 2022 for doctors who had undertaken Wellbeing SA–funded training, subject to the following selection criteria:

- level of remoteness (higher score awarded for rural and remote practices)
- higher area-level disadvantage (SEIFA index for postcode)
- higher prevalence rate of melanoma
- level of access to a current dermatoscope (higher score awarded for those without access to a dermatoscope, or a high ratio of GPs per dermatoscope currently available in the practice).

Wellbeing SA has also implemented skin cancer prevention and detection initiatives.

Skin cancer prevention campaigns were funded in early 2021 and late 2022, extending the reach, impact, and frequency of existing CCSA campaigns. Co-investment reduces duplication for consumers and provides time and cost efficiencies for government. Dual branding (CCSA and Government of SA) provides the community with confidence that the health message is from a reliable source.

Dermoscopy training was funded in 2021 and 2022 and aims to increase the confidence and accuracy of GP referrals to dermatologists ensuring more targeted referrals and more accurate and timely treatments occurring in GP surgeries. This initiative will be repeated in 2023.

As part of the South Australian Walking Strategy 2022–2032, Wellbeing SA outlined priorities which included: 'Plan walkable neighbourhoods, towns, and cities' and 'Build connected, safe and pleasant walking environments for all'. This could include working with policy makers to influence the provision and retention of street trees. Street trees provide shade along walking routes and shaded meeting areas and contribute to reinvigorated main streets and neighbourhoods through shade and awnings to make walking a pleasure in any weather.[23]

The Healthy Parks Healthy People SA Framework (2021–2026) notes:

i. the harms to human health that are mitigated due to trees and green space, like safety, air pollution, UV radiation, and heat exposure (p36)
ii. improved quality and quantity of green infrastructure can strengthen the resilience of towns and cities to respond to the major current and future challenges presented by complex issues such as population growth and climate change. Green infrastructure also provides return on investment as a structural asset, which provides benefits for people, communities and for the environment (p36).[24]

Through Healthy Parks Healthy People SA, Wellbeing SA has partnered with Green Adelaide, the Department for Infrastructure and Transport and metropolitan local councils to map green cover, canopy cover, impermeable surfaces, urban heat, and social vulnerability. The analysis will ensure a strategic and equitable approach to future tree planting with priority areas for action. Green infrastructure, particularly tree canopies, provide a range of benefits to human health and wellbeing. Shade, as an example, can benefit skin cancer prevention, particularly for people using local streets and parks for recreation and physical activity. Socio-economically disadvantaged areas can often have fewer street trees, parks and other green spaces, denser housing, and fewer opportunities to increase the tree canopy.

The Local Government Association Public Health Partner Authority Agreement builds upon existing investment to strengthen partnerships and collaboration in public health and community wellbeing between State and local government. In 2022, Wellbeing SA funded a project officer position within the Local Government Association to actively support and build the capacity and capability of South Australian councils to invest in and strengthen community wellbeing. Local government is a key enabler of many aspects of community wellbeing, including accessible, greener urban neighbourhoods including parks, and increasing tree canopy coverage to provide additional shade for walkways, cycle paths and play spaces.

5.0 Our Framework for Action

The aim of the Skin Cancer Prevention Partnership – a Framework for Action is to reduce the incidence and impact of skin cancer in the South Australian population.

Skin cancer is the most preventable cancer, with skin cancer prevention programs having been shown to be effective and cost-effective.[25] Furthermore, the evidence indicates that investing in preventing skin cancers results in cost benefits to governments and society.[26] As the majority of skin cancers are avoidable and curable it is important that primary prevention of skin cancer remains a priority.[27] This Framework focuses on prevention and early detection as a means to reduce the personal and economic costs to individuals and the growing burden on the health system into the future.

5.1 Objective 1: Reduce ultraviolet radiation exposure

UVR exposure during the first 18 years of a person's life is a critical risk factor for skin cancer.[28] Studies of migrants from low UVR environments to high UVR environments also add to the evidence that childhood and adolescence are critical periods during which exposure to UVR is more likely to contribute to skin cancer in later life.[29]

Anyone may develop skin cancer but for people with darker skin the risk of skin cancer is reduced, although not eliminated entirely. Australia experiences some of the highest levels of UVR in the world. Therefore, it is recommended that sun protection measures are practised regardless of skin type.

Risk factors for skin cancer

- Skin type (according to the Fitzpatrick scale), with skin types I to II considered highest risk, skin type III to IV considered medium risk and skin types V to VI considered low risk[30]
- Lifetime exposure to UVR (high intensity bursts and/or prolonged exposure)
- Previous skin cancer diagnosis or a family history of skin cancer
- Immuno-compromisation or other health conditions i.e. organ transplant recipients, photosensitivity, genetic conditions[31]
- Environmental factors, such as location (in relation to altitude and latitude) and the surrounding environment, which may reflect more UVR and increase indirect UVR exposure
- Use of sun protection behaviours.

Modifiable risk factors can be mitigated using a settings approach, policy interventions, and programs to address exposure in childhood and high-risk occupations.

Cancer Council recommendations for preventing skin cancer through reducing UVR exposure include using a combination of the following sun protection measures.

- **Slip** on sun protective clothing that covers as much skin as possible. Wearing tightly woven fabric and dark colours provide higher UVR protection.
- **Slop** on broad spectrum, water resistant SPF50+ sunscreen. Apply as part of the morning routine on days when UV is forecast to be 3 and above and if planning outdoor activities, reapply 20 minutes before going outdoors and again every two hours afterwards.
- **Slap** on a hat – broad brim, Legionnaire, or a bucket-style hat to protect the face, head, neck, and ears.
- **Seek** shade.
- **Slide** on close-fitting, wraparound sunglasses that meet AS/NZS 1067.1: 2016 standards for sun protection.

5.2 Objective 2: Increase early detection

Primary prevention and early detection of skin cancer are likely to have the greatest impact on reducing the incidence and mortality from skin cancer in the South Australian community. Population-based screening is not recommended for melanoma or other skin cancers due to insufficient evidence that it reduces mortality, but early detection has an important role to play.[32] Melanoma is considered more serious than other forms of skin cancer as it can spread quickly to other parts of the body. People with thinner melanomas have a better prognosis and greater chance of survival than those with thicker lesions. GPs play a pivotal role in the prevention, early detection, and management of all skin cancers. Training GPs in dermoscopy has been shown to be achievable and have an impact on diagnosing and monitoring skin lesions in general practice, which is why Wellbeing SA and Cancer Council SA have identified GP dermoscopy training as a priority.[33] When used in primary care settings, dermoscopy and sequential digital dermoscopy imaging have been shown to reduce the referral of benign pigmented lesions whilst nearly doubling the sensitivity for the diagnosis of melanoma.[34] The use of dermoscopy in general practice will improve early detection rates of skin cancer resulting in more lives saved.

It is recommended that:

- people become familiar with their own skin and check their skin regularly for early changes. Cancer Council does not recommend the use of smartphone applications by consumers to self-diagnose skin cancer including melanoma.
- people consult their doctor if they notice changes to their skin. Full skin examinations supported by total body photography and dermoscopy are also recommended every 6 months for individuals at high risk (i.e. people with previous history of melanoma or more than 5 atypical moles).
- skin examinations be conducted by a doctor, using dermoscopy, for the early detection of skin cancer. The *Clinical practice guidelines for the management of melanoma* recommend clinicians who are performing skin examinations for the purpose of detecting skin cancer should be trained in and use dermoscopy.[35]

5.3 Objective 3: Monitor, research, and evaluate

Research and evaluation are important elements to monitor the Impact of this Framework and to inform future action.

The South Australian Population Health Survey (SAPHS) is a statewide survey, managed by Wellbeing SA's Epidemiology Branch, which aims to monitor the health of all South Australians.[36] Data is collected every month for about 600 adults and children. The SAPHS will be the primary method of measuring changes in attitudes and sun protection behaviour in the South Australian population.

Wellbeing SA also coordinates a survey called Population Health Survey Module System (PHSMS). This survey aims to provide an alternative data source for indicators not already covered in the SAPHS.[37]

6.0 Action priorities and strategies

Reducing the incidence and impact of skin cancer on the community requires a targeted approach using a comprehensive range of strategies. This Framework will provide the basis for coordinated action and shared responsibility between partners to ensure effective and sustainable medium and long-term outcomes to reduce UVR overexposure and increase early detection of skin cancer. The Framework will be built upon and adapted over time using information available from monitoring, research, and evaluation activities.

This Framework will focus on the following priority populations and settings where prevention activities are expected to have the greatest impact. Priorities for actions are set out in a companion document and are subject to funding.

PRIORITY POPULATIONS

The following populations are considered a high priority for skin cancer prevention and/or early detection:

Children (under 10 years)

Babies and children have a thinner dermis than adults, increasing the risk of sunburn and skin cancer in later life. Data from an Australian study showed that self-reported lifetime sun exposure was positively associated with skin damage and skin aging, particularly for younger people. [38] A study conducted by Kricker et al. found that exposure to UV in early life appeared to increase the risk of basal cell carcinoma.[39]

Adolescents and young adults (10–24 years of age)

UV exposure up to 18 years has been found to be critical in determining lifetime skin cancer risk. As with children, the need to reduce sun exposure for adolescents and young adults is critical to reducing the risk of developing skin cancer later in life. One Australian cross-sectional survey found that while there was a decrease in weekend sunburn amongst adolescents over time, further improvements are required.[40] A Western Australian study found poor routine-use of outdoor sun protection measures among adolescents and suggested that new approaches were needed to improve attitudes to sun protection.[41] Research shows that adolescents' attitudes to tanning and attempts to tan are significant predictors of sunburn. There is a need to target sun protection messages at adolescent males who are less likely to engage in the most effective sun protection behaviours and demonstrate an increased propensity to experience sunburn.[42]

Men 40 years and over

For both sexes, the lifetime risk of being diagnosed with melanoma continues to increase but the lifetime mortality risk for melanoma is starting to decrease. The incidence and lifetime risk of dying from melanoma is higher in men than women and the incidence of melanoma increases with age, particularly for men.

Outdoor workers

Outdoor workers receive up to ten times more UVR exposure than indoor workers. Cancer Council recommends that outdoor workers or those working near highly reflective surfaces use sun protection year-round.

PRIORITY SETTINGS

Opportunities for intervention are considered to be greatest in the following settings.

Setting	Examples of actions
Healthcare	Increase GP skills in early detection and triage of melanomas and keratinocyte cancers and improve opportunistic patient education.
Education sector including childcare	Initiatives to raise awareness about the importance of sun protection and implement improved skin cancer prevention strategies.
Workplaces	Consultation programs to aid organisations with their work health and safety obligations, through development of new or updating existing policies in relation to skin cancer prevention and early detection.

STRATEGIES

- Raise public awareness regarding the danger of overexposure to UV radiation.
- Increase individual and organisation-wide practice of sun protection behaviours.
- Increase access to adequate shade.
- Encourage earlier detection and treatment of melanomas and keratinocyte cancers.
- Increase awareness about the risk factors for skin cancer, early signs of skin cancer and the need for prompt attention.
- Promote interagency action and coordination.
- Continue to monitor data to identify emerging trends.
- Evaluate initiatives to inform future investments.

6.1 Aligning our Framework to policy

The Framework aligns with the following policies.

The **Wellbeing SA Strategic Plan,** which prioritises chronic disease and actions to create healthier communities and environments, focusing on settings such as hospitals and health services, workplaces, education sites and parks, community spaces, and recreation facilities.

The **Cancer Council SA Strategic Plan 2023–2028,** which aims to prevent cancer through evidence-based primary, secondary and tertiary prevention programs and services.

The **National Cancer Control Policy,**[43] which includes three key priorities for reducing the incidence of skin cancer:

i. Investment in national mass media campaigns to increase public awareness about skin cancer risk, sun protection and associated behaviour change.

ii. Investment in population health research into sun protection behaviours to inform evidence-based policy and programs.

iii. Establish a roadmap towards optimising early detection of melanoma.

The **State Public Health Plan 2019–2024 (Department of Health and Wellbeing),** which promotes built environments that support health and wellbeing for all through improved access to quality public realm and green infrastructure, including open space and effective use of shade, vegetation, and sustainable water use.[44]

7.0 Next Steps

While this is the first formal document setting out our joint commitments for skin cancer prevention in South Australia, there has been significant collaborative work in this area for many years.

This Framework provides opportunities for ongoing and new partnerships which aim to reduce the incidence of skin cancer in the community.

We know we can achieve much more by working together than we can achieve on our own.

For further information:

Visit: wellbeingsa.sa.gov.au
Email: wellbeingsaprevandpophealth@sa.gov.au

References

1. Australian Institute of Health and Welfare (AIHW), *Disease expenditure in Australia 2018–19,* AIHW, 2021.

2. Australian Institute of Health and Welfare 2021. Health system expenditure on cancer and other neoplasms in Australia, 2015–16. Cancer series no. 131. Cat. no. CAN 142. Canberra: AIHW.

3. Australian Institute of Health and Welfare, Cancer data in Australia, AIHW, 2022, accessed 26 October 2022.

4. AIHW, Cancer data in Australia.

5. Staples et al, 'Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985', *Medical Journal of Australia,* 2006, 184(1): 6–10. doi: 10.5694/j.1326-5377.2006.tb00086.x

6. Walker et al, 'Forty years of Slip! Slop! Slap! A call to action on skin cancer prevention for Australia'.

7. Olsen et al, 'Keratinocyte cancer incidence in Australia: a review of population-based incidence trends and estimates of lifetime risk', *Public Health Research and Practice,* 2022, 32(1).

8. Australian Institute of Health and Welfare, Cancer data in Australia.

9. L Fritschi and T Driscoll, 'Cancer due to occupation in Australia', *Australian and New Zealand Journal of Public Health,* 2006, 30(3):213–921. doi: 10.1111/j.1467-842x.2006.tb00860.x.

10. Wellbeing SA, SA population health survey, Wellbeing SA, accessed 15 June 2023.

11. Adelson et al, 'Keratinocyte cancers in South Australia: incidence, geographical variability and service trends', *Australian and New Zealand Journal of Public Health,* 2018, 42(4):329–33. doi: 10.1111/1753-6405.12806

12. *AIHW, Disease expenditure in Australia 2018–19.*

13. *AIHW, Disease expenditure in Australia 2018–19.*

14. Walker et al, 'Forty years of Slip! Slop! Slap! A call to action on skin cancer prevention for Australia'.

15. Navale et al, 'Vitamin D and brain health: an observational and Mendelian randomization study', *The American Journal of Clinical Nutrition,* 2022, 116(2):531–540. doi.org/10.1093/ajcn/nqac107

16. Sintzel et al, 'Vitamin D and multiple sclerosis: a comprehensive review', *Neurology and Therapy,* 2018, 7(1):59–85. doi: 10.1007/s40120-017-0086-4.

17. J Makin, 'Implications of climate change for skin cancer prevention in Australia', *Health Promotion Journal of Australia,* 2011, 22(4):39–41.

18. Roseleur et al, 'Skin checks and skin cancer diagnosis in Australian general practice before and during the COVID-19 pandemic, 2011-2020', *British Journal of Dermatology,* 2021, 185(4):853–855. doi.org/10.1111/bjd.20494.

19. Berry et al, 'Reduced melanoma referrals during COVID-19 lockdown', *Australian Journal of General Practice,* 2021. doi: 10.31128/AJGP-COVID-45, epub ahead of print.

20. Dinnes et al, 'Dermoscopy, with and without visual inspection, for diagnosing melanoma in adults', *Cochrane Database Systematic Reviews,* 2018, 12(12). doi: 10.1002/14651858.CD011902.pub2

21. Roseleur et al, 'Skin checks and skin cancer diagnosis in Australian general practice before and during the COVID-19 pandemic, 2011-2020'.

22. *Cancer Australia, The impact of COVID-19 on cancer-related medical services and procedures in Australia in 2020: Examination of MBS claims data for 2020, nationally and by jurisdiction,* Cancer Australia, 2021.

23. Wellbeing SA, *South Australian Walking Strategy 2022–2032,* Wellbeing SA, n.d.

24. Government of South Australia, *Healthy parks healthy people South Australia 2021–2026,* Government of South Australia, n.d.

25. Shih et al, 'Skin cancer has a large impact on our public hospitals but prevention programs continue to demonstrate strong economic credentials', *Australian and New Zealand Journal of Public Health,* 2017, 41(4):371–376. doi: 10.1111/1753-6405.12679

26. Gordon et al, 'The economics of skin cancer prevention with implications for Australia and New Zealand: where are we now?', *Public Health Research and Practice,* 2022, 32(1). doi.org/10.17061/phrp31502119

27. Gordon et al, 'The economics of skin cancer prevention with implications for Australia and New Zealand: where are we now?'.

28. MG Kimlin and Y Guo, 'Assessing the impacts of lifetime sun exposure on skin damage and skin aging using a non-invasive method', *Science of the Total Environment*, 2012, 425:35-41. doi: 10.1016/j.scitotenv.2012.02.080

29. Khlat et al, 'Mortality from melanoma in migrants to Australia: variation by age at arrival and duration of stay', *American Journal of Epidemiology,* 1992, 135(10):1103–1113. doi: 10.1093/oxfordjournals.aje.a116210

30. V Gupta and VK Sharma, 'Skin typing: Fitzpatrick grading and others', *Clinical Dermatology*, 2019, 37(5):430–436. doi: 10.1016/j.clindermatol.2019.07.010

31. TF Schulz, 'Cancer and viral infections in immunocompromised individuals', *International Journal of Cancer,* 2009, 125(8):1755-1763.

32. Cancer Council Australia, *Position statement – early detection of skin cancer,* Cancer Council Australia, n.d.

33. Jones et al, 'A dermoscopy training program for Victorian GPs to improve skin cancer prevention and detection', *Public Health Research and Practice,* 2022, 32(1). doi.org/10.17061/phrp3212207

34. Menzies et al, 'Impact of dermoscopy and short-term sequential digital dermoscopy imaging for the management of pigmented lesions in primary care: a sequential intervention trial', *British Journal of Dermatology,* 2009, 161(6):1270–1277. doi: 10.1111/j.1365-2133.2009.09374.x

35. Cancer Council Australia, *Clinical practice guidelines for the diagnosis and management of melanoma,* Melanoma Institute Australia, accessed 28 Jun 2022.

36. Wellbeing SA, *SA population health survey,* Wellbeing SA, n.d.

37. Wellbeing SA, *Population health survey module system,* Wellbeing SA, n.d.

38. MG Kimlin and Y Guo, 'Assessing the impacts of lifetime sun exposure on skin damage and skin aging using a non-invasive method'.

39. Kricker et al, 'Early life UV and risk of basal and squamous cell carcinoma in New South Wales, Australia', *Photochemistry and Photobiology,* 2017, 93(6):1483–1491. doi: 10.1111/php.12807

40. Volkov et al, 'Seven-year trends in sun protection and sunburn among Australian adolescents and adults', *Australian and New Zealand Journal of Public Health,* 2013, 37(1):63–9. doi: 10.1111/1753-6405.12012

41. Koch et al, 'Trends in Australian adolescents' sun-protection behaviours: implications for health campaigns', *Australian and New Zealand Journal of Public Health*, 2016, 40: 468–473. doi.org/10.1111/1753-6405.12561

42. Pettigrew et al, 'Predictors of sun protection behaviours and sunburn among Australian adolescents', *BMC Public Health,* 2016, 16: 565. doi.org/10.1186/s12889-016-3197-4

43. Cancer Council Australia, *Policy priorities,* Cancer Council Australia, n.d.

44. SA Health, *State Public Health Plan 2019–2024,* SA Health, n.d.

wellbeingsa.sa.gov.au

Government of South Australia

Wellbeing SA

In partnership with Cancer Council SA