New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017

Skin Cancer Primary Prevention and Early Detection Steering Committee

May 2014
# TABLE OF CONTENTS

1. **Overview** .................................. 4

2. **Skin Cancer in New Zealand** .......... 6

3. **Intervening to Reduce the Incidence and Impact of Skin Cancer** .... 9
   
   3.1 Primary Prevention ................................................................. 9
   
   3.1.1 **Skin Cancer Risk Factors** .................................................. 9
   
   3.1.2 **Addressing Skin Cancer Risk** ........................................... 12
   
   3.1.3 **Vitamin D and Sun Exposure** ............................................ 13
   
   3.2 Early Detection ................................................................. 14
   
   3.2.1 **Melanoma Thickness a Predictor of Prognosis** ................. 14
   
   3.2.2 **Screening for Melanoma** .............................................. 15
   
3.3 Diagnosis and Treatment of Skin Cancer .................................. 16

3.4 Research, Evaluation and Surveillance .................................... 16

4. **New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017** .... 19
   
   4.1 The Outcomes Framework ..................................................... 21

**References** ............................................................................. 22

**Appendix A: The New Zealand Skin Cancer Primary Prevention and Early Detection Steering Committee**

- **A History of the Committee** .................................................. 28
- **Committee Meeting 2013** ...................................................... 29
1. OVERVIEW

Skin cancers (non-melanoma skin cancers (NMSC) and melanoma) are by far the most common cancers in New Zealand today, and there is evidence that both types are increasing in incidence. The incidence of NMSC has been increasing globally, with Australia reporting a 1.5-fold increase over the last 17 years. As NMSCs are not registered in New Zealand their true incidence in this country is unknown.

Of all cancers, skin cancers represent one of the most significant cost burdens on our health system. In 2010 they were responsible for more than 454 deaths and they are conservatively estimated to cost New Zealand $57.1 million every year in direct health care costs.

Melanoma is the most serious of the common skin cancer types as it is more likely than other types to result in death. New Zealand and Australia have the highest age-standardised melanoma incidence rates in the world. During the period 1996 to 2010, New Zealand melanoma registration rates increased, as did male melanoma mortality rates. Yet melanoma, as well as other skin cancers, is considered largely potentially preventable through appropriate ultraviolet radiation (UVR) protection.

The New Zealand Skin Cancer Primary Prevention and Early Detection Steering Committee (formerly the New Zealand Skin Cancer Steering Committee) is a national group of researchers and representatives of organisations working in skin cancer control. The role of the Committee is to facilitate improved coordination and collaboration among organisations involved in skin cancer prevention and early detection in New Zealand. The Committee meets triennially to develop the New Zealand Skin Cancer Primary Prevention and Early Detection Strategy (formerly the New Zealand Skin Cancer Control Strategic Framework). The resulting sector-led strategy helps inform programmes and activities undertaken by key agencies to reduce the incidence and impact of skin cancer in New Zealand.

The New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017 identifies five intervention pathways for reducing the incidence and impact of skin cancer:

- primary prevention
- early detection
- diagnosis and treatment
- rehabilitation, support and palliative care
- research, evaluation and surveillance.

The focus of this document is on the primary prevention pathway and, to a lesser extent, the early detection pathway.
This document provides:

- an overview of skin cancer incidence, mortality and costs in New Zealand
- information about interventions to reduce the incidence and impact of skin cancer, with a particular focus on risk factors and interventions to reduce risk
- the New Zealand Skin Cancer Primary Prevention and Early Detection Outcomes Framework 2014 to 2017
- an overview of the New Zealand Skin Cancer Primary Prevention and Early Detection Steering Committee, including its role and history, and the 2013 meeting of the Committee (appended).
2. SKIN CANCER IN NEW ZEALAND

Skin cancers are commonly classified into two groups: cutaneous melanoma (melanoma) and non-melanoma skin cancer (NMSC). The NMSC category includes mainly squamous cell (SCC) and basal cell (BCC) cancers. Of the three most common types of skin cancer (melanoma, SCC and BCC), melanoma tends to present the greatest potential threat to survival.

Skin cancer is by far the most common cancer affecting New Zealanders. It has been estimated (using 2005 data) that all types of skin cancer account for just over 80% of all new cancers (O’Dea, 2009). Melanoma was the fourth most commonly registered cancer in 2010, accounting for 11.0% of all registrations, and the sixth most common cause of death from cancer (Ministry of Health, 2013a).

Melanoma occurs much less frequently than NMSC but has a significantly higher mortality rate. In 2010, melanoma accounted for 2,341 new cancer registrations and 324 deaths (Ministry of Health, 2013a). The age-standardised registration rate was 43.4 per 100,000 for males and 36.1 per 100,000 for females. The age-standardised mortality rate was 6.5 per 100,000 for males and 3.5 per 100,000 for females.

NMSC is more common than melanoma but has a lower mortality rate. Although the incidence of NMSC is presently unknown (currently new cases of NMSC are not registered with the Cancer Registry due to resource considerations; Ministry of Health, 2013a), a conservative estimate is that there are at least 67,000 new cases of NMSC every year in New Zealand (O’Dea, 2009). According to a regional analysis of data, the risk of being treated for any form of NMSC by the age of 80 years in 2006 was 52% for males and 33% for females (Brougham et al., 2010). In 2010 there were 130 deaths from NMSC, representing 29% of all skin cancer deaths (Ministry of Health, 2013a). Worldwide, the ratio of BCC to SCC is about 4:1 for the head and neck but SCC has a higher risk of metastasis and mortality (Narayanan et al., 2010). NMSC is more commonly diagnosed in men than women (Madan et al., 2010).

Skin cancer is a huge cost to New Zealand. In 2006, the direct health-care treatment costs of skin cancer in New Zealand were conservatively estimated at $57.1 million ($5.7 million for melanoma and $51.4 for non-melanoma skin cancer) (O’Dea, 2009). Were it not for skin cancer, New Zealanders would have lived an additional 4,741 life-years in 2006 (melanoma accounted for 3,811 of the lost life-years and NMSC accounted for 930 of the lost life-years). In addition, these persons, if alive, would have made an economic contribution through employment of an estimated additional NZ$66 million in 2006 ($59.3 million for lost production from melanoma deaths; $6.7 million for lost production through NMSC deaths). Because of the huge numbers of diagnoses, skin cancers place an enormous burden on the health care system in New Zealand and this burden will increase with the aging population.
Melanoma incidence and mortality rates have increased. Between 1996 and 2010 rates of melanoma registration increased. Over the same time the death rate increased in men by about 13% and remained stable in women. The death rate is consistently higher for males than for females. New Zealand and Australia have the highest melanoma incidence rates in the world (Australian Cancer Network Melanoma Guidelines Revision Working Party, 2008), but from 2003 to 2007 the age-standardised melanoma mortality rate in New Zealand women was 40% higher than in Australian women (Sneyd and Cox, 2013).

NMSC incidence is likely to have increased. The incidence of NMSC has been increasing globally with Australia recording a 1.5-fold increase over the last 17 years (Staples et al, 2006). Although national NMSC incidence data are not routinely recorded or reported, clinicians have reported evidence that regional NMSC incidence also has increased (Brougham et al., 2011) and described NMSC as a “neglected problem” in New Zealand (Brougham et al., 2010).

The incidence of melanoma and NMSC increases with age. The median age for females diagnosed with invasive melanoma between 2006 and 2010 was 62 years and for males was 66 years. However, although cancer is very rare in young people, in 2010 melanoma was the fourth most common cancer registration in men aged 0 to 24 years and the third most common in women of the same age. According to a regional study in New Zealand, the greatest increase in NMSC over a ten-year period was in the population over 50 years of age (Brougham et al., 2011).

Overall melanoma incidence and mortality is consistently higher in males than females. In 2010, the male incidence rate was 20.5% higher than the female rate and the death rate was 86% higher in men than women (Ministry of Health, 2013a).

Melanoma incidence and mortality are substantially lower among New Zealand Māori and Pacific peoples than among New Zealand Europeans. Māori melanoma incidence rates are about one-tenth that of New Zealand Europeans (Sneyd and Cox, 2009). Of the 2,341 new melanoma registrations in 2010, 32 were Māori and seven were Pacific peoples (Ministry of Health, 2013a). Of the 324 melanoma deaths in that same year, six were Māori and two were Pacific peoples. However, the incidence of melanoma among Māori has increased. Age-adjusted incidence rates increased annually from 1996 to 2010 by 0.25 per 100,000 in Māori men and 0.17 per 100,000 in Māori women, compared to an increase of 0.55 per 100,000 in non-Māori men and 0.35 per 100,000 in non-Māori women. This equates to a 14% increase in incidence per year in Māori men and a 5% increase per year in Māori women, compared to a 1.5% and 1.1% annual increase in incidence in non-Māori men and non-Māori women, respectively. From 2002 to 2010, melanoma incidence rates were higher in Māori than Pacific or Asian peoples.¹

¹ Ethnicity is self-identified in New Zealand. The New Zealand Health Information Service, which is responsible for the Cancer Registry, collects ethnicity for each registration from data providers, the National Minimum Dataset of hospital events or the National Health Index. In 2010 the proportion of registrations lacking ethnicity data was higher for some types of cancer, including melanoma (189 cases: 8.1% of all melanoma registrations) (Ministry of Health, 2013a). Registrations without an ethnic identification were included in the non-Māori group.
Māori and Pacific peoples in New Zealand have a higher than expected risk of thick and more advanced melanoma, with poorer prognosis. In the time period from 2006 to 2010, the median thickness at diagnosis of melanomas of all subtypes, from a total of 12,394 patients, was 0.80mm (95% CI 0.78-0.80) in New Zealand Europeans, 0.95mm (95% CI 0.7-1.23) in Māori and 3.4mm (95%CI 0.6-6.2) in Pacific peoples (Sneyd and Cox, 2010). Thirty-five percent of melanomas in Pacific peoples were >4mm thick at diagnosis compared with 7.9% in New Zealand Europeans. The distribution of melanoma subtypes, with different natural histories, is known to vary by ethnic group. When the analysis was restricted to superficial spreading melanomas (SSM), there was no significant difference in median thickness between New Zealand Europeans (n=5258; median depth 0.67mm; 95% CI 0.65-0.70) and Māori (n=52; median depth 0.69mm; 95% CI 0.6-0.96). It is unknown how much of the discrepancy in thickness at diagnosis by ethnic group is due to delay in diagnosis, different biological behaviours of similar melanomas or other factors that have yet to be identified.
3. INTERVENING TO REDUCE THE INCIDENCE AND IMPACT OF SKIN CANCER

The New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017 identifies five intervention pathways for reducing incidence, impact and inequalities with respect to skin cancer:

- primary prevention
- early detection
- diagnosis and treatment
- rehabilitation, support and palliative care
- research, evaluation and surveillance.

These pathways are consistent with corresponding pathways of the cancer control continuum in The New Zealand Cancer Control Strategy (Minister of Health, 2003).

The focus of this document is on the primary prevention pathway and, to a lesser extent, the early detection pathway, as well as related issues for research, evaluation and surveillance (see Figure 1, page 21). This is consistent with evidence suggesting that the best avenues for reducing skin cancer burden are prevention and early diagnosis (Sneyd and Cox, 2006).

The pathways for early detection, along with diagnosis and treatment and support, rehabilitation and palliative care, are linked to the recommendations of the Standards of Service Provision for Melanoma Patients in New Zealand – Provisional (National Melanoma Tumour Standards Working Group, 2013). Though clearly of importance, these areas, with the exception of early detection, fall outside the scope of the New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017.

3.1 PRIMARY PREVENTION

According to the World Health Organization (WHO, 2002) cancer prevention should be a key element in all cancer control programmes. Cancer prevention focuses on factors that can either increase a person's chances of developing cancer (risk factors) or reduce the risk of developing cancer (protective factors).

3.1.1 Skin Cancer Risk Factors

A number of factors are known to increase skin cancer risk. Most risk factors, such as skin type, are non-modifiable. However, a small number relating to exposure to UVR are potentially modifiable and, therefore, are the focus of most primary prevention activities.

A risk predictor model developed from a case-control study of melanoma in New Zealand found that 89% of risk in women was attributable to fair skin, family history of dysplastic moles, count of large moles, and personal history of NMSC, whereas in men, 85% of risk was attributable to a
personal history of NMSC, age, country of birthplace, and outdoor occupation (Sneyd, personal communication, 2014).

**Non-modifiable personal and demographic risk factors for skin cancer include the following:**

- A previous personal history of melanoma and/or NMSC, or a family history of melanoma, increases the risk of melanoma.
- Age: The chance of developing skin cancer increases with age, possibly because older people have had more opportunities to be exposed to UVR and their capacity to repair the damage is diminished.
- Skin type: The chance of developing skin cancer is greater among those who sunburn readily and tan poorly - typically those with red or blond hair and fair skin that freckles or burns easily. Ethnic differences in skin cancer rates are mostly due to skin colour, which is determined by the amount of melanin produced by skin cells called melanocytes. These cells protect the skin from the damage produced by UVR. As a result, darkly pigmented people develop skin cancer on sun-exposed sites at lower rates than lightly pigmented people. However, incremental UVR does increase the risk of developing skin cancer for people with more darkly pigmented skin (Pennello et al., 2000). In New Zealand, people who identify as European have the greatest risk of developing skin cancer. Although there is no systematic collection of information relating skin type to ethnicity in New Zealand, self-report data suggest that there is some heterogeneity of skin type among Māori and Pacific peoples (Marshall, 2009; Reeder, et al, 2010; Nessvi, et al., 2011). Notwithstanding this, Māori have about one-tenth the incidence rate of melanoma compared to New Zealand Europeans (Sneyd and Cox, 2009).
- Type and number of moles (probably partly modifiable): Having more than 100 moles (compared with 0 to 15 moles) and having more than five atypical moles compared with no atypical moles increases the risk of melanoma.
- Immune suppression: HIV, leukaemia and certain drugs used to treat organ transplants and other conditions may suppress the immune system, leading to skin cancers.

**The overarching and potentially modifiable risk factor for skin cancer, overall, is overexposure to UVR that causes harm.** Examples of specific risk factors that relate to overexposure to UVR include:

- history of sunburn
- intermittent excessive sun exposure
- sunbed use.

Other potentially modifiable factors include:

- inadequate personal sun protection
- inadequate environmental and social support for appropriate personal UVR protective practices.
Overexposure to UVR increases the risk of all three major forms of skin cancer (Armstrong and Kricker, 2001). Intervening to address the potentially modifiable risk factors listed above is likely to reduce both NMSC and melanoma incidence. Severe blistering sunburns are associated with an increased risk of both melanoma and BCC (Armstrong and Kricker, 2001). For these cancers, the experience of intermittent intense UVR seems to carry a higher risk than do chronic or cumulative exposures, even if the total amount of UVR received is the same. The risk of SCC, in contrast, is strongly associated with chronic UVR exposure (typical of outdoor occupational groups), but not with intermittent exposure. Total UVR exposure depends on the intensity of the UVR, duration of skin exposure, and whether the skin is protected by shade, clothing, broad-brimmed hats or sunscreen.

Overexposure to UVR at any age increases the risk of melanoma. Childhood sun exposure is associated with the development of melanocytic nevi (moles), which are a risk factor for melanoma (Bauer and Garbe, 2003). In a meta-analysis of sunburns and melanoma risk, increasing numbers of sunburns increased melanoma risk for all time periods (childhood, adolescence and adulthood) (Dennis et al., 2008).

Exposure to UVR from sunbeds increases the risk of melanoma and NMSC. In 2009 the International Agency for Research on Cancer (IARC) of the World Health Organization classified UVR from tanning beds as “carcinogenic to humans” (group 1) (El Ghissassi et al., 2009). Sunbed use is associated with increased risk of early-onset melanoma, with risk increasing with greater use, an earlier age at first use and for earlier onset disease (Cust et al., 2011). Sunbed exposure is also associated with skin burns, premature aging, corneal burns, cataracts, ocular melanoma and photodermatoses (Lim et al., 2011). In Australia it has been estimated that among those who had ever used a sunbed and were diagnosed between 18 and 29 years of age, three-quarters (76%) of melanomas were attributable to sunbed use (Cust et al., 2011). Internationally, more than 450,000 cases of non-melanoma skin cancer and more than 10,000 melanoma cases each year are considered to be attributable to indoor tanning in the United States, Europe and Australia (Mackenzie et al., 2013).

A number of environmental factors influence UVR exposure. The single greatest factor determining environmental UVR is solar elevation; the nearer the sun is to the zenith, the shorter is the absorption path through the stratospheric ozone layer. That is why UVR is strongly peaked in summer and around solar noon, and higher in the tropics, much more than is apparent in visible light or perceived solar warmth. Other factors, in descending order of their effect, are clouds, ozone variation, reflective surfaces (snow, concrete, sand), altitude, atmospheric aerosols (dust), and the annual variation in Earth-sun distance (McKenzie et al., 2006; McKenzie et al., 2011). The effect of cloud is deceptive, as optically thin cloud like cirrus has minimal effect. Under broken cloud with the sun unobscured, cloud reflection can increase solar radiation above the clear sky intensity. Modifiable environmental factors include the availability and quality of built and natural shade – factors guided by collective social policies and practices that have a potentially important influence on reducing an individual’s UVR exposure.
There are a number of personal protective behaviours that reduce skin cancer risk by limiting or minimising excessive UVR exposure. These include avoiding the sun at peak hours, seeking shade, avoiding artificial sources of UVR light (in particular sunbeds), wearing protective clothing and using sunscreen protection.

In the 2013 Sun Exposure Survey, 69% of respondents aged 18 to 54 years who were outdoors for at least 15 minutes the previous summer weekend reported they had everything that they needed to protect their skin from the sun. More than half of respondents (61%) reported having stayed in the shade at any time while outdoors with 54.5% reporting that they used sunscreen. Less than 1 in 10 (9.2%) respondents reported having worn a long-sleeved shirt that covered the shoulders, upper arms, and lower arms (Armstrong et al., 2013).

In a 2009 population survey of 40 to 74 year old Europeans, 40% of men and 22% of women sometimes used sunscreen, and 33% of men and 41% of women usually used a sunscreen. In the same study, 5% of men and 29% of women had ever used a sunbed (Sneyd et al., 2011).

Sunburn rates in New Zealand do not appear to be decreasing. The 2013 Sun Exposure Survey revealed that 23% of respondents aged 18 to 54 years who were outdoors for at least 15 minutes the previous summer weekend reported having been sunburnt. This prevalence appears to have remained reasonably steady over the last 13 years, or four waves of data collection in 2000 (24%), 2003 (21%), 2006 (23%) and 2010 (20%) (Armstrong et al., 2013).

3.1.2 Addressing Skin Cancer Risk

As noted above, evidence suggests that one of the best avenues for reducing the burden of skin cancer is prevention of overexposure to UVR. Sneyd and Cox (2006) estimated that 328 new cases of melanoma in New Zealand in 2002 were directly attributable to severe sunburn. They argued that, if severe sunburn (with blisters) in the population was decreased by 10%, this could result in 28 fewer cases of melanoma per year and a reduction of about four deaths per year. Further, because NMSC is also associated with sunburn, a reduction in severe sunburn in the population would also result in fewer NMSCs. Yet among the New Zealand population (15-69 years) there has been no significant reduction in the frequency of self-reported summer weekend sunburn, in general, since a 1994 baseline survey (Armstrong et al., 2013).

A focus on primary prevention was supported by the Melanoma Guidelines Implementation Plan (New Zealand Guidelines Group, 2010), which noted that prevention initiatives undertaken over an extended period of time have the greatest potential for health gain and are, therefore, of the highest priority. The prevention initiatives proposed in the Plan focused on the primary healthcare setting, recognising that GPs and practice nurses have a role in advising on cancer prevention. However, current evidence of effectiveness is insufficient to recommend specific interventions in primary health care settings that target adults over 24 years (Moyer, 2012; Lin et al., 2011). A survey done in 2011 among primary health care workers and consumers found that consumers would be open to receiving sun safety messages from their GPs (UMR Research, 2011).
research recommended the inclusion of prevention messages on GPs’ dashboards and providing them with appropriate information to provide to consumers.

The Guidelines Implementation Plan also highlighted that patients have a right to consistent, evidence-based information. More recently, the Standards of Service Provision for Patients with Melanoma in New Zealand – Provisional requires that “patients are offered evidence-based information on risk factors, prevention and early detection” (National Melanoma Tumour Standards Working Group, 2013).

Currently, evidence of the effectiveness of skin cancer primary prevention interventions is limited to particular settings and strategies. However, according to an, as yet, unpublished series of systematic reviews for the US Community Preventive Services Task Force that update published findings (Saraiya et al., 2004), the evidence in support of five primary prevention intervention types has strengthened as follows:

- Primary and middle school settings: evidence upgraded from “sufficient” to “strong”
- Outdoor occupational settings: evidence upgraded from “insufficient” to “strong”
- Child care settings: evidence upgraded from “insufficient” to “sufficient” (for use of sunscreen, clothing, shade and combinations of protective practices)
- Multi-component community-wide settings: evidence upgraded from “promising” but “insufficient”, to “sufficient” (for sunscreen use)
- Recreational and tourism settings: upgraded from “sufficient” for children only to “strong” for both children and adults.

The current series of systematic reviews, which have yet to be independently peer-reviewed, has also found that the evidence for mass media (alone) campaigns and interventions in secondary schools and college settings remains “insufficient”. These are among the areas in which further suitably rigorously designed research is required.

To date the systematic reviews for the US Community Preventive Services Task Force have addressed the effectiveness of interventions in positively changing behavioural and (some) health outcomes, but not their cost-effectiveness. In Australia, however, a review of the comprehensive SunSmart programme concluded that “sustained modest investment in skin cancer control is potentially excellent value for money” (Shih et al., 2009). Furthermore, such a programme would return $2.32 for every $1 invested over 20 years, reduce the number of melanoma cases by 20,000 over that period and deliver $90 million in productivity gains each year. A second analysis identified the SunSmart programme in Victoria as one of a handful of cost-effective interventions for the future that would have a significant impact on Australia’s health (Vos et al., 2010).

### 3.1.3 Vitamin D and Sun Exposure

While sun exposure is a major cause of skin cancer, it is also the main source of vitamin D for most people in New Zealand. Therefore, it is important to balance the risks of skin cancer from too much sun exposure with maintaining adequate vitamin D levels.
According to a survey undertaken in 2010, most general practitioners (87%) were concerned that “patients may not be getting enough vitamin D”, and 81% also thought that “skin cancer prevention messages contribute to the development of vitamin D deficiency” (Reeder et al., 2012). Partly in response to these findings and also that 97% of those surveyed said that they would value clinical guidelines, the Ministry of Health and the Cancer Society of New Zealand developed the Consensus Statement on Vitamin D and Sun Exposure in New Zealand (Ministry of Health and Cancer Society of New Zealand, 2012). The Companion Statement on Vitamin D and Sun Exposure in Pregnancy and Infancy in New Zealand (Ministry of Health, 2013b) was developed to be read in conjunction with the Consensus Statement.

According to the Consensus Statement, with sufficient exposure to ultraviolet B (UVB) from sunlight, a healthy person should be able to synthesise all of their vitamin D requirements in their skin. However, there is no scientifically validated, safe threshold level of UVR exposure that allows for maximal vitamin D synthesis without increasing skin cancer risk. Advice on sun exposure, therefore, requires balancing the risk of skin damage and skin cancer against the risk of vitamin D deficiency. There is no evidence that current sun behaviour (specifically sunscreen use) is adversely affecting vitamin D status (Marks et al., 1995). For the general population with no specific medical issues or risk factors for vitamin D deficiency, supplementation is not necessary and is not recommended. General practitioners can prescribe a vitamin D supplement for those at high risk of vitamin D deficiency as defined in the Consensus Statement.

3.2 EARLY DETECTION

According to The New Zealand Cancer Control Strategy, early detection means detecting cancer prior to the development of symptoms or as soon as practicable after the development of symptoms (Minister of Health, 2003). For skin cancer, early detection means identifying lesions suspicious of malignancy at the earliest clinical stage possible. This may occur through self-screening (people who have no symptoms of skin cancer deliberately check their skin), screening (people who are unaware of any signs or symptoms of skin cancer undergo a total skin examination) or early clinical diagnosis (visual recognition of an early suspicious lesion by a health professional). Early identification of a lesion can lead to earlier and more effective treatment.

As a proportion of diagnoses, melanoma has a much higher death rate than NMSC. Because of this greater risk of death, research in relation to early detection has tended to focus on melanoma.

3.2.1 Melanoma Thickness a Predictor of Prognosis

Worldwide, melanoma survival decreases with increasing melanoma thickness, from about 92% 10-year survival for melanomas <=1mm thickness to 50%10-year survival in patients with melanomas >4mm thick (Balch et al., 2009). In general, the thinner the lesion the better the outcome, with an Australian study reporting a 20-year survival of 96% for those with thin invasive melanomas (Green et al., 2012). For these reasons, Sneyd and Cox (2006) advise that early
diagnosis, along with prevention of excessive sun exposure, is one of the best avenues for reducing the burden of melanoma in New Zealand.

According to an analysis of data from 1994 to 2004, of those diagnosed with melanoma, the proportion with thick melanoma (>3.0mm) was greater for older compared with younger people (with the proportion of thick melanomas increasing with age), for males compared with females, for Māori compared with non-Māori (despite the substantially lower incidence in Māori), and for those diagnosed with nodular melanoma compared with other types of melanoma (Richardson et al., 2008).

For invasive melanomas registered from 1996 to 2010, the proportion of very thick melanomas (>4mm) ranged from about 3% for patients aged under 50 years at diagnosis, to 20% in patients aged 80 years and over. Men had a greater percentage of thick melanomas and a slightly higher median thickness. Although the incidence of melanoma is substantially lower in Māori and Pacific peoples, 13% of melanomas in Māori and 35% in Pacific peoples were >4mm at diagnosis, compared to 8% in non-Māori non-Pacific peoples.

3.2.2 Screening for Melanoma

The screening test for the early detection of melanoma is a total body skin examination either by a health professional or by self-examination. The skin examination may be augmented by dermoscopy by trained health professionals. Melanoma can only be confirmed by biopsy, ideally excision biopsy (but not punch biopsy) followed by histological examination.

Population screening for melanoma

Population screening for melanoma has not been shown to reduce mortality from melanoma so the Clinical Practice Guidelines for the Management of Melanoma in Australia and New Zealand (Australian Cancer Network Melanoma Guidelines Revision Working Group, 2008), the US Preventive Services Task Force (Wolff et al., 2009) and the Melanoma Standards (National Melanoma Tumour Standard Working Group, 2013) do not recommend routine screening for the general population.

Screening of people at high risk of melanoma

Risk assessment and prognostication are regularly used in medicine to guide management decisions. It is generally believed that screening of high-risk people by total skin examination for early detection is more feasible, cheaper, has fewer false positive screens and lower patient anxiety (Williams et al., 2011) compared to population screening. However, screening of high-risk people requires their accurate identification. The common practice of stratifying individual risk based on a single variable, such as age, rarely gives a precise enough estimate of individual risk and, to date, few melanoma risk prediction models have been comprehensively developed and assessed (Vuong et al., 2014). Although many risk factors for melanoma are well described, their multiple interactions make risk prediction complex. However, having estimated an individual’s absolute risk by consideration of their personal combination of risk factors, appropriate strategies for prevention, surveillance and early diagnosis can be offered.
Skin self-examination

Although skin self-examination has been suggested as one way to detect melanoma, its efficacy is not well understood. Nevertheless, in a population-based series of melanoma patients in New Zealand, 45% of melanomas were first recognised as abnormal skin lesions by the patient, 31% by a family member or friend, and 20% by their general practitioner (Sneyd, 1999).

Sensitivity and specificity of the skin examination by a health professional

The evaluation of a screening examination is commonly described using a single measure of accuracy. However, as overall accuracy is dependent on prevalence of the disease, it is less useful than sensitivity (probability that a person with the disease will test positive) and specificity (probability that a person without the disease will test negative) when evaluating a screening test (Alberg et al., 2004).

Evidence for the accuracy of screening with total skin examinations by physicians or patients is limited and inconsistent (Wolff et al., 2009). Most evaluations of skin examinations have assessed the test using pictures of lesions, or when conducted by specialists, primarily within screening programmes, so are not generalisable to screening in the general population. Furthermore, it is unknown whether the routine use of dermoscopy in total skin examinations is likely to improve accuracy. One Australian study estimated the specificity of skin examinations for melanoma by general practitioners as 86.1% (Aitken et al., 2006). Sensitivity could not be calculated in this study as people with negative screening tests were not followed up for verification.

Although there is some evidence that a screening skin examination by a physician is associated with thinner melanomas being diagnosed (Aitken et al., 2009; Koh et al., 1996), three major biases (lead-time bias, length bias and overdiagnosis bias) can result in over-estimation of benefit.

3.3 DIAGNOSIS AND TREATMENT OF SKIN CANCER

As indicated previously, the pathway for diagnosis and treatment directly links to the Standards of Service Provision for Patients with Melanoma in New Zealand (National Melanoma Tumour Standard Working Group, 2013). The Standards promote nationally coordinated and consistent standards of service provision across New Zealand. They aim to ensure efficient and sustainable best-practice management of melanoma, with a focus on equity. Comparable standards for the diagnosis and treatment of non-melanoma skin cancer in New Zealand, which have not yet been developed, are also needed.

3.4 RESEARCH, EVALUATION AND SURVEILLANCE

The knowledge required for effective cancer control originates from three broad types of knowledge-generating activities - fundamental research (causes and impacts), intervention research (efficacy and effectiveness of cancer control actions) and surveillance (collection, analysis and review of cancer-related data) (Minister of Health, 2003).
With regard to primary prevention, the 2004 comprehensive systematic review carried out for the US Community Preventive Services Task Force identified a number of issues that may help to explain why there has been insufficient evidence regarding the effectiveness of interventions to prevent skin cancer (Saraiya et al., 2004). These issues (in the reviewed studies, which were published up to 2000) included a lack of rigour in research design (particularly the need for appropriate comparison groups), measurement issues, poor description of interventions, lack of insight into how environmental and policy interventions may work, and lack of studies among multi-ethnic populations. That review also noted that there was a paucity of research that measured key health outcomes, from objectively measured skin damage through to clinical evidence of skin cancer. However, the ongoing series of review updates relating to specific intervention contexts and types, which supplement earlier findings with research published since 2000, have tended to find a strengthening in evidence for the effectiveness of most primary prevention interventions. As outlined on page 13, these include interventions in primary and middle school, outdoor occupational, child care, multi-component community-wide and recreational and tourism settings. However, there remains a need to implement and rigorously evaluate such interventions within the New Zealand context where skin cancer is a much more common health outcome than in any other country, except Australia.

With regard to early detection, the Early Detection Sub-Committee of the Skin Cancer Steering Committee (2010) highlighted the need for research to better target early detection strategies to reduce mortality from both melanoma and NMSC. While the current Skin Cancer Primary Prevention and Early Detection Steering Committee recognises that international research has focused on melanoma due to its greater risk of death, the committee also concurs with Brougham et al. (2010) that New Zealand needs a critical analysis of our significant burden of NMSC, including an understanding of the extent to which delays in detection and diagnosis may contribute to deaths from NMSC. Of particular importance is data on cutaneous SCC as it is more likely to result in death than BCC.

With regard to early detection of melanoma, the report of the Early Detection Advisory Group (EDAG, 2006) identified the need for research in New Zealand into:

- who is most likely to develop which type of melanoma
- who is most likely to develop thick melanoma
- who is most likely to die of melanoma
- the extent to which delay in recognition, presentation, diagnosis occurs and the reasons for this.

Also, the EDAG, the Melanoma Guidelines Implementation Plan (NZ Guidelines Group, 2010) and the New Zealand Skin Cancer Control Strategic Framework 2011 to 2014 (New Zealand Skin Cancer Steering Committee, 2011) identified the need for research to inform the development of a tool to identify individuals at high risk.
The Early Detection Sub-Committee of the Skin Cancer Steering Committee (2010) also highlighted the need for research to:

- better target early detection strategies to reduce mortality from skin cancer, particularly melanoma, in New Zealand
- inform the development of a melanoma high-risk assessment tool specific for New Zealand.
4. NEW ZEALAND SKIN CANCER PRIMARY PREVENTION AND EARLY DETECTION STRATEGY 2014 TO 2017

KEY PRINCIPLES

Alignment with The New Zealand Cancer Control Strategy. As noted in Section 2, the New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017 aligns with The New Zealand Cancer Control Strategy (Minister of Health, 2003). In particular, the Outcomes Framework (Figure 1, page 21) purposes and intervention pathways are consistent with the purposes and Goals 1 (primary prevention) and 2 (early detection) of that Strategy.

Reducing inequalities. Reducing inequalities is a guiding principle of the New Zealand Primary Prevention and Early Detection Strategy 2014 to 2017 as reflected in the identified purposes of the Outcomes Framework. The Committee recognises the need to reduce the incidence and impact of skin cancer and reduce inequalities with respect to skin cancer. This is consistent with The New Zealand Cancer Control Strategy (Minister of Health, 2003). A Health Equity Assessment Tool (Equity Lens) for Tackling Inequalities in Health (Signal et al., 2008) should be applied in the development of skin cancer policy, identification of interventions and commitment of resources. Inequalities relating to gender, age and ethnicity require particular attention.

Evidence-based. A guiding principle of the New Zealand Primary Prevention and Early Detection Strategy 2014 to 2017 is that all activities should be evidence-based. Again, this is consistent with The New Zealand Cancer Control Strategy (Minister of Health, 2003). A strong evidence base provides confidence that the intervention approaches, goals and objectives identified are likely to be effective and that efforts and resources are directed at the population groups most affected by skin cancer and its risk factors. The importance of ensuring this Strategy is evidence-based is reflected in the inclusion of a research, evaluation and surveillance intervention pathway in the Outcomes Framework (see Figure 1).

The Strategy as a guide for action. As in previous years, the Strategy is intended to inform action rather than be a blue print. Organisations are encouraged to assess areas of expertise and capacity in relation to the Outcomes Framework (Figure 1) and, in developing programmes, specifically identify how the programmes contribute to these outcomes. It is expected that each organisation involved in skin cancer control will interpret and use the Strategy from their organisational perspective.

4.1 THE OUTCOMES FRAMEWORK

As Figure 1 (p.21) shows, the overarching purposes of the 2014 to 2017 Strategy are to contribute to reducing the incidence and impact of skin cancer and reducing inequalities with respect to skin cancer. Skin cancer is understood to include both melanoma and non-melanoma skin cancer. Impact includes mortality and morbidity (ie, stage at detection) as well as quality of life.
considerations (beyond the scope of this document). Consistent with the Melanoma Standards (National Melanoma Tumour Standard Working Group, 2013), priorities for early detection include increasing health professional best practice relating to detection, with a particular focus on recognition by primary care clinicians of skin lesions suspected of being melanoma.

As highlighted in the Strategy principles, research, evaluation and surveillance should provide a critical underpinning to all skin cancer control activities. To this end the 2013 Committee has identified the need to review and revise the New Zealand Skin Cancer Prevention and Early Detection Research Strategy 2011 to 2013 (Health Sponsorship Council, 2011). The Health Promotion Agency and MelNet have agreed to take the lead role in facilitating the review of this Strategy.

Figure 1 identifies priorities for the primary prevention intervention pathway. The focus of primary prevention activities is on reducing excessive exposure to UVR, the overarching risk factor for melanoma and NMSC. Excessive exposure to UVR incorporates sunburn, intermittent and chronic sun exposure and solaria use. Key medium term outcomes are increases in individual behaviours that protect people from excessive UVR exposure and increases in the number of effective sun safe settings. Changes that may be expected to contribute to achievement of these outcomes include:

- increased knowledge of the risks and benefits from UVR among the public, policy makers and health professionals
- attitudes toward UVR exposure among policy makers, the health and skin workforce and the public become protective (with universal recognition that skin cancer is a serious public health issue)
- increased policy support for protective environments.

It is anticipated that these changes will be the focus of a mix of strategies to include settings-based interventions, advocacy, and marketing and communications.

The Committee agreed that prevention activities need to target all age groups. Based on the recommendations from the preliminary task force findings, early childhood, primary and intermediate school settings are identified as priority settings for prevention activities. Workplaces and primary health care are also identified as important channels for sun safety prevention activities, with a focus on men and older adults. The task force upgraded to “sufficient” their classification of the evidence for the effectiveness of multi-component community-wide skin cancer prevention interventions to significantly increase sunscreen use. This will include a focus on working with community influencers, eg, local and regional councils and recreational organisations, to increase sun safety policy and practice.
Figure 1: Skin Cancer Primary Prevention and Early Detection Outcomes Framework 2014 to 2017

Purpose of the New Zealand Skin Cancer Primary Prevention and Early Detection Strategic Framework 2014 to 2017
1. Reduce the incidence and impact of skin cancer
2. Reduce inequalities with respect to skin cancer

Long Term Outcomes
- Improved primary prevention of skin cancer

Medium Term Outcomes
- Reduced excessive exposure to UVR
  - Reduced exposure to UVR from sun
  - Reduced exposure to UVR from solars

- Increased individual behaviours that protect from excessive UVR exposure
  - Increased sun safe settings
- Increased knowledge of risk and benefits of UVR among public, health professionals and policy makers
- Attitudes toward UVR exposure among policymakers, health and skin workforce and the public become protective
- Increased policy support for protective environments

Short Term Outcomes
- Skin cancers, particularly melanomas, are detected earlier
- Best practice relating to melanoma detection is followed by health professionals
  - All primary care clinicians are able to recognise skin lesions suspicious of melanoma
  - People at increased risk of melanoma are identified and offered management appropriate to their level of risk
- All allied professionals who come into contact with people's skin have access to training to recognise skin changes suggestive of melanoma and advise those with suspicious lesions to see a doctor

Research, evaluation and surveillance is undertaken to underpin all primary prevention and early detection activities
REFERENCES


APPENDIX A  NEW ZEALAND SKIN CANCER PRIMARY PREVENTION AND EARLY DETECTION STEERING COMMITTEE

A HISTORY OF THE COMMITTEE

2001

The first meeting of the New Zealand Skin Cancer Prevention and Early Detection Steering Committee (formerly the New Zealand Skin Cancer Steering Committee) took place in August 2001. The meeting, which was convened by the Health Sponsorship Council (HSC) and the Cancer Society, brought together representatives of the HSC, the Cancer Society, NIWA, the Social and Behavioural Research in Cancer Group of the University of Otago, as well as a GP and a dermatologist. Meeting discussions were underpinned by a discussion document prepared by Dr Tony Reeder (2001). The Skin Cancer Prevention and Early Detection Action Plan 2001-2004 that resulted from the meeting set out five key objectives for skin cancer control work in New Zealand. On the basis of the Action Plan, HSC and Cancer Society National Office developed a SunSmart programme that focused on primary prevention of skin cancer, with children 12 years and under and their caregivers as its priority audiences.

2004

The second meeting of the Committee took place in August 2004, with a view to reflecting on the previous three years and developing and identifying strategic direction for the next three years. Again the meeting was underpinned by a report prepared by Dr Reeder (2004). In addition to the organisations represented at the previous Committee meeting, a GP, and representatives of the Ministry of Health, Victoria University School of Architecture and Design, and Waikato District Health Board, also participated. On the basis of discussions at the 2004 Committee meeting a Skin Cancer Control Strategic Framework for 2005 to 2008 was developed. Early detection of skin cancers and effectiveness of skin cancer treatment were identified as core components of the 2005 to 2008 Framework, providing the impetus for establishment of the Early Detection Advisory Group (EDAG). Vitamin D deficiency was also acknowledged as an important issue for skin cancer control at this meeting.

2007

The third meeting of the Committee took place in April 2007. Once again, the purpose of the meeting was to reflect on the previous three years and develop the strategic direction and priorities for the next three years. Organisations represented at the meeting were the Cancer Society, the HSC, the Cancer Society Social and Behavioural Research Group, the Hugh Adam Cancer Epidemiology Unit, the Wellington School of Medicine, NIWA, the Ministry of Health, Te Ohu Rata o Aotearoa, the University of Auckland School of Population Health, the New Zealand Dermatological Society, the Royal College of General Practitioners, and the Cancer Control
Council. On the basis of discussions at the 2007 Committee meeting a *Skin Cancer Control Strategic Framework for 2008 to 2011* was developed.

### 2010

The fourth meeting of the Committee, hosted by MelNet and funded by the HSC, took place in August 2010. As with previous meetings, its purpose was to reflect on the previous three years and develop the strategic direction and priorities for the next three years. Organisations represented at the meeting were the Cancer Society, the HSC, the Melanoma Foundation, the Cancer Society Social and Behavioural Research Group, the Hugh Adam Cancer Epidemiology Unit, the Wellington School of Medicine, NIWA, the Ministry of Health, Te Ohu Rata o Aotearoa, the University of Auckland School of Population Health, the New Zealand Dermatological Society, the Royal College of General Practitioners, Daffodil Enterprises, the New Zealand Guidelines Group, Procare Health and Cancer Control New Zealand. On the basis of discussions a *Skin Cancer Control Strategic Framework for 2008 to 2011* was developed.

### NEW ZEALAND SKIN CANCER PRIMARY PREVENTION AND EARLY DETECTION STEERING COMMITTEE MEETING 2013

The fifth meeting of the Committee, hosted by MelNet and funded by the Health Promotion Agency, took place on 24 September 2013. Meeting participants were as follows:

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Control New Zealand</td>
<td>Andrew Lesperance</td>
</tr>
<tr>
<td></td>
<td>Mary Clare Tracey</td>
</tr>
<tr>
<td>Cancer Society of New Zealand</td>
<td>Barbara Hegan</td>
</tr>
<tr>
<td></td>
<td>Dr Jan Pearson</td>
</tr>
<tr>
<td>Cancer Society Social and Behavioural Research Unit, University of Otago</td>
<td>Associate Professor</td>
</tr>
<tr>
<td></td>
<td>Tony Reeder</td>
</tr>
<tr>
<td>Institute of Environmental Sciences and Research</td>
<td>Murray Matthews</td>
</tr>
<tr>
<td>Health Promotion Agency</td>
<td>Kath Blair</td>
</tr>
<tr>
<td></td>
<td>Kerri Kruse</td>
</tr>
<tr>
<td></td>
<td>Bham Rajiv</td>
</tr>
<tr>
<td>Hugh Adam Cancer Epidemiology Unit, University of Otago</td>
<td>Dr Mary Jane Sneyd</td>
</tr>
<tr>
<td>Melanoma Foundation of New Zealand</td>
<td>Linda Flay</td>
</tr>
<tr>
<td>MelNet</td>
<td>Mr Gary Duncan</td>
</tr>
<tr>
<td></td>
<td>Betsy Marshall</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>Dr Andrew Simpson</td>
</tr>
</tbody>
</table>
The Committee meeting was facilitated by Jennifer Harris of the Health Promotion Agency.

The first part involved presentations on implementation of the 2011-2014 Framework prevention and early detection ‘streams’ by the Cancer Society (Barbara Hegan), Health Promotion Agency (Kath Blair, Bhama Rajiv, Kerri Kruse), Melanoma Foundation (Linda Flay) and MelNet (Betsy Marshall as coordinator of agency sunbed advocacy); development of the Melanoma Standards (Dr Andrew Simpson); epidemiology of skin cancer, particularly melanoma, in New Zealand (Dr Mary Jane Sneyd); and, intervention strategies for prevention, along with the Melanoma Summit 2013 prevention workshop recommendations on priorities (Associate Professor Tony Reeder).

The second part of the meeting involved discussion by all members of the prevention and early detection outcomes of the 2008 to 2011 Framework, followed by committee agreement on revised short, medium and long term outcomes for 2014 to 2017. Members also agreed that the Committee should be renamed as the New Zealand Skin Cancer Primary Prevention and Early Detection Steering Committee to reflect its focus and that the title of the proposed document be the New Zealand Skin Cancer Primary Prevention and Early Detection Strategy 2014 to 2017.

A draft document incorporating considerable data and evidence provided by Dr Mary Jane Sneyd and Associate Professor Tony Reeder was circulated to Committee members for feedback from them and their organisations before finalisation. Dr Donna Cormack, of the University of Otago Te Ropu Rangahau Hauora a Eru Pomare, peer reviewed the document. Input and feedback also were provided by Louise Sandford of the Cancer Society of New Zealand and Dr Mark Foley.