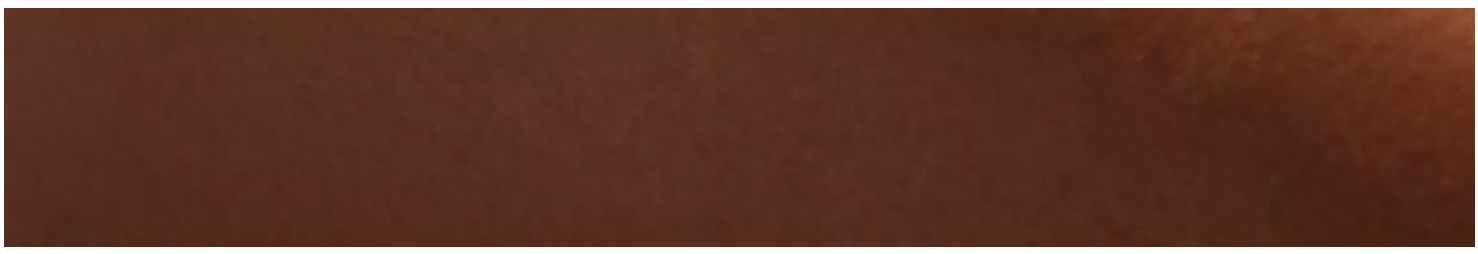
Alberta Health Services

SNAPSHOT OF SKIN CANCER PREVENTION FACTS AND FIGURES



Snapshot of Skin Cancer Prevention Facts and Figures: A Resource to Guide Skin Cancer Prevention in Alberta

As part of the first step in developing a comprehensive action plan related to preventing skin cancer in Alberta, the Alberta Cancer Prevention Program conducted a situational analysis. This report serves as a point-in-time (snapshot) resource to guide the primary prevention of skin cancer through individual change, implementation of health-promoting public policy, and the mobilization of communities to create environments where healthy choices become easier choices.

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EXECUTIVE SUMMARY

Using evidence-based practice and a population health focus for cancer prevention, the Alberta Cancer Prevention Program strives to achieve the goals established by what was then the Alberta Cancer Board for the year 2025:

- 35% fewer people (than currently projected) developing cancer;
- 50% fewer people (than currently projected) dying of cancer;
- Support to eliminate or reduce the suffering of every Albertan living with cancer.

In order to achieve these goals, the Alberta Cancer Prevention Program is committed to a reduction in the incidence of cancer and other chronic diseases in Alberta, including skin cancer. Skin cancer is the most common malignancy diagnosed in Canada, and the key contributor to skin cancer risk is exposure to solar and artificial ultraviolet radiation. This strong relationship between skin cancer and ultraviolet radiation indicates that a significant proportion of the malignancies could be prevented by reducing exposure and implementing more effective protection practices and policies.

As part of the first step in developing a comprehensive action plan for reaching the 2025 goals related to skin cancer, the Alberta Cancer Prevention Program conducted a situational analysis. This report serves as a point-in-time ("snapshot") resource to guide the primary prevention of skin cancer through individual change, implementation of health-promoting public policy, and the mobilization of communities to create environments where healthy choices become easier choices.

This report includes several components:

- An approach to skin cancer prevention that will be used to provide insight on the larger unifying influences on health outcomes, as well as guiding population health efforts in skin cancer prevention;
- Information on incidence and mortality trends for skin cancer;
- Background information on the impact of solar and artificial ultraviolet radiation exposure;
- Skin cancer risk factors and an analysis of Albertans related to protective behaviour;
- A best-practice review of peer-reviewed literature in five target areas for skin cancer prevention, including the broader population, outdoor workers, artificial tanning, children and youth, physical activity and recreation, and shade;
- An asset map of skin cancer prevention activities across the province of Alberta;
- Summary and conclusions.

The scope of this report does not include early detection or screening. Limited research prevents accurate estimation of the benefits of screening for skin cancer in the general population.

This report indicates that there is a great need for investment in the area of skin cancer prevention. The evidence shows that despite its preventability, skin cancer continues to be associated with significant and increasing morbidity, substantial health-care costs, increased risk of a second primary cancer and, particularly for melanoma, mortality.

Results show that a comprehensive action plan is the most effective method for improving skin cancer health outcomes at the population level. Further, skin cancer prevention is fairly low on the priority list across the province and very little strategic coordination is occurring at the provincial level. The experience of other population-level programs suggests that a comprehensive plan should start with building a "community of concern."

At this point, the Alberta Cancer Prevention Program is committed to providing leadership and coordination at the provincial level to strengthen community action and seeks to build a comprehensive action plan in conjunction with community stakeholders in order to achieve reductions in the incidence of and mortality from skin cancer.

CHAPTER 1 INTRODUCTION

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BACKGROUND

The primary prevention of cancer focuses on minimizing risk factors that give rise to cancer. It is estimated that up to 90% of all skin cancers are associated with solar and artificial ultraviolet radiation (UVR) exposure, modifiable and preventable risk factors (Armstrong & Kricker, 2001; Hill, Elwood, & English, 2004; International Agency for Research on Cancer [IARC], 1992; International Agency for Research on Cancer Working Group on Artificial Ultraviolet (UV) Light and Skin Cancer, 2007). In addition to the increased risk of developing skin cancer, overexposure to UVR can also cause premature ageing of the skin, eye damage, and a weakened immune system (Armstrong & Kricker, 2001). Skin cancer currently accounts for more than one-third of all new cancer cases in Canada, making it the most common type of malignancy in Canada (Canadian Cancer Society/ National Cancer Institute of Canada, 2008). The most common type of skin cancers are squamous and basal cell carcinomas, while melanoma is the most deadly. Although skin cancers are commonly removed with minor surgery, there is an element of disfigurement associated with the procedure.

ORGANIZATIONAL GOALS

Using evidence-based practice and a population health focus for cancer prevention, the Alberta Cancer Prevention Program (ACPP) strives to achieve the goals established by what was then the Alberta Cancer Board (ACB) for the year 2025:

- 35% fewer people (than currently projected) developing cancer;
- 50% fewer people (than currently projected) dying of cancer;
- Support to eliminate or reduce the suffering of every Albertan living with cancer.

In order to achieve these goals, the ACPP is committed to a reduction in the incidence of cancer and other chronic diseases in Alberta. Developing comprehensive collaborative strategies that concentrate on known risk factors and targeted populations, the ACPP has a unique opportunity to make a positive change in the future health of all Albertans. Related strategies include linking with partners from regional, national and international levels to make a difference in the lives of individuals and populations at large.

The Alberta Cancer Prevention Program has adopted an integrated approach to address

1 Tobacco control

2 Nutrition and physical activity

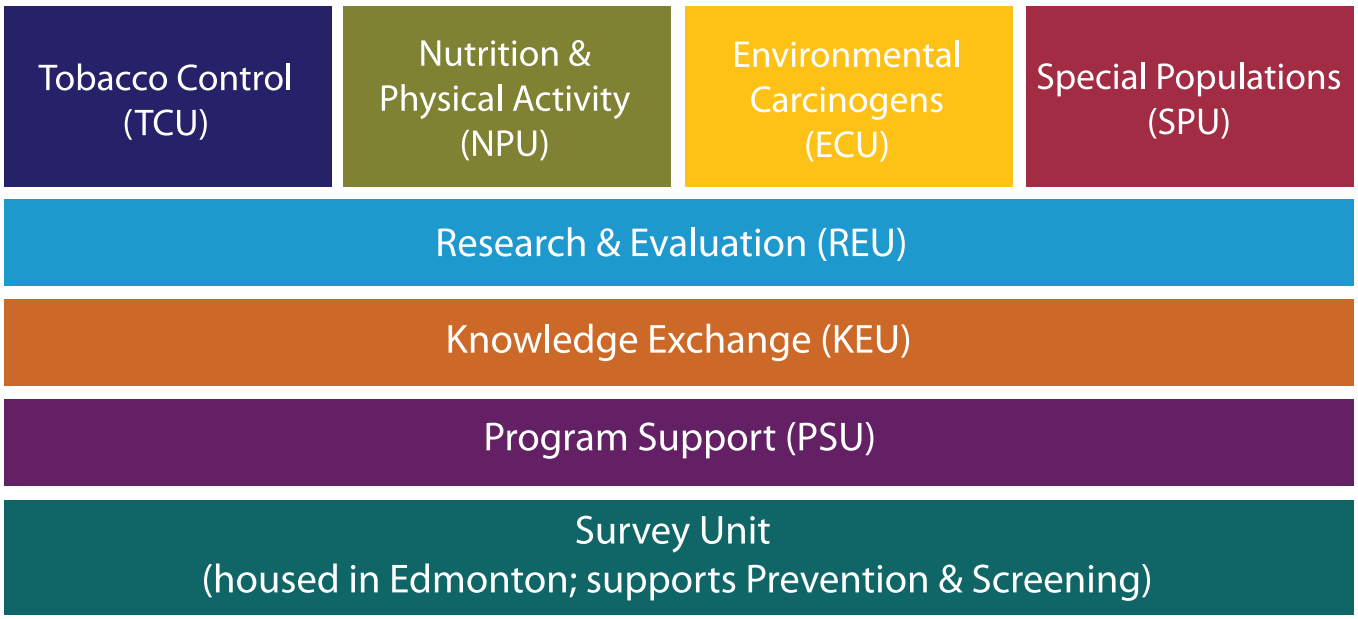
3 Environment (skin cancer prevention, environmental and occupational carcinogens)

4 Special populations

CURRENT EVIDENCE SUGGESTS THAT AT LEAST HALF OF ALL NEW CANCERS ARE DUE TO PREVENTABLE FACTORS AND THAT PREVENTION OFFERS THE MOST COST-EFFECTIVE, LONG-TERM STRATEGY FOR THE CONTROL OF CANCER. (CANADIAN CANCER SOCIETY/NATIONAL CANCER INSTITUTE OF CANADA, 2008; WORLD HEALTH ORGANIZATION, 2006)

These program units are grounded in Research and Evaluation, Knowledge Exchange, Survey and Program Support Units, all of which are working towards achieving short-term and intermediate goals, which will lead to success in attaining the long-term 2025 goals. This integrated program structure is illustrated below in Figure 1.1.

Figure 1.1 The Alberta Cancer Prevention Program Structure

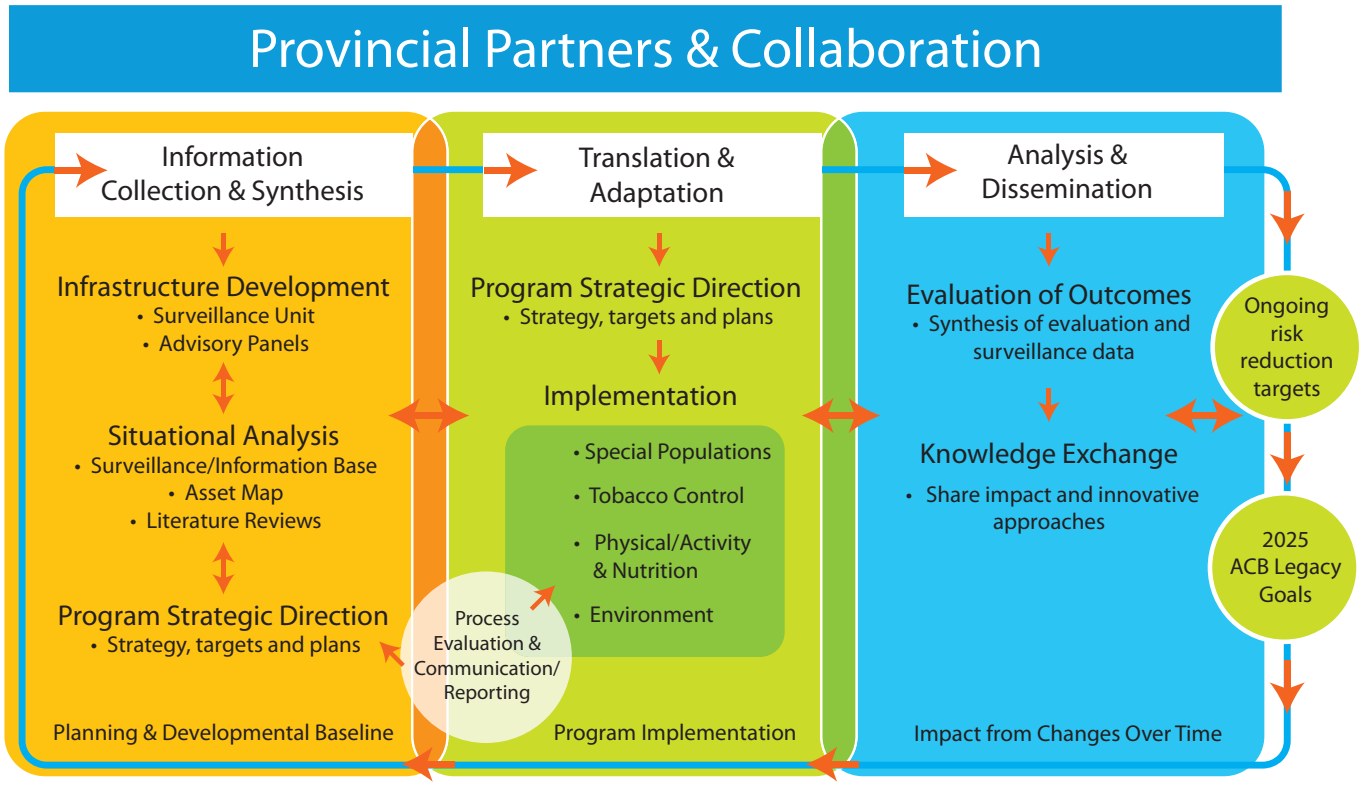


CONCEPTUAL MODEL

In order to reach the 2025 goals, the ACPP employs a cancer control model, thus shifting from a purely patient-centred approach to a comprehensive cancer control approach. As part of these efforts, the ACPP has developed a conceptual model (Figure 1.2) to guide efforts in programming.

As part of the first step in the conceptual model, units within the ACPP are to conduct a situational analysis to help guide the development of work plans and strategic directions in cancer prevention. The purpose of this report is to serve as a resource to guide the primary prevention of skin cancer through individual change, implementation of health-promoting public policy, and the mobilization of communities to create environments where healthy choices become easier choices. Therefore, it outlines the prevalence of skin cancer in Alberta, population behaviour as it relates to primary prevention, and provides evidence about effective health promotion strategies and best practices. Further, this document also discusses what action needs to be taken across Alberta to achieve improved population health outcomes regarding skin cancer prevention.

Figure 1.2 Conceptual Model for the Alberta Cancer Prevention Program



THE ALBERTA CANCER PREVENTION PROGRAM IS COMMITTED TO ACHIEVING REDUCTIONS IN THE INCIDENCE OF, AND MORTALITY FROM, SKIN CANCER.

THE APPROACH TO SKIN CANCER PREVENTION

The Approach to Skin Cancer Prevention (the Approach) is a dynamic, three-step process that was developed to guide the Skin Cancer Prevention Strategy towards the 2025 organizational goals (Figure 1.3). It helps to provide insight on the larger unifying influences on health outcomes, as well as guiding population health efforts in skin cancer prevention.

The Approach is based on the notion of evidence-informed practice, and combines concepts from the Population Health Template (Health Canada, 2001) with existing skin cancer prevention models, including

1 The Conceptual Model for Sun Protection Infrastructure in New South Wales, which describes how sun protection infrastructure operates in conjunction with key stakeholders to reach target populations in key settings (Ferguson & Vita, 2002);

2 The SunSmart model implemented in Australia. This model describes the interrelationships between the major components of the Sun Smart program and attempts to articulate the relationship between the interventions and the community. It also describes the main routes of influence to change behaviour and highlights both individual and social targets of change (Montague, Borland, & Sinclair, 2001);

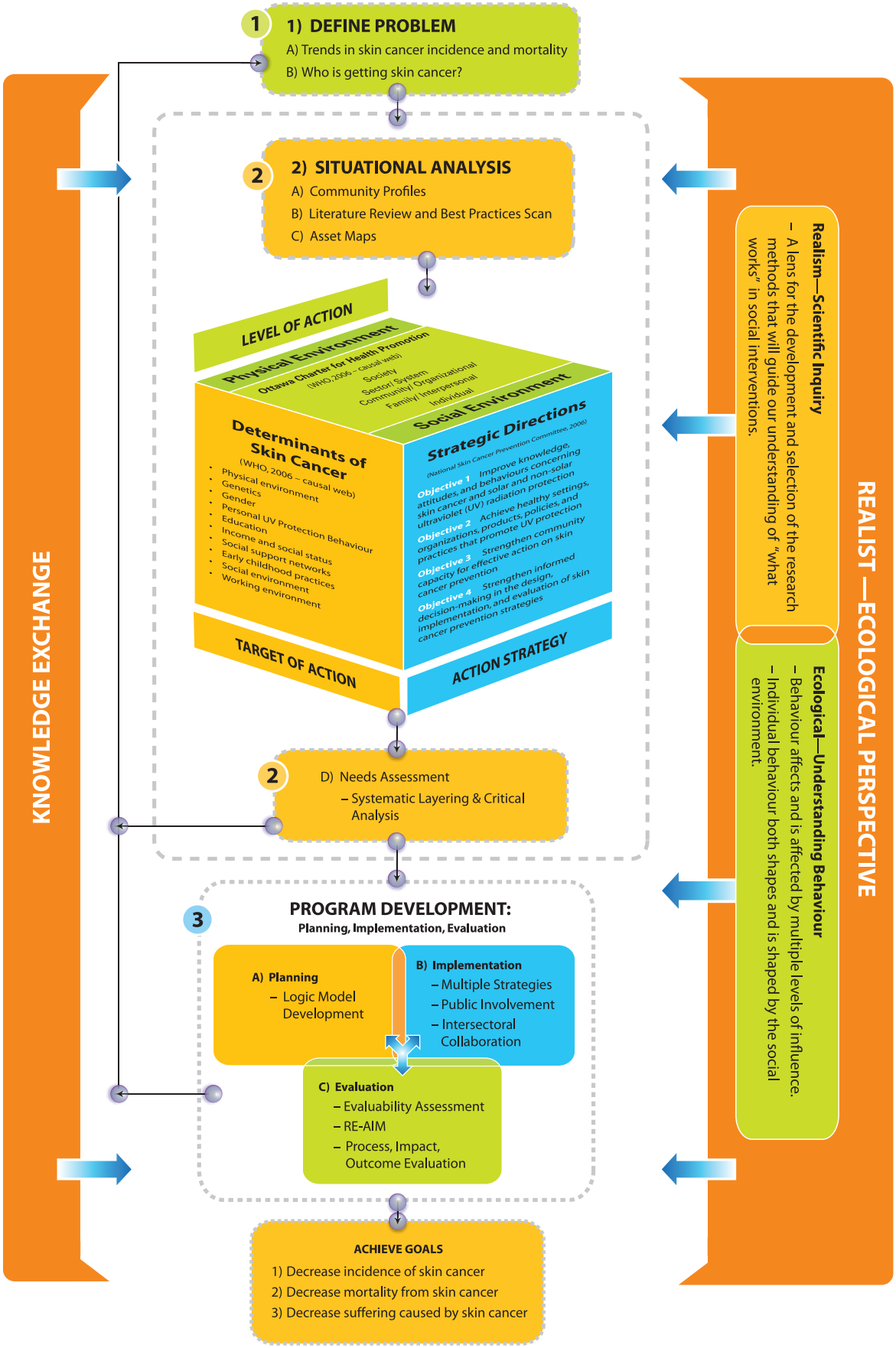
3 The World Health Organization (WHO) model to examine the causal factors of skin cancer (World Health Organization, 2006); and

4 The Centers for Disease Control and Prevention (CDC) analytic framework for media interventions in skin cancer prevention in the United States (Saraiya et al., 2004).

These models provide the theoretical foundation of the Approach, and have been combined in order to create a comprehensive skin cancer model for population health promotion.

THE APPROACH FOLLOWS A SYSTEMATIC PROCESS: 1) DEFINE THE PROBLEM, 2) SITUATIONAL ANALYSIS AND 3) PROGRAM DEVELOPMENT: PLANNING, IMPLEMENTATION, EVALUATION AND KNOWLEDGE EXCHANGE.

Figure 1.3 A Population Health Approach to Skin Cancer Prevention



REALIST-ECOLOGICAL PERSPECTIVE

The Skin Cancer Prevention Approach utilizes a realist-ecological perspective as an overarching theme for directing all aspects of population health promotion in skin cancer prevention. Realism is a lens for guiding scientific inquiry and the development and selection of research methods that will provide an understanding of "what works" in social interventions. It seeks to emphasize the relationship between a social intervention and the context in which it is implemented (Pawson, Greenhalgh, Harvey, & Walshe, 2004). By itself, however, realism is insufficient as an overarching theme for addressing the skin cancer problem because it lacks an explanation of what influences behavioural outcomes at the population health level and in a particular context. Through the realist perspective we understand that the effectiveness of an intervention is affected by the context in which it is implemented.

Utilizing an ecological perspective, we can obtain a complete understanding of, as well as address the contextual factors through, effective interventions. The ecological perspective affirms that 1) behaviour affects and is affected by multiple levels of influence and 2) individual behaviour both shapes and is shaped by the social environment. Ecological theory defines the linkages between communities of people and the social environment and it helps us identify the broad determinants that influence population health outcomes (McLaren & Hawe, 2008; National Institutes of Health, 2005). Consequently, the Approach has merged the ecological perspective with realism in order to clearly determine what influences behaviour at the population level. A thorough understanding of the factors influencing human behaviour ultimately leads to an enhanced ability to characterize the context in which a social intervention is to be planned, implemented and evaluated.

In addition to a realist-ecological perspective, the Approach recognizes knowledge exchange as an ongoing process rather than an endpoint.

THE SKIN CANCER PREVENTION APPROACH

This section provides an overview of the way in which the Skin Cancer Prevention Strategy will approach its work in reducing the incidence and mortality of skin cancer.

1) Define the Problem

Ongoing surveillance of the incidence and mortality of skin cancer rates in the population is essential for defining the health problem. The first step of the Approach is to define the problem based on two questions implicit in the Population Health Template: 1) "What are the incidence and mortality rates for skin cancer, and are they improving or not?" and 2) "Who is getting skin cancer and who is not?" It is necessary to answer these two questions at regular intervals in a population's life cycle through ongoing surveillance activities, in order to monitor our progress and adapt program plans as needed (Health Canada, 2001).

2) Situational Analysis

Once the parameters of the problem have been established, an in-depth examination of the elements of the problem should also be conducted. The Alberta Cancer Prevention Program has developed a framework for conducting a situational analysis, which is defined as "a strategic, multi-layered analytic process assessing community profiles, literature reviews and best-practice scans to identify gaps that will direct various initiatives in chronic-disease prevention. This includes analyzing provincial and regional needs and assets, problem diagnosis and examining relevant research, knowledge and experience, and identifying gaps" (see Figure 1.4) (Alberta Cancer Board: Tobacco Control Unit, 2007). The model employed by the ACB Prevention Department is consistent with the Population Health Template (Health Canada, 2001). Three main categories of information are collected: community profiles, literature review and best practice scan, and asset maps, which are then subject to systematic layering and critical analysis, called a needs assessment.

Figure 1.4 Situational Analysis (SA) Approach for the Alberta Cancer Prevention Program

	Community Profiles (CP)	Literature Review and Best Practice Scan (LR & BPS)	Asset Maps (AM)	Needs Assessment (NA)
PURPOSES	Establish statistical and social determinants of health profiles of Alberta's regional health authorities to identify and prioritize health needs	Formulate LR & BPS of predefined topic areas as directed by the CP, when applicable	Identify and map key individuals & groups regionally and provincially	Provide information that will augment and fill programmatic & research gaps
REQUIRED SCOPE	Comprehensive approach based on current availability of data (e.g., Census and Canadian Community Health Survey data)	Comprehensive review within the prioritized risk factors and at-risk populations as directed by the CP, when applicable	Key leaders, organizations and policies addressing prioritized risk factors and at-risk populations as directed by the CP and LR &BPS, when applicable	Directed by the layering and analysis of the first three components (CP, LR &BPS, AM) of the SA to identify gaps that will direct research and programming
POSSIBLE METHODS	Primary and secondary analysis of existing population data	Content analysis of existing literature, initiatives and interventions	Systematic mapping of key players/ organizations and their geographic placement on a map of Alberta	Data collection & analysis (qualitative / quantitative) using surveys, questionnaires, interviews, focus-groups etc.
OUTCOMES/ EXAMPLES	Synthesis of existing provincial data (region/risk factor) using charts, graphs, maps, tables, etc.	Division-specific overview document of current literature and best practices	Combined inventory and mapping of region-specific and provincial resources (hosptitals, schools, screening centres, organizations, etc) and key stakeholders	Identification of missing information, resources and programs

All of the information gathered in the situational analysis is subject to the theoretical foundation of the Approach. The primary model that influenced the development of this component of the Approach was the *Population Health Model: An Integrated Model of Population Health and Health Promotion* (PHP) (Hamilton & Bhatti, 1996). The PHP is a resource for understanding how population health and health promotion work together, and a guide for intervening at the population level. The model attempts to answer three questions: 1) "What should we take action on?" 2) "How should we take action?" and 3) "With whom should we act?" (Hamilton & Bhatti, 1996). Through an understanding of what to target, levels of action and the action strategies in skin cancer prevention, in addition to understanding what predicts behaviour (i.e., ecological theory), the evidence collected through the situational analysis can be analyzed and synthesized to lead to the development of effective recommendations in skin cancer prevention.

3) Program Development: Planning, Implementing, Evaluation

The third phase of the approach strategically combines the three key elements of program development (planning, implementation and evaluation) to create and actualize a long-term, sustainable plan for reducing the incidence of skin cancer across Alberta.

The planning step will formally assess the logistics needed for implementing a program, by determining the resources that will be required. Once the logistics of implementing a program have been determined and the needed resources are in place, the program is then ready to move into the implementation step. Multiple strategies, public involvement and intersectoral collaboration will be employed to address skin cancer prevention (Health Canada, 2001).

Evaluation mechanisms are constantly employed throughout the Approach, to adjudicate interventions at multiple phases. There are three main components that relate to developing an evaluation plan in the Approach: 1) the evaluability assessment that discusses a participatory method for developing the plan in conjunction with stakeholders, 2) the RE-AIM framework that provides guidance for what types of outcomes and indicators should be evaluated, and 3) process, impact and outcome evaluation, based on the Precede-Proceed framework (Green & Kreuter, 1991). An evaluation plan should be developed in conjunction with the overall program plan during the earlier stages, and should not be merely the afterthought of an intervention effort.

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CHAPTER 2 WHAT IS SKIN CANCER?

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This section will provide background information on skin cancer and ultraviolet radiation exposure, including risk factors for skin cancer. The UV Index, sun exposure and vitamin D are also discussed.

Cancer is a disease in which cells develop the ability to grow out of control. The tumours can become totally independent and grow on their own. The top layer of the skin (epidermis) contains two types of cells: skin cells (basal and squamous) and pigment-producing cells (melanocytes). When altered by ultraviolet radiation (UVR), these cells can produce skin cancers. Skin cell cancers can be basal or squamous cancers, together referred to as non-melanoma skin cancer. These are usually on the skin surface and are almost always curable if treated early. Non-melanoma skin cancers tend to develop later in life on areas of the body that have been repeatedly exposed to the sun, such as the face, neck, ears or hands (B. K. Armstrong, 2004b).

Pigment-cell cancers are called melanomas. Melanoma can occur anywhere on the body but is more likely to develop in certain locations (e.g., trunk, legs). These body sites are often areas that are rarely exposed to the sun and therefore more likely to get sunburned. The development of melanoma is related to sun exposure, particularly to sunburns during childhood (Autier & Dore, 1998; M. Elwood & Jopson, 1997; Gandini et al., 2005; Whiteman, Whiteman, & Green, 2001), and is most common among individuals with fair skin, blue or green eyes, and red or blond hair. This is the least common type of skin cancer but the most serious because of its ability to metastasize or spread through the body where it becomes hard to treat. It can be fatal. Melanomas can usually be cured if detected and treated early (Hill, Elwood, & English, 2004a).

THERE ARE THREE MAIN TYPES OF SKIN CANCER—BASAL CELL CARCINOMA, SQUAMOUS CELL CARCINOMA AND MELANOMA.

Both frequency and intensity of exposure to UVR have been associated with the development of skin cancer. Specifically, continuous patterns of exposure, as seen in outdoor occupations, appear to be related to squamous cell carcinoma, whereas intermittent or intense (sunburn) exposure is associated with the development of basal cell carcinoma and melanoma (Hill, Elwood, & English, 2004a).

The sun gives off several different types of radiation. In addition to visible light, the sun produces invisible radiation, such as heat-producing infrared radiation and ultraviolet radiation (UVR). UVR is not warm; we can neither feel it nor see it.

OVEREXPOSURE TO ULTRAVIOLET RADIATION FROM SOLAR AND ARTIFICIAL SOURCES (TANNING EQUIPMENT) HAS BEEN STRONGLY ASSOCIATED WITH THE DEVELOPMENT OF SKIN CANCER.

UVR is grouped into three different wavelengths (Canadian Cancer Society, 2007):

- Ultraviolet A (UVA) rays make up most of the sun's UV light (90 to 95%). They have the longest wavelength and penetrate deep into the skin, causing DNA damage, wrinkles and aging. Solar UVA rays are partially absorbed by the atmosphere. These rays also make up a large proportion of UVR emitted from tanning equipment.

- Ultraviolet B (UVB) rays are the most damaging to our skin. They are the main cause of sunburns and are nearly 1,000 times stronger than UVA rays. Most of these rays are absorbed by the ozone layer in the earth's atmosphere; only about 5 to 10% reach the surface. These rays are also found in tanning equipment.

- Ultraviolet C rays are the most dangerous but never reach the earth's surface because they are absorbed by oxygen and the ozone layer.

The strength of UVR that reaches the earth's surface is influenced by these factors (World Health Organization, 2002):

- **Time of day** – the most important factor affecting UVR levels is the height of the sun in the sky; the higher the sun in the sky, the higher the UV radiation level; peak at around midday (solar noon).

- **Season** – UV radiation varies with time of year, with maximum levels occurring during the summer months; the sun is higher in the sky and the path the UVR must traverse is shorter.

- **Latitude** – the closer the equator, the higher the UV radiation levels.

- **Cloud cover** – UV radiation levels are highest under cloudless skies. Even with cloud cover, UV radiation levels can be high due to the scattering of UV radiation by water molecules and fine particles in the atmosphere.

- **Altitude** – at higher altitudes, a thinner atmosphere filters less UV radiation. With every 1,000 metres' increase in altitude, UV levels increase by 10% to 12%.

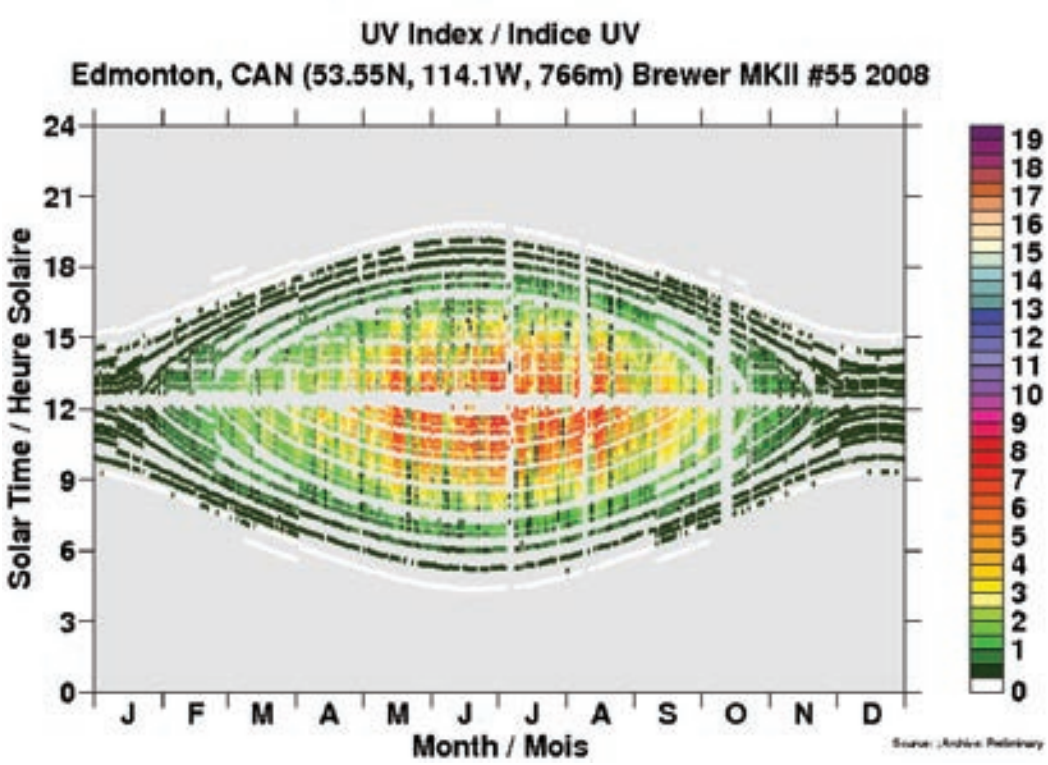
- **Ozone** – ozone absorbs some of the UV radiation that would otherwise reach the earth's surface. Ozone levels vary over the year and even across the day.

- **Ground reflection** – UV radiation is reflected or scattered to varying extents by different surfaces; for example, snow can reflect as much as 80% of UV radiation, and dry beach sand about 15%.

THE UV INDEX

The UV index measures the intensity of solar ultraviolet radiation and is affected by the angle of the sun at solar noon. The angle of the sun varies by the geographic region and season. For example, the UV index is more intense in southern regions and during the summer months for many countries. Figure 2.1 shows the distribution of the UV index for Edmonton, Alberta accounting for seasons and time of day. The strongest solar rays hit the Alberta area between the hours of 10 a.m. and 2 p.m., throughout the summer months (Environment Canada, 2009). The index measures the total UVR during the entire day, not just when UVR is at its peak (11 a.m. to 4 p.m.). It is important to note that UVA rays have a more constant intensity throughout the day, whereas UVB rays peak during midday (Grant & Holick, 2005; Holick, 2004).

Figure 2.1 Year to date UV Index for Edmonton, Alberta (Environment Canada, 2009)



APPLICATION OF THE UV INDEX IS VERY LOW IN OUR PROVINCE. A RECENT SURVEY INDICATES THAT 75 PER CENT OF ALBERTANS RARELY OR NEVER CHECK THE UV INDEX WHEN THEY PLAN ON SPENDING TIME OUTDOORS IN THE SUN (CANADIAN PARTNERSHIP AGAINST CANCER, 2006).

Environment Canada's UV index is a standardized tool used to report the sun's strength by the intensity of the sun's UVR—the higher the number, the stronger the sun's rays (Table 2.1). It also describes what protective actions are recommended to minimize an individual's risk. It is recommended to avoid the sun's rays any time of the day when the UV index is 3 or higher (Environment Canada, 2007).

Table 2.1 UV Index Sun Protection (Environment Canada, 2007)

UV Index	Description	Sun Protection Actions
0–2	Low	• Minimal sun protection required for normal activity. • Wear sunglasses on bright days. If outside for more than one hour, cover up and use sunscreen. • Reflection off snow can nearly double UV strength. Wear sunglasses and apply sunscreen.
3–5	Moderate	• Take precautions—cover up, and wear a hat, sunglasses and sunscreen, especially if you will be outside for 30 minutes or more. • Look for shade near midday when the sun is strongest.
6–7	High	• Protection required—UV damages the skin and can cause sunburn. • Reduce time in the sun between 11 a.m. and 4 p.m. and take full precautions—seek shade, cover up, wear a hat, sunglasses and sunscreen.
8–10	Very High	• Extra precautions required—unprotected skin will be damaged and can burn quickly. • Avoid the sun between 11 a.m. and 4 p.m. and take full precautions—seek shade, cover up, and wear a hat, sunglasses and sunscreen.
11+	Extreme	• Values of 11 or more are very rare in Canada. However, the UV Index can reach 14 or more in the tropics and southern U.S. • Take full precautions. Unprotected skin will be damaged and can burn in minutes. Avoid the sun between 11 a.m. and 4 p.m., cover up, and wear a hat, sunglasses and sunscreen. • White sand and other bright surfaces reflect UV and increase UV exposure.

SKIN CANCER RISK FACTORS

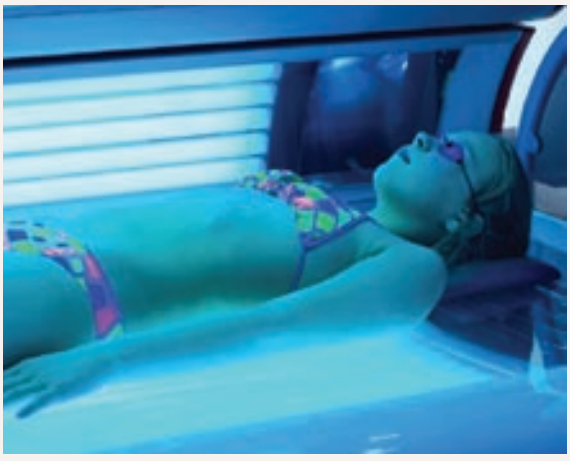
Everyone is at risk for developing skin cancer; a dramatic increase in individual risk appears to be determined by a combination of inherited characteristics and behaviour or way of life that increases exposure to UV radiation. The following is a review of several factors that influence skin cancer risk.

EXPOSURE TO ULTRAVIOLET RADIATION

Overexposure to ultraviolet radiation (UVR) from the sun and artificial sources (e.g., tanning equipment) is the primary cause of skin cancer (Armstrong & Kricker, 2001; IARC, 1992; International Agency for Research on Cancer Working Group on Artificial Ultraviolet (UV) Light and Skin Cancer, 2007). Intense exposures to UVR can lead to sunburn and are linked with the development of melanoma and basal cell carcinoma; long-term or chronic exposure is linked to squamous cell carcinoma (Hill, Elwood, & English, 2004a). Exposure to UVR can also cause premature ageing of the skin, eye damage, and a weakened immune system (Armstrong & Kricker, 2001).

The following categories of UVR exposure are correlated with different types of skin cancer and different risks for skin cancer: 1) total sun exposure, 2) occupational exposure, 3) recreational exposure, and 4) history of sunburn. Total sun exposure has greater associations with squamous cell carcinoma (SCC), a form of non-melanoma skin cancer. Recreational or intermittent exposures have a stronger relationship with melanoma skin cancer and basal cell carcinoma (BCC). A history of sunburn at any age has similar associations as with recreational/ intermittent exposures, with a greater association with melanoma skin cancer (Hill, Elwood, & English, 2004b).

Erythema, commonly referred to as sunburn, is the skin's reaction to being overexposed to UVR. This often results in the reddening and discomfort of the skin and potentially blistering, depending on the degree of overexposure. Sunburn can occur after just a few minutes spent in the sun, and is dependent on several personal (e.g., skin pigmentation) and environmental factors, including solar elevation, cloud coverage, the UV index, altitude, ground surface reflection and the ozone layer (Hill, Elwood, & English, 2004a).



PIGMENTATION TRAITS

Pigmentation characteristics play a large part in determining risk of skin cancer; generally, the fairer the skin, the higher the risk (Table 2.2). Indeed, all major types of skin cancer are more common among persons with light skin pigmentation, light or red hair, green or blue eyes, persons who burn easily and those who tan poorly (Elwood, 2004).

Table 2.2 Description of skin types related to risk for skin cancer (The Skin Cancer Foundation, 2008)

Skin Type	Example	Sun History
I. Pale white skin	Red-headed, freckles, Irish/Scots/Welsh	Always burns easily, never tans, extremely sun sensitive skin
II. White	Fair-skinned, fair-haired, blue or green-eyed, Caucasians	Always burns easily, tans minimally, very sun sensitive skin
III. White (Average)	Average skin	Sometimes burns, tans gradually to light brown, sun sensitive skin
IV. Beige or lightly tanned	Mediterranean-type Caucasians	Burns minimally, always tans to moderate brown, minimally sun sensitive
V. Moderate brown or tanned	Middle Eastern, some Hispanics, some African-Americans	Rarely burns, tans well, sun insensitive skin
VI. Dark brown or black skin	African-Americans	Never burns, deeply pigmented, sun insensitive

AGE

Generally, the incidence of skin cancer increases exponentially with age. Over time, accumulated exposure to UVR and the declining ability to repair UV-damaged DNA are thought to contribute to an increased risk of skin cancer (Armstrong, 2004a).

NEVI (BENIGN MOLES OR FRECKLES)

Nevi are benign melanocytic tumours, also known as moles. They are strongly associated with risk for melanoma (Armstrong & Kricker, 2001; J. M. Elwood & Jopson, 1997). The greater the number of nevi on a person's skin, especially dysplastic (atypical) nevi, the greater the risk of melanoma. An individual who has more than 100 common nevi or more than two atypical nevi has a five- to twenty-fold increased risk of melanoma (Bataille & de Vries, 2008).

SOLAR KERATOSES

Solar keratosis is a precursor to skin cancer and is also considered a major risk factor for non-melanoma skin cancers. Solar keratoses are a reflection of abnormal skin cell development due to exposure to ultraviolet radiation and are considered precancerous. They appear as multiple flat or thickened, scaly or warty, skin-coloured or reddened lesions (Armstrong, 2004a; Hill, Elwood, & English, 2004b).

GENETIC & ENVIRONMENTAL FACTORS

An individual's risk of melanoma is approximately twice that of the general population if they have a first degree relative that has been diagnosed with melanoma. Additionally, there is a higher risk for developing skin cancer among persons with organ transplants on immunosuppressant drugs (Kricker et al., 2007; Lindelöf, Sigurgeirsson, Gäbel, & Stern, 2000). The relationship between risk of non-melanoma and family history is less distinct, but, as is the case with most cancers, there is evidence that genetics can play a huge role in cancerous outcomes (Hill, Elwood, & English, 2004b).

ULTRAVIOLET RADIATION AND VITAMIN D

While excessive exposure to ultraviolet radiation from the sun is known to increase skin cancer risk, modest amounts of sun exposure are an important source of vitamin D. Current research suggests that vitamin D may be important in reducing the risk of a number of cancers, as well as other diseases.

In 2008, the International Agency for Research on Cancer (IARC) released findings from a systematic review of the literature investigating the health impacts of vitamin D as they relate to cancer risk. The report discusses the amount of UVB rays needed for adequate vitamin D synthesis in relation to the amount needed to cause erythema (sunburn). Much of the confusion on this issue stems from the fact that the UVB action spectrum for vitamin D synthesis in the skin is similar to the UVB action spectrum for erythema, leading to increased risk for skin cancer. Consequently, exposure to UVB will automatically increase vitamin D synthesis in the skin at the same time increasing risk of sunburn and skin cancer. The report emphasizes that vitamin D synthesis in unprotected skin fades away after approximately 15 minutes of UVB exposure and depends on a number of factors such as pollution, cloud coverage, time of year and latitude (International Agency for Research on Cancer, 2008).

In fair-skinned individuals, the maximum possible vitamin D synthesis occurs rapidly, within a few minutes of summer sun exposure and equilibrium is reached shortly after UVB irradiation begins, indicating that prolonged exposure to UVB does not result in continuous increases in vitamin D production (Holick, 2006). Longer exposures add nothing to the vitamin D pool despite linearly increasing DNA damage (Wolpowitz & Gilchrest, 2006). The duration of sun exposure beyond the skin's capacity to synthesize vitamin D will only increase skin cancer risk.

Regardless of the limited evidence currently available for vitamin D and cancer outcomes, most dermatologists are recommending that the general public obtain vitamin D through supplementation or their diet (e.g., fish, fortified milk). It is not recommended that people rely on obtaining adequate amounts from UV exposure, especially during the winter months (October to April) when no vitamin D can be metabolized in Canada. Health Canada currently recommends 200 IU of vitamin D per day for adults 19 to 50 years of age (Health Canada, 2007).

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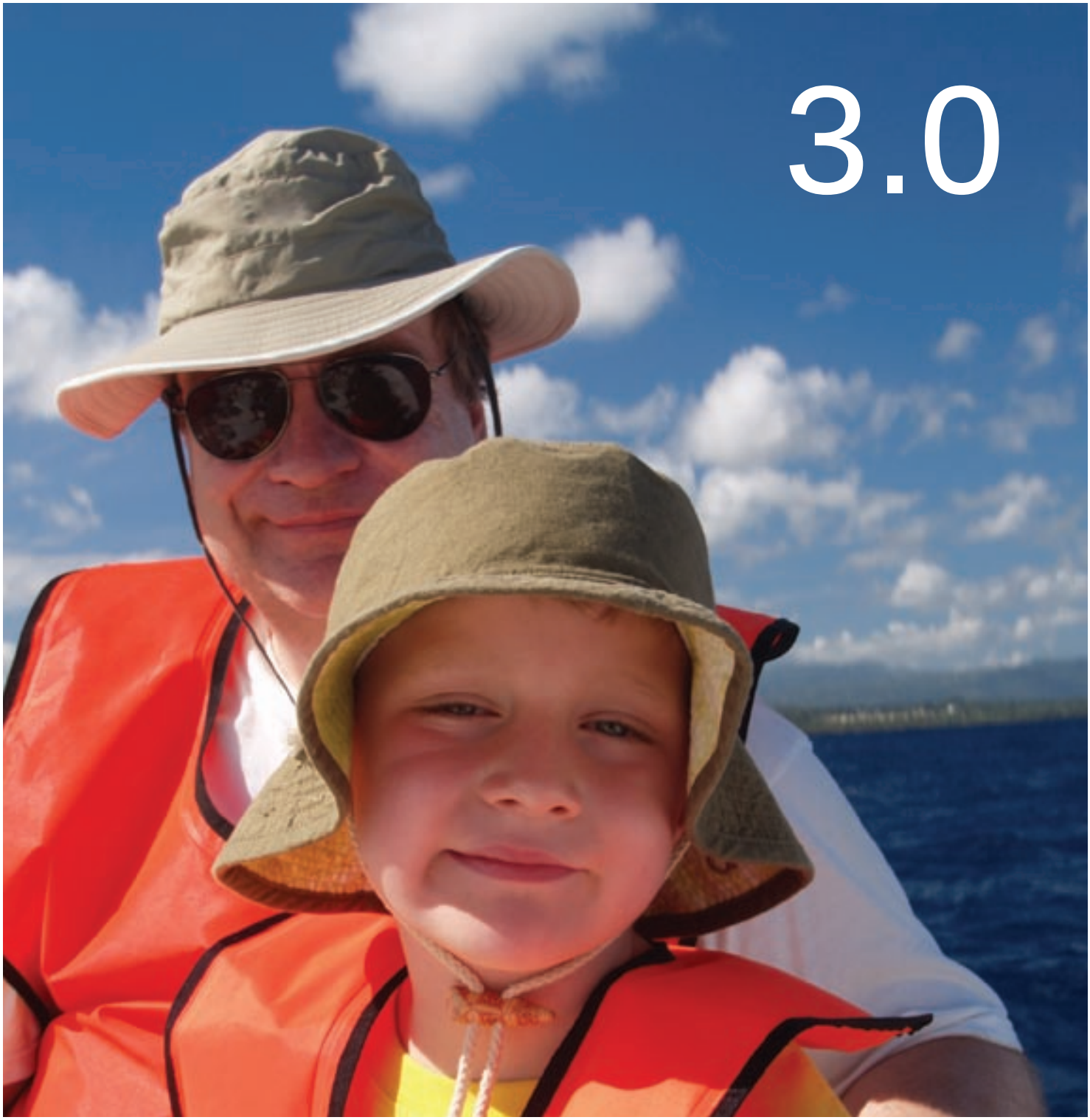


CHAPTER 3 RATES AND TRENDS

CHAPTER 3 RATES AND TRENDS

This chapter will examine the rates and trends as they relate to skin cancer in both Canada and Alberta.

SKIN CANCER IN CANADA

Skin cancer is the most common type of malignancy in Canada. It is divided into two general types, non-melanoma and melanoma. Non-melanomas are the most common, with 73,000 new cases and 260 deaths projected across Canada in 2008 (Table 3.1) (Canadian Cancer Society/National Cancer Institute of Canada, 2008).

Non-melanoma rates in Canada have more than doubled since the 1960s. It is, however, important to note that this increase may in part be due to changes or improvements in the reporting of non-melanoma skin cancers (Demers, Nugent, Mihalcioiu, Wiseman, & Kliewer, 2005). Although prevalent, non-melanomas rarely metastasize or cause death.

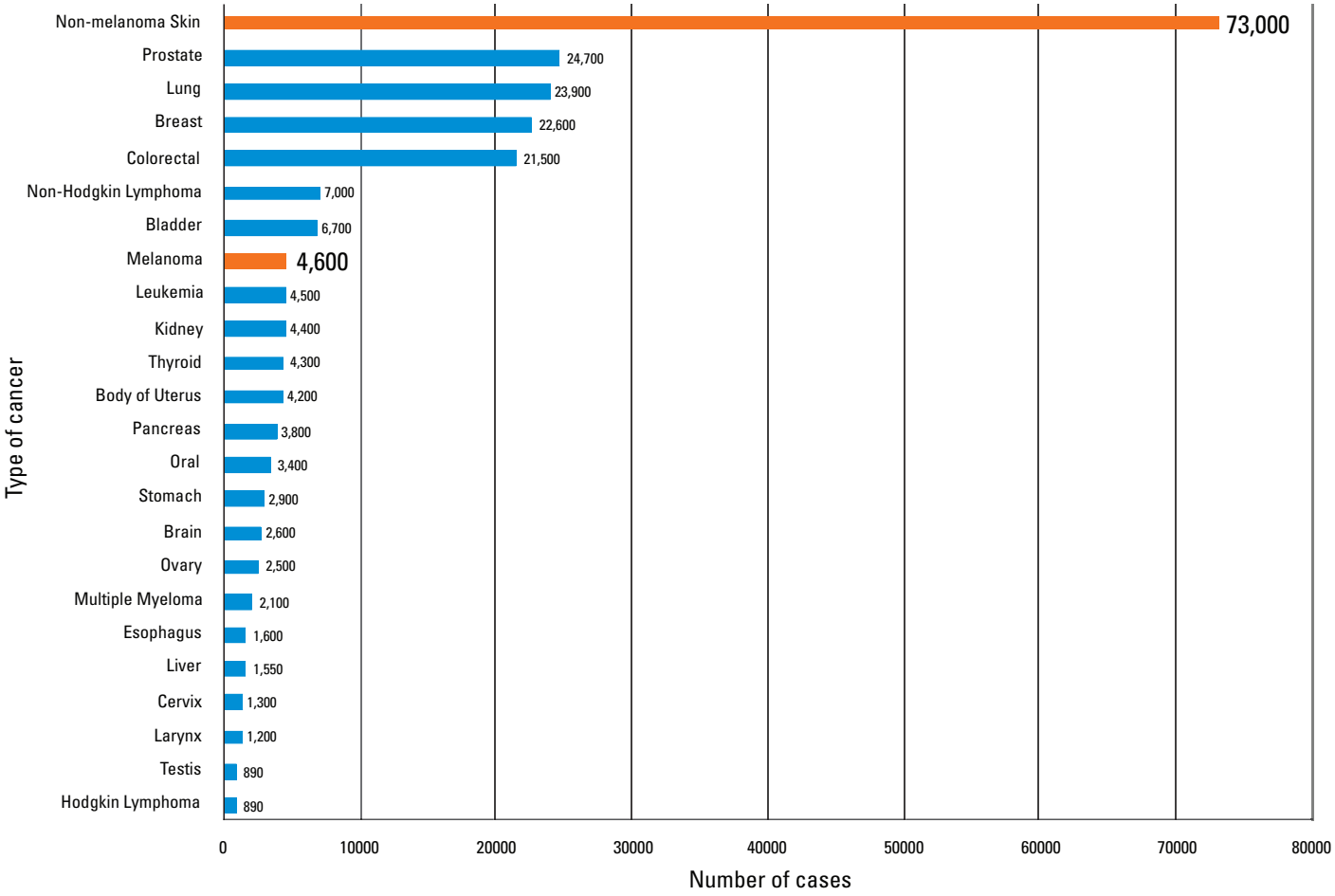
Table 3.1 Estimated new cases and deaths for top cancers by sex in Canada for 2008
(Canadian Cancer Society/National Cancer Institute of Canada, 2008).

	New Cases – 2008 Estimates			Deaths – 2008 Estimates		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
Non-melanoma Skin	73,000	40,000	33,000	260	160	100
Melanoma	4,600	2,500	2,100	910	560	350
Prostate	24,700	24,700	–	4,300	4,300	–
Lung	23,900	12,600	11,300	20,200	11,000	9,200
Breast	22,600	170	22,400	5,400	50	5,300
Colorectal	21,500	11,800	9,700	8,900	4,800	4,100
All Cancers	239,400	127,000	112,400	74,060	38,960	35,100

1 IN 7 CANADIANS WILL BE DIAGNOSED WITH SKIN CANCER IN THEIR LIFETIME (CANADIAN CANCER SOCIETY/ NATIONAL CANCER INSTITUTE OF CANADA, 2008).

There has been a significant increase of melanoma between 1995 and 2004; over this period, there was an annual increase in incidence of 1.8% among men and 1.0% among women across Canada. It is currently projected to account for 4,600 new cancer cases and 910 cancer-related deaths in 2008 alone (Canadian Cancer Society/ National Cancer Institute of Canada, 2008).

Figure 3.1 Estimated new cases of cancer in Canada for 2008
(Canadian Cancer Society/ National Cancer Institute of Canada, 2008)



It is important to note that although the Canadian Cancer Society provides projected incidence and mortality rates for non-melanoma skin cancer, most provincial registries across Canada do not track all non-melanoma skin cancer cases; only Manitoba, British Columbia and New Brunswick routinely collect this information.

Non-melanoma skin cancer is difficult to track because tissue samples are often not sent to labs where the tissue could be verified as cancerous. Many physicians routinely remove a cancerous lesion on the skin without a lab analysis. Because only skin cancer cases with a lab analysis will be reported to the registries, the cases reported through registry data may not account for all non-melanoma skin cancers. It is, therefore, likely that the actual incidence is higher than we are currently aware of.

SKIN CANCER ACCOUNTS FOR APPROXIMATELY ONE-THIRD OF ALL NEW CANCERS DIAGNOSED.

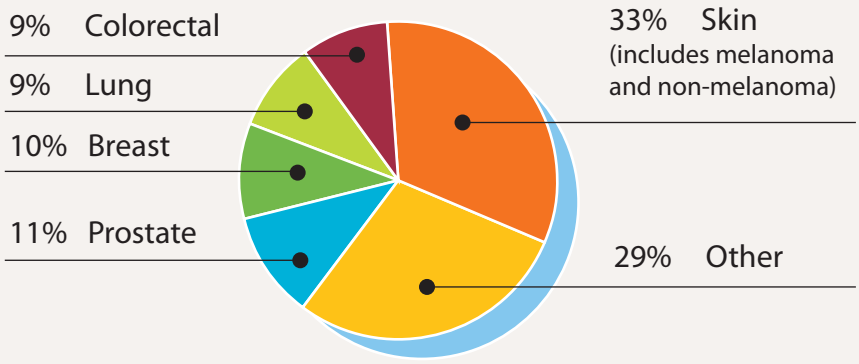
SKIN CANCER IN ALBERTA

Approximately 1 in 3 Albertans diagnosed with cancer in 2006 were diagnosed with skin cancer (Alberta Cancer Board, 2006). This is demonstrated in Table 3.2 and Figure 3.2, respectively.[1,2]

Table 3.2 Cancer incidence for top cancer sites by sex in Alberta for 2006
(Alberta Cancer Board, 2006)

	New Cases—2006		
	Total	**Males**	**Females**
Non-melanoma Skin	5,833	3,152	2,681
Melanoma	482	255	227
Prostate	2,111	2,111	–
Breast	1,913	12	1,901
Lung	1,743	931	812
Colorectal	1,978	926	752
All Other Sites	5,264	2,766	2,798
All Cancers	**19,324**	**10,153**	**9,171**

Figure 3.2 Proportion of total new cancers diagnosed in 2006 by site, Alberta



1 Provincial cancer data is provided by the Alberta Cancer Registry, in association with the Canadian Council of Cancer Registries, the National Cancer Institute of Canada, and the Health Statistics division of Statistics Canada. Incidence counts are based on the diagnosis and classification of new cancer cases among the well population per year (Alberta Cancer Board: Population Health & Information, October 2007). Mortality counts are based on the number of deaths attributed to a particular type of cancer per year. The most up-to-date set of complete statistics for both incidence and mortality is for 2006.

2 All statistical analysis on Alberta Cancer Registry data was conducted by the Surveillance Department at the Alberta Cancer Board.

In 2006, fewer than 2% of all cancer-related deaths were caused by skin cancer (Alberta Cancer Board, 2006). This is demonstrated in Table 3.3.

Table 3.3 Cancer-related mortality for top cancer sites by sex in Alberta for 2006
(Alberta Cancer Board, 2006)

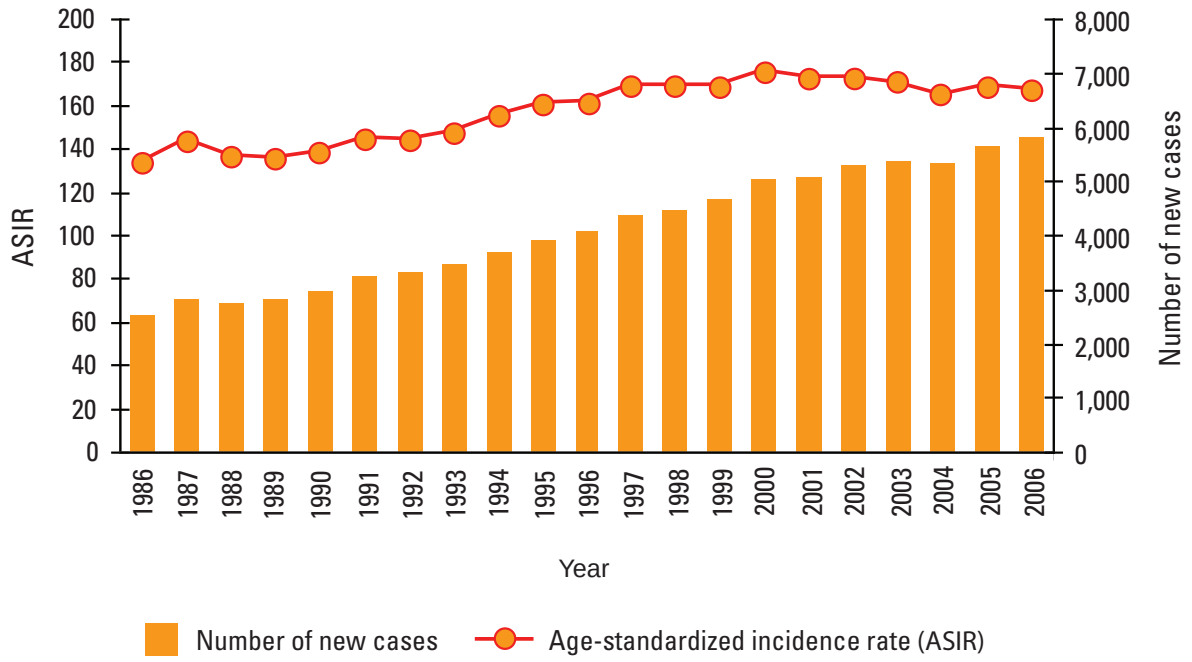
	Cancer-Related Deaths—2006			
	Total	**Males**	**Females**	**Percentage of Cancer-Related Deaths by Cancer Site in 2006**
Non-melanoma Skin	23	17	6	Non-melanoma and Melanoma
Melanoma	70	36	34	1.8%
Prostate	337	337	–	6.1%
Breast	389	5	384	7.0%
Lung	1,365	727	638	24.8%
Colorectal	615	325	290	11.2%
All Other Sites	2,709	1,435	1,274	49.2%
All Cancers	**5,508**	**2,882**	**2,626**	–

APPROXIMATELY 1 IN 2 ALBERTANS WILL DEVELOP CANCER IN THEIR LIFETIME, AND 1 IN 4 WILL DIE OF THE DISEASE (ALBERTA CANCER BOARD: POPULATION HEALTH & INFORMATION, OCTOBER 2007).

NON-MELANOMA

In Alberta, 5,826 new cases of non-melanoma were diagnosed in 2006. Non-melanoma skin cancer is on the rise; Figure 3.3 (below) illustrates the non-melanoma trends over the past two decades. When accounting for population growth and age distribution, using an age-standardized rate (ASR),[1] a 25% increase in the rate was observed over the past two decades. The number of cases has more than doubled from 2,536 cases to 5,826 between 1986 and 2006.

Figure 3.3 Age-standardized incidence rate and number of new cases of non-melanoma skin cancer in Alberta from 1986 to 2006 (Alberta Cancer Board, 2006)



1 Age-standardized rate: A weighted average of age-specific rates using a standard population distribution. They reflect the overall numbers that would be expected if the population of interest had an age-structure identical to the standard population (1996 Canadian population) and are used to compare cancer rates among populations or identify trends over time. Rates are also standardized to the world, United States, and Canada 1991 standard populations. The Alberta population used in computing rates is from Statistics Canada.

A total of 23 deaths were attributed to non-melanoma skin cancer in Alberta in 2006. When accounting for population growth, using an age-standardized rate (ASR), an increase is observed over the past two decades, as seen in Figure 3.4 below. Although mortality counts from non-melanoma have doubled since 1986, death from non-melanoma is still quite rare. It is important to note that the trends shown in Figure 3.4 have reduced precision and more variation as there are fairly low numbers of deaths attributed to non-melanoma skin cancer over this time period (Alberta Cancer Board, 2006).

Figure 3.4 Age-standardized mortality rate and number of deaths attributed to non-melanoma skin cancer in Alberta from 1986 to 2006 (Alberta Cancer Board, 2006)

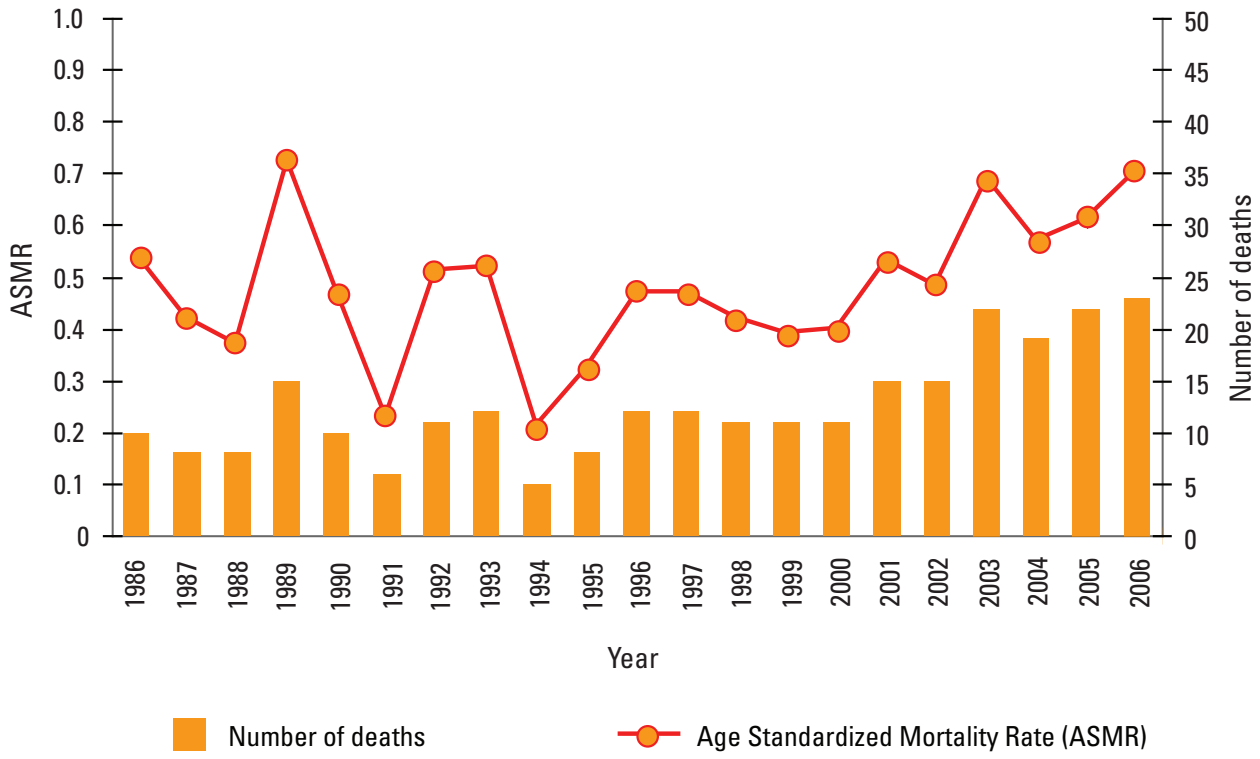
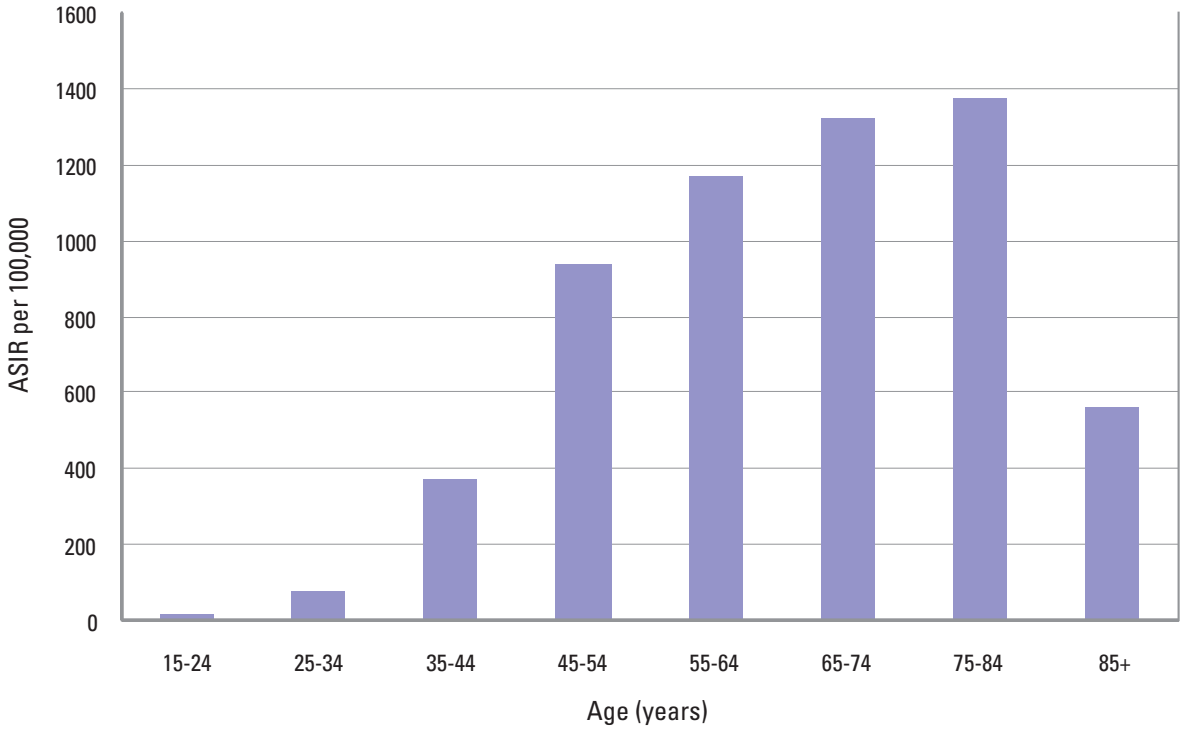


Figure 3.5 shows the number of new cases, standardized to the population (per 100,000 people) for non-melanoma skin cancer by age category. As with most other cancers, the majority of new cases of non-melanoma appear later in adult life (Figure 3.5). This may be due to lag time, the period between exposure and the onset of disease. However, it is important to note that a large proportion of new non-melanoma cases can be found in the 35- to 44-year-old age category.

Figure 3.5 Non-melanoma incidence rates in Alberta per 100,000 people by age groups, diagnosed in 2006 (Alberta Cancer Board, 2006)

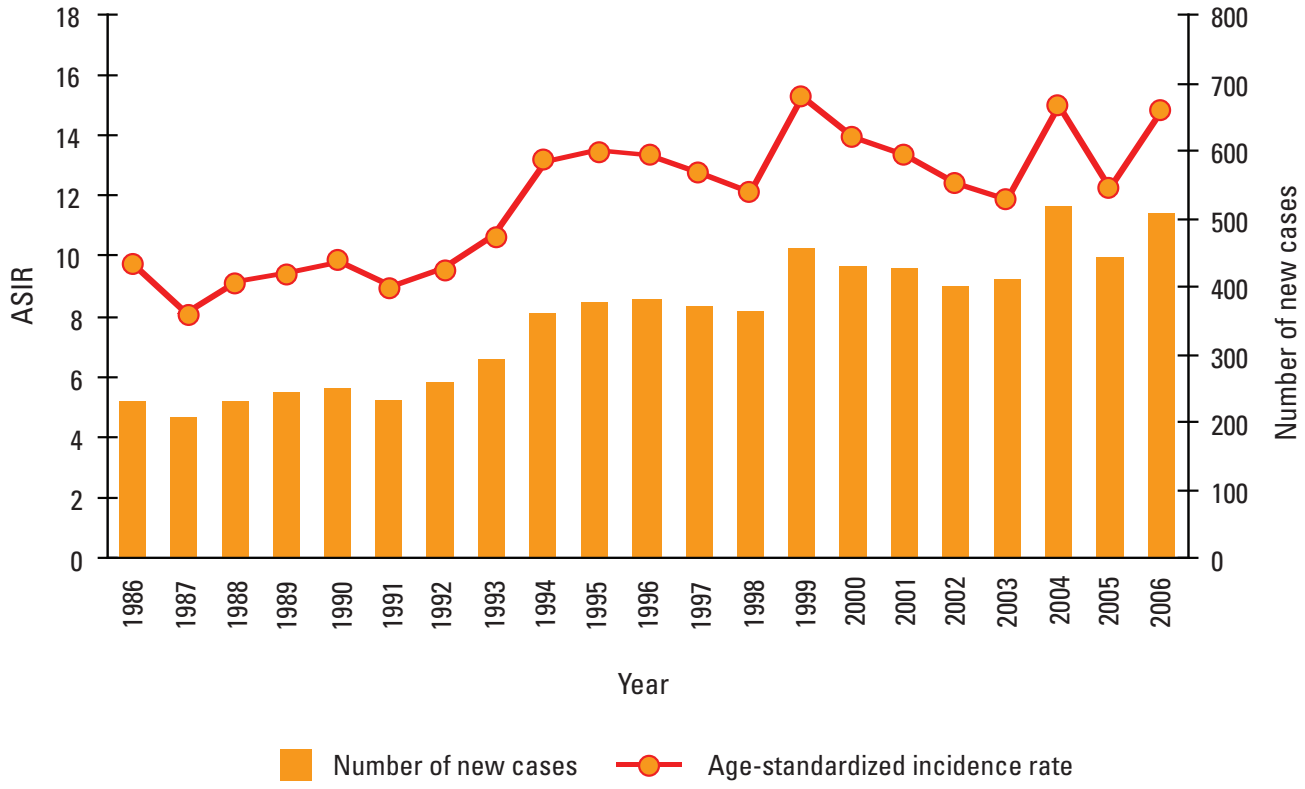


The figures for non-melanoma skin cancer are not as precise and are not normally included in cancer statistics as a result of non-reporting and coding procedures. Therefore, these are conservative estimates. The majority of non-melanomas are also diagnosed and treated in physicians' offices without a pathologic review. This, in combination with the fact that these cancers are usually not life-threatening, results in many cases not being reported to the Alberta Cancer Registry. The Alberta Cancer Registry records only the first non-melanoma skin cancer of a specific histological type. Subsequent reports of non-melanoma skin cancer in the same person are not recorded.

MELANOMA

Melanoma is a comparatively rare form of skin cancer, but more dangerous. Across the province, 508 new cases of melanoma were diagnosed in 2006. As with non-melanoma, melanoma incidence rates are on the rise; new cases more than doubled and the age-standardized rate increased 29% between 1986 and 2006 (Figure 3.6).

Figure 3.6 Age-standardized incidence rate and number of new cases of melanoma skin cancer in Alberta from 1986 to 2006 (Alberta Cancer Board, 2006)



A total of 81 deaths were attributed to melanoma skin cancer in Alberta in 2006. Standardized mortality rates for melanoma skin cancer increased 44% during this time period (Figure 3.7) (Alberta Cancer Board, 2006).

Figure 3.7 Age-standardized mortality rate and number of deaths attributed to melanoma skin cancer in Alberta from 1986 to 2006 (Alberta Cancer Board, 2006)

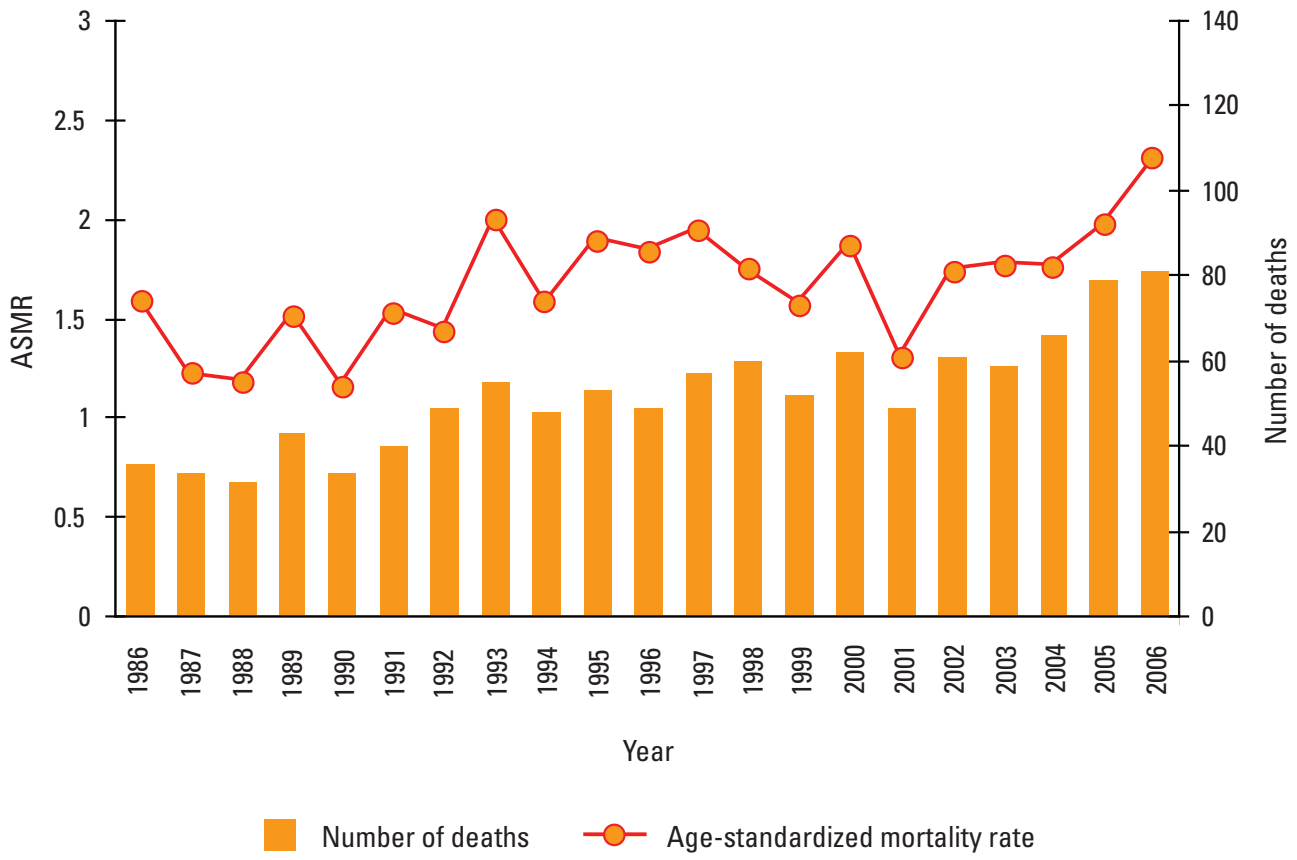
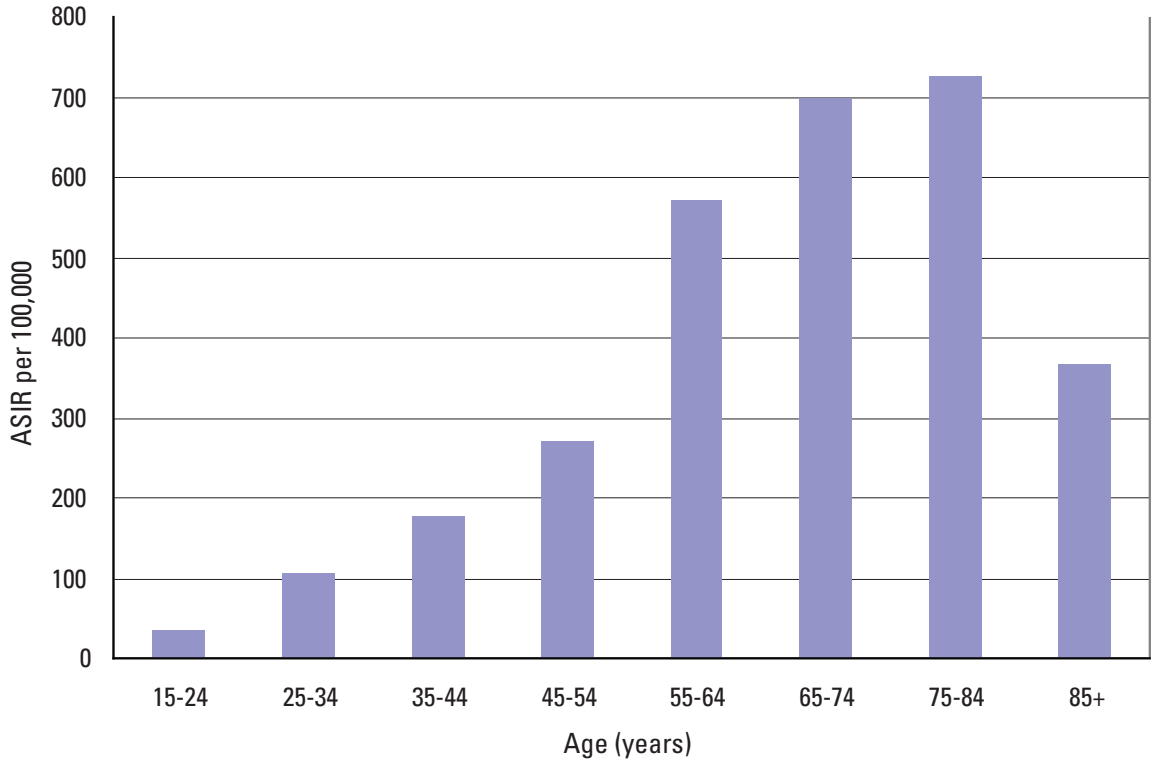


Figure 3.8 shows the number of new melanoma cases by age category standardized to the population (per 100,000 people) by age category. Melanoma appears to adhere to the typical age pattern that most major cancers follow, with more cases in older age categories. A noteworthy amount of new melanomas has been observed in the 15-to-44-year age group (Figure 3.8). It is not known why melanoma has an earlier onset than non-melanoma. Further exploration is needed to fully understand the course of the disease and its control.

Figure 3.8 Melanoma incidence rates in Alberta per 100,000 people by age groups, diagnosed in 2006 (Alberta Cancer Board, 2006)



ECONOMIC IMPACT OF SKIN CANCER

The current prevalence and rising incidence of skin cancer is creating a significant financial burden on health-care systems around the world. The direct costs of care related to skin cancer treatments, as well as the indirect costs, including items such as travel costs and workplace absenteeism costs, are creating this large financial burden.

Reports on health expenditures from Australia have found skin cancer costs the Australian health-care system almost $300 million annually (Australian Institute of Health and Welfare, 2005). A recent report from England states England's health-care system experienced approximately £70 million in indirect costs related to skin cancer, with a total economic burden in excess of £190 million (Morris, Cox, Bosanquet, Tanaka Business School, & Technology and Medicine (Great Britain) Imperial College of Science, 2005).

In the United States, a study assessing both the direct and indirect costs associated with skin cancer found the annual costs in 2004 associated with melanoma to be $3.12 billion ($280 million direct; $2.84 billion indirect) and with non-melanoma to be $2.41 billion ($1.46 billion direct; $950 million indirect) (Lewin Group Inc., 2005).

An analysis of the economic burden of skin cancer across Canada is currently being conducted by the Canadian Partnership Against Cancer; it will assess the economic impact skin cancer has on our health care system nationally and provincially (expected completion date, spring 2009).

RECURRENCE AND SECOND PRIMARY CANCERS

In addition to an increased risk of developing subsequent skin cancers, people with previous cases of skin cancer (Marcil & Stern, 2000) also risk developing a second primary cancer (SPC) following a primary skin cancer. The risk of an SPC following basal cell carcinoma, for example, is 20 to 30% higher than the rate of cancers in the general population, whereas the risk following squamous cell carcinoma is more than double (Krueger, McLean, & Williams, 2008).

In addition to the overall higher risk of an SPC, specific cancers emerge more often following non-melanoma skin cancer. Accordingly, a recent study confirmed an individual with a history of non-melanoma was twice as likely to develop a subsequent cancer other than non-melanoma, even after adjusting for age, sex, body mass index, cigarette smoking, education, skin type, and sunburn history (Chen et al., 2008). These include malignancies of the lung, colorectum, breast and liver; melanoma, leukemias, and lymphomas (Krueger et al., 2008).

SUMMARY

It is clear from the incidence and mortality data—as well as the economic burden and risk of a second primary cancer—that skin cancer poses a significant burden on patients, their loved ones, and our health-care system. Based on current trends, this burden is only expected to increase. This data provides a strong basis to move forward with prevention strategies focused on improving population health outcomes for skin cancer.

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CHAPTER 4 SKIN CANCER PREVENTION

CHAPTER 4 SKIN CANCER PREVENTION

To prevent new cancers from starting, risk factors and protective factors should be assessed. Anything that increases the chance of developing cancer is a cancer risk factor; anything that decreases the chance of developing cancer is a cancer protective factor.

Overexposure to ultraviolet radiation (UVR) from solar and artificial sources has been determined to be the primary risk factor for skin cancer (Armstrong & Kricker, 2001; IARC, 1992; International Agency for Research on Cancer Working Group on Artificial Ultraviolet (UV) Light and Skin Cancer, 2007). (For more information on skin cancer risk factors, see Chapter 2.) This chapter highlights Albertans' skin cancer risk factors and focuses on protective factors. As well, it will look at methods of reducing sun exposure and indoor tanning usage.

Using data from the Second National Sun Survey (NSS2) conducted in 2006, statistics on related skin cancer prevention knowledge, attitudes and behaviour are presented throughout this chapter and in subsequent chapters. The main principle behind the survey is to provide accurate and up-to-date information on the amount of time Canadians spend in the sun, along with their knowledge, attitudes and use of sun protection methods. The information was collected via telephone from August to November in 2006 with a national sample size of 7,121 adults aged 16+; a sample size of 1,054 was collected in Alberta (Canadian Partnership Against Cancer, 2006). Alberta census data for 2006 was used to determine population data (2,691,529 age 16+) based upon the NSS2 sample size (Statistics Canada, 2006).

Case Study

ALBERTA VERSUS CANADA SUN EXPOSURE BEHAVIOUR

Exposure to solar and artificial ultraviolet radiation (UVR) is a significant risk factor for skin cancer. Many Albertans are putting themselves at increased risk for skin cancer by intentionally trying to tan and getting sunburned. In fact, Alberta has a higher tanning and sunburn occurrence than any other province (Canadian Partnership Against Cancer, 2006).

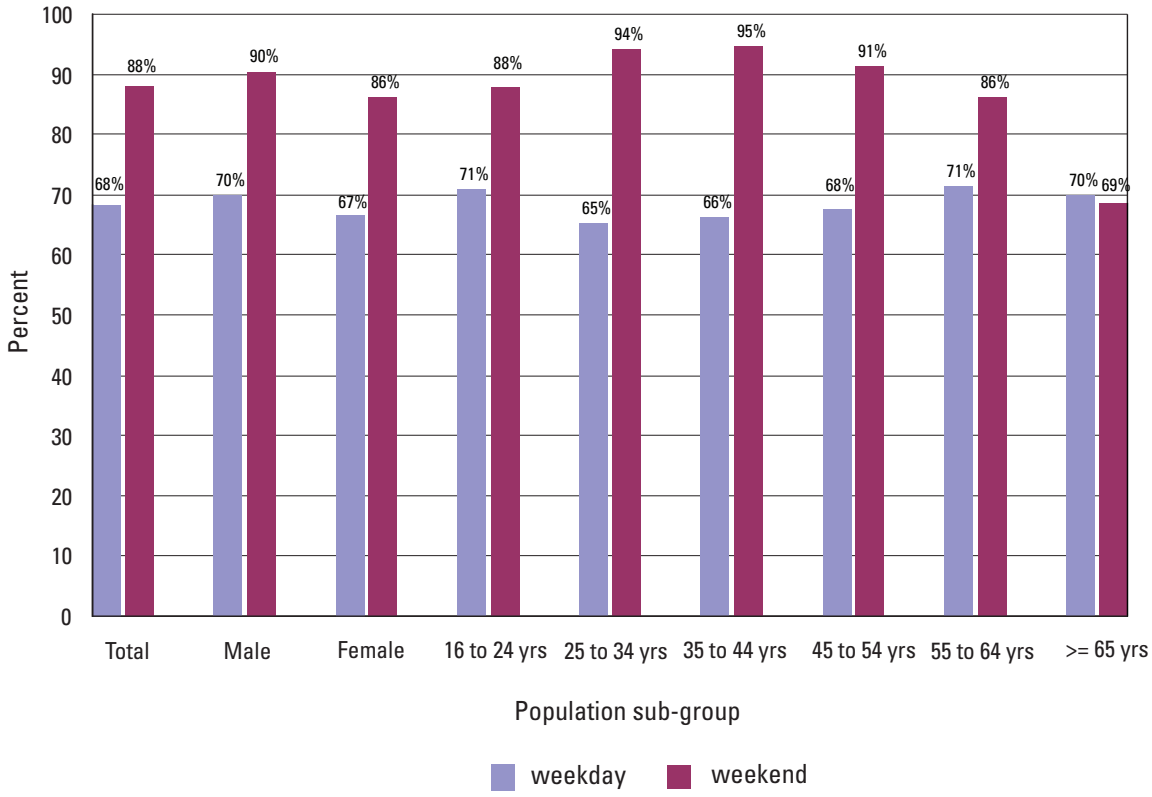
Exposure Behaviour	Alberta	National Average
Tanning	26%	22%
Sunburns	25%	19%
Artificial Tanning	12%	9%

RISK FACTOR: ULTRAVIOLET RADIATION EXPOSURE

Time spent in the sun is a significant risk factor for skin cancer. Greater exposure to UVR, both cumulative and intermittent, has been linked to increased risk (Hill, Elwood, & English, 2004). Risk is dramatically increased when UVR is at its peak between the hours of 11 a.m. and 4 p.m.

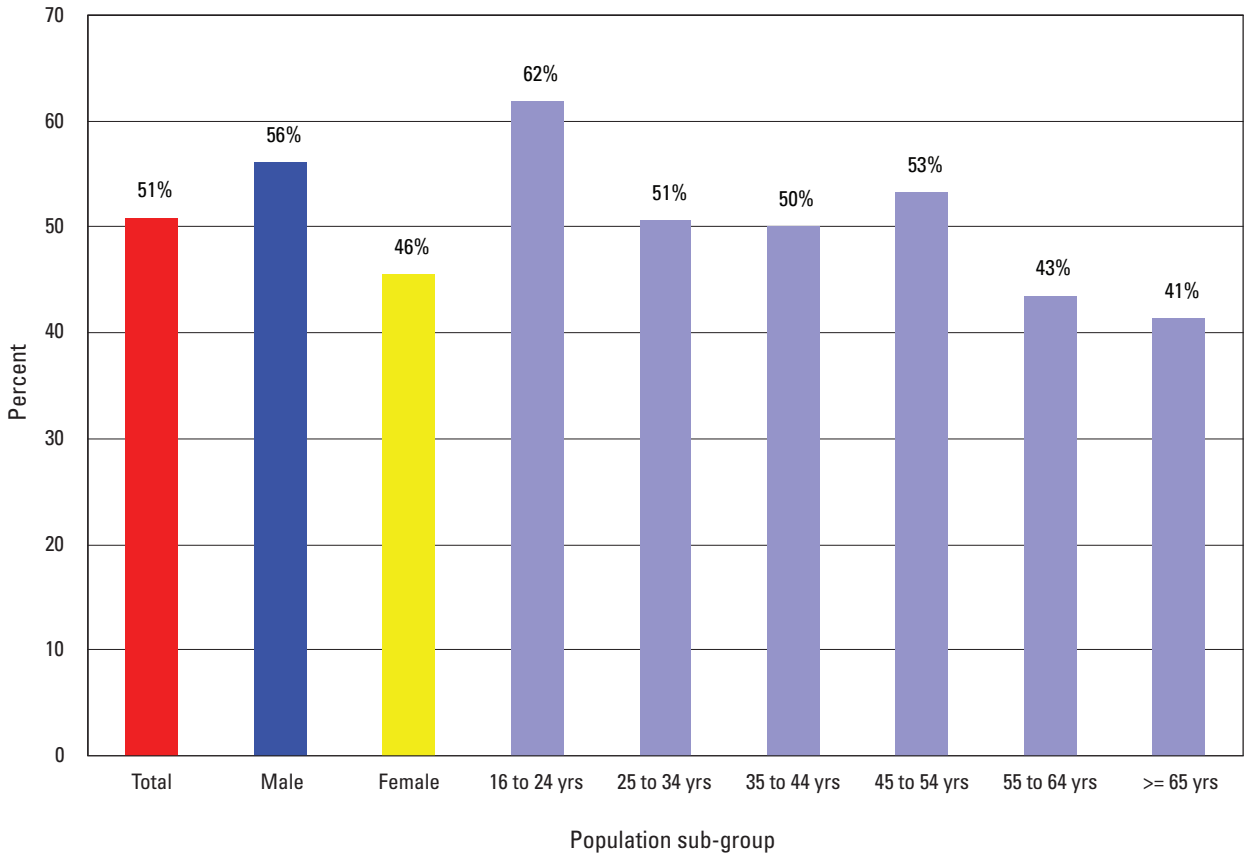
In 2006, more than two-thirds of Albertans reported spending 30 minutes or more in the sun on a typical day, between 11 a.m. and 4 p.m. during the summer months (Figure 4.1). The majority of people spent more time in the sun on weekends (88%; 2.4 million Albertans) than during the week (68%; 1.8 million Albertans) (Statistics Canada, 2006). The population sub-groups that spent the most time outside during the weeked were males and people aged 25 to 44 years (Canadian Partnership Against Cancer, 2006).

Figure 4.1 Percentage of Albertans who spent 30 minutes or more in the sun on a typical day during the summer between 11 a.m. and 4 p.m., by sex and age



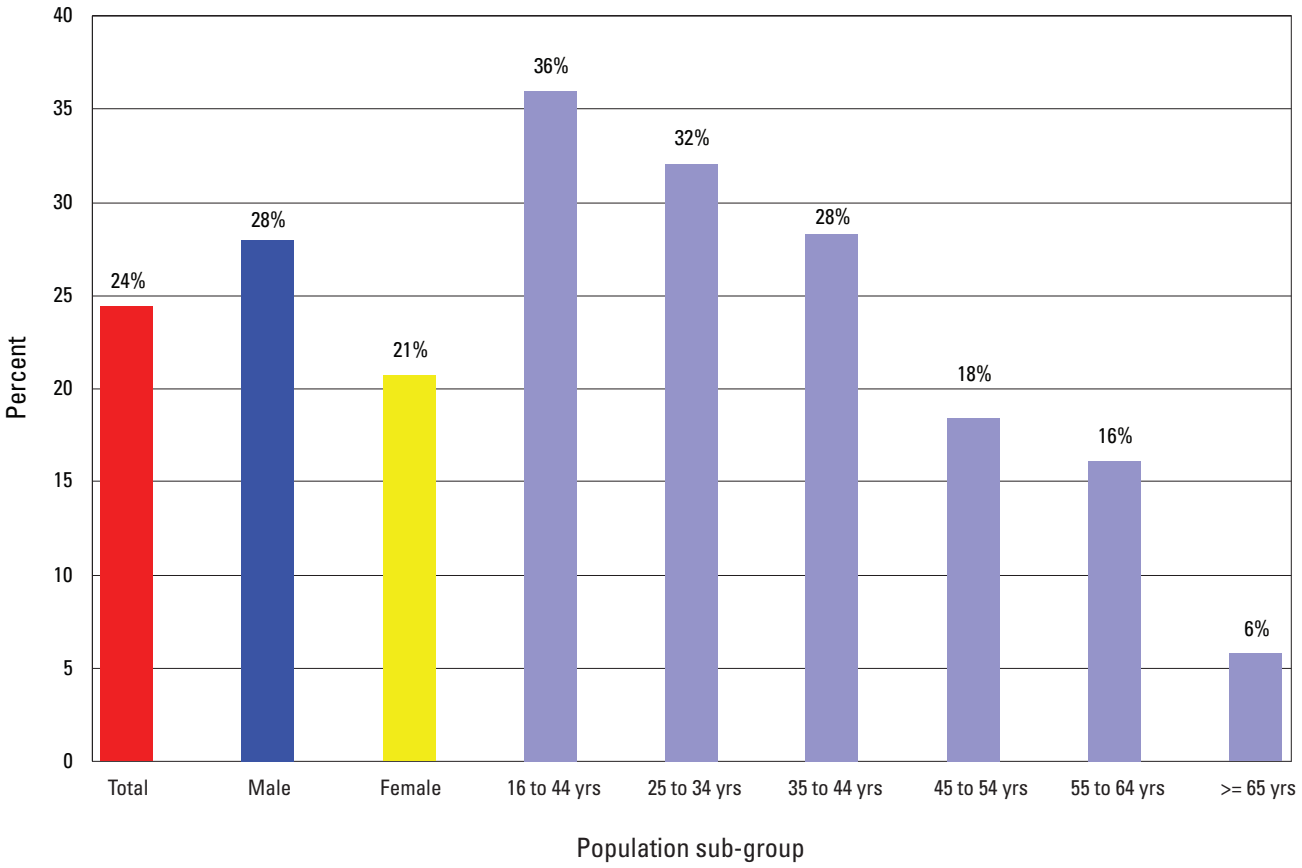
Attempting to obtain a tan is also a risk factor for skin cancer, as it leads to overexposure to UVR (Hill et al., 2004). In 2006, more than one-half (51%) of Albertans indicated they "always" or "often" tried to tan during the summer (Figure 4.2). Based on provincial population data, this means that around 1.4 million Albertans intentionally exposed themselves to UVR (Statistics Canada, 2006). Attitudes toward tanning indicate 83% of Albertans strongly or somewhat agree that others look better if they have at least a bit of a tan and 72% think they look more attractive if they have a tan. The most active tanning groups are males (56%) and the 16-to-24-year-old age group (62%) (Canadian Partnership Against Cancer, 2006).

Figure 4.2 Percentage of Albertans who always or often tried to get a tan during the summer, by sex and age



A sunburn is a visible indicator of UVR damage to the skin, and has been associated with an increased risk of skin cancer. Nearly one-quarter of all Albertans over 16 years of age indicated they received a sunburn after being exposed to the sun (Figure 4.3). Based on census data, this means 633,000 Albertans had a sunburn in the summer of 2006 (Statistics Canada, 2006). More males (28%) than females (21%) indicated they got sunburned. Of those that reported a sunburn, almost half (47%) indicated they were sunburnt on more than one occasion. There was also a noticeable correlation between sunburns and age, as younger Albertans (16 to 24 years old) were more likely to report a sunburn than older residents (45 years and older) (Canadian Partnership Against Cancer, 2006).

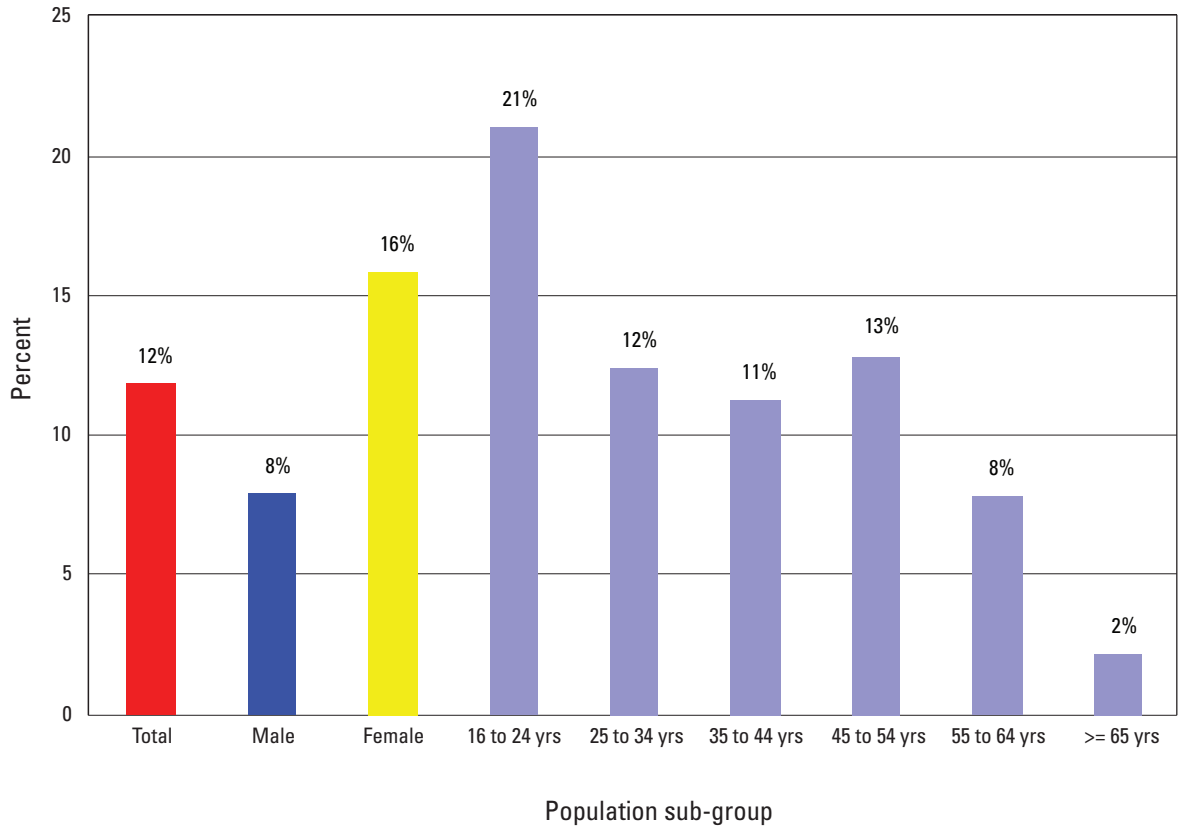
Figure 4.3 Percentage of Alberta residents who reported a sunburn during the summer months, by sex and age



The ultraviolet radiation emitted from indoor or artificial tanning equipment has the same potential to cause damage as natural exposure to the sun. In fact, indoor tanning is particularly dangerous since it leads to intense doses of UVR exposure, which produces the highest increase in melanoma risk (Gallagher, Spinelli, & Lee, 2005). In addition to increased melanoma risk, indoor tanning use is also a risk factor for non-melanoma skin cancers (Karagas et al., 2002). Sun beds mainly produce UVA radiation, but have more recently been manufactured to produce higher levels of UVB radiation to mimic the sun and speed up the tanning process. As a result, people can receive up to five times more UVB rays from the use of tanning beds than from the sun.

In Alberta, 12% (346,038 people) of the population used artificial tanning equipment in 2006 (Figure 4.4) (Statistics Canada, 2006). Sixteen per cent of all females used equipment, in contrast to 8% of males. Approximately 96,000 (21% of) Albertans 16 to 24 years of age indicated they used tanning equipment, the highest age category in the province (Canadian Partnership Against Cancer, 2006).

Figure 4.4 Percentage of Albertans who used artificial tanning equipment over the past year, by sex and age



PROTECTIVE FACTORS

The focal message underlying many skin cancer intervention campaigns is that skin cancer is largely preventable through a reduction in exposure to UVR. Sun safety messages are commonly centred on three major themes: sun avoidance, sun protective clothing and the use of sunscreen (Alberta Health Services: Cancer Prevention, 2008; Canadian Cancer Society, 2007; Canadian Dermatology Association, 2007).

Although the importance of particular preventive activities may differ among different health agencies, the main skin cancer prevention practices have remained constant: wearing protective clothing such as hats and long-sleeved shirts; applying sunscreen with an appropriate sun protection factor; avoiding the sun when possible (especially at peak hours); and seeking shade. Other recommendations frequently promoted include the use of the UV index tool and the importance of skin cancer screening (Saraiya et al., 2004). Below is an examination of skin cancer protective factors, common messages and supporting evidence.

SUN AVOIDANCE

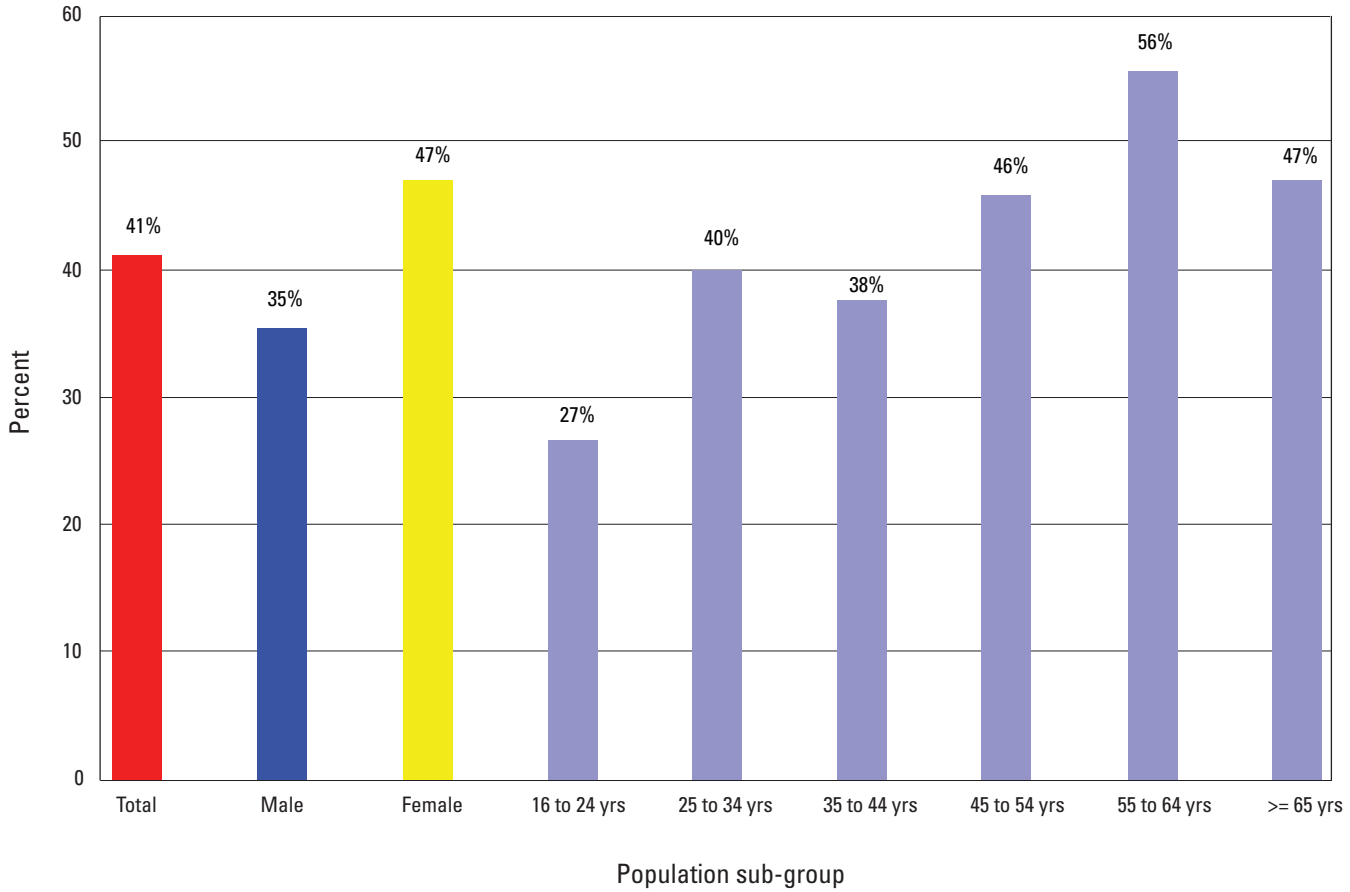
When solar ultraviolet radiation is at its strongest, sun avoidance is an important method of protection. Environmental research at mid-latitudes show roughly one-third of the daily total of UVR occurs within one hour of solar noon (12 p.m. to 2 p.m.), 57% within two hours (11 a.m. to 3 p.m.), and 77% within three hours on either side of solar noon (10 a.m. to 4 p.m.) (P. Gies & Mackay, 2004). Solar noon is usually around 1 p.m. daylight saving time (DST) and refers to a time when the sun has reached its highest point in the sky, when UVB rays are at their strongest. Solar noon is a more appropriate measure to use than "clock noon" as it reflects changes in location and time of year within a time zone. Sun avoidance is encouraged between the hours of 11 a.m. and 4 p.m. (World Health Organization, 2002).

Sun protection through the use of shade structures such as trees and buildings is another method of reducing your risk of skin cancer. Though evidence has shown seeking shade to be vital in an overall sun safety strategy, studies have found many shade structures and trees do not offer adequate UV protection (Parsons, Neale, Wolski, & Green, 1998; Turnbull & Parisi, 2006). The amount of protection offered by a shade structure varies with the angle of the sun; the shadow that is cast may not always be directly beneath the shade structure.

ONE-QUARTER OF ALBERTANS REPORTED RARELY OR NEVER SEEKING SHADE WHEN IN THE SUN FOR 30 MINUTES BETWEEN 11 A.M. AND 4 P.M. DURING THE SUMMER (CANADIAN PARTNERSHIP AGAINST CANCER, 2006).

Forty-one per cent of Alberta residents regularly sought shade when in the sun for more than 30 minutes between 11 a.m. and 4 p.m. during the summer; more women (47%) than men (35%) also chose to seek shade (Figure 4.5). Generally, as their age increases, Albertans are more likely to seek shade and avoid the sun (Canadian Partnership Against Cancer, 2006).

Figure 4.5 Percentage of Albertans who sought shade when outside for 30 minutes or more between 11 a.m. and 4 p.m. during the summer, by age and sex

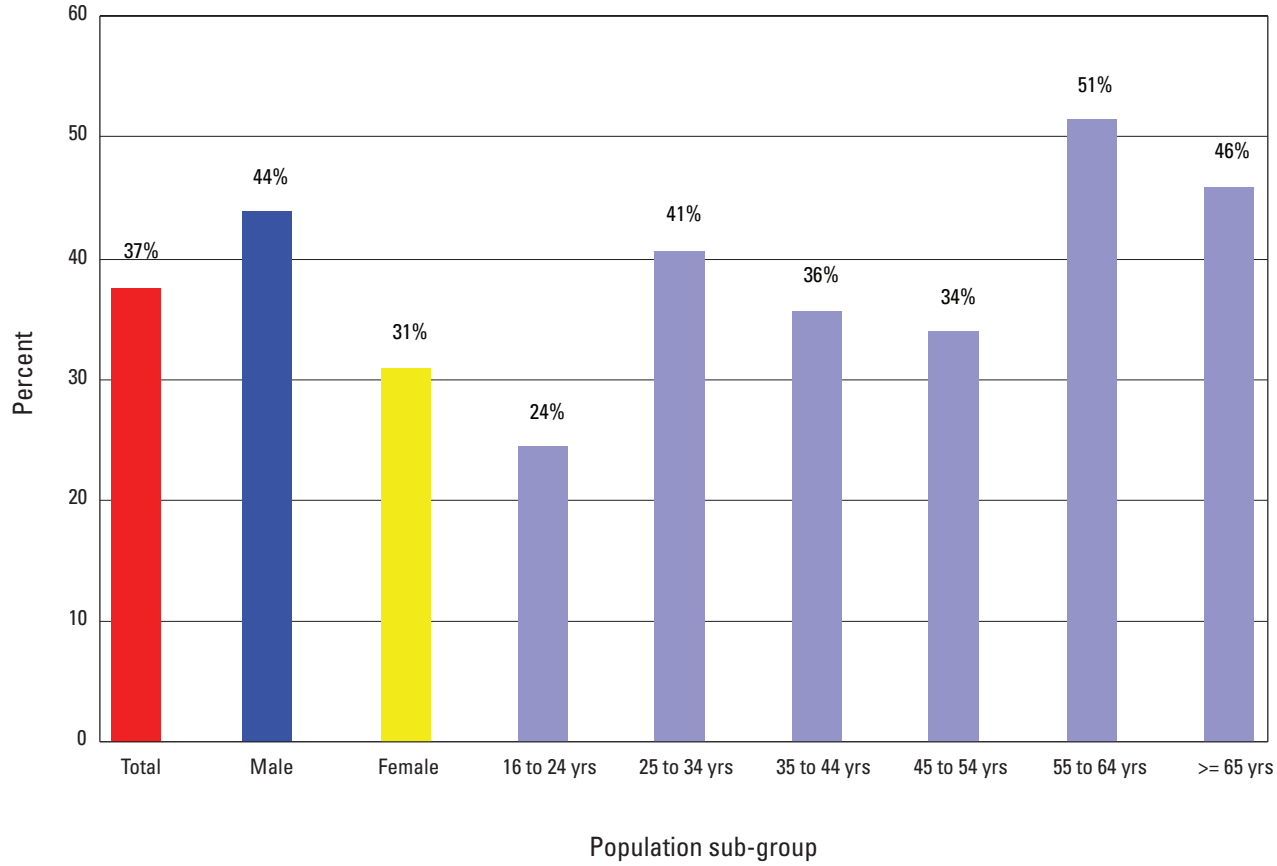


SUN PROTECTIVE CLOTHING

When out in the sun, it is important to wear clothing and other physical barriers to cover as much of your skin as possible. Research has shown the relative density of skin cancers (BCC, SCC and melanoma) are highest on body sites commonly exposed to the sun. Conversely, skin cancers are found to be rare on sites seldom exposed to the sun (Armstrong, 2004; Armstrong, Kricker, & English, 1997). However, not all clothes provide the same level of protection; many factors play a role in the amount of protection provided by fabrics. Two very important factors include: weave—the more closely woven the fabric the less UVR is transmitted; and colour—dark colours of the same fabric type will absorb UVR more strongly than light pastel shades and will consequently have a higher ultraviolet protection factor (UPF) (Gies, Roy, Toomey, & McLennan, 1998). Clothing specifically designed for sun protection with a high UPF will absorb most of the UVR and reduces the amount the skin is exposed too. Additionally, it has been found that most white fabrics provide less protection than a sunscreen with SPF 15. Loose-fitting, closely woven dark clothing will provide an effective physical barrier to UVR (Davis, Capjack, Kerr, & Fedosejevs, 1997; Gies et al., 1998).

In 2006, only 37% of Alberta residents reported frequently wearing protective clothing when in the sun for more than 30 minutes on a typical day between 11 a.m. and 4 p.m. during the summer (Figure 4.6). Protective clothing was more likely to be worn by men (44%) than women (31%). Only one-quarter of Albertans 16 to 24 years old reported using clothing to protect themselves from the sun, making them the least likely age group to wear protective clothing (Canadian Partnership Against Cancer, 2006).

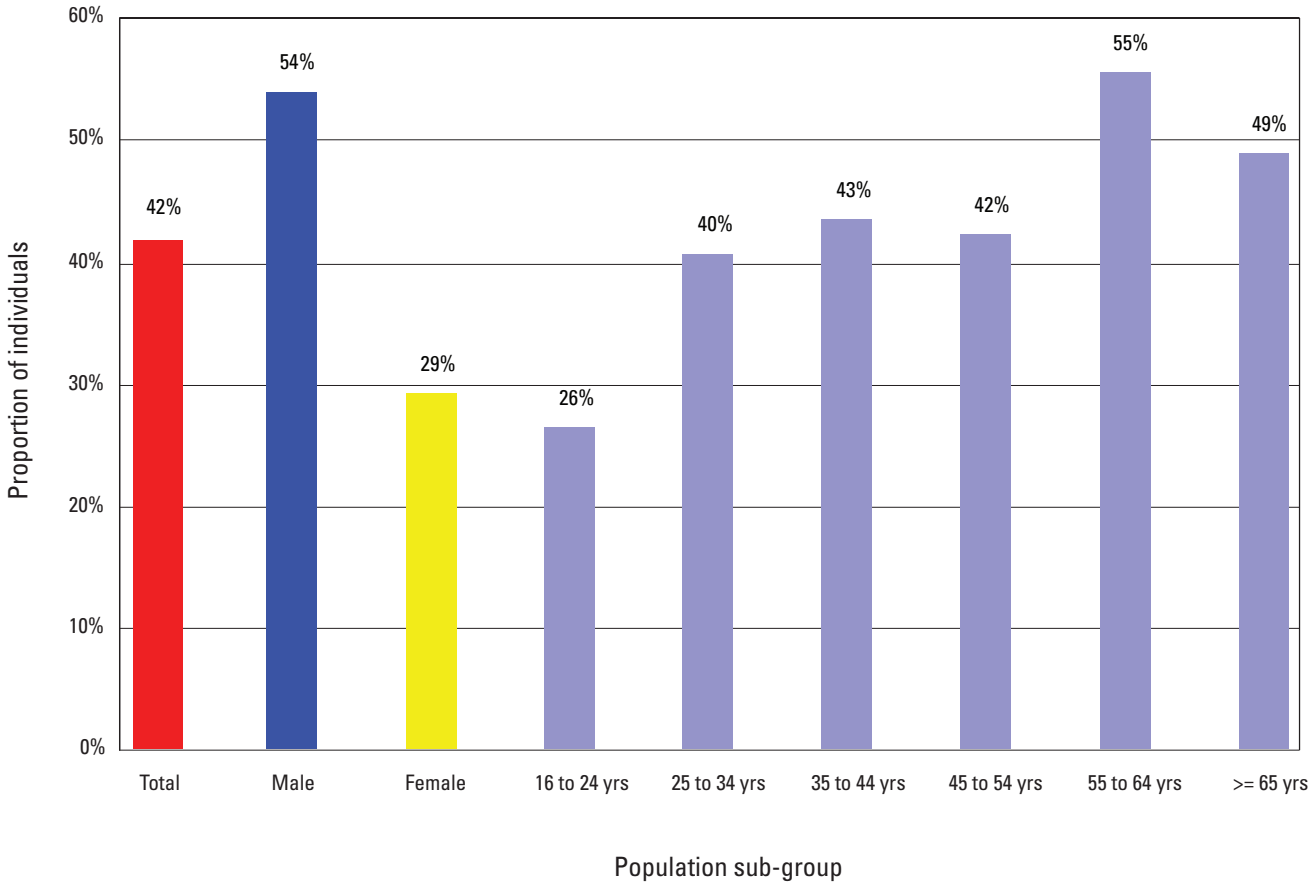
Figure 4.6 Percentage of Albertans who frequently wore protective clothing when outside for 30 minutes or more between 11 a.m. and 4 p.m. during the summer, by age and sex



A proper hat can also provide an effective physical barrier to UVR. A hat with a wide brim all around (two to three inches) is necessary to provide reasonable protection for often exposed skin areas such as the neck, ears, eyes, nose, forehead and scalp. On average, compared to the top of the head, the forehead receives about 40% more exposure, the nose 50% more, and the back of the neck about 30% more (Diffey & Cheeseman, 1992).

Regular hat usage was seen in about one-half (54%) of Albertan males, but only in a third (29%) of females (Figure 4.7). Albertans 16 to 24 years old are the age group with the lowest reported frequency of covering their heads when in the sun. Overall, only 42% of Albertans routinely covered their head with a hat when in the sun for more than 30 minutes between 11 a.m. and 4 p.m. on an average summer day (Canadian Partnership Against Cancer, 2006).

Figure 4.7 Percentage of Albertans who covered their head when outside for 30 minutes or more between 11 a.m and 4 p.m. during the summer, by age and sex



Although the use of sunglasses does not prevent skin cancer, it is still an important component of a comprehensive UVR strategy, as long hours in the sun without protecting your eyes will increase the risk of developing eye disease such as cataracts (Gies et al., 1998; West et al., 1998).

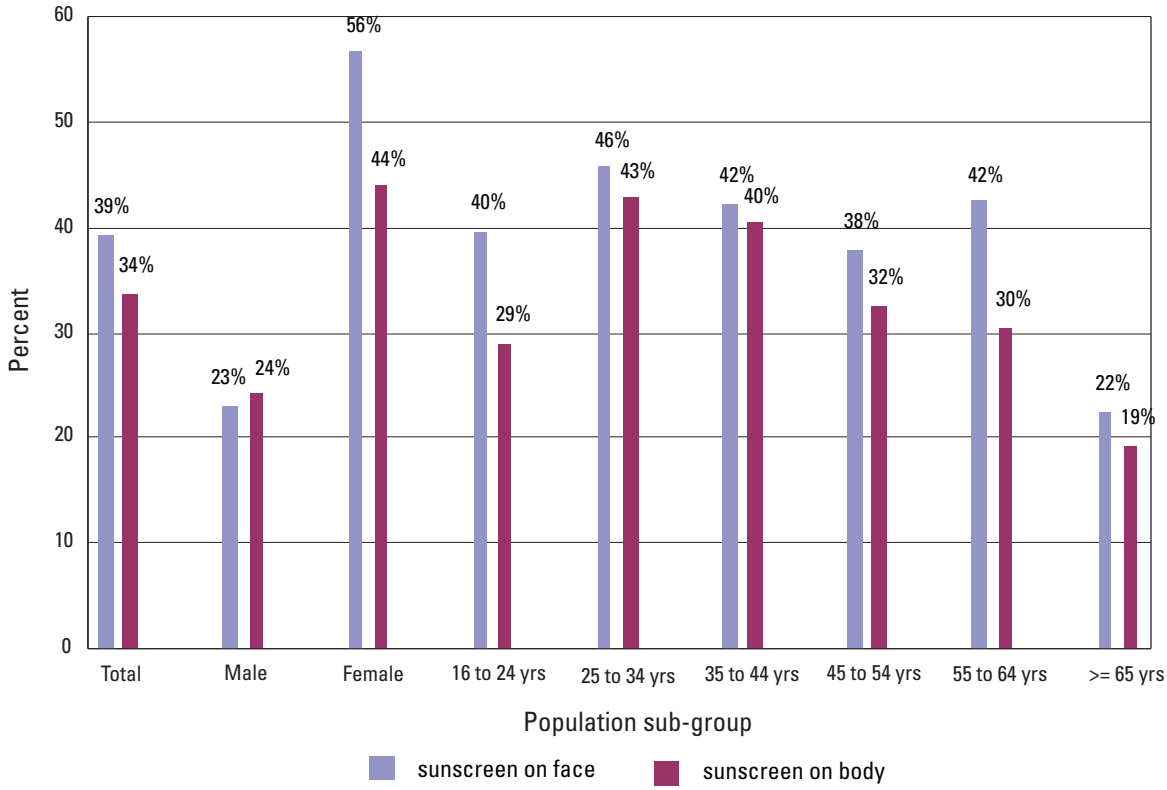
SUNSCREEN

Sunscreens are chemical barriers applied to the skin and are designed to absorb or reflect the sun's UVR away from the skin. A product with a sun protection factor (SPF) of 15 will block 93% of UVB rays, whereas an SPF 30+ sunscreen will block 97% of UVB rays. A broad-spectrum sunscreen will protect against both UVA and UVB rays, and offers the best protection against both non-melanoma (SCC & BCC) and melanoma skin cancers (Armstrong, 2004). Sunburns (intermittent) and lifetime (chronic) exposure risks are also reduced by the use of sunscreen (Gallagher et al., 2000).

Proper application and re-application of sunscreen has been found to be a good form of defence against UVR and can play a key role in the protection against skin cancer (Green et al., 1999; Thompson, Jolley, & Marks, 1993). It should be applied generously and evenly 15 to 30 minutes prior to sun exposure, followed by re-application 15 to 30 minutes after exposure begins (Diffey, 2001). Re-application should also occur every two hours, especially after vigorous activity or sweating. Proper re-application of sunscreen is very important as it can provide a two- to three-fold increase in protection from sunburn (Odio et al., 1994; Pruim & Green, 1999). The use of a broad spectrum sunscreen with increased SPF provides the best protection against sunburns (Armstrong, 2004).

Just over one-third of Albertans reported frequent use of sunscreen for more than 30 minutes when outside between 11 a.m. and 4 p.m. during the summer; Albertans were more likely to use sunscreen on their faces (39%) than on their bodies (34%) (Figure 4.8). A greater percentage of women than men used sunscreen when in the sun for at least 30 minutes. The youngest (age 16 to 24 years) and oldest (65+ years) age categories did not wear sunscreen as frequently as other age categories (Canadian Partnership Against Cancer, 2006).

Figure 4.8 Percentage of Alberta residents who frequently used sunscreen when outside for 30 minutes or more between 11 a.m. and 4 p.m. during the summer, by age and sex



SKIN CANCER SCREENING

A recent review of the literature found that there was insufficient evidence to assess the balance of benefit and harm of using a whole-body skin examination by a primary-care clinician, or patient skin self-examination, for the early detection of cutaneous melanoma, basal cell cancer, or squamous cell skin cancer in the adult general population (Wolff, Tai, & Miller, 2009).

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CHAPTER 5.0 REVIEW OF BEST PRACTICES

CHAPTER 5.0 REVIEW OF BEST PRACTICES

This chapter explores the peer-reviewed literature from a global perspective. The focus is to review best practices, including interventions, strategies and programs that have undertaken to improve behaviour related to skin cancer prevention. [1]

Best practices in skin cancer prevention have been sorted into the following target groups, each guided by their own research question:

- **Broader Population-Level Strategies**
  - What is the evidence for the effectiveness of interventions and strategies implemented at the population level for general skin cancer prevention?
- **Outdoor Workers**
  - What is the evidence for the effectiveness of skin cancer prevention interventions among outdoor workers?
- **Artificial Tanning**
  - What is the evidence for the effectiveness of skin cancer prevention interventions that target artificial tanners?
- **Children and Youth**
  - What is the evidence for the effectiveness of skin cancer prevention interventions among children and youth?
- **Recreation and Physical Activity**
  - What is the evidence for the effectiveness of skin cancer prevention interventions that target participants, parents, and spectators involved with recreational and physical activities?
- **Shade**
  - What is the evidence for the effectiveness of shade policies and shade interventions in the built environment in the prevention of skin cancer?

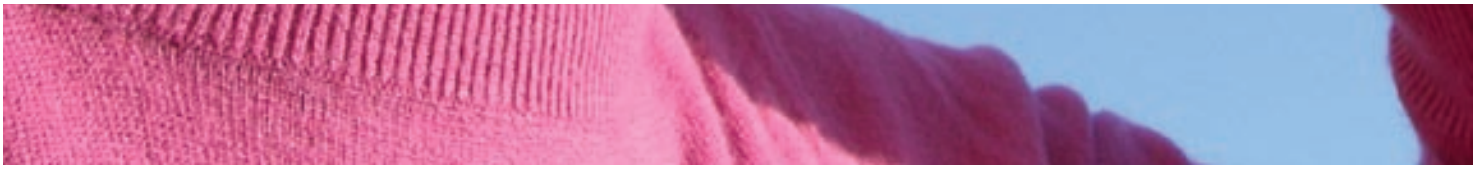
1 For each literature search process, Medline, PsycINFO, CINAHL, and Embase databases were searched for English-language papers from January 1998 to present. Search terms related to skin cancer ("skin cancer,""melanoma,""skin neoplasms,""sun burn," etc.) were combined with terms related to prevention ("prevention,""intervention,""awareness,""education,""health promotion," etc.) and to the target population (e.g., "child,""youth,""tanners,""sports"). The reference lists of articles were also searched for additional potentially relevant studies.

Interventions for each review of best practices were organized into four categories, as identified in the Ottawa Charter for Health Promotion: Develop Personal Skills (education, information and awareness), Supportive Environments, Policy and Advocacy, or Strengthen Community Actions (Hamilton & Bhatti, 1996). These are briefly outlined below. Many interventions fell into more than one of these categories as part of a comprehensive strategy to reduce exposure to harmful ultraviolet (UV) rays.

- **Develop Personal Skills:** Provision of information and education for health promotion, facilitated in school, home, work, and community settings; enabling people to learn to exercise more control over their own health.
- **Supportive Environments:** Generating living and working conditions that are safe and enjoyable; protection of the natural and built environments; conservation of natural resources.
- **Policy and Advocacy:** Health, income and social policies that ensure healthier public services and cleaner, safer, and more enjoyable environments.
- **Strengthen Community Action:** Empowerment of communities in setting priorities, making decisions, and planning and implementing strategies to achieve better health; enhancement of self-help and social support; public participation in and direction of health concerns.

Summaries of the results are provided for each of the following literature reviews in this chapter; detailed accounts of the results are available upon request.

CHAPTER 5.1
BROADER POPULATION-LEVEL STRATEGIES



CHAPTER 5.1
BROADER POPULATION-LEVEL STRATEGIES

A wide variety of programs have been implemented as components of a broader population-level strategy for creating improvements in skin cancer outcomes. The vast majority of these interventions are mass media campaigns, which consist of promotional tactics such as, television advertising, radio, public service announcements, outdoor billboard advertising, transit advertising (bus sides), print advertisements, and the Internet.

The media strategy utilized was dependent on the target group. Other intervention components of a broader-population strategy for skin cancer prevention include policy and legislation changes, program development, environmental changes, systemic changes and research and evaluation efforts. Some of the longest running and most successful mass media programs in skin cancer prevention are done in Australia, under the Slip! Slop! Slap! campaign and the more recent SunSmart program. This section highlights a comprehensive approach to population-level skin cancer prevention, using Australia as a case study example. Further, this section also discusses mass media approaches in relation to improving skin cancer outcomes at the population level, as mass media is generally a component of most broad population-level strategies.

AUSTRALIA—*SLIP! SLOP! SLAP!* AND *SUNSMART*

Australia has been running various mass media skin cancer prevention campaigns for at least 20 years, at national, state, and regional levels. Through the Anti-Cancer Council of Victoria, the Slip! Slop! Slap! program was implemented from 1980 to 1988, and was then replaced by the SunSmart program , which is still running today (Montague, Borland, & Sinclair, 2001). The SunSmart skin cancer prevention program in the Australian state of Victoria is a broad-based, multi-component program that has provided public education and promoted structural and environmental change since 1988, with television advertising as one aspect of it (Dobbinson et al., 2008). Many of Australia's mass media skin cancer prevention campaigns have targeted specific audiences: the National Skin Cancer Awareness Campaign was geared toward adolescents and young adults whereas the Seymour the Snowman campaign was directed toward parents and caregivers of children under 12 years of age (Smith, Ferguson, McKenzie, Bauman, & Vita, 2002).

Through these programs, there have been positive changes in attitudes, beliefs, knowledge and behaviour of Australian residents (particularly in Victoria residents) documented throughout the literature. Additionally, reports of increased networks between different organizations and institutions are seen in the work that has been done through schools, the employment sector, sport and leisure organizations, community health centres and clothing merchandisers. Finally, the Australian strategies also targeted system-level barriers in skin cancer prevention through policy and legislative changes. Policies were especially aimed at children and youth through the school system, as well as outdoor worker populations. Research and evaluation efforts, including surveillance, were routinely implemented to monitor progress with the initiatives. As a result of this comprehensive strategy, the incidence of skin cancer in younger cohorts has been reported to have decreased and incidence across the population is finally plateauing, after several decades of increase (Giles, Armstrong, Burton, Staples, & Thursfield, 1996; Montague et al., 2001; Staples, Marks, & Giles, 1998; Staples et al., 2006).

In reviewing the Australian programs, it is obvious that the priority placed on different aspects of the social, political and economic environment across Australia related to skin cancer prevention should be considered a key success factor. Overall the campaign used a combination of strategies listed under the Ottawa Charter (Hamilton & Bhatti, 1996). Specifically, the campaigns helped to build public awareness and increase engagement from the community to secure more support for skin cancer prevention, as well as aimed to build supportive environments through policy changes.

Long-term assessments of trends in skin cancer outcomes, assessed through population household surveys and cohort studies in Australia, have shown some improvements. The incidence of melanoma skin cancer in younger cohorts has continued to fall or has stabilized; however, incidence in older cohorts has increased since 1988 in Australia. Data on deaths from melanoma have shown decreases for both men and women from 1984 to 1994. This decrease has largely been attributed to increases in early detection during the 1980's. The incidence of non-melanoma skin cancer is still increasing, based on data from 1985, 1990 and 1995 for the general population (Giles & Thursfield, 1996). Although incidence of non-melanoma has continued to rise, there is evidence of a reduction for younger cohorts in basal cell carcinoma (Staples et al., 1998). Death from non-melanoma is quite rare; however, trends in Australia have shown mixed results. The death rate for the general population decreased from1984 to 1994; however, there was also an increase reported in an older cohort of men. This increase has been noted to in part be due to misclassification of cause of death during this time period. Although the data sources mentioned above do help in determining the long-term impact of the Australian programs, stronger evaluation designs of long-term skin cancer outcomes are necessary to accurately assess the impact of such interventions (Giles & Thursfield, 1996).

The Anti-Cancer Council of Victoria realized that the first task for developing a successful program campaign was to build a "community of concern" and that, without this, little community effort would be given to resolving the problem. Australia has a higher incidence of skin cancer than Canada does and there are other contextual differences, but Canadians can still learn a lot from the Australian experience and knowledge of communities of concern. Much of what has been learned about skin cancer prevention in Australia and other countries can be applied in Alberta. A direct result of establishing a community of concern for the Anti-Cancer Council of Victoria was the adoption of a population-wide approach, where the focus was on making system changes that would ultimately lead to individual behaviour changes. A mass media strategy was used to target social and cultural norms about the value of a suntan. Other efforts were made to educate health professionals and policy-makers about the financial burden that skin cancer places on the Australian health care system. As more support was gained and cultural norms shifted, increased emphasis was placed on making structural changes at the state and national level (Ferguson, C. & Vita, P., 2002; Montague et al., 2001).

MASS MEDIA APPROACHES

In a review of population-level approaches, it is necessary to discuss the role of mass media campaigns. Most population-level skin cancer prevention programs have included a mass communications campaign as part of a more comprehensive strategy. Television advertising as well as publicly available informational brochures were common components of the mass media strategies reviewed. In combination with these, additional communication strategies—namely, radio, billboards and Internet—were also used. In their discussion of population interventions, the New South Wales Skin Cancer Working Group stated, "Mass media can be used to reach large segments of the population, raise the profile of public health issues and influence the knowledge, attitudes and behaviours of large numbers of people" (New South Wales Skin Cancer Prevention Working Group, 2007). Studies that reviewed mass media interventions concluded that repeated exposure and long-term commitments to the campaign were necessary to achieve sustained impact (Dobbinson et al., 2008; Smith et al., 2002). Furthermore, targeted messaging at specific groups is also important, otherwise the message tends to get "lost in the wash" across the broader population. Based on studies reporting on the effectiveness of mass media campaigns at a population level, it is clear that these approaches can create significant improvements in awareness and knowledge related to the campaign; however, behaviour changes may not always follow (National Collaborating Centre for Environmental Health, 2008; Randolph & Viswanath, 2004; Saraiya et al., 2004; Smith et al., 2002). After a review of literature, the U.S. Task Force on Community Preventive Services concluded that there is insufficient evidence to determine the effectiveness of mass media interventions alone in changing sun exposure behaviour (Saraiya et al., 2004). Thus, it is important to consider that mass media approaches are more effective as part of a broader comprehensive strategy, such as a community-wide or regional sun protection program implemented in schools, recreational areas, primary care practices, hospitals and other target settings, such as discussed in the Australian case example above (Gregson et al., 2001).

SOCIAL MARKETING

Mass media approaches encompass a variety of strategies that, in turn, aim to influence a variety of different outcomes, such as awareness levels, knowledge levels, or behaviour within a population. Social marketing is a strategic framework that embraces different tactics including mass media. The main goal of social marketing is to influence a target audience to modify behaviour-related outcomes, and not solely their awareness or knowledge levels. Furthermore, a social marketing campaign will have a pre-defined segment of the population which is the main target group of a social marketing campaign. A specific audience is defined in order to promote only the most appropriate messages using vehicles with the greatest level of reach for that specific audience (Andreasen, 1995; Kotler, Roberto, & Lee, 2002; Maibach, 2002). Based on this description, it is important to note that components of the Australian mass media campaigns under the SunSmart and Slip! Slop! Slap! programs used social marketing principles. For example, young people were especially targeted when they emerged as one of the most at-risk groups who were not adopting sun safe behaviour. Media messages were tailored and focus-tested with this particular segment of the population to increase the negative shock value of not adopting protective behaviour (Montague et al., 2001).

CONCLUSIONS

There are several reasons for the success of the Australian initiative, but clearly the recognition that a system-wide health promotion program requires a complex, multi-dimensional approach is a key factor. The role of mass media campaigns was clearly recognized as important, but not relied upon as the sole factor for changing behaviour. From the perspective of the Ottawa Charter, several combinations of multiple strategies were used to build concern, remove systemic barriers and change behaviour (Hamilton & Bhatti, 1996). For example, mass media which focuses on the development of personal skills was only one component of a broader comprehensive strategy. Other strategies used included the development of partnerships and coalitions, which may be classified as a strategy that "strengthens community action" in the Ottawa Charter. The Australian case example clearly shows how to combine several components as part of an overall strategy for improving population health in skin cancer. Furthermore, it recognized how complex behaviour change processes are, that population-level changes in health are not linear, and that it is not easy to predict where resources and emphasis should be placed.

However, some components of an overall strategy may be more important at certain time intervals than others. To relate back to the Australian initiatives, the first step, as mentioned previously, was to build a "community of concern." Mass media was used to raise public awareness of the issue, but it also raised the knowledge levels of individual citizens for improving skin cancer prevention habits at the same time. Once a community of concern was created, the foundation for making broader system level changes was laid. The Australian initiatives had the capacity to work on several different fronts simultaneously but, most importantly, recognized that not everything could be done at once (Montague, 2001). Through recognition of how complex system-level change occurs, the Australian programs have worked by creating a matrix in which outcomes, strategies and target audiences are intertwined and influence one another. The Australian initiatives are therefore considered a model program and best practice for creating change at the broader population-level in skin cancer prevention.

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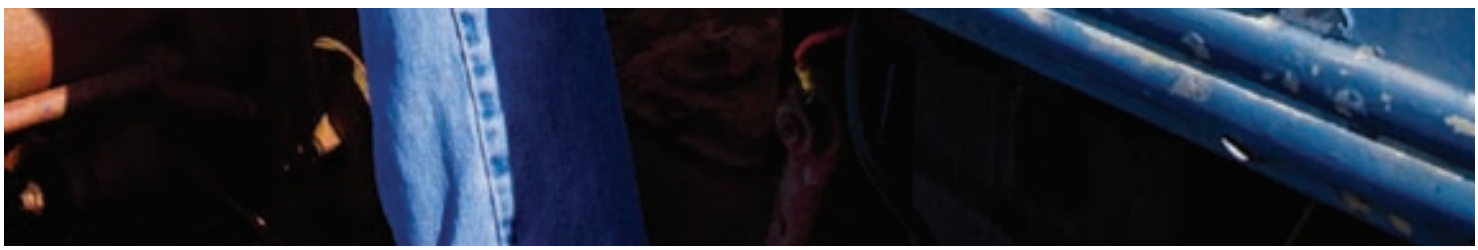
CHAPTER 5.2 OUTDOOR WORKERS



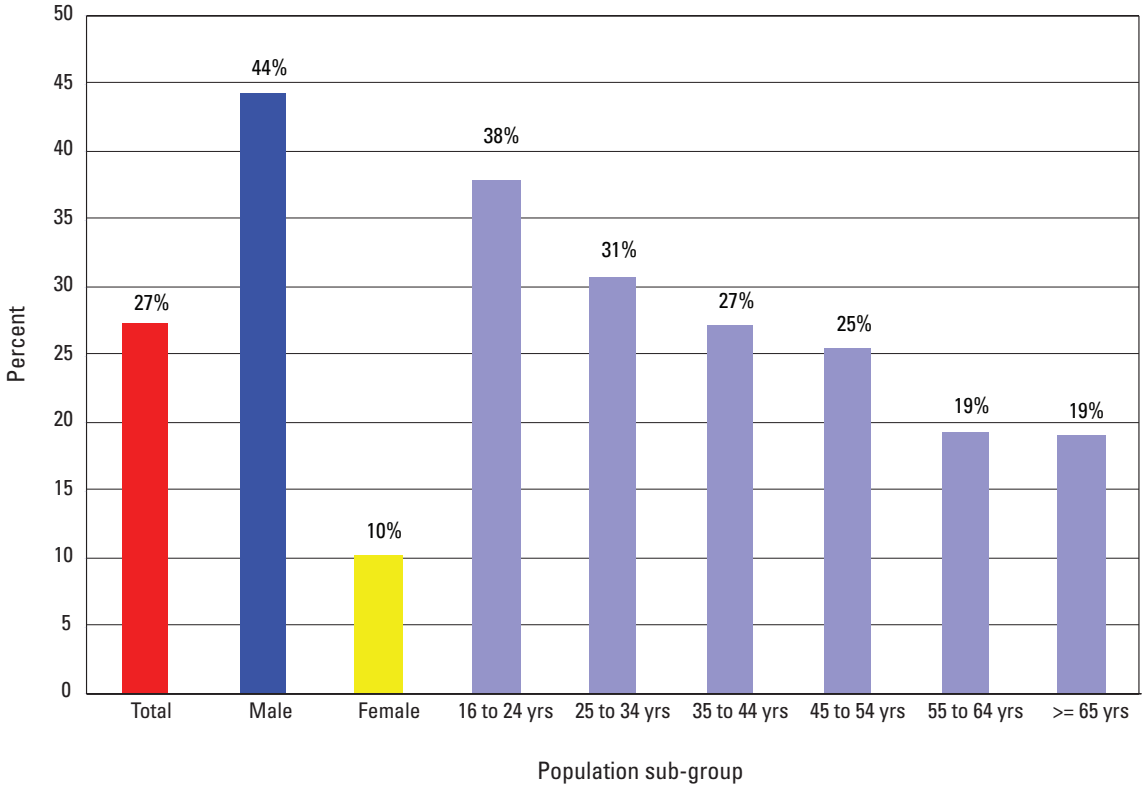
CHAPTER 5.2 OUTDOOR WORKERS

Occupational exposures contribute greatly to a person's total exposure, both of which have the strongest associations with squamous cell carcinoma (SCC) in contrast to basal cell carcinoma (BCC) and melanoma (Armstrong, 2004). The nature of the work environment for many outdoor occupations is a likely barrier for practising UV protective behaviours.

Studies in outdoor workers have shown that there are a substantial number of workers who do not follow recommended guidelines for sun safety (Glanz, Buller, & Saraiya, 2007). Following recommended guidelines for UV protection, such as reapplying sunscreen and avoiding the sun during peak hours of the day, is difficult, as these practices may not be seen as conducive to efficiency in the workplace. Furthermore, many employees do not see their employers as a source for information about sun safety, outdoor work sites typically do not have any sun safety guidelines, and few employers have specific policies to protect their workers. Thus, it is recommended that interventions for skin cancer prevention be incorporated into existing work site policies and programs (Shoveller, Lovato, Peters, & Rivers, 2000).

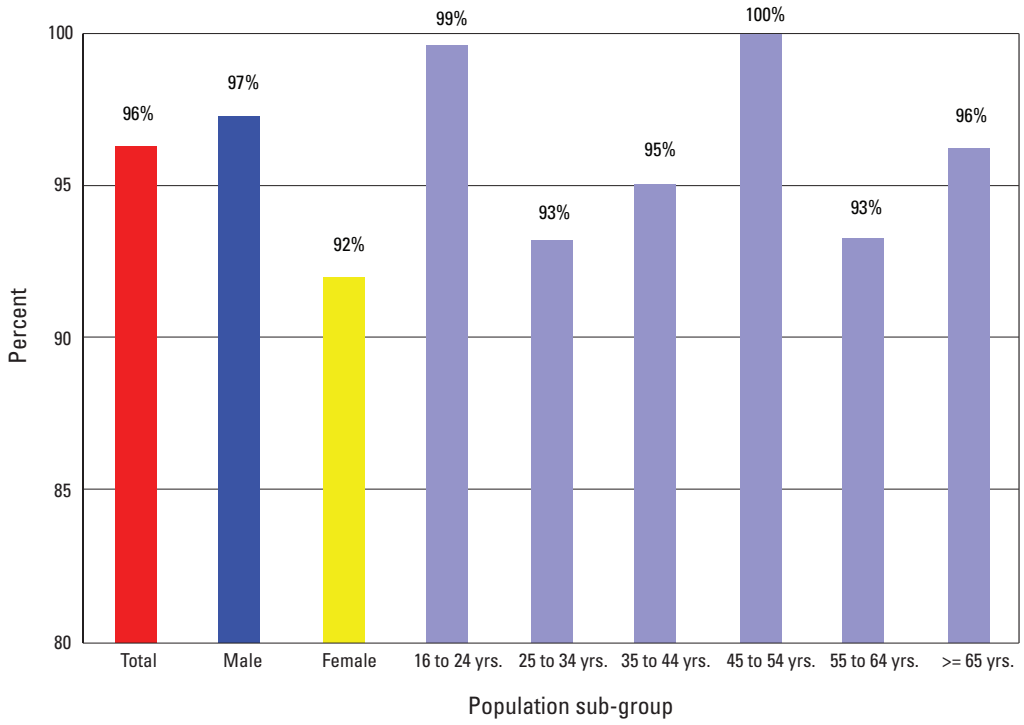
In Alberta, there are a total of 2,883,655 people 15 years of age and older (Statistics Canada, 2006). Twenty-seven per cent of these individuals worked outdoors during the summer of 2006 (Figure 5.1). Based on the census data, this translates to a total of 778,587 Albertans who are exposed to UV radiation through their occupation. Employees typically spend eight or more hours per day at work, thus the workplace represents an ideal setting to implement programs and initiatives that are designed to improve individual health and well-being.

Figure 5.1 Percentage of Albertans who have a job that requires them to work outdoors during the summer, by sex and age



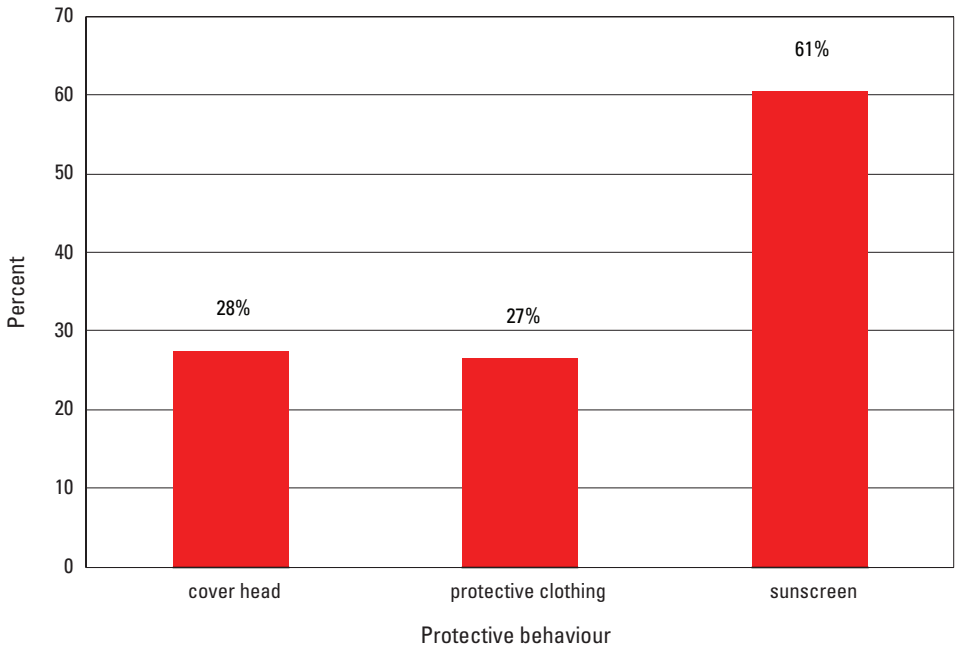
Of the residents of Alberta who worked outdoors, over 90% were exposed to the sun for at least 30 minutes a day (Figure 5.2) (Canadian Partnership Against Cancer, 2006).

Figure 5.2 Percentage of outdoor workers who spent more than 30 minutes in the sun, by sex and age



In Alberta, 28% of outdoor workers rarely or never covered their head while at work, while 27% rarely or never wore protective clothing. Over 60% of Alberta residents who worked outdoors rarely or never used sunscreen while at work (Figure 5.3) (Canadian Partnership Against Cancer, 2006).

Figure 5.3 Percentage of outdoor workers who reported "rarely" or "never" adopting sun protection behaviour



REVIEW OF BEST PRACTICES IN OUTDOOR WORKERS

Past intervention efforts in the workplace that have focused on improving UV protection have utilized many different strategies to change outcomes such as awareness, knowledge, beliefs, socio-cultural norms, behaviour and physical characteristics affected by UV exposure. Several programs have used educational approaches that incorporate social marketing strategies to change knowledge and behaviour related to UV protection. Most intervention efforts have typically used more than one strategy to improve UV protection among outdoor workers, with at least one component focused on the development of personal skills: for example, educational and knowledge promotion techniques. Other strategies included one-on-one screening sessions with employees, training of champions within the organization, supply of sunscreen or protective clothing and hats, and worksite policy changes (Azizi et al., 2000; Buller et al., 2005; Geller et al., 2001; Girgis, Sanson-Fisher, & Watson, 1994; Glanz, Buller & Saraiya, 2007; Glanz, Maddock, Lew, & Murakami-Akatsuka, 2001; Lewis, Mayer, & Sylmen, 2006; Mayer et al., 2007; Woolley, Lowe, Raasch, Glasby, & Buettner, 2008).

Results of past intervention efforts have been mixed, but most demonstrated a significant improvement on at least one outcome measure related to skin cancer prevention. None of the interventions examined measured long-term changes in outcomes as a result of a work site program or policy, or outcomes related to change in skin cancer prevalence or incidence (Azizi et al., 2000; Buller et al., 2005; Geller et al., 2001; Girgis et al., 1994; Glanz et al., 2007; Glanz et al., 2001; Lewis et al., 2006; Mayer et al., 2007; Woolley et al., 2008). Evaluations of skin cancer prevention efforts in outdoor workers reported significant improvements in knowledge and beliefs related to UV protection. Mixed results were found for subsequent changes in protective behaviour, with only a few studies reporting significant improvements (Buller et al., 2005; Geller et al., 2001)(Girgis et al., 1994; Glanz et al., 2001; Glanz et al., 2007). Strategies that implemented a policy change, however, were found to have significant improvements in UV protective behaviour (Glanz et al., 2001; Glanz et al., 2007; Woolley et al., 2008). A common theme of the intervention efforts reviewed for this document was that the programs and policies were implemented as part of a comprehensive strategy to improve protection from UV in the workplace.

There is limited information available regarding the effectiveness of interventions in outdoor workers. Furthermore, the evidence that is currently available is inconsistent in many respects, including impacts on protective behaviour. There are many factors to be considered in skin cancer prevention efforts, and it is likely that the mixed results that have occurred are due to the different contexts and circumstances in which the interventions were implemented. Health promotion practitioners should also take into account the context in which a new program or policy may be implemented, as some policies may be met with more resistance than others. Literature published to date on outdoor workers in this area has not demonstrated a strong link to changes in distal skin cancer outcomes. Furthermore, it should also be noted that the Centers for Disease Control and Prevention's Community Preventive Services Guide conducted a systematic review of interventions in outdoor workers and found insufficient evidence to recommend current strategies as effective, based on their review (Glanz et al., 2007). Although there are studies that do provide support for the effectiveness of a comprehensive workplace strategy which includes policy, the evidence is not strong, as it is not well supported by numerous studies.

Implementation of sun protection policies for outdoor workers is likely to be the most effective interventional strategy in this area, especially as one component of a comprehensive program in an outdoor workplace. Training of key staff, educational sessions for employees and provision of sun protection equipment are key components that may help to improve effectiveness. It is also important to keep in mind, however, that there has been limited long-term follow-up of interventions aimed at outdoor workers. This is important as skin cancer has approximately a 10- to 20-year latency period and, therefore, long-term follow-up should take place to evaluate the impacts on skin cancer outcomes.

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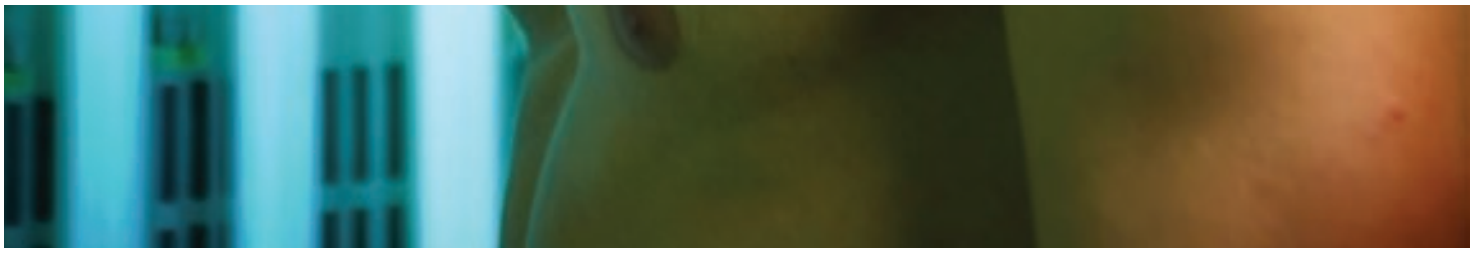
CHAPTER 5.3 ARTIFICIAL TANNING



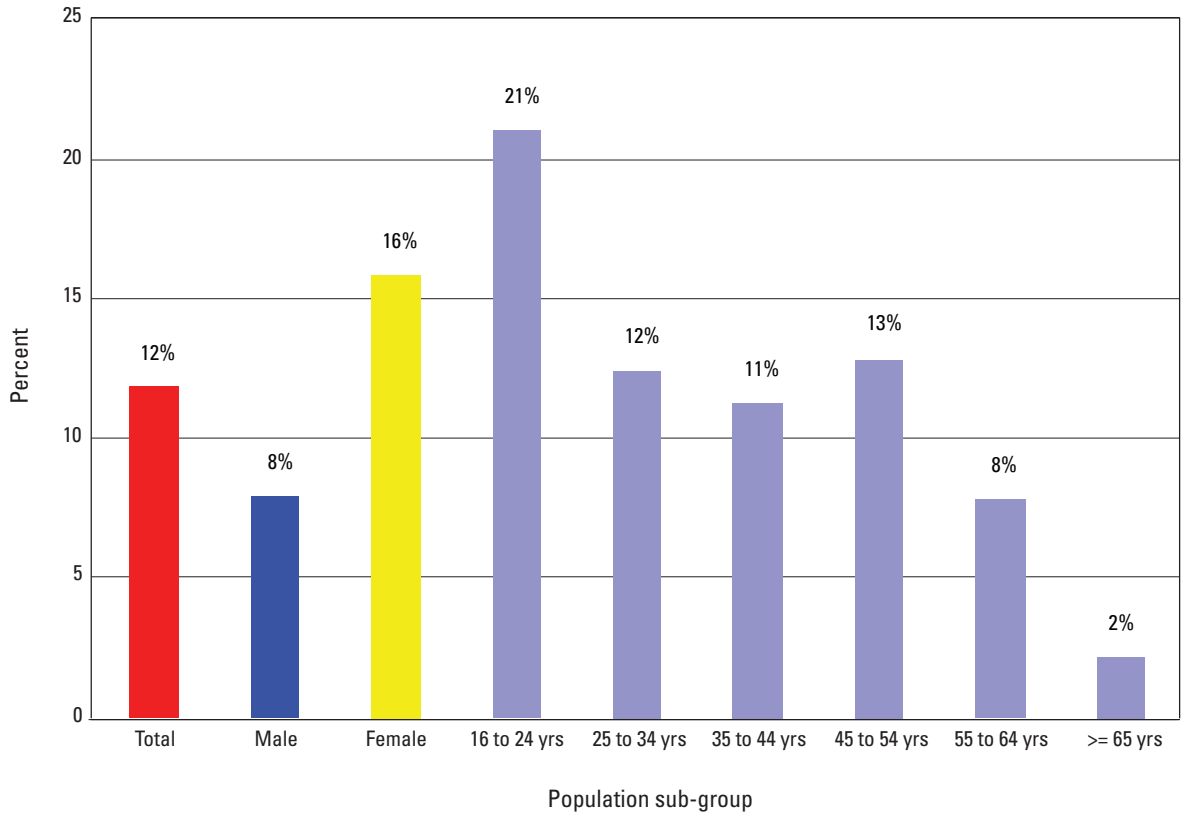
CHAPTER 5.3 ARTIFICIAL TANNING

Ultraviolet (UV) radiation exposure through indoor tanning equipment has been linked to all forms of skin cancer, with the risk increasing by more than 50% for those who utilize indoor tanning 10 or more times per year (Westerdahl, Ingvar, Masback, Jonsson, & Olsson, 2000). Despite this, artificial tanning has been gaining popularity, especially among youth.

Prevalence among older adolescent females is estimated at 25% to 40% (Geller et al., 2002). One reason for this could be that young people choose to use artificial tanning despite an awareness of the risk involved; their desire to appear more attractive in the short term outweighs the long-term health risks. This has led to the use of appearance-based interventions for artificial tanning, rather than interventions that focus solely on skin cancer risk.

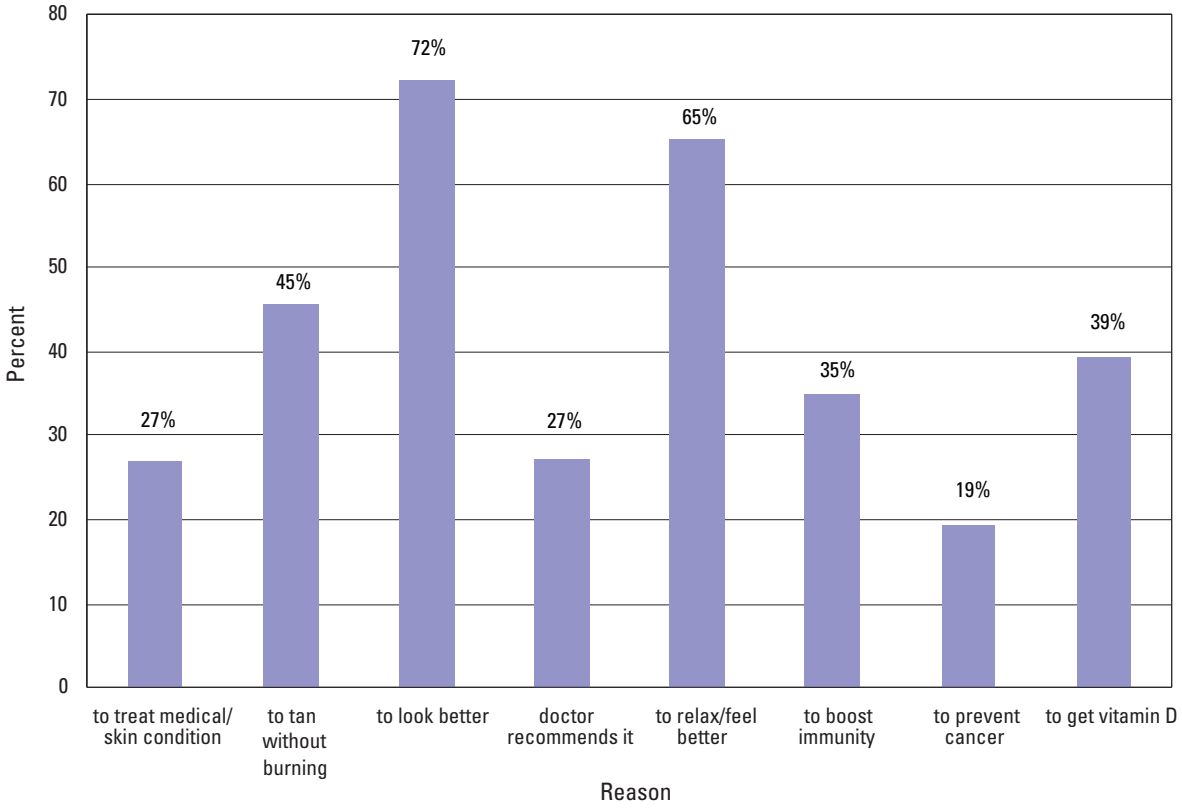
In Alberta, 12% (346,038 people) of the population used artificial tanning equipment in 2006 (Figure 5.4) (Canadian Partnership Against Cancer, 2006; Statistics Canada, 2006). Sixteen per cent of all females used equipment, in contrast to 8% of all males in the province. More residents aged 16 to 24 years use tanning equipment than any other age category in the province (Canadian Partnership Against Cancer, 2006).

Figure 5.4 Percentage of Albertans who used artificial tanning equipment over the past year, by sex and age



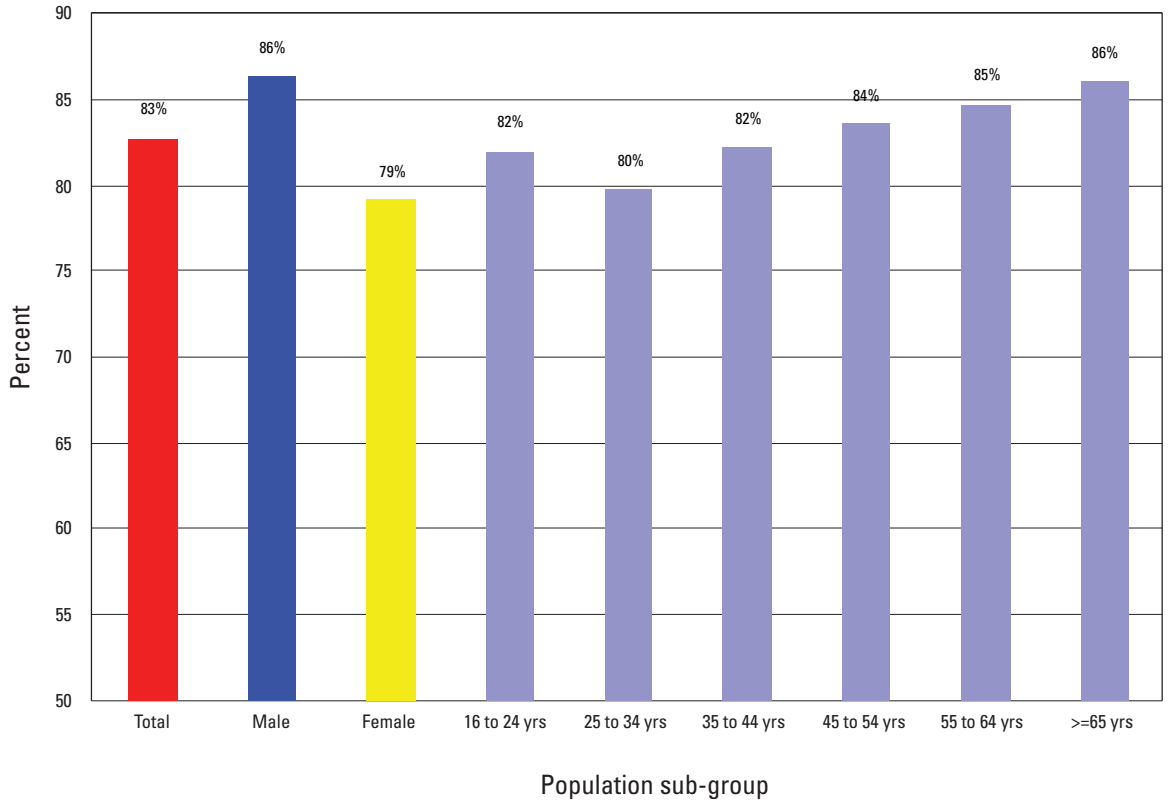
The most important reason Alberta residents listed for using artificial tanning equipment was "to look better" (Figure 5.5). Sixty-five per cent also listed "to relax/feel better" as an important reason and 45% listed "to tan without burning" also as important (Canadian Partnership Against Cancer, 2006).

Figure 5.5 Reasons Albertans listed as "important" for using artificial tanning equipment



Over 80% of all Albertans agreed that people look better with a tan (Figure 5.6) (Canadian Partnership Against Cancer, 2006). This statistic highlights the importance of how people think about appearance in our population, as well as the idea that tanning is a social norm present within our own culture.

Figure 5.6 Percentage of Albertans who agreed people look better with a tan, by sex and age



REVIEW OF BEST PRACTICES FOR ARTIFICIAL TANNING

Most of the published intervention studies for artificial tanning were aimed at female college students in the U.S. who are indoor tanners. They may all be classified as interventions focused on the development of personal skills. They include appearance-focused interventions such as workbooks and UV photography, as well as a personalized interview with graphic feedback, and a survey with a message in statistical or narrative format (Gibbons, Gerrard, Lane, Mahler, & Kulik, 2005; Greene & Brinn, 2003; Hillhouse & Turrisi, 2002; Hillhouse, Turrisi, Stapleton, & Robinson, 2008; Turrisi, Mastroleo, Stapleton, & Mallett, 2008). The five studies all reported significant reductions in indoor tanning amongst participants. Most also reported that participants had fewer intentions to indoor tan post-intervention. The recent study by Hillhouse et al. found that female indoor tanners' attitudes toward artificial tanning had changed post-intervention; so had their perceptions that a tan is attractive (Hillhouse et al., 2008). Attitudes toward artificial tanning had the strongest mediated effect, suggesting this should be the focus of future interventions.

Although these artificial tanning studies were successful in reducing indoor tanning frequencies, they were done on relatively small scales, and long-term effects (greater than 6 months) of the interventions have not yet been evaluated. Based on the results of this review, strategies for reducing the frequency of artificial tanning may be most effective if targeted at older adolescent females, as this demographic uses artificial tanning with the highest frequency. Interventions should also involve an appearance-focused intervention such as UV photography, since the desire to appear attractive is generally of greater concern to young people than long-term risks to their health (Hart & Demarco, 2008).

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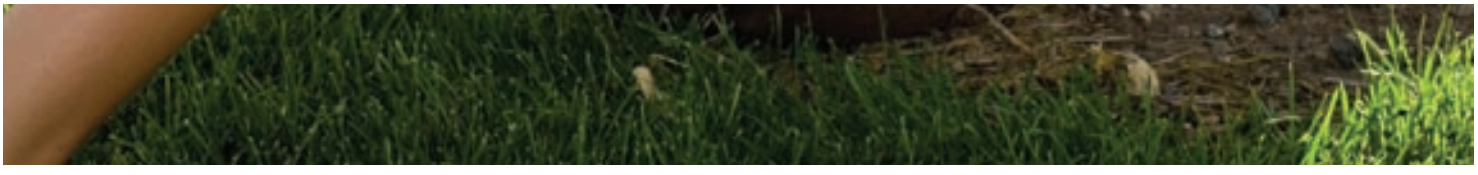
CHAPTER 5.4 CHILDREN AND YOUTH



CHAPTER 5.4 CHILDREN AND YOUTH

Up to 50% of an individual's lifetime sun exposure reportedly occurs before 18 years of age; limiting exposure during childhood is a significant factor in reducing skin cancer risk (Dadlani & Orlow, 2008). Also, lasting behavioural change is more easily achieved during the formative years than in adulthood.

There have been many widespread sun protection interventions and programs implemented for children and youth, but according to a U.S. survey of adolescents by Cokkinides et al. (2006), there was only a small reduction in sunburn frequency and a modest increase in sun protection practices associated with these interventions (Cokkinides et al., 2006).

A potential barrier to increasing sun protection in children and youth is cost. This includes not only the costs of protective clothing and sunscreen, but also the financial resources required to build shade structures, provide educational materials and implement intervention programs and policies. Lack of parental compliance and inadequate understanding of sun protective practices also may have a significant effect on children's sun-related behaviour. During adolescence, peer pressure and the media may negatively influence attitudes toward sun-safe behaviour. Barriers to sun protection in children and youth also include a lack of sun-safe environments, such as playgrounds with inadequate shade structures (Saraiya et al., 2004).

In Alberta, 14% of all children (aged 0 to 18 years) in Alberta have experienced a sunburn that lasted longer than 12 hours in their lifetime (Figure 5.7).

Figure 5.7 Percentage of Alberta children who have had a sunburn that lasted longer than 12 hours in their lifetime

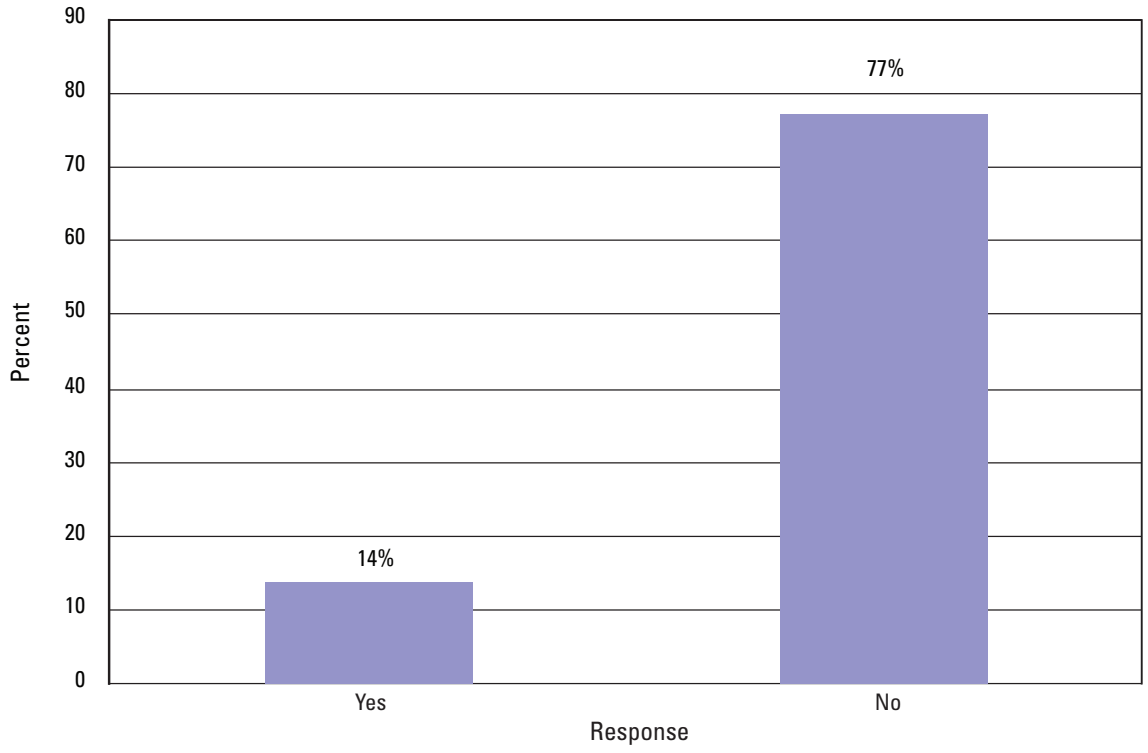
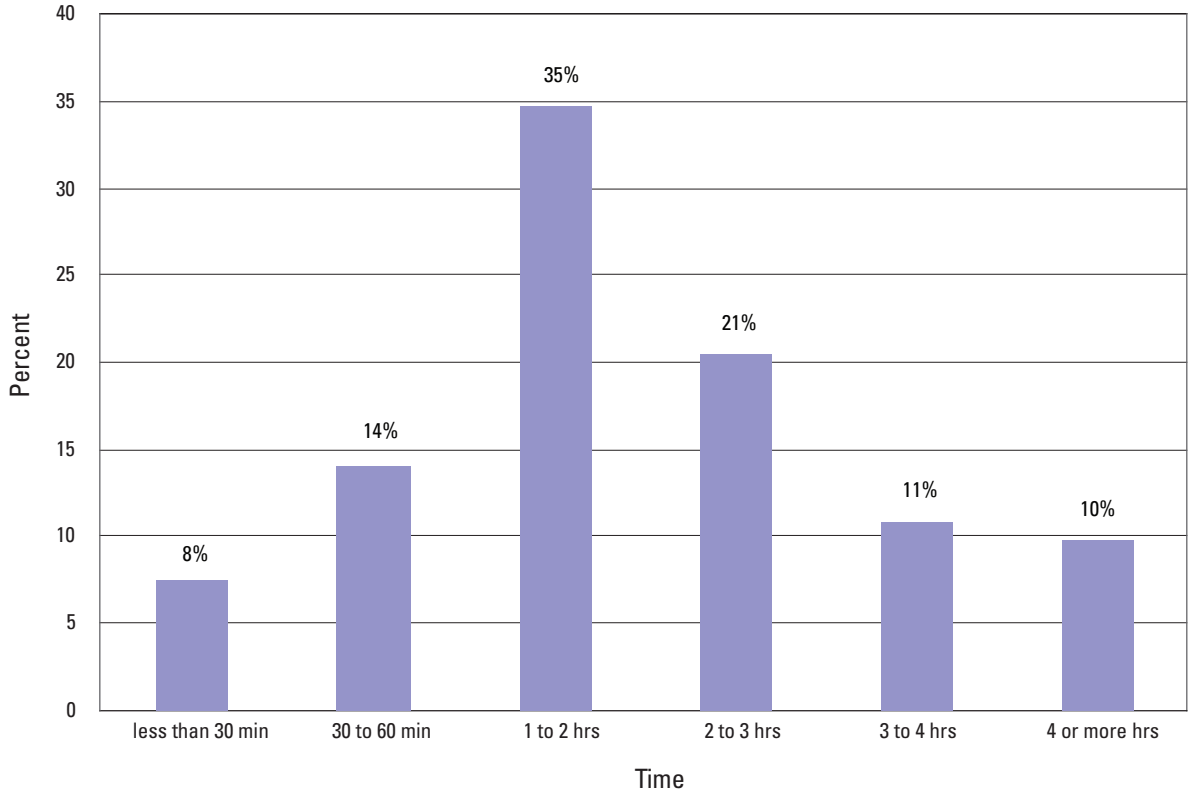


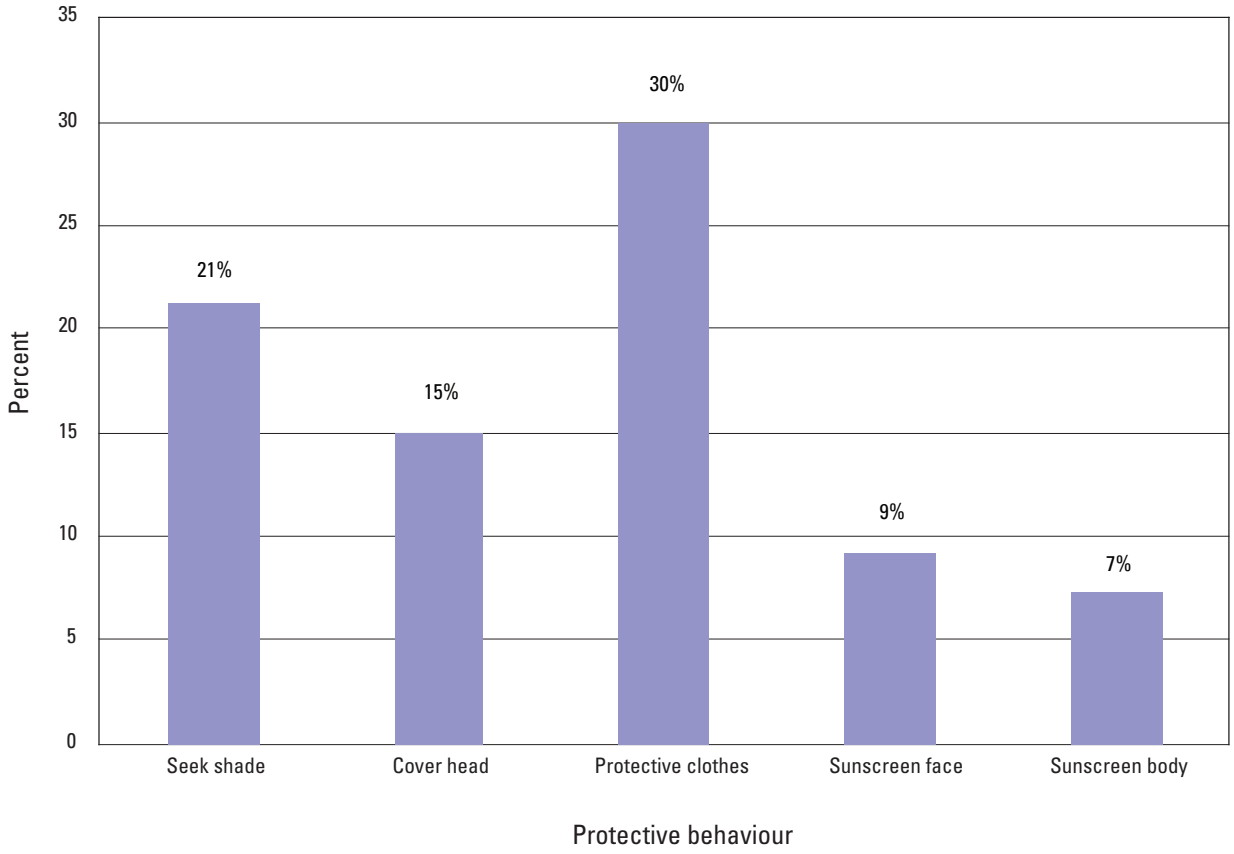
Figure 5.8 shows that 94% of all children spent 30 minutes or more outside in the sun during the summer months (Canadian Partnership Against Cancer, 2006). Based on this figure, 593,600 children were exposed to UV radiation during the summer months for at least 30 minutes (Statistics Canada, 2006). This is not to say that children should be kept indoors, but rather that proper precautions need to be taken when people are outside and exposed to UVR.

Figure 5.8 Average amount of time Alberta children spent in the sun each day during the summer



When asked about sun protective behaviour, 21% of all children in Alberta reported "rarely" or "never" seeking shade, 15% reported "rarely" or "never" covering their head (Weinstock, Rossi, Redding, & Maddock, 2002), and 30% reported "rarely" or "never" wearing protective clothes. Children were reported to use sunscreen more often than any other protective behaviour, as only 9% and 7% of children reported "rarely" or "never" wearing sunscreen on their face and body, respectively (Figure 5.9) (Canadian Partnership Against Cancer, 2006).

Figure 5.9 Percentage of Alberta children who reported "rarely" or "never" practising sun protective behaviour



REVIEW OF BEST PRACTICES FOR CHILDREN AND YOUTH

All of the intervention efforts with children and youth utilized strategies focused on developing personal skills with two of the multi-component interventions also having a component that aimed to strengthen community actions. The target audience varied among parents, preschool/daycare staff, and children of various age groups. Many of the educational programs were part of a school curriculum and were implemented in the classroom setting, while other educational interventions took place in primary-care practices or preschools and daycare centres. There were also several multi-component interventions which involved combinations of the aforementioned sites as well as recreational and community venues, and included community-wide publicity campaigns. A few of the school-based programs were directed at the students and the parents, via homework assignments or informational material. The goals of the educational programs usually included one or more of the following: increasing sun protection knowledge, improving attitudes toward sun protection, increasing sun protection intentions, or increasing sun protection behaviour. Several studies measured the incidence of melanocytic nevi in children as an outcome of sun protection education. While almost all of the intervention programs were effective in at least one outcome related to sun protection, very few of them studied long-term effectiveness.

All of the 16 school-based interventions were effective at increasing knowledge related to sun-safe behaviour. Interventions attempting to improve students' attitudes toward sun protection met with limited success, with only four studies reporting effectiveness in this area (Buller et al., 2006; Hewitt, Denman, Hayes, Pearson, & Wallbanks, 2001; Hornung et al., 2000; Olson, Gaffney, Starr, & Dietrich, 2008). Sun protection behaviour was also difficult to improve, with only five of these studies reporting improvements in this outcome (Bastuji-Garin, Grob, Grognard, Grosjean, & Guillaume, 1999; Buller et al., 2006; Gilaberte, Alonso, Teruel, Granizo, & Gallego, 2008; Hoffmann, Rodrigue, & Johnson, 1999; Milne et al., 2006). Of these five studies, three were multi-unit programs, where several activities and presentations were delivered to students on multiple topics related to sun safety. The other two studies included only one presentation delivered to the students on one day. Previous reviews have determined that multi-unit interventions in preschools and primary schools are effective in improving children's sun protection behaviour; however, there is moderate evidence in this review to support that conclusion (Buller & Borland, 1999; Saraiya et al., 2004). Of the five curriculum-based programs for adolescents that included behaviour as an outcome, only the Buller et al. (1999) study was effective in increasing sun-protective behaviour in this age group (Buller et al., 2006; Geller et al., 2005; Kristjansson, Helgason, Mansson-Brahme, Widlund-Ivarson, & Ullen, 2003; Lowe, Balanda, Stanton, & Gillespie, 1999; Olson et al., 2008). It should be noted that the Buller et al. (1999) intervention was a multi-unit program.

One curriculum-based intervention was assessed for its long-term effectiveness. This intervention delivered a program called Kidskin, through a non-randomized school-based intervention in Perth, Australia over four years. Control schools received the standard health education curriculum, whereas intervention schools received a multi-component intervention including sun safety topics integrated into the school curriculum. Despite initial positive effects on some sun-protective behaviour, there was little remaining favourable effect at four years post-intervention for this particular intervention (Milne et al., 2006).

The seven interventions aimed at parents of children and youth had mixed results. One intervention was found to be effective in increasing parents' intentions to adopt sun protective practices for themselves and for their children, while two others were effective and two were ineffective at increasing sun-protection behaviour of preschool parents (Bauer, Buttner, Wiecker, Luther, & Garbe, 2005; Buller et al., 2000; Crane, Schneider, Yohn, Morelli, & Plomer, 1999; Crane et al., 2006; Turrisi et al., 2004). One outcome for two parent education interventions was the actual sun-protection behaviour of the children (aged 9 to 12 years), which was found to increase in both studies (Troyanova, Manolova, & Spangenberg, 2004; Turrisi et al., 2004).

There was one intervention with the goal of increasing sun protection counselling for children by primary care physicians, which was reported to have positive results (Dietrich et al., 2000). A second primary care-based intervention was also found to be effective in increasing sun protective behaviour of adolescents (Norman et al., 2007).

The three multi-component interventions reviewed for this document were all effective in increasing sun protective behaviour, mainly in terms of increasing sunscreen use (Dietrich et al., 1998; Miller, Geller, Wood, Lew, & Koh, 1999; Olson et al., 2007). These studies involved community-wide, multi-site interventions that occurred over one, two, or three years, and targeted children aged two years through to adolescents. All interventions had a component focused on the development of personal skills, while only two had additional components that also aimed to strengthen community actions. Examples of these include the Falmouth Safe Skin Project, which combined community activism and local participation with behavioural and educational interventions and a community-wide publicity campaign (Miller et al., 1999). In the SunSafe project, significant support was provided at each of the intervention venues; adults were trained to be role models, volunteer school liaisons served as ongoing advocates, and adolescents were on peer-education "sun teams" (Olson et al., 2007).

There are several types of interventions that may be most effective in facilitating improvements in sun protection behaviour in children and youth. Evidence exists that educational, curriculum-based programs in elementary schools that take place over several years can be effective. Interventions in primary care practices to increase sun protection counselling may also be effective in improving sun protection behaviour in both children and adolescents. Finally, a strategy with great potential to improve sun safe behaviour in children and youth would be community-wide, multi-component initiatives, which encompass programs implemented at healthcare and recreational sites, mass media, and environmental and policy changes. A multi-faceted program such as this should ideally be over several years to increase the likelihood that long-term improvements in knowledge, attitudes and sun protective behaviour occur to contribute to a reduction in incidence, morbidity, and mortality from skin cancer.

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CHAPTER 5.5
PHYSICAL ACTIVITY AND RECREATION

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PHYSICAL ACTIVITY & RECREATION

There are many outdoor recreational activities in which UV exposure is very high, resulting in risk for development of skin cancer. Recreational activities generally encompass leisure time activities, from participation in sports outside to sunbathing on the beach during summer holidays. Some of the most intense sun exposures often occur during holidays in the sun.

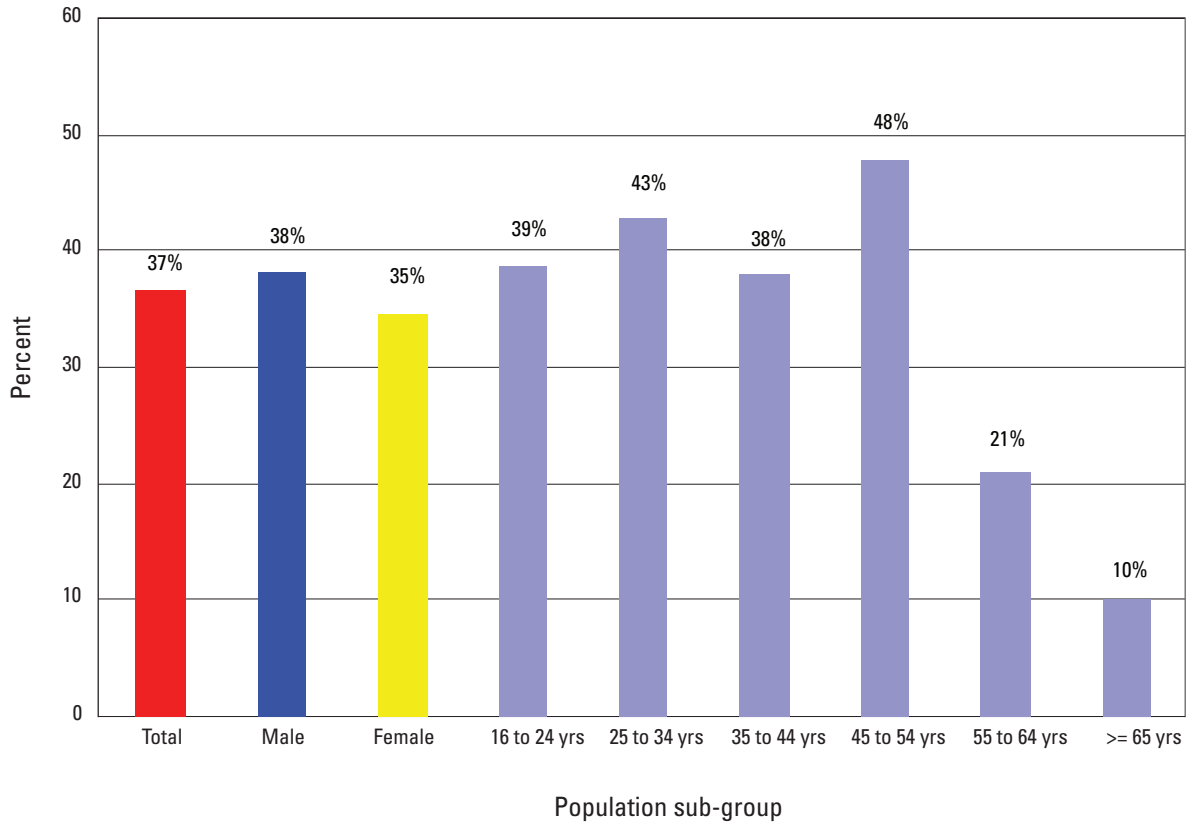
There has been an increase in travel by vacationers from temperate climates to destinations with high UV levels. Sports such as soccer, swimming and skiing are conducted mostly or entirely outdoors, and participation in outdoor leisure activities in general has increased, resulting in increased exposure to sunlight. The risk of melanoma tends to increase with increased recreational sun exposure (Saraiya et al., 2004; Segan, Borland, & Hill, 1999).

One potential barrier to the implementation of sun protection interventions in recreational settings is the limited time that recreational staff have with their clients (e.g., swimming lessons). Also, there are often many other safety-related messages associated with sports such as skiing, which may limit the dissemination of sun-protection information. Within the tourism industry, there may be a feeling that sun-safety concerns would deter potential customers, resulting in unwillingness to participate in sun-protection intervention programs.

STATE OF EVIDENCE IN ALBERTA

In Alberta, 37% of residents reported they were on vacation when they received their most serious sunburn (Figure 5.10) with the greatest proportion of those receiving a sunburn being 45 to 54 years of age.

Figure 5.10 Percentage of Albertans who were on vacation when they received their most serious sunburn, by sex and age



Twenty-four per cent of Albertans reported they tried to get a suntan when on vacation (Figure 5.11). Almost 50% of residents aged 16 to 24 reported they tried to get a suntan when on vacation. Based on Alberta census data, there is a population of 714,095 aged 15 to 24 years (Canadian Partnership Against Cancer, 2006). Thus, it is likely that over 300,000 Albertans are intentionally exposing themselves to harmful UV rays by trying to suntan when on vacation (Statistics Canada, 2006).

Figure 5.11 Percentage of Albertans who tried to suntan when on summer vacation, by sex and age

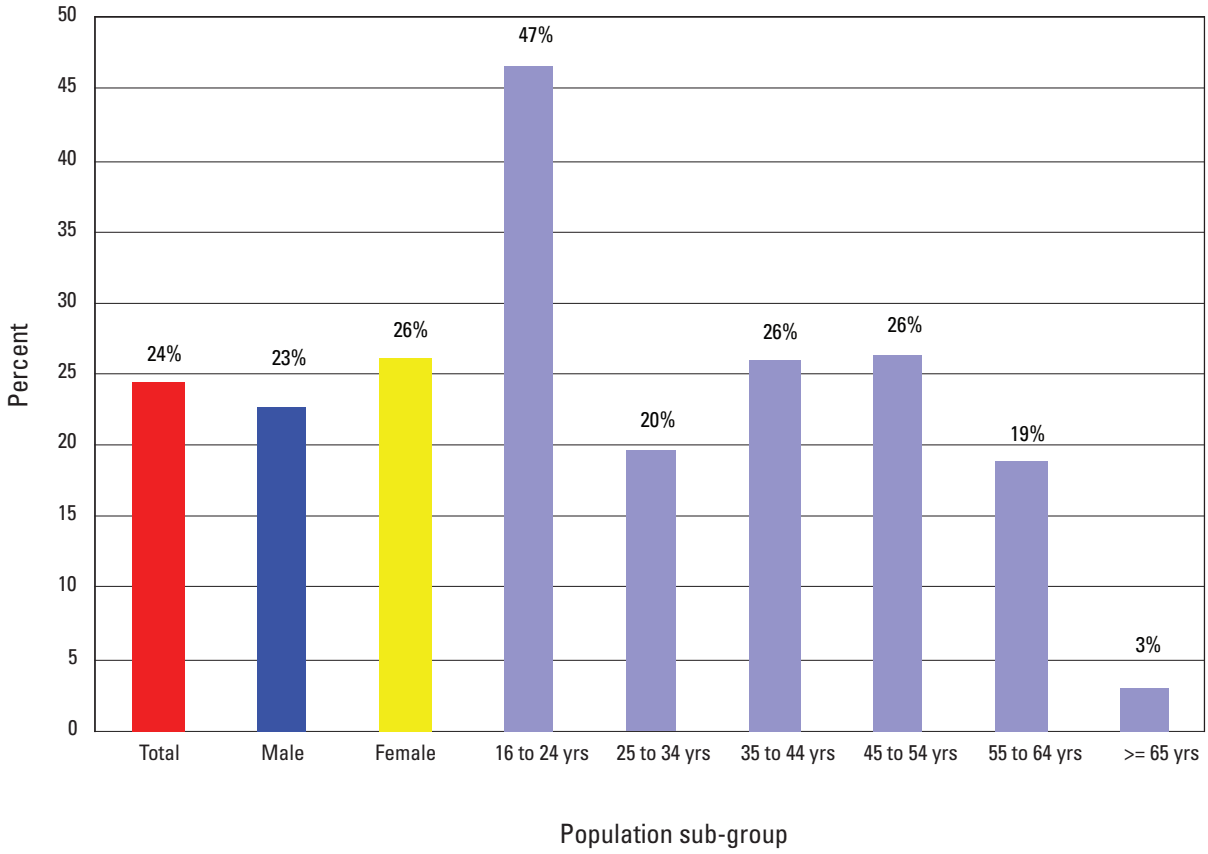


Figure 5.12 and Figure 5.13 show the recreational activities that Albertans were participating in when receiving their most serious sunburn. The most common activity reported by Albertans was taking part in recreational activities, which also included sunbathing. Fifty-four per cent of adult residents reported taking part in recreational activities when they had their most serious sunburn (Figure 5.12). In comparison, 24% of children's parents reported that the children received their most serious sunburn when they were taking part in recreational activities (Figure 5.13) (Canadian Partnership Against Cancer, 2006).

Figure 5.12 Activity Alberta adults were participating in when receiving their most serious sunburn

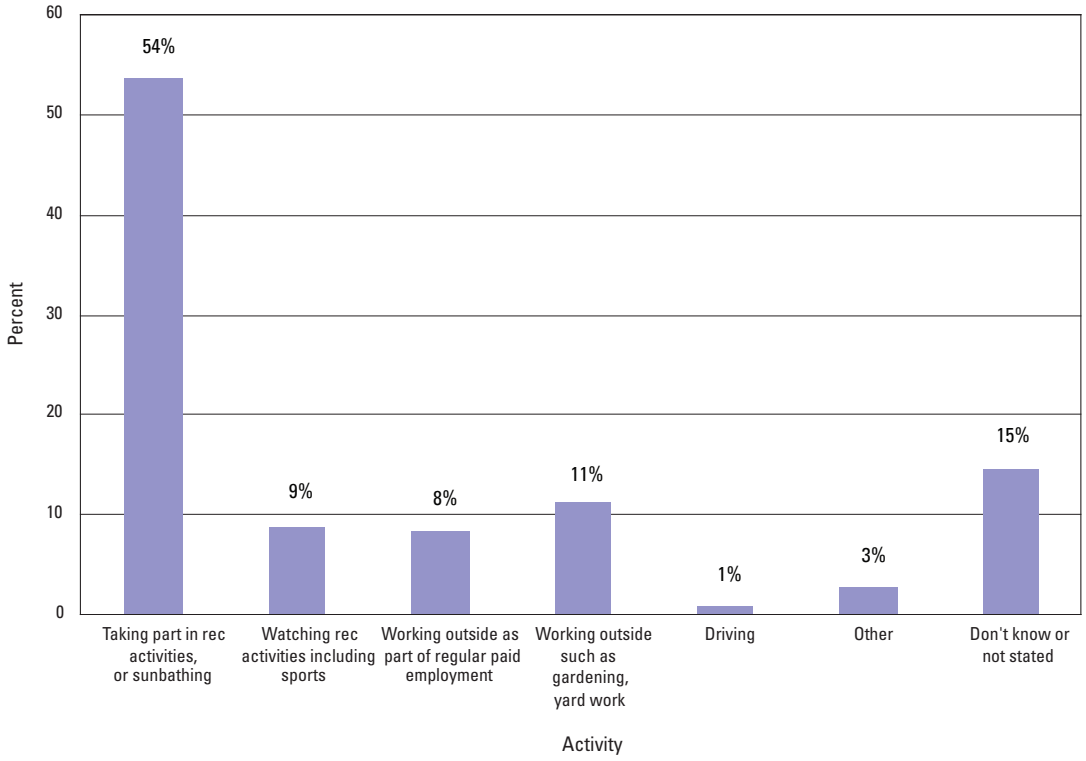
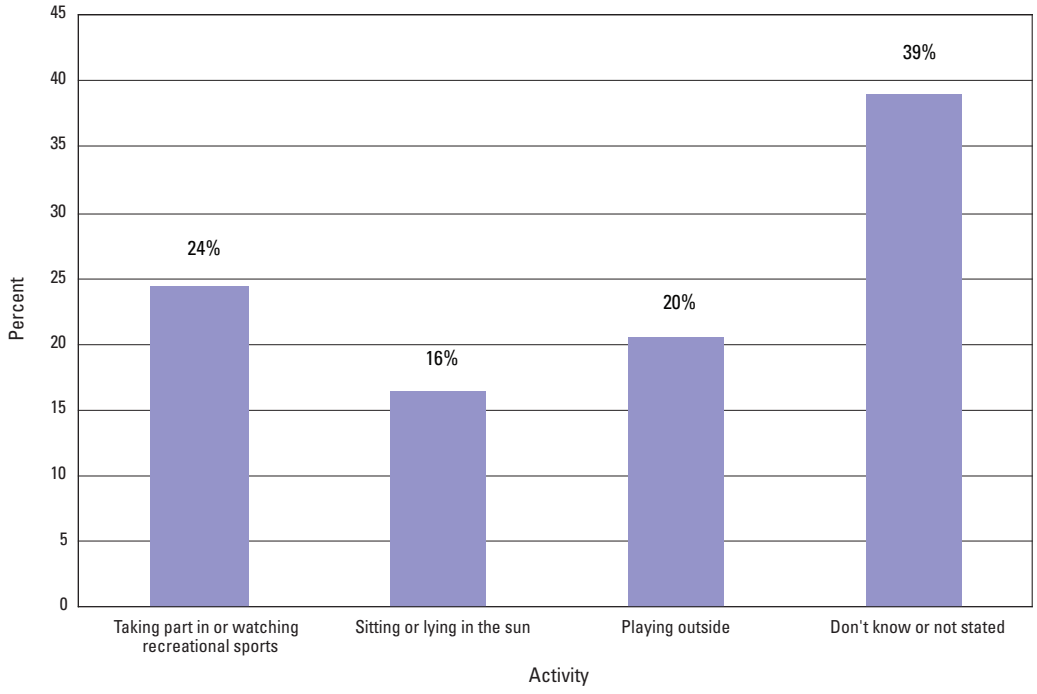


Figure 5.13 Activity Alberta children were participating in when receiving their most serious sunburn



REVIEW OF BEST PRACTICES IN RECREATION

Sun protection interventions specific to recreation have occurred in three main areas: outdoor sports, sun vacations and beachgoers, and zoos. All but two of these interventions may be categorized as Develop Personal Skills (educational/informational) only. Educational strategies included training recreational program staff to promote sun protection, informational brochures and/or free sunscreen for tourists and beachgoers, and informational materials for zoos regarding sun safety and implementation of visitor activities. Two studies had a Develop Personal Skills component as well as Policy and Advocacy and Supportive Environment components; these occurred at outdoor recreation sites in Hawaii, and at swimming pools in Hawaii and Massachusetts (Glanz, Maddock, Lew, & Murakami-Akatsuka, 2001; Glanz, Lew, Song, & Murakami-Akatsuka, 2000; Glanz, Geller, Shigaki, Maddock, & Isnec, 2002). These interventions included promotion of sun-safe environments and policies along with sun protection training for staff.

All of the recreational interventions had limited success, although in each study at least one outcome measure related to skin cancer prevention showed significant improvement. For most studies, this measure was related to sun protection knowledge or promotion. Only a handful of studies demonstrated significant improvement in sun protection practices; these included two multi-component interventions for beachgoers, a sun safety education program at ski and snowboard resorts, free sunscreen provided to adults at seaside resorts, and a program at outdoor recreation sites in Hawaii (Glanz et al., 2000; Nicol, Gaudy, Gouvernet, Richard, & Grob, 2007; Pagoto, McChargue, & Fuqua, 2003; Walkosz et al., 2007; Weinstock, Rossi, Redding, & Maddock, 2002). Both of the policy-related interventions achieved significant increases in sun protection policies at the recreation sites, and one of them also reported a significant improvement in the supportive environment (Glanz et al., 2000; Glanz et al., 2002).

The most effective interventions in the recreation category were those that had multiple components, and they often had follow-up interventions, or multiple opportunities to interact with participants. Overall, there are a limited number of recreation-specific interventional studies and, of those evaluated, there is a wide variety of venues in which the interventions occurred. As a result, assessing overall effectiveness of various strategies is difficult; a greater number of studies within similar venues is required. Saraiya et al. (2004) determined that there was sufficient evidence of effectiveness of interventions in recreational or tourism settings at increasing adult sun protective behaviour of covering up (Saraiya et al., 2004). In the present review, there were three studies with adult sun protective behaviour as a measured outcome, and the two multi-component studies were effective while the one-time intervention with Australian tourists by Segan et al. was not effective in altering behaviour (Pagoto et al., 2003; Segan et al., 1999; Weinstock et al., 2002). This evidence moderately supports the findings of Saraiya et al. (2004).

Amongst the various recreational venues, it seems apparent that adult beachgoers are most likely to alter their sun protection behaviour as a result of interventional strategies. A program targeting beachgoers would be most effective if it included several components, such as educational pamphlets, personalized feedback, provision of sunscreen, and educational mailings post-intervention. Interventions to change sun protection policies at recreational pools may also be an effective strategy in this category.

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CHAPTER 5.6 SHADE

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The use of shade is a strategy in the reduction of human exposure to solar UV radiation. The provision of shade in schools is especially important in protecting children, as school recess and lunch breaks occur during peak sun hours.

UV protection provided by trees and shade structures at parks, schools and public areas has been studied and measured (Gies & Mackay, 2004; Gies et al., 2007; Milne et al., 1999; Turnbull, Parisi, & Sabburg, 2003; Turnbull & Parisi, 2006). These studies concluded that UV radiation levels in the shade in winter in Australia could cause erythema and other sun-related disorders, and that few shade structures in New Zealand primary schools would meet the suggested UVR protection factor required for all-day protection (Gies & Mackay, 2004; Turnbull et al., 2003). Many shade structures do not provide adequate protection from scattered ultraviolet radiation (Turnbull & Parisi, 2006). It is recommended that use of shade be part of a UV minimization strategy, but should be combined with other sun protection practices such as wearing sunscreen, sunglasses, and a hat (Gies et al., 2007; Turnbull et al., 2003).

Barriers to providing effective shade often include cost and building regulations (Turnbull & Parisi, 2006). Schools and child care centres usually do not have budgets for erecting structures that provide adequate UVR protection, and tree shade has been found to be ineffective in many studies (Grant, Heisler, & Gao, 2002; Parisi, Kimlin, Wong, & Wilson, 2000; Parsons, Neale, Wolski, & Green, 1998).

STATE OF EVIDENCE IN ALBERTA

Figure 5.14 shows the proportion of people who sought shade when they were exposed to the sun's UV rays for at least 30 minutes during the summer. Forty-one per cent of Alberta residents sought shade, with more women (47%) than men (35%) choosing to seek shade (Canadian Partnership Against Cancer, 2006). Based on Alberta census data with a population of 2,883,655 age 15 years and over, a total of 59% or approximately 1.7 million Albertans are not consistently seeking shade when in the sun (Statistics Canada, 2006). The greatest proportion of individuals in Alberta reporting seeking shade or avoiding the sun are between the ages of 55 and 64 (56%). Trending across age groups shows that as the age increases people are more likely to seek shade or avoid the sun.

Figure 5.14 Percentage of Albertans who frequently sought shade when in the sun for 30 minutes or more, by sex and age

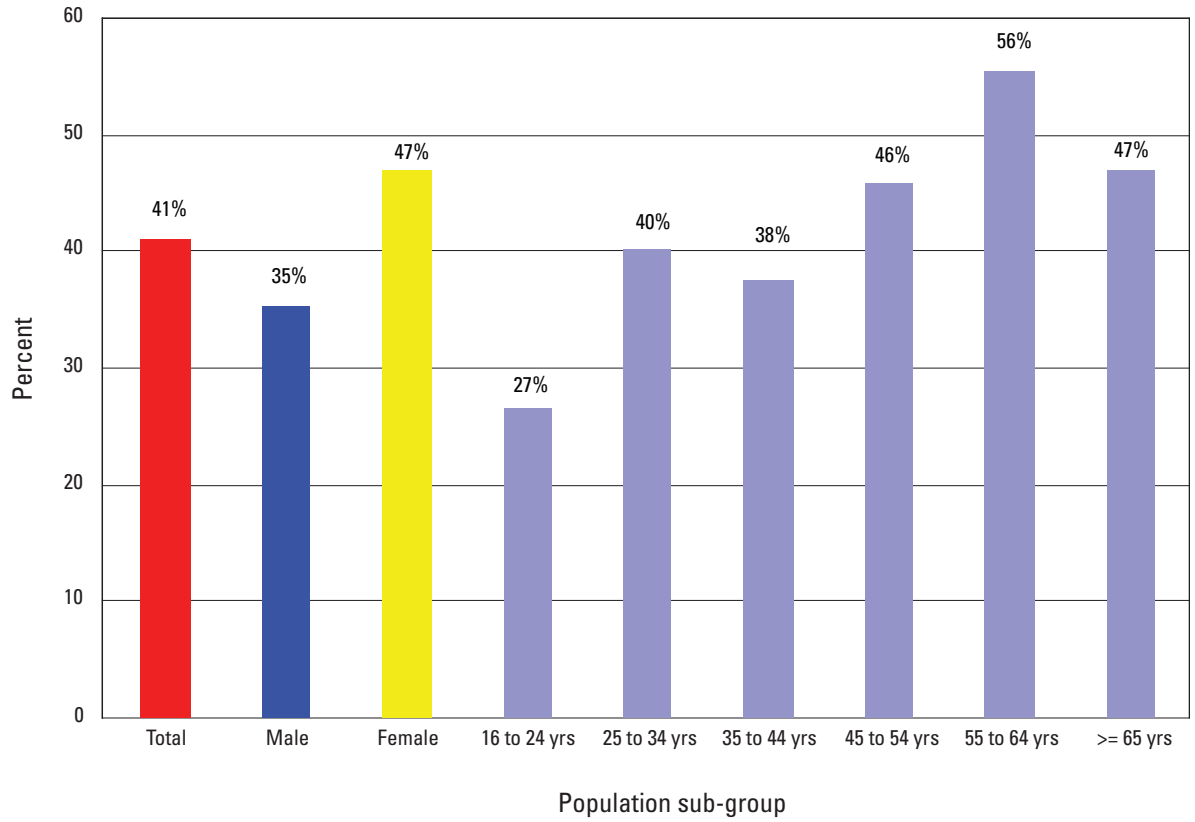
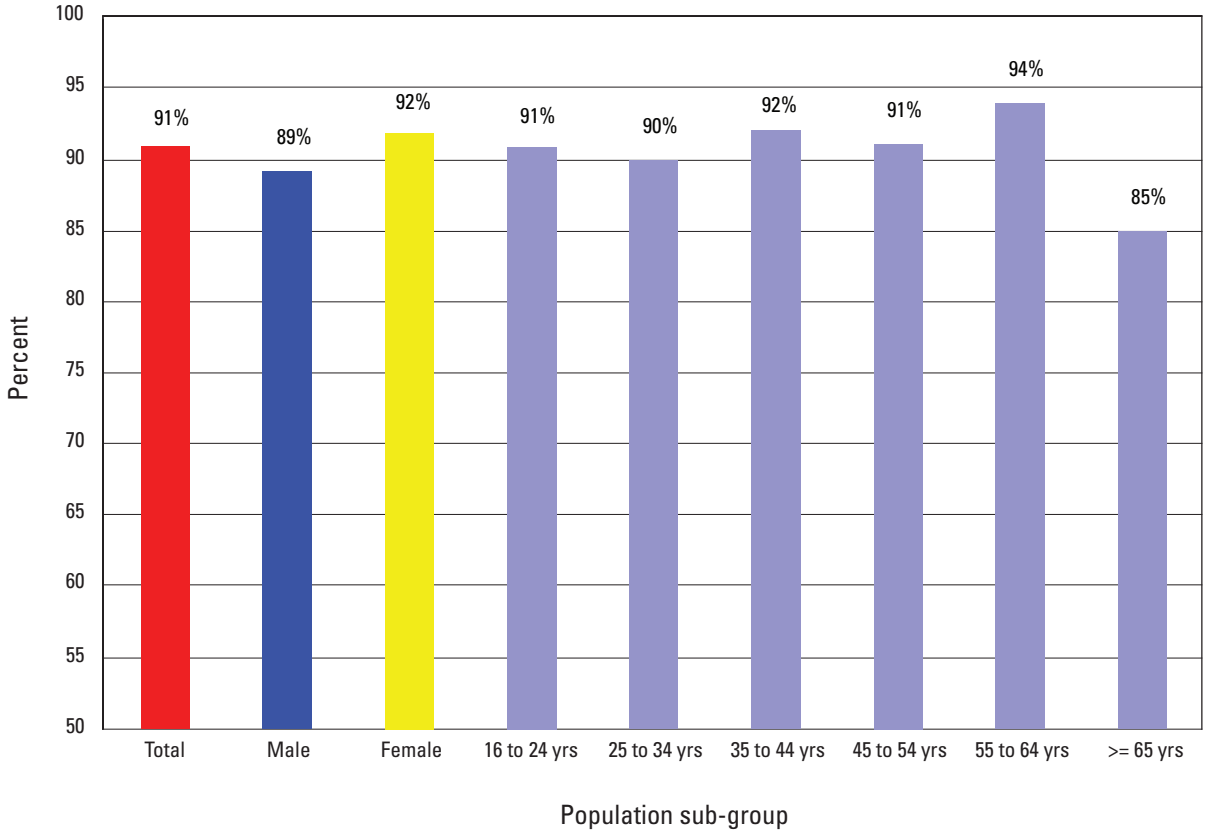


Figure 5.15 shows that a large proportion of Albertans agree that public places should provide shade (91%) (Canadian Partnership Against Cancer, 2006).

Figure 5.15 Percentage of Albertans who agreed that public places should provide shade, by sex and age



REVIEW OF BEST PRACTICES FOR SHADE

A number of skin cancer prevention interventions include use of shade as one of many outcome measures, though it is not the sole focus of such interventions (Bastuji-Garin, Grob, Grognard, Grosjean, & Guillaume, 1999; Crane, Schneider, Yohn, Morelli, & Plomer, 1999; Dietrich et al., 1998; Geller, Rutsch, Kenausis, & Zhang, 2003; Gilaberte, Alonso, Teruel, Granizo, & Gallego, 2008; Milne et al., 2006; Olson et al., 2007). Most commonly, the use of shade is promoted in educational programs for elementary school children. They are an important target, as healthy behaviour patterns established in early childhood are likely to continue throughout life. Some of these programs were successful in increasing shade-seeking behaviour in children, or intention to play in the shade, but the results were short-term (Geller et al., 2003; Gilaberte et al., 2008; Glanz, Geller, Shigaki, Maddock, & Isnec, 2002; Milne et al., 2006). One study evaluating the Kidskin intervention found that shade use and some other sun protective practices increased initially after the program, but a three-year follow-up of that program found little evidence of any effect on children's sun protective behaviour, including seeking shade (Milne et al., 2006). A knowledge-based elementary school intervention found that children considered a T-shirt and shade better protection than sunscreen post-intervention, but behaviour was not measured (Bastuji-Garin et al., 1999). Finally, another multi-component intervention that was implemented in schools, primary care practices and recreational areas was reportedly ineffective in increasing the time children spent in the shade (Dietrich et al., 1998).

The three interventions for shade fit into three different categories of interventions, based on the Ottawa Charter: Develop Personal Skills, Supportive Environments, and Policy and Advocacy. In the intervention focused on the development of personal skills, children in child care centres were given instruction to play in the shade as part of the intervention. However, their relative use of complete shade did not increase as a result (Stanton, Saleheen, O'Riordan, & Roy, 2003). In the intervention focused on creating supportive environments, preschool staff use of or setup of shaded areas was a behavioural outcome of a staff training program that showed significant improvement over the control group (Gritz et al., 2007). The program presented a variety of options for creating shaded areas and this was cited as important in the program's success. A policy intervention was also implemented in elementary schools and was designed to increase adoption of sun protection policies (Emmons et al., 2008). Although it was a small pilot study, the intervention had a positive effect on two shade-related policy areas: "current shade structures" and "have shade trees in play area." A previous study by Crane et al. (1999) was unsuccessful in changing behaviour associated with the clothing and shade practices of staff in preschools and daycares through a policy intervention; high staff turnover was cited as a possible barrier to its success (Crane et al., 1999).

Although there are few interventions in which shade-related outcomes are the primary focus, there are many school-based programs that have included shade use as a measure of change in sun protective behaviour. Results from these have been mixed. In a systematic review by Saraiya et al. (2004), it was reported that for interventions in primary schools, evidence is insufficient to determine effectiveness in improving sun protective behaviour such as seeking shade (Saraiya et al., 2004). Interventions related to shade policy and shade structures have also had limited success, with an insufficient number of studies to provide support for their effectiveness.

Education related to providing shade structures and environments as part of a sun protection training program for preschool and daycare staff is likely to be one of the more effective strategies in this category for increasing the use of appropriate shade. Another potential shade-related strategy that may be effective in elementary schools is a program to increase the adoption of sun protection policies. Although there is insufficient evidence in this review to determine that policy-related interventions for shade are effective, shade-related interventions have been effective in settings that were focused on reducing UV exposure in recreational and leisure settings, as well as in outdoor workers.

A potential barrier for the effective use of shade structures is seasonality. The long winters in Alberta discourage the public from seeking shade rather than maximizing the few months to be in the sun. Furthermore, shade structures need to be practical and designed to withstand intense Alberta weather, such as heavy snowfalls. Another likely barrier for the development of shade structures includes parental safety concerns for child visibility in and around shade structures on playgrounds.

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CHAPTER 6 ASSET MAP

CHAPTER 6 ASSET MAP

Health promotion begins with identifying existing assets, capacities, and strengths and drawing upon and extending these as people begin to articulate, examine, and address their priority health concerns. The first part of this chapter explores the findings from a provincial scan of current activities in skin cancer prevention, to determine where our assets lie within Alberta.

Referring back to the Skin Cancer Prevention Approach presented in Chapter 1, this provincial scan is considered the needs assessment, or the final part of conducting a situational analysis. This includes a review of the current types and levels of activity among the former Alberta regional health authorities and other key stakeholders, including a discussion of existing programs, resources, and strategies across Alberta.

A provincial scan was conducted to determine where the assets and gaps lie for skin cancer prevention activities. The goal of the provincial scan was to summarize roles of the participants/respondents as they relate to skin cancer prevention and describe activities related to skin cancer prevention in targeted settings (i.e., schools, families and communities, workplace, etc.). The purpose of the data collection was to identify, describe and build upon regional and provincial strengths or assets pertaining to skin cancer prevention. The data collected through this provincial scan is categorized by the Ottawa Charter for Health Promotion pillars, including build healthy public policy, create supportive environments, strengthen community actions, develop personal skills, and reorient health services. Though the focus was primarily on provincial health organizations, various related sectors were also explored. The scan includes interviews with 31 informants from seven different sectors. The next section discusses the findings from health organizations.

HEALTH ORGANIZATION FINDINGS

The scan included interviews with 18 health organizations, including representatives from the former nine regional health authorities, six provincial organizations, and three national bodies. Almost all of the regional and provincial representatives indicated that skin cancer prevention is a fairly low priority for their organizations. They attributed this to several factors, including

- Limited staff
- Limited financial resources
- No designated funding for skin cancer prevention
- Competing priorities[1]
- Low staff and public interest

A few respondents from the health sector indicated that skin cancer prevention is given increased (medium) priority in the spring and summer, when parents of young children become a key target for messaging and education. Informants also mentioned that most of their messaging centres on "basic sun safety": using protective clothing, seeking shade, applying sunscreen, and avoiding "prime time" sun. While a number of regional representatives identified artificial tanning as an important area for skin cancer prevention efforts, only two of the regional representatives said that they offered any messaging around artificial tanning, and qualified this to say that what they offered was "minimal."

ACTIVITIES

Most of the skin cancer prevention activities initiated by regional and provincial health organizations in Alberta are conducted on an ad hoc basis, with a large proportion of informants stating that information is offered "upon request" or at the discretion of staff. Activities identified primarily focus on offering information and promoting awareness (Table 6.1).

1 The following were cited as high priorities by a majority of regional representatives: childhood obesity, physical activity, tobacco reduction, chronic disease prevention.

Table 6.1 Skin cancer prevention activities offered by health organizations

Ottawa Charter Strategy	Type of Activity	Formal	Ad hoc[1]	Comments
Develop Personal Skills	Presentations, displays, public events	2	4	Presentations made at schools, camps, health fairs, and (in one case) a conference
	Pamphlets, posters, print materials	3	5	Pamphlets distributed with immunizations; pamphlets distributed in daycares via public health nurses (PHNs); Sun Safety package sent to daycares
	Media messaging (PSAs, newspaper columns, media requests)	1	5	Seasonal articles in newspapers or newsletters; usually upon request; Sun Awareness Week
	Website material	4		Downloadable fact sheets and other resources available on dedicated Sun Safety pages
	Embedded messaging	5	4	Included in prenatal materials (Healthy Beginnings), "Million Messages," Backyard Safety Fact Sheet, and safety guidelines for physical activity in schools; sometimes embedded in general/ad hoc injury prevention messaging and at bike safety rodeos
	Educational programs, training	1	1	Evaluated teachers' program with interactive activities; in-services for staff
	One-on-one counselling/education		5	Well Baby clinics, travel clinics
Build Supportive Environments	Shade planning		(1)*	Hoping to do shade planning with schools
	Monitoring & compliance	1		Health Canada monitors advertising, regulatory knowledge, and equipment in the tanning industry.
Strengthen Community Action	Coalitions, working groups	1		Participation in international working groups on tanning equipment standards and regulations
	Research			Health Canada conducts ongoing research (see interview summary for specifics)
	Funding, sponsorships, fundraising	1		Raise funds to support Mary Johnson Chair at the Cross Cancer Institute
	Resource development	1		Modules for UV Exposure being developed
Policy and Advocacy	Advocacy	(1)*		Canadian Cancer Society is hoping to advocate for indoor tanning legislation, especially regarding youth access
	Policy development	1 + (2)*		Alberta Health and Wellness is currently developing regulations for social care facilities. Sun safety might be briefly addressed in the regulations; Health Canada will be working to influence school policy through their Teachers' Program; CDA has developed a position statement on indoor tanning

1 Ad hoc activities are those not performed in a systematic or regular manner, commonly referred to as "one-time" events/activities.

* Activity is planned or anticipated, but not yet implemented

TARGET GROUPS

Most activities identified in the scan are designed to target parents and young children via interactions in health-care settings, as seen in Table 6.2 (clinics, health fairs, waiting rooms). Schools and daycares constitute other prime settings for the delivery of skin cancer prevention messages, with a number of strategies working within these settings. Workplace and recreational settings seem likely candidates as well, but none of the strategies identified in the scan were set in the workplace, and only a few "upon-request" initiatives were implemented at recreational sites.

Table 6.2 Skin cancer prevention activity target groups

Population/Setting	# of organizations	Comments
Parents & young children	14	
School-aged youth	4	Regionally and provincially-led interventions aimed at elementary school children, not teens; the Canadian Skin Cancer Foundation is working with older youth in Calgary and Edmonton (no rural coverage at this point)
Child care providers and educators	8	
Outdoor workers	1	
Travellers	2	Offered at travel immunization clinics
Consumers (tanning salons)	1	Some website information is aimed at this group; however, no formal, targeted messaging exists (i.e., the onus is on the consumer to seek out the information; they are not being actively targeted)
Health professionals	1	Pharmacists
General public	7	
Policy makers, decision makers	(1)*	Health Canada hoping to work to influence school policy through Teachers' Program
Seniors	2	
Recreation providers	1	

*Activity is planned or anticipated, but not yet implemented

OTHER FINDINGS

In addition to organizations within the health sector, the scan included a total of 13 other national, provincial and regional organizations working with key target populations (e.g., children, youth, outdoor workers). These included three from the recreation sector, seven from the education sector, one from the child care sector, one from the employment sector and one from the environment sector.

Sun safety is generally a very low priority for these organizations, with one respondent stating that the issue was not even "on the radar."

Table 6.3 below offers an overview of the types of activities being implemented by these organizations.

Table 6.3 Skin cancer prevention activities offered by other organizations

Ottawa Charter Strategy	Type of Activity	Formal	Ad-hoc	Comments
Develop Personal Skills	Pamphlets, posters, print materials	1		"Working in the Heat" fact sheet
	Media messaging (PSAs, newspaper columns, media requests)	1		UV index is automatically added to weather forecasts when it is above 3.
	Website material	3		
	Educational programs, training	1	1	YMCA encourages sun safety through informal training of staff and youth; lifeguards receive skin cancer prevention training via their certification program.
Policy and Advocacy	Policy development	2		The YMCA has a policy for outdoor programs and camps; Lifesaving Society works with pool owner/operators to establish sun safety policies; also have developed a position statement on Sun Protection in Aquatic Environments.

THE FORMER ALBERTA CANCER BOARD—ACHIEVEMENTS TO DATE

SKIN CANCER PREVENTION ENVIRONMENTAL SCAN (2000)

Completed a Skin Cancer Prevention Environmental Scan. The purpose of the scan was to

1. assess the usefulness of Healthy Living with Sunshine 2000, an Alberta Cancer Board resource for regional health authority health professionals;
2. identify the current level of skin cancer prevention activity among the former Alberta regional health authorities and other Alberta stakeholders;
3. document existing programs, resources, strategies and /or stakeholders from other jurisdictions, elsewhere in Canada and beyond; and
4. identify gaps in Alberta programming.

BASELINE KNOWLEDGE, ATTITUDES AND BEHAVIOUR SURVEY (2003)

The Sun Safety Knowledge, Attitudes and Behaviours Survey in (former) Headwaters Health Region was conducted between January and February 2003 to obtain information about sun safety knowledge, attitudes and behaviour among parents with children ages five to 14.

SUNRIGHT SOCIAL MARKETING CAMPAIGN (2003–2005)

Developed, implemented, and evaluated Sunright, a three-year pilot project of a community-based social marketing campaign. Sunright ran from 2003 to 2005 and was awarded a national award of excellence in public education from the Canadian Dermatology Association (2004, 2005).

CAMPAIGN OBJECTIVES

Short term

To raise awareness about the importance of sun safety among families with children aged five to 14.

To encourage parents and children to adopt sun-safe behaviour.

Long term

To decrease the number of skin cancer cases in Alberta.

TARGET AUDIENCES

Primary audience

The target market for the 2004 Sunright campaign has been identified as families with children aged five to 14 who live in the Headwaters communities.

Parents of young families

This audience is open to information about sun safety and promoting good health for their families. Parents serve as role models for practising sun-safe behaviour and can influence their children's practices through the application of sunscreen, use of hats and clothing and encouraging the use of shade.

Children

Children in this stage still tend to be impressionable and forming their beliefs about proper behaviour. Reached primarily through school, community events and other recreational opportunities to engage them in learning.

CHAPTER 7 SUMMARY

CHAPTER 7 SUMMARY

This report indicates there is a great need for investment in the area of skin cancer prevention to significantly reduce the incidence of, and morbidity and mortality from, skin cancer. The evidence shows that despite its preventability, skin cancer continues to be associated with significant and increasing morbidity and health-care costs, increased risk of a second primary cancer and, particularly for melanoma, increased mortality.

There is persuasive evidence that each of the three main types of skin cancer is caused by sun exposure. Recent evidence has also found a significant association between indoor tanning and skin cancer risk. The most "at-risk" groups in Alberta are the 16-to-24-year-olds and the 25-to-34-year-olds. These age groups are the least likely to adopt protective behaviour and should therefore be a key target group for intervention efforts.

The incidence and mortality of skin cancer, as well as the economic burden and the risk of developing a second primary cancer, indicates a sizable burden on our health care system. Based on current trends, this burden is expected to increase. The data in this report provide a strong basis to move forward with prevention campaigns focused on improving population health outcomes for skin cancer.

Best practices suggest that a comprehensive action plan is likely the most effective method for improving health outcomes at the population level for skin cancer. The factors that influence sun protection behaviour are numerous, and many are culturally entrenched. In his commentary on skin cancer prevention, Hill writes, "It seems improbable that lasting (sustainable) change in sun protection will be achieved without multi-component, population-based interventions that include policy change, environmental enhancement (e.g., shade provisions), and mass communication" (Hill, 2004).

Skin cancer prevention is generally considered to be of low priority across Alberta and, therefore, very little action is occurring at the provincial level. Lessons from Australian population-level skin cancer prevention strategies suggest that a multi-component, comprehensive plan should start with creating a "community of concern" and that without this, little community effort would be given to resolving the problem then developing strategies targeting at-risk populations and settings. Although Australia has a higher incidence of skin cancer than Canada does and there are contextual differences, there is still much that can be learned from their experience and knowledge of communities of concern. Past experiences in Australia (and other countries) can be quite beneficial for Alberta in establishing community efforts around skin cancer prevention.

THE ALBERTA CANCER PREVENTION PROGRAM IS COMMITTED TO PROVIDING LEADERSHIP AND COORDINATION AT THE PROVINCIAL LEVEL AS A FIRST STEP IN WORKING TOWARD ACHIEVING REDUCTIONS IN THE INCIDENCE OF, AND MORTALITY FROM, SKIN CANCER.

A community of concern consists of people who share a concern, a set of problems, or a passion about an issue (in this case, skin cancer prevention) and who deepen their understanding and knowledge of this area by interacting on a regular basis. Our context in Alberta is currently showing that skin cancer prevention is of fairly low priority compared to other public health issues. Quite possibly, building a community of concern would help make it a priority. Leadership and coordination are needed to initiate collaborative efforts with other stakeholders at the national, provincial and local levels in order to build awareness of the issue and to develop action plans for skin cancer prevention in Alberta.

Components of a comprehensive plan should include a variety of different strategies and target the population in a multitude of different places. Population-level efforts should focus on clarifying key messages in order to modify attitudes, beliefs and behaviour related to increased protection, as well as modify cultural norms around tanning behaviour. The development of supportive environments that discourage artificial tanning among youth and young adults is especially important in Alberta. Reducing intentional exposure to UVR is also vital as Alberta boasts a higher prevalence of tanning and occurrence of sunburn than any other province.

It is also important to assist the employment sector in determining ways to improve and enhance protection from ultraviolet radiation for outdoor workers. Policy and legislation should be developed in these two target areas (artificial tanning and outdoor workers) to ensure the population is adequately protected and safer working conditions are provided. To initiate action, the Alberta Cancer Prevention Program is committed to providing leadership and coordination for the exchange of evidence-based information to guide and enhance population-level efforts in skin cancer prevention across Alberta.

CONCLUSION

Results of this situational analysis show that a comprehensive action plan is the most effective strategy for improving skin cancer health outcomes at the population level. Furthermore, skin cancer prevention is currently fairly low on the priority list across the province and, therefore, very little strategic coordination is occurring at the provincial level, which is a concern that must be addressed.

The experience of other population-level programs suggests that a comprehensive plan should start with building a "community of concern." By recognizing the importance of a comprehensive and coordinated effort, the Alberta Cancer Prevention Program acknowledges the inherent complexity of population health promotion. This was a crucial finding upon review of the Australian programs and is thus of prime importance for determining future efforts for skin cancer prevention at the population level here in Alberta.

The Alberta Cancer Prevention Program is committed to providing leadership and coordination at the provincial level to help build a "community of concern" and seeks to build a comprehensive action plan in conjunction with community stakeholders in order to achieve reductions in the incidence of and mortality from skin cancer.

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SNAPSHOT OF SKIN CANCER PREVENTION FACTS AND FIGURES

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