ABSTRACT

Melanoma is the most dangerous form of skin cancer, and its incidence is increasing significantly among Canadians. In parallel with the rising incidence and morbidity, the financial burden caused by this disease will continue to increase dramatically for the government and for individuals alike. More concerted effort to raise awareness of melanoma in Canada is therefore needed.

Risk factors—such as family history, childhood sunburn exposure, and age—play a significant role in an individual’s likelihood to develop melanoma. Ultraviolet radiation exposure is the most modifiable variable in melanoma causation. It is therefore important for the general public, in particular the country’s youth, to understand the consequences of lifestyle choices—especially tanning bed use and “sun worshipping.” Many of these issues are not being addressed fully at either the national or the provincial level, with Canadian efforts trailing those of other nations facing similar challenges. Canada also has workforce issues, with an inadequate distribution and number of physicians who can detect and treat melanoma at an early curative stage. With proper education and public awareness, melanoma prevention can be an achievable goal in Canada.

KEY WORDS

Skin cancer, squamous cell carcinoma, basal cell carcinoma, melanoma, sun, UV radiation

1. THE IMPACT OF MELANOMA

Skin cancer is the most commonly diagnosed cancer in Canada. Although skin provides a level of protection against injury, infection, and damage from ultraviolet (UV) sunlight, ambient sunlight remains the most significant source of UV radiation, which in turn increases the risk of a variety of cutaneous malignancies, including basal cell carcinoma, squamous cell carcinoma, and melanoma.

Melanoma accounts for only 4% of all skin cancer cases diagnosed, but it is the most dangerous form of cutaneous malignancy. It is responsible for 80% of skin cancer deaths, and it is the seventh most commonly diagnosed cancer in Canada. The incidence of skin cancers in Canada is growing at an alarming rate, having increased by 38.4% between the years 1992 and 2011. In 2011 alone, approximately 5800 new cases of melanoma were diagnosed, and 970 deaths were caused by melanoma, which compares with 2400 new cases and 500 deaths in 1989. Thus, melanoma is one of the few cancer types that is increasing in incidence in the Canadian population. The current estimated lifetime probability of developing melanoma is 1 in 85 for women and 1 in 67 for men. That risk is clearly a significant increase from the approximately 1 in 1500 risk of the 1930s.

Although approximately 90% of Canadians diagnosed with melanoma will survive, the stage at which the disease is diagnosed plays a significant role in outcome, making early detection of this cancer crucial. The 5-year survival rate for patients with stage III disease ranges from 70% for patients with T1–4N1aM0 melanoma to 39% for patients with T1–4N3M0 melanoma, and the prognosis for stage IV melanoma is very poor, with the 1-year survival rates being 62% for M1a, 53% for M1b, and 33% for M1c melanoma. Additionally, melanoma survivors are 9 times more likely to develop a subsequent melanoma, suggesting the need for lifelong vigilance to prevent second or further primary cancers.

Recently, much has been written about the advances in melanoma therapeutics, but few publications have addressed the public health implications of the rising burden of melanoma in Canada. Quantifying those implications is complex. Mortality is often used, but it does not fully address the issue of premature deaths, especially among younger populations in which melanoma is of particular concern. Years of potential life lost (YPLL) is an alternative
measure that provides a more accurate depiction of mortality for the young and the elderly populations and may therefore be more relevant to public health funding agencies.

In general, each person’s YPLL is calculated by subtracting the person’s age at death from a reference adjusted life expectancy. The associated YPLL index has not been specifically estimated in a Canadian context, but an extensive study in the United States identified that individuals with melanoma have, on average, 20.4 YPLL compared with 16.4 YPLL in individuals with all other types of malignancies. That difference is associated with an estimated annual productivity loss of US$3.5 billion attributable to melanoma mortality; further estimates suggest that an individual who died because of melanoma in the years 2000–2006 would forgo an average of US$413,370 in lifetime earnings.

The cost of care is another measure used for public health assessment. With regard to the overall cost of skin cancer care in Canada, the total estimated cost of skin cancer in 2004 was CA$532 million. A substantial share of that cost was attributed to the diagnosis and care of melanoma (83.4%); basal cell carcinoma (9.1%) and squamous cell carcinoma (7.5%) accounted for the remainder. It is estimated that, by the year 2031, the financial burden of skin cancer in Canada will skyrocket to CA$922 million annually, with melanoma, basal cell carcinoma, and squamous cell carcinoma respectively accounting for 75.5%, 13.3%, and 11.2% of the cost.

2. AWARENESS OF MELANOMA IN CANADA

Despite the rapid escalation in the incidence of melanoma, time and resources devoted to public awareness of melanoma in Canada are low compared with those seen in other nations such as the United States and Australia. That lack is compounded by relative ignorance of melanoma in the Canadian population. For example, in Alberta, only 45% of adult respondents believed that sun exposure affected their cancer risk (n = 3843). Fewer than half of respondents were likely to practice any of the four “safe sun” habits: wearing a hat, using sunscreen, avoiding the sun, and wearing protective clothing. These issues are of particular relevance for Canadian youth. Data from the 2006 Second National Sun Survey shows that, compared with the general population, Canadians 16–24 years of age are least likely to protect themselves from the sun (seeking shade or wearing protective clothing), and 27% of women 16–24 years of age reported having used tanning equipment within the preceding 12 months. In stark contrast, in countries such as Australia, where public education efforts are into their second decade, more than 90% of the population are aware of melanoma and also believe that it is a serious disease.

This article examines the importance of raising disease awareness and access to care by examining the societal availability and acceptability of measures to reduce UV radiation exposure as the mechanism to reduce the impact of melanoma in Canada. In particular, how can intense intermittent exposure to the sun resulting in sunburn (such that which occurs with outdoor recreation or vacationing) be mitigated, because sunburn is a stronger risk factor for melanoma than is chronic occupational sun exposure. The article also examines the problems faced by health officials, professionals, and policymakers and the factors involved in reducing the burden of cutaneous melanoma.

3. RISK FACTORS FOR MELANOMA AND IMPLICATIONS FOR CANADA

3.1 Genetics and Age

Aside from well-established risk factors such as fair skin (relative risk: 2.06) and atypical nevi (relative risk: 4), the risk of melanoma is also in doubled in first-degree relatives of those who have had melanoma. Frequently underappreciated, age is also an important risk factor, specifically in men (increase by a factor of 2 in men 50–59 years of age, increase by a factor of 4 in men 60–69 years of age, and increase by a factor of 7 in men more than 70 years of age). With a predominantly Anglo-Saxon aging population, including 6.3 million men more than 50 years of age, the demographics of the population therefore suggest potential for concern in Canada.

3.2 Environmental Factors and Lifestyle Choices

Environmental factors—specifically UV light exposure—also play an important role in the cause and course of melanoma. Exposure to UV radiation is the major accepted modifiable variable in melanoma causation. Excessive exposure to natural or artificial UV radiation through certain occupations or lifestyle choices such as use of tanning beds is the largest environmental contributor to melanoma risk. In 2009, the International Agency for Research on Cancer of the World Health Organization announced that it had placed UV tanning beds into its highest cancer risk category, “carcinogenic to humans,” thereby ranking them equal to well-known carcinogens such as asbestos and tobacco. In fact, the most recent meta-analysis of 27 studies from 1981 to 2012 suggested that the risk of developing melanoma is increased by...
20% for those who have ever used an indoor tanning device with ultraviolet light, a risk that rises to 87% if those individuals started their use before they were 35 years of age. Access to and use of tanning beds remains unregulated in most provinces in Canada, and although Health Canada has guidelines for tanning salon owners, which state that children under 16 years of age should not use tanning equipment and that minors under 18 require parental consent, the guidelines are frequently ignored in Canada and are generally ineffective elsewhere. Victoria, British Columbia, became the first Canadian municipality to introduce a bylaw banning minors under 18 years of age from tanning bed use, and the B.C. government will enact a province-wide law this fall restricting the use of tanning beds by those under 18 unless directed by a physician. Manitoba requires that minors have written parental consent to use tanning beds, and Quebec has implemented a ban for minors. The Nova Scotia Tanning Beds Act was proclaimed in May 2011. Its legislation was the first to ban youth access to tanning beds for anyone under 19 years of age. In Ontario, because of grassroots lobbying, a ban has recently been enacted in Oakville. However, since 2008, three sequential bills in the provincial legislature have been tabled for consideration, but have not proceeded to passage. In May 2011, its legislation was the first to ban youth access to tanning beds for anyone under 19 years of age. In Ontario, because of grassroots lobbying, a ban has recently been enacted in Oakville. However, since 2008, three sequential bills in the provincial legislature have been tabled for consideration, but have not proceeded to passage.

By contrast, Australia, France, Germany, Austria, and the United Kingdom have banned indoor tanning for those younger than 18. Australia has also banned such use for anyone with very fair skin, and Brazil has completely banned the sale of tanning beds for aesthetic purposes.

3.3 Physician Practices—Number and Distribution

Physicians potentially have two roles in melanoma education: patient counselling and diagnosis. To date, no study has directly examined whether counselling interventions in the primary care setting can reduce skin cancer incidence. Recent systematic evidence updated by the United States Preventive Services Task Force concluded that evidence does suggest that counselling in the primary care setting can help to increase sun-protection behaviours in adults and young adolescents.

With regard to diagnosis, dermatoscopy is currently the “gold standard” for the early detection of melanoma. It is generally carried out in Canada only by dermatologists familiar with the technique. However, even without the use of dermatoscopy, dermatologists have a higher rate of accuracy in correctly diagnosing melanoma (sensitivity: 0.81–1.00) than do primary care physicians (sensitivity: 0.42–1.00). In fact, greater dermatologist population density is associated with lower melanoma mortality rates, and a greater distance between melanoma patients and their dermatologists is associated with a more advanced stage of melanoma at the time of diagnosis. Indeed, a study in Nova Scotia found that patients who regularly visited their family physician 2–5 times during a 2-year interval before diagnosis were 66% less likely to be diagnosed with thick melanoma and had a better prognosis than did those who saw their family physician at a lesser frequency or not at all.

It remains a point of substantial concern that Canadian family medicine programs provide limited general formal training in dermatology, despite the increasing incidence and burden of melanoma in Canada over the last 20 years, and that relatively few dermatologists are available to serve the Canadian population. In 2001, Canada had 1.5 dermatologists per 100,000 people compared with 3.5 per 100,000 in the United States. By 2011, the number of Canadian dermatologists was expected to drop to 1.1 per 100,000 if the status quo number of resident positions and teachers was maintained. Dermatologists are not evenly distributed across Canada (urban: 507; rural: 3), and a 2006 survey suggested that more and more physicians are increasing the urban component of their practice while decreasing the rural component (urban area increasing to 95% from 89%, and the rural component decreasing to 16% from 19%)..

Further statistics about access to dermatology care are sobering for patients with skin cancer. In particular, in a national survey conducted in 2011, the Melanoma Network of Canada reported that 55% of patients had to wait longer than the accepted benchmark of 2 weeks to be seen by a dermatologist for a suspected cancer diagnosis.

4. CURRENT CANADIAN INITIATIVES

Population screening for melanoma is generally not considered cost effective even though several professional organizations recommend it. One of the most cost-effective ways of reducing the rising incidence of cutaneous melanoma is therefore to implement effective guidelines, campaigns, and public policies.

An integrated approach to sun safety has been implemented in both Australia and the United Kingdom. From 1980 to 1988, Australia had a population-based skin-cancer prevention program known as Slip! Slop! Slap! After 1988, the country implemented the SunSmart initiative. Since the inception of SunSmart, positive changes in sun-related attitudes and behaviours, and a reduction in the prevalence of sunburn have been observed. After several decades of an increasing melanoma incidence in Australia, the rate of increase has slowed and is beginning to plateau.

The National Institute for Health and Clinical Excellence in the United Kingdom has guidelines...
that focus on preventing skin cancer through the use of public information, the provision of sun protection resources, and physical changes to the environment. The guidelines focus on national mass-media campaigns: developing and evaluating information and interventions, tailoring messages for specific audiences, protecting the workplace, and providing shade as part of the design of new buildings.

In Canada, these more comprehensive approaches are limited, both at the national and the provincial level. Simple interventions such as the UV index—launched in 1992 by Environment Canada and reported as part of the local weather forecast—is well utilized. Almost half of all Canadians (49%) report that they check the UV index at least occasionally before spending time in the sun. Guidelines and fact sheets on the prevention of skin cancer and on sun or UV protection are also available from Health Canada at its Sun Safety Web page (http://www.hc-sc.gc.ca/hl-vs/sun-sol/index-eng.php). This program also encompasses the UV Index Sun Awareness Program, which focuses on educating children about the effects of UV radiation on skin. Since its inception in 1998, that initiative has reached more than 7700 teachers and 609,000 students, although its Web presence appears to be limited to 3 small pages.

Despite the guidelines, melanoma mortality data for Canada between 1971 and 2005 indicate an increasing trend paralleling the incidence, suggesting that efforts to date have had limited, if any, efficacy. Indeed, attention and support for the guidelines and recommendations from individuals or concerned authorities have been somewhat muted. Their relatively low profile is limited to the Web or specific print media such as brochures and pamphlets. In addition, relatively little effort has been aimed at educating Canadians about the dangers of sun exposure on sun vacations, during which the risk of intermittent sunburn is the greatest.

Given this relative inaction at the federal and provincial levels, the call for melanoma prevention has been taken up by a number of grassroots organizations and dermatology professional associations.

The Canadian Dermatology Association established the Sun Protection Program and Sun Awareness Program in 1989 to educate the public about skin cancer and its increasing incidence. Those programs target a diverse group of at-risk audiences such as outdoor workers and younger women with their Outdoor Workers Program and their Indoor Tanning Is Out Program respectively.

More recently, patient-based organizations have become involved. The David Cornfeld Melanoma Fund was set up in 2007 in memory of David Cornfeld, who succumbed to melanoma at the age of 32. The fund is dedicated to raising awareness of melanoma, and in 2010, it launched several campaigns including the Dear 16-Year-Old Me video. This 5-minute film calls on its viewers to use sun protection. It is hosted on YouTube and went “viral” with more than 1 million hits in the first week of the campaign and more than 100,000 user visits to the David Cornfeld Melanoma Fund Web site. The film has now reached approximately 6 million views since its launch on May 2, 2011. It has also been translated into four languages. The Save Your Skin Foundation, based out of Vancouver (http://www.saveyourskin.ca/), is an organization that raises funds for promoting awareness and research into skin cancer. The Melanoma Network of Canada (http://www.melanomanetwork.ca) was founded in 2009 with a goal to “respond to the need for patients in Canada to have a nationally-based organization to coordinate educational and prevention efforts, provide a strong voice for advocacy, and assist in efforts to target funding for melanoma research.” It has been instrumental in the introduction of tanning bed legislation at the Ontario provincial level, in providing Ontario-based educational seminars, and, recently, in partnering with the Canadian Institutes of Health Research to promote Canadian-based melanoma research. Finally, the Canadian Skin Patient Alliance (http://www.skinpatientalliance.ca) has a general focus on dermatology care and has made significant contributions to an understanding of the patterns of dermatology care in Canada.

5. FUTURE DIRECTIONS

There is a great need for a more coordinated approach to melanoma prevention in Canada. Rising economic and societal costs suggest a need for a coordinated national plan, with an emphasis on the country’s youth, for whom the long-term impact is likely to be the greatest. For example, nearly all Canadian children 1–12 years of age (94%) spent at least 30 minutes in the sun each day. However, the regular use of sun protective measures is prevalent only in children 1–5 years of age, and those protective sun behaviours are continued less frequently as they get older. A nationwide sun protection program targeting parents and teachers, with a specific emphasis on schools, playgrounds, summer camps, and “sun” vacations, is a needed priority in Canada. Such an investment would have both public health and economic benefits. A recent economic evaluation of Australia’s 20-year SunSmart skin cancer prevention campaign found that a long-term investment in preventive sun exposure campaigns provides excellent value for money. Every AU$1.00 invested returned approximately AU$2.30.

The rising incidence of melanoma has led to increased awareness of the disease and identification of melanoma as a significant public health issue across the developed world. Many countries have already implemented broad-based preventive measures, but Canada is still in the early stages of promoting
melanoma awareness (often lagging behind other developed countries), and has no nationally coor-
dinated approach and little action since a national consensus meeting in 1994.49 The reasons are likely multifactorial, including a perception that the climate is protective “enough,” lobbying from the tanning industry, and undoubtedly, political “off-loading” between federal and provincial agencies.

With the recent developments in melanoma care and the continuing increase in melanoma incidence in the Canadian population, further action is needed to ensure adequate and appropriate prevention. Given the high economic and societal impacts of this dis-
ease, educational efforts have to increase and to be broadly available through community, workplace, school, and home-based interventions.

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7. CONFLICT OF INTEREST DISCLOSURES

AMJ is a board member of the Melanoma Network of Canada.

8. REFERENCES


Correspondence to: Anthony Michael Joshua, Princess Margaret Hospital, 5th Floor, Room 5-101, 610 University Avenue, Toronto, Ontario M5G 2M9. E-mail: anthony.joshua@uhn.ca