Preventive Medicine 111 (2018) 225–230

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Intentional tanning among adolescents in seven Canadian provinces: Provincial comparisons (CRAYS 2015)☆

V. Nadalin[a,*], L.D. Marrett[b], C. Cawley[b], L.M. Minaker[c], S. Manske[c,d]

[a] Population Health and Prevention, Cancer Care Ontario, Canada
[b] Aboriginal Cancer Control Unit, Cancer Care Ontario, Canada
[c] Propel Centre for Population Health Impact, University of Waterloo, Canada
[d] School of Public Health & Health Systems, University of Waterloo, Canada

ARTICLE INFO

Keywords:
Adolescent
Ultraviolet rays
Prevention and control
Legislation
Suntan

ABSTRACT

This report explores intentional tanning behaviors among Canadian high school students in light of provincial restrictions on UV tanning device use among youth. Data are from the Cancer Risk Assessment in Youth Survey (CRAYS), collected from January to December 2015, at randomly selected high schools in 7 provinces. Relevant variables were: tanning methods ever used, demographics, and location and refusal of UV tanning device (beds, lamps) use in the past 12 months. Data were weighted so total survey weights by male/female, grade and province equal actual enrolments in these groups. Analyses were conducted in SAS, mostly for grades 10 and 11. Rao-Scott chi squared tests and *p*-values were calculated. Among 6803 grade 10 and 11 participants, 82% tanned intentionally, mostly by being/playing outside, or laying in the sun. Spray/self-tanners were used by 15% of participants. UV tanning device use was uncommon (4.4%), lowest in Ontario (2.7%) and British Columbia (3.8%), which have legislation against use among youth. Of 202 who used UV tanning devices in the past 12 months, most did at salons/studios (85%), 35% at home and 30% at a gym. Two hundred and forty-nine participants (3.4%) were refused use of UV tanning devices in the past 12 months. While legislation appears to deter UV tanning device use, it appears to have no impact on UV exposure among high school students overall. Greater prevention efforts are required to deter intentional tanning among high school students.

1. Introduction

In recent years, the incidence of melanoma and non-melanoma skin cancers (NMSC) has been increasing in Canada. Between 1986 and 2010, melanoma incidence rates increased by 2% a year in males, and by 1.5% a year in females (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). In Canada, melanoma is one of the most commonly diagnosed cancers among youth and young adults (8%), and NMSC accounts for at least 40% of new cancers diagnosed (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014; Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2016). The main risk factor for skin cancer is exposure to ultraviolet (UV) radiation (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014), sources of which include sunlight and exposure to UV tanning devices (tanning beds or lamps).

Because North American adolescents engage in all tanning behaviors and are frequent users of UV tanning devices (Qutob et al., 2017; Buller et al., 2011; Nadalin et al., 2016; Harland et al., 2016), a recent trend in skin cancer prevention, both internationally and in Canadian provinces, has been to limit access to UV tanning devices among youth, either through parental consent requirements or age restrictions (Government of Ontario, 2013; Pan & Geller, 2015). While laws restricting youth access to UV tanning devices might be effective, they require enforcement (Pan & Geller, 2015; Watson et al., 2013)and it is unclear if laws result in less UV radiation exposure overall, or merely lead to different patterns of exposure. At the time the data for this study were collected, some Canadian provinces limited UV tanning device use among those under age 18, some under age 19; Alberta did not have legislation; Saskatchewan was transitioning from parental consent requirements to an age-based ban; and the fines for violating these laws varied across provinces (Nadalin et al., 2016; Harland et al., 2016; Government of Newfoundland and Labrador, 2013; Government

☆ Data used for this research were from the Cancer Risk Assessment in Youth Survey (CRAYS) which was conducted by the Propel Centre for Population Health Impact at the University of Waterloo. Funding for CRAYS included a Prevention Research Grant of the Canadian Cancer Society Research Institute (grant #703073) and the Canadian Institutes of Health Research - Institute of Cancer Research (grant #137732).

* Corresponding author at: Cancer Care Ontario, 620 University Avenue, Toronto, Ontario M5G 2L7, Canada.
E-mail address: Victoria.nadalin@cancercare.on.ca (V. Nadalin).

https://doi.org/10.1016/j.ypmed.2018.03.004
Received 12 September 2017; Received in revised form 6 March 2018; Accepted 9 March 2018
Available online 19 March 2018

of British Columbia, 2011; Government of Québec, 2012).

At this time, the pattern of intentional tanning among Canadian youth is not known. In order to assess the impact of laws restricting the use of UV tanning devices, and plan preventive interventions around UV radiation exposure among youth, it is important to understand the current sources of exposure.

The objective of this report is to explore the pattern of intentional tanning among Canadian adolescents in seven provinces, including UV tanning device use, location and service refusal, and its association with other demographic characteristics, in light of the legislation in place at the time of data collection. Data used in this paper were collected in 2015 for the Cancer Risk Assessment in Youth (CRAYS) survey.

2. Methods

CRAYS 2015 was a paper-based school survey of Canadian high school students in seven provinces (British Columbia, Alberta, Saskatchewan, Quebec, Ontario, Nova Scotia, and Newfoundland and Labrador) that collected data on a range of health risk behaviors, to determine the impact of provincial policies on relevant behaviors. These same data were collected in 2017 and will be compared with the 2015 results. There are variations in high school grades across the country, therefore, grades for which data were collected varied. For British Columbia, Ontario and Saskatchewan, data were collected for grades 9 through 12; for Alberta, Newfoundland and Labrador, and Nova Scotia, data were collected for grades 10 through 12, and for Quebec, data were collected for grades 9 through 11. The age at which students are usually in a particular grade is the same across provinces. Due to the fact that only grades 10 and 11 are common to all seven provinces, most of our results are reported for these grades only.

The CRAYS questionnaire was developed through a series of meetings with subject matter experts in each area of interest and translated into French. Regarding UV exposure, the investigators were restricted to 5 main questions, and those selected were similar to what was asked in a recent study on adolescent tanning behavior in Ontario, so that results would be comparable (Nadalin et al., 2016). Once developed, the survey was pilot tested (in 2014) to assess student understanding of the questions, response to its logic and flow, and to determine the time required for completion. Nineteen youth participated in a pilot test and focus group, after which the questionnaire was modified significantly. Ethics approval was obtained from the Office of Research Ethics from the University of Waterloo.

School selection was by simple random sample drawn from the *Propel School Database* of schools in each province. The target population was private, public, and Catholic secondary school students. Schools and school boards were recruited through multiple methods, including email and follow-up calls. Schools without school boards were approached directly. In 2015, 74 schools within 46 school boards participated. Students were invited to participate and could opt out at any time; parental consent was active (written) or passive (assumed unless withdrawn) and determined by the school board. Teachers administered the questionnaire during class and completed questionnaires were placed in sealed envelopes, collected by a fellow student and sent back to Propel, where they were machine-scanned using Optical Mark Recognition technology.

Data were collected between January and December 2015 from 12,110 participants, which is 41% of the eligible student population. The questionnaire took approximately 35 min to complete and asked a range of demographic and risk factor questions. Intentional tanning questions asked whether students ever used or engaged in the following behaviors to get or keep a tan: being in the sun; spray tanning booth; self-tanning lotions or sprays; tanning bed/lamp; being outside/playing outside; other. Another question assessed the location of UV tanning device use, with response options: home/someone else's home; tanning salon/studio; beauty or hair salon/spa; gym/fitness club; other. Refusal of UV tanning device use was also assessed. Urban/rural status was determined by the postal code of the school, using census definitions.

Table 1
Demographic characteristics of participants, seven Canadian provinces (2015).

Characteristic	Total sample, % (n)	Grades 10 and 11, % (n)
Female/male		
Female	50.2 (6076)	51.6 (3508)
Male	49.8 (6034)	48.4 (3295)
Grade		
9	23.8 (2883)	–
10	28.9 (3499)	51.4 (3499)
11	27.3 (3304)	48.6 (3304)
12	20.0 (2424)	–
Residence		
Urban	69.7 (8446)	68.8 (4683)
Rural	28.4 (3434)	29.5 (2006)
Ethnicity describe themselves as[a]		
White	78.6 (9513)	79.0 (5373)
Black	3.7 (449)	3.6 (245)
West Asian/Arab	1.4 (173)	1.3 (90)
South Asian	2.2 (271)	1.9 (130)
East/Southeast Asian	9.1 (1106)	9.6 (650)
Latin American/Hispanic	1.9 (229)	1.8 (121)
Aboriginal	7.1 (855)	7.3 (496)
Other	4.4 (533)	4.0 (273)
Age		
11	0.0 (10)	0.1 (4)
12	0.0 (3)	0.0 (1)
13	0.8 (104)	0.1 (40)
14	14.4 (1978)	1.2 (80)
15	25.1 (3131)	34.5 (2348)
16	26.7 (3371)	47.2 (3209)
17	23.9 (2634)	15.7 (1070)
18	7.5 (757)	1.0 (67)
19	1.6 (122)	0.3 (20)
Total	12,110	6803

[a] Multi-response option: students were instructed to mark all that apply. Sum of categories is greater than total sample size.

2.1. Statistical analyses

Data were weighted to present provincially generalizable estimates by male/female, grade and province of residence. Analyses were conducted in SAS 9.4 to obtain prevalence estimates for tanning behaviors. Rao-Scott chi-squared test *p*-values (a design adjusted Pearson chi squared test) were used to assess statistically significant differences based on male/female, grade, ethnicity and place of residence (province and urban/rural). Data were analyzed by grade as opposed to age, because the focus of this study is the overall pattern of intentional tanning of high school students as a peer group. Because those who are not in school were excluded, age would not have been suitable for analysis.

3. Results

The unweighted demographic characteristics of the sample of participants in seven provinces are shown in Table 1. About half (n = 6076, 50.2%) were female, half (n = 6034, 49.8%) were male, and participants predominantly attended urban schools (69.7%) and identified themselves as White (78.6%).

Table 2 shows weighted results for tanning methods ever used across seven provinces by demographic characteristics for grades 10 and 11. Ever having tanned intentionally was common in these grades; 81.8% had ever tried to get or keep a tan using any method. There was statistically significant variation by province, from 89.8% in Quebec to 74.4% in British Columbia. Relative to students who did not identify as White, students who identified as White more frequently reported