Work-time Sun Behaviours Among Canadian Outdoor Workers: Results From the 2006 National Sun Survey

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ABSTRACT

The objective of the study was to describe summer work-related sun behaviours among Canadian outdoor workers. Information on time in the sun and sun protection practices at work during the summer of 2006 were collected from 1,337 outdoor workers aged 16-64 years as part of the Second National Sun Survey. Proportions (and 95% confidence intervals) were estimated using procedures appropriate for complex survey designs. Twenty-six percent of all Canadians, 39% of males and 33% of those aged 16-24 years work outdoors during the summer. Although 41% spend four or more hours daily in the sun at work, just over half always or often protect themselves by covering their heads (58%), wearing protective clothing (56%) or wearing sunglasses (54%), and only 29% use sunscreen. Males and those aged 16-24 spend the most work time in the sun but are the least likely to use protection. The prevalence of outdoor work and sun behaviours varies among regions. Study findings confirm the need for strategies to reduce time in the sun and increase the use of sun protection among outdoor workers. In order to be effective, these strategies must include both enhanced workplace policies and practice, and increased individual use of sun protection.

Key words: Outdoor workers; solar radiation exposure; skin neoplasms

La traduction du résumé se trouve à la fin de l'article.

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Outdoor workers generally experience high levels of exposure to solar radiation,¹ the major cause of skin cancer.² Such exposure also increases the risk of other conditions, such as lip cancer and cortical cataract.³ In relation to skin cancer, outdoor work is most strongly associated with risk of squamous cell carcinoma and, to a lesser extent, basal cell carcinoma and melanoma,⁴ which together represent the most common malignancy in Canadians.⁵ Because of the nature of their work, outdoor workers may also have fewer options for avoiding or reducing sun exposure than people at leisure and are therefore an important group for skin cancer prevention strategies.

This report presents results from the Second National Sun Survey (NSS2) of adult Canadians and describes working time in the sun and sun protection practices for those engaged in outdoor work during the summer of 2006. These results can be used to inform the development of skin cancer prevention strategies and recommendations for outdoor workers.

METHOD

The Second National Sun Survey (NSS2)

The NSS2 was conducted between August and November 2006. The content and methods of sampling, data collection and basic analysis are described in detail elsewhere.⁶ Briefly, survey data were collected through a computer-assisted telephone interview administered to households selected through modified random digit dialing and containing at least one adult (aged 16 years of age and older). A total of 7,121 adults participated, with a response rate of 63%. Sampling was stratified by Canadian provinces, and sample allocation ensured that the sample size was adequate for basic analysis within each of six regions: Atlantic Canada, Quebec,

Ontario, Manitoba and Saskatchewan, Alberta and British Columbia. The territories (Yukon, Northwest Territories, Nunavut) were not included. NSS2 builds on the first Canadian sun survey (NSS1) conducted in 1996.⁷

Outdoor workers

Of the 7,121 NSS2 participants aged ≥16 years, 1,490 were "outdoor workers", defined as those who reported having a job that required them to work outdoors during the summer months of June, July and/or August of 2006. Analysis was restricted to outdoor workers who were aged 16-64 and not retired at the time of the survey (N=1,337).

For comparison purposes, NSS1 data were extracted for those aged 16-64,⁷ and the proportion reporting outdoor work in June to August 1996 was estimated.

Sun-related behaviours

Outdoor workers were asked about their average daily time in the sun between 11 a.m. and 4 p.m. when at work (response categories: <30 minutes, 30-60 minutes, 1-2 hours, 2-3 hours, 3-4 hours and 4+ hours). Extended work time in the sun was defined as 4+ hours daily.

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Conflict of Interest: None to declare.

Table 1. Estimated Daily Work Time in the Sun and Use of Sun Protection Among Canadian Outdoor Workers Aged 16-64, by Sex and Age

	Overall (N=1,330) % (95% CI)	Male (N=941) % (95% CI)	Female (N=389) % (95% CI)	16-24 Years (N=254) % (95% CI)	25-44 Years (N=568) % (95% CI)	45-64 Years (N=515) % (95% CI)
Daily work time in the sun						
<30 min	5 (3.9-7.0)	3 (1.9-4.6)	12 (7.2-16.4)	3* (0.1-6.3)	6 (3.3-8.4)	7 (3.9-9.1)
30-60 min	9 (7.2-11.0)	8 (5.9-10.2)	12 (8.5-16.3)	4* (1.7-6.8)	8 (5.2-10.2)	15 (10.3-18.7)
1-2 hr	19 (16.0-21.3)	16 (13.0-19.0)	27 (20.8-32.2)	17 (11.4-22.3)	21 (16.8-25.3)	17 (12.3-21.4)
2-4 hr	26 (22.7-28.7)	26 (22.2-29.4)	25 (20.1-30.9)	27 (20.2-33.0)	26 (21.3-30.6)	25 (19.8-29.7)
4+ hr	41 (37.6-44.6)	47 (42.7-51.1)	24 (18.6-29.0)	49 (41.8-56.4)	39 (34.0-45.0)	37 (31.4-43.2)
Sun protection: always/often†						
Covers head	58 (54.3-61.2)	62 (58.2-66.3)	44 (37.9-50.6)	55 (47.8-62.2)	59 (53.4-63.9)	59 (52.6-64.4)
Wears protective clothing	56 (52.4-59.5)	59 (55.0-63.4)	46 (39.9-52.4)	44 (36.6-50.8)	59 (53.2-64.0)	62 (55.6-67.5)
Uses sunscreen	29 (26.0-32.5)	20 (16.8-24.1)	56 (49.3-61.8)	29* (22.3-36.1)	31 (25.9-36.3)	26 (21.0-31.9)
Wears sunglasses	54 (50.0-57.1)	52 (47.4-55.8)	59 (53.2-65.5)	41 (34.0-48.2)	58 (52.9-63.7)	57 (50.8-62.5)

* Figures should be interpreted with caution: N≥10 but coefficient of variation 16.6%-33.3%.

† When in the sun for 30 minutes or more at work.

Using a 5-point Likert response scale ranging from “always” to “never”, outdoor workers were asked to report “...when you were at work and in the sun for 30 minutes or more, between 11 a.m. and 4 p.m., how often did you...” for each of four sun protective behaviours: *cover your head; use protective clothing such as a long-sleeved shirt, long pants, or a t-shirt; wear sunglasses; and use sunscreen on your face*. Sunscreen on the face is considered an indicator of overall sunscreen use, since facial and body sunscreen use are highly correlated in outdoor workers (NSS1, unpublished). For each sun protection behaviour, the proportion of outdoor workers who reported always or often engaging in that behaviour was estimated.

Seven subjects had some missing sun behaviour data, leaving 1,330 outdoor workers for these analyses.

Statistical analysis

Proportions and their 95% confidence intervals (CI) were estimated using complex survey procedures in SAS 9.1 (SAS Institute, Cary, NC) and STATA 10.0 (StataCorp., College Station, TX) with weights adjusted for the probability of household and respondent selection, and were post-stratified to the 2006 regional age/sex distribution of Canadians.⁶ Tests of association were based on the adjusted Wald method.

For comparisons among regions (and with NSS1), proportions were age-standardized to the Canadian 2001 population using weights for age groups 16-24, 25-44 and 45-64.⁸

RESULTS

Approximately 26% (N=1,337) of Canadians aged 16-64 years report having a job that required them to work outdoors during the summer of 2006. Outdoor workers are predominantly male (75%).

The proportions of adult Canadians who are outdoor workers differ between sexes and among regions (Figure 1). Overall, a significantly greater proportion of males than females are outdoor workers (39% vs. 13%, respectively, $p<0.001$); this is true within every region ($p<0.001$).

A significantly lower proportion of those from Quebec and Ontario report being outdoor workers (23%), compared with those from western Canada (Manitoba and Saskatchewan 35%, British Columbia 33%, Alberta 29%) and Atlantic Canada (29%). Similar regional patterns are evident for both males and females.

A significantly higher proportion of Canadians aged 16-24 years (33%) are outdoor workers than those aged 25 to 64 years (24%) ($p<0.001$).

Sun-related behaviours

Overall, 67% of outdoor workers spend 2 or more and 41% spend 4 or more working hours in the sun daily. Males spend more work time in the sun than females (Table 1); significantly more males than females spend 2 or more hours in the sun daily (73% vs. 46%, $p<0.001$), and the difference is even greater for 4 or more work hours in the sun (47% of males and 24% of females, $p<0.001$). This male-female difference is significant only among workers aged 25 years or older (data not shown). Younger workers (aged 16-24 years) are significantly more likely to spend 4 or more hours in the sun than those aged 25 years or older (49% vs. 39%, respectively, $p=0.013$).

Slightly more than half of all outdoor workers always or often cover their head (58%), wear protective clothing (56%) or wear sunglasses (54%) at work; less than one third (29%) always or often use sunscreen (Table 1). Sun protection preferences at work differ by sex: males are significantly more likely to cover their heads (62% of males vs. 44% of females, $p<0.001$) or wear protective clothing (59% of males vs. 46% of females, $p=0.002$), whereas females are significantly more likely to use sunscreen (56% of females vs. 20% of males, $p<0.001$) or wear sunglasses (59% of females vs. 52% of males, $p=0.023$).

Sun protection practices are similar for outdoor workers aged 25-44 and 45-64. However, compared with those aged 25 years and older, younger workers are significantly less likely to wear protective clothing (44% of younger vs. 60% of older outdoor workers, $p<0.001$) or sunglasses (41% of younger vs. 58% of older outdoor workers, $p<0.001$).

There were no significant differences among regions in the proportions of male outdoor workers spending 4 or more hours in the sun per day at work nor in any specific sun protection practices (data not shown). (Sun-related behaviours were examined regionally for male outdoor workers only because of the small number of female outdoor workers and the sex differences in these behaviours for Canada as a whole.)

DISCUSSION

About 26% of Canadians aged 16 to 64 years report having a job that required them to work outdoors during summer 2006. This is significantly higher than in 1996, when 21% of those participating in NSS1 worked outdoors during the summer months. Almost all (95%) of those reporting outdoor work in 2006 spent 30 or more minutes in the sun daily during work time; only 50%-60% of these

Figure 1. Estimated proportion* of Canadians aged 16-64 working outdoors during the summer, 2006, by region and sex (N=1,337)

* Age-standardized to the 2001 Canadian population.

† Atlantic includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

always or often covered their heads, wore protective clothing or wore sunglasses; and only 29% used sunscreen. Forty-one percent spent extended time in the sun (4 or more hours) on a daily basis. The majority (75%) of outdoor workers were male, and they spent more time in the sun than their female counterparts. Younger outdoor workers (under age 25) were more likely to be in the sun than those who were older and were in general less likely to use sun protection than older workers.

These findings are consistent with other studies showing that outdoor workers experience high levels of sun on a routine basis.¹ Differences in work time in the sun between the sexes and among age groups may relate to differing types of jobs or job requirements. In their review, Glanz et al.¹ note that, as in NSS2, preferred sun protection practices differ between male and female outdoor workers, males being more likely to wear hats and females to use sunscreen. They found also that methods of sun protection varied across occupational groups. This could not be examined in NSS2 because no data were collected about type of outdoor work.

Leisure-time sun behaviours mirror those associated with work: males and young adults (aged 16-24 years) spend more leisure time in the sun than females and those who are older; females are more likely than males to use sunscreen; and younger people (ages 16-24) are less likely than older adults to use sun protection.⁹

The proportion of adults who are outdoor workers varies significantly across the country. Lower proportions in Ontario and Quebec may reflect different types of jobs than elsewhere. For example, those living on farms in 2006, an indicator of one kind of outdoor work, made up 1.5% of the Ontario population compared with 11.5% in Saskatchewan.¹⁰ NSS2 did not collect information on type of outdoor job, thereby prohibiting further investigation of this issue.

This is the first study since NSS1, conducted in 1996, to describe summer work time in the sun and sun protection behaviours in a broad sample of Canadian outdoor workers. As with any scientific study, it has strengths and limitations. The substantial number of survey respondents (over 7,000) and the regional allocation of the sample have produced a relatively large number of outdoor workers, enabling examination of demographic factors in relation to sun behaviours. However, questions about outdoor work were only a

small part of the survey, and details such as type of work, sun-related policies in the workplace and specific details of head covering and protective clothing were not captured. While the survey was designed to be representative of the Canadian adult population, certain groups are under-represented, including non-Caucasians, those born outside Canada and those with lower levels of attained education.⁶ As a result, the sample may not be truly representative of the outdoor worker population.

NSS2 results suggest that 5,410,213 Canadians aged 16-64 (26%) may be required to work outdoors in the summertime. The high levels of sun exposure and low levels of protection among outdoor workers are of concern because of the strong link between excessive sun exposure and increased risk of skin cancer and some other diseases. These risks are at least partly associated with cumulative, life-time exposure to ultraviolet radiation; for those who work outdoors during the summer, when the sun's rays are strongest, work time sun exposure likely contributes substantially to overall lifetime dose.

These findings confirm the need for strategies aimed at outdoor workers to reduce time in the sun, including increased use of sun protection during both work and leisure time. In order to be effective, these strategies must include both enhanced workplace policies and practice, and increased individual use of sun protection. The Canadian Dermatology Association (CDA) currently recommends that employers schedule outdoor work tasks to limit midday sun exposure and provide employees with both structures to create shade and personal protective equipment (such as wide-brimmed hats, protective clothing with a high ultraviolet radiation protection factor, and broad-spectrum sunscreen with a sun protection factor of 30 or greater). The CDA also recommends that outdoor workers protect themselves by limiting their sun exposure at work as much as possible, including seeking shade during work breaks; wearing personal protective equipment throughout the workday; and using sunscreen, including reapplication when appropriate.¹¹

Further, since young adults are most likely to have outdoor jobs, spend extended time in the sun and use the least protection, strategies that are geared specifically to them should be developed.

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RÉSUMÉ

Notre étude vise à décrire les comportements au soleil liés au travail, en été, chez les travailleurs extérieurs canadiens. Nous avons recueilli des informations sur le temps passé au soleil et l'utilisation d'une protection solaire au travail durant l'été 2006 auprès de 1 337 travailleurs extérieurs âgés de 16 à 64 ans dans le cadre de la Deuxième Enquête nationale sur l'exposition au soleil. Les proportions (et les intervalles de confiance de 95 %) ont été estimées par des méthodes convenant aux enquêtes complexes. Vingt-six p. cent des Canadiens, 39 % des hommes et 33 % des personnes de 16 à 24 ans travaillent dehors l'été. Bien que 41 % passent quatre heures ou plus par jour au soleil au travail, un peu plus de la moitié seulement se protègent toujours ou souvent en se couvrant la tête (58 %), en portant des vêtements de protection (56 %) ou des lunettes de soleil (54 %), et à peine 29 % appliquent un écran solaire. Les hommes et les personnes de 16 à 24 ans passent le plus d'heures de travail au soleil, mais sont les moins susceptibles de se protéger. La prévalence du travail à l'extérieur et des comportements au soleil varie d'une région à l'autre. Les résultats de cette étude confirment le besoin de stratégies pour réduire le temps passé au soleil et pour augmenter l'utilisation d'une protection solaire par les travailleurs extérieurs. Pour être efficaces, ces stratégies doivent améliorer à la fois les politiques et les pratiques en milieu de travail et l'utilisation individuelle des mesures de protection solaire.

Mots clés : travailleurs extérieurs; exposition au rayonnement solaire; tumeurs de la peau