

Sustained impact of an occupational sun safety program 5-7 years on

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Abstract. Outdoor workers throughout the world are chronically exposed to large doses of solar ultraviolet radiation while on the job. Go Sun Smart (GSS) is an occupational sun safety program that educated and motivated employees in an outdoor recreation industry to reduce sunburns and improve sun protection. Assessment of continued use and impact of the program 5-7 years after initial distribution found that employees (n=2974) reported a) greater sun protection at employers that were still implementing sun safety messages and b) fewer sunburns at employers that originally received GSS through theory-based dissemination communication. Achieving sustained impact of occupational sun protection requires using sound behavior change strategies to convince employers to remain committed to employee sun safety education.

Introduction

Sustaining evidence-based public health programs is essential for achieving long-term health benefits and critical given national and local resource investment (Brownson, et al., 2012). The sustainability of efforts to educate and convince outdoor workers to practice sun protection is essential for several reasons. Outdoor workers are chronically exposed to ultraviolet radiation (UV), the primary cause of skin cancer. Non-melanoma skin cancer, i.e., basal and squamous cell carcinoma, is associated with outdoor work and an elevated risk of melanoma has also been observed (Bauer, Diepgen, & Schmidt, 2011). Workplaces are promising for promoting sun safety because many outdoor workers fail to protect themselves from the sun yet are outdoors for 4-8 hours per day and spend many years in these jobs, receiving chronically high UV exposure. Many outdoor workers spend considerable time outdoors off the job, adding to their high UV exposure. Reducing chronic UV exposure in outdoor workers is critical for skin cancer prevention efforts.



The Go Sun Smart Program

Go Sun Smart (GSS) is an occupational sun protection program developed in collaboration with the North American ski industry intended to prevent their employees from receiving high doses of UV. The communication in *GSS* advised employees to practice sun protection on the job including using sunscreen, sunglasses, hats, and protective clothing, seeking shade, and reducing time in the midday sun and to avoid sunburning.

In a randomized controlled effectiveness trial, *GSS*' multi-channel health communication program had beneficial effects on employees sunburning rates and long-term sun protection behaviors (Buller, et al., 2005). *GSS* advised employees to practice sun protection on the job including using sunscreen, sunglasses, hats, and protective clothing, seeking shade, and reducing time in the midday sun and to avoid sunburning.

The program message and materials were based on Diffusion of Innovation theory and principles of persuasive communication and contained 23 posters, small decals, magnets, outdoor signage, signage for ski/snowboard schools, brochures for employees and guests, a training program with script and PowerPoint slides, newsletter articles, and brief messages. With the success of *GSS*

Sample Dissemination Communication for Go Sun Smart



established, a second randomized trial was conducted to evaluate an industry dissemination practices in comparison to strategies designed to enhance use of *GSS* based primarily on diffusion of innovation theory (DIT). Two

dissemination strategies were compared and tested at 68 ski areas: (1) the "Basic Dissemination Strategy" (BDS) comprised of normal actions taken by the National Ski Areas Association to distribute safety programs to its members. BDS was used to distributed GSS to all member ski areas and served as the comparison condition and (2) the "Enhanced Dissemination Strategy" (EDS), that augmented the BDS with face-to-face contact between GSS project staff and ski areas' senior managers and support materials (see sample materials). It was determined that: GSS improved employee sun safety when disseminated: Employees who recalled a GSS message reported more sun protection than those not recalling one ($p<.001$). Recall was highest at ski areas receiving the EDS ($p=0.001$); sun protection increased when ≥ 9 GSS items were used ($p<0.032$) (Buller, et al., 2012). In this study, the results of a long-term follow-up, 5 to 7 years, on employees at the ski areas enrolled in the dissemination are reported.

Sample, Trial Design and Measures

Ski areas ($n=68$) that participated in the dissemination trial in 2005-07 were contacted and invited to participate in the follow-up study. 53 ski areas participated in the 2011-2012 season with one area delaying to 2012-2013 because of lack of snow.

In January-April 2012, the sustained use of GSS on employee sun protection was assessed. Project staff visited the ski area and employed an on-site observation protocol used in the dissemination trial to assess the number of GSS items being used for the current sustainability assessment. Other sun protection messages (employer-generated, commercial advertising) were also recorded. Three measures of program use were created: GSS items only, non-GSS items excluding commercial advertising, and total sun protection communication.

A questionnaire assessing was also distributed to employees during the resort visit. Employees were asked to report on their sun protection practices (use of hats, sunscreen, sunglasses, lip balm, clothing, limit time on the sun, use of shade); sunburn incidence in the last 3 months, if they recalled receiving a message on sun safety, if they had heard of the Go Sun Smart program, the number of years they had worked in the ski industry, if they worked mostly indoors or outdoors, job title, skin cancer history, age, race, sex, and education level.

Results of the Sustainability Assessment

Of the 53 resorts, GSS materials observed were ($37\leq 3$, $12=3-8$, $4\geq 9$) and all sun safety materials observed were ($31<4$, $11= 4-8$, $11\geq 9$). Employees ($n=2974$) completed the questionnaire on their sun safety behavior.

No differences were identified between the basic and enhanced condition for employee recall of having received sun protection messages. However, more employees in the

basic condition (21.44%) reported having a sunburn in the last month than in the enhanced condition (27.47%), $p=0.0138$). A signal detection technique in a receiver operator curve (ROC) analysis was used to detect the degree to which the number of GSS materials or total materials in use discriminated between employee reports of sun protection practices. Greater sun protection practices were identified at employers that were still implementing at least 9 GSS sun safety messages (employers with <9 GSS sun safety messages: 22.42; employers with ≥ 9 GSS sun safety messages: 24.12; $p=0.0373$) or 5 sun safety messages from any source (employers with <5 other sun safety messages: 22.08; employers with ≥ 5 other sun safety messages: 24.10; $p<.0001$).

Discussion

The use of both GSS and non-GSS sun safety materials five to seven years out from our last contact with the resorts was encouraging given the transitional nature of the ski industry. The differences in employee sunburning between the enhanced and basic dissemination conditions reflected the same effect between the intervention and control resorts in the first GSS effectiveness trial. The significant results of exposure to program materials on employee sun protection compared similarly to the results of the GSS dissemination trial indicating once again that dose of message exposure to public health information matters. Some sustained use of GSS occurred in the industry; however, the challenge remains to determine strategies, such as industry-wide policy adoption of sun safety practices that will sustain occupational sun safety over the long-term.

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