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Enhancing Industry-based Dissemination of an Occupational Sun Protection Program with Theory-based Strategies Employing Personal Contact

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Abstract

Purpose—Industry-based strategies for dissemination of an evidence-based occupational sun protection program, Go Sun Smart (GSS), were tested.

Design—Two dissemination strategies were compared in a randomized trial in 2004 – 2007.

Setting—The North American ski industry.

Subjects—Ski areas in the United States and Canada (n=69) and their senior managers (n=469).

Intervention—Employers received GSS through a Basic Dissemination Strategy (BDS) from the industry's professional association which included conference presentations and free starter kits. Half of the areas also received the Enhanced Dissemination Strategy (EDS), in which project staff met face-to-face with managers and made ongoing contacts to support program use.

Measures—Observation of program materials in use and managers' reports on communication about sun protection.

Analysis—The effects of two alternative dissemination strategies were compared on program use using PROC MIXED in SAS, adjusted for covariates using 1-tailed p-values.

Results—Ski areas receiving the EDS used more GSS materials ($M=7.36$) than those receiving the BDS ($M=5.17$; $F=7.82$, $p<.01$). Managers from more areas receiving the EDS reported communicating about sun protection in employee newsletters/flyers ($M=0.97$, $p=.04$), in guest email messages ($M=0.75$, $p=.02$), and on ski area websites ($M=0.38$, $p=.02$) than those receiving the BDS ($M=0.84$, 0.50 , 0.15 , respectively).

Conclusion—Industry professional associations play an important role in disseminating prevention programs; however, active personal communication may be essential to ensure increased implementation fidelity.

Keywords

sun protection; dissemination; implementation; occupational

Purpose

Outdoor workers constitute a large group that can benefit from sun protection to prevent melanoma and non-melanoma skin cancer (NMSC) caused by solar ultraviolet radiation (UV).¹ Career outdoor workers, many with vulnerable fair skin,^{1,2} receive excessive doses of UV^{3–8} over their worklife.^{8,9} Reducing chronic UV exposure through sun protection is critical for reducing NMSC^{10–15} and probably melanoma.^{10,16,17}

Go Sun Smart (GSS)¹⁸ is an occupational sun protection program developed in collaboration with the North American ski industry, whose employees receive substantial UV exposure.¹⁹ It contained signage (posters and signs for indoor and outdoor use) and brochures, a training program, and short messages for use in communication with employees (e.g., in newsletters). In a randomized controlled effectiveness trial, GSS significantly reduced sunburning among employees in the short term and improved sun protection over the longer term.^{20,21} GSS also benefited guests (both adults and children) while skiing and snowboarding.^{22–24}

Safety and health programs, like GSS, are often distributed to individual ski areas through their membership in industry professional associations such as the National Ski Areas Association (NSAA). In this study, we were interested in comparing the basic industry-based dissemination strategy (BDS) to an active, enhanced dissemination strategy (EDS) based primarily on Diffusion of Innovation Theory (DIT) in which the program was distributed free of charge to employers. In DIT, it is posited that organizational diffusion has two phases – adoption and implementation²⁵. Adoption includes agenda-setting (recognition of a problem and search for innovations to solve it), matching (evaluating fit between problem and innovation), and adoption decision. Once the adoption decision occurs, organizations engage in the stages of redefining/restructuring (adapting the innovation or changing the organization to improve the innovation's fit), clarifying (communicating changes to employees), and routinizing (making innovation part of organization's regular activities, i.e., institutionalizing it). Through organized efforts,

external change agents have successfully promoted adoption of disease prevention programs to diverse organizations²⁵.

To enhance adoption and implementation, active strategies by program purveyors are needed to maximize program use when health and safety programs from external sources such as industry associations or research groups are distributed.^{26–28} Because such programs are often loosely-bundled and give wide discretion in implementation and program adjustment,^{25,29–31} managers may find it irresistible to adopt only some or partial program components to conform to the organization's needs, context, and culture.^{30–35} Active strategies (such as in-person visits, recommendations and training for program implementation, and periodic reminders) can enhance program fidelity and implementation and reduce re-invention or the reconstruction of the program by organizations. This approach is particularly relevant for GSS, since the effectiveness trial revealed that higher program use was associated with greater employee sun protection.²⁰ In this paper, the primary findings from the dissemination trial regarding GSS adoption and implementation are presented.

Methods

Intervention

Go Sun Smart Program—GSS was prepared for dissemination through review of intervention items by the authors based on the effectiveness trial. The goal was to distribute GSS materials with a level of clarity and feasibility that would forestall the need to alter GSS during implementation.^{27,36,37} This review was performed using a Delphi Method,^{38,39} in which program items were rated on scales assessing graphic design, message, impact, and ease of use. Items with mean scores less than 5.0 (out of 10) on all of these items were eliminated and 23 program items were selected for distribution: large and small posters, small decals, magnets, outdoor signage, signage for ski/snowboard schools, brochures for employees and guests, a training program for use by managers with their work groups, newsletter articles, brief messages for use in email, grooming reports, and other ski area communication. All materials carried the GSS logo.

Dissemination Strategies—Two dissemination strategies were compared. First, the BDS, used by NSAA to distribute safety programs to its members, was applied to all member ski areas and served as the comparison condition. NSAA designated GSS as an industry “partner program” and it was promoted at informational booths at annual and regional NSAA trade shows (provided free of charge by NSAA), where project staff displayed sample GSS messages and distributed promotional materials, including magnets, lip balm, and post-it notes with the GSS logo and a 1-page informational tip sheet (see below). All ski areas received, free of cost, two starter kits of selected program materials each year over three years (6 free starter kits in total). NSAA and the project shared the cost of mailing the starter kits. In Year 1, ski areas received 9 posters (3 posters-3 ea.), 3 static clings, 3 base stake signs, 1 employee training CD-ROM, 1 CD-ROM with newsletters and other messaging recommendations, and 100 employee risk brochures. Year 2 starter kits included 12 posters (4 posters – 3 ea.), 3 base stake signs, 1 set of training CD-ROMs, 100 guest brochures, and 1 updated newsletter CD-ROM. In Year 3, 12 posters (4 posters-3ea), 3 static clings, 3 base stake signs, and 100 ski school brochures were distributed. All resorts, regardless of size, received the same amount of items. In addition to program materials, the first kit each year (at beginning of ski season in October/November) contained a letter from the senior author and NSAA President, a GSS Guidebook, and a catalog of GSS materials (also available the NSAA website). The second kit, mailed in January, contained 1-page informational tip sheets (also distributed at trade shows) based on DIT principles and

providing advice on implementation, addressing barriers, highlighting program success, and emphasizing leadership for sun safety. All starter kits contained a packing list, describing intended use of the included program items. If managers wanted more GSS materials, they could order them from NSAA for only the price of printing them.

Second, the EDS augmented the BDS with largely face-to-face contact between project staff and ski areas' senior managers. It was intended to maximize program adoption and use, based on well-documented principles deduced from DIT,²⁵ literature on dissemination of prevention programs,²⁶ and experience gained from the effectiveness trial. The enhanced strategies included one personal visit to each ski area during November through January by project staff. In meetings and presentations, project staff (1) attempted to reduce managers' uncertainty about GSS by noting the need for sun safety, reviewing its effectiveness, and describing how well it fit into extant ski area operations;^{25,40,41} (2) highlighted endorsements by industry professional associations to build credibility for GSS and program staff;^{42,43} (3) coached managers in skills for overcoming organizational barriers and resistance from coworkers to enhance public commitment from the managers responsible for using GSS;^{44–46} and (4) recruited internal champions to leverage support for GSS based on champions' interest in health and safety, tenure at the ski area, and/or ability to "get things done" (a few had a personal history of skin cancer).^{25,47} Project staff personally met with the manager responsible for GSS and/or CEO, made a presentation to senior managers, met individually with other managers as needed, and introduced GSS to groups of employees if requested (project staff only announced the program; managers were responsible for delivering sun protection education). A small number of the promotional materials including hats, magnets, lip balm, and post-it notes with the program logo were distributed to managers, which were intended to boost managers' commitment and remind them to use GSS. These items were not used to promote sun safety to employees and were not included as part of the program evaluation. Finally, (5) follow-up contacts by telephone and email with the responsible manager were made at least once a month through March designed to maintain commitment to GSS, support its use, and nourish interpersonal relationships between staff and managers.^{48,49}

Design

All ski areas in the NSAA membership received GSS through the BDS. The BDS began in May 2004 at the annual NSAA conference, where the NSAA President announced GSS as the newest partner program. Booths featured GSS at the annual national and the mid-year regional tradeshows in 2004, 2005, and 2006. Free GSS starter kits were mailed to the entire NSAA membership during the 2004–05, 2005–06, and 2006–07 ski seasons (two starter kits per season).

Beginning in 2004, ski areas were recruited to participate in the randomized trial comparing the BDS and EDS. Ultimately 69 ski areas were enrolled in the trial in three waves over three ski seasons (n=28 ski areas in 2004–05, 20 in 2005–06, and 21 in 2006–07). In each wave, the EDS began in October or November at half of the ski areas in the trial (n=33 ski areas; 12 in 2004, 11 in 2005 and 10 in 2006), randomly assigned by the project statistician after pretesting. The EDS ended in April of each year, when the ski areas closed. Thus, half of the ski areas in the trial received the BDS plus EDS and the other half, the BDS only.

Both on-site observations and surveys were performed assessing GSS use in the ski season when the ski areas were enrolled in the trial (ski areas enrolled in 2004–05 were observed in 2005 and managers were surveyed in 2004 and 2005 at the start and end of the season; those enrolled in 2005–06 were observed in 2006 and surveyed in 2005 and 2006; those enrolled in 2006–07 were observed in 2007 and surveyed in 2006 and 2007). Surveys of employees, guests, and parents were performed and will be reported elsewhere. Senior managers

completed a pretest survey in October – December and pretested managers were posttested in March – April. Survey invitations indicated that the chief executive officer (CEO) had agreed to have the ski area participate, participation was voluntary and confidential, and that managers could decline without harm. Surveys were performed online. In all years, non-respondents in both the BDS group and the EDS group were followed-up by telephone and in the third year, with mailed surveys. To increase posttest response, a \$5 gift card was included in the second and third years. Managers provided implied consent by completing the pretest survey. Posttest only observational procedures were conducted by trained project staff visiting each ski area once between February and April. All procedures were approved by the Institutional Review Boards of the authors' research firm and universities.

Sample

Worksites were recruited from NSAA member ski areas. Eligible ski areas were defined as those with a) two or more aerial chair lifts with ride times of at least five minutes (to interview guests); b) 100 or more employees (to survey at least 50 employees); c) summit elevation of 2500 feet or higher (to have increased UV levels); and d) a full-time general manager or equivalent (for recruitment). Ski areas in the previous effectiveness trial were ineligible. A total of 129 ski areas in 24 U.S. states and 4 Canadian provinces were eligible. An invitation letter signed by the senior author and President of NSAA was sent to each manager listed as the "NSAA contact" (usually the CEO) in August and investigators completed recruitment by telephone. Reasons for not enrolling were lack of time and interest or failure to be reached. A final sample of 69 ski areas (53%; n=28 in 2004, 20 in 2005, and 21 in 2006) enrolled (see Figure 1).

The NSAA contact at each ski area provided a list of senior managers responsible for area operations, workplace policies and work procedures (e.g., human resources, risk management, ski and snowboard school, ski patrol, mountain host, lift operations, mountain operations, marketing, lift maintenance, and base operations), and designated a manager to be responsible for implementing GSS. Senior managers (n=664) were contacted by mail and invited to complete baseline and follow-up surveys online in October – December and March – April, respectively. Managers who did not respond online were contacted by telephone or mail to complete the survey.

Measures

Observation of Use of Go Sun Smart—The primary outcome variable was a measure of the use of GSS collected through on-site observations by trained project staff, using a protocol from the effectiveness trial.²⁰ Each ski area was visited over two days and all printed GSS materials on display (i.e., 15 posters/signs, 3 brochures, 2 static clings and 1 logo magnet) and any other sun protection messages (e.g., commercial advertising) were recorded. Staff searched in all locations, including locations accessible only to employees (e.g., administrative offices, locker rooms, garages, chair lift shacks, ski patrol rooms). Staff noted where each item was located and whether it was in an employee-only area.

Two scores were calculated. A dichotomous measure of adoption was based on whether any GSS items were in use or not (yes v. no). All but four ski areas had adopted GSS (2 in EDS and 2 in BDS), so this measure was not analyzed. Instead, the primary outcome measure was the extent of use, i.e., number of GSS items observed (observed range=0 to 26 items).

The observational measure was validated in the 2005–06 ski season by having independent trained observers visit 14 ski areas unannounced, one week prior to the scheduled observation. There was high correspondence between project staff and the unannounced observer assessments on the number of materials in use ($r=0.87$, $p<.05$; discrepancies ranged

from +2 to -2, $F=0.44$, $p=.52$, staff mean=3.8, observer mean=4.6), confirming the validity of the project staff's observations.

Go Sun Smart Use Measured in Manager Surveys—The posttest surveys of managers included items assessing elements of program use that were difficult to observe. Managers were asked if they had communicated with employees about sun protection by publishing a message in employee newsletter, sending an email message, linking the GSS website to the ski area's website, or providing training or if they had communicated with guests about sun protection by publishing a message in a snow or grooming report, guest newsletter, flyer, whiteboard or electronic sign or sending a message by email or on the resort website (yes/no/don't remember). Managers' reports were validated by correlation with employees' reports of receiving sun protection messages at posttest (Table 1). That all correlations were positive suggested some degree of validity to managers' reports. However, the correlations varied from moderate to small and not all reached statistical significance. These findings may reflect variability with which each type of communication occurred and in employee's exposure to different workplace channels.

Process Measures on Enhanced Dissemination Strategy—Project staff completed a checklist assessing fidelity of dissemination activities during the in-person visits. They recorded number of meetings (with whom, duration, and topics), distribution and review of materials, managers' enthusiasm for GSS and willingness to implement and verbally support it, project staff's effectiveness, presence of internal champions, and meetings with employees.

Measures of Potential Covariates—Ski area characteristics were provided by the senior manager at the time of enrollment (see Table 2). Also, the mean number of hours of sunshine at each of the ski areas was obtained by consulting maps prepared by the National Weather Service. These variables were used as potential covariates in the comparison of BDS and EDS.

Analysis

The overall goal of the analysis was to compare the GSS use measures between the BDS and EDS from the ski areas that completed follow-up assessments. Analyses were conducted using Proc Mixed in SAS. Since only one ski area was lost to follow-up due to lack of snow, non-response bias was considered minimal and intent-to-treat analyses and imputation for the one missing ski area were not done. There were no missing data in the observational measure, beyond the one ski area that was lost. Managers' reports of use of GSS from the posttest surveys were compared between conditions adjusting for clustering within ski area, using responses collected from managers successfully followed up (i.e., no imputation was made for missing values), as this was a secondary measure. Finally, backwards stepwise regression was used to explore the influence of various aspects of the EDS (from process measurement) on program use.

Initially, BDS and EDS were compared without adjustments for year or any potential covariates. Next, a mixed-model analysis was performed with two between-subjects factors – dissemination strategy (EDS v. BDS) and year of participation (Year 1 v. 2 v. 3). No interactions between dissemination strategy and year were statistically significant so the reduced model was used for the remaining analyses. Three covariates were included that demonstrated large univariate relationships with GSS use, i.e., number of employees in the ski area (a measure of size), proportion of female senior managers, and mean annual number of hours of sunshine obtained from the National Oceanic and Atmospheric Administration.⁵⁰ The comparison between conditions was performed using a 1-tailed p-value of 0.05.

The sample size was planned using a 1-tailed test. While 1-tailed tests are not standard, we planned and tested a directional hypothesis that that EDS would be superior to BDS. We opted not to plan on interpreting any results indicative of the inferiority of EDS because failure to reject the null hypothesis in the 1-tailed test would lead to the same recommendation as in a 2-tailed test: recommend employing the BDS. Also, the 1-tailed test helped to control project costs by reducing the number of ski areas that needed to be enrolled, treated, and assessed.

Results

Profile of Participating Ski Areas

Table 2 describes the characteristics of the participating ski areas. They were located in all regions except Midwestern United States and eastern Canada (due to low summit elevations) and ranged from 200 to over 1000 employees. Most were privately owned. Four ski areas did not complete the trial in their initial year due to lack of snow, but continued the next year when on-site observations and manager posttests occurred. Only one ski area dropped out completely due to lack of snow (Figure 1).

Profile of Participating Managers

Of the 469 managers (226 at EDS and 243 at BDS areas) who completed the pretest (response rate=72%; 72% EDS, 69% BDS), 334 completed the posttest (171 in EDS and 163 in BDS; follow-up rate=71%; 74% EDS, 66% BDS) (Figure 1) and reported on their use of GSS. Most managers were middle aged, educated beyond high school, male, and non-Hispanic White (the ethnic group with the highest risk for developing skin cancer^{16,51}). Most managers also had a long history of working in the ski areas (10 years or more) and worked outdoors, with a third experiencing a sunburn and 10% having a history of skin cancer (Table 3).

Comparison of Observed Program Use by Dissemination Strategy

Ski areas randomized to receive the EDS had more use of GSS (unadjusted $M=7.36$ GSS items in use, $sd=5.58$) compared to ski areas in the BDS condition (unadjusted $M=5.17$ GSS items in use, $sd=4.67$), $Z=1.78$, $p=.04$ (1-tailed, unadjusted), $F=7.82$, $p<.0001$ (1-tailed, adjusted for year of participation, number of employees, ratio of female to male senior managers, and mean annual number of hours of sunshine) (Figure 2). Number of employees (Spearman Rank $r=0.25$, $p=0.04$), ratio of female to male managers ($r=0.29$, $p=0.02$), and mean number of hours of sunshine ($r=0.26$, $p=0.03$) had moderate positive associations with use of GSS ($r=0.26$, $p=.03$) so they were included as covariates.

Managers' Reported Use of Go Sun Smart at Posttest

Examining reported use by any manager at a ski area, GSS training was performed more at more ski areas receiving the EDS than the BDS to communicate about sun protection with employees and guests (Table 4). Also, more managers reported linking to the GSS website in the EDS than BDS dissemination strategy.

Process Analysis on Personal Visit in Enhanced Dissemination Strategy

Given the success of the EDS, analyses were performed within the EDS condition to determine which components of this strategy most accounted for improved use of GSS. Several actions during the visit were associated with improved use of GSS at posttest, including total number of meetings at ski area, Spearman Rank $r=0.40$, $p=.01$ [1-tailed]; meetings with key contact manager, $r=0.35$, $p=.02$; and meetings with key contact manager and general manager plus presentation to key managers ($r=0.44$, $p=.005$). Distribution of

more of the materials created for the EDS throughout the ski areas (both materials distributed, $r=0.37$, $p=.02$, and reviewed, $r=0.41$, $p=.005$) also was positively correlated with GSS use. Finally, ski areas where the general manager appeared to support GSS more enthusiastically during the project staff's visit had greater use of GSS ($r=0.48$, $p<.0001$). A backwards stepwise multiple regression analysis with number of female senior managers as a covariate (criteria for elimination $p>.10$) revealed that two actions during the visit most predicted increased use of GSS – total number of meetings (regression coefficient= 0.13 , $p=.01$) and meetings with the key contact manager (regression coefficient= 0.002 , $p=.03$; model $F[3,28]=6.46$, $p<.0001$, $R^2=0.41$).

Discussion

The EDS was effective in increasing overall use of GSS in ski area compared to the BDS or industry-based dissemination strategy. While the EDS, on average, increased program use by only two GSS items in the observational measure, it did activate managers to deliver more sun protection messages by conducting formal training of employees and linking to the GSS website. Further, analyses of the surveys of employees showed that exposure to messages on sun safety at the workplace increased when there were between six and nine GSS items observed in use at the ski areas (depending on whether they were in employee-only areas or anywhere in the ski areas). Exposure, in turn, was associated with improvements in sun protection⁵². As shown in Table 3, nearly three times as many ski areas reached the 9 or more GSS items threshold when receiving the EDS ($n=11$; 33% of EDS ski areas) than merely the BDS ($n=4$; 11% of BDS ski areas). If EDS had been used to disseminate GSS to all of NSAA's approximately 350 members, over 100 ski areas would have used GSS with sufficient fidelity to improve employees' sun safety.

A recent systematic review of dissemination of cancer prevention programs concluded that multi-model strategies incorporating active contact worked best.⁵³ Process analyses in the present study showed that the number of meetings with managers most influenced program implementation. The personal contact in EDS may have raised the profile of the program and the NSAA sponsorship. In-person visits may have made it more difficult to ignore occupational sun protection and GSS than NSAA mailings or displays at industry tradeshow booths.⁵⁴ Discussions with managers may have corrected misunderstandings about workplace sun safety and GSS.⁵⁴ These interactions could have clarified and given meaning to the communication about workplace sun safety by elevating need for such a program,²⁵ placing it in the context of similar industry-sponsored workplace safety efforts,^{55,56} and helping to translate this need into action by managers (i.e., use of GSS), a process referred to as social representation.^{57,58} Staff also sought public commitment for using the program during in-person visits, which should have made the decision to use GSS more difficult to reverse.⁴⁴⁻⁴⁶ The EDS may have reduced managers' uncertainty about implementing GSS by creating plans and working through potential barriers. The presence of an internal champion for GSS also should have helped reduce resistance among employees as it was implemented,^{25,47} although the number of champions identified at a ski area did not improve implementation. Perhaps, champions are more influential on whether a program continues rather than whether it is initially used. Finally, the personal visit, which many managers saw as an extension of the NSAA, created pressure to use GSS in exchange for the effort by program staff to spend time assisting managers (i.e., a reciprocity effect).^{48,49} Unfortunately, it was not possible to discern exactly which of these processes resulted in greater program use, but incorporation of active communication in dissemination efforts appears to be an essential means of improving program use.

Granted, the active dissemination strategy represented by the EDS had additional costs relative to the more passive BDS (roughly \$1700 versus \$150 per ski area). This cost may be

justified if it yields greater safety for three times as many employees. There may be ways to reduce its cost when taken to scale by, for example, providing training in group settings such as at industry conferences or utilizing web-based training and social networking technology instead of personal visits to each ski area.

Program dissemination to employers through a loosely-affiliated industry network created by the professional associations had both advantages and limitations. On the positive side of the ledger, these associations can be important intermediaries in dissemination.³⁵ Dues-paying members may expect professional associations to identify new safety issues (i.e., establish a need, in DIT terms²⁵), reduce their liability, and evaluate and endorse suppliers and programs that meet these needs (i.e., fit in and are feasible with members' operations, in DIT terms²⁵). Professional associations also have established communication channels to which members routinely attend and expect to receive credible and useful information. However, the effectiveness of NSAA's traditional methods of disseminating a safety program as operationalized in the BDS produced only modest program use, although most member ski areas adopted it at least minimally. The extent to which managers identified with NSAA may have influenced program implementation but the strength of this tie was not measured and should be explored in future research.

On the other hand, program use was highly variable, with four ski areas using no items and one area using 26 items. Given the autonomy of employers, we were only able to operationalize two core implementation components described by Fixsen and colleagues in the EDS:^{26,36} training and ongoing coaching and support. Research staff did attempt to obtain commitment for GSS and worked with managers to fit GSS into existing work procedures, part of the facilitative administration implementation component.^{26,36} Variation in program use may have been reduced if more core implementation components were operationalized (i.e., efforts to align GSS with the organization, input on managers selected to implement GSS, and/or provision of performance feedback).

There were several notable strengths and limitations to this study. Among the most prominent strengths was the participation of a large number of employers across most of North America that improved generalizability, the use of observational measures that avoided self-report biases, and the partnership with leading professional associations that provided a realistic context for testing the dissemination strategies. However, the study was limited to a single industry providing winter outdoor recreation, and employers in eastern, southern and western North America. UV radiation was low for part of the winter dissemination period at northern latitudes and in cloudy climates where some ski areas were located. However, the EDS remained more effective when adjusting for mean annual hours of sunshine. Future studies should examine the success of dissemination strategies for sun safety programs in summer recreation when UV is more intense.

Partnering with an industry professional association to disseminate an evidence-based worksite disease prevention program can be a successful strategy. Practitioners and funders should take advantage of their unique intermediary role. Still, the influence of professional associations alone may not achieve high program use. Personal communication and support of the end-users of these programs (in this case, managers) by experts who created the program and have experience with deploying it may be needed to ensure that prevention programs are well implemented and achieve the intended behavior change to promote health and deter disease.

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SO WHAT?

What is already known on this topic?

Outdoor workers are at risk for developing skin cancer and could benefit from sun protection. *Go Sun Smart* is one of a very few effective occupational sun protection programs. Active strategies may be needed to achieve high program fidelity when it is disseminated industry-wide.

What does this article add?

Findings are presented from a randomized trial enrolling 69 employers from a North American outdoor recreation industry. Industry professional association has some success when distributing *Go Sun Smart*, but program use was variable and relatively low. Active dissemination strategies by experts familiar with the program appeared to achieve greater use, perhaps by increasing attention to and decreasing uncertainty about the program, achieving commitment to use it, and helping overcome barriers to use.

What are the implications for health promotion practice or research?

Partnerships with professional associations may be essential for introducing evidence-based prevention programs into industries but normal communication channels may not achieve high use. Personal contacts by program experts may assist managers in seeing benefits from the program, planning for its use, and increasing actual use.

Figure 1.
CONSORT diagram for trial

Figure 2.
Observed number of Go Sun Smart items in use by Basic and Enhanced Dissemination Strategy

Table 1

Spearman Rank correlation of manager's reported use of Go Sun Smart with employee recall of receiving messages on sun protection on the job (n=65 ski areas)

Managers Reported Use of GSS:	Employee Recall of Sun Protection Message			
	Written	Spoken	Electronic	Training
Placed article in newsletter or flyer	0.19	0.03	0.36 [‡]	0.23 [*]
Sent message by email	0.23 [*]	0.11	0.48 [‡]	0.29 [‡]
Provided training	0.20	0.44 [‡]	0.13 [‡]	0.52 [‡]

^{*}
p<.10

[‡]
p<.05

[‡]
p<.01

Table 2

Characteristics of participating ski areas (n=68)

Characteristic	Total %	BDS %	EDS %
Region (states):			
North West (Idaho, Oregon, Washington, and British Columbia; n=9)	13	7	6
West (California; n=8)	12	6	6
Northern Rocky Mountains (Montana, South Dakota, Wyoming, and Alberta; n=6)	8	1	7
South West (Arizona, Colorado, New Mexico, and Utah; n=20)	30	15	15
North East (Maine, Maryland, New Hampshire, New York, Pennsylvania, and Vermont; n=19)	28	16	12
South East (North Carolina, Virginia, and West Virginia; n=6)	9	3	6
Ski Area Size (number of employees):			
Less than 250 (n=22)	33	15	18
250–499 (n=26)	38	22	16
500–999 (n=15)	22	7	15
1000 or more (n=5)	8	4	3
Percentage of Females in Key Manager Positions:			
0–24% (n=32)	48	48	49
25–49% (n=30)	45	46	42
50% or more (n=5)	7	6	9
Ownership Type:			
Individual Privately Owned Ski Area (n=52)	76	38	38
Multi-resort Corporate Ownership (n=16)	24	10	13

Table 3

Profile of sample of participating managers at pretest (n=469)

Characteristics	Total %	BDS %	EDS %
Age (Mean = 45.1, Std dev = 10.2):			
18–24	1.3	0.8	1.8
25–34	14.9	18.3	11.4
35–44	26.8	28.1	25.4
45–54	40.0	40.0	39.9
55–64	15.1	11.9	18.4
65 or older	1.9	0.9	3.1
Education:			
High school graduate or less	9.0	8.4	9.7
Trade, technical, or vocational education beyond high school or some college	31.4	30.8	32.0
College graduate or postgraduate degree	59.6	60.8	58.3
Hispanic Ethnicity:			
Not Hispanic/Latino	97.4	97.4	97.4
Hispanic/Latino	2.6	2.6	2.6
Race:			
Other or Mixed Race	3.6	3.8	3.5
White	96.4	96.2	96.5
Gender:			
Male	74.2	75.1	73.2
Female	25.8	24.9	26.8
Years Working in Ski Industry:			
1 year or less	1.7	1.7	1.7
2–3 years	3.6	5.0	2.2
4–10 years	20.1	18.9	21.3
11 or more years	74.6	74.4	74.8
Work Environment:			
Mostly indoors	37.1	37.9	36.3
Mostly outdoors or equal indoors and outdoors	62.9	62.1	63.7
History of Skin Cancer:			
No	90.2	90.3	90.0
Yes	9.8	9.7	10.0
Number of Sunburns in Previous Ski Season (Mean = 1.6; Std dev = 3.3):			
None	54.7	54.7	54.8
1	15	13.8	16.2
2–5	24.1	25.5	22.6

Characteristics	Total %	BDS %	EDS %
6–10	4.2	5.2	3.2
More than 10	2.0	0.8	3.2

Table 4

Proportion (and standard deviation ^{*}) of managers who reported use of Go Sun Smart by Basic and Enhanced Dissemination Strategy

Managers Reported Use of GSS:	BDS	EDS	p[†]
N	32	32	
Placing an article in an employee newsletter or flyer	0.544 (0.33)	0.620 (0.28)	0.159
Sending a message to employees by email or on ski area website	0.366 (0.29)	0.350 (0.25)	0.407
Providing any sort of training to employees	0.621 (0.28)	0.774 (0.20)	0.006
Placing an article or message for guests in a snow or grooming report, guest newsletter, flyer, whiteboard or supersign.	0.329 (0.27)	0.389 (0.29)	0.197
Sending a message to guests by email or on ski area website	0.166 (0.23)	0.255 (0.23)	0.058
Linked GSS website to ski area website	0.036 (0.10)	0.111 (0.19)	0.023

^{*} Standard deviations of the proportions are presented for simplicity.

[†] 1-tailed p-values.