Community Preventive Services Task Force

Preventing Skin Cancer: Interventions in Outdoor Occupational Settings

Task Force Finding and Rationale Statement

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Task Force Finding and Rationale Statement

Intervention Definition

Interventions in outdoor occupational settings to promote sun protective behaviors among workers include at least one of the following:

- Educational approaches (e.g., providing informational messages about sun protection to workers through instruction, small media such as posters or brochures, or both)
- Activities designed to influence knowledge, attitudes, or behavior of workers (e.g., modeling or demonstrating behaviors)
- Environmental approaches to encourage sun protection (e.g., providing sunscreen or shade)
- Policies to support sun protection practices (e.g., requiring sun protective clothing)

Task Force Finding (August 2013)

The Community Preventive Services Task Force recommends interventions in outdoor occupational settings to prevent skin cancer based on strong evidence of effectiveness in increasing outdoor workers' sun protective behaviors (e.g., use of sunscreen or sun protective clothing or combination of sun protective behaviors) and reducing sunburns.

Rationale

Basis of Finding

The Task Force finding is based on evidence from a Community Guide systematic review published in 2004 (Saraiya et al., 7 studies with behavioral outcomes; search period January 1966 – June 2000) combined with more recent evidence (8 studies, search period June 2000 – April 2013). Based on this updated review, the Task Force recommendation was changed from insufficient evidence to strong evidence of effectiveness. The table summarizes results from the updated search period for selected outcomes.

Summary of Results from Updated Search Period

Review Outcomes	Summary Effect Estimates
Sunscreen Use	Median increase: 8.0 pct pts (Range: 7.0 pct pts to 10.1 pct pts); 3 studies
Hat Use	Median increase : 8.8 pct pts (Range: 4.8 pct pts to 11.0 pct pts); 4 studies
Sunburns	Median decrease: -5.2 pct pts (Range: -7.0 pct pts to -3.0 pct pts); 3 studies

Pct pts = percentage point difference in proportion of workers reporting outcomes

Eight studies from the updated search period assessed effectiveness of interventions on a number of outcomes including sun protective behaviors, sunburns, UV exposure, and skin cancer risk among outdoor workers. All eight studies evaluated intervention effects on at least one sun protective behavior and found consistently favorable results for use of sunscreen, hats, sun protective clothing, and combined sun protective behaviors. Effect estimates for sunscreen use, hat use, and sunburns are reported in Table 1. Additionally, one study reported that intervention group workers were more likely to report using sunscreen (OR:1.43; 95% CI=1.20 – 1.71) or a hat (OR:1.01; 95% CI=0.86 – 1.18) than were workers in the control group (Andersen et al., 2008).

Four of the included studies examined intervention effects on sunburns and found favorable results (Andersen et al., 2008, Hall et al., 2008, Hiemstra et al., 2012, Woolley et al., 2008). One study found that workers effected by a policy intervention reported fewer sunburns (mean: -0.2/person) and severe sunburns (mean: -0.7/person) in the last month than did workers in the control group (Woolley et al., 2008).

Included studies evaluated interventions in different types of outdoor work settings. Four of the studies targeted workers in recreational settings (Andersen et al., 2008, Glanz et al., 2002, Hall et al., 2008, Hiemstra et al., 2012,), two included U.S. postal workers (Mayer et al., 2007, Mayer et al., 2009) and two targeted highway or road workers (Stock et al., 2009, Woolley et al., 2008). Six studies evaluated effectiveness of multicomponent interventions that implemented educational and environmental approaches. Only one study evaluated effectiveness of education alone (Stock et. al., 2009), and one study assessed effects of a mandatory worksite policy (Woolley et al., 2008).

Three studies assessed intervention effects on workers' use of protective clothing and found favorable results. One study reported a 23.4 percentage point increase in the proportion of lifeguards who wore shirts with long sleeves following the intervention (Glanz et al., 2002). Another study evaluated a policy-based intervention and found 81% of outdoor workers in the intervention group reported wearing long-sleeved shirts during work as compared with 29% of workers in the control group (Woolley et al. 2008). And one study found outdoor workers in the intervention group more often reported wearing sun protective clothing than did workers in the control group, though the results were not statistically significant (OR:1.10; 95% CI = 0.93 - 1.30; Andersen et al., 2008). This study also found that workers in the intervention group were less likely to report seeking shade during peak hours (OR:0.94; 95% CI = 0.80 - 1.11; Andersen et al., 2008).

Four studies evaluated intervention effects on composite sun protective behaviors (Hall et al., 2008, Hiemstra et al., 2012, Andersen et al., 2008, Stock et al., 2009). Although different measurements and sun protection questions across the studies made it difficult to calculate a summary effect estimate, studies consistently reported favorable results.

Two of the studies assessed intervention effects on change in UV exposure (i.e., sun tan) and found mixed results (Mayer et al., 2007, Woolley et al., 2008).

Only one study examined the effects of a worksite policy on keratosis and skin cancers and found that workers mandated to practice sun safety during work reported fewer solar keratoses and medically diagnosed and excised skin cancers than did workers in the control group (Woolley et al., 2008).

Applicability and Generalizability Issues

Seven of the eight studies from the updated search period were conducted in the United States. Studies included male and female workers from various age groups, with white workers over-represented in the samples.

The Task Force recommendation is most directly applicable to interventions that target workforces with substantial numbers of white men and women, regardless of age or specific occupation. Though few included studies provided detailed information, evidence also suggests the findings apply to full-time and seasonal workers, and to people with sun-sensitive skin.

Data Quality Issues

Most studies from the updated search were group randomized control trials, and results were consistently positive across all study designs. Quality issues found in this review reflect challenges identified by authors of included studies and other researchers in the field. For example, studies used different data collection methods with variations in question content, wording, recall periods, and measurement scales. In addition, most studies had a follow-up period of 3 to 12 months, making it difficult to assess sustainability of effects. Most of the studies also used self-reported data that would have been subject to recall and social biases, though a number of studies validated self-report data with direct observation or used previously validated measures.

Other Benefits and Harms

Benefits of the intervention may extend to other health outcomes for outdoor workers and their families. One study reported that workers in the intervention group reported discussing sun safety at home with family members (Andersen et al., 2008). Literature suggests that interventions designed to reduce overexposure to sun can prevent heat strokes (Glanz et al., 2007).

Increasing sunscreen use may have unique and specific benefits. A community-based randomized control trial found that using sunscreen on a regular basis can stop changes in skin cells induced by sun-exposure (i.e., photo-aging—a known risk factor for skin cancer; Hughes et al., 2013).

Included studies did not identify any specific harm to outdoor workers resulting from the interventions. Reducing sun exposure may decrease levels of vitamin D and physical activity in some populations, though these outcomes are unlikely among outdoor workers. One study of outdoor workers evaluated the effect of reduced sun exposure (using different modalities of sun protection for skin cancer prevention) and found that sun protection did not suppress vitamin D levels (Azizi et al., 2012).

Economic Evidence

An economic review is pending.

Considerations for Implementation

Given the increased occupational risk of outdoor workers developing skin cancers, employers should implement sun protection interventions in the context of workers' safety and risk management (Glanz et al., 2007). It is important to educate and encourage workers to practice personal sun protective behaviors (e.g., wearing sun screen, hats, and sun protective clothing), though some sun protective measures may be largely out of workers' control (e.g., taking breaks or working in the shade during peak hours of sun exposure). Employers can provide sun safety supports such as shade structures, sun protective clothing, and sunscreen when work conditions permit.

Barriers to sun safety interventions may include competing worksite priorities, social norms, feasibility, cost, and workers' attitudes about sun protection measures. Worksite policies can hold both the workers and their employers accountable for implementing, practicing, and reinforcing sun safety practices. It is important to have practical policies that do not hinder the work or create a hazard. Engaging key stakeholders to facilitate awareness, acceptance, and

implementation of effective sun safety policy interventions is critical. Reaching out to unions and employers to identify effective and realistic messages, policies, and practices appropriate for their occupational setting may increase buy-in and sustainability of sun safety interventions.

Two studies reported a positive association between the level of program implementation (e.g., the number of sun safety sessions that workers attended or the degree to which a worksite implemented a sun protection program) and workers' sun protection behaviors (Mayer et al., 2007, Andersen et al., 2008).

Achieving high initial use of the program and developing strong partnerships with industry professional associations may influence successful and sustainable dissemination of sun protection interventions (Buller et al., 2012). Further, dissemination strategies that use personal communication and support end users may contribute to program success (Buller et al., 2012).

Evidence Gaps

The occupational groups evaluated in the included studies were heterogeneous; each group had its own distribution of age, gender, and educational background, making it difficult to determine variability in intervention effectiveness by population characteristics. Further, questions about the most effective intervention component or optimal combination of components were not adequately addressed in the available literature.

Large, multi-arm studies, in diverse occupational settings are needed to assess comparative effectiveness by specific intervention components in specific context and settings. Additionally, studies that examine effectiveness of worksite policies in diverse outdoor occupational settings are needed. Included studies over-represented interventions in recreational settings (50%); more studies are needed that target outdoor workers in non-recreational occupational settings. Future studies also should assess interventions over longer periods of time to determine sustainability of effects.

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

References

Andersen PA, Buller DB, Voeks JH, et al. Testing the long-term effects of the Go Sun Smart Worksite Health Communication Campaign: a group-randomized experimental study. *Journal of Communication* 2008;58:447-71.

Azizi E, Pavlotsky F, Kudish A, et. al. Serum levels of 25-hydroxy-vitamin D3 among sun-protected outdoor workers in Israel. *Photochemistry and Photobiology* 2012;88(6):1507-12.

Buller DB, Andersen PA, Walkosz BJ, et al. Enhancing industry-based dissemination of an occupational sun protection program with theory-based strategies employing personal contact. *American Journal of Health Promotion* 2012;26(6):356–65.

Glanz A, Geller AC, Shigaki D, Maddock JE, Isnec MR. A randomized trial of skin cancer prevention in aquatics settings: the Pool Cool program. *Health Psychology* 2002; 21:579–87.

Glanz K, Buller DB, Saraiya M. Reducing ultraviolet radiation exposure among outdoor workers: State of the evidence and recommendations. *Environmental Health* 2007;6(22).

Hall DM, Elliot R, Nehl E, Glanz K. Effectiveness of a targeted peer-driven skin cancer prevention program for lifeguards. *International Journal of Aquatic Research and Education* 2008;2:287-97.

Hiemstra M, Glanz K, Nehl E. Changes in sunburn and tanning attitudes among lifeguards over a summer season. *Journal of the American Academy of Dermatology* 2012;66:430-7.

Hughes MC, Williams GM, Baker P, Green AC. Sunscreen and prevention of skin aging: a randomized trial. *Annals of Internal Medicine* 2013;158(11):781-90.

Mayer JA, Slymen DJ, Clapp EJ, et al. Long-term maintenance of a successful occupational sun safety intervention. *Archives of Dermatology* 2009; 145:88-9.

Mayer JA, Slymen DJ, Clapp EJ, et al. Promoting sun safety among US Postal Service letter carriers: impact of a 2-year intervention. *American Journal of Public Health* 2007;97:559-65.

Saraiya M, Glanz K, Briss PA, et al. Interventions to prevent skin cancer by reducing exposure to ultraviolet radiation: a systematic review. *American Journal of Preventive Medicine* 2004;27(5):422-66.

Stock ML, Gerrard M, Gibbons FX, et al. Sun protection intervention for highway workers: long-term efficacy of UV photography and skin cancer information on men's protective cognitions and behavior. *Annals of Behavioral Medicine* 2009;38:225-36.

Woolley T, Lowe J, Raasch B, Glasby M, Buettner PG. Workplace sun protection policies and employees' sun-related skin damage. *American Journal of Health Behavior* 2008;32:201-8.

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