Skin Cancer Preventive Behavior and Sun Protection Recommendations

Janet H. Cooley and Lisa M. Quale

OBJECTIVES: To summarize, in tabular form, the current literature and information available for skin cancer preventive behaviors and sun protection recommendations.

DATA SOURCES: Peer-reviewed literature, web sites of professional and federal organizations.

CONCLUSION: The link between skin cancer and ultra-violet radiation (UVR) exposure is well documented. Primary skin cancer prevention must focus on proven ways to reduce the amount of UVR that reaches the skin, including avoiding UVR, covering up, wearing a wide-brimmed hat and sunglasses and use of sunscreen.

IMPLICATIONS FOR NURSING PRACTICE: Nurses play a key role in patient education and should use evidence-based resources to provide skin cancer prevention recommendations.

KEY WORDS: skin cancer, sunscreen, prevention, sun protection

The link between skin cancer and ultraviolet radiation (UVR) exposure is well documented. UVR penetrates skin and causes damage that may lead to non-melanoma skin cancer or melanoma.\textsuperscript{1-3} UVR also damages the eyes (potentially influencing development of ocular melanoma, cataracts).\textsuperscript{4} Tanning bed use also greatly increases...
the risk of skin cancer.\textsuperscript{5,6} The International Agency for Research on Cancer classified UVR-emitting tanning devices as “carcinogenic to humans” in 2006.\textsuperscript{3} Melanoma risk may increase significantly if first exposure to a tanning bed is before 35 years of age.\textsuperscript{3,5} Primary skin cancer prevention behaviors that focus on proven ways to reduce the amount of UVR reaching the skin include avoiding UVR exposure, covering sun-exposed skin, wearing a wide-brimmed hat and sunglasses, and sunscreen use.\textsuperscript{7} There is little research or evidence for primary prevention behaviors influencing decreased skin cancer recurrence. Table 1 provides recommendations for sun protection behavior and rationale.\textsuperscript{7-20}

### TABLE 1.
Sun Protection Behavior

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Rationale</th>
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| **Avoid natural and artificial UVR** | - Avoid sun exposure from 10AM-4PM when UVR is most damaging to the skin.\textsuperscript{7} Use another form of sun protection if avoidance is not possible.  
- Stay in the shade for optimal (but not complete) protection. Shade protection relies on shade density, shade structure, season, and sun angles.\textsuperscript{1} UVR bounces off reflective surfaces such as sand, concrete, or water.\textsuperscript{8}  
- Avoid indoor tanning beds. Skin cancers, including melanoma, are linked to the use of tanning beds.\textsuperscript{5,6} |
| **Cover up with clothing** | - Wear long sleeves and long pants to cover UVR-exposed skin.\textsuperscript{9}  
- Choose dark colors, tight weaves, and thick fabrics, which UVR is less able to penetrate. Light colors, loose weaves, and thin fabrics allow much more UVR to reach the skin.\textsuperscript{10,11}  
- Choose fabrics labeled as having UPF of 40 or higher.\textsuperscript{12,13} These are effective alternatives to fabrics such as linen and white cotton, which have very low UPF ratings.\textsuperscript{14} UPF fabrics with a high rating are specially treated or constructed of fibers that naturally block and/or absorb UVR before it reaches the skin. |
| **Wear sunglasses in combination with a wide-brimmed hat that shades the eyes and face** | - Wear large-framed, wrap-around sunglasses in combination with a wide-brimmed hat for optimal eye protection.\textsuperscript{15} Evidence suggests wearing sunglasses alone may not adequately protect eyes because of poor construction and fit.\textsuperscript{16,17} Adding the protective shade of a hat may reduce this risk.  
- Choose sunglasses with 99% to 100% UVA/UVB protection.\textsuperscript{15,18-20} This value may also be reported as 400 nm.  
- Wear UVR-blocking contact lenses that reduce the amount of radiation that reaches the surface of eye and protects the eye from UVR entering from the periphery of ill-fitting sunglasses.\textsuperscript{17} Little evidence exists for the protective values of clear, UVR-treated prescription glasses. |

Abbreviations: nm, nanometers; UPF, ultraviolet protective factor; UVR, ultraviolet radiation; UVA, ultraviolet A radiation; UVB, ultraviolet B radiation.
Sunscreen protects against the acute, sunburn-causing effects of UVR and chronic UVR exposure that can result in photoaging and skin cancer.21,22 In combination with sun-safe behaviors, sunscreen can reduce the risk of skin cancer and early skin aging.23 New US Food and Drug Administration sunscreen product labels are available at: http://www.fda.gov/downloads/ForConsumers/ConsumerUpdates/UCM258910.pdf. Table 2 provides recommendations and rationale for sunscreen use.

### TABLE 2. 
Sunscreen Recommendations and Rationale

<table>
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<th>Sunscreen Recommendations</th>
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<tr>
<td>Use quality sunscreen</td>
<td>• Use a product labeled with an SPF of 15 to 30 or greater.24,25</td>
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<td>• Use SPF as a comparison between product coverage, not to determine absolute protection.26</td>
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<td>• Use “broad spectrum” sunscreen to protect against skin cancer and not just sunburn.27 For a product to be labeled as “broad spectrum” it must offer protection against both UVA and UVB.23</td>
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<tr>
<td>Apply the appropriate amount</td>
<td>• Read the directions on the sunscreen product. The product label may use the terminology “Apply Liberally.”</td>
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<td>• To achieve the labeled SPF level, apply the product in a thickness of 2 mg/cm². Thickness is based on the definition of SPF, which is the ratio of the dose of UVR required to produce one MED on sunscreen-protected skin after application of 2 mg/cm² of product.28 MED is the lowest dose of UVR that produces perceptible reddening of the skin.</td>
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<td>• The thickness volume has been interpreted as “The Teaspoon Rule” for ease of consumer understanding.29,30 Consumers typically do not apply this much31 and should engage in other sun protection behaviors described to compensate for lowered actual SPF.</td>
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<td>• Decreased SPF associated with decreased application volume is linear-to-exponential, depending on the product, skin type, and body area of application typically resulting in an SPF of less than half of the labeled SPF (specifically the SPF should be divided by 1.5 to 3.8 for half an application of 1 mg/cm²).32-34</td>
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<td>Apply and re-apply at the appropriate time</td>
<td>• Apply sunscreen 15 minutes before sun exposure.23</td>
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<td>• Re-apply sunscreen within 15 to 60 minutes after exposure to increase the thickness and uniformity of coverage and compensate for uneven application.31,35-37</td>
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<td>• Re-apply sunscreen every 2 hours or after swimming or sweating.23,38</td>
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<td>• The SPF value of a product decreases by 25% after 8 hours without activity and by about 55% with activity.39</td>
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<td>Use sunscreens that are water resistant</td>
<td>• Note that there is no water-proof sunscreen. The new FDA labeling specifies water-resistance up to 40 or 80 minutes.20</td>
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<td>• Only use a product specifically designed for use in water.</td>
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<td>Note sunscreen expiration information</td>
<td>• FDA guidelines23 specify that all sunscreens must retain their original strength for 3 years.</td>
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<td>• Store sunscreens in a cool location; the expiration date does not account for degradation that results from heat (in a car or in the sun).</td>
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</table>

Abbreviations: FDA, US Food and Drug Administration; MED, minimum erythema dose; SPF, sun protection factor; UVR, ultraviolet radiation; UVA, ultraviolet A radiation; UVB, ultraviolet B radiation.

### REFERENCES

