SUNBURN OVERVIEW

Increased exposure to UV radiation occurs near the equator, during summer months, at high elevation, and between 10 AM and 4 PM. Reflection from the snow, sand, and water increases exposure, a particularly important consideration for beach activities, skiing, swimming, and sailing. In addition, several common medications may cause photosensitivity reactions in travelers:

- Acetazolamide
- Amiodarone
- Antibiotics (fluoroquinolones, sulfonamides, and tetracyclines, especially demeclocycline and doxycycline)
- Furosemide
- Nonsteroidal anti-inflammatory drugs
- Phenothiazines
- Sulfonylureas
- Thiazide diuretics
- Voriconazole

UVA rays are present throughout the day and cause premature aging of the skin. In addition, UVA rays are responsible for photosensitivity reactions and also contribute to skin cancer. UVB rays are intense from 10 AM to 4 PM and are most responsible for sunburn and skin cancer. Serious burns are painful, and the skin may be tender, swollen, and blistered. These sunburns may be accompanied by fever, headache, itching, and malaise. Overexposure to the sun over several years leads to premature aging of the skin, wrinkling, age spots, and an increased risk for skin cancer, including melanoma. Repeated exposure to sunlight can result in pterygium formation, cataracts, and macular degeneration.

PREVENTIVE MEASURES FOR TRAVELERS

Sun Avoidance

Staying indoors or seeking shade between 10 AM and 4 PM is very important in limiting exposure to UV rays, particularly UVB rays. Be aware that sunburn and sun damage can occur even on cloudy days and even when one sits under an umbrella or in the shade.

Protective Clothing

Wide-brimmed hats, long sleeves, and long pants protect against UV rays. Tightly woven clothing and darker fabrics provide additional protection. High-SPF clothing is recommended for travelers at increased risk of sunburn or with a history of skin cancer. This type of clothing contains colorless compounds, fluorescent brighteners, or treated resins that absorb UV rays; this clothing often provides an SPF of 30 or higher. A laundry additive, such as the product SunGuard, can be used to add UV protection to clothing. Sunglasses that provide 100% protection against UV radiation are strongly recommended.
Sun Protection Factor

Sun protection factor (SPF) defines the extra protection against UVB rays that a person receives by using a sunscreen. For example, if a person using SPF 15 sunscreen normally acquires a sunburn in 20 minutes without protection, the benefit will be $20 \times 15$ minutes ($300$ minutes; $5$ hours) extra protection with sunscreen. SPF does not refer to protection against UVA rays.

Sunscreens

Physical sunscreens contain large particulate substances, such as titanium dioxide or zinc oxide, that reflect and scatter both visible and UV light. They are effective sunscreens but are unpopular because they are opaque and tend to stain clothing. They are recommended for people who burn easily or who take medications that may cause photosensitivity reactions.

Chemical sunscreens absorb rather than reflect UV radiation. A combination of agents is recommended to provide broad-spectrum protection against UVA and UVB rays. Travelers should consider the following key points regarding sunscreens:

- Choose a sunscreen with at least 15 SPF.
- Select a water- and sweat-resistant product.
- Look for a sunscreen with at least 3 different active ingredients to provide broad-spectrum UVA and UVB protection:
  - PABA derivatives, salicylates (homosalate, octyl salicylate), or cinnamates (octyl methoxycinnamate, cinoxate) for UVB absorption
  - Benzophenones (oxybenzone, dioxybenzone, sulisobenzone) for shorter-wavelength UVA protection
  - Avobenzone, ecamsule, titanium dioxide, or zinc oxide for the remaining UVA spectrum
- Apply 30 minutes before exposure to the sun.
- At least 1 oz of sunscreen is needed to cover the entire body.
- Apply to all exposed areas, especially the ears, scalp, lips, back of the neck, tops of the feet, and backs of the hands.
- Use a lip balm with at least 15 SPF.
- Reapply after 1–2 hours and after sweating, swimming, or towel-drying (even on cloudy days).
- Many sunscreens lose potency after 1–2 years. Always check the expiration date.
- Sunscreens should be applied to the skin before insect repellents. (Note: DEET-containing insect repellents may decrease the SPF of sunscreens by one-third. Sunscreens may increase absorption of DEET through the skin.)
- Avoid products that contain both sunscreens and insect repellents, because sunscreen may need to be reapplied more often and in larger amounts than needed for the repellent component to provide protection from biting insects.
TREATMENT

Travelers with sunburn should maintain hydration and stay in a cool, shaded, or indoor environment. Topical and oral nonsteroidal anti-inflammatory drugs decrease erythema if used before or soon after exposure to UVB rays and may relieve symptoms such as headache, fever, and local pain. Topical steroids are of limited benefit, and systemic steroids appear to be ineffective. Moisturizing creams, aloe vera, and diphenhydramine may relieve symptoms. In severe cases, narcotic analgesics may be indicated to relieve pain.