

Staying Safe In The Sun

Information for Patients

The sun is associated with recreation, relaxation, and a healthy lifestyle. But too much sun and exposure to ultraviolet (UV) rays can cause adverse health effects. There are two types of UV rays to be concerned about: UVA and UVB. The UVB rays mostly affect the surface of the skin and cause sunburn. The UVA rays go deep into the skin and are associated with premature skin aging. Both UVA and UVB rays have been linked to skin cancer.

Harmful effects of the sun

Since the mid-seventies, we have known about the harmful effects of the sun, the most serious being skin cancer. More than 1 million people in the U.S. are diagnosed with skin cancer each year, and 90% of skin cancers are linked to sun exposure. Years of too much sun exposure also cause premature aging of the skin. The eyes are susceptible to the damaging effects of the sun as well. Cataracts, a condition that impairs eyesight, are caused by chronic sun exposure.

Are tanning booths safe?

Many people feel artificial tanning in booths or sunbeds is safe. The newer types of tanning devices expose a person to mostly UVA rays, along with very little UVB rays. At one time, experts believed UVB rays were the most harmful, but now we know more about UVA and its damaging effects on the skin. Evidence suggests UVA exposure causes melanoma, the most serious form of skin cancer.

Until more is known about the long-term effects of UVA exposure, artificial tanning devices should be avoided. If you use a tanning device, follow the suggested time limits for use and wear UV-blocking goggles to avoid eye damage.

Protecting your skin

The best way to protect your skin from the harmful effects of the sun is to limit your exposure. The sun's rays are the strongest between 10 a.m. and 4 p.m. If you have to be out at that time, find some shade or wear protective clothing. A wide-brimmed hat will help protect your face, scalp, ears, and neck. Your eyes need

protection too. Wear sunglasses with high UVA **and** UVB protection. Don't expect to be safe on a cloudy day or if you're in water. Clouds only block up to 20% of UV rays and water doesn't block any.

Wear sunscreen with a sun protection factor (SPF) of 15 or higher. Use products that protect against both UVA **and** UVB, and look for those with a seal of approval from the American Academy of Dermatology or the Canadian Dermatology Association. They've been tested for quality.

Apply at least two tablespoons of sunscreen for full body coverage, 30 minutes before going outdoors. If you're in the sun between 10 a.m. and 4 p.m., reapply sunscreen every 2 hours (more often if swimming or sweating).

If you need bug repellent too, don't choose the products with sunscreen and bug repellent combined. Sunscreen needs to be reapplied more frequently than bug repellent. Also, be sure to apply the sunscreen first, before the bug repellent.

What if I get sunburned?

If you have lighter skin you are more likely to burn. Sunburned skin will be tender, painful, and red. If the burn is severe you might also experience swelling and blistering. The immediate effects of sunburn are temporary, but the long-term consequences (skin cancer) are very serious.

For minor sunburn (no blistering) taking a cool bath or applying cool tap-water compresses to the burned area will help relieve discomfort. Your pharmacist, or other healthcare professional, can recommend over-the-counter products to help relieve the pain. If you have a severe sunburn and are experiencing fever, chills, upset stomach, or confusion, seek medical attention immediately.

Be safe in the sun

It's important to think about sun safety every day, not just when you're at the pool or the beach. Simple actions like avoiding sun exposure during peak hours, wearing protective clothing or a hat, and using sunscreen can help reduce your risk of skin cancer and other harmful effects of the sun.

Update on Sunscreens: UVA Protection

Background

In most populations around the world, the incidence of cases and deaths from melanoma continues to increase. There were around 60,000 new cases of melanoma (an increasing incidence of 2.5% per year in the past decade) and around 8,000 deaths from melanoma in the U.S. in 2006.¹ Worldwide, there are about 60,000 deaths per year caused by cancers that result from too much sun exposure.²

It has been recognized for many years that melanoma is associated with exposure to sunlight, especially to acute intermittent exposures. Unfortunately, it is still not clear which wavelengths of sunlight actually cause melanoma. Evidence suggests that both UVA and UVB radiation are involved.¹

UVB Protection and SPF

UVB radiation (290 nm to 320 nm) is called “sunburn radiation” because it’s the most active at causing erythema.³ Sun protection factor (SPF) is used globally to indicate the degree of protection a sunscreen affords against UVB. SPF is the ratio of the “dose” of UVB radiation that may be tolerated while wearing sunscreen to the “dose” of UVB tolerated while not wearing sunscreen. Simply put, a person who can typically stay in the sun for 20 minutes before starting to burn can prolong that time to 200 minutes by using a sunscreen with SPF 10.³ On the other hand, the intensity of UV radiation depends on time of day, season, etc., so this isn’t an absolute.¹⁷

There are multiple ingredients approved for use in sunscreens that absorb UVB radiation. The American Academy of Dermatology and Canadian Dermatology Association recommend consistent, year-round use of sunscreens with an SPF of at least 15 for those who are exposed to the sun.^{4,5}

UVA Protection

UVA radiation is divided into two classifications, UVA I (340-400 nm) and UVA II

(320-340 nm). UVA penetrates deeper into the skin than UVB. Unlike UVB radiation, a percentage of UVA isn’t blocked by the ozone layer, window glass, etc.⁴ It is much less likely to cause sunburn (200 times less potent than UVB in this respect), but UVA radiation is more harmful than UVB radiation, with effects ranging from premature aging to DNA damage.³ This is actually one of the difficulties in assessing the degree of UVA protection of a product. There isn’t a simple physical surrogate marker analogous to sunburn for UVB radiation.⁶ As a matter of fact, there is no standardized way to measure UVA protection in the U.S. The FDA is expected to publish a final proposed rule on this in late summer 2007.¹⁸

More than 80% of marketed sunscreens in the U.S. claim to give UVA protection (label states “broad spectrum,” “UVA protection,” etc). But only a little over half of them actually contain a UVA-I filter.⁶ Current FDA regulations allow a product to make a claim of UVA protection as long as it has an absorption spectrum that extends up to 360 nm.³ In Canada, a sunscreen that contains a designated ingredient that blocks UVA radiation can be labeled as such.⁷ However, evidence suggests that the longer UVA-I wavelengths up to 400 nm may play a prominent role in causing melanoma, and many products labeled as broad spectrum may not protect from these dangerous rays.¹ The American Academy of Dermatology recommends choosing a sunscreen with ingredients that provide UVA protection, like avobenzone (Parsol 1789), ecamsule (*Mexoryl SX*), titanium dioxide, and zinc oxide.⁸ Understanding the benefits and shortcomings of these different ingredients can help bring to light the best sunscreen choices.

Avobenzone

About one in four sunscreen products on the market in the U.S. contain avobenzone (Parsol 1789, dibenzoylmethane). It is currently the only

More . . .

available ingredient that absorbs long UVA wavelengths up to 400 nm.⁹

Unfortunately, exposure to UV radiation causes avobenzone to break down. This can be prevented by its formulation. Octocrylene and oxybenzone (benzophenone-3) absorb UVB and shorter UVA wavelengths, and help photo stabilize avobenzone. (Note that oxybenzone is one of the UV filters most likely to cause skin reactions).⁹ *Helioplex*, a patented combination of avobenzone and oxybenzone with stabilizers, provides protection against the full spectrum of UVA and UVB radiation. It is contained in several products marketed by Neutrogena.

Ecamsule

Ecamsule is marketed in the U.S. as part of a combination product, *Anthelios SX*, that also contains avobenzone and octocrylene. In Canada, ecamsule is called *Mexoryl SX*. Ecamsule itself is photostable, but only covers short UVA II wavelengths. The combination with avobenzone and octocrylene provides coverage against the full spectrum of UVA and UVB radiation.¹⁰

Anthelios SX was approved by the FDA in July 2006 and is currently only available in the U.S. as facial moisturizers from Laroche-Posay and Lancome. The cost is around \$34 for 3.4 ounces. Ecamsule as an ingredient has been available in Canada and Europe since 1993.¹⁰

Zinc Oxide and Titanium Dioxide

Zinc oxide and titanium dioxide are physical barriers, not chemical barriers like the other sunscreen ingredients mentioned. They reflect and scatter (as opposed to absorbing) the full spectrum of UV radiation.⁹ These ingredients are traditionally associated with opaque, white products applied to the nose and tips of the ears, but they are also available as microfine particles that are more cosmetically desirable products.⁹ Zinc oxide and titanium oxide are unlikely to cause skin irritation, sensitization, or photosensitivity.⁹

Quality Assurance

The American Academy of Dermatology (AAD) now offers a “Seal of Recognition” to products that meet specific criteria, independent of the FDA. Applicants for the AAD Seal of Recognition must submit extensive formulation

and scientific testing data, and show evidence of broad spectrum protection. Products must be water and sweat resistant, have stability, and show no signs of photo toxicity. *Aveeno Continuous Protection* and *Aveeno Baby Continuous Protection SPF 55* are the first to receive the new AAD seal.¹¹

The Canadian Dermatology Association (CDA) logo is placed on the labels of Canadian products that have been specially tested for safety and efficacy. Criteria include an SPF of at least 15, inclusion of a broad spectrum UVA block, and a noncomedogenic, nonirritating, hypo-allergenic, minimally or nonperfumed formulation. The most current list of CDA recommended sunscreens can be found at www.dermatology.ca/patients_public/info_patient/s/sun_safety/recognized_sunscreens.html.

The Skin Cancer Society, an international organization, has offered a “Seal of Recognition” for certain sunscreen products since 1979. Criteria are very similar to the AAD and CAD criteria. The list of products (both U.S. and international) is available at www.skincancer.org/component/option,com_virtuemart/Itemid,14/.

The Environmental Working Group, an advocate for cosmetic safety, provides a database to help consumers choose a sunscreen based on selected criteria, like water-resistance and UVA coverage. The database can be accessed at www.cosmeticsdatabase.com/special/sunscreens/sunsummary.php.

Consumer Reports publishes sunscreen ratings. In 2007, *Neutrogena Ultra Sheer Dry-Touch SPF 45* and *No-Ad Sunblock Lotion Maximum SPF 45* were some top picks. The Neutrogena product contains *Helioplex*. A Canadian product not available in the U.S., *L’Oreal Ombrelle Kids SPF 45*, received excellent ratings as well. Active ingredients include *Mexoryl SX*, avobenzone, octocrylene, and titanium dioxide.

Other Considerations

Even if people are choosing the very best sunscreen products available, they won’t benefit from maximum effectiveness unless the products are applied correctly. It has been shown that sunscreen users only apply about half as much sunscreen as they should, which drastically reduces the SPF.³

More . . .

Advise applying at least one ounce (two tablespoons) of sunscreen, explaining that this is necessary to achieve the labeled SPF value. Recommend the following: one-half teaspoon of sunscreen to the face and neck, each arm and shoulder, front of torso, and back of torso. Plus, one teaspoon should be applied to each leg/top of foot.³ Don't forget lip protection.

Tell people to apply sunscreen at least 15 to 30 minutes prior to sun exposure, anytime they plan to spend 20 minutes or more in the sun. Sunscreen should be reapplied every two hours at minimum, even on cloudy days, and after swimming, heavy sweating, and toweling off. Reapplying sunscreen doesn't extend the length of time a person is protected from sunburn, it just guarantees that the actual SPF of the product is realized.³ For those who choose to use sunscreen sprays, remind them that the products should be both sprayed on and rubbed in to ensure uniform coverage.¹²

Advise patients against using products that combine insect repellents and sunscreen. In general, sunscreen should be applied before insect repellent.¹³ Insect repellent doesn't need to be reapplied as frequently as sunscreen, and applying them at the same time may increase the absorption of DEET.¹⁴

Other measures that should be taken whenever possible include avoiding sun during the hours between 10 a.m. and 4 p.m. and wearing protective clothing like a wide-brimmed hat, sunglasses, and long sleeves to minimize sun exposure.⁸

Stability of Sunscreens

People frequently ask how long a tube or bottle of sunscreen can be used. A common misconception is that the answer is "one year." In the absence of an expiration date, sunscreens can be considered stable for three years after the date of manufacture when stored at room temperature.^{4,15,16} Of course this doesn't apply if the product is left in the sun, in a beach bag, in a hot car, etc.

It's unlikely that sunscreen would last for a year or more if it were being used appropriately. For those who ask this question, take the opportunity to counsel on proper application and use.

Conclusion

Pharmacists must advocate sun protection, which includes consistent sunscreen use and proper application techniques. Recommend products with an SPF of at least 15 that contain ingredients protective against UVA radiation. Look specifically for avobenzone, titanium dioxide, or zinc oxide to provide protection against dangerous longer wavelength UVA. Other ingredients like ecamsule (*Mexoryl SX*), oxybenzone or octocrylene (which both stabilize avobenzone), octylmethyl cinnamate, and cinoxate are active against shorter wavelength UVA radiation.

Users of this document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and Internet links in this article were current as of the date of publication.

Project Leader in preparation of this Detail-Document: Stacy A. Hester, RPh, BCPS

References

1. Lund LP, Timmins GS. Melanoma, long wavelength ultraviolet and sunscreens: controversies and potential resolutions. *Pharmacol Ther* 2007;114:198-207.
2. Anon. Skin cancer fact sheet. American Academy of Dermatology. www.aad.org/aad/Newsroom/2007+Skin+Cancer+Fact+Sheet.htm. (Accessed July 12, 2007).
3. DeSimone EM. Chapter 39 Prevention of sun-induced skin disorders. In: Berardi RR, DeSimone EM, Gail D, et al., Eds. Handbook of Nonprescription Drugs. 14th ed. Washington DC: American Pharmaceutical Association, 2004:929-53.
4. Anon. Facts about sunscreens. American Academy of Dermatology. www.aad.org/public/News/DermInfo/DInfoSunscreenFAQ.htm. (Accessed July 11, 2007).
5. Anon. Sunscreen questions. Canadian Dermatology Association. www.dermatology.ca/english/newsite/graphics_en/sunscreen_eng.pdf. (Accessed July 11, 2007).
6. Nash JF, Tanner PR, Matts PJ. Ultraviolet A radiation: testing and labeling for sunscreen products. *Dermatol Clin* 2006;24:63-74.
7. Anon. Sunburn protectants. Health Canada. http://www.hc-sc.gc.ca/dhp-mps/alt_formats/hpfb-dgpsa/pdf/prodnatur/mono_sunprotect_eocransolaire_e.pdf. (Accessed July 12, 2007).

More . . .

8. Anon. 2007 facts about sunscreen. American Academy of Dermatology. www.aad.org/aad/Newsroom/Virtual+Press+Office.htm. (Accessed July 11, 2007).
9. Nash, JF. Human safety and efficacy of ultraviolet filters and sunscreen products. *Dermatol Clin* 2006;24:35-51.
10. Anon. FDA approves a new over-the-counter sunscreen product. www.fda.gov/bbs/topics/NEWS/2006/NEW01417.html. (Accessed July 11, 2007).
11. Anon. AAD Seal of Recognition. American Academy of Dermatology. www.aad.org/aad/seal/Seal_Home.htm. (Accessed July 11, 2007).
12. Barr J. Spray-on sunscreens need a good rub. *J Am Acad Dermatol* 2005;52:180-1.
13. Anon. Insect repellent use and safety. Centers for Disease Control and Prevention. www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm. (Accessed July 12, 2007).
14. Gu X, Wang T, Collins DM, et al. In vitro evaluation of concurrent use of commercially available insect repellent and sunscreen preparations. *Br J Dermatol* 2005; 152:1263-7.
15. Anon. Current good manufacturing practice for finished pharmaceuticals. Code of Federal Regulations 2005; Title 21(4): 21CFR211.137. <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?YEAR=2005&TITLE=21&PART=211&SECTION=137&SUBPART=&TYPE=TEXT>. (Accessed July 11, 2007).
16. Personal Communication. Cosmetic, Toiletry and Fragrance Association. Washington, DC 20036. June 5, 2006.
17. Anon. Sun protection factor (SPF). U.S. Food and Drug Administration. http://www.fda.gov/cder/Offices/OTC/understanding_spf_sunscreen.htm. (Accessed July 19, 2007).
18. Personal communication. C. Rice. Center for Drug Evaluation and Research. U.S. Food and Drug Administration. July 17, 2007.

Cite this Detail-Document as follows: Update on sunscreens: UVA protection. Pharmacist's Letter/Prescriber's Letter 2007;23(8):230806.



Evidence and Advice You Can Trust...



3120 West March Lane, P.O. Box 8190, Stockton, CA 95208 ~ TEL (209) 472-2240 ~ FAX (209) 472-2249
Copyright © 2007 by Therapeutic Research Center

Subscribers to *Pharmacist's Letter* and *Prescriber's Letter* can get *Detail-Documents*, like this one, on any topic covered in any issue by going to www.pharmacistsletter.com or www.prescribersletter.com