



Protecting Your Skin from UV Exposure

What does Exposure mean?

Exposure happens when UV radiation from the sun reaches your skin. You are exposed to UV when you are outside on sunny or cloudy days.

UV intensity varies with time of day, season, and latitude. The equator at noon receives much more UV than at noon in Norway. You can still get sunburned on cloudy days because UV rays can bounce off the clouds. This is known as the broken-cloud effect. In fact, one survey found that UV-B increased by 25% on partly cloudy compared to sunny days.

What is UV?

UV is ultraviolet light, a light wave shorter than violet-color light. UV light is divided into 3 wave-lengths:

- UV-A, the most common
- UV-B, the most dangerous
- UV-C is dangerous but we're not exposed because it is bounced back to space by the Earth's ozone layer

See the Light Spectrum table on the reverse side

The National Weather Service issues the UV Index, a daily forecast of UV intensity. Find it on weather stations, newspapers, or at the US Environmental Protection Agency (EPA) website: www.epa.gov/enviro/uv-index-search

What is Vitamin D?

Vitamin D helps the body absorb calcium and other minerals. The body synthesizes Vitamin D in the skin using UV light. To avoid Vitamin D deficiency and the diseases associated with it, including rickets and osteoporosis, Vitamin D is added to milk and other food staples. Vitamin D can also be taken as a supplement.

Because UV exposure is dangerous, doctors recommend getting Vitamin D from the diet, including from fortified foods, fatty fish such as salmon, and supplements.

Risks & Benefits of UV Exposure

UV is an environmental carcinogen, which means that being exposed to UV light can cause cancer. Unprotected UV exposure causes skin damage, speeds aging and

increases lifetime risk of skin cancer. Sun exposure also causes wrinkles, brown spots, leathering and sagging.

There is no such thing as a healthy tan. Any change in your skin color is a sign of skin damage.

1.3 million people are diagnosed with skin cancer in the US each year, mostly from sun exposure. UV is harmful for anyone, but those with fair skin are at higher risk because they burn more quickly and severely. More Americans have skin cancer than all other cancers combined.

The only benefit of UV exposure is Vitamin D. Five minutes of unprotected UV 2-3 times a week provides all the Vitamin D the body can make. Some UV reaches the skin even when you wear sunscreen.



What is SPF?

SPF stands for Sun Protection Factor. SPF is the fraction of UV-B rays blocked by the sunscreen. In SPF15, 1/15th of the UV-B rays will reach the skin when sunscreen is applied properly. If you get sunburned in 10 minutes without sunscreen, you will prevent sunburn for 150 minutes by wearing an SPF15 sunscreen. SPF15 sunscreen protects from 93% of UV-B, SPF30 protects from 97%, and SPF50 gives 98% protection.

The Food and Drug Administration (FDA), which regulates sunscreens as an over-the-counter drug, does not recommend using sunscreen with SPF higher than 50. FDA says sunscreen higher than SPF50 is misleading because it offers little added protection, gives a false sense of safety, and tempts people to reapply less often or stay in the sun longer.

What about nanoparticles in sunscreen?

Nanoparticles are ultra-fine particles between 1-100 nanometers in diameter. Nano-size titanium dioxide and zinc oxide have been used in some sunscreens since the 1990s. These physical ingredients reflect, scatter and absorb UV rays and don't tend to cause allergic reactions.

The nano-size particles are clear, while older sunscreens used larger particles that appeared white on the skin. Nanoparticles do not pass through healthy skin. Sunscreen with nano-particles protects skin as soon as it is applied while conventional sunscreens must be absorbed.



Risks & Benefits of Using Sunscreen

Sunscreens are more protective against UV-B than UV-A. Avobenzone, titanium dioxide and zinc oxide protect against UV-A. New products that protect against UV-A are used in Europe and are under review by the FDA.

Spray sunscreen should not be inhaled, especially sunscreen with nanoparticles because the small particles can be harmful to the lungs.

Oxybenzone in sunscreen can penetrate the skin and cause an allergic reaction. It can also interfere with normal hormone function. Sunscreen SPFs higher than 50 have higher concentrations of chemicals and are more likely to have these effects.

However, any sunscreen is better for you than being exposed to UV radiation.

How can I protect myself?

- Stay out of the sun between 10am-4pm
- Stay in the shade
- Wear protective clothing
- Use a "broad spectrum" sunscreen with SPF30-50 to protect from both UV-A and UV-B
- Avoid getting sunburned
- Apply sunscreen thickly, 1 oz. every 2 hours
- Apply conventional sunscreen 20 min. before going in the sun, giving it time to absorb into your skin
- Don't use indoor tanning beds. Exposure to tanning beds before age 30 increases the risk of developing melanoma by 75%
- With less mature skin and higher surface area to body weight, babies should not be exposed to UV or sunscreen. Babies under 6 mo should be covered and kept out of the sun, especially from 10am-4pm

Where to learn more:

Sun Safety US Environmental Protection Agency
<http://www.epa.gov/sunsafety>

Environmental Working Group (EWG) Sunscreen Guide
<http://www.ewg.org/2015sunscreen/>
EWG Teen Sunscreen Guide
<http://www.ewg.org/teensunscreen/>

Nanoparticles & Sunscreens. 5 Things Worth Knowing
 (4-minute animation from the University of Michigan)
<https://www.youtube.com/watch?v=VV0cCg4clMw&list=UU8cxoTk9M0HdZB3gyJNjEtw>

Experimenting with UV-sensitive Beads, Stanford Solar Center
<http://solar-center.stanford.edu/activities/UVBeads/UV-Bead-Instructions.pdf>

THE LIGHT SPECTRUM

Infrared 1000-700nm*	Visible 390-700nm*	UV-A 400-315nm*	UV-B 315-280nm*	UV-C 280-100nm*
Makes our skin feel warm. Can be seen by snakes	Wavelength seen by our eyes. Includes the colors of the visible spectrum	Invisible. Shorter wavelengths, more energy. Causes skin damage, premature aging, melanoma. Passes through car glass	Causes sunburn, skin cancer, photo-aging, cataracts. Needed for Vitamin D synthesis	Dangerous, but completely absorbed by the ozone layer and doesn't reach earth surface

*nanometer, equals one-billionth of a meter