



FAQs: Safer Sunscreen Use

Overview

Practice safety in the sun to ensure outdoor fun!

Playing outside is important to children's health and development, and some of the greatest family or childhood memories arise from outdoor fun—especially fun in the sun. Sunshine provides a boost of mood, vitamin D, and other health benefits. However, part of the sun's energy is emitted as invisible rays called UV radiation which can burn skin and cause skin cancer. Therefore, it is important to practice good sun safety for you and your children while outdoors and enjoying the weather.

UV radiation exposure

There are two different types of UV radiation rays that humans come into contact with on a daily basis: UV-A and UV-B.

UV-B rays penetrate the top layer of the skin and are primarily responsible for sunburns, which is a big risk factor for skin cancer.

UV-A rays have the longest wavelength of UV radiation, so they penetrate the deepest into the skin. They are responsible for the wrinkling and leathery skin. UV-A can increase the carcinogenic (cancer causing) effect of UV-B rays because the cells under the top layer of skin are also damaged and cannot help repair the sunburn above.

How does sunscreen work?

Sunscreens are applied to protect the skin from harmful ultraviolet UV radiation. Two important characteristics of sunscreen are: 1) the Sun Protection Factor (SPF) and 2) the mechanism used (either chemical filters or mineral filters) to prevent UV radiation absorption into the skin.

1) SPF is a measure of a sunscreen's ability to prevent UV-B from damaging the skin.

For example:

SPF 15 filters out approximately 93 percent of all incoming UV-B rays

SPF 30 keeps out 97 percent of UV-B

SPF 50 keeps out 98 percent of UV-B

“Broad spectrum” sunscreens can work to protect the skin against both UV-A and UV-B rays.

Research has found that people are misled by the claims on high-SPF (50+) sunscreen bottles. They are more likely to use high-SPF products incorrectly resulting in greater exposure to harmful ultraviolet radiation. The public often assumes that they get twice as much protection from SPF 100 sunscreen as from SPF 50-- properly applied SPF 50 sunscreen blocks 98 percent of UVB rays; SPF 100 blocks 99 percent.

2) A sunscreen's ingredients indicate how the product has been formulated to protect against UV radiation. For example, the compound named oxybenzone absorbs UV radiation and converts it into heat, which is then released from the skin. These types of UV-absorbing and converting ingredients are called chemical filters. Ingredients such as zinc oxide create physical barriers to radiation by reflecting or scattering it, which prevents it from penetrating the skin. These types of physical barrier ingredients are called mineral filters.



What is sunscreen made of?

The active ingredients in sunscreens come in two forms, mineral and chemical filters. Each uses a different mechanism for protecting skin. The most common sunscreens on the market contain chemical filters. These products typically include a combination of the following ingredients: oxybenzone, avobenzone, octisalate, octocrylene, homosalate and octinoxate. Mineral sunscreens use ingredients such as zinc oxide and/or titanium dioxide. Some “broad spectrum” products combine zinc oxide with chemical filters.

Is sunscreen toxic?

Some of the active ingredients, especially chemical filters, found in many common sunscreen products have been linked with health concerns. For example, oxybenzone has been linked to allergic skin reactions. There is also evidence that certain chemical filters (such as oxybenzone and octinoxate) mimic, interact or interfere with human sex or thyroid hormones.

Animal studies report lower sperm counts and sperm abnormalities after exposure to oxybenzone and octinoxate, and delayed puberty after exposure to octinoxate. However, evidence of adverse human health outcomes resulting from hormone disruption is not conclusive enough for the U.S. Food and Drug Administration (FDA) to restrict these compounds.

The Environmental Working Group has reviewed the existing data and comprised a table of human exposure and toxicity for the nine most commonly used, FDA-approved sunscreen chemicals. To view, please visit: <https://www.ewg.org/sunscreen/report/the-trouble-with-sunscreen-chemicals/#.WxfuuFMvy3X>

What about Nanoparticles and Mineral Sunscreens?

Though mineral filters like zinc oxide and titanium dioxide are the preferred choice for sun protection there are potential health risks related to the use of nanoparticles (are tiny materials hav-

ing size ranges from 1 to 100 nanometers) in personal care products. Most mineral sunscreens are made up of nanoparticles of zinc oxide or titanium dioxide. Some studies show that nanoparticles can harm organs when administered in large amounts. To date, research has shown no evidence that zinc oxide nanoparticles can penetrate the skin in significant amounts.

Titanium dioxide, and sometimes zinc oxide, are photocatalysts-- when they are exposed to UV radiation they can form free radicals-- unstable atoms that can damage cells, causing illness and aging. Nanoparticle sizes of these minerals are more affected by UV rays than larger particles. Sunscreen manufacturers often use surface coatings that greatly reduce the potential for photoactivity, thus reducing the creation of free radicals.

Breathing in nanoparticles is a health concern. Thus we strongly encourage caregivers to avoid the use of SPRAY sunscreens using titanium dioxide or zinc oxide or chemical filters.

All available research shows that zinc oxide and titanium dioxide can be safely used in sunscreen lotions and that both pose a lower health hazard than most other sunscreen ingredients approved in U.S.

Inactive Ingredients are important too

It is important to pay attention to the inactive ingredients in sunscreen as well because they often make up more of the sunscreen than active ingredients do. For example, the preservative methylisothiazolinone is of particular concern to health. Methylisothiazolinone can be used alone or mixed with methylchloroisothiazolinone. The American Contact Dermatitis Society named methylisothiazolinone its “allergen of the year” in 2013. In March 2015, the European Scientific Committee on Consumer Safety concluded that no concentration of the chemical could be considered

safe in leave-on cosmetic products; however, it is still allowed in the U.S.

Important: The benefits of protection afforded by sunscreen use against UV radiation outweigh the concerns above about some sunscreen ingredients. Always use sunscreen to protect yourself and your children. Here are some tips on benefitting from sunscreen's protection while minimizing your exposure to potentially harmful ingredients.

Tips for safer sunscreen use:

- Protection mechanism
 - Use mineral-based sunscreens such as zinc oxide or titanium dioxide
 - Avoid sunscreens that use chemical filters like oxybenzone, octinoxate, or methylisothiazolinone as the active ingredient
 - Broad-spectrum products offer coverage of both UVA and UVB radiation but they often use chemical filters
- Application method
 - Use lotions and sunscreen sticks
 - Avoid aerosol containers to prevent inhalation of the sunscreen (microscopic airborne particles)
- Avoid SPFs higher than 50 (these products don't necessarily offer better protection and can mislead consumers into staying in the sun longer)
- Apply 15 minutes before sun exposure
- Follow label instructions for the frequency of repeated applications
- Sunscreen should not be used on infants under 6 months, and therefore they should be kept out of the sun
- Adults should apply sunscreen to children to avoid accidental ingestion of harmful chemicals and to ensure correct application of the product

- Do not use combination bug spray-sunscreen products, as you will most likely need to reapply sunscreen--leading to over application of the bug repellent
- Apply sunscreen first and wait five to ten minutes before using bug spray

Other tips for sun protection include wearing light-weight, long-sleeve shirts and pants AND always wearing a hat if you plan on being outside in the sun. Sunglasses are also a must to protect your eyes. Make sure the sunglasses are UV protected so they are actively safeguarding your eyes from harmful UV rays. Polarized sunglasses provide even better protection from glare, especially from water, and can keep your eyes safer and healthier.

Organize outdoor activities for the early morning or late afternoon to avoid the sun's most intense rays. Finally, if you do need to be outside in the middle of the day, find some shade to cool off and protect your skin.

References

<https://www.loc.gov/rr/scitech/mysteries/sunscreen.html>

<https://www.skincancer.org/prevention/sun-protection/sunscreen/sunscreens-explained>

<https://www.ewg.org/sunscreen/report/the-trouble-with-sunscreen-chemicals/#.Wxay0VMvy3V>

<https://www.ewg.org/sunscreen/report/nanoparticles-in-sunscreen/#.WypTtGP0WM8>