

Sunscreens prevent sunburns, but beyond that simple fact surprisingly little is known about the safety and efficacy of these ubiquitous creams and sprays. FDA's failure to finalize its 1978 sunscreen safety standards both epitomizes and perpetuates this state of confusion. EWG's review of the latest research unearthed troubling facts that might tempt you to give up on sunscreens altogether. That's not the right answer – despite the unknowns about their efficacy, public health agencies still recommend using sunscreens, just not as your first line of defense against the sun. At EWG we use sunscreens, but we look for shade, wear protective clothing and avoid the noontime sun before we smear on the cream.

Here are the surprising facts:

1. There's no consensus on whether sunscreens prevent skin cancer.

The Food and Drug Administration's 2007 draft sunscreen safety regulations say: "FDA is not aware of data demonstrating that sunscreen use alone helps prevent skin cancer" (FDA 2007). The International Agency for Research on Cancer agrees. IARC recommends clothing, hats and shade as primary barriers to UV radiation and writes that "sunscreens should not be the first choice for skin cancer prevention and should not be used as the sole agent for protection against the sun" (IARC 2001a). Read more.

2. There's some evidence that sunscreens might increase the risk of the deadliest form of skin cancer for some people.

Some researchers have detected an increased risk of melanoma among sunscreen users. No one knows the cause, but scientists speculate that sunscreen users stay out in the sun longer and absorb more radiation overall, or that free radicals released as sunscreen chemicals break down in sunlight may play a role. One other hunch: Inferior sunscreens with poor UVA protection that have dominated the market for 30 years may have led to this surprising outcome. All major public health agencies still advise using sunscreens, but they also stress the importance of shade, clothing and timing. Read more.

3. There are more high SPF products than ever before, but no proof that they're better.

In 2007 the FDA published draft regulations that would prohibit companies from labeling sunscreens with an SPF (sun protection factor) higher than “SPF 50+.” The agency wrote that higher values were “inherently misleading,” given that “there is no assurance that the specific values themselves are in fact truthful...” (FDA 2007). Scientists are also worried that high-SPF products may tempt people to stay in the sun too long, suppressing sunburns (a late, key warning of overexposure) while upping the risks of other kinds of skin damage.

Flaunting FDA’s proposed regulation, companies substantially increased their high-SPF offerings in 2010. Nearly one in six products now lists SPF values higher than 50, compared to only one in eight the year before, according to EWG’s analysis of nearly 500 beach and sport sunscreens. Neutrogena, with six products labeled “SPF 100,” and Banana Boat, with four, stand out among the offenders. [Read more.](#)

4. Too little sun might be harmful, reducing the body’s vitamin D levels.

Adding to the confusion is the fact that sunshine serves a critical function in the body that sunscreen appears to inhibit — production of vitamin D. The main source of vitamin D in the body is sunshine, and the compound is enormously important to health – it strengthens bones and the immune system, reduces the risk of various cancers (including breast, colon, kidney, and ovarian cancers) and regulates at least 1,000 different genes governing virtually every tissue in the body. (Mead 2008) Over the last two decades, vitamin D levels in the U.S. population have been decreasing steadily, creating a “growing epidemic of vitamin D insufficiency” (Ginde 2009a). Seven of every 10 U.S. children now have low levels. Those most likely to be deficient include children who are obese or who spend more than four hours daily in front of the TV, computer or video games (Kumar 2009).

Experts disagree on the solution. The American Medical Association has recommended 10 minutes of direct sun (without sunscreen) several times a week (AMA 2008), while the American Academy of Dermatology holds that “there is no scientifically validated, safe threshold level of UV exposure from the sun that allows for maximal vitamin D synthesis without increasing skin cancer risk” (AAD 2009). Vitamin D supplements are the alternative, but there is debate over the proper amount. The Institute of Medicine has launched new research to reassess the current guidelines. In the meantime, your doctor can test your vitamin D levels and give advice on sunshine versus supplements. [Read more.](#)

5. The common sunscreen ingredient vitamin A may speed the development of cancer.

Recently available data from an FDA study indicate that a form of vitamin A, retinyl palmitate, when applied to the skin in the presence of sunlight, may speed the development of skin tumors and lesions (NTP 2009). This evidence is troubling because the sunscreen industry adds vitamin A to 41 percent of all sunscreens.

The industry puts vitamin A in its formulations because it is an anti-oxidant that slows skin aging. That may be true for lotions and night creams used indoors, but FDA recently conducted a study of vitamin A's photocarcinogenic properties, the possibility that it results in cancerous tumors when used on skin exposed to sunlight. Scientists have known for some time that vitamin A can spur excess skin growth (hyperplasia), and that in sunlight it can form free radicals that damage DNA (NTP 2000).

In FDA's one-year study, tumors and lesions developed up to 21 percent sooner in lab animals coated in a vitamin A-laced cream (at a concentration of 0.5%) than animals treated with a vitamin-free cream. Both groups were exposed to the equivalent of just nine minutes of maximum intensity sunlight each day.

It's an ironic twist for an industry already battling studies on whether their products protect against skin cancer. The FDA data are preliminary, but if they hold up in the final assessment, the sunscreen industry has a big problem. In the meantime, EWG recommends that consumers avoid sunscreens with vitamin A (look for "retinyl palmitate" or "retinol" on the label). Read more.

6. Free radicals and other skin-damaging byproducts of sunscreen.

Both UV radiation and many common sunscreen ingredients generate free radicals that damage DNA and skin cells, accelerate skin aging and cause skin cancer. An effective sunscreen prevents more damage than it causes, but sunscreens are far better at preventing sunburn than at limiting free radical damage. While typical SPF ratings for sunburn protection range from 15 to 50, equivalent "free radical protection factors" fall at only about 2. When consumers apply too little sunscreen or reapply it infrequently, behaviors that are more common than not, sunscreens can cause more free radical damage than UV rays on bare skin. Read more.

7. Pick your sunscreen: nanomaterials or potential hormone disruptors.

The ideal sunscreen would completely block the UV rays that cause sunburn, immune suppression and damaging free radicals. It would remain effective on the skin for several hours and not form harmful ingredients when degraded by UV light. It would smell and feel pleasant so that people use it in the right amount and frequency.

Unsurprisingly, there is currently no sunscreen that meets all of these criteria. The major choice in the U.S. is between “chemical” sunscreens, which have inferior stability, penetrate the skin and may disrupt the body’s hormone systems, and “mineral” sunscreens (zinc and titanium), which often contain micronized- or nano -scale particles of those minerals.

After reviewing the evidence, EWG determined that mineral sunscreens have the best safety profile of today’s choices. They are stable in sunlight and do not appear to penetrate the skin. They offer UVA protection, which is sorely lacking in most of today’s sunscreen products. Mexoryl SX (ecamsule) is another good option, but it’s sold in very few formulations. Tinosorb S and M could be great solutions but are not yet available in the U.S. For consumers who don’t like mineral products, we recommend sunscreens with avobenzone (3 percent for the best UVA protection) and without the notorious hormone disruptors oxybenzone or 4-MBC. Scientists have called for parents to avoid using oxybenzone on children due to penetration and toxicity concerns. [Read more.](#)

8. Europe’s better sunscreens.

Sunscreen makers and users in Europe have more options than in the United States. In Europe, sunscreen makers can select from among 27 chemicals for their formulations, compared to 17 in the U.S. Companies selling in Europe can add any of seven UVA filters to their products, but have a choice of only three when they market in the U.S. European sunscreens could earn FDA’s proposed four-star top rating for UVA protection, while the best U.S. products would earn only three stars. Sunscreen chemicals approved in Europe but not by the FDA provide up to five times more UVA protection; U.S. companies have been waiting five years for FDA approval to use the same compounds. Last but not least, Europeans will find many sunscreens with strong (mandatory) UVA protection if proposed regulations in Europe are finalized. Under FDA’s current proposal, Americans will not. [Read more.](#)

9. The 33rd summer in a row without final U.S. sunscreen safety regulations.

In the United States, consumer protection has stalled because of the FDA's 32-year effort to set enforceable guidelines for consumer protection. EWG has found a number of serious problems with existing products, including overstated claims about their performance and inadequate UVA protection. Many of these will be remedied when the FDA's proposed sunscreen rule takes effect. But even after the rule is enacted, gaps will remain. FDA does not consider serious toxicity concerns such as hormone disruption when approving new sun filters, and the new rules would fail to measure sunscreen stability despite ample evidence that many products break down quickly in sunlight. [Read more.](#)

Here are some prime examples of products and players that typify what's wrong with the sun protection business:

Banana Boat Baby Max Protect, SPF = 100

Sky-high SPF protects against sunburn but leaves skin exposed to damaging UVA rays.

One of at least 79 sunscreens on the market this year with high SPFs (greater than "SPF 50+"), this product protects babies from UVB radiation and the sunburns it causes but leaves them exposed to UVA radiation that penetrates deep into the skin. UVA is known to accelerate skin aging and cause skin cancer (IARC 2009).

A standard industry sunscreen model estimates that the actual UVA protection factor for this sunscreen is only 9.3 – a far cry from 100 (BASF 2010). The best possible UVA protection in U.S. sunscreen lotions is currently about 20 (BASF 2010). Sunscreen makers are waiting for the FDA to decide whether to approve a wider selection of chemicals that could help boost UVA protection. In the meantime, high-SPF products may tempt people to stay in the sun too long, suppressing sunburns but upping the risks of other kinds of skin damage. EWG recommends that consumers avoid products labeled with anything higher than "SPF 50+" and reapply sunscreen often, regardless of SPF.

iS Clinical SPF 20 Powder & Peter Thomas Roth Instant Mineral Powder SPF 30

Loose powder sunscreens can enter the airways and may move from the lungs to the bloodstream. Health concerns include cancer and tissue damage.

These sunscreens are in a loose powder form. The particles of zinc and titanium they contain can offer strong UV protection for the skin, but they end up in the lungs, too, inhaled from a cloud of airborne particles with each use. There, they can cause damage. The International Agency for Research on Cancer classifies inhaled titanium dioxide as “possibly carcinogenic to humans,” based on studies of rats and of people who work in dusty environments (IARC 2006).

Once in the lungs, the minerals may move into the bloodstream and throughout the body. In 2008 a research group based in China reported that nanoscale titanium dioxide like that used in many sunscreens can accumulate in the brain and cause lesions and other tissue damage (Wang 2008). Nano and micronized zinc oxide cause lung inflammation (Sayes 2007).

The bottom line? Sunscreen belongs on your skin, not in your lungs. EWG recommends that people stick to creams and avoid powders, pumps and sprays.

Hawaiian Tropic Baby Creme Lotion SPF 50

“Advanced UVA protection”? Not so much. Many U.S. sunscreens claim to provide “broad spectrum” protection that blocks both UVA and UVB rays, but the reality is that they don’t. Hawaiian Tropic Baby Creme Lotion SPF 50 lists “Advanced UVA protection” on its website and “UVB/SPF with UVA” on its label. But it would earn only 1 star in FDA’s proposed 4 star UVA labeling scheme, according to EWG analysis using a standard industry sunscreen model.

Hawaiian Tropic is not required to back up its claim of “advanced UVA protection,” and the fact is that no currently available sunscreen chemical has been shown to block UVA rays effectively. Regulations in Japan and Australia prohibit making such claims altogether for products that

provide such weak UVA protection (Diffey 2009), but there is no such restriction in the U.S.

Based on a review of partial label information published by online retailers, EWG researchers identified 218 beach sunscreens that claim “broad spectrum” or “full spectrum” protection for 2010. Many would garner only “low” or “medium” UVA protection in FDA’s proposed labeling system.

Aveeno Baby Continuous Protection SPF 55

“Mild as water.” Sure it is.

Can a product be “mild as water to the skin” if the label warns to “Stop use and ask a doctor if rash or irritation develops and lasts”? And certainly when swallowed this product is nothing like water: “Keep out of reach of children” and “get medical help or contact a Poison Control Center right away,” reads the warning label.

Anthony Logistics for Men Sunstick SPF 15

Safe for eyes? Not really.

This product’s directions tell users to “Apply to eye area,” but the warnings advise : “Keep out of eyes.”

Since there are no regulations to ensure it, you would hope that common sense would lead sunscreen makers to formulate products for use around the eyes that are actually safe for the eyes.

No such luck!

Tip for consumers: Wear sunglasses and keep sunscreen (including from sprays) out of your eyes.

Panama Jack Naturals Baby Sunblock SPF 50

Potential hormone disruptor in baby sunblock .

Panama Jack advises users of this baby product to “apply liberally.”

Scientists who have researched a key sunscreen chemical in this sunblock , the potential hormone disruptor oxybenzone , advise the opposite: “It would be prudent not to apply oxybenzone to large surface areas of skin for extended and repeated periods of time, unless no alternative protection is available. There may be an additional concern for young children who have less well developed processes of elimination, and have a larger surface area per body weight than adults, with respect to systemic availability of a topically applied dose” (Hayden 1997).

Oxybenzone is readily absorbed through the skin; government studies have detected the compound in 97 percent of the population (Calafat 2008). In rodents, it mimics estrogen and increases the weight of the uterus (Schlumpf 2004). In people, higher maternal exposures to oxybenzone have been linked to decreased birth weight in girls (Wolff 2008).

This Panama Jack sunscreen is one of at least 26 sunscreens offered in the 2010 season with the word “baby” in their name and the chemical oxybenzone on their ingredient list. EWG advises consumers to avoid sunscreens containing oxybenzone . Plenty of safer products are available.

One more thing: This so-called “natural” sunscreen contains at least ten compounds that do not occur in nature. Most are made from petroleum.

Banana Boat Ultra Defense Sunscreen Stick SPF 50

Maybe it doesn't break down, but it also doesn't last forever.

"It doesn't break down," says the manufacturer of the Banana Boat sunscreen stick.

You might think one coat would do you for a whole day. Not so. Even though sunscreen makers like Banana Boat often use stabilizing additives to keep their ingredients from breaking down in sunlight, the product still doesn't last forever on the skin. Sunscreens wash off in water and rub off on clothes and towels.

Tip for sunscreen users: Some sunscreen chemicals break down in the sun. They also wash off in water and rub off on towels and clothes – reapply them as directed.

Baby Blanket Tender Scalps Scalp Sunscreen Spray for Babies SPF 45+

Instant protection from sunburn, instant exposure to UVA rays.

"Instantly provides 45 times your babies' natural protection," claims the manufacturer. While that may be true for UVB rays and the red burns and blisters they cause, it's not the case for UVA. This product would earn only one of four stars for UVA protection in FDA's proposed rating system, according to EWG's analysis. Your baby's scalp may not get burned, but UVA rays could instantly penetrate deeply and cause skin damage and trigger cancer later in life. At least 18 other products EWG assessed claim "instant" or "immediate" protection.