

Take 3 – Practical Practice Pointers[©] June 3, 2019 Edition

Almost Summer Sun Protection Edition: Sunscreen 2019, Sunscreen Danger?, UPF Clothing

From the Consumer Reports and Caveat Emptor 2019

1) Sunscreen 2019: Not All Sunscreens Deliver Claimed SPF

Ultraviolet radiation (UV) exposure is recognized as a major environmental risk factor for both melanoma and keratinocyte cancers. The sun protection factor (SPF) is a relative measure of how long a sunscreen will protect you from UVB rays, which are the chief cause of sunburn and a contributor to skin cancer. Usually the number is explained as the amount of time it takes an individual's skin to burn when it's covered in sunscreen compared with when it's not. For example, assuming you apply—and reapply—the sunscreen correctly, if you'd normally burn after 20 minutes in the sun an SPF 30 protects for about 10 hours.

SPF calculations do not apply to UVA rays, which can tan and age skin and also trigger skin cancer. Thus the need for a broad-spectrum sunscreen that provides protection against both types of UV rays. However, no sunscreen blocks 100 percent of UVA or UVB rays. The breakdown: SPF 30 blocks 97 percent of UVB rays, SPF 50 blocks 98 percent, and SPF 100 blocks 99 percent.

The Consumer Reports organization yearly tests sunscreens to see how close they approximate their claims. In 2019, of the 82 lotions, sprays, sticks, and lip balms tested, 32 tested at less than half their labeled SPF number. These results aren't a fluke. Similar patterns have been found in previous years' sunscreen tests. This doesn't mean the products aren't protective at all, but may not be providing the degree of protection claimed and expected. Since the American Academy of Dermatology recommends using a product with an SPF of 30 or higher, this means that many cases, users are not adequately protected, even with listed SPF ratings of 50. This also means that most products with an SPF rating of 30 are not sufficient.

Additionally, testing has consistently found that so-called natural or mineral sunscreens—those that contain only titanium dioxide, zinc oxide, or both as active ingredients—while non-absorbed and therefore theoretically safer (see Pointer #2), have tended to perform less well for sun protection. None made the list. **NOTE:** This does not include products labeled sunblock, such as higher concentration zinc oxide products (think white noses on lifeguards).

Top Rated Products in order of rating (scores drop, often significantly, after these):

Lotions (rating):

- La Roche-Posay Anthelios SPF 60 Melt-in Sunscreen Milk lotion (100 - perfect score – highest price)
- Bullfrog Land Sport Quik Gel SPF 50 (95)
- Coppertone Ultraguard Lotion SPF 70 (94)
- Equate (Walmart) Ultra Lotion SPF 50 (94)

Sprays (rating):

- Trader Joe's Spray SPF 50 (100 - perfect score)
- Banana Boat Sun Comfort Clear Ultramist Spray SPF 50 (96)
- CVS Health Beach Guard Clear Spray SPF 70 (90)
- Neutrogena CoolDry Sport Spray SPF 50 (89)
- Neutrogena Beach Defense Water + Sun Protection SPF 70 (82)

Stick (rating):

- Up & Up (Target) Kids Sunscreen Stick SPF 55 (84)

My Comment:

The FDA requires sunscreen makers to test their products but does not necessarily require them to submit their results. Additionally, the testing method used by Consumer Reports varied from the FDA testing methods. What makes this report compelling is that the same evaluation process was used on all products under the same conditions testing 3 different lots (less potential bias than a company testing their own product). As an avid sunscreen (and sunshirt and goofy sun hat) user, this report will impact which sunscreen I use, as one of the sunscreens I used last year went from a rating in the 90's to one in the 30's. Additionally, note that cost and "brand name" are not necessarily "better" and there can be incredible variation in quality among the various products even from the same manufacturer. See Pointer 2 for more regarding sunscreen safety.

Reference:

Consumer Reports April 30, 2019 (full report only available to subscribers): [Report](#)

From the Literature

2) Systemic Absorption of Sunscreen

Sunscreens prevent skin damage by reflecting, absorbing, and/or scattering UV radiation and are regulated as over-the-counter (OTC) drug products. The FDA permits certain OTC drugs to be marketed without approved new drug applications because they are generally recognized as safe and effective (GRASE) and not misbranded. Over the last twenty years, new scientific evidence has helped to shape the FDA's perspective on the conditions, including active ingredients and dosage forms, under which sunscreens could be considered GRASE. In February 2019, the FDA proposed a new rule for sunscreens marketed without FDA-approved applications:

- "Proposes that, of the 16 currently marketed active ingredients, two ingredients – zinc oxide and titanium dioxide – are GRASE for use in sunscreens; two ingredients – PABA and trolamine salicylate – are not GRASE for use in sunscreens due to safety issues. There are 12 ingredients for which there are insufficient safety data to make a positive GRASE determination at this time. To address these 12 ingredients, the FDA is asking industry and other interested parties for additional data. The FDA is working closely with industry to make sure companies understand what data the agency believes is necessary for the FDA to evaluate safety and effectiveness for sunscreen active ingredients, including the 12 ingredients for which the FDA is seeking more data."

The FDA has additionally provided guidance that sunscreen active ingredients with systemic absorption greater than 0.5 ng/mL or with safety concerns should undergo

nonclinical toxicology assessment including systemic carcinogenicity and additional developmental and reproductive studies.

Although OTC sunscreen products are widely used, little is known about systemic exposure for most active ingredients. Understanding the extent of systemic exposure of these products is important, as even a low percentage of systemic absorption (eg, 0.1%) could represent a significant systemic exposure. The clinical relevance of systemic exposure is not well understood.

This study was designed to determine whether and the extent to which 4 commonly used active ingredients (avobenzone, oxybenzone, octocrylene, and ecamsule) are absorbed into systemic circulation of 24 healthy volunteers.

The authors found that systemic concentrations greater than 0.5 ng/mL were reached for all 4 products after 4 applications on day 1 of the 4 day trial and concluded that the systemic absorption of sunscreen ingredients supports the need for further studies to determine the clinical significance of these findings. They specifically noted that these results do not indicate that individuals should refrain from the use of sunscreen.

My Comment:

Many of the chemicals intentionally consumed every day (OTC products) are done so with often completely blind faith. It is disturbing to me that such a relatively easy study has never been done on such diffusely “consumed” products. Additionally, ongoing accumulation in the blood with slow drug washout is at the least notable for substances whose long-term safety is completely unknown.

This presents a public health quandary. These substances have been used for decades and there have been no strong epidemiologic signals of harm while they have certainly prevented uncounted cases of skin cancer. While not wanting to instill public fear, the results do remind us that “caveat emptor” still reigns. They also serve as a reminder that there are other (and likely more economical) options available. While I will personally continue to use sunscreen when indicated, I will be even more mindful of using other options as well, and limiting the amount of my exposure when possible. See Pointer #3 for more about this

References:

- Matta MK. Effect of sunscreen application under maximal use conditions on plasma concentration of sunscreen active ingredients. A randomized clinical trial. JAMA. Online. 2019 May 6. [Abstract](#)
- FDA News Release: FDA advances new proposed regulation to make sure that sunscreens are safe and effective. February 21, 2019. [Link](#)

Question From a Colleague

3) The Effectiveness of UPF Clothing for Sun Protection

Question: With the arrival of summer, I’m wondering about the effectiveness of ‘SPF Clothing.’ And is it worth the cost?”

Answer: There is actually no such thing as SPF clothing. Clothing/fabrics are tested using a UPF (Ultraviolet Protection Factor) rating system. The UPF rating indicates how much UV radiation (UV-R) will pass through the fabric; the higher the rating the greater

the protection. A UPF 25 means 1/25 (4%) of UV-R will pass. UPF 50 means 1/50 (2%) will be able to penetrate the fabrics. The highest UPF protective level is 50+, which means less than 2% of the UV-R may be penetrating the clothes. There is no “official” UPF higher than 50+. In general, UPF clothing will lose protection when wet or when stretched out.

Currently, manufacturers follow voluntary testing guidelines and use private labs to determine a fabric’s UPF rating. The most common standard used in the US to “rate” UPF clothing is ASTM (formerly the American Society for Testing and Materials). Some manufacturers also use the AS/NZS (Australia/New Zealand) standard. They are similar in terms of the measurement process used. In general, advanced textiles and fabrics score better for UPF ratings. Polyester & Nylon are best for UV reflection. Wool and silk are moderately effective. Cotton, rayon, flax and hemp have naturally low ability to block or reflect UV.

The Federal Trade Commission monitors UPF advertising claims. If a manufacturer adds a tag with a UPF 15-50+ rating to any product, it must adhere to the testing standards outlined above. No clothing item with an Ultraviolet Protection of less than 15 can be labeled “sun-protective”. If a manufacturer's claims are questioned, the FTC can investigate the testing methods that were used to ensure that they support the claim.

Interestingly, Consumer Reports did a study comparing the UPF of three white shirts, only one of which had a UPF claim. The Coolibar Girl’s Rash Guard UPF 50+ (\$32), which is a blend of 84 percent polyester and 16 percent spandex embedded with titanium dioxide, delivered a UPF of 174. A cotton Hanes Beefy-T long-sleeve T-shirt (\$13) which is thicker than a regular T-shirt had a UPF of 115 and an Eastbay Evapor long-sleeve compression crew (\$18) made of the same polyester/spandex blend as the Coolibar top had a UPF of 392. When wet, the Coolibar’s UPF actually increased to 211, the Eastbay’s dipped to 304, and the Hanes Beefy-T decreased to a UPF of 39.

My Comment:

Clothing can offer excellent sun protection without having a UPF label. For example, it is estimated that jeans have a UPF of approximately 1700! However, a normal thickness white t-shirt has a UPF of 5. While there is usually a cost differential between regular shirts and UPF-labeled products, when one considers that the average sunscreen costs somewhere between \$6-12, a sunshirt that will last years (and that you don’t have to worry about “reapplying” after 2 hours, after swimming, or after sweating, OR about systemic absorption OR about damaging reefs/sea life) begins to look like a good bargain indeed.

Reference:

Consumer Reports Sun Protection Clothing: [Report](#)

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Mark

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