

Protecting Children from Sun Exposure

Solar radiation is hazardous for children. It can cause skin cancer, including malignant melanoma, the most highly fatal form of skin cancer. Rates of skin cancer in the United States have been rising steadily over the past three decades, and these increases are closely associated with increased exposure to ultraviolet (UV) radiation from the sun. Blistering sunburns in childhood and adolescence are especially dangerous and are strongly associated with increased risk of skin cancer. Blond or red-haired and blue-eyed children, who often have lighter complexions, are at highest risk of solar injury, because their skin contains smaller quantities of the protective pigment, melanin, than children with darker complexions.

Two strategies exist to protect children against solar radiation (1) sunscreens or sunblocks and (2) sun-protective clothing.

Sunscreens and Sunblocks

Sunscreens are regulated by the US Food and Drug Administration (FDA). FDA permits 17 active ingredients to be used in sunscreens. Two of these are minerals, titanium dioxide and zinc oxide, which work by reflecting and scattering the sun's rays away from the skin ("sunblocks"). The rest are chemicals, which absorb the sun's rays and keep them from causing skin damage ("sunscreens").

The **least harmful active ingredients in sunscreens include titanium dioxide, zinc oxide and avobenzone**, according to the Environmental Working Group (www.cosmeticsdatabase.com).

Neither zinc oxide nor titanium dioxide is associated with skin irritation or sensitization in humans. Studies (Nash, 2006) have found no evidence of skin penetration of titanium dioxide and only limited penetration for zinc oxide. Sunscreens containing these two agents alone are generally recommended for children, because of their lack of skin penetration.

What does SPF mean?

Sunscreens are rated by **SPF** – Sun Protection Factor. SPF measures the amount of time it takes for sun-exposed skin to redden. If you normally burn in 10 minutes, a sunscreen with SPF 15 would protect you 15 times as long, or 150 minutes, assuming you don't sweat or get wet. But that equation changes at SPF's above 30. A sunscreen with SPF 50 blocks only about 1.3 percent more UVB rays than SPF 30, according to the Environmental Working Group.

UVA and UVB rays

There are two types of ultraviolet solar radiation – A and B. Both types of rays may cause skin damage or possibly skin cancer. SPF only measures the protection that a sunscreen provides against UVB but not UVA rays, which penetrate more deeply into the skin, creating wrinkles. To protect your child against both types of rays, it is important to look for sunscreens that are labeled "broad spectrum," or check the ingredients for the four FDA-approved UVA blockers: titanium dioxide, zinc oxide, avobenzone or mexoryl. Use of these products will minimize your child's exposure to both UVA and UVB rays.

Sun Protective Clothing

The tightness of the weave, the weight, type of fiber, color and amount of skin covered all affect the amount of protection that clothing provides from the sun. In general, clothing made of tightly-woven fabric best protects skin from the sun. The easiest way to test if a fabric can protect your skin is to hold it up to

the light. If you can see through it, then UV radiation can penetrate it – and reach your skin. Clothes may also be treated with UV-absorbing chemicals, such as titanium dioxide, providing additional protection.

What is UPF?

Clothing is rated according to its UPF - Ultraviolet Protection Factor. The UPF rating indicates how much of the sun's UV radiation is absorbed. A fabric with a rating of 50 will allow only 1/50th (2%) of the sun's UV rays (both UVA and UVB) to pass through, blocking the remaining 98%. To be deemed sun-protective, such clothing must have a UPF of more than 30 and undergo 40 simulated launderings, be exposed to the equivalent of 2 years of light and be tested with chlorinated water if it is intended for swimsuits.

Even if a piece of clothing has a good UPF, what you do while wearing it can make a difference. If the fabric gets stretched, it will lose some of its protective ability, because the fabric becomes thinner and more transparent to light. And once it gets wet, sun-protective clothing can lose up to 50 percent of its UPF. According to the Skin Cancer Foundation, a dry long-sleeved, white cotton T-shirt's UPF is 7, but after it gets wet, it provides a UPF of only 3. At the opposite end of the spectrum, a long-sleeved dark denim shirt has a UPF of 1,700, which amounts to a complete sun block.

What guidelines or regulations exist for testing/labeling clothing?

Unlike sunscreens, which are regulated by the FDA, there is no regulation and no universally accepted standards of testing or labeling sun-protective clothing. Currently, manufacturers follow voluntary testing guidelines and use private labs to determine a fabric's UPF rating. The only way for consumers to determine if a fabric has been tested is to check with the manufacturer. As a result of the lack of regulation, sun-protection as advertised cannot always be guaranteed.

According to a review published in *The Lancet*, (Lautenschlager et al., 2007) the most effective steps that you and your family can take to protect your children against the sun are to wear sun protective clothes and a hat. These approaches are more effective than sunscreen alone in preventing skin cancer.

Recommendations for Reducing Sun Exposure:

- Use sunscreen that is SPF 15 or higher, is labeled "broad spectrum" and contains: titanium dioxide, zinc oxide, avobenzone and mexoryl to ensure UVA and UVB protection.
- Use sun protection even on cloudy days as most of the sun's rays can penetrate the clouds.
- Put on sunscreen 30 minutes before going outdoors - it needs time to work on the skin.
- Re-apply every two hours, especially if your child is playing in the water.
- Hats with wide brims all the way around are very effective in protecting the ears, nose and back of the neck.
- Choose tightly woven and dark fabrics over pale or pastel-colored and loosely woven clothes.
- Thicker, heavier fabrics offer higher UPFs.
- Wear loose clothing -- the closer the fabric is to the skin the less sun protection it offers.
- While there have been no studies focusing on the long-term safety of the materials used in sun-protective clothing in children, a review of the available research suggests that the materials in the clothing are not likely to pose any increased risk of harm to children whereas the beneficial protection they offer against the more clear-cut threat of skin cancer is indisputable.