Sun Protection

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What are we protecting ourselves from?
Effects of UV Radiation

**UVB**

**Acute**
- Sunburn
- Synthesis of Vitamin D

**Chronic**
- Tanning
- Photocarcinogenesis
- Immunosuppression
- Photoageing

**UVA**

**Acute**
- Immediate skin darkening

**Chronic**
- Photoageing
- Immunosuppression
- Photocarcinogenesis
Effects of UV Radiation

**UVB**

**UVA**
Effects of UV Radiation

UVB

UVA

Basal Cell Carcinoma

Melanoma

Squamous Cell Carcinoma
Stratospheric ozone levels
Cloud cover
Latitude
Season
Lower atmospheric pollution

Behavior
• Sun-seeking
• Sun-protective

Genetic
• Skin pigmentation
• Sun sensitivity disorders

Cultural
• Dress
• Behaviors

Immune competence (HIV)

Cutaneous melanoma
Squamous cell carcinoma
Basal cell carcinoma
Solar keratoses
Sunburn
Cataract
Pterygium
Reactivation of herpes labialis
Sun Protection Guidelines
Sun Protection Regimen

• Protective Clothing
• Hat and Sunglasses

• Seek Shade
• Limit exposure to midday sun

• Sunscreen
UV Index

- A measure of the intensity of UV radiation on the Earth’s surface that is relevant to effects on the human skin
Variations in the UV Index

The intensity of the sun's UV rays reaching the earth's surface, and the UV Index ratings, vary according to many factors. All influence the UV Index in locations across the U.S.

**Cloud Cover**, if heavy, can block most UV radiation. Thin or broken clouds allow most UV rays through. Puffy, fair-weather clouds deflect rays and can increase UV radiation reaching the surface.

**Ozone** absorbs UV radiation. The higher the amount of ozone, the fewer rays reach the surface. Ozone levels vary from day to day and throughout the year.

**Altitude** affects UV radiation; UV increases about 2% for every 1,000-foot increase in elevation due to thinner mountain air.

**Time of Day** affects UV radiation, which peaks at midday (with the sun highest in the sky), and lessens in the early morning and late afternoon.

**Seasons** affect UV radiation, which peaks in spring and summer (April to August), declines in fall, and is lowest in winter.

**Land Cover**, such as structures and trees, significantly reduces exposure to UV radiation.

**Latitude** affects UV radiation, which is strongest at the equator and declines toward the poles.

**Earth Surface Characteristics** can reflect or scatter UV radiation. Snow may reflect as much as 80% of UV, sand 15%, and water 10%.
UV Index

<table>
<thead>
<tr>
<th>Exposure Category</th>
<th>Index Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>1-2</td>
</tr>
<tr>
<td>MODERATE</td>
<td>3-5</td>
</tr>
<tr>
<td>HIGH</td>
<td>6-7</td>
</tr>
<tr>
<td>VERY HIGH</td>
<td>8-10</td>
</tr>
<tr>
<td>EXTREME</td>
<td>11+</td>
</tr>
</tbody>
</table>
UV Index Guidelines

1 2
NO PROTECTION REQUIRED
You can safely stay outside!

3 4 5 6 7
PROTECTION REQUIRED
Seek shade during midday hours!
Slip on a shirt, slop on sunscreen and slap on a hat!

8 9 10 11+
EXTRA PROTECTION
Avoid being outside during midday hours!
Make sure you seek shade!
Shirt, sunscreen and hat are a must!
## UV Index Guidelines

<table>
<thead>
<tr>
<th>UV INDEX</th>
<th>Recommended protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2</td>
<td></td>
</tr>
<tr>
<td>3 - 7</td>
<td><img src="https://via.placeholder.com/50" alt="Sunscreen" /> <img src="https://via.placeholder.com/50" alt="Umbrella" /></td>
</tr>
<tr>
<td>8 +</td>
<td><img src="https://via.placeholder.com/50" alt="Sunscreen" /> <img src="https://via.placeholder.com/50" alt="Shelter" /></td>
</tr>
<tr>
<td>LOCATION</td>
<td>AVERAGE UV INDEX VALUE</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td>Winter</td>
</tr>
<tr>
<td>Atlanta, Georgia</td>
<td>2 (Low)</td>
</tr>
<tr>
<td>Phoenix, Arizona</td>
<td>3 (Moderate)</td>
</tr>
<tr>
<td>Anchorage, Alaska</td>
<td>&lt;1 (Low)</td>
</tr>
<tr>
<td>Honolulu, Hawaii</td>
<td>6 (High)</td>
</tr>
<tr>
<td>New York, New York</td>
<td>1 to 2 (Low)</td>
</tr>
<tr>
<td>Portland, Oregon</td>
<td>1 (Low)</td>
</tr>
<tr>
<td>St. Louis, Missouri</td>
<td>1 to 2 (Low)</td>
</tr>
<tr>
<td>Miami, Florida</td>
<td>4 (Moderate)</td>
</tr>
</tbody>
</table>

Typical UVI values for different parts of the U.S. at midday. These values may vary significantly depending on cloud cover and ozone levels.
Pop Quiz

UV Index Knowledge
UV Index
UV INDEX FORECAST

UV Index Variation During a Summer Day

St. Louis, Missouri, June 20, 2003
Sun Protection Regimen

- Protective Clothing
- Hat and Sunglasses

- Seek Shade
- Limit exposure to midday sun

- Sunscreen
Clothing is Photoprotective
Tan Lines From Typical Summer Activities

Waterskiing
Mountain Biking
SCUBA Diving
Rollerblading
Blogger
Tennis
Protective Clothing

- Tightly woven fibers
- Thick fabric
- Denim, wool, synthetic materials
- Dark-color fabrics
- Unbleached fabrics
- Lax materials
- Dry materials
- Shrinking after washing
- Treatment with a broad-spectrum ultraviolet absorber (e.g. Tinosorb)
Ideal Clothing

– An Ultraviolet Protection Factor (UPF) of 30 or higher.
– UVA transmission of less than 5 percent (95 percent blocking of UVA).
– Meet or exceed minimal coverage criteria as indicated by the European standard (EN 13758).
– Documentation supporting adherence to U.S. standards for testing and labeling of UV-protective garments (ASTM D6544; AATCC 183; ASTM D6603).
– Hats designed for adults must include a fixed brim/fabric material 7.5cm (3 inches) or more around the circumference of the hat.
Pop Quiz #2

Which is more photoprotective?
Who was more photoprotected?

A

B
Which is more photoprotective?

A

B
Who is more SunSmart?
Sun Protection Regimen

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- Hat and Sunglasses

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- Sunscreen
Sunscreen

• SPF 30+, “Broad Spectrum”

• While using a higher SPF provides greater UVB protection than a lower SPF, it does not mean that you should stay out in the sun longer.
FDA Labeling

- “Warning: UV exposure from the sun increases the risk of skin cancer, premature skin aging, and other skin damage. It is important to decrease UV exposure by limiting time in the sun, wearing protective clothing, and using a sunscreen.”
Sun Protection Regimen

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Pop Quiz #3

True or False
True or False

A suntan is healthy.
FALSE

A suntan is healthy.

A tan results from your body defending itself against further damage from UV radiation.
Ture or False

A tan protects you from the sun.
False

A tan protects you from the sun.

A dark tan on white skin offers only limited protection equivalent to an SPF of about 4.
True or False

You can’t get sunburned on a cloudy day.
False

You can’t get sunburned on a cloudy day.

Up to 80% of solar UV radiation can penetrate light cloud cover. Haze in the atmosphere can even increase UV radiation exposure.
True or False

You can’t get sunburned while in the water.
False

You can’t get sunburned while in the water.

Water offers only minimal protection from UV radiation, and reflections from the water can enhance your UV radiation exposure.
True or False

UV radiation during the winter is not dangerous.
False

UV radiation during the winter is not dangerous.

UV radiation is generally lower during the winter months, but snow reflection can double your overall exposure, especially at high altitude. Pay particular attention in early spring when temperatures are low but the sun’s rays are unexpectedly strong.
True or False

Sunscreens protect me so I can sunbath longer.
False

Sunscreens protect me so I can sunbath longer.

Sunscreens should not be used to increase sun exposure time but to increase protection during unavoidable exposure. The protection they afford depends critically on their correct application.
True or False

If you take regular breaks during sunbathing you won’t get sunburned.
False

If you take regular breaks during sunbathing you won’t get sunburned.

UV radiation exposure is cumulative during the day.
True or False

If you don’t feel the hot rays of the sun you won’t get sunburned.
False

If you don’t feel the hot rays of the sun you won’t get sunburned.

Sunburn is caused by UV radiation which cannot be felt. The heating effect is caused by the sun’s infrared radiation and not by UV radiation.