Use of sunscreens should be on daily basis especially when outside as harmful UV rays are emitted year-round. Even on cloudy days, 80 percent of UV rays can go into the skin. Snow, sand and water reflect the Sun’s rays, making sunscreen use a necessity.

When should I use sunscreen?

In infants less than six months of age, sunscreen should be avoided as their skin is thinner than that of adults, allowing absorption of chemical ingredients in sunscreen more easily (as compared to adults). This may increase the risk of development of an allergic reaction. So, for babies physical protection like protective clothing and broad-brimmed hats are effective sun protective measures. If these are used properly, sunscreens would be required only on very small areas. Only sensitive sunscreens are to be used in babies if needed as they are protective (sunscreens with scattering ingredients, ingredients and preservatives that may cause reactions are avoided).

For infants above six months, sunscreen which is broad-spectrum, water-resistant and SPF 30 should be preferred. Physical or special sunscreens specially made for infants are recommended as they are less irritating to them.

How long can sunscreens be stored?

Sunscreens are emulsions of oil and water, they tend to separate and vary from few months to many years. The time taken for this would depend on the quality of the formulation. Sunscreens should be applied before or after moisturizer?

Most cosmetic formulas lack enough protection against UVA rays, so sunscreen can be applied under makeup.

Can sunscreens be used with makeup?

According to FDA, titanium dioxide and zinc oxide which are ingredients of sunscreen are generally recognized as “safe and effective” (GRASE).

Safety concerns about ingredients in chemical sunscreens (namely oxybenzone) stem from the fact that these ingredients can lead to skin irritation and even cancer as they can be absorbed through the skin. But no studies have shown harmful effects in humans, despite the evidence of absorption.

Side effects of sunscreens
- Skin sensitivity
- Serious allergic reaction (itching / swelling of face / tongue / throat, rash, dizziness and breathing difficulties)

How to apply sunscreen?

It is not applied uniformly, so some areas of skin will have little or no protection.

Vitamin D required for healthy bones is produced in the skin by the UV rays in sunlight. As sunscreens are designed to absorb UV, it might be thought that applying sunscreens would affect vitamin D production. Sunscreens tested in laboratory conditions do not block vitamin D production and their daily use has negligible effect on vitamin D levels. The reasons for which are
- Usually less quantity of sunscreen is applied than the amount used by the manufacturers in the testing process.
- It is not applied uniformly, so some areas of skin will have little or no protection.

How to test for allergenicity of sunscreens?

When should I use sunscreen?

Most cosmetic formulas lack enough protection against UVA rays, so sunscreen can be applied under makeup.

US Food and Drug Administration regulations require all sunscreens to have an expiry date and sunscreen that don’t have an expiry date should be considered expired three years after purchase. Once the sunscreen has expired, it should be discarded as it becomes less effective, reducing the SPF thereby increasing the sunburn risk.

Does sunscreen expire?

Children are more sensitive to the sun and are also at higher risk than adults to get sunburn, resulting in more DNA damage in response to the same amount of sunshine as adults. Thus, regular sunscreen application is imperatively for children. Physical blockers are considered safer in children.

Should sunscreens be used in children?

Very few sunscreen users re-apply sunscreen. Sunscreen are mostly used during recreational exposure, so a sufficient thin layer of sunscreen will be there even on the areas of skin that are protected during that time of exposure, allowing adequate UV penetration through the skin to produce vitamin D.

Vitamin D is synthesized in the skin on a daily basis and many do not apply sunscreen during daily sun exposure.

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What is “UVA, UVB and UVC radiation”?

What is “Sun Protection Factor (SPF)”?

What is “Water resistance”?

What is “UV star system”?

What are the types of sunscreens available?

Which sunscreen should be used?

Does sunscreen expire?

Is sunscreen safe to use?

Does sunscreen use cause deficiency of vitamin D?

What is a sunscreen and how do they work?

What does ‘broad-spectrum’ mean?

What is “GRASE”?

What is “Sun protection?”

What is “Photo-sensitivity” of sunscreens?

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Side effects of sunscreens
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What is UVA, UVB and UVC radiation?

Ultraviolet (UV) radiation, invisible energy from the sun is mainly responsible for causing skin cancer, premature aging and other sign of sun damage. UV radiation is transmitted in three wavelengths; namely UVA, UVB and UVC. This radiation can be increased by reflections of the Sun’s rays. Snow increases the radiation upto 85%, sand upto 17% and water upto 5%.

UV radiation

They are long-wavelength rays of 320-400 nm and comprise the majority of UV radiation which reaches the surface of the Earth. They do not get blocked by glass, clouds or Ozone layer. As their penetration in the skin is more deeper than UVB, they affect the cells of the skin, causing ageing changes in the form of coarse wrinkles, rough and leathery skin, brown pigmentation and skin cancer. Thus a sunscreen with UVA protection will reduce signs of ageing and development of skin cancer.

UVB radiation

They are shorter-wavelength rays of 290-320 nm, mostly absorbed by the Ozone layer. Penetrating the top layers of skin, UVB rays are mainly responsible for skin damage including sunburn and skin cancer.

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Sunscreen is a topical product to be applied to the skin, absorbing or reflecting proportion of the UV rays from penetrating and damaging the skin. Chemical sunscreens that absorb UV radiation, consist of mixture of organic filters/chemicals. Physical sunscreens that contain inorganic filters/chemicals prevent UV rays from penetrating the skin by scattering them away from the skin. Chemicals called excipients are used to formulate and give them cosmetic feel.

Physical sunscreens contain ingredients like zinc oxide and/or titanium dioxide are recommended for sensitive skin. Inorganic filters/chemicals prevent UV rays from penetrating the skin by scattering them away from the skin. Chemicals called excipients are used to formulate and give them cosmetic feel.

Active ingredients of chemical sunscreens are oxybenzone, avobenzone, octisalate, octocrylene, homosalate, and octinoxate. Natural ingredients like green tea extract, licorice, willow bark and cayenne are used to formulate and give them cosmetic feel.

What is “photostability” of sunscreen?

Photostability means that the UV filters of sunscreens do not degrade on sun exposure. 'Photostability' means that the UV filters of sunscreens do not degrade on sun exposure.

What is “Water resistance”? Ability of a sunscreen to retain its sun protection properties for a certain time after immersion in water is known as "water resistance".

What is “UVA star system”? The percentage of UVA radiation absorbed by the sunscreen in comparison to UVA indicates the UVA star rating and ranges from 0 to 5. Sunscreen with rating of 4 or 5 stars and SPF 30 gives good standard of sun protection.

What is “UVB star system”? "UVB star system" is a system of comparison to UVB indicates the UVA star rating and ranges from 0 to 5. Sunscreen with rating of 4 or 5 stars and SPF 30 gives good standard of sun protection.

What is “Broad-spectrum” mean? Broad spectrum protection refers to protection from both UVA and UVB spectrum from at least 370nm to 280nm.

Sun Protection Factor is sunburn protection provided by sunscreens and is interpreted as how much time skin covered with sunscreen takes to burn in comparison with unprotected skin. On the basis of the level of protection offered by sunscreen, SPF is rated on a scale of 0-50+. Ratings of 0 to 14 and 50+ offer the least and strongest form of protection respectively. Adequate sun protection is obtained by sunscreen with SPF 30.

SPF 30 is recommended, which blocks 97 % of UVB rays, especially if spending several hours in strong sunshine. Sunscreens with higher SPF block UVB rays to a slightly more extent, but blocking of 100% of UVB rays is not possible with any sunscreen. Lasting capacity is almost same with sunscreens of high and low SPF.

How to test for allergenicity of sunscreens? If there is a concern regarding development of reaction to sunscreen, one should do usage test before using a new sunscreen. The tests consists of applying a small amount of sunscreen on a small area on the inner aspect of forearm for a few days to check if skin develops reaction to the sunscreen. This test indicates the sensitivity of skin to a component of the sunscreen. But it may not always point to an allergy which occurs after repeated use. Sunscreen use should be stopped immediately if unusual reaction occurs and medical attention should be sought.

How to apply sunscreen? Usually around 25-50 percent of the recommended amount of sunscreen is applied. Tips for proper application of sunscreens are:

- The amount of sunscreen to be applied should be generous.
- A teaspoon of sunscreen i.e. 5 ml should be applied to each hand, each leg, front and back of the body and one teaspoon to the face and neck. For an adult around 35 ml is required for one full body application.
- It should be reapplied after every 2-3 hours of exposure. A reapplication of sunscreen should be every two to three hours while outdoors, and also after excessive sweating or swimming.
- It should not be rubbed into the skin but spread uniformly and allowed to dry.
- It should be applied to all skin not covered by clothing. Areas like face, ears, neck, top of feet should be included. For hard to reach areas like back, help should be taken or spray sunscreen should be used. In case of thinner hair, sunscreen should be applied on scalp.
- It should not be applied on lips.
- It should not be inhaled or applied near heat, open flame or while smoking.
- Spray sunscreens should never be applied directly to the face.

Points to be considered while choosing sunscreen:

- Broad-spectrum UVA and UVB protection
- SPF of 30 or more
- Resistant to water
- Suitable for one’s skin type and activity
- Easy to reapply
- If the skin is sensitive and has reacted to sunscreen, fragrance-free product should be used. If sunscreen residue is undesirable, a gel should be chosen.

1. What is a sunscreen and how do they work?

2. What are the ingredients of chemical and physical sunscreens?

3. What does ‘broad-spectrum’ mean?

4. What is “Sun Protection Factor (SPF)”?

5. What is “Water resistance”?

6. What is “photostability” of sunscreen?

7. What is “UVA star system”?

8. What is “UVB star system”?

9. What are the types of sunscreens available?

10. Which sunscreen should be used?

11. Is a sunscreen with higher SPF better than sunscreen with a lower SPF?

12. How to apply sunscreen?