

Cancer Association of South Africa (CANSA)



Fact Sheet on the Use of Sunbeds

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Introduction

A sunbed, also known as a tanning bed or sun tanning bed, is a device that emits ultraviolet radiation (typically 95% UVA and 5% UVB, +/- 3%) to produce a cosmetic tan. Regular tanning beds use several fluorescent lamps that have phosphor blends designed to emit UV in a spectrum that is somewhat similar to the sun. Smaller, home tanning beds usually have 12 to 28 100 watt lamps while systems found in tanning salons (solariums) can consist of 24 to 60 lamps, each of 100 to 200 watts.



[Picture Credit: Sunbed]

There are also "high pressure" tanning beds that generate primarily UVA with some UVB by using highly specialised quartz lamps, reflector systems and filters. These are much more expensive, thus less commonly used. A tanning booth is similar to a tanning bed, but the person stands while tanning and the typical power output of booths is higher.

Because of the adverse effects on human health of overexposure to UV radiation, including skin cancer, cataracts, and premature skin aging, the World Health Organization (WHO) does not recommend the use of UV tanning devices for cosmetic reasons. Most tanning beds emit mainly UVA rays - which increase the risk of malignant melanoma, the deadliest form of skin cancer. Misusing a sunbed by not wearing special goggles may also lead to a condition known as arc eye (snow blindness) as well as cataracts. Occasional acute injuries occur where users carelessly fall asleep whilst having an artificial tan. (Wikipedia).

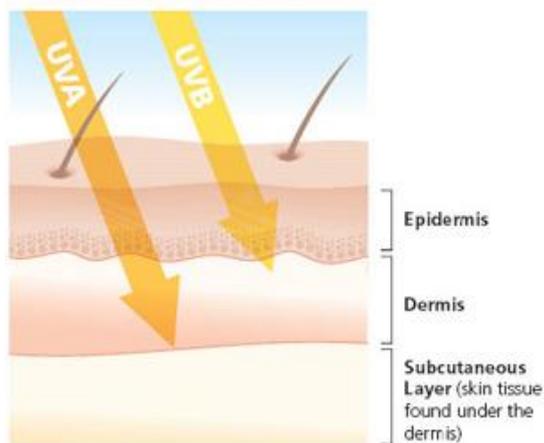
Using a tanning bed, booth, or sunlamp to get tan is called *indoor tanning*. Indoor tanning can cause skin cancers including melanoma (the deadliest type of skin cancer), basal cell carcinoma, and squamous cell carcinoma. Exposure to ultraviolet (UV) radiation also can cause cataracts and cancers of the eye (ocular melanoma). (Centers for Disease Control and Prevention).

UV Radiation and Tanning Beds

Before one can discuss harmful effects of tanning equipment and increased sun exposure, one must be familiar with the components of ultraviolet light and how it affects the skin. Sunlight contains two types of ultraviolet (UV) light: UVA and UVB. UVA rays consist of longer wavelengths that penetrate deep into the dermal layer of the skin. Limited exposure to UVA rays causes skin to tan, however, most experts agree that overexposure to UVA can lead to other long-term skin damage. The wavelengths of UVB rays are much shorter, affecting the outermost layers of skin. UVB rays are known as the "burning rays" and are considered more dangerous. Tanning beds and sun lamps generally emit 93% to 99% UVA radiation increasing the benefits of a tan – this, however, is three times the UVA radiation given off by the sun. (Vanderbilt University).

It is well known that UV radiation contributes to the development of skin cancer. Exposure to solar radiation is predominantly responsible for the high incidence rate of skin cancer, but there are also indications that sunbeds are involved. The UV emission spectra of sunbeds have special characteristics and are different from the sun spectrum, which can be seen in high-resolution spectral measurements. Sunbed emission spectra are similar to the sun spectrum in the UVB (around 280-320 nm) range but reach values 10 to 15 times higher in the UVA (320-400 nm) range. An average erythema-effective irradiance of 0.33 W/m² was determined for sunbeds. This corresponds to a UV index of 13, which is significantly higher than the UV index of 8.5 of the high summer sun at noon at intermediate latitudes. (Gerber, *et al.* 2002).

UV Radiation and the Skin



[Picture Credit: UV Radiation]

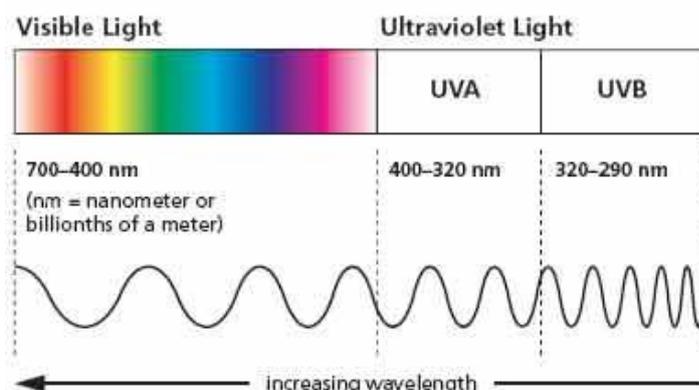
Ultraviolet Radiation

UVA, which penetrates the skin more deeply than UVB, has long been known to play a major part in skin aging and wrinkling (photoaging), but until recently scientists believed it did not cause significant damage in areas of the epidermis (outermost skin layer) where most skin cancers occur. Studies over the past two decades, however, show that UVA damages skin cells called keratinocytes in the basal layer of the epidermis, where most skin cancers occur.

(Basal and squamous cells are types of keratinocytes.) UVA contributes to, and may even initiate, the development of skin cancers.

[Picture Credit: UV Radiation and the Skin]

Visible Light/UV



UVA is the dominant tanning ray, and we now know that tanning, whether outdoors or in a salon, causes cumulative damage over time. A tan results from injury to the skin's DNA; the skin darkens in an

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

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imperfect attempt to prevent further DNA damage. These imperfections, or mutations, can lead to skin cancer.

Tanning booths primarily emit UVA. The high-pressure sunlamps used in tanning salons emit doses of UVA as much as 12 times that of the sun. Not surprisingly, people who use tanning salons are 2.5 times more likely to develop squamous cell carcinoma, and 1.5 times more likely to develop basal cell carcinoma. According to recent research, first exposure to tanning beds in youth increases malignant melanoma risk by 75 percent.

UVB, the chief cause of skin reddening and sunburn, tends to damage the skin's more superficial epidermal layers. It plays a key role in the development of skin cancer and a contributory role in tanning and photoaging. Its intensity varies by season, location, and time of day. The most significant amount of UVB hits South Africa between 10:00 and 15:00. However, UVB rays can burn and damage one's skin year-round, especially at high altitudes and on reflective surfaces such as snow, ice, cement, etc which bounce back up to 80 percent of the rays so that they hit the skin twice. UVB rays do not significantly penetrate glass.

(Skin Cancer Foundation).

Indoor Tanning is not a Safe Way to get Vitamin D

Although it is important to get enough Vitamin D. The safest way to do so is through what one eats. Tanning harms one's skin, and the amount of UV exposure one needs to get enough Vitamin D is hard to measure because it is different for every person and also varies with the weather, latitude, altitude, and more.

(Centers for Disease Control and Prevention).

IARC Classification of Sunbeds

An International Agency for Research on Cancer (IARC) Working Group has classified UV-emitting tanning devices as "carcinogenic to humans" (Group 1). A classification of Group 1 means that there is sufficient evidence of carcinogenesis (ability to cause cancer) in humans. The Working Group was convened by the IARC Monographs Programme and the conclusions were reported in an article and press release issued by *The Lancet Oncology*.

(International Agency for Research on Cancer).

Safe Levels of Sunbed Usage

At present, it is not possible to give a safe limit for long-term effects of sunbed usage, such as the risk of skin cancer, especially malignant melanoma, because there is no threshold dose below which cancer will not occur.

(European Union Public Health).

Non-Cancer Risks of Tanning

In addition to the serious risk of skin cancer, tanning can cause:

Premature aging - tanning causes the skin to lose elasticity and wrinkle prematurely. This leathery look may not show up until many years after you've had a tan or sunburn.

Immune suppression - UV-B radiation may suppress proper functioning of the body's immune system and the skin's natural defenses, leaving you more vulnerable to diseases, including skin cancer.

Eye damage - exposure to UV radiation can cause irreversible damage to the eyes.

Allergic reaction - some people who are especially sensitive to UV radiation may develop an itchy red rash and other adverse effects.

Advocates of tanning devices sometimes argue that using these devices is less dangerous than sun tanning because the intensity of UV radiation and the time spent tanning can be controlled. But there is no evidence to support these claims. In fact, sunlamps may be more dangerous than the sun because they can be used at the same high intensity every day of the year - unlike the sun whose intensity varies with the time of day, the season, and cloud cover.

(US Food and Drug Administration).

Tanning in Children and Teens

The US Food and Drug Administration (FDA) is particularly concerned about children and teens being exposed to UV rays. Intermittent exposures to intense UV radiation leading to sunburns, especially in childhood and teen years, increase the risk of melanoma, according to National Cancer Institute (NCI).

FDA believes that limiting sun exposure and using sunscreen or sunblock are particularly important for children since these measures can prevent sunburn at a young age.

NCI reports that women who use tanning beds more than once a month are 55 percent more likely to develop melanoma. Teenage girls and young women make up a growing number of tanning bed customers.

(US Food and Drug Administration).

Individuals who should Never use a Sunbed

The following individuals should never make use of a sunbed:

- under 18s
- people who have very fair skin
- people who burn easily
- people who tan poorly
- people with a lot of freckles
- people with a lot of moles
- people who have had skin cancer
- people who have a family history of skin cancer
- people using medication that could make their skin more sensitive to UV
- people who already have extensive "sunlight" damage

(World Health Organization).

Medical Disclaimer

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