

Melanoma Incidence Yesterday and
Today - Where are we Going?

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Skin cancer is the most common cancer in the United States of America, including melanoma and non-melanoma skin cancer. Malignant melanoma, being ranked as the fifth most common cancer within the US shows a yearly incidence of 73,870 cases and remains the most aggressive form of all skin cancers with a mortality rate of 2.7 per 100,000 [1,2]. Fortunately, over the last decade melanoma treatment options have tremendously improved. Progress in areas such as immunotherapy and targeted therapies has led to increased melanoma survival rates, rising from 82% (1975-1977) to 93% (2004-2010) [3]. In consequence, the cost of skin cancer treatments, specifically for melanoma treatments increased from an average annual total cost of \$864 million in 2002 to \$3349 million in 2011 [4].

Even though striking progress has been made on the therapeutic side, melanoma incidence is still increasing all over the world, including the United States, the Czech Republic, Germany, England, Japan and Australia [5-8]. In the United States, within the last three decades, melanoma incidence rates raised around 5-fold [9]. Whereas in 1976, only 7.89 out of 100,000 Americans were newly diagnosed with melanoma, in 2011 the incidence per 100,000 raised up to 22.86 (total 65,647). According to estimations by the American Cancer Society, melanoma incidence is suspected to raise upto 73,870 new cases in 2015 and 112,000 in 2030 [1,3].

In general, differences in melanoma incidence have been attributed to several factors, such as outdoor activities, tanning behavior, use of cosmetics, hormone levels, and environmental factors, such as air pollution and UV exposure [2,10,11]. So far, UV exposure is considered as the main carcinogen, being attributed to cause 89%-95% of all melanoma cases [2]. Upto now, multiple approaches have been recommended to protect human skin from UV light, including the decreased frequency of outside activities, wearing appropriate protective clothing, or applying sunscreens.

In Australia, a country with the highest ambient UV exposure worldwide, further action was taken in 1997 when the Australian government introduced a campaign program called "Sun Smart" to the state of Victoria to promote public awareness on melanoma by using social media. In 1998 this program was also expanded to other states in Australia [8,12]. So far, this program has been reported to successfully promote public awareness and education towards sun protection, and decreased melanoma incidence for males from approximately 70 to 44 per 100,000 and for females from approximately 53 to 34 per 100,000 inhabitants (data from the state of Victoria in 2004) [8]. In total, it was estimated that this program contributed to successfully avoiding 103,000 skin cancer cases in Australia (9,000 melanomas and 94,000 non-melanoma skin cancers). It was estimated that the Sun Smart program especially prevented basal cell carcinoma formation, decreasing its incidence rate by 10-40 per 100,000 cases [13]. In addition to the medical benefits, it was estimated to save the Australian government over AUD 270 million since its establishment.

So far, multiple studies could show that sunscreens are protecting humans from sunburn, erythema, and especially non-melanoma skin cancer formation. Likewise, it has been assumed that sunscreens may also provide protection against melanoma formation. However, multiple studies were published showing conflicting results, highlighting an urgent need for further research and investigation [14-16]. In sum, a multiple-level approach might be needed to fight the continuing increase in melanoma incidence: implementing campaigns to promote patients' awareness on a public health level, support of sunscreen research and an accelerated approval process on an industrial and federal level, and finally on a scientific level further effort to understand the basic principles leading to skin cancer formation, and especially melanoma development.

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