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Tans, Bans, and Sedans: How Distance from Tanning Beds May Save Lives

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Indoor tanning is universally considered to be an important cause of melanoma and keratinocyte carcinomas. Pooling together more than 406,000 individuals from 88 studies, Wehner et al found that more than 450 000 NMSC cases and more than 10 000 melanoma cases each year were attributable to indoor tanning in the United States, Europe, and Australia.¹

Mechanistically, it is well documented that both UVA and UVB wavelengths trigger mutagenic changes in the genomes of skin cells. Moreover, the UV/tanning pathway has been shown to directly stimulate cutaneous synthesis of β -endorphin and to cause addiction-like behavioral changes. UV or sun-seeking risk may therefore be compelled by conscious or even unconscious behavioral influences, which may include ease of access to sources of UV-tanning.²

Two economic models, one from the United States and the second from the UK both concluded that restricting or banning indoor tanning would result in fewer skin cancer cases and deaths. In the United States, restricting indoor tanning among minors younger than 18 years could prevent 61,839 melanoma cases, prevent 6735 melanoma deaths, and save \$342.9 million in treatment costs over the lifetime of the 61.2 million youth age 14 years or younger. The projected health and economic benefits increased as indoor tanning were further reduced.³ Compared with the current lack of a consistent policy, a ban on commercial indoor tanning combined with a public information campaign would result in 1206 preventable cases of melanoma, 207 fewer melanoma deaths and 3987 averted cases of keratinocyte cancers over the lifetime of all 18-year-olds ($n = 618\,873$) living in England in 2019. At a cost-effectiveness threshold of £20 000, they determined that there is a 99% likelihood of this policy-based intervention being cost-effective.⁴

Between 2012 and 2020, a broad representation of 20 politically diverse US states and the District of Columbia have passed indoor tanning bed bans for children under the age of 18 and the US Food and Drug Administration strongly considered a national ban on youth

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tanning. In fact, during the same time, Australia, Brazil, and Iran banned indoor tanning for people of all ages. Among a number of public health strategies designed to combat the spread of tanning bed use in children, such age restriction laws were associated with a 47% ($P < .001$) lower indoor tanning prevalence among female high school students.⁵ Parental permission laws were not found to be associated with indoor tanning prevalence among either female or male high school students.

Set against this backdrop, Wei et al used a novel adjusted spatial regression analysis to measure the effect of travel time to tanning facilities and its relationship to higher county melanoma incidence rates among all counties in the six New England states between 2014 and 2018. When examining the relationship between tanning facilities and the incidence of melanoma, they found that a one-minute increase in travel time to tanning facilities within a 30 minute travel time was associated with a 3.46% decrease in incidence in the same county and 1.92% across New England. There are some caveats to consider.⁶ First, there are likely unmeasured confounders that account for a modest proportion of the decreased incidence. However, there is certainly some plausibility in the relationship between travel time, use of tanning facilities, and melanoma incidence as tanning facilities began to close during these five years, likely resulting in routine or sporadic users having to travel further to find ones that were open. Second, as this is an ecologic study, one cannot provide any detail about the actual exposure (tanning bed use) for specific individuals and a given individual's risk of disease. Pursuing this further, one would want to know more about an individual's exposure to a tanning salon—for example, how frequently they used it in the past month, for how many minutes, and over what period of time. Third, the authors assessed melanoma incidence from state cancer registries among individuals of all ages. Here it is worth noting that most people diagnosed with melanoma during these five years would not have used tanning beds as they are used primarily by women between the ages of 18 and 34 who comprise fewer than 25% of all cases. Future research should assess whether the same exposure corresponds to an excess burden of melanoma/skin cancer in affected younger individuals.

To the best of our knowledge, there are no national published studies on the prevalence of youth tanning bed use in the US since 2019, yet all indications point to a sharp downward trend. Using CDC's national Youth Risk Behavior Study (2009-2017), Holman et al found that indoor tanning declined overall (15.6 to 5.6%; $p < 0.001$), across all age groups, and among white (37.4 to 10.1%; $p < 0.001$) and Hispanic (10.5 to 3.0%; $p < 0.001$) female students, and white (7.0 to 2.8%; $p < 0.001$) and Hispanic (5.8 to 3.4%; $p < 0.001$) male students.⁷ In fact, the rates as of 2017 are well below the Healthy People 2020 target for adolescents. Seidenberg et al provided an analysis of tanning facilities in North Carolina (2012-2019). Likely as a response to the sharp downturn in use, the total number of licensed tanning beds in North Carolina declined during the study period, from 6758 to 4057 (40% decline) and the total number of licensed tanning facilities declined 45%, from 1379 in 2012 to 757 in 2019.⁸

More work must be done to understand the mechanism linking an increase in travel time and decreased use of indoor tanning facilities. One can hypothesize that two complementary drivers led to the reduction of tanning bed use-- the beginning of a shift from the social norm that strongly values tanned skin coupled with the proliferation of the under age 18 bans.

Profits dropped overall for the salon industry-- some went out of business and for others, it became economically risky to add more beds within a dwindling market. As it became more difficult to find a place to tan indoors, indoor tanning dropped and the social norm against indoor tanning was further reinforced. In fact, industry reports 'indicate that the number of businesses in the Tanning Salons industry in the US has declined 4.4% per year on average over the five years between 2018 – 2023'.⁹ Industry revenue was expected to total \$1.8 billion in 2023,⁹ a precipitous drop from the \$5 billion market just 12 years ago.¹⁰ We have seen this before with other risky behaviors, such as for tobacco use, where the social norm evoking coolness and tobacco use dissipated concurrent with tobacco bans spreading from schools to work to places where people live and recreate, making it more difficult for people to find easy places to continue smoking.

The steady decline in indoor tanning is an important success story that can be strongly tied to the power of public health advocacy interwoven and fueled by the production and dissemination of research-based scientific information that have resulted in persuasive arguments before legislators in the 20 states that have now passed indoor tanning bans for children less than 18 years of age. Advocates, including, but not limited to the American Cancer Society's Cancer Action Network, AIM at Melanoma, American Academy of Dermatology, American Academy of Pediatrics, and the National Council on Skin Cancer Prevention, federal thought leaders such as the CDC and the US Surgeon General, and informal networks of family members of young women who lost their lives to melanoma, have collaborated to put knowledge into action. The study led by Wei and others adds one vital piece to the ever-growing base of knowledge. Still, 30 additional states do not have such bans for children. The overall trend is cause for celebration. Yet as a uniquely preventable cause of cancer, there remains room for improvement.

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