



Evidence-Based Series 8-8

**A Quality Initiative of the
Program in Evidence-Based Care (PEBC), Cancer Care Ontario (CCO)**

**The Use of Indoor Tanning Devices and the Risk of Developing
Cutaneous Malignant Melanoma: A Systematic Review and
Clinical Practice Guideline**

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J. McLaughlin, A. Mamelak, F. Wright, T. Petrella, and the
Use of Indoor Tanning Devices Expert Panel*

Report Date: August 6, 2014

An assessment conducted in November 2023 deferred the review of Evidence-based Series (EBS) 8-8. This means that the document remains current until it is assessed again next year. The PEBC has a formal and standardized process to ensure the currency of each document ([PEBC Assessment & Review Protocol](#)).

EBS 8-8 is comprised of 3 sections. You can access the summary and full report here:

<https://www.cancercareontario.ca/en/guidelines-advice/types-of-cancer/1166>

Section 1:	Guideline Recommendations
Section 2:	Evidentiary Base
Section 3:	Development Methods, Recommendations Development and External Review Process

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Evidence-Based Series 8-8: Section 1

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The Use of Indoor Tanning Devices and the Risk of Developing
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Guideline Recommendations

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GUIDELINE OBJECTIVES

To determine the risk of cutaneous malignant melanoma (herein referred to as melanoma) associated with use of indoor tanning devices, including impact of age at first use and frequency of use on the relative risk of developing melanoma.

TARGET POPULATION

All users of indoor tanning beds are the target population of this guideline.

INTENDED USERS

This guideline is intended for use by clinicians, other health care providers, users and potential users of indoor tanning devices in Ontario.

RECOMMENDATIONS, KEY EVIDENCE, AND JUSTIFICATION

RECOMMENDATION 1

Use of indoor tanning devices should be avoided to reduce risk of melanoma.

Summary of Key Evidence for Recommendation 1

A systematic review with meta-analysis (1) based on pooling of 27 cohort and case-control studies found a significant association between ever use of indoor tanning devices and increased risk of developing melanoma (relative risk [RR], 1.25: 95% confidence interval [CI], 1.09-1.43; $p < 0.05$).

Justification for Recommendation 1

There is strong evidence linking the use of indoor tanning devices to an increased risk of developing melanoma. Although the meta-analysis (1) lacked detail on some elements of interest for the included studies, the current systematic review of the literature verified the clinical homogeneity of the pooled studies. The Use of Indoor Tanning Devices Guideline

Development Group (GDG) believes that the current evidence informs a strong recommendation.

Qualifying Statements for Recommendation 1

The International Agency for Research on Cancer (IARC) recently declared solar ultraviolet radiation (UVR) from indoor tanning devices a carcinogen (2). Both UVA and UVB have been shown to cause direct DNA damage through production of DNA mutations (UVA at a lower level than UVB), as well as indirect DNA damage via production of reactive oxygen species. Although UVB radiation can initiate the production of vitamin D in the skin, there are no data to support that artificial UVR is superior to oral supplementation with vitamin D to increase serum levels of this vitamin. Given the significant risk of melanoma as a consequence of using tanning devices, the GDG concludes that risks that arise from the use of tanning devices far outweigh any perceived benefit to their use.

This systematic review evaluated studies from 2000 to present with the goal of capturing the impact of modern tanning beds, which have been designed to more accurately mimic UVR. However, the identified meta-analysis conducted by Boniol et al (1) included studies published from 1981 through 2012 and evaluated an older generation of tanning beds. It is hypothesized that future studies assessing the impact of modern tanning beds could potentially amplify the effects found in the current review.

RECOMMENDATION 2

All individuals should avoid use of indoor tanning devices, especially those at a younger age.

Summary of Key Evidence for Recommendation 2

A recent and comprehensive systematic review with meta-analysis (1) found an increased risk of melanoma in those who initiated tanning devices use at a younger age (RR, 1.59; 95%CI, 1.36-1.85; $p < 0.05$). Data were pooled from 13 studies, 12 of which adjusted for confounders related to sun exposure and sun sensitivity.

Justification for Recommendation 2

Both the rate of tanning device use in youths, as well as the incidence of melanoma diagnosis in 15 to 34 year olds has been increasing. Moreover, the meta-analysis by Boniol et al (1) demonstrated that the younger a person starts using indoor tanning devices, the higher the risk of developing melanoma in their lifetime. These are concerning statistics, and the GDG concludes that the current evidence informs a strong recommendation.

Qualifying Statements for Recommendation 2

Based on the evidence, the GDG has not set an age cut-off for “younger age.” The identified meta-analysis defined young age as under age 35 (1). However, not all the studies included in the analysis defined an age for younger age; in those that did, younger age was defined as anywhere from 18 to 35. In the three included case-control studies that found an increased risk of melanoma with a definitive age cut-off, younger age was defined as less than 25 years (3), less than 35 years (4) and less than 18 years (5). The GDG concludes that these data point to an association between tanning bed use and increased risk of developing melanoma at any younger age of first use: defining a specific age cut-off would only be speculative and would not add to the recommendation.

RECOMMENDATION 3

There is no safe lower limit of exposure to artificial UVR from indoor tanning devices.

Summary of Key Evidence for Recommendation 3

When evaluating the risk associated with frequent use of indoor tanning devices, both number of sessions and length of tanning sessions were considered. The meta-analysis conducted by Boniol et al (1) found a 1.8% increased risk of developing melanoma for each additional session of tanning device use per year (95%CI, 0.0-3.8%; $p < 0.05$). Additionally, when Boniol et al (1) conducted an analysis of 14 studies that reported relative risks with frequent tanning bed use, they found a 42% increased risk of developing melanoma with high tanning bed use (RR, 1.42; 95%CI, 1.15-1.74; $p < 0.05$). One additional case-control study (6), which was not included in the Boniol et al meta-analysis (1), similarly found an association between increased risk of melanoma and both the number of sessions and length of sessions ($p = 0.04$).

Justification for Recommendation 3

Based on the association between ever use of indoor tanning devices and increased risk of developing melanoma, plus the greater risk associated with frequent use of indoor tanning devices, the evidence indicates that there is no safe lower limit of exposure to artificial UVR from indoor tanning devices.

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Updating

All PEBC documents are maintained and updated through an annual assessment and subsequent review process. This is described in the PEBC Document Assessment and Review Protocol, available on the CCO website at:

<https://www.cancercareontario.ca/sites/ccocancercare/files/assets/CCOPEBCDARP.pdf?redirect=true>

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