

Age at first indoor tanning use and melanoma risk: a prospective, population-based cohort study

Reza Ghiasvand¹, Corina S. Rueegg¹, Elisabete Weiderpass^{2,3,4,5}, Adele C. Green^{6,7},
Eiliv Lund², Marit B. Veierød¹

¹ Oslo Centre for Biostatistics and Epidemiology, Institute of Basic Medical Sciences, University of Oslo, Norway

² Department of Community Medicine, Faculty of Health Sciences, University of Tromsø, The Arctic University of Norway

³ Department of Research, Cancer Registry of Norway, Oslo, Norway

⁴ Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

⁵ Genetic Epidemiology Group, Folkhälsan Research Center, Helsinki, Finland

⁶ Cancer and Population Studies Group, QIMR Berghofer Medical Research Institute, Brisbane, Australia

⁷ CRUK Manchester Institute, University of Manchester, United Kingdom



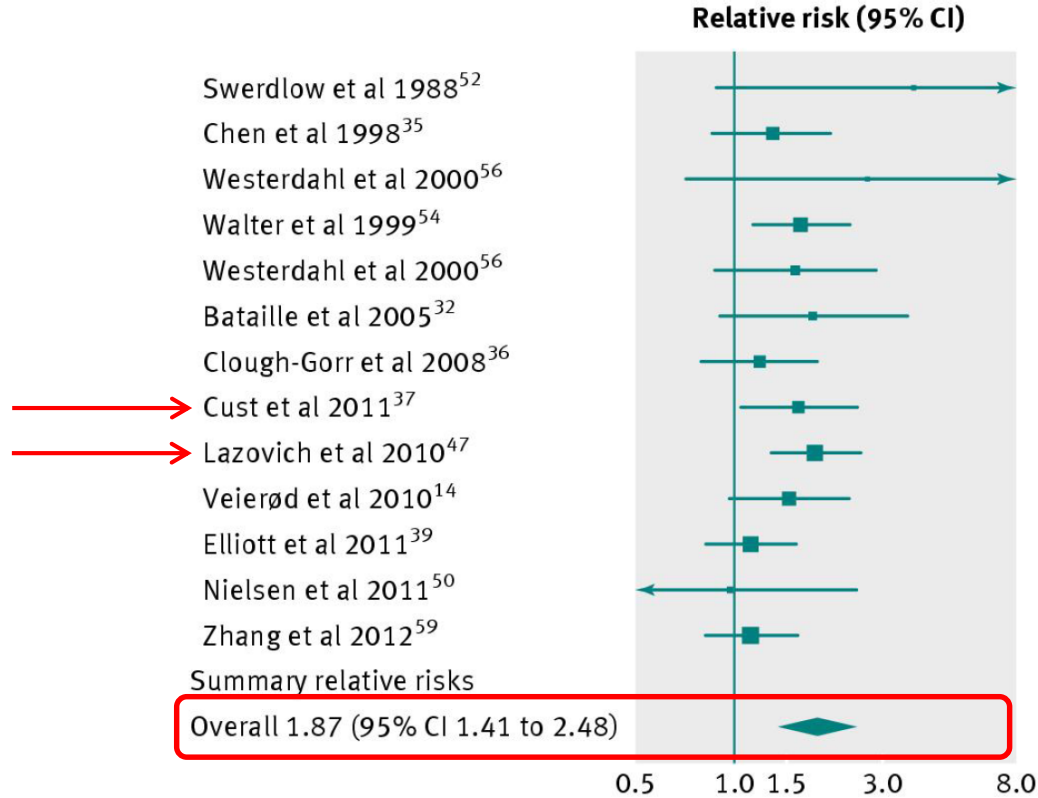


IARC Working Group:

- The risk of melanoma is increased by 75% when use of tanning devices starts before 35 years of age.¹
- Raised the classification of the use of UV-emitting tanning devices to Group 1, “carcinogenic to humans”.²

1. Green A, et al. Int J Cancer, 2007.
2. El Ghissassi F, et al. Lancet Oncol, 2009.

Risk of melanoma when first use was before age 35 years.



Boniol et al, BMJ, 2012.

Increased risk of melanoma related to younger age
at first indoor tanning use:

Higher susceptibility at younger age or just greater
cumulative exposure?

Norwegian Women and Cancer (NOWAC) study

- A population based cohort study started from 1991
- 171,000 women aged 30-75 years.
- Host characteristics and history of UV exposure (sunburns, sunbathing, and indoor tanning)
 - ✓ baseline questionnaire
 - ✓ updated with follow-up questionnaires

How often have you tanned yourself in a solarium?

Age	Never	Seldom	1/month	2/month	3-4/month	>1/week
<10 years						
10-19 years						
20-29 years						
30-39 years						

Cal. period	Never	Seldom	1/month	2/month	3-4/month	>1/week
1991-1994						
1995-1998						

- 141,045 women with information on indoor tanning followed-up until December 2012.
- 1,930,583 person-years of follow-up (mean follow-up 13.7 years)
- 861 incident cases of melanoma

Relative risks (RR) and 95% confidence intervals (CIs) of cumulative indoor tanning and risk of melanoma

Cumulative number of sessions	No.	%	Cases	RR (95% CI)
Never	34,122	29.2	203	1.00
Lowest tertile	20,527	17.5	158	1.16 (0.94–1.43)
Medium tertile	30,229	25.9	177	1.26 (1.04–1.58)
Highest tertile	32,097	27.4	208	1.30 (1.06–1.58)
	116,975		746	P-trend=0.006

Poisson regression analysis

Adjusted for birth-cohort, year of inclusion, ambient UV of residence, hair color, and cumulative number of sunburns and sunbathing vacations

Relative risks (RR) and 95% confidence intervals (CIs) of age at first indoor tanning use and risk of melanoma

Age at first indoor tanning use	No.	%	Cases	RR (95%CI)
Never	30,774	29.4	185	1.00
≥ 30 years	53,396	51.1	358	1.15 (0.96–1.37)
< 30 years	20,447	19.5	129	1.36 (1.07–1.73)
	104,617		672	

Poisson regression analysis

Adjusted for birth-cohort, year of inclusion, ambient UV of residence, hair color, and cumulative number of sunburns and sunbathing vacations

Cumulative indoor tanning and risk of melanoma by age at first use

		No.	%	Cases	RR (CI%)
Age at first use	Cumulative sessions				
≥ 30 years	Never	30,774	29.4	185	1.00
	Low	16,473	15.7	123	1.03 (0.82–1.29)
	Medium/high	36,923	35.3	235	1.22 (1.01–1.49)
< 30 years	Never	30,774	29.4	185	1.00
	Low	2,589	2.5	24	1.78 (1.16–2.75)
	Medium/high	17,858	17.1	105	1.32 (1.03–1.69)
		104,61		672	P-interaction=0.016

Poisson regression analysis

Adjusted for birth-cohort, year of inclusion, ambient UV of residence, hair color, and cumulative number of sunburns and sunbathing vacations

Mean differences (years) and 95% confidence intervals (CIs) for the association between age at indoor tanning use and age at diagnosis

	Cases	Mean age	Mean difference (95% CI)
Age at first use			
Never	185	56.4	Referent
≥30 years	358	55.9	-1.1 (-2.1 to -0.2)
<30 years	129	51.6	-2.1 (-3.4 to -0.8)

Linear regression analysis

Adjusted for birth-cohort, year of inclusion, ambient UV of residence, hair color, and cumulative number of sunburns and sunbathing vacations

Conclusions

- Our findings suggest a greater vulnerability of younger people to the carcinogenic impact of indoor tanning.
- Indoor tanning leads to melanoma at a younger age.