

Editorial Comment

## Sunbeds – do they increase risk of melanoma or not?

Richard Gallagher \*

*Cancer Control Research Program, British Columbia Cancer Agency, 675 W. 10th Avenue, Vancouver, BC, Canada V5Z 1L3  
Department of Health Care and Epidemiology, University of B.C., Vancouver Canada  
Department of Dermatology, Faculty of Medicine, University of B.C., Vancouver, Canada*

Received 15 June 2005; received in revised form 15 June 2005; accepted 21 June 2005

Available online 22 August 2005

Epidemiologic studies conducted over the past 15 years have tended to show increased risk of melanoma in individuals using sunbeds [1] for tanning purposes. A recent meta-analysis has confirmed the impression that use increases risk, in those using these devices [2]. In this issue of the *European Journal of Cancer*, results of a new pan-European study by a group of experienced investigators show no risk associated with use of tanning beds [3]. Furthermore, in contrast to a host of studies conducted over the past 20 years and summarized in Elwood and Jopson [4] the new study found no association between melanoma risk and reported sunlight exposure.

Why should this study show no association between artificial or solar UV and melanoma when previous investigations have indicated a significant increase in risk? A number of explanations can be examined.

The first and simplest potential explanation is that participants' sunlight exposure and tanning bed use was poorly remembered and hence inaccurately reported. If the degree of such misclassification is similar in cases and controls, the net effect is to bias results toward the null – exactly what is seen in the Bataille study. While this might be a potentially acceptable explanation for the lack of association with reported solar exposure, it is not compelling when applied to tanning beds. Tanning bed use is an activity that is carried out using scheduled sessions usually of fixed duration in commercial salons, and it costs money. It is difficult to accept that the degree of misclassification of tanning bed use would be of the same magnitude

as that for solar exposure. More research is needed on how well estimates of reported tanning bed use and documented use – perhaps using records from salons-coincide.

The second potential explanation for the findings is that public education programs concerning the dangers of sun exposure and tanning bed use influenced reporting. The authors' accompanying article [5] suggests that public education programs aimed at reducing sun exposure and discouraging sunbed use may have resulted in underreporting of both sun exposure and sunbed use by melanoma cases. This is a strong possibility, however to deliver the results observed, the explanation requires that cases underreport, while controls report accurately in spite of being exposed to the same public education information as cases.

The third possibility is that methodological difficulties associated with the conduct of case-control studies (representativeness of subjects, information bias, etc.) influenced the results. The cases were ascertained from melanoma referral centres in each of the participating countries using a diversity of methods. Using referral-based cases instead of a true population-based sample may have resulted in recruitment a biased group of cases, namely those with more serious melanomas. Response rates for cases and controls are not presented and if rates were low, may have further contributed to selection of a sample of study subjects quite uncharacteristic of the population of European melanoma patients and healthy controls. If the study subjects had a pattern of sun exposure and tanning bed use uncharacteristic of the populations they were meant to represent, biased results could have been

\* Tel.: +1 604 675 8050; fax: +1 604 675 8180.

E-mail address: rgallagher@bccrc.ca.

seen even in the absence of problems with the veracity of reported data. Further, the direction and magnitude of the bias would be difficult to characterize and quantify.

The fourth possibility is that the results observed are real and that there is no relationship between use of tanning beds and melanoma. The fact that most previous studies have found a positive (although sometimes modest) relationship argues against this explanation. Perhaps, the positive relationship between tanning beds and melanoma seen in previous studies is due to confounding – that is the elevated risk attributed to use of such devices is in reality due to high levels of concomitant sun exposure in indoor tanners. If this were a valid explanation however, there is no reason why the present study should not have found the same positive result as previous studies that used virtually the same questionnaire [6,7]. Furthermore, the questionnaire did, in fact, attempt to adjust tanning bed risk estimates for concurrent sun exposure. Could it be that the subjects in the present study were exposed to more modern tanning beds than previous studies; perhaps emitting wavelengths of less carcinogenic potential, with no resulting increase in melanoma risk? This seems unlikely, as the relative risk estimates (Bataille article, Table 3) among those who first used sunbeds more than 15 years ago (of the older type) and those using them less than 6 years ago, and 6–10 years ago are very similar. One might have expected an increased risk in those who began use some time ago (presumably with a greater lag-time and with machines emitting more carcinogenic wavelengths) if the effects of more recent machines were qualitatively different. It should be noted that previous case-control studies did show a greater magnitude of risk as lag time from first use increased – something not seen in this study.

In summary, it seems likely that the first, second, and third explanations all contributed to the results seen in the present study. The fourth potential explanation – that tanning beds are unrelated to melanoma risk – is possible but seems unlikely for the reasons

noted above. Bataille and colleagues deserve credit for their efforts to increase knowledge about a growing public health concern, and for having the courage to publish rather than ‘bury’ their controversial results. It is clear that recruiting representative cases and controls, and obtaining unbiased, accurate exposure information in the face of public education campaigns, is becoming more difficult. In addition current exposure measures for sunlight and sunbed use are crude at best. Better study methods are needed before further retrospective investigations of sunbed use will be useful.

A prospective cohort study of users carried out with co-operation of salons might produce better estimates of sunbed use, but would require study subjects to keep diaries to record concomitant sun exposure with accuracy. Such a study would be very expensive, very time consuming, and may ultimately prove impractical.

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