Use of topical sunscreens and the risk of malignant melanoma: a meta-analysis of 9067 patients from 11 case-control studies

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Authors' objectives
To examine the impact of sunscreen use on melanoma risk.

Searching
MEDLINE (from January 1996 to December 1999), Cancerlit, and Current Contents were searched. Articles written in any language were considered. Handsearches of the bibliographies of published reports, review articles, and textbooks were also conducted. No search terms were reported.

Study selection
Study designs of evaluations included in the review
Case-control studies were eligible.

Specific interventions included in the review
Studies investigating the use of topical sunscreen preparations were eligible. The frequency of sunscreen use in the included studies was defined as 'ever', 'almost always', 'very often/often', 'use', '>10yrs' and 'regular use'. All of the studies included controls whose use was defined as 'never' or 'rarely or never'.

Participants included in the review
Studies enrolling adult melanoma patients were eligible. Studies including nonmelanoma skin cancer patients not stratified by tumour type were excluded.

Outcomes assessed in the review
The primary outcome of interest was the proportion of patients with a diagnosis of malignant melanoma.

How were decisions on the relevance of primary studies made?
Initial decisions, based on the abstracts only, were made by one reviewer. No further information was provided.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
A data extraction form was designed to record the following information: author; year; number of patients; number of controls; selection criteria; frequency of sunscreen use; odds ratio with the 95% confidence interval (CI); and the type of statistical adjustments made, if any. Two reviewers extracted the data, and any differences in the extraction forms were resolved by consensus.

For each included study, the odds ratio reflecting the risk of developing malignant melanoma associated with sunscreen use was derived. In addition, the natural logarithm of the relative risk (RR) was determined, followed by an estimate of the variance.

Methods of synthesis
How were the studies combined?
The weights for each included study were calculated and added together. The product of the study weight and the natural logarithm of the estimated RR was determined, followed by a summation of these products. Finally, a summary
RR and 95% CI were calculated (see Other Publications of Related Interest no.1).

**How were differences between studies investigated?**
A Q test for heterogeneity (see Other Publications of Related Interest no.2) was performed before the summary RR was estimated. Sensitivity and/or further stratified analyses were performed as needed, based on the magnitude of Q.

**Results of the review**
Eleven case-control studies (n=9,067) were included.

Combining the data from all 11 studies (n=9,067) gave a summary RR of 1.11 (95% CI: 0.37, 3.32; heterogeneity Q=42.0, d.f.=10, p<0.001).

Pooling the data from 4 studies (n=4,836) that used population registry-derived patients gave a summary RR of 1.01 (95% CI: 0.46, 2.28; heterogeneity Q=4.9, d.f.=3, p=0.18).

Combining the data from 7 studies that used hospital patient databases indicated that significant heterogeneity existed between the studies (p<0.001).

**Authors' conclusions**
The available epidemiological data do not support the existence of a relationship between topical sunscreen use and an increased risk of cutaneous malignant melanoma.

**CRD commentary**
On the whole, the methodological quality of this review was good. The review addressed a sound question and the inclusion and exclusion criteria were appropriate. The literature search involved electronic databases and handsearches of bibliographies from published reports and textbooks. It was not restricted by language, but only published articles were eligible for inclusion. Although the authors did not assess the validity of the included studies, the data extraction process was described and the data were well presented in tabular format. The method of pooling was appropriate, although the authors relied heavily on the Q test statistic to explain heterogeneity. The authors' conclusions, while supported by the results, present an unbalanced view of the evidence. The data presented are equivocal; they do not support the existence of a link between topical sunscreen use and the risk of malignant melanoma, but neither do they prove that there is no link.

**Implications of the review for practice and research**
Practice: The authors state 'until more conclusive data are available, recommending use of sunscreens as a cancer prevention strategy would appear to be prudent'.

Research: The authors did not state any implications for further research, although they state that it is their hope that 'the results of the present analysis will contribute to the design of future studies addressing this issue'.

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