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### **More About: Sunscreen Use, Wearing Clothes, and Number of Nevi in 6- to 7-Year-Old European Children**

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The recent article by Autier et al. (1) and the accompanying editorial (2) have heightened interest in the relationship between sunscreen use and the incidence and prevalence of melanocytic lesions, including nevi and cutaneous melanoma.

In view of the concern about sunscreens and melanoma risk (3,4), we have analyzed data from the Western Canada Melanoma Study. This study is one of the largest and most detailed studies of melanoma, and it demonstrated clear associations with pigmen-

tation characteristics and tendency to sunburn (skin type), as well as with recreational and occupational sun exposure (5,6). It compared incident cases of melanoma diagnosed from 1979 through 1981 with population-based controls, using a home interview. Subjects were asked, "When exposed to sun on your skin, other than face and arms, do you use a suntan or anti-sunburn lotion or cream almost always, sometimes, only for the first few hours, or almost never?" Only three control subjects and no case patients responded "almost never." Before this analysis, we hypothesized that if sunscreens directly increase melanoma risk, risks will be highest in the "almost always" users, whereas if sunscreens are used to permit more intense sun exposure, risks will be highest in the "only for the first few hours" category. The risks were assessed as odds ratios for melanoma of the trunk or lower limb (369 case-control pairs), after adjustment for host factors and skin type, and for measures of sun exposure, using multiple logistic regression.

As shown in Table 1, compared with those using sunscreens "sometimes," which we interpret as the lowest degree of use, those reporting use "almost always" had an unchanged risk of melanoma, both in simple analysis and after adjustment for host factors (hair, eye, skin color, and skin type) and for measures of sun exposure. In contrast, those who reported use of sunscreens "only for the first few hours" had a statistically significantly increased risk of melanoma that was only slightly lowered and remained statistically significant, after adjustment for host factors and for sun exposure. Analyses of men and women separately showed very similar results, the adjusted odds ratios for sunscreen use only for the first few hours being 1.68 in men and 1.70 in women.

The results for the "almost always" users argue strongly against any direct increased risk of sunscreen use. The results for those who use sunscreens only for the first few hours suggest that such use provides inadequate protection against the increased risks due to sun exposure or host characteristics. This study was done before extensive publicity on the risks of sun exposure, which makes response bias less likely, although the types and usage patterns of sunscreen use may differ from current

**Table 1.** Sunscreen use and melanoma risk; 369 case patients and 369 control subjects\*

Sunscreen use	No. of control subjects	No. of case patients	OR (95% CI)†
"Sometimes"	97	105	1.00 (referent)
"Almost always"	168	201	1.10 (0.75–1.62)
"Only for the first few hours"	104	63	1.62 (1.04–2.52)

\*OR = odds ratio; 95% CI = 95% confidence interval.

†ORs and 95% CIs adjusted for age, sex, ethnic origin, education, host factors (hair, eye, skin color, and propensity to sunburn), and sun exposure (summer recreational exposure and short-term occupational exposure) were derived, using multiple logistic regression.

practice. The sunscreens used would have mainly contained para-amino-benzoic acid, an effective ultraviolet-B blocker, although some sunscreens at that time may have been relatively ineffective. Some of the speculations about risks of sunscreens are also based on similarly dated data. The current results suggest that sunscreens provide incomplete protection against the effects of excess intermittent sun exposure but do not suggest any direct hazard of sunscreens, a conclusion that we believe is consistent with clinical experience and with the ultraviolet-B-blocking properties of older sunscreen agents (7).

Recently, newer sunscreens have emerged with effective ultraviolet-A-blocking potential, particularly those containing Parsol 1789. To date, no studies are available that are able to assess the ability of newer broad-spectrum sunscreens to protect against melanocytic lesions.

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## NOTES

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## RESPONSE

The new analysis of the Western Canada Melanoma Study is consistent with the absence of a direct hazardous effect of sunscreens. Likewise, data from our study (1) do not suggest a direct effect of sunscreens on development of nevi. Data in Table 2 of our published article (1) indicate that it is not sunscreen use that has a direct effect on development of nevi, but rather it is the sun. And data in Table 3 of our published article (1) suggest that the role of sunscreen use is probably to allow amounts of sun exposure that would not be possible otherwise. The latter mechanism, however, still needs confirmation.

Other aspects of our study are against a direct effect of sunscreen use on the occurrence of nevi or melanoma. In all four countries where our study was conducted, the number of nevi tended to increase with increasing sunscreen use and to decrease with the wearing of clothes (1). In contrast, mothers reported using more than 100 different brand names of sunscreens—on their children, and many sunscreen formulations found in one country were not available in another country.

Drs. Elwood and Gallagher interpret their data as being the result of sunscreens' providing incomplete protection against the effects of excess intermittent sun exposure. But the suggestion of incomplete protection implies that

sunscreen use would in any event confer some protection. In that logic, after appropriate adjustment, a higher melanoma risk should be found when sunscreen is never or rarely used, mainly among subjects with high levels of intermittent sun exposure. We see no evidence in this new analysis for a protective effect of sunscreen use, even among subjects who "always" used sunscreen. Also, in our data (1,2) on subjects having high levels of intermittent sun exposure, sunscreen use was associated with higher melanoma risk or higher number of nevi (1,2).

Drs. Elwood and Gallagher state that to date no study has assessed the protection conferred by newer broad-spectrum sunscreens, mainly those containing effective ultraviolet-A-blocking chemicals. Actually, most sunscreens used by the children in our study (1) were broad-spectrum sunscreens, containing effective ultraviolet-A filters. The eventual role of ultraviolet A in the development of human melanoma remains largely unknown. But the suggestion that ultraviolet-A would be involved in the melanoma-sunscreen association implies that, although the sunscreen blocks ultraviolet-B (and thus retards sunburn occurrence), greater amounts of ultraviolet-A reach the skin cells than in the absence of sunscreen. This occurrence can be achieved only if sunscreen use allows sun exposures of longer duration.

Another hypothesis is possible. For instance, a given dose of ultraviolet is a more efficient carcinogen when delivered in multiple fractions or over a longer period of time (3). From these data, one could argue that sunscreen use could modify the way ultraviolet-B is delivered to skin cells, resulting in greater carcinogenic efficiency.

Hence, studies are still needed to elucidate the precise mechanism by which sunscreen, when used for recreational or cosmetic sun exposure, would increase melanoma occurrence.

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## NOTES

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