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Children Apply Far Too Little Sunscreen

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January 17, 2012 — A recent study found that children do not get anywhere near the sun protection factor (SPF) reported on sunscreen labels because they are not applying enough of the product. However, some types of dispensers encourage them to apply more than others.

Abbey Diaz, MAppSc, from Queensland University of Technology, Kelvin Grove, Australia, and colleagues report their findings in an article published online January 16 in the *Archives of Dermatology*.

They conducted a crossover study of 87 children to determine whether children apply adequate amounts of sunscreen compared with the amounts used during SPF testing and whether the amount they apply is influenced by their age (grades 1 - 2, grades 3 - 5, grades 6 - 7) or the type of dispenser used (pump, squeeze bottle, or roll-on).

Participants were randomly enrolled from 7 public schools in Brisbane, Australia. The children were assigned to 1 of 3 groups that used each type of dispenser for 1 school week at a time (Monday - Friday), in the order assigned to that group.

At the beginning of the study, the researchers gave each participant 3 bottles of sunscreen, 1 with each of the 3 dispenser types. The researchers weighed the bottles before and after the study to determine the amount of sunscreen each child used. Children used the study sunscreen for only the first application of the day, and they received no instruction or assistance in applying it.

The investigators calculated the weekly mean thickness of application for each dispenser by dividing the weight of sunscreen used by the total coverage area.

Overall, the participants applied sunscreen at a median thickness of 0.48 mg/cm² (range, 0.00 - 8.72 mg/cm²), which is less than one fourth of the thickness used during product testing (2.00 mg/cm²).

"Because of the quasilinear relationship between sunscreen thickness and the SPF, these results suggest that children's in-use SPF may be less than one-fourth of the manufacturer's SPF," the authors write.

When children used the pump dispenser, they applied the largest amount of sunscreen (0.75 mg/cm²; range, 0.00 - 8.72 mg/cm²). However, even with the pump, children used less than half the recommended amount.

When they used a squeeze bottle they applied less than with the pump (0.57 mg/cm²; range, 0.15 - 5.10 mg/cm²), but the difference was not significant.

Children applied the smallest amount of sunscreen (0.22 mg/cm²; range, 0.01 - 1.58 mg/cm²) when they used the roll-on dispenser, and the differences between the roll-on and both the pump and squeeze bottle were statistically significant ($P < .001$ for both).

The investigators also found that older children (study range, 5 - 12 years of age) applied significantly less sunscreen than younger children ($P = .03$). The researchers suggest the difference may have occurred because the younger children had more assistance from teachers, spilled more during application, or tried harder to please the researcher. However, past studies have also indicated that adolescents have poorer adherence to sun protection practices.

"[G]iven the results of this study, parents should be advised to provide sunscreen in pump or squeeze bottle dispensers, at least for the morning home application, with roll-ons reserved for supplementary applications during the day if necessary," the authors write.

The researchers were surprised that such characteristics as phenotype, usual time in the sun, and frequency of sun protection behaviors (eg, frequency of sunscreen application) were not significantly associated with sunscreen application thickness.

The authors note that this study is particularly concerning because for many children, sunscreen is their primary method of sun protection.

"Our results highlight the need for continued recommendations that sunscreens should be combined with other forms of sun protection, such as hats, clothing, and shade, to achieve optimal [ultraviolet] protection," the authors note.

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