

Is DEET safe for children?

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EVIDENCE-BASED ANSWER

Reported evidence suggests that DEET use is safe for children older than 2 months, with only very rare incidence of major adverse effects (strength of recommendation [SOR]: **C**). Typically, a topical concentration between 10% and 30% should be used (SOR: **C**). Increasing DEET concentration does not improve protection, but does increase the duration of action (SOR: **A**).

CLINICAL COMMENTARY

Counsel parents to take 3 steps to prevent bites—avoid, cover up, and repel

The emergence of West Nile virus has heightened awareness of mosquitoes, and I often field questions about how to protect children from bites. I counsel parents to take 3 steps to prevent bites—avoid, cover up, and repel. Mosquitoes are active at dawn and dusk, so staying indoors during these times is protective. Covering up with long sleeves, pants, and socks protects from most bites. Lastly, DEET repellent protects exposed areas from mosquitoes. Lotions make it easier to apply DEET to children. Commonly, parents express fear of DEET due to media reports. This review will help me ease their fears.

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■ Evidence summary

The increasing prevalence of mosquito-borne diseases, including West Nile virus, has raised concerns about safe and effective forms of prevention. For decades, parents have used the insect repellent DEET (N,N-diethyl-metatoluamide), but questions remain regarding adverse effects,

including seizures, particularly when used in children.

Two large case series suggested that the risk of DEET is low. The first collected poison control center reports during the 1980s. The report concluded that DEET exposure rarely led to adverse effects and that the route of administration (ie, ingestion) was more closely linked to toxicity than age or gender.¹ There were 5 major adverse reactions reported from 9086 exposures to DEET (0.05%); these included hypotension, hypotonic reaction, and syncope, and 1 death (a suicide ingestion).

The second series, also collected from poison control centers, included roughly 21,000 reports of DEET exposures during the 1990s. The authors concluded that the risk of toxicity was low and that there was no clear dose-dependent relationship between exposure and extent of severity of neurologic manifestations.² This report found a rate of major adverse reactions (0.1%) from DEET that was similar to the first case series. The major reactions reported included hypotension, seizures, respiratory distress, and 2 deaths (0.01%). When limiting the data to infants and children only, there were 10 major events among 17,252 reported exposures (0.06%), and no deaths. Although infants and children accounted for 83.1% of all reported exposures, the majority of the serious outcomes (including the deaths) occurred in adults. About half of all those exposed reportedly had no ill effects, the

other half had minor effects (transient effects that resolved without treatment). Only 4% experienced moderate effects (non-life threatening problem, but one that would likely require treatment). There were no data presented on the overall size of the exposed population, eg, users of DEET in the US.

Two recent narrative reviews also concluded that DEET toxicity is rare in children. The first review found that DEET posed essentially no risk in children.³ The second review was sponsored by SC Johnson and Company, the makers of OFF! brand insect repellent. It assessed animal studies, epidemiologic data, and case reports, and supported the safety of DEET in children.⁴

A theoretical risk is that DEET toxicity could be enhanced by coapplication with other agents. Some studies have uncovered dangerous interactions with military and industrial chemicals, but such exposures are unlikely in most children. The most practical concern regards sunscreen. One study reported that use of sunscreen increased the penetration of DEET.⁵ However, since the poison control center studies indicated that toxicity did not occur in a dose-dependent manner; the clinical significance of increased penetration is not clear.^{1,2}

Increasing the concentration of DEET does not improve protection but does provide longer duration. Concentrations of 6.65% protect for about 2 hours while 23.8% DEET can last about 5 hours.⁶ By understanding this relationship, parents can apply lowest concentration necessary to provide the protection needed.

Recommendations from others

The American Academy of Pediatrics recommends avoiding DEET in children under 2 months of age. For all other children, it advises using DEET with a concentration between 10% and 30%.⁷

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CONTINUED

FAST TRACK

DEET at 10%–30% concentration is safe for children older than 2 months; increased concentration prolongs action but does not improve protection