

## Children are not "little adults" — NAS report

Major conclusions of the NAS Report *Pesticides in the Diets of Infants and Children* include:

### Children are not "little adults."

Their surface-to-volume ratio is three times higher; they eat fewer kinds of foods and consume more of certain foods per unit of body weight. They also drink more water both alone and mixed with other foods. As children grow, their tissues increase rapidly in cell number and size, and pass through several stages of development. Children's metabolic rates are higher, and they are subject to different levels of enzyme induction and action.

**Toxicity testing of immature animals.** Risk estimates, tolerances and other food safety determinations should be based on testing that includes immature animals, so that potential sensitivities of infants and children can be evaluated. Some data suggest that children may be more sensitive than adults to some pesticides, while being equally or less sensitive to others.

Better laboratory tests must be developed to measure effects on immature animals. In particular, tests should be developed to assess effects

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California Agriculture file

on the immune, neurologic, and reproductive systems.

**Uncertainty factors.** Use of an additional "uncertainty factor" of up to 10-fold should be used when there is evidence of postnatal toxicity, or when data relevant to children are incomplete. This precaution — resulting in a 1,000-fold safety factor — is already taken in cases of prenatal toxicity.

(Currently, if animal tests show no adverse effects at a certain exposure level, the reference dose, or acceptable daily intake, is obtained by dividing that level by 100 — to account for differences between humans and animals and variations among humans.)

**Risk distributions.** Risk assessment currently takes a "one-size-fits-all" approach to estimating pesticide risk. Each pesticide risk estimate is a single number representing the average risk of an entire population. Instead, assessments should use "risk distributions" combining data that reflect variations in food intake and pesticide residues. (For instance, distributions would reflect food intake variations according to factors such as age, geographic region and ethnic group).

**Food consumption data.** Because sufficient data are not currently available to permit wide application of these methods, food consumption data should be collected with age-related, geographic, ethnic and cultural differences in mind. Food consumption surveys should be conducted at seven age levels — for every one-year interval up to age 5, for young children ages 5 to 10, and for older children ages 11 to 18.

**Multiple exposures.** All exposures to pesticides should be considered in determining dietary tolerances. Non-dietary sources of possible concern include drinking water, air, soil, lawns, pets and indoor surfaces. Due to a child's constant tasting, touching and manipulating of the world at hand, most of these sources are more important for children than for adults.

**Additive effects.** Estimates of total dietary exposure should be refined to consider possible additive effects for pesticides having common mechanisms of action, as well as synergistic effects of exposure to multiple pesticides having common toxicological effects.



Children may be more sensitive than adults to some pesticides.

**Pesticide residue data.** Uniform analytical methods and reporting procedures should be used by all laboratories that measure pesticide residues so that data from different laboratories can be reliably compared. The committee also recommended establishment of a computerized data base for collating measurements from different laboratories.

*This summary was derived from the NAS report Pesticides in the Diets of Infants and Children and the article "Report Elicits Promises to Improve Pesticide Rules," published in the National Research Council's magazine NewsReport, Summer 1993. —Editor*