Pesticide/food risk greatest under age 6

U.S. adults face a cancer risk from pesticides on the fruits and vegetables they ate as children—a threat roughly 240 times higher than the one-in-a-million risk usually deemed unacceptable by the Environmental Protection Agency. So concludes a study released this week by the Natural Resources Defense Council (NRDC) in Washington, D.C. The two-year study concludes that because fruit makes up so much of a preschooler's diet and is the food most likely to harbor toxic pesticide residues, more than half an individual's lifetime cancer risk from fruit is typically acquired before age 6.

Using U.S. government data, NRDC researchers identified the 27 foods — other than milk — most frequently eaten by children under age 6. Relative quantities were broken down by age. Then the researchers applied information on residues of 23 pesticides, including eight suspected carcinogens, recorded as contaminating these fruits and vegetables in recent EPA and Food and Drug Administration surveys. What results is "the most comprehensive data base that has ever been put together" for computing a preschooler's dietary exposure to pesticides, says Robin M. Whyatt, one of the study's principal authors.

It shows that although fruit represents 32 percent of a child's diet — 70 percent more than the average 22- to 30-year-old woman's — children actually eat six times more fruit, relative to their weight, than do adults. Because the food-to-body-weight ratio — and therefore the pesticide-to-body-weight ratio—declines with age, the youngest children face the highest toxic exposures. Take apple juice, a childhood favorite that has been found to contain daminozide, a suspected carcinogen, and its more potent metabolite UDMH (SN: 9/7/85, p.149). Compared with the typical adult, preschoolers consume almost 18 times as much apple juice, relative to their weight; toddlers consume more than 31 times as much.

Based on preliminary data on its cancer potency—as suggested by an EPA risk assessment reported last month — the researchers say UDMH contributes 86 to 96 percent of the cancer risk in the produce typically consumed by preschoolers. In a case filed before the Supreme Court two weeks ago, NRDC seeks to sue EPA to prohibit the marketing of food containing any daminozide.

Uncharacteristically, EPA responded to NRDC's charges in a four-page press package issued before NRDC formally unveiled its report. In these materials, EPA says that contrary to NRDC's claim, "foods containing legal levels of pesticides are generally safe." Moreover, the agency says, it considered the proportionately higher exposures to children when setting its pesticide-use limits on food. However, the statement adds, "although EPA believes its approach to tolerance-setting adequately protects the young, the agency has contracted with the National Academy of Sciences to study this issue and recommend changes."

According to the National Academy of Sciences, that report — due out in the fall of 1990 — will reevaluate not only the entire dietary-pesticide risk-assessment process but also what's known about actual human exposures and the apparently higher sensitivity of infants and children to toxic chemicals.

Attorney Janet Hathaway, NRDC's leading anti-pesticide lobbyist, contends her group's report underestimates actual cancer risks since its calculations are based on data for only eight carcinogens. EPA estimates 66 legal pesticides can cause tumors. More important, Hathaway says, of the 496 pesticides most likely to leave residues on produce, only 40 percent can be detected in the multichemical monitoring surveys that federal regulators typically use. Finally, NRDC's estimates are based on childhood exposures only. Most exposures will continue throughout an individual's life.

Titled "Intolerable Risk: Pesticides in our Children's Food," the study recommends that:

- EPA and FDA develop methods to routinely monitor more pesticides.
- Congress modify farm-support programs to reward growers for using fewer chemicals.
- Parents wash produce in soapy water (although that won't remove all chemicals, such as UDMH).
- EPA use its regulatory powers to move more swiftly in revoking the registration of pesticides the agency views as serious hazards — most notably daminozide/UDMH.

EPA's prepared statement appears aimed at generally discounting the NRDC study's conclusions. However, in an interview, Edwin Tinsworth, EPA's director of pesticide special reviews and reregistration, said scientists at his agency had yet to see the full report—and therefore had not reviewed how NRDC derived its controversial dietary-pesticide-risk estimates. As a result, he says his agency cannot yet comment on the validity of NRDC's conclusions.

However, he adds, owing to the fact that "NRDC is a well-thought-of organization," capable of "good quality" research, "we're clearly going to go through their report carefully." If EPA's review confirms NRDC's calculations — yielding cancer risks hundreds of times greater than EPA's general threshold of acceptable risk — "it's hard to believe there would be any kind of benefit that would make it worthwhile maintaining the chemicals [in question]," Tinsworth says. *— J. Raloff*

If only this diamond truly lasted forever

Most of the diamonds sparkling on wedding rings were born in the Earth's mantle, 150 kilometers underground, and shot up to the surface mixed into columns of hot, fast-moving lava called kimberlite. However, many diamonds may be rising by a slower process.

Peter H. Nixon of the University of Leeds, England, and his colleagues have studied a 50-kilometer-long slab of earth called Beni Bousera that was once in the mantle and surfaced in Morocco about 15 million years ago. In a letter to the March 2 NATURE, they cite evidence showing that before the deposit surfaced, it contained about 10,000 times the diamond-richness of the best kimberlites.

Actual diamonds no longer exist in the Beni Bousera, only bits of graphite. But Nixon says the shape of the graphite suggests a more lustrous past. All of the Beni Bousera graphite is shaped distinctively as diamond crystals, not as graphite crystals—most of it in strikingly diamond-like octahedra. "You wouldn't expect to see graphite in an octahedral shape," says diamond expert Tony Erlank of the University of Cape Town in South Africa. He agrees this graphite probably was once diamond.

Graphite and diamond are both pure carbon, and at surface pressures, diamonds tend to revert to graphite. Kimberlite diamonds persist because they rise to the surface quickly. But the Beni Bousera probably came up slowly, its diamonds apparently retaining their shape but losing their value. Nixon suggests Beni Bousera was once a carbon-rich seafloor that sank to the mantle, where the diamonds formed. It then slowly surfaced through the shifting crust.

Had the Beni Bousera made it up faster, some of its layers might have been a staggering 15 percent diamond, or 10,000 times as rich as kimberlite. Nixon suggests that such deposits — carbon-rich seafloor that goes to the mantle and back — might be the original source of kimberlites. The kimberlites may pick up their few gems as they speed through these diamond wellsprings, he says. Could such a million-dollar mantle ever make it to the surface before its diamonds became worthless graphite? Nixon thinks it possible. Similar deposits in Tibet and the eastern Soviet Union have retained some of their diamonds, he notes.

The place to look for surfaced, diamond-rich mantle would be around the restless plate margins where deep material moves up. Diamond hunters normally range over the calm continental interiors where kimberlites are found, but Nixon suggests the plate margins deserve a closer look. *— F. Flam*