NRDC used a model, known as a "time-dependent multistage model," that takes into account the longer cancer latency period that comes from early exposure. EPA, on the other hand, uses a time-independent model that assumes that the risk for a given dose is the same whether the person is 5 or 70 years old.

A handful of pesticides pose the greatest risk, NRDC found. Eighty-six to ninety-six percent of the total cancer risk NRDC calculated can be traced to one pesticide, Alar, and its breakdown product, UDMH. Since the late 1960s Alar has been widely used on red apples and thus finds its way into apple juice and applesauce as well. Alar penetrates the apple skin and cannot be washed off. According to NRDC calculations, preschool exposure to UDMH poses a cancer risk of 1:4200, 240 times the 1:1 million lifetime risk that EPA strives for.

NRDC also found "unacceptable" exposures to four carcinogenic fungicides: captan, chlorothalonil, folpet, and ethylene thiourea (ETU), a metabolite of the pesticide mancozeb. Preschool exposures to these fungicides will result in 140 to 670 excess cancers, a risk of 1 cancer for every 33,000 to 160,000 children exposed NRDC estimates. These fungicides are typically used on tomatoes, strawberries, apples, grapes, and other fruits.

At least 3 million kids, or 17% of the sample, are exposed to neurotoxic organophosphate insecticides in amounts that exceed EPA's established safe level, or acceptable daily intake. These low-level exposures could result in neurological or behavioral impairment, says NRDC, but chronic effects are poorly understood at best.

These "intolerable" risks arise, says NRDC, because EPA drastically underestimates preschooler consumption of certain foods and has thus set standards that fail to protect them. Standards for many pesticides now in use were set in the 1950s and 1960s, before EPA even existed. Historically, EPA and other federal agencies relied on rather crude estimates of adult intake, known as Food Factors, in setting tolerances. These were often based on dividing U.S. production of each commodity by the population.

In the past few years EPA has moved to correct the situation. According to Bill Jordan, in EPA's pesticides office, the agency now looks at actual consumption data for the first year of life, for ages 1 through 5, 6 through 13, and so on.

True enough, concedes NRDC's Whyatt, "but we are concerned about the 300 pesticides already on the market. EPA has not gone back and lowered existing tolerances based on new consumption data." Jordan maintains that the agency is doing just that, albeit slowly. This "reregistration" of existing pesticides should be complete within 9 years, he says.

In addition, NRDC charges, the consumption data the agency is using are already out of date. The agency is still using USDA's 1977 consumption survey rather than the 1985 survey NRDC used. Between the 1977 and 1985 survey, fruit consumption among preschoolers jumped 30%.

Reliance on the 1977 data, as well as use of the different risk assessment methodologies, leads EPA to a lower estimate of risk for most pesticide residues than NRDC calculates. Alar is a case in point. Based on interim data from a study now under way, EPA calculates a lifetime risk of 4.5 cancers in a population of 100,000. For infants, the risk for an 18-month period—not lifetime exposure—is 9 in 1 million, which would translate into a risk of about 3 or 4 cancers per 100,000 for the first 6 years of life. NRDC's estimate for the first 6 years of life is 1 cancer in 4200.

When the report came out last week, EPA scientists began working through NRDC's risk assessment for Alar, "trying to identify the differences in approach and talking about how important they are," says Jordan. "We are reassessing our procedures. We are not going to brush this report aside and consider it ranting and raving in the dark. The folks NRDC involved in the study we take seriously. The public deserves that these questions get looked at."

Jordan suspects that NRDC's risk assessment techniques have overestimated the true risk to children. In most cases, he says, EPA finds that a pesticide is either acceptable for both children and adults or not. "There are a few cases—and Alar was one—where there is a difference."

NRDC, on the other hand, maintains that its study underestimates the risk, and several reviewers, including Markowitz, agree. NRDC looked at just 23 pesticides out of the 300 used on foods, and at only 8 of the 66 pesticides identified as potential carcinogens. They looked at just 27 foods, omitting milk and several other major components of children's diets. Moreover, NRDC assessed risk only from birth through age 5. Exposures accumulated after that time would add to the risk.

A more definitive answer will probably emerge in mid-1990 when the National Academy of Sciences completes its study. The committee is looking at about 100 pesticides and will have access to more recent data than did NRDC on both children's consumption and typical pesticide residues in foods. ■ **LESLIE ROBERTS**

NASA's $60,000 Epoxy Drops

For want of a piece of paper, the National Aeronautics and Space Administration (NASA) will be spending some $350,000 this spring to apply six small drops of epoxy to certain nuts and bolts inside the Hubble Space Telescope.

"We want to make sure they don't vibrate loose during launch," says project scientist Fred S. Wojtalik of the Marshall Space Flight Center in Huntsville, Alabama. Any loosening of these particular bolts could make it difficult or impossible for ground controllers to focus the telescope once it is in orbit. Far worse, he says, the bolts could conceivably work loose entirely—sending about 20 kilograms of hardware plunging down onto the telescope's primary mirror.

The epoxy problem was uncovered last year, during one of the agency's analyses of how various components of the telescope might fail. Standard procedure calls for all nuts and bolts on the spacecraft to be dabbed with epoxy, or "staked," after they are tightened. But there was no evidence that this had been done for a particular assembly on the telescope's secondary mirror, which will play a critical role in focusing starlight onto the scientific instruments. The files contained no documentation on these bolts, and the technicians involved could not remember if they had staked them or not.

Vibration tests on an engineering mock-up of the secondary mirror confirmed that unstaked nuts might indeed start backing off during launch. So project managers decided that it was time to be safe rather than sorry. The telescope is currently being stored in a vertical position at the Lockheed Missiles and Space facility in Sunnyvale, California. But this June, as it is being prepared for shipment to Cape Canaveral, it will be tilted onto its side. A specially designed platform will then be inserted into the telescope's forward opening. An elaborate system of rails and stops will ensure that the platform touches nothing on the inside. An equally elaborate system of tarps will keep dust from drifting onto the mirrors.

Once the platform is in place, a technician will crawl along it armed with a sample of special epoxy. The technician will then open up the secondary mirror assembly, and look. If the epoxy is already there, he will close everything up again and withdraw. If not, he will put six small drops where they are needed. ■ **M. MITCHELL WALDROP**