Understanding the effects Pesticide Exposure: The absence of knowledge is not proof of safety.

The more that scientists learn about the toxicity of pesticides, the more questions are raised about the potential toxic effects on people. Pesticide manufacturers often dismiss these unresolved scientific issues using statements similar to, "there is no conclusive evidence of harm to humans" which can mislead the public into believing that exposures to these pesticides and toxic chemicals are without appreciable risks.

This is not true. Absence of knowledge is not proof of safety.

There are two chief reasons why it is so difficult to link human harm conclusively to toxic chemicals.

Firstly, most safety tests done for regulatory agencies are not designed to discover whether the low dose exposures to pesticide and chemical mixtures that we all experience are safe, particularly during critical periods of development. In general, the government demands, and companies conduct, high dose studies designed to find gross, obvious toxic effects. In the absence of the appropriate tests at lower doses, pesticide and chemical manufacturers claim safety because no harm at low doses has been conclusively demonstrated (or even studied).

Secondly, because people are contaminated with trace levels of literally hundreds of chemicals, it is generally impossible to attribute a specific health effect to any one or to a specific combination of them. There are several worrisome exceptions, however, including chemicals like PCBs and lead, where low doses at critical periods of development have been shown to have significant permanent adverse effects on learning and behaviour (CDC 2001, CDC 2003, EWG 2003, ATSDR 1999, ATSDR 2000).

Beyond the narrow confines of regulatory agencies, independent research scientists are beginning to understand the subtle ways in which small doses of pesticides during critical periods of fetal development and childhood can have long lasting adverse effects on people. It is well established that the fetus, infant and small child are typically most vulnerable to the toxic effects of pesticides and toxic chemicals (NRC 1993, EPA 2003, FSA 2003). The metabolism, physiology and biochemistry of a fetus, infant or child is fundamentally different than an adult. A host of vital organ systems continue to grow and mature from conception throughout childhood. At critical periods of developmental change, these systems are susceptible to the toxic effects of pesticides and toxic chemicals, both individually, and in mixtures. Many organ systems, for example the nervous system and brain, can be permanently, if subtly damaged by exposure to toxic substances in-utero or throughout early childhood that, at the same level, cause no measurable harm to adults (Jacobson 1996, CDC 1997, NRC 2000)

The endocrine (hormone) system is perhaps even more sensitive to toxic exposure than the nervous system, and over the past decade, enormous effort has been put into the study of how pesticides and toxic chemicals interfere with normal endocrine signalling and function. A significant body of research in animals now shows that ultra-low doses of pesticides and toxic chemicals on critical days of development can cause changes in hormone function and effects on organ development and function that often only appear later in life. A growing number of these studies show that low doses at a susceptible moment of development can cause more of an effect than high doses (vom Saal 1997, Alworth 2002, Hayes 2003). This is particularly relevant to childhood and fetal exposures via food and water where the timing of the exposure is at least as important as the dose.

Many pesticides are now considered "endocrine disrupters", in part because the term is something of a catch phrase for chemicals that cause a variety of changes in normal hormone signalling. Some better known examples of highly toxic endocrine disrupting pesticides are DDT (and its metabolite DDE) which are now known to exhibit much of their toxicity through anti-androgenic (de-masculinizing) properties (ATSDR 2002), vinclozolin, a heavily used fungicide that is also anti-androgenic (EPA 2000), endosulfan, a DDT relative with estrogenic properties that is found more often in food than any other pesticide (EPA 2002, USDA 1994-2001), and atrazine, a weed killer with broad hormonal activity, that contaminates the drinking water of about 20 million people in the United States (EWG 1999, EWG 1995).

Today scientists know much more about how pesticides can change critical hormone signals in the human body in ways that can have potential life changing effects. Yet in spite of these advances, there is little agreement on how much endocrine disruption is too much, and how much is without harm. The same is true of immune system effects and to a lesser degree effects on the developing nervous system.

As science advances, public health and environmental officials are faced with growing knowledge about the hazards of pesticides, but uncertainty about precise mechanisms and nature of the adverse effects. This conundrum is straining a regulatory system that has become overly dependent on scientific certainty when certainty is increasingly difficult, and even impossible to achieve.

Rather than preventing exposures and putting the burden of proving safety where it belongs, on pesticide and toxic chemical producers, most pesticides remain on the market with no threat of regulatory action. EPA is increasingly mired in complex and arcane scientific arguments, mostly generated by chemical companies, that serve primarily as delaying tactics to keep pesticides and toxic chemicals in the marketplace. With no end in sight to this stalemate, the consumer is wise to minimize exposure to pesticides whenever possible.

Doesn't the government regulate these chemicals?

Yes, but far too slowly. Further, it's important to remember that the government said that highly toxic pesticides like DDT, chlordane, dursban and others were safe right up until the day they were banned.

Are these chemicals bad for me?

Pesticides are toxic by design. They kill bugs, weeds, fungi, rodents and other "pests." That's why the government regulates them--though not stringently enough. The risks you encounter when you eat them depend on a number of factors including the toxicity of the pesticide, degree and form of exposure, your age, genetic susceptibility, and exposure to other toxics, including other pesticides. We believe that:

1. You have a right to know what's in your food.

2. The risks from many of these contaminants are unacceptably high, especially for infants and children

3. The government can and should take steps to eliminate toxic chemicals, including

pesticides, from the food supply.

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