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## What Physicians Don't Know About Occupational Exposure to Pesticides

by Molly Joel Coye, MD, MPH

*"Why hasn't my physician told me more about the pesticide hazards I am facing?"*

*"Why is s/he reluctant to diagnose my illness as pesticide-related when it seems at least an obvious possibility?"*

These are questions frequently asked by workers when they first learn about the possible hazards they face from exposure to pesticides on their job. One answer is that their physician may not have been trained to investigate occupational exposure as a cause of illness.

In a 1979 survey of U.S. medical schools, 70% of the responding schools indicated they required *no* formal instruction in occupational or environmental medicine. Among the 30% that did require such instruction, the median time required was four hours during the four years of medical education. In a repeat survey conducted in 1984, 54% of the schools included such instruction, but the median time required was still four hours (Levy 1985).

### Acute, Severe Poisoning

What most physicians know about pesticide toxicity is limited to the specific signs of acute, severe poisonings. Some chemicals produce characteristic physiologic changes which make diagnosis easier, but almost all of these signs and symptoms occur only after a substantial exposure. In cases of direct exposure to large amounts of a pesticide (e.g. following a spill, accidental ingestion, or direct spray by a helicopter), some effects will be so specific that they suggest the diagnosis of pesticide poisoning.

Not very many categories of pesticides have specific "signs," however, and even these signals may be misinterpreted if the link to pesticide exposure is not made. For example, a sign of moderately severe organophosphate or carbamate poisoning is miosis, or pin-point pupils. If pesticide exposure is not mentioned by the patient or by the person who brings the patient to the emergency room or clinic, most physicians would initially suspect narcotics abuse because it is the most common reason for this finding in a patient. When pesticide exposure is mentioned, and the symptoms are severe, many nurses and physicians will recognize the presenting symptoms as signs of pesticide poisoning or will make use of a poison control center and other resources to investigate the possibility of pesticide poisoning.

### Chronic, Low-level Poisoning

Acute severe poisonings are relatively rare, however, in comparison with low-level pesticide exposures at work or in home and garden use. The effects of low-level exposure are much more difficult to diagnose, for a number of reasons:

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# Don't Know About Exposure to Pesticides

1) *The symptoms are almost always non-specific*, meaning that they could be caused by many different chemicals, by an influenza or cold, by physical exhaustion or even psychological stress. Mild organophosphate exposure may only produce headache, fatigue, weakness, nausea and sweating, all those being classic signs of a beginning bout of flu. Dermatitis caused by a pesticide could easily be diagnosed as a reaction to a soap or plant at home rather than a pesticide in the workplace. Medical students learn to "look for the zebras" (i.e. think of exotic explanations for common findings) while they are in school, but everyday practice in the real world teaches most physicians that "if it looks like a horse, it probably is not a zebra." In other words, if there is a logical, common explanation for a set of symptoms, why try to dig up another explanation?

2) *In most cases it will not be easy for the physician to "prove" the diagnosis.* Making a diagnosis means both a) demonstrating the probability that a certain agent (e.g. a pesticide) caused the illness, and b) ruling out other causes (e.g. demonstrating that the patient doesn't have the flu or a cold). Since many illnesses like a cold or flu can't be conclusively ruled out in most situations, diagnosis depends upon making a strong case for the probability that pesticides caused the illness.

Biological testing for pesticides in the blood or urine is relatively difficult and very expensive (the usual method is gas chromatography and it may cost several hundred dollars per test), and not very helpful in low-level exposures. Exposure to organophosphate or carbamate compounds is measured by the activity of the enzyme cholinesterase in blood. The interpretation of this test is difficult in mild or moderate exposures, however, because there is a wide range of variation in enzyme activity between individuals. A mild effect in one person is almost impossible to detect without a baseline measurement for that person prior to the exposure for comparison. As a result, a physician who says "I think this patient has a headache and nausea because she worked on a railcar that was shipping pesticides" has no way of demonstrating why that patient didn't just have a mild case of flu.

3) *In some cases the exposure occurred a long time before the onset of symptoms, or the symptoms have existed for a while before the patient realizes that a past exposure might have caused them.* Again, unless there is some symptom or finding which clearly demonstrates the link with the pesticide exposure in the past (for example, a peripheral neuropathy developing several weeks after exposure to certain organophosphates), this is difficult to diagnose. Even the most sympathetic physician, one very interested in pursuing occupational etiologies (causes), has a tough time defending a diagnosis in cases like this.

4) *Very little research has been done on the clinical toxicology of pesticides, and even less is published in medical journals and texts.* When a physician is puzzled by a clinical situation, she or he turns first to textbooks in the office. If a case is very unusual

or interesting, the physician may ask for a literature search of medical journals. If neither of these turns up any suggestion that the patient's symptoms may be related to pesticides, most physicians will be quite reluctant to make a diagnosis of pesticide-related illness, particularly because a disproportionately high number of such cases wind up in compensation or tort suits in which the physician may have to defend this diagnosis.

5) In many parts of the country, the library resources in occupational and environmental medicine are extremely limited and there are only about 800 board-certified specialists in occupational medicine in the U.S. As a result, the physician may not have a local source to consult in this field.

All of these factors make physicians understandably reluctant to pursue diagnoses of pesticide-related illness. Unless the signs and symptoms and history of exposure are relatively clear-cut, the physician often feels that trying to make the diagnosis will be frustrating, unrewarding and may even expose her or him to the risk of professional ridicule or the risk of lawsuits.

I realize that this long list of problems may be discouraging to patients and workers in search of help. It may seem to suggest that physicians should not be expected to learn about pesticide health effects or to make these diagnoses. I do not mean to imply that. All general practitioners, including internists, family medicine physicians, pediatricians, obstetricians and gynecologists, nurse practitioners and physician's assistants, as well as toxicologists, clinical pharmacologists and emergency room nurses and physicians should be acquainted with the range of symptoms and illnesses which may be associated with pesticide exposure. But it is important to recognize the barriers faced by health providers who are sympathetic and interested in learning about pesticides, and the reasons why health professionals may be hesitant to get involved or may grow discouraged.

### Steps Toward Diagnosis

Physicians who are interested in occupational and environmental medicine must 1) gather comprehensive occupational histories; 2) provide for appropriate biological testing; and 3) offer worker education. Elements of the occupational history gathered from a worker should include job title, type of industry or farm, name of employer, period of employment, job duties, protective equipment provided and/or used, additional job-related hazards (machinery, noise, sun, etc.), information on whether other workers have symptoms, prior work history, history of work-related illnesses, accidents and compensation, home pesticide use or exposure, other chemical exposures on the job or at home (e.g., solvents used in hobbies), and most importantly (if the worker knows this), the compounds to which he or she is exposed. If the worker does not know this, it may be possible to approximate an answer. If a farmworker only knows, for example, that she is working in tomatoes, the physician should be able to learn from the county health office or agricultural commissioner what is typically being applied to tomatoes during that time period. If the worker knows that symptoms developed after fighting a fire in a particular warehouse, it may be possible to find out what was in the warehouse from the fire department records.

No medical examination of a worker should be conducted without appropriate education of the worker about the potential hazards of their job and the means to reduce the associated risks. Simple instruction about such topics as field

sanitation, protection during mixing, loading, and transportation of pesticides, proper storage of pesticides, and the early symptoms of poisoning may prevent serious damage. Pamphlets, one-page posters, information sheets, and even short slide programs have been prepared for patient/worker education on pesticide health hazards.

Because of the inadequate training which most health providers have received in occupational medicine, continuing education programs on pesticide-related health hazards are particularly important. Pesticide reform groups have been successful in some states in sponsoring continuing medical and nursing education programs, or in arranging for county or state health departments to sponsor them. Support for research in occupational and environmental medicine is also important, not just in order to learn more about the health effects of pesticides, but in order to get more of this into the scientific literature so that clinicians in the field have more to refer to when evaluating pesticide illnesses.

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