

Practice Skill I:

Taking an Environmental History

In the primary care setting, the recognition of pesticide poisoning begins with incorporating an environmental exposure history as a routine part of a focused medical history. Understanding how humans become exposed to pesticides is key. Health care providers should be aware of professions associated with use of pesticides (see Table 1 on page 37), as well as other incidental exposure possibilities at home, in schools, in the workplace, and elsewhere.

The exposure history may provide a clue to the broad category of pesticide to which an individual may have been exposed. The major categories of pesticides are insecticides, herbicides, fungicides, and rodenticides. Fumigants and disinfectants are also important as common pesticide exposures.

While some patients may recognize that they were exposed to a pesticide and that the exposure might be responsible for their symptoms, others will not have considered such a cause. Thus, the questions posed by the health care provider concerning the possibility of exposure represent the best chance to make such a connection.

Occasionally, a health care provider will be faced with a patient who believes he or she has been affected by a pesticide application when, in fact, there has been no exposure. Contacting the company or individual who applied the pesticide is the best choice, but if the contact is unavailable or unwilling to cooperate, the health care provider can seek assistance from other sources listed in the Resources section below.

Content

I-1. Understand the purposes and general principles for taking an environmental history.

- Purposes include:
 - ▶ Increase awareness of environmental/occupational factors
 - ▶ Improve diagnosis
 - ▶ Prevent disease and aggravation of conditions
 - ▶ Identify potential work-related environmental hazards, and/or environmental hazards in and around the home and community
 - ▶ Detect new associations
 - ▶ Improve rapport with patient
- Know the differences in exposure effects on different groups (e.g., children, adults, pregnant and lactating women, elderly).

- Recognize sign/symptoms for pesticides under consideration (see Practice Skill IV).
- Understand relationships of suspect exposures to health outcomes, including "hallmark" indicators of exposure.
- Recognize timing of suspected exposure to manifested signs and symptoms, including what makes signs/symptoms disappear or get worse.

I-2. Incorporate general environmental screening questions into routine patient histories.

■ Adults:

- ▶ What kind of work do you do?
- ▶ Do you notice the problems you are having while you are at work? at home? in your community? in a specific location?
- ▶ What causes symptoms to come and go?
- ▶ Have you recently used pesticides, solvents, insecticides, weed killers?
- ▶ What kinds of hobbies do you have?
- ▶ Has your workplace been treated recently for insects, weeds, or other pest problems?

■ Children: (Questions asked of parent or guardian)

- ▶ Where does your child go to school, daycare, playgrounds?
- ▶ Have any of these places been treated recently (e.g., sprayed) for insects, weeds, or other pest problems?
- ▶ Does your child help with gardening activities?
- ▶ Sources of food, water (e.g., well water), breast feeding of infant.

I-3. Be able to take a complete environmental exposure/health history for adults and children, covering occupational and non-occupational exposure factors.

■ Adults:

- ▶ Type of work including, how long on the job, kinds of work-exposures, any specific pesticide or work exposure (e.g., agricultural, extermination), sorting of contaminated clothing, use of PPE, hygiene practices of applicators, co-worker symptoms.
- ▶ Home environment (age of home, characteristics of heating and ventilation system), use of pesticides in gardening or as an insecticide in the home, well water or source of drinking water, storage of chemicals, type of food bought/eaten, anyone else in family sick, hobbies (e.g., pottery, photography, painting, furniture stripping).
- ▶ Community exposures including home location near industry, businesses (e.g., auto repair shops, dry cleaners), landfills, hazardous substance spills.

- *Children: (Questions asked of parent or guardian)*
 - ▶ Where child goes to school, daycare, playground, play
 - ▶ Whether child helps with gardening activities
 - ▶ Hobbies
 - ▶ Sources of food, water (e.g., well water), breast feeding of infant
 - ▶ Parent's occupational exposure
 - ▶ Developmental issues
 - ▶ If parents have occupational exposure, is the clothing worn during application stored and washed separately from family clothing?

I-4. Develop network of resources.

- Know local and state experts or specialists who can be consulted for differential questions or exposure questions.
- Review pesticide label, or obtain information on pesticide labels related to health hazards and adverse effects. (See box on next page.)
- Contact patient's employer about potential work-related pesticide exposures and access to material safety data sheets, for information on health hazards and adverse effects. (See box below.)
- Develop network of resources for assessment tools.
- Compile Web resources for MSDS and label information.

Resources

- Reigart JR, Roberts JR. *Recognition and Management of Pesticide Poisonings*, 5th ed. Washington, D.C.: U.S. Environmental Protection Agency, 1999. The manual contains an exposure history questionnaire and cursory screening questions. Online at <http://npic.orst.edu.rmpp.htm>
- National Pesticide Information Center. Technical Pesticide Information, <http://npic.orst.edu/tech.htm>. Includes links to factsheets on toxicology and active ingredients, health information databases, environmental and chemical properties databases; and product, label, and MSDS databases. For a list of sites with MSDS information, go to: www.phys.ksu.edu/area/jrm/Safety/msds.html
- Pesticide manufacturer: Contact information should be on the label, or go to: <http://npic.orst.edu/manuf.htm>.
- Agency for Toxic Substances and Disease Registry. "Case Studies in Environmental Medicine, No. 26: Taking an Exposure History". www.atsdr.cdc.gov. Provides examples of case histories and suggested patient dialogues, includes an exposure history form.

- University of Maryland Pesticide Education and Assessment Program. “Developing a Pesticide Exposure History”; Pesticide Information Leaflet No. 25. May 1998. Provides guidance on taking exposure histories for both occupational and incidental pesticide exposures. <http://pest.umd.edu/spatc/Leaflets/LeafletList.html>. Other leaflets include: Comparing Symptoms of Heat Stress and Pesticide Poisoning, Cholinesterase Monitoring, Health Care Providers’ Access to Pesticide Information, etc.
- County Cooperative Extension Service – Listed in the blue pages of telephone directories, or go to: <http://npic.orst.edu/countyext.htm>. County Extension personnel can help determine which pesticides may have been applied to a particular crop, and what activities might have taken place through which workers or others may have been exposed.
- State Agromedicine Programs – Agromedicine is a collaboration between medical professionals and state pesticide Extension and/or regulatory personnel to address health concerns of agriculture and forestry, and products associated with commodity production, including pesticides. Several states have active Agromedicine Programs; others are in the process of developing programs. Go to www.neetf.org/Health/Resources/healthcare.htm for a list of designated state contacts.
- USDA Crop Profiles – Provides information about pesticides used on a particular crop in a specific state in the United States. <http://pestdata.ncsu.edu/CropProfiles/>.
- U.S. EPA Pesticide Management Resource Guide – Contains directories and lists of pesticide information contacts: www.epa.gov/oppfead1/pmreg/index.html.

Using the Pesticide Label as a Resource

The pesticide label is a legal document, and it is a violation of the law to use a pesticide in any manner inconsistent with the label. Every pesticide is required to bear a label that conforms to EPA standards.

The following items must appear on the label:

Ingredient statement – Name and percentage of each *active ingredient* and total percentage of *inert ingredients*. An inert ingredient is one for which no toxic activity against the pest is claimed, while the active ingredient is that component that actually controls the pest. (Although they are not toxic, inerts can cause health and environmental concerns.)

EPA registration number – Indicates that the pesticide label has been registered by EPA.

Establishment number – Identifies that facility where the product was made.

Formulation – Certain formulations are more likely to be absorbed through the skin or inhaled.

Signal word – Indicates level of acute toxicity. DANGER = extremely toxic (high potential for skin and eye irritation); DANGER/POISON = extremely toxic by ingestion; WARNING = moderately toxic; CAUTION = slightly toxic to relatively nontoxic.

Statement of practical treatment (first aid) – Indicates initial first aid practices to mitigate exposure. Indicates whether inducement of vomiting is recommended or contraindicated.

Personal protective equipment (PPE) – Clothing and/or equipment required to be worn when handling the pesticide.

Environmental hazards – Potential concerns regarding hazards to environment, including fish, avian, and bee toxicities.

Directions for use – Identifies crops/sites for application, pests controlled, method of application, rate of application, mixing directions, preharvest intervals, restricted entry intervals, etc.

Hazards to humans – Indicates which route of entry (mouth skin, eyes, lungs) must particularly be protected and what specific actions should be taken to avoid acute effects from exposure.

Storage and disposal directions – Usually fairly general information such as "Store out of reach of children" and "Do not re-use container."

The following items may appear on a pesticide label

Restricted Use classification – A pesticide classified for restricted use has been determined by EPA to present potential hazard to humans and/or the environment even when used according to label directions. May be used only by or under supervision of a certified applicator.

Information on specific hazards posed by the pesticide – Labels may indicate that the product is a cholinesterase inhibitor (capable of binding to cholinesterase); causes allergic reactions or sensitization; or may cause chronic or delayed effects (carcinogenicity, reproductive effects, etc.) Note that such information was not required until relatively recently; older products may not carry this information even if it applies.

Using the Material Safety Data Sheet (MSDS) as a Resource

Commercial establishments using pesticides and other products are required to keep MSDS and make them available to workers or others potentially exposed to the substance, its diluted end product, or its residues. There is no standardized form for the MSDS. Items generally found on the MSDS are included below.

Chemical product identification – Name and percentage of each active ingredient and total percentage of inert ingredients. An inert ingredient is simply one for which no toxic activity against the pest is claimed, while the active ingredient is that component that actually controls the pest. Inert ingredients may also cause adverse effects in people and/or the environment.

Physical and chemical properties – Water solubility, vapor pressure, stability, melting and freezing points, etc.

Fire and explosion hazards – Flash point

Toxicological information / Human health data – Identifies routes of exposure whereby toxicity may result, LD₅₀ and/or LC₅₀, etc.

Regulatory levels and classifications –

Threshold Limit Value (TLV) – 8-hour time-weighted average exposure that should not be exceeded.

Permissible Exposure Limit (PEL) – Time-weighted average concentration that must not be exceeded during any 8-hour work shift of a 40-hour work week.

Carcinogen classification – Known (Group A), probable (Group B), and possible (Group C) human carcinogens. Probable human carcinogens are further defined as Group B1 (probable human carcinogens with limited human evidence) or B2 (probable human carcinogens with sufficient evidence in animals but inadequate or no evidence in humans).

Personal protection recommendations – Note that this information applies to the concentrate only; refer to the product label to determine whether special equipment is needed when handling the diluted product.

Emergency and first aid procedures – Identifies cholinesterase inhibitors and provides treatment information for the physician.

Ecological or environmental hazards – Provides information on acute and chronic effects on wildlife.

Spills, fires, and accident procedures – Describes special precautions to be taken by emergency response personnel.

Storage and disposal directions – Directions may range from very specific to quite general.