



Putting Data to Work

Oregon Worker Illness and Injury Prevention Program (OWIIPP)

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Putting Data to Work is produced by the Oregon Worker Illness and Injury Prevention Program (OWIIPP)

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Importance of taking environmental exposure histories

Case 1:

A 4-year old boy was taken to a physician after several days of abdominal cramping, vomiting, and diarrhea without fever. His symptoms resolved but reappeared 1-2 weeks later. His condition was diagnosed as probable viral syndrome and anemia of undetermined etiology. Two days later, he was taken to an emergency department with worsening symptoms that included constipation and inability to eat or sleep. A radiograph showed a metallic object in the stomach; repeat laboratory studies showed a normocytic anemia. Endoscopy was performed, and a medallion pendant was obtained from the boy's stomach. When the boy returned 3 days later, testing for blood lead level (BLL) occurred; the value was 123 µg/dL (CDC level of concern is 10 µg/dL). The medallion retrieved was tested by the state environmental quality lab and found to contain 38.8% lead; it was reportedly purchased from a toy vending machine in Oregon approximately 3 weeks before it was retrieved.¹

Case 2:

A 40 year-old female began work in October 1993 at a microwave-popcorn packaging plant. In March 1994, she began coughing about 3 hours after the start of her evening shift; she had no history of smoking or chest symptoms. There was no improvement of symptoms while she was away from work. She gradually experienced exertional dyspnea that prevented her from lifting 25-lb boxes at work and from taking her usual 3-5 mile walk. When her dry cough became productive (April 1994), she consulted an allergist, who diagnosed bronchitis, hay fever, and asthma. Bronchodilator use did not improve her symptoms, and she consulted a pulmonologist in June. Her forced

(cont. on page 2)

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(case 2 cont.)

expiratory volume in one second (FEV1) was 0.86 liter, or 30% of the expected value; her forced vital capacity (FVC) was 2.27 liters, or 66% of the predicted value. The patient stopped working 4 months after her symptoms began. Later lung studies in October 1994 showed an FEV1 of 0.73 liter (24% of predicted value) with no response to a bronchodilator. She also experienced a decrease in oxygen saturation, from 95 to 88 percent during a 3-minute walk. High resolution CT scan and lung biopsy were consistent with bronchiolitis obliterans, likely caused from chronic inhalation of diacetyl, a chemical popcorn flavoring.^{2†}

† A rapidly progressive, irreversible lung disease characterized by fixed airway obstruction, inflammation, and scarring claims vs. 1.2% of claims).

Why is taking an exposure history important?

Many environmental and occupational diseases manifest as common medical problems or have nonspecific symptoms (as in these cases). By taking a thorough exposure history, the health care provider (HCP) can play a vital role in detecting, treating, and even preventing disease that is due to toxic exposure. Etiology will distinguish a disorder as an environmental illness; thus, if a thorough exposure history is not undertaken by the HCP, the etiologic diagnosis may be missed, treatment may be inappropriate, or exposure could continue.³ The case studies described above highlight the importance of a thorough environmental exposure history as well as prompt notification of the health department. For example, because lead is a reportable condition in Oregon [Case 1], additional toy medallions were tested (in other areas of the state), leading to their voluntary recall by the U.S. Consumer Product Safety Commission in September 2003. For Case 2, the linkage of occupational exposures in the flavorings industries to the lung disease bronchiolitis obliterans led to the study of the risk of exposure to diacetyl (2,3-butanedione), a commonly used food flavoring.⁴ It further resulted in the NIOSH alert "Preventing Lung Disease in Workers Who Use or Make Flavorings".⁵

Many HCPs do recognize the need and importance of taking work and environmental exposure histories, even though most have had little training or practice in doing so. Further, most people with environmentally caused or exacerbated illness do not receive medical care from clinicians specializing in the field. Taking an exposure history requires minimal time and can be tailored to fit the needs of the patient's signs and symptoms. Often, the patient can complete the form. Although the diagnosis of an occupational or environmental condition may not be definite, it can identify possible causes, guide treatment options, and suggest consultation with industrial hygienists or other specialists.³

How to take an environmental exposure history

Exposure histories, even when short in length, should gather information about a patient's typical work day; home activities and hobbies; home environment; and other factors. A simple, standardized form is provided by the Agency for Toxic Substances and Disease Registry (ATSDR) (www.atsdr.cdc.gov/asbestos/site-kit/docs/CSEMExposHist-26-29.pdf). Ideally, such a history would be taken on every patient, but is especially important in cases of illness at an atypical age or non-response to treatment. For pediatric cases, an environmental history screening can be obtained from the National Environmental Education and Training Foundation (NEETF) at www.neetf.org/Health/PEHI/HistoryForm.htm. One approach to taking an environmental exposure history is based on the acronym "I PREPARE" (see Figure). This approach helps the clinician focus on key activities that may be important in identifying environmental or occupational exposures that may be responsible for symptoms.

Where to get help

There are a variety of resources about workplace and environmental exposures to hazardous and toxic materials that are available to HCPs. In the Office of Environmental Public Health (www.oregon.gov/DHS/ph/ophs/index.shtml), there are programs that track occupational and environmental illnesses and injuries, including occupational burns, pesticide exposure, and lead exposure. Several infections, diseases, and conditions (including pesticide and lead poisoning) are reportable by law to the PHD/DHS. More information about how to report and which conditions to report can be found at www.oregon.gov/DHS/ph/acd/reporting/disrpt.shtml.

The Oregon Worker Illness and Injury Prevention Program (OWIIPP) complements the work of the Oregon Occupational Safety and Health Administration by tracking and analyzing data to inform and focus prevention efforts. Occupational Health Indicators (OHIs) are the first data generated on occupational illnesses and injuries in Oregon. Currently, there are 19 OHIs, along with a profile of employment in the state. Examples include incidence of mesothelioma, elevated blood lead level among adults, and acute pesticide-associated illness reported to poison control centers. The full list of OHIs is available on the OWIIPP website (www.oregon.gov/DHS/ph/owiipp/fundamental.shtml).

As needed, PHD routinely responds to outbreaks of illnesses in workplaces or communities. In some circumstances this requires in-depth epidemiological consultation. Staff can be reached at 503/731-4025.

The PHD's Toxicology Unit provides consultation about risks from exposures to chemical compounds occurring in occupational and environmental settings. Toxicology Unit Staff can be reached at 971/673-0440.



Sample questions to explore related to specific exposures

LEAD EXPOSURE

1. Does the patient work with lead on the job, or as a hobby (e.g. soldering)?
2. Does the patient eat or drink while doing these activities?
3. Does the patient live in an older home that has been recently renovated?
4. Does the patient/family use earthenware pottery for food preparation or serving?

OCCUPATIONAL EXPOSURE

1. Can you smell the chemicals or materials you work with?
2. Do you use protective equipment such as gloves, masks, or respirator?
3. Do you shower at work?
4. Do you eat at the workplace, and where at?
5. Do you know of any coworkers experiencing unusual or similar symptoms?

I - INVESTIGATE POTENTIAL EXPOSURES

P - PRESENT WORK

R - RESIDENCE

E - ENVIRONMENTAL CONCERNS

P - PAST WORK

A - ACTIVITIES

R - REFERRALS AND RESOURCES

E - EDUCATE

REFERENCES

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2. Kreiss K, Gomaa A, Kullman G, Fedan K et al. Clinical Bronchiolitis Obliterans in Workers at a Microwave-Popcorn Plant. *NEJM* 2002;347:330-338.
3. Frank AL, Balk SJ, eds. Case Studies in Environmental Medicine: Taking an Exposure History. ATSDR Monograph 26. Atlanta: Agency For Toxic Substances and Disease Registry, 1992 (updated 2000). At www.atsdr.cdc.gov/HEC/CSEM/exphistory/.
4. Parmet AJ, Von Essen S. Rapidly Progressive, Fixed Airway Obstructive Disease in Popcorn Workers: A New Occupational Pulmonary Illness? *J Occup Environ Med* 2002;44:216-218.
5. NIOSH. Preventing Lung Disease in Workers Who Use or Make Flavorings. December, 2003. At www.cdc.gov/Niosh/docs/2004-110/.

Other resources

The Oregon Poison Center (OPC) is a poison emergency management resource that provides ongoing consultation and case management assistance to HCPs. They can also provide information about treatment options, diagnostic testing, and evaluation of laboratory and EKG findings. OPC can be reached 24 hours a day at 800/222-1222; information can be obtained at www.ohsu.edu/poison.

For science-based chemical information about pesticides, the National Pesticide Information Center (NPIC) can be reached at 800/858-7378 or on the web at <http://npic.orst.edu/index.html>.

You may also wish to consult with a physician that specializes in occupational medicine; the Oregon Board of Medical Examiners lists all active MDs and DOs who declare that specialty (www.bme.state.or.us/bycity/OM.html).

A copy of How to Take an Exposure History (ATSDR Case Studies in Environmental Medicine) is available at the ATSDR web site (www.atsdr.cdc.gov/HEC/CSEM/exphistory/). The "I PREPARE" card can be downloaded there; hard copies can be ordered at 888/422-8737.