CURRENT CONCEPTS

OCCUPATIONAL ILLNESS
LEE SCOTT NEWMAN, M.D.

WORKPLACE exposures to hazardous materials cause or aggravate diseases as common and diverse as asthma, cancer, dermatitis, and tuberculosis. Crude estimates of the number of new cases of occupational disease in the United States range from 125,000 to 350,000 per year, in addition to 5.3 million work-related injuries. The economic cost is estimated to exceed $60 billion annually. Occupational disorders occur in industry and agriculture, both underrecognized endemic diseases and in sporadic epidemics. With modernization, occupational hazards have shifted from factories and mines to include hospitals and office buildings.

Patients perceive industrial toxins as threatening their health and safety. In one study, 17 percent of 334 patients seen in a primary care clinic thought their health problems were work-related; 75 percent reported previous exposure to one or more recognized toxic agents. Occupational factors have been implicated in over 10 percent of all admissions to general internal medicine wards in hospitals; the proportion is even higher when the primary illness is either respiratory or musculoskeletal. Pediatricians encounter occupational disorders both because some children work and because parents may “foul the nest” with toxins carried home on work clothes.

Occupational diseases are preventable. A missed diagnosis means a lost opportunity for meaningful clinical intervention. From a broader public health perspective, each patient with a work-related illness represents a “sentinel health event,” whose recognition could lead to disease prevention if the case is traced back to the workplace hazards that caused it. From an economic perspective, the failure to prevent occupational disease results in costly, unnecessary health care after the fact.

Unfortunately, because relatively few physicians are specifically trained to recognize or prevent occupationally induced illness, the association between occupational risks and disease may be missed. When physicians fail to ask patients about their work, work-related ailments may be incorrectly attributed to nonoccupational causes, unnecessary tests may be ordered, patients may be referred to consultants equally unprepared to connect work-related exposures to disease, and an opportunity may be missed to protect others who are at risk.

The identification of clusters of work-related disease by physicians is a time-tested means of uncovering and ultimately preventing occupational illness, exemplified by the recent recognition of multidrug-resistant tuberculosis in health care workers, asthma in office workers, and repetitive-motion injuries among grocery checkout workers. In an era of cost containment, high-efficiency and high-volume medical practice, and managed care, many practitioners feel that they lack the time, expertise, and resources to prevent occupational illness.

Recent progress in the field of occupational and environmental medicine has led to a better understanding of the most efficient strategies for recognizing a wide variety of work-related ailments. The key to detecting occupational illness is to suspect the diagnosis. Work-related disease is obvious when the patient reports an acute, traumatic injury on the job. When the ailment results from repetitive motion or from long-term or multiple exposures, however, detection may be more difficult. In such circumstances, the diagnosis of work-related illness hinges principally on the quality of the occupational and environmental history.

THE OCCUPATIONAL AND ENVIRONMENTAL HISTORY

Obtaining the occupational history is a two-part process consisting of a few routine questions to screen for associations between work and the patient’s chief symptoms, followed by more detailed follow-up questioning if the answers arouse clinical suspicion. The questions and topics outlined in Figure 1 require no special knowledge of toxicology or of industrial processes. If asked of all patients as part of each medical history, however, they provide important leads. Most physicians can stop their inquiries after these questions if the replies are uniformly negative.

Greater certainty about the effects of past and present workplace exposure on a patient’s health comes from detailed questioning (Fig. 1). In many practices, patients complete health questionnaires before seeing the physician, but few of these surveys systematically collect information about the patient’s work history and history of exposure. By adding questions to such a questionnaire (Table 1), the clinician can obtain reliable and valid information on occupational exposure without sacrificing time spent with the patient.

Recently, several questionnaire templates have been published to encourage their widespread use.

Even when asked, patients frequently underestimate the extent of exposure or neglect to tell the physician about critical work processes that may entail risk. Both employees and employers may be misinformed or unaware of chemical names and toxic effects. Fewer than 20 percent of industrial chemicals in the United States have been adequately tested for toxicity to humans, despite a congressional mandate for the testing of new chemicals under the Toxic Substances Control Act of 1976. Clinicians should initially emphasize only those questions that help determine the like-
lihood that the illness is not work-related. Detailed inquiry about each past or present exposure, specific toxins, and work practices can be reserved for later visits if it seems warranted. Recent publications offer further instruction in the nuances of taking the occupational history.22,28

**The Occupational History and the Clinical Assessment**

Occupational exposure can affect any organ, and disorders caused by such exposure often masquerade as common ailments.1 My approach is, first, to formulate an accurate clinical diagnosis (e.g., peripheral neuropathy); second, to conduct the clinical tests needed to exclude common, nonoccupational causes of the disorder (e.g., blood glucose measurements); and, third, routinely to consider occupational causes in the differential diagnosis. Table 2 summarizes clinical clues that point to the likelihood that an illness is work-related. Once armed with a clinical diagnosis, the physician can use major textbooks to determine the most commonly recognized environmental causes of the condition. In the case of peripheral neuropathy, these include exposure to lead, acrylamide, and naphthalene.13 Several resource books describe work processes, enumerate the typical chemical exposures in common jobs, and list common chemicals and their potential effects on health.29,30

In practice, most physicians may consult a specialist in occupational and environmental medicine when the initial evaluation raises the suspicion that the patient’s disease or injury is linked to the workplace (see the Appendix for sources of information and assistance). Specialists will take a more detailed occupational and environmental history and, if possible and when indicated, conduct a work-site assessment. By coordinating efforts with industrial hygienists, occupational health nurses, and others, these specialists can amass important data on the nature and extent of a patient’s exposure. Appropriate clinical consultation and work-site investigation can lead to primary or secondary prevention. A consultant may advise a company to take one or more of the following steps: (1) substitute less hazardous materials, (2) improve engineering controls— for example, by modifying ventilation systems or improving the ergonomic design of the workstation, (3) provide workers with protective equipment against exposure to substances that cannot be adequately controlled, (4) use administrative controls, such as reducing the number of workers engaged in inherently hazardous tasks, and (5) introduce screening programs...
### Table 2. Clues to the Recognition of Occupational Disease.

<table>
<thead>
<tr>
<th>Clues</th>
<th>Comments</th>
<th>Examples</th>
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<tbody>
<tr>
<td>Job title or type of industry</td>
<td>Patients may be obviously at high risk or may work in hazardous industries where certain disorders occur at higher than average frequency.</td>
<td>Tuberculosis in health care workers. Lead toxicity in radiator-repair shops.</td>
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<tr>
<td>Description of work tasks</td>
<td>Job titles are misleading and often fail to reflect workplace hazards; a description of a usual day at work is more helpful.</td>
<td>Asthma in a taxidermist that turns out to be caused by the spraying of sensitizing isocyanate-containing polyurethane foams into molds.</td>
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<td>Major employment opportunities in the region</td>
<td>In areas with one or more large employers, many patients share common exposures, increasing the likelihood that work-related disease clusters will be recognized.</td>
<td>Bronchitis and pneumoconiosis in coal-mining regions.</td>
</tr>
<tr>
<td>The most common toxic exposures in local industries</td>
<td>The index of suspicion for certain work-related illnesses should be high because of the types of exposures and associated health effects in the largest local industries.</td>
<td>Latex-induced dermatitis in a local glove-manufacturing plant or in a hospital.</td>
</tr>
<tr>
<td>Coworkers who are sick or case clusters noticed in a clinical practice</td>
<td>Clusters of disease are often a helpful clue to both endemic and epidemic work-related illness.</td>
<td>Bladder cancer in rubber-manufacturing workers exposed to benzidine and naphthylamines.</td>
</tr>
<tr>
<td>Past exposure to long-latency agents</td>
<td>Recognizing an important past exposure to toxic compounds helps the physician make the causal link to new symptoms of delayed onset.</td>
<td>Viral hepatitis among workers in a child-care center.</td>
</tr>
<tr>
<td>Pattern of disease onset</td>
<td>The onset of symptoms may be related to a change in employment, a change in job duties, or a change in the type or use of hazardous materials.</td>
<td>Nasal cancer among woodworkers.</td>
</tr>
<tr>
<td>Pattern of aggravation of symptoms</td>
<td>There may be changes in symptoms during the workday or during the workweek or improvement during weekends and vacations.</td>
<td>Asbestosis, lung cancer, or mesothelioma in a former naval-shipyard worker with exertional dyspnea who has a history of exposure to asbestos.</td>
</tr>
<tr>
<td>Unusual combination of multi-organ symptoms and signs</td>
<td>Multigran and systemic symptoms usually prompt concern about endocrine, infectious, drug-related, and autoimmune disorders; occupational–environmental exposures to toxins should also be considered.</td>
<td>New-onset angina after the use of a methylene chloride–containing paint stripper that is metabolized to carbon monoxide in blood.</td>
</tr>
<tr>
<td>Unusual distribution of disease within an organ</td>
<td>The distribution of pathologic effects in an organ is often related to the area of most direct or intense contact with an occupational hazard.</td>
<td>Improvement in hand paresthesias and wrist pain in a computer-terminal operator when on vacation, with recurrence on return to work.</td>
</tr>
<tr>
<td>Susceptible organ systems</td>
<td>Certain organs are more prone to occupational disease or to the aggravation of preexisting diseases because they are the portal of entry for or in direct contact with injurious agents; detoxify or filter toxins; are sites of bioaccumulation of toxic agents; are especially sensitive to the effects of toxic agents because of the rate of cell division or specialized cellular functions; or are susceptible to injury by repetitive activity (cumulative trauma).</td>
<td>Psychiatric, neurologic, and hematopoietic symptoms and signs. Occupational–environmental exposures to toxins should also be considered.</td>
</tr>
<tr>
<td>Demographically “wrong” patient</td>
<td>When disease occurs in an unlikely person, one should consider occupational agents that can produce the same symptoms, signs, and pathologic consequences.</td>
<td>Rash caused by the spraying of sensitizing iso-cyanate-containing polyurethane foams into molds.</td>
</tr>
<tr>
<td>The “usual suspects” are innocent</td>
<td>When commonly recognized causes of illness have been eliminated from the differential diagnosis, the likelihood of an occupational and environmental cause rises.</td>
<td>Lead toxicity in radiator-repair shops.</td>
</tr>
<tr>
<td>Idiopathic disease</td>
<td>Before assigning the designation “etiology unknown,” one should exclude environmental and occupational causes.</td>
<td>Chronic beryllium disease masquerading as sarcoidosis in a patient who works metals metalurgy or who prepares dental alloys.</td>
</tr>
<tr>
<td>Disease that does not respond to conventional medical therapy</td>
<td>In many instances of occupational disease, the problem has no chance of cure if the patient continues to be exposed.</td>
<td>&quot;Baker’s asthma&quot; in a corticosteroid-dependent patient who works as a baker and that could improve or be cured by avoidance of high-molecular-weight antigens in flour dust.</td>
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</table>

To detect and treat occupational disorders at early stages, companies vary in their willingness to follow such suggestions, in part because of the initial cost of implementing preventive measures. Such suggestions, however, may be taken seriously when employers consider the health of their workers and the potential social and legal ramifications if efforts are not made to correct problems.

**Learning More about Exposure**

Even without visiting the working site, a physician may be able to collect data about the types of exposure in...
the patient’s workplace. The Occupational Safety and Health Administration (OSHA) of the Department of Labor requires that employees receive information about the hazardous chemicals used in their jobs through appropriate labeling, training programs, and Material Safety Data Sheets, which describe the products’ ingredients, known health hazards, recommended precautions for handling the products safely, and permissible exposure limits. If the employer is in compliance with OSHA regulations, the patient should be able to locate the Material Safety Data Sheet and bring it to the physician’s office. Under federal right-to-know legislation, physicians are entitled to receive Material Safety Data Sheets from the manufacturer, distributor, or patient’s employer on request. Consider the example of an endoscopy technician whose dermatitis worsened at work and improved on weekends. The occupational history generated a list of substances to which the technician might have been exposed, including “instrument sterilization solution.” On request, the employer supplied the data sheet that showed glutaraldehyde to be a major constituent of the solution; this chemical was later confirmed to have caused the rash. Material Safety Data Sheets do not reflect how the product is used by the patient or the extent of exposure. They are sometimes vague and overly general in describing toxic effects of chemicals, they often emphasize acute rather than long-term effects on health, and they may omit data on proprietary chemicals. Nonetheless, they can prove useful, especially when they include chemicals for which toxicologic profiles have been published.31

Detailed information concerning the major health effects of specific chemicals can be obtained from textbooks, through telephone consultations with the staff of public health agencies, and by consultation with professionals (see the Appendix). Computers have revolutionized access to toxicologic data through on-line and CD-ROM services. Excellent resources include the National Library of Medicine, the home of Toxline, Medline, Toxnet (which incorporates the Hazardous Substances Data Bank), Chemline, and ChemID; the National Institute for Occupational Safety and Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS); the Environmental Protection Agency’s Integrated Risk Information System (IRIS); OSHA regulations, documents, and technical information on CD-ROM; and Micromedex TOMES Plus Information System.32,33 Recently, OSHA announced a new telephone and fax system for obtaining access to brief summary documents. The Internet provides access to many of these agencies and data bases (see the Appendix).

Discussing workplace conditions with the patient’s employer can be helpful, but before doing so, the physician should obtain the patient’s consent. The physician must not divulge confidential information about the patient’s health problems to employers or insurers. They are entitled to know only about any necessary restrictions on the patient’s ability to perform his or her job. A corporate medical director, occupational health nurse, health and safety officer, industrial hygienist, or manager may provide valuable information about specific exposures and help investigate work conditions. Labor representatives may know about similarly affected workers and may have information relevant to the patient’s concern about health and safety. Public health agencies, including state and county health departments, OSHA, the Mine Safety and Health Administration (MSHA), and NIOSH may conduct an investigation when a physician reports a sentinel health event. Employees or employers can request an inspection by OSHA, MSHA, or NIOSH (they may do so anonymously). OSHA and MSHA enforce compliance with federal health and safety standards and may levy penalties for infractions. Unfortunately, not all federal standards are sufficiently protective, and enforcement can be erratic. Through evaluations of health hazards in work sites, NIOSH conducts research and makes recommendations that can improve workplace practices, but it has no enforcement authority.

In attempting to confirm the role of current exposure in the patient’s illness, a physician can restrict the patient’s work temporarily and observe any objective or subjective change in the patient’s medical condition. Spontaneous improvement following such a trial helps establish that the workplace caused or aggravated the illness, but lack of improvement does not necessarily exonerate the workplace.

### Biologic Markers

Some of the greatest progress in occupational medicine has been made in the development of new biologic assays that reflect the patient’s exposure, toxin-specific health effects, or individual susceptibility to toxins.31 If properly used, a biologic marker can confirm that exposure has occurred, as in the case of lead in the circulation indicated by the whole-blood lead concentration and by the zinc protoporphyrin assay. But even seemingly well-established biologic markers may be misleading. People with divergent histories of exposure may have similar blood lead concentrations. Not all investigators agree about the particular blood lead value that predicts disease or that should trigger therapeutic intervention.32 Promising new methods, such as bone lead measurement by K X-ray fluorescence, may provide better estimates of long-term cumulative exposure and the relation of such exposure to disease.32,33

As part of the emerging understanding of immune mechanisms, assays to measure the immunotoxic effects of environmental agents have proliferated rapidly.32 The blood beryllium lymphocyte-proliferation test illustrates the potential power of an immune biologic marker.32 This in vitro test of beryllium-specific hypersensitivity is sensitive and specific for chronic beryllium disease, which is most commonly found in workers employed in metal machining in the aerospace and defense industries, thus making it possible to correct erroneous diagnoses of sarcoidosis and to screen large numbers of workers with a biologically relevant indicator of the cell-mediated immune response.32 Few such
biologic markers have undergone sufficient validation to merit clinical use, however. Caution should be exercised in the application of nonspecific, poorly reproducible, or nonvalidated immunologic tests, such as T-cell phenotyping, to the diagnosis of controversial clinical illnesses such as multiple chemical sensitivity.

People vary in their ability to inactivate endogenous and exogenous toxins, partly because of polymorphisms in metabolic enzyme systems. Such genetic differences influence susceptibility to lung and bladder cancers caused by carcinogens such as polycyclic aromatic hydrocarbons. Genetic markers of such polymorphisms could be used to identify workers who are less able than others to metabolize foreign substances and could potentially predict susceptibility to environmental carcinogens. Similarly, a genetic marker located within the HLA-DP locus identifies a subgroup of the exposed people who are at increased risk for chronic beryllium disease. Theoretically, such tests of genetic susceptibility could contribute to disease prevention by increasing medical monitoring of workers at high risk for early signs of toxic effects. But even if the ethical and practical issues could be resolved, these tests would not obviate the need to reduce exposure to hazardous substances for all workers.

**Clinical Management of Occupational Illness**

In addition to prescribing appropriate medical or surgical treatment for occupational disorders, physicians make other decisions that affect the patient’s prognosis, psychological and social well-being, employability, opportunities for job advancement, future earning potential, and insurability. One of the most important decisions is whether the patient can return to work. In exposure-induced occupational diseases, work restriction may offer the best hope for cure or control of disease, but it often results in economic hardship or job loss. In cumulative trauma disorders, such as carpal tunnel syndrome, early, graduated return to work through modified duty improves the medical outcome. Before deciding to recommend job restriction or return to work, the physician should document the degree of impairment, weigh the seriousness of the illness, learn what specific tasks the patient would need to perform at work, consider whether these duties and future exposures will aggravate, accelerate, or permanently worsen the condition, determine the appropriate time for the return to work, and counsel the patient about the implications of work modification for both health and employment. When the causative exposure is an allergen, as in isocyanate-induced asthma, returning the patient to a “nonexposed job” in the same plant is likely to worsen the disease and increase the requirement for medication. Common mistakes on the part of physicians include restricting patients’ work or allowing them to return to their jobs before learning enough about ongoing exposures and tasks at work, erroneously assuming that gloves, respirators, and other forms of protective equipment are sufficiently effective, and failing to provide enough information to patients and their employers to help them define meaningful work restrictions.

Understanding the rudiments of the workers’ compensation system is crucial if physicians are to manage work-related disorders properly. In the United States, workers’ compensation is a “no-fault” insurance system that is supposed to ensure the payment of medical expenses and lost wages and compensation for lost earning potential when an employee’s medical condition is either caused by or substantially aggravated by his or her job. In exchange, employers relinquish the right to sue their employers for most work-related health problems. Primary care physicians are frequently asked to determine whether a patient has a work-related illness or injury and is either temporarily or permanently impaired. When an occupational disorder is diagnosed, the physician should tell the patient, advise him or her to contact the employer to file a report of injury or illness, and carefully document the diagnosis. Studies show that physicians often neglect to document the patient’s work history and rarely provide sufficient information to enable a legal judgment to be made for purposes of compensation, thus impeding an already slow process. Documentation should include the medical basis for the diagnosis of a work-related disorder, the evidence of impairment, treatment and rehabilitation requirements, and any proposed modification in the patient’s work.

If the occupational illness is likely to be permanent, the physician will be asked to determine the percentage of “permanent impairment of the whole person.” This assessment forms the legal basis for the determination of compensation to the injured worker. In most states, physicians are not expected to assess the effect of the impairment on job performance (disability), but only to describe accurately and quantify the physical effect of illness and to determine whether modifications would be needed if the worker were to return to his or her job. The evaluation of the degree of impairment requires familiarity with standardized medical guidelines. Many physicians become frustrated by the paperwork or are intimidated by the possibility of a legal embroglio after the diagnosis of work-related conditions. Physicians, however, can help both their patients and the workers’ compensation system by being objective and by using the best available standardized criteria for impairment.

Under managed-care arrangements, primary care physicians are assuming more responsibility for the management of occupational illness and injury. State laws vary in whether they allow the employer or the injured worker to select the physician who will treat the work-related condition. When designated as the health care provider for a patient who has been awarded workers’ compensation, the physician functions as in most managed-care systems, attending to the insurer’s reporting requirements and rules for preapproval of testing and treatment. This “gatekeeper” approach to cost
control may help reduce the economic burden to the workers’ compensation system. Far greater savings would be realized if managed-care programs took the initiative in the primary prevention of occupational disease. Unfortunately, few workers’ compensation insurance carriers or managed-care systems take the approach that cases of occupational illness should prompt them to encourage employers to modify work practices, prevent unnecessary injury and illness, and thereby avert costly medical testing and treatment.

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APPENDIX

Sources of Information and Assistance in the Clinical Evaluation of Occupational Disorders

Agency for Toxic Substances and Disease Registry (ATSDR), 1600 Clifton Rd. NE, Atlanta, GA 30333. Telephone: (404) 639-6000 (Division of Toxicology); (404) 639-6206 (Division of Health Education). Internet address: http://atsdr.cdc.gov/ (last accessed 9/18/95). Part of the U.S. Public Health Service, the ATSDR provides toxicologic profiles through the Division of Toxicology and clinically useful Case Studies in Environmental Medicine concerning common chemicals.

American College of Occupational and Environmental Medicine (ACOEM), 55 W. Seegers Rd., Arlington Heights, IL 60005-3919. Telephone: (708) 228-6850. The ACOEM lists physicians who are board-certified in occupational–environmental medicine and members of the college; it also conducts educational programs on occupational health, impairment, and the workers’ compensation system.

Association of Occupational and Environmental Clinics (AOEC), 1010 Vermont Ave., Suite 513, Washington, DC 20005. Telephone: (202) 547-4976. The AOEC is a network of academically based occupational–environmental medicine clinics throughout the United States. Member clinics provide professional training, community education about toxic substances, exposure and risk assessment, clinical evaluation, and consultation. Clinicians can contact the AOEC office for clinical referrals to assist in the diagnosis, management, therapy, and prevention of occupational disorders.

Center for Safety in the Arts, 5 Beckman St., Rm. 820, New York, NY 10038. Telephone: (212) 227-6220.

Chem Trek Non-Emergency Services Hotline: (800) 262-8200. This hotline refers callers to companies that manufacture chemicals and to state and federal agencies for health and safety information and information regarding regulations.

Indoor Air Quality Information Clearinghouse, P.O. Box 37133, Washington, DC 20013-7133. Telephone: (800) 438-4318.

Job Accommodation Network. Telephone: (800) 526-7234; (800) 232-9675; (800) 526-2262 (in Canada). This network offers ideas for employing and accommodating handicapped persons in the workplace. Consultants who are knowledgeable about types of disabilities are available to discuss the Americans with Disabilities Act as well as the information physicians are and are not required to release to employers about patients with disabilities.

MotherRisk Program, Hospital for Sick Children, 555 University Ave., Toronto, ON M5G 1X8, Canada. Telephone: (416) 813-6780. This program counsels callers about the safety of exposures to drugs, chemicals, infectious agents, or radiation during pregnancy or breast-feeding.


National Institute for Occupational Safety and Health (NIOSH), Robert A. Taft Laboratories, 4676 Columbia Pkwy., Cincinnati, OH 45226-1998. Telephone: (800) 356-4674. Internet address: http://www.cdc.gov/niosh/homepage.html (last accessed 9/18/95). A division of the Department of Health and Human Services and part of the Federal Centers for Disease Control and Prevention, NIOSH provides information about substance toxicity and workplace hazards. Physicians should have Material Safety Data Sheets available when calling, if possible. The health-hazard evaluation program can investigate work sites at which physicians, employees, or employers suspect work-related illness and injury to have occurred. NIOSH offers training in occupational safety and health and funds university-based Educational Resource Centers that conduct continuing-medical-education courses and serve as referral sources in the assessment of occupational and environmental health problems.

Occupational Safety and Health Administration (OSHA), Department of Labor, 200 Constitution Ave., NW, Washington, DC 20210. Telephone: (202) 219-8148 (general information); (202) 219-9308 (compliance office); (202) 219-4667 (publications). Fax: (900) 555-3400 (OSHA FAX). Internet address: http://www.osha-slc.gov/ (last accessed 9/18/95). OSHA promulgates standards for health and safety in the workplace, investigates compliance, and issues citations. The publications-distribution office has articles about many occupational diseases (look under local Department of Labor listings for local or regional offices). OSHA FAX is a fax-on-demand data-base service providing brief documents such as OSHA news releases, fact sheets, and publication listings, for a nominal telephone charge.

Office of Disease Prevention and Health Promotion, National Health Information Center, P.O. Box 1133, Washington, DC 20013-1133. Telephone: (800) 336-4797; (301) 565-4167 (Washington, D.C. area). The office is a source of information and referral for health questions from health educators, health professionals, and the general public.

Physician Line and LungLine, National Jewish Center for Immunology and Respiratory Medicine, 1400 Jackson St., Denver, CO 80206. Telephone: (800) 632-9553 (Physician Line); (800) 222-3864 (LungLine). Internet address: http://www.njc.org/ (last accessed 9/18/95). These services provide telephone consultation for physicians and patients seeking information on lung and allergic disorders, including those related to exposure to environmental and occupational toxins.

Poison Control Centers. The American Association of Poison Control Centers certifies regional centers (listed in local telephone directories). Many provide useful information about the toxicity and health effects of hazardous exposures. The quality of assistance is enhanced if the physician can provide names of specific chemicals.

Teratogen Exposure Registry and Surveillance (TERAS), Department of Pathology, Brigham and Women’s Hospital, 75 Francis St., Boston, MA 02115. Telephone: (617) 732-6507 (Fred Bieber, M.D.). TERAS maintains information networks for consultation and evaluations concerning the effects of toxic agents on the fetus.

REFERENCES
