14 Occupational Health Services

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Occupational health services are those health care services provided to prevent, diagnose, or treat work-related injuries or illnesses or to promote rehabilitation from such an injury or illness. Other sections of this textbook provide information on specific work-related injuries and illnesses. This chapter describes the systems in which these ailments are cared for, including descriptions of the health care providers, the environment in which they work, and the various health care services they provide.

OCCUPATIONAL HEALTH CARE PROVIDERS

There is great diversity among providers of occupational health services. Although occupational health services are often provided by physicians, their training and backgrounds vary. Some physicians who designate their practice as occupational medicine have trained in occupational medicine residencies. Most occupational medicine physicians have trained in other specialties, although some also have passed the occupational medicine certifying examination offered by the American Board of Preventive Medicine. Of 7,018 current and retired members of the American College of Occupational and Environmental Medicine, only 1,486 (21%) are board certified in occupational medicine (Lanny Hardy, American College of Occupational and Environmental Medicine, personal communication, February 12, 1999).

Many physicians in other specialties also see patients with occupational illnesses. For example, patients with work-related musculoskeletal disease may be cared for by orthopedic surgeons or specialists in physical medicine and rehabilitation, and patients with occupational asthma may be referred to pulmonologists or allergists. Most cases of work-related injury or illness are seen in the offices of primary care physicians or in emergency departments; in these settings, however, the association between disease and work-related causes is often not recognized (1). This chapter focuses primarily on practice settings that are designated as occupational health clinics or are staffed by physicians and other providers who identify their primary practice as occupational medicine.

Occupational health care is also provided by occupational health nurses. Although not all nurses working in occupational health are specialty-trained, available training curricula include master's degrees in occupational health nursing. Certified occupational health nurses have completed requisite work experience and educational training and have passed a credentialing examination (2). Some occupational health nurses work in physician-staffed occupational health practices; others manage the routine functions of an occupational health clinic and refer cases needed medical management to consulting

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physicians or serve as case managers in managed care organizations and insurance companies.

Working under the supervision of physicians, physician assistants provide occupational health care in many of the same settings as occupational health physicians and nurses. Approximately 3% of physician assistants in the United States work in occupational and environmental health services (Maryann Ramos, PA-C, MPH, American Academy of Physician Assistants in Occupational Medicine, personal communication, March 11, 1999). Other health professionals providing occupational health services include occupational therapists and occupational psychologists.

SETTINGS IN WHICH OCCUPATIONAL HEALTH SERVICES ARE PROVIDED

The diversity of occupational health practitioners is matched by the diversity of settings in which occupational health care is provided. For many years, it was common to find in large industrial plants a medical clinic staffed by both physicians and nurses. These were typically owned and operated by the corporation, and medical staff members, like the production workers they cared for, were employees of the corporation. Although many of these clinics still exist, other options have appeared. Some large plants maintain on-site clinics but have contracted to outside health care providers (e.g., hospitals, managed care organizations) to operate and staff them. In these plants, clinic staff members are not employees of the plant.

Other corporations have reduced the scope of practice of, or completely eliminated, the traditional plant medical clinic. In this regard, they have become more like smaller employers, many of whom never had an on-site clinic because they could not afford one or because the number of employees was too small to justify it. Some of these employers contract with off-site clinics to provide their occupational health services. These clinics may be operated by and locate at area hospitals; they may be satellite clini operated by hospitals; or they may be fre standing clinics. In some cases, an employ makes a formal or informal arrangemer with a physician in the area to see workers o an as-needed basis. Finally, workers initiall may present with work-related illnesses c injuries to their family doctors because tha is their preference, because there are no oc cupational health care providers available because their health plan requires them t see their primary care provider first, or be cause the work-relatedness of their ailmen is not recognized. Although practitioners i settings removed from the workplace ma be equally as skilled as those in plant medica clinics, this distance may leave them less fa miliar with the particular exposures or haz ards faced by their patients unless they make deliberate efforts to understand the workplace involved.

SCOPE OF OCCUPATIONAL HEALTH SERVICES

Occupational health services can be divided into four general categories: *preventive, curative, rehabilitative,* and *consultative.* Preventive health services are those that are intended to prevent the development of illness or injury, or to prevent or retard further progression of illness or injury that has already occurred. Preventive services are further divided into primary, secondary, and tertiary preventive services. As described in the following sections, many curative and rehabilitative services also have preventive functions and can be ranked within the hierarchy of preventive health services. In preventive, curative, and rehabilitative services, a physician-patient relationship exists in which the physician is working to ensure the patient's best interests and health, regardless of the source of the physician's compensation for these services. In consultative services, the physician is responsible for providing an accurate and informed judgment but may not be involved in the patient's care.

Primary Preventive Services

Primary preventive services are those intended to prevent illness or injury. Because occupational medicine is one of the preventive medical specialties, primary preventive services distinguish occupational health from other types of health care that address only curative services. Primary prevention is accomplished by eliminating hazardous exposures, protecting workers against remaining exposures, or protecting workers against the effects of those exposures.

Some primary preventive services are activities familiar to most providers of clinical care. They include immunizing workers against possible work-related infections, such as hepatitis B immunization for health care workers or rabies immunization for veterinarians and animal control workers. More often, primary preventive services involve modifying work environments to eliminate or contain hazards or supplying personal protective equipment to workers when hazardous exposures cannot otherwise be controlled. Although industrial hygienists, ergonomists, and safety specialists have the leading roles in these aspects of primary prevention (see Chapters 7 through 9), ideally occupational health care providers work closely with occupational hygienists and safety specialists to identify potential health hazards that require correction. The interaction between the various health and safety specialists is most clearly demonstrated in the linkage between primary, secondary, and tertiary prevention (see later discussion).

Secondary Preventive Services

Secondary prevention services are those intended to detect illness or injury at a relatively early stage, often before symptoms or clinical signs are noticed. When disease is detected at this early stage, it may be possible to take steps to arrest or reverse the disease process. Because the interventions are likely to be both clinical and workplace based, secondary prevention explicitly shows the need for occupational medicine clinicians to work with employers in a role that extends beyond their clinical role. For example, the physician may screen a worker at a battery manufacturing plant and discover that the worker has significantly elevated blood lead levels. The clinical response is to assess target organ function and determine whether chelation therapy is indicated. However, this case is a sentinel event that indicates excessive lead exposure in the workplace. In addition to providing clinical care, it is essential that the physician contact the employer to report the case. This information allows the employer to make workplace changes that can reduce or eliminate the hazardous exposures.

Secondary prevention usually addresses ailments that are not yet symptomatic, and these ailments typically are detected through screening examinations. Some screening examinations are required by the Occupational Safety and Health Administration (OSHA) for workers exposed to specific hazards, and OSHA standards regulating exposures to these substances often contain instructions regarding the medical examinations or tests and the frequency with which they must be performed. A list of substances for which OSHA has established standards for medical surveillance appears in Table 14-1. OSHA may also use the "general duty" clause of the Occupational Safety and Health Act to require medical surveillance for other occupational exposures (e.g., tuberculosis). Readers should contact OSHA for current requirements, recommendations, and interpretations (3). Other countries have different requirements for medical surveillance, and in some cases more specific guidance is provided regarding examinations, tests, recordkeeping, and other aspects of medical surveillance (4,5). Principles of medical surveillance and screening are presented in Chapter 4.

Tertiary Preventive Services—Curative and Rehabilitative

Tertiary preventive services are those provided after injury or illness has occurred or

TABLE 14-1. *OSHA standards mandating medical surveillance*

Substance	USA 29 CFR
Acrylonitrile	1910.1045(n)
2-Acetylaminofluorene	1910.1014[a]
4-Aminodiphenyl	1910.1011[a]
Arsenic	1910.1018(n)
Asbestos	1910.1001(l) and 1910.1001(m)(3)
Benzene	1910.1028(i)
Benzidine	1910.1010[a]
Bloodborne pathogens	1910.1030
1,3-Butadiene	1910.1051(k)
Cadmium	1910.1027(l)[b,c,d]
bis-Chloromethyl ether	1910.1008[a]
Coke oven emissions	1910.1029(j)[b]
Compressed air	1926.803(b)
Cotton dust	1910.1043(h)
1,2-Dibromochloropropane, 3-chloropropane	1910.1044(i)(5)
3,3′-Dichlorobenzidine (and its salts)	1910.1007[a]
4-Dimethylaminoazo-benzene	1910.1015[a]
Ethyleneimine	1910.1012[a]
Ethylene oxide	1910.1047(i)
Formaldehyde	1910.1048(l)
Hazardous waste and emergency response	1910.120(f)
Laboratories—hazardous chemical exposures	1910.1450(g)
Lead	1910.1025(j)[b]
Methyl chloromethyl ether	1910.1006[a]
4,4′ Methylenedianiline (MDA)	1910.1050(m)[b]
Methylene chloride	1910.1052(j)
α-Naphthylamine	1910.1004[a]
β-Naphthylamine	1910.1009[a]
4-Nitrobiphenyl	1910.1003(g)
N-Nitrosodimethylamine	1910.1016[a]
Noise	1910.95(g)
β-Propiolactone	1910.1013[a]
Respiratory protection	1910.134(e)
Vinyl chloride	1910.1017(k)

[a] Medical surveillance regulations for these carcinogens have been grouped into 1910.1003(g).

[b] Also regulated in Contruction standards (29 CFR 1926).

[c] Also regulated in Maritime standards (29 CFR 1915).

[d] Also regulated in Agriculture standards (29 CFR 1928).

From: US Department of Labor, Occupational Safety and Health Administration website. Available at; http://www.osha-slc.gov/SLIC/medicalsurveillance/index.html. Accessed August 1999.

has become clinically apparent, and they are intended to prevent disability or further progression. Some tertiary services are curative, such as treatment for acute or chronic intoxication from a workplace exposure, orthopedic care for a fracture, or rehabilitation after surgery for a work-related injury. Tertiary preventive services include clinical care for occupational injuries and illnesses and are probably the most common occupational health services. Even clinical care, however, has aspects that extend beyond the clinic. Physicians who provide this care should be planning for the patient's ultimate return to work. This may require initial return to a modified or alternative job with reduced demands, with a graduated return to the original job (or as close to it as possible). It may also be necessary to modify the original job to correct ergonomic or other problems that would otherwise lead to reinjury or exacerbation of the ailment. The physician (or other clinician caring for the patient) should coordinate this process with an employer representative to ensure that needed workplace changes are made.

Other tertiary prevention strategies do not cure the illness but are intended to prevent its progression. Auditory screening in hearing conservation programs, for example, does not restore lost auditory acuity. Instead, the screening program identifies workers whose noise exposures must be reduced through control of noise emissions or use of hearing protection. These measures prevent further noise-related hearing loss but do not restore acuity that has already been lost.

Primary, Secondary, and Tertiary Prevention Interlinked

Many cases of occupational illness or injury indicate the presence of a particular hazard in the workplace. Lead intoxication in a working adult, for example, suggests occupational exposures to lead. Such diagnoses are termed *sentinel events* (6), and they illustrate that the three levels of prevention are interlinked in occupational health. If a worker is identified as having neurologic symptoms related to lead poisoning, chelation therapy can be given to reduce lead levels (tertiary prevention, since symptomatic disease is already present); other workers can be screened for possible subclinical lead intoxication (secondary prevention); and ventilation or respiratory protection can be used to

reduce lead exposures for all workers (primary prevention).

Partners in Occupational Health Services—Liaison with the Workplace

Preventive health care can be practiced by the primary care clinician in the privacy of the office, with only the physician and the patient involved. Many of the issues discussed, such as diet, exercise, and tobacco use, are lifestyle risks that are under the patient's control. However, prevention in occupational medicine is a more complex matter. Occupational health and safety risks most often result from workplace hazards that are under the control of the employer, not the worker. There is a unique relation between occupational health services and the workplace because occupational health deals with the effects of workplace hazards. For this reason, occupational health services must address workplace risks. Strategies used by occupational medicine physicians may involve assessing workplace hazards; collaborating with primary prevention services, including occupational safety or occupational hygiene professionals; and reporting cases of illness to the employer or to regulatory agencies so that the hazards identified can be corrected.

Many clinical interventions are incomplete if they are not accompanied by needed workplace interventions. It would not be appropriate to use chelation therapy to reduce the body burden of lead in a lead-intoxicated worker and then send the worker back to an unchanged workplace for additional exposure. Similarly, a worker should not receive surgery and rehabilitation for carpal tunnel syndrome and then return to the same job with the same repetition rates and forces affecting the wrist. In both cases, the worker is at risk for reinjury, recurring illness, or exacerbation of existing disease.

Unlike purely clinical encounters, however, many of these preventive interventions are beyond the reach of the physician working alone. For this reason, clinicians treating occupational injuries or illnesses must work closely with other occupational health specialists. Cases of work-related disease should be reported to the employer, with appropriate caution to protect the worker's confidentiality and job security, so that causative workplace hazards can be controlled or eliminated. This may involve sharing information with occupational hygienists, safety specialists, ergonomists, or others qualified to assess and correct the identified hazard.

Conversely, the information provided by specialists in these related disciplines can provide valuable assistance to the occupational medicine physician. Industrial hygienists in a workplace can tell the physician which exposures are present, allowing the physician to recommend appropriate medical screening examinations. In addition, information on workplace exposures may be essential when considering a diagnosis of work-related disease or when selecting appropriate therapy after an acute exposure.

Occupational medicine specialists who are located at the workplace would seem to have the advantage in this situation, with more ready access to the workplace and its safety specialists. However, occupational medicine providers who are located elsewhere can include outreach to the workplace in their activities. This approach was used by a large managed care organization as it provided occupational health services under contract to employers (7).

Consultative Services

The services described previously are examples of care provided in a traditional physician-patient relationship, in which the physician is involved in the patient's welfare for an extended period. Some occupational health physicians also see patients for single or isolated visits in which they are not providing clinical care but instead are serving as medical consultants to the employer. One example of such a role is supervision of the testing of workers or job applicants for evidence of use of illegal drugs. The physician is paid by the employer to oversee the process of

collecting the specimens (usually urine) and may be called on to use medical judgment in interpreting an uncertain result or ruling out other causes of a positive test, such as use of prescription medications. Although the physician has a duty to the patient to provide this service according to standards of confidentiality and scientific validity, no other relationship with the patient (e.g., medical treatment of addiction) is implied. Physicians performing this service are called *medical review officers.*

Another consulting role is that of the independent medical examiner. When a worker files for workers' compensation benefits, the state workers' compensation board or attorneys for the worker or the employer may request an independent examination of the patient to assess the degree of medical impairment (see Chapters 11 and 12). This examination is provided by a physician who is not otherwise connected with the case. The independent medical examiner takes a history from the patient and performs an examination to evaluate impairment. The physician reports this assessment to the requesting entity but has no further relationship with the patient. Other services that may be provided on a consultative basis include OSHA-mandated medical functions such as medical surveillance and clearance for workers who must wear respirators.

Health Risk Appraisal and Health Promotion

One other activity, health promotion (which can include health risk appraisal), often falls in the purview of the occupational health program, although it does not address work-related disease. Health risk appraisals are surveys, questionnaires, or interviews that help patients identify aspects of their lifestyle that are health risks. Survey instruments may ask about behaviors such as use of alcohol or tobacco, diet and exercise habits, or compliance with seatbelt laws. Health promotion activities seek to help patients adopt healthier behaviors, such as smoking cessation or increased physical activity. They may use employer-funded programs, such as smoking cessation clinics, exercise programs, or nutritional counseling (8).

Health promotion activities are conducted in the workplace for several reasons. Because working people spend so much time in the workplace, it is a convenient place to conduct these activities. In addition, because the employer generally pays for employee health care, it is in the employer's interest to promote better health. Health promotion activities also may benefit the employer if improved workforce health results in increased productivity at work. Studies of whether health promotion activities are cost-effective have not shown a consistent benefit and suggest that target populations and interventions must be carefully selected (9,10). However, health promotion activities can complement occupational health activities; for example, workers with a history of asbestos exposure can be counseled about the interaction between that exposure and smoking (leading to a multiplied risk for lung cancer) and referred to a smoking cessation program if necessary.

ETHICS IN OCCUPATIONAL HEALTH SERVICES

Those who provide occupational health services have a unique obligation. Not only must they work to protect the patient's health, but they must do so in circumstances in which another party (the employer) pays for the care, has the capacity to address risk factors, and determines whether the patient is employed. The occupational health physician, nurse, or physician assistant therefore must seek the patient's consent, protect the patient's privacy, and be mindful of potential adverse effects on the patient's job status. A worker's medical information should remain confidential, and employers generally need to know only the employee's ability to work and whether job modifications (e.g., safety measures, exposure prevention) or work restrictions are needed. The reader is referred

to Chapter 13 for more information about occupational health ethics.

FINANCING OCCUPATIONAL HEALTH SERVICES

Payment systems for occupational health services are diverse. Some care is directly underwritten by employers, including care given at on-site clinics by providers who are themselves plant employees and care given by on-site or off-site providers who either bill the employer for services or contract on a capitated basis. Sometimes this includes care for nonoccupational health conditions, if such care is delivered in an on-site clinic. Employers also pay for curative (although not consultative or preventive) occupational health care indirectly through contributions to state workers' compensation funds. In addition to payments by employers and workers' compensation systems, medical costs of occupational injuries and illnesses are also borne by other insurance systems—including health insurance for general health care, Medicaid and Medicare, and Social Security Disability Insurance—and payments workers make out of pocket (11). However, even employer-provided care involves a cost to workers, because workers' compensation fund contributions and health insurance payments are part of the employer's total resources for employee salaries and benefits; contributions to these insurance plans result in less available money for wages.

CHANGES IN THE DELIVERY OF OCCUPATIONAL HEALTH SERVICES: THE NEED FOR RESEARCH

Like other health services, occupational health services are undergoing rapid changes in their organization and delivery. In many places, the plant physician is being eliminated, replaced by contract providers or referral services. There are fewer plant clinics and increasing reliance on occupational health services provided by hospitals, clinics, managed care organizations, and other off-site providers (12). Most of these changes have been driven by efforts to reduce the cost of occupational health services. As a result, there is increasing competition among providers and provider organizations for employer contracts to provide employee health and workers' compensation care (13).

In general (nonoccupational) health care, the need to assess quality among different health care providers has prompted the development of performance measures. Measurement systems such as the Health Plan Employer Data and Information Set (HEDIS) allow patients and purchasers to compare managed health care plans on measures of the effectiveness of their care delivery (14). Efforts are now underway to develop similar performance measures of quality in the provision of workers' compensation care by managed care organizations (15). These measures may also be applicable to occupational health care provided in other settings, but occupational health services require additional, unique measures to assess their quality. A set of proposed quality indicators in occupational health care is presented in Table 14-2 (16,17).

These questions about the effectiveness of various providers and appropriate ways to measure performance illustrate the need for the relatively new field of occupational health services research. As defined by the Association for Health Services Research, health services research uses quantitative or qualitative methodology to examine the impact of the organization, financing, and management of health care services on access to, delivery, cost, outcomes, and quality of services (18).

There is great diversity in occupational health services, including the training and practice of the health care providers, the settings in which care is provided, the way that care is paid for, and the specific tests, therapies, and procedures used to screen for or to treat work-related injuries and illnesses. Different options may not be equally efficacious or cost-effective, and they therefore

TABLE 14-2. *Proposed quality indicators for occupational health care and possible specific measurements*

1. Do patients have adequate and timely access to care?
   a. How long is the time needed to obtain an appointment for urgent and routine primary occupational health care?
   b. How long is the time needed to obtain a referral to specialty care?
   c. How long is the time from being authorized for a surgical procedure to receiving a scheduled time for surgery?
2. Primary prevention—how well is primary prevention carried out?
   a. What percentage of the contracted employers have had a review of their injury and illness experience and strategies for prevention?
   b. What percentage of contracted companies have decreasing rates of injury or illness?
   c. What percentage of sentinel health events have been reported to the employer?
   d. What percentage of health care workers have documented hepatitis B immunization?
3. How well are work-related illnesses recognized and diagnosed?
   a. What percentage of cases of work-related dermatitis or asthma were recognized in a report of first injury or illness?
   b. What percentage of lead-exposed workers received a blood lead level measurement?
4. How is the quality of clinical care?
   a. What percentage of cases of lumbar spine injury resulted in permanent partial disability?
   b. What percentage of occupational health hazardous exposure evaluations included a worksite visit?
   c. Appropriate utilization of surgical procedures: What percentage of patients receiving carpal tunnel release surgery had prior demonstration of delayed median-nerve conduction?
5. Are patients satisfied with their occupational health care?
   a. Survey question: "Overall, how satisfied are you with the service you received from your doctor?"
   b. Survey question: "Overall, how would you rate the care and services you received during this visit?"
   c. What is the complaint rate per 100 claims?
6. Are employers who purchase occupational health care satisfied with that care?
   a. What percentage of contracts were renewed?
   b. Mail survey: "Overall, how satisfied are you with the care and services your workers receive?"
7. What is the quality of care being provided, as assessed by the outcomes of that care?
   a. Using appropriate diagnostic category scores during treatment, how much time is lost from work for claims related to diagnoses of the lumbar spine and shoulder, or carpal tunnel syndrome?
   b. Comparing workers' compensation to group health claims, what is the average cost per claim in the lumbar spine diagnostic category?
   c. What percentage of patients with lost time greater than 3 days experience additional time lost due to reinjury after their initial return to work?
   d. What percentage of patients with lost time greater than 3 days are at their preinjury job or a modified job at 90 days after being released to return to work?
8. Are health care services being utilized appropriately?
   a. What is the rate of use of plain film and advanced imaging (computed tomography and magnetic resonance imaging) per low back diagnostic category claim?
   b. What is the rate of laminectomies per low back diagnostic category claim?
   c. What is the rate of treatment and rehabilitation visits (occupational therapy, work hardening, or physical therapy) per low back diagnostic category claim?
9. Are cases being managed appropriately?
   a. What percentage of filed claims are accepted as work-related?
   b. What percentage of cases require independent medical studies?
   c. What percentage of claims incur litigation?
10. Does the practice environment strive for quality in health care?
    a. Are clinical guidelines, including those for chemical exposure and surveillance, in use and updated annually?
    b. Is there a quality management program, including indicator tracking, and is it updated annually?
    c. What percentage of physicians are board-certified?

Adapted from occupational health quality measures proposed in Rudolph L. A Call for Quality. J Occup Environ Med 1996;38:343–344; and Feldstein A. Quality in Occupational Health Services. J Occup Environ Med 1997;39:501–503.

provide fruitful issues for study. The outcomes of occupational health care may be affected by provider characteristics (e.g., type of provider, provider organization, reimbursement system) or by employer characteristics (e.g., industry type, employer size, geographic location). Research addressing these issues will help to determine the most effective practices for providing occupational health services.

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A detailed compilation of practice guidelines for managing work-related injury and illness.

Occupational Health

Recognizing and Preventing Work-Related Disease and Injury

Fourth Edition

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Compositor: Bi-Comp
Printer: Maple Press

227 East Washington Square
Philadelphia, PA 19106-3780 USA
LWW.com

Printed in the USA

Library of Congress Cataloging-in-Publication Data

Occupational health : recognizing and preventing work-related disease and injury / edited by Barry S. Levy, David H. Wegman. — 4th ed.
p. cm.
Includes bibliographical references and index.
ISBN 0-7817-1954-2 (pbk.)
1. Medicine, Industrial. I. Levy, Barry S. II. Wegman, David H.
[DNLM: 1. Occupational Diseases—prevention & control. 2. Occupational Health. WA 440 0149 2000]
RC963.022 2000
616.9'803—dc21
DNLM/DLC
for Library of Congress 99-35194
CIP

10 9 8 7 6 5 4 3 2 1