AMERICAN COLLEGE OF
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Scope of Occupational and Environmental Health Programs and Practice

The scope of practice of occupational and environmental medicine has undergone important changes over the last century as a result of changing expectations of society, employers, and workers, as well as evolving federal and state regulations. The role of the occupational and environmental physician has expanded to enhancing the productivity of the worker with absence management and increased emphasis on the overall health, wellness, and safety of the worker – not just at the work site but also at home and in the community.

The provision of occupational health care has also expanded from the industrial in-plant clinic to university and community hospital-based clinics, multi-specialty group clinics, occupational medicine clinics, as well as private and government consultants. In many of these settings, the emphasis is on preventive interventions and policies rather than treatment. It is important that the practitioner be fully informed of all significant occupational and environmental health and safety activities, problems and concerns in order to provide necessary advice to assure a safe, healthy environment. These changes are reflected in the transition of terms from "industrial medicine" to "occupational medicine" and finally to "occupational and environmental health."

There is increased recognition by organizations and regulatory agencies that occupational and environmental medicine (OEM) physicians and other licensed health care professionals have expertise in the development, implementation, evaluation and analysis of programs and policies that protect the worker.[a] The occupational and environmental physician often designs programs and manages health services directed toward defined populations, as well as engaging in clinical care that emphasizes the evaluation and treatment of individuals for both occupational and non-occupational illness and injuries. Communities are increasingly in need of qualified medical professionals to advise them on risk assessment as it relates to the environment and to develop programs to protect the health of workers and other populations potentially exposed to environmental injury. The ability to interact with diverse stakeholders to prevent and manage injury and illness, and to promote health, wellness and productivity of working populations, gives occupational physicians a unique perspective and role in the medical community.

The field of occupational and environmental health continues to be impacted by a variety of regulatory and public health agencies such as federal and state Occupational Safety and Health Administration, Nuclear Regulatory Commission, Environmental Protection Agency, Mine Safety and Health Administration, and Department of Transportation. Issues as diverse as bioterrorism, ergonomics, toxic exposures, indoor air quality, work place violence, wellness, productivity, and absence management all come under the realm of the occupational and environmental health physician. Additionally, as the United States' workforce is increasingly part of a global workforce, it is necessary for occupational and environmental (OEM) physicians to understand and foster the needs of the international worker and build ties with the occupational, safety and health care community internationally thus encouraging best practices.

Appropriate training for participation in occupational and environmental health programs provides skill in clinical, environmental and occupational medicine, toxicology, epidemiology, biometry, and population health. In addition, practitioners understand how to enlist and collaborate with the

colleagues from industrial hygiene, toxicology, occupational health nursing, safety engineering, industrial relations, health physics, ventilation engineering, mechanical engineering, biomechanics, law, public policy, and health education.

The change in practice location in occupational and environmental medicine within the past decade has added another needed set of skills, those of data management. Computerization of medical information necessitates a sophisticated degree of "computer literacy" on the part of the occupational and environmental health professional. Knowledge of data management, including understanding all aspects of confidentially of medical records, is required.

Lastly, occupational health professionals are advancing the field of health and productivity management (HPM). Integrated HPM is a component of occupational health, safety, loss and risk management, absence and disability management, health promotion, disease management, injury prevention, hazard control, and health care benefits management that includes evaluation of personal health care.

The specific contents of any occupational and environmental health program are determined by the nature of the work organization, the products produced or services provided, the nature of the workforce, job tasks, activities and potential hazards and specific workplace or community activities. Occupational health programs must comply with all relevant local, state and federal laws and regulations.

The following document identifies those services considered essential components of comprehensive occupational and environmental programs in meeting a standard of excellence. The components contained below are further defined and expanded in the Guide to a Healthy Workplace developed by the Corporate Health Achievement Award (CHAA) program of the American College of Occupational and Environmental Medicine (ACOEM). To learn more about each component and to have a clearer understanding of measuring these components, please refer to the CHAA Guide to a Healthy Workplace that can be found at www.chaa.org.

LEADERSHIP AND MANAGEMENT

Organization & Management

Employers should assure that occupational medicine, industrial hygiene, safety and environmental health professionals have input into the decision making process related to health, safety and environmental issues. In all settings, this requires close alliance between OEM and OEH professionals, with all reporting to a level in the organization that will have a broad influence and global impact. OEM and OEH professionals should work collaboratively to identify, design and implement improvements to enhance health and productivity of the workforce as well as maintain a safe workplace. Health, safety and environmental programs should assist in interpreting and developing pertinent regulations and guidelines for business, labor organizations, government agencies and communities. Health, safety and environmental programs are most effective when organizational support and commitment to the health, productivity and safety of the workforce exists. Management must be willing to provide appropriate resources, encourage innovation and support positive change. OEM and OEH professionals must collaborate with management to meet the challenge of designing and disseminating cost effective health, safety, and wellness programs to an increasingly diverse and aging population, often at widely dispersed national and international sites. Programs should set uniform standards of care and encourage best practices throughout the organization, including internationally. Managers should understand the value of workplace occupational and environmental health and safety and must be able to manage change in a constructive and positive manner.

Health Information Systems
Effective health, safety and environmental programs use information systems to promote worker health and safety. Occupational health information systems (OHIS) can and should be used for multiple reasons, including: aggregate data collection and analysis, documentation of worker's medical surveillance, tracking medical appointments, delivery and documentation of training programs and health and wellness programs, communications between stakeholders, benefits education and tracking, as well as monitoring of chemical and other hazards. These systems help provide access to material safety data sheets (MSDS), Occupational Safety and Health Administration (OSHA) accident and injury logs, research data, updates to regulatory and governmental changes at the state and federal levels. These systems support statistical analysis, integrated case management and enable research of peer reviewed literature and delivery of continuing professional education. OHIS are needed to generate metrics used to identify problems, track compliance, manage programs and assure quality and effectiveness. These systems are also used to wisely allocate health resources. Health, safety and environmental programs must maintain occupational medical records on each worker, documenting the reasons for and results of all evaluations. Ideally these records should contain data sufficient to reproduce a chronology of the worker's medical history, workplace exposures, medical evaluations, illnesses, and injuries. As these systems provide powerful analytical tools, the organization must maintain appropriate control and meet all privacy requirements. Procedures must preserve confidentiality of all health information and medical records while allowing access to those with a bona fide need to know. If the records are computerized, their security must be assured and the information they contain kept confidential. OEH professionals must remain informed on regulatory issues affecting medical records, such as the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the Americans with Disabilities Act (ADA) and Genetic Information Nondiscrimination Act (GINA) regulations.

Evaluation and Quality Improvement
Program evaluation is necessary to assure that programs meet objectives and operate effectively and efficiently. Program evaluation methods will vary but periodic review is necessary to make sure that high standards are being met and maintained. Data collection is not sufficient; the information must be collated, validated, tracked, trended and used in planning appropriate, specific interventions for quality improvement.

HEALTHY WORKERS

Health Evaluation of Workers
Appropriate health evaluations should be performed and workers should be fully informed of the results of each health evaluation, whether normal or if variations are detected. Those performing health evaluations must be familiar with the workplace, understand any potential hazards, and have access to worker job descriptions. Arrangements for care should be made when appropriate including to the worker's private physician. Follow-up information should be received and documented, and appropriate action taken. Evaluations should be carried out on the following occasions:

Pre-assignment/pre-placement – Health status, both physical and emotional, should be assessed before making recommendations regarding the assignment of an applicant or current worker to a job to assure that the individual can perform the essential job functions safely and without endangering the safety of others. This recommendation shall be based on any or all of the following:

- Complete medical history
- Occupational history (complete work history) including past job exposures
- Assessment of the organs or systems likely to be affected by the assignment
- Evaluation of the job description and demands to which assignment is being considered
- Compliance with federal, state and local laws and regulations including GINA regulations.

Medical surveillance – The health status of the worker should be reviewed periodically when there is a possibility that workplace exposures or job activities (including organizational stress factors) could have an adverse health effect. Medical surveillance of workers may be required by an employer or regulatory agency directive because of potential exposure to hazards in the work environment. Certification examinations such as Federal Aviation Administration (FAA) or U.S. Department of Transportation (DOT) commercial driver may also be required. OEM and/or OEH professionals should be involved in defining and developing the medical surveillance programs that identify early signs of potential hazard exposure and thus protect workers.

Infection control – OEM and OEH professionals are sometimes involved in screening for infectious diseases that may spread at the workplace during an epidemic or pandemic. For those organizations with health clinics or who offer on-site flu vaccine programs and health screenings such as cholesterol and diabetes, programs should be in place for infection control and transmission of blood borne pathogens. Appropriate infection control procedures should be implemented during an epidemic or pandemic.

Occupational Injury and Illness Management

Occupational and environmental injuries and illnesses should be diagnosed and treated promptly. OEM physicians are best qualified to diagnose occupational illnesses and injuries because of their knowledge of the workplace and environment. The OEM physicians and OEH nurses should objectively resolve issues about occupational causation of illness, be knowledgeable regarding available rehabilitation programs and facilities, and interact with program administrators as appropriate to facilitate post illness or injury return to work based on familiarity with the worksite and input from supervisory/management personnel.

Post-illness or injury, fitness-for-duty evaluations, and independent medical examinations – The health status of the worker should be re-evaluated following prolonged absence from work due to illness or injury whenever there are concerns of ability to perform all job tasks, and for globally assessing worker's allegations and claims. The goal is to assure that the individual has sufficiently recovered from the illness or injury to perform the job without undue risk of adverse health or safety effects to the individual or to others. It is important for OEM and OEH professionals to be involved in return-to-work planning to help determine if the worker is able to return to restricted or full-time work on a temporary or permanent basis.

Termination of assignment – Health status may need evaluation when exposure ceases or employment terminates. The worker should be informed concerning health status and advised of any adverse health effects due to work or environmental exposures.

Traveler Health

Organizations should have a method to advise travelers concerning various travel-related issues, such as prevention of jet lag, food and water borne diseases, local outbreaks of illness, motion sickness, and the need for medical care abroad. Vaccinations and information are available to workers who may be exposed to a disease for which there is an effective vaccination (e.g., hepatitis A and B virus exposure in travel to certain areas).

Mental and Behavioral Health and Misuse of Substances

The organization should have appropriate written policies for worker education, prevention, and recognition of substance abuse, mental health issues and violence in the workplace. Management and supervisors should be skilled in the identification and recognition of troubled workers and refer them to OEM and OEH professionals, Employee Assistance Program (EAP) counselors, and/or substance abuse programs (SAPs). OEM and OEH professionals are often involved in counseling and rehabilitation of the

troubled worker in a confidential manner, realizing the importance of rehabilitation of impairment for drug or alcohol misuse. OEM and OEH professionals are appropriately involved in mandated (e.g., DOT or military) or elective drug screening and testing of workers, and serving as medical review officers (MROs) who receive, review and interpret drug test results as part of drug-free workplace programs. Confidentiality is maintained, with no diagnostic or treatment information provided to the employer. Workplace violence prevention and response programs are in place.

HEALTHY ENVIRONMENT

Workplace Health Hazard Evaluations, Inspection and Abatement

OEM physicians and OEH professionals should routinely inspect and evaluate the workplace to identify potential health and safety hazards and sub-optimal work practices. OEM and OEH professionals should be familiar with the working environment, worker tasks, worker job descriptions, potential chemical, physical and biological agent exposures, and mental stresses they may result from those jobs via qualitative and/or quantitative assessments.

Education Regarding Worksite Hazards

Health, safety and environmental programs are in place to educate workers about potential hazards at the worksite and their potential for impacting the local community environment. Every worker should know the potential hazards involved in each job to which he or she is likely to be assigned and what the potential risks are in relation to these hazards. The OSHA Hazard Communication Standard ("right-to-know") stresses the importance of worker knowledge of chemical usage. State and local statutes also may require reporting of some occupational biomonitoring results and illnesses. Effective communication procedures should ensure that all stakeholders, both within the organization and the local community, are informed on an ongoing basis of the identities of these hazardous chemicals, associated health and safety hazards and appropriate protective measures. Systematic review regarding the quality of information disseminated under the programs is necessary to determine whether the information is accurate, up-to-date and readily accessible from the material safety data sheets (MSDS) and other communication materials. Substantive guidance from OEM and OEH professionals should assist workers to evaluate hazards and risks, provide worker training, and assist in the preparation of the MSDS. A long term approach to improving hazard communication should be part of any program and include provisions to address worker comprehension of the hazards or risks and standardized approaches to educate workers about labels and the MSDS format.

Personal Protective Equipment (PPE)

Health, safety, and environmental programs should ensure that workers who need personal protective equipment (PPE) are clearly identified, provided with proper selection and fitted with personal protective devices. These include equipment such as hearing and eye protection, gloves and respirators. The organization should determine that the devices provide adequate protection to workers. The organization should also provide adequate education to workers in the proper utilization, cleaning and care, and where applicable, disposal of equipment for all potential uses. Furthermore, workers who utilize respirators should be enrolled in an appropriate medical evaluation program. This should be provided to all impacted workers at all relevant sites. OEM and OEH professionals and management should actively encourage worker compliance with proper care and use of equipment.

Toxicological Assessment and Planning

Health, safety and environmental programs should include procedures to incorporate advice on the nature, adequacy, and significance of toxicological test data pertinent to the workplace. Toxicological assessments should include advice on chemical substances that have not had adequate toxicological testing. Where adequate data does not exist, the OEM and OEH professionals should recommend appropriate control measures to protect staff and where there is good science based rationale, medical

surveillance and testing practices. Processes should be in place for toxicological assessment of new chemicals prior to introduction in the workplace. OEM and OEH personnel should recommend appropriate protection and surveillance of workers in keeping with data available or until appropriate data are received.

Emergency Preparedness, Continuity Planning, and Disruption Prevention
The organization should assure that health, safety and environmental programs incorporate plans for managing health-related aspects of emergencies, including disasters, terrorism and public health hazards. This is important for the safety and welfare of the workers and the local community, as well as for the continuity planning and prevention of disruption of organizational initiatives. Since the organization's health and safety personnel are an essential part of dealing with an emergency at the workplace, planning for emergencies should be done in conjunction with the local community. Under Title III – Superfund Amendments and Reauthorization Act (SARA), organizations covered under the Hazard Communication Standard are required to make their chemical inventories known to emergency response groups of the local community. Where these standards are not met, it is the responsibility of OEM and OEH professionals to work for improvement. Concern or fear of terrorist attacks requires considerable professional judgment. OEM physicians and OEH professionals should assure that proper treatment referral networks, such as EAP and critical incident debriefing (CID) resources are in place.

HEALTHY ORGANIZATIONS

Health Promotion and Wellness Including Non-occupational Injury and Illness Management
Health education and health promotion programs are integral to maintaining and enhancing the health of worker populations. Periodic health screening examinations and education aimed at maintaining and promoting the health of workers are important aspects of comprehensive worker health, safety, and environmental initiatives. Health risk appraisals (HRAs) can be used to identify and prioritize beneficial health behavior change programs. For example, smoking cessation, nutrition, and exercise programs have been documented to improve health and productivity. Evidenced-based approaches are used to develop the content and periodicity of preventive services and are reviewed regularly by knowledgeable professionals. Worker participation is typically voluntary however these programs help maintain and promote the health and productivity of the worker, improve morale and foster employer concern for workers' general welfare.

The health, safety, and environmental programs should also provide treatment for emergency conditions, including emotional crises that occur among workers while at work. This treatment may only be palliative and to prevent loss of life and limb or, where personnel and facilities are available, may be more definitive. These services are convenient for the worker and enhance productivity in the workplace by helping to reduce time away from the work site for minor injury or illness. Employers may even arrange for personal medical care to be provided at the work-place. Care at the workplace should be consistent with local standards of patient-physician relationships. OEM and OEH professionals can motivate and educate workers to take responsibility for making wise, healthier choices in lifestyle behavior and personal health care decisions.

Absence and Disability Management
Disability management programs assess reasons for workers' poor performance or absence from work due to illness or injury and determine when individuals are well enough to return to work safely. Closely related is the primary role of evaluating illness conditions that render work unsafe and require job accommodations. Frequently, the workplace can be used for rehabilitating workers, especially where selective work can be provided on a temporary, limited basis. Disability management is expanding to identify individuals and worker populations who are at increased risk of poor performance because of health issues and to find positive means to enhance health and productivity in the workforce.

Health Benefits Management

Organizations are challenged to skillfully manage human capital to maximize the health, safety, and productivity of the workforce. Health benefits management includes assessing and identifying specific health care needs of a given worker population and helping to maximize available resources to have the largest impact on delivery of high-quality care to workers, retirees, and their families. Actuarial claims analysis for trends in diagnoses and costs can facilitate planning appropriate disease management and health promotion programs. Actuarial rate-setting can help guide appropriate utilization of medical services. Pharmacy benefit plan design can reduce costs while providing access to appropriate medications. Quality of care of network providers can be evaluated against evidence-based best practices and standards and providers can be rewarded for highest quality care. OEM and OEH professionals provide valuable assistance in evaluating worker health benefits, benefit costs, and the adequacy of care provided. OEM and OEH professionals are in a unique position to apply epidemiology, statistics, and information systems to assure quality of care and identification of the most effective opportunities to improve the health of a defined population of workers/beneficiaries.

Integrated Health and Productivity Management

Integrated health and productivity management measures the link between worker health and productivity and directs employer investments into interventions that improve health and organizational performance. With this approach, managing the health of a population is incorporated as an important component in the organization's business strategy. Organizational resources are aligned to support an integrated approach to strategically investing in worker health and performance. Efforts are made to quantify the total economic impact of health, including direct medical and pharmacy costs of health care as well as indirect productivity-related costs such as absenteeism and presenteeism (present at work, but limited in some aspect of job performance by health problems). Health interventions are chosen and evaluated to maximize positive impact on health, attendance, and productivity. For the individual, injury or illness impacts on all aspects of life – at home and at work. Implementation of a strategy that promotes worker health and quality of life is essential to the worker's overall well-being. For employers, this approach is also beneficial as a cost-effective means of reducing health care expenditures, improving organization productivity and human capital management, promoting worker retention, lowering retraining and replacement costs, and enhancing organization culture.

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[a]The terms OEM and OEH professionals are used throughout this document. OEM refers to occupational and environmental (OEM) physicians who have received training in occupational and environmental medicine whether through an accredited residency program or advanced training in OEM coupled with work experience focused on workplace health, wellness, safety and the environment. OEH refers to occupational and environmental professionals such as occupational health nurses, registered or licensed practical nurses, nurse practitioners, industrial hygienists, safety experts and other health and safety personnel whose focus is workplace health, safety and/or the environment.

References

ACOEM Special Committee on Competencies. American College of Occupational and Environmental Medicine Competencies – 2008. *J Occup Environ Med*. 2008;50(6):712-24.

Baicker K, Cutler D, Song Z. Workplace wellness programs can generate savings. *Health Aff(Millwood)*. 2010;29(2):304-11.

Brady, Bass J, Moser R Jr, Anstadt GW, Loeppke RR, Leopold R. Defining total corporate health and safety costs-significance and impact: review and recommendations. *J Occup Environ Med*. 1997; 39(3):224-31.

Bunn WB, Stave GM, Allen H, Naim AB. Evidence-based benefit design: toward a sustainable health care future for employers. *J Occup Environ Med*. 2010;52(10):951-5.

Bunn WB, Stave GM, Allen, Naim AB. How to align evidence-based benefit design with the employer bottom-line: a case study. *J Occup Environ Med*. 2010;52(10):956-63.

Burton WN, Chen CY, Conti DJ, Schultz AB, Pransky G, Edington DW. The association of health risks with on-the-job productivity. *J Occup Environ Med*. 2005;47(8):769-77.

Collins JJ. Baase C, Sharda C, Ozminkowski RJ, Nicholson S, Billotti GM, Turpin RS, Olson M, Berger ML. The assessment of chronic health conditions on work performance, absence, and total economic impact for employers. *J Occup Environ Med*. 2005; 47(6):547-57.

Ducatman AM, Chase KH, Farid I, et al. What is environmental medicine? *J Occup Med*. 1990;32(11):1130-2.

Emmett EA. What is the strategic value of occupational and environmental medicine? Observations from the United States and Australia. *J Occup Environ Med*. 1996;38(11):1124-34.

French SA, Hannan PJ, Harnack LJ, Mitchell NR, Toomey TL, Gerlach A. Pricing and Availability Intervention In Vending Machines at Four Bus Garages. *J Occup Environ Med*. 2010;52(1S):S29-S33.

Goetzel RZ, Anderson DR, Whitmer RW, Ozminkowski RJ, Dunn RL, Wasserman J. Health Enhancement Research Organization (HERO) Research Committee. The relationship between modifiable health risks and health care expenditures. An analysis of the multi-employer HERO health risk and cost database. *J Occup Environ Med*. 1998:401):843-54.

Goetzel RZ, Hawkins K, Ozminkowski RJ, Wang S. The health and productivity cost burden of the "top 10" physical and mental health conditions affecting six large U.S. employers in 1999. *J Occup Environ Med*. 2003;45(1):5-14.

Goetzel RZ, Juday TR, Ozminkowski RJ. What's the ROI? A systematic review of return-on-investment studies of corporate health and productivity management initiatives. *AWHP's Worksite Health*. 1999;6(3):12-21.

Goetzel RZ, Shecter D, Ozminkowski RJ, Marmett PF, Tabrizi MJ, Roemer EC. Promising Practices in Employer Health and Productivity Management Efforts: Findings From a Benchmarking Study. *J Occup Environ Med*. 2007;49(2):111-130.

Green-McKenzie J, Rainer S, Behrman A, Emmett E. The effect of a health care management initiative on reducing workers' compensation costs. *J Occup Environ Med*. 2002:44(12);1100-5.

Harber P, Rose S, Bontemps J, et al. Occupational medicine practice: one specialty or three? *J Occup Environ Med*. 2010;52 (7):672-9.

Harris JS, Loeppke RR. *Integrated Health Management: The Key Role of Occupational Medicine in Managed Care, Disability Management, Productivity, Prevention, and Integrated Delivery Systems*. Beverly Farms, Mass: OEM Press; 1998.

Holland J., in Peterson KW, Travis JW, Eds. *Health, Work, and Productivity Management. Vol. 4: Impact of the Workplace Environment on Worker Health and Productivity*. Scottsdale, AZ: Institute for Health and Productivity Management; 2001.

Landsbergis PA. The changing organization of work and the safety and health of working people: a commentary. *J Occup Environ Med*. 2003:45(1):61-72.

Leigh JP, Markowitz SB, Fahs M, Shin C, Landrigan PJ. Occupational injury and illness in the United States: estimates of costs, morbidity, and mortality. *Arch Intern Med*. 1997:157(14);1557-68.

Linnan L, Bowling M, Childress J, et al. Results of the 2004 National Worksite Health Promotion Survey. *Am J Public Health*. 2008;98(1):1-7.

Loeppke R, Hymel PA, Lofland, JH, et al. Health-related workplace productivity measurement: general and migraine-specific recommendations from the ACOEM Expert Panel. *J Occup Environ Med*. 2003;45(4):349-59.

Loeppke R, Taitel M, Haufle V, Parry T, Kessler R, Jinnett K. Health and Productivity as a Business Strategy: A Multi-Employer Study. *J Occup Environ Med*. 2009; 51(4):411-428.

McCunney RJ, ed. *A Practical Approach to Occupational and Environmental Medicine*. 3rd ed. New York: Little, Brown & Company; 2003.

National Institute for Occupational Safety and Health. Steps to a Healthier US Workforce Initiative; History of the WorkLife Initiative. www.cdc.gov/niosh/worklife/steps/default.html. Accessed October 15, 2010.

Moser R Jr. *Effective Management of Occupational and Environmental Health and Safety Programs*. 2nd ed. Boston, Mass: OEM Press; 1999.

O'Donnell MP, Harris JS, eds. *Health Promotion in the Workplace*. 2nd ed. Albany, NY: Delmar Thomson Learning, 1994.

American College of Occupational and Environmental Medicine Panel to Define the Competencies. Occupational and environmental medicine competencies – v1.0. *J Occup Environ Med*. 1998;40(5):427-40.

Peterson KW, Yarborough CM, Ferguson EB, Matthew SJ. The American College of Occupational and Environmental Medicine's Corporate Health Achievement Award. *J Occup Environ Med*. 1996:38(10);969-972.

Peterson KW. Occupational health: where it's been, where it's going. *Ben Law J*. 1996;9(1):117-44.

Piirainen H, Räsänen K, Kivimäki M. Organizational climate, perceived work-related symptoms and sickness absence: a population-based survey. *J Occup Environ Med*. 2003:45(2);175-84.

Pransky G. Occupational medicine specialists in the United States: a survey. *J Occup Med*. 1990;32(10):985-8.

Punnett L, Cherniack M, Henning R, Morse T, Faghri P. A conceptual framework for integrating workplace health promotion and occupational ergonomics programs. *Public Health Reports*. 2009;124(S1):16-25.

Riedel JE, Lynch W, Baase C, Hymel P, Peterson KW. The effect of disease prevention and health promotion on workplace productivity: a literature review. *Amer J Health Promotion*. 2001;15(3):167-91.

Sells B. What asbestos taught me about managing risk. *Harv Bus Rev*. 1994;76-9,82-90.

Stave, GM, Muchmore L, Gardner H. Quantifiable impact of the contract for health and wellness: health behavior, health care costs, disability and workers' compensation. *J Occup Environ Med*. 2003;45(2):109-17.

Teal T. The human side of management. *Harv Bus Rev*. 1996;35-8.

Thorpe KE. Factors accounting for the rise in health care spending in the United States: the role of rising disease prevalence and treatment intensity. *Public Health*. 2006;20:1002-7.

US Preventive Services Task Force. *Guide to Clinical Preventive Services: An Assessment of the Effectiveness of 169 Interventions*. 2nd ed. Baltimore, Md: Lippincott Williams & Wilkins; 1995.

Woolf SH, Jonas S, Lawrence R, eds. *Health Promotion and Disease Prevention in Clinical Practice*. Baltimore, Md: Lippincott Williams & Wilkins; 1995.

Wright DW, Beard MJ, Edington DW. Association of health risks with the cost of time away from work. *J Occup Environ Med*. 2002:44(12);1126-34.

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