

Teaching Occupational Health to Medical Students

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Occupational and environmental disease and injury are both widespread and preventable, yet their study has been traditionally neglected in undergraduate medical education. Because family physicians will encounter many working patients who are subject to varying degrees of risk as a result of their job, home, or community environment, family practice faculty must play an important role in teaching occupational and environmental health to medical students. Goals for the longitudinal integration of occupational and environmental health over the four-year curriculum include sensitizing students to the relationship between work and health, introducing and reinforcing the importance of the occupational and environmental history in patient care, integrating occupational and environmental health principles and examples with existing course work, and providing appropriate clinical, research, and didactic activities for interested students. Goal achievement will vary with the availability of curricular time and teaching faculty. Strategies for implementing occupational and environmental health curriculum in the face of these two variables are discussed.

Although approximately 100,000 people die of occupational disease each year¹ and currently nearly 2 million workers are either severely or partially disabled from an occupationally related disease,² occupational and environmental health has traditionally been a neglected area in medical education. In a recent survey³ it was found that only about 30 percent of the 92 responding Ameri-

can medical schools specifically taught occupational health in their curricula; of these, the median required curriculum time was four hours.

Because the problem is of significant magnitude and severity and because most occupational injuries and illness are preventable, occupational and environmental health should be a required component of the undergraduate medical curriculum. Family physicians should play an important role in teaching the basic knowledge, skills, and attitudes of this discipline to medical students because family physicians are the likely source of health care for working people who are subject to varying degrees of risk and disease due to hazardous exposures on their jobs and in their community and home environments. The delivery of truly comprehensive

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care demands the timely diagnosis and treatment of such disease as well as adequate attention to preventable or reducible occupational risk factors as part of the patient's health care maintenance.

Based on the belief that a working knowledge of occupational and environmental health and risk should become part of every physician's armamentarium, this paper identifies goals and strategies for introducing or expanding the teaching of occupational and environmental health within the undergraduate family medicine curriculum or within other course structures where family physicians teach. The goals should be integrated throughout the entire four-year curriculum. Limiting them to one specific course or one particular year would isolate this important area from the mainstream of medicine and make its study appear separate, something to be addressed when the faculty or students have extra time or specific interest.

Curricular Goals

The following goals for a longitudinal integration of occupational and environmental health over the four-year curriculum are proposed:

Year 1

1. Introduce and sensitize first-year medical students to the field of occupational and environmental health
2. Provide a sense that work and health are frequently related and that occupation should be considered a potential risk factor in helping workers maintain optimum health
3. Instruct the students in the essential elements of a basic screening occupational and environmental history for integration into their medical interviewing and physical diagnosis courses
4. Demonstrate to the students that family and other primary care physicians have important roles in delivering comprehensive care to workers and their families

Year 2

1. Augment existing basic science courses with occupational and environmental case studies, handouts, or other educational materials
2. Provide opportunities to practice occupational history-taking skills and observe cases of

work-related disease during physical diagnosis and preceptorship experience

Year 3

1. Provide materials and enhance the skills that enable the student to obtain a comprehensive, in-depth occupational and environmental history on all adult patients
2. Provide sufficient clinical examples to demonstrate to the student that knowledge of a patient's occupational and environmental history is useful both in health maintenance and in the diagnosis and treatment of many medical problems seen in family practice

Year 4

1. Provide appropriate clinical, didactic, or research activities in occupational medicine on an elective basis for interested students

Years 1-4

1. Provide for interested students adequate extracurricular activities to address specific educational or training needs that are not met within the formal curriculum. Examples may include summer assistantships, traineeships, seminars of topical interest, and full-time training opportunities relating to occupational and environmental health

Teaching Strategies

Teaching strategies and time requirements aimed at accomplishing these goals will vary with the experience, expertise, and resources of each institution. The two most important variables are the availability of curricular time and teaching faculty. The amount of time available may vary from no time to completely adequate blocks of time. Faculty may range from those with no experience in teaching occupational and environmental health to those with exceptional experience. In all cases, with a commitment to provide medical students the opportunity to learn elements of occupational and environmental health during their four undergraduate years, most of the curricular goals can be met to some extent.

Table 1 presents basic strategies for integrating occupational and environmental health into the formal or, if necessary, the informal curriculum structure of a medical school. The cells within the table are interchangeable to a great degree.

Table 1. Basic Implementation Strategies

Level of Faculty Experience	Curricular Time Available		
	No Time	Some Time	Adequate Time
Inexperienced	<p>Provide self-study materials to students</p> <p>Establish journal clubs, discussion groups, seminar series</p> <p>Utilize existing audiovisual materials</p> <p>Provide handouts (obtained from other programs) to all students during interviewing and physical diagnosis courses to explain the basic elements of the occupational history</p> <p>Refer students to other schools or programs for electives in occupational health</p>	<p>Use existing text and audiovisual materials</p> <p>Identify and use resources within institution (eg, pulmonary specialists) and community (eg, industrial hygienists)</p> <p>Arrange site visits</p> <p>Arrange clinical preceptorships</p> <p>Refer students to other schools or programs for electives</p>	<p>Refer students for enrichment activities in other schools and programs</p> <p>Seek appropriate training for interested full-time faculty</p> <p>Use community consultants</p>
Some Experience	<p>All of the above plus:</p> <p>Role model occupational and environmental history taking during family medicine rotations</p> <p>Make presentations at journal clubs, etc</p> <p>Work with supportive faculty who have access to the formal curriculum to encourage inclusion of occupational and environmental examples, correlations, etc</p>	<p>All of the above plus:</p> <p>Exploit existing curriculum</p> <p>Use case-based teaching</p> <p>Role model in clinical setting</p>	<p>All of the above plus:</p> <p>Develop didactic and research electives</p> <p>Consult with other clinical services</p>
Exceptional Experience	<p>All of the above plus:</p> <p>Make scholarly presentations at schoolwide activities (eg, Grand Rounds, Dean's Rounds)</p> <p>Provide formal extra-curricular training courses</p>	<p>All of the above plus:</p> <p>Develop own materials</p> <p>Make scholarly presentations (eg, Grand Rounds)</p> <p>Participate in formal courses</p>	<p>All of the above plus:</p> <p>Develop clinical electives</p> <p>Make scholarly presentations</p> <p>Expand consultation with other clinical services</p> <p>Provide in-house enrichment activities</p>

It is perhaps most important to be aware of the existence and availability of curricular materials. These materials can be helpful in all situations and

to all levels of faculty. Many texts and audiovisual materials have been developed specifically for use in medical schools and primary care residency

programs. The University of Alabama at Huntsville (Department of Community Medicine) has developed a catalog of educational resources and instructional materials listed by occupational or environmental hazard, industry, or disease. Additional materials, such as case studies, handouts relating to specific hazards, and reading lists, may be available from recipients of environmental health curriculum development grants provided by the Health Resources Administration of the Department of Health and Human Services.* These materials can be used even when no formal curriculum time can be found, although the goal of reaching all medical students will not be realized. In this case, noncredit informal seminars, discussion groups, or journal clubs can be established for interested students. These groups can create the necessary groundswell of interest that will get the attention of other faculty members and the curriculum committee and may facilitate the addition of occupational and environmental health to the formal curriculum.

Another generic strategy that can be used in a number of situations to facilitate the provision of a longitudinal experience is the exploitation of the existing curriculum for opportunities to teach or role model the practice of occupational and environmental health. Especially useful are courses in interviewing, patient evaluation, community medicine, and basic science (eg, pathology and pharmacology), as well as formal clinical clerkships. Course enrichment can be accomplished by adding complementary occupational or environmental health-related readings to the syllabus, by using occupational or environmental case examples or clinical correlations, by developing handouts to illustrate the relationship of occupational or environmental health to the subject at hand (eg, the work-related epidemiology of asbestosis during pathology, workers at increased risk for certain infectious diseases during microbiology, hazardous substances in the home environment during pediatrics), and, most important, by role modeling an awareness of occupational or environmental risk factors and disease during all clinical clerkships. Descriptions of and formats for taking an occupational or environmental history are availa-

ble from a variety of institutions.** Guidance is also provided in the medical literature.^{4,5}

The workplace site visit is an excellent teaching tool. It provides a community-based experience that is highly acceptable to medical students. Although it is most effective when the accompanying faculty member is familiar with the work process and potential hazards, the less experienced teacher can usually rely on workers, management, and company safety or medical personnel to act as guides.

When the amount of curriculum time devoted to occupational and environmental health appears adequate, faculty may wish to provide additional opportunities for students with a special interest in the field. Didactic, research, and clinical electives can be developed, as can other enrichment activities such as traineeships and assistantships with organizations involved in occupational or environmental health research (eg, NIOSH Educational Resource Centers, cancer centers, departments of health, and other governmental and nongovernmental agencies). Lerman⁶ has prepared a resource guide that lists the names and addresses of the NIOSH centers as well as a number of other private and public agencies and academic programs involved in occupational safety and health.

Other creative strategies for enrichment activities have also been proposed and implemented. One example is the five-week interdisciplinary Summer Institute in Occupational and Environmental Health sponsored by the University of Arizona open to entering first-year and second-year medical students. Designed as an intensive introduction to the field, the institute combines didactic classroom-based instruction with industrial site visits, case studies, and problem-solving exercises. Enrichment methods and strategies are limited only by the teacher's imagination and the availability of resources.

In all cases faculty should be prepared to refer students to programs that provide clinical experience in occupational medicine. These programs can be found in corporate medical departments,

*A list of project directors is available from the Division of Medicine, Health Resources Administration, 3700 East West Highway, Hyattsville, MD 20782.

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labor unions, private occupational medicine practices, academic departments of occupational and environmental medicine, and government or other public health agencies.

Comment

This short paper has dealt with the teaching of occupational and environmental health in family medicine undergraduate education. While agreeing that the role must be more fully defined, the authors have assumed that family physicians play an important part in both the teaching and practice of occupational and environmental health because most working adult patients will initially seek health care from their primary care or family physician. Indeed, the family physician can be the first line of defense in the prevention and early detection of occupational and environmental disease. Some examples of generic goals and implementation strategies for use in teaching occupational and environmental health to medical students have been suggested. The goals, objectives, and teaching strategies must be developed within the con-

text of faculty and community experience and resources, the status of the formal curriculum, and the industrial profile of the area in which the medical institution operates. Fortunately, progress in this area continues to be made and a variety of educational materials have already been developed and are available for use. Although the specific knowledge, skills, and attitudes to be taught within the context of family practice remain to be detailed, it is no longer necessary for every program to reinvent the occupational and environmental health curricular wheel.

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