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Environmental Health Faculty in Schools of Public Health

A. C. ANDERSON, PhD

Dr. Anderson is Professor of Environmental Health Sciences, School of Public Health and Tropical Medicine, Tulane University, 1430 Tulane Ave., New Orleans, LA 70112.

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Tearsheet requests to Dr. Anderson.

Synopsis

This paper profiles the faculty in schools of public health, particularly in environmental health.

There are approximately 1,650 faculty members in schools of public health; 300 of them are in environmental health.

The future demand for personnel in environmental health appears to be for generalists, as well as specialists in toxicology, epidemiology, environmental chemistry and biology, industrial hygiene, vector control, and institutional environments. These demands will require new and updated programs and additional faculty. While PhD scientists and engineers (the pool of potential new faculty) are increasingly being drawn to industry rather than academia, new personnel for faculty positions are expected to be available in the market.

IN 1980, NATIONAL GOALS were established to improve the health of the nation substantially by 1990. Two of the 15 priority areas targeted for action were the control of toxic materials and the improvement of occupational safety and health. Specific objectives were set to improve health status, reduce risk factors, increase public and professional awareness, improve services and protection, and improve surveillance and evaluation systems. One of the measures suggested to meet the stated objectives was to "educate health professionals . . . about toxicology, epidemiology, industrial hygiene, medical surveillance, control technology design, and hazardous substance control" (*1*).

Those who conducted the midcourse review of the 1990 Health Objectives for the Nation in 1985 found the toxic control priority area to be still in a "relatively embryonic stage of development," reflecting a "relatively new perspective on environmental hazards" and "very little in the way of baseline data" (*2*). Of the 20 stated objectives for toxic agents and radiation control, only 4 were on track for completion by 1990. There were no data available to assess the progress of the remaining 16 objectives. Similarly, in the occupational health priority area, only 8 of the 20 stated objectives had been achieved or were on track for completion by 1990.

Training and technology transfer in toxics management and occupational health are lagging substantially behind legislation in these two areas. It is imperative that those responsible for the control of the environment be knowledgeable, not only in the basics of environmental health, but in the substantive information related to their chosen field.

The purpose of this paper is to assess the environmental health faculty workforce in schools of public health who are, in part, responsible for training the manpower to meet current and future environmental needs.

Schools of Public Health

Schools of public health are professional schools educating individuals at the graduate level in methods of health promotion and disease prevention.

There are 24 schools of public health in the United States accredited by the Council on Education in Public Health; 8 are in private and 16 in public universities.

Students. The schools have an annual collective enrollment of approximately 9,000 students. Data from 1984 indicated that women students were in the majority (60 percent), with 13 percent of the total being foreign nationals and 16 percent members of minority groups. The median age was 30–31 years. Almost one-third of students were enrolled part time (*3*).

There was a rapid rise in student enrollment through the 1970s, with enrollment stabilized throughout the 1980s. Since the 1970s there has been a significant increase in women students and in the number of foreign students. The number of minority students grew between the mid-1970s and 1980, but it has been falling slightly since then. In 1976, the median age of the students was 27, and it has been rising. There is, therefore, a trend toward older, more experienced, employed students (*3*).

In the 1984–85 academic year, most public health students were enrolled in master's degree programs, with the master of public health (MPH) being the most popular degree. Twenty-one percent of all those enrolled were doctoral students, and 8 percent were in nondegree programs (*3*).

There are approximately 3,000 graduates of schools of public health annually. They are employed in Federal, State, and local health and environmental agencies for their expertise in health promotion and disease prevention. Graduates also work in industrial, private, and academic settings.

Programs. Graduate programs in schools of public health center on nine major specialties, supported by approximately 1,650 faculty. Specialty areas include biostatistics, epidemiology, health services administration, public health practice and program management, health education, environmental sciences, occupational health, nutrition, and biomedical and laboratory sciences (*3*).

In 1984, a total of 56 percent of the students were enrolled in three areas: health services administration (29 percent), epidemiology (14 percent), and environmental health sciences (13 percent). Students in occupational health represent approximately 3 percent of the total (*3*).

Collectively, environmental health and occupational health programs in schools of public health are subdivided into the following subspecialties: environmental science, environmental health, toxicology, radiological health, environmental chemistry, water quality, environmental health planning, occupational safety and health, industrial hygiene, occupational medicine, and aerospace medicine.

In 1984–85, 1,109 students were enrolled in environmental health and 218 in occupational health programs. There were 353 graduates of environmental health and 84, of occupational programs (*3*).

Public Health Faculty

All faculty. A profile of faculty in all public health disciplines was prepared in 1981 (*4*) for 21 schools of public health. At that time, there were 1,644 faculty members. About 75 percent of the faculty were men—a pattern that has not changed appreciably since 1974. The median age of all faculty was 44, with the largest group (21 percent) in the 35–39 years category. Most faculty were employed full time.

Titles held by faculty members in 1981 were primarily in teaching categories: professor (31 percent), associate professor (24 percent), assistant professor (28 percent), instructor (5 percent), and lecturer (6 percent). Research titles were held by considerably fewer faculty (6 percent). Since 1974, the proportion of faculty with teaching titles has been rising, and faculty with research titles is on the decline (*4*).

In 1981, approximately one-fourth of faculty members held joint appointments with other schools in the university, reflecting the interdisciplinary nature of public health (*4*).

Faculty activities in 1981 included teaching, research, consultation, and administration (*4*). Almost all faculty members (93 percent) taught, but the time they spent in teaching varied widely. Less than 1 percent of faculty were full-time teachers; 67 percent devoted less than half of their time to teaching. Most faculty (85 percent) also did research, but only 3 percent were full-time researchers. The majority (56 percent) spent 10–50 percent of their time in research activities. Sixty-five percent of faculty served as consultants, but most of this group spent less than one-third of their time in consultation. Some form of administration occupied 74 percent of faculty.

Faculty in environmental health. Data from the 1985–86 academic year for 302 faculty in environmental health and occupational health in 23 schools of public health show that the majority were employed full time; about half were tenured, and an-

Research Interests of Environmental Health Faculty

Aerosol physics	Indoor air pollution
Air pollution	Industrial hygiene
Aquatic and wetland ecology	Industrial worker physiology
Aquatic microbiology	Inhalation toxicology
Aquatic toxicology	Injury prevention surveillance
Arthropod vectors	Mathematical modeling
Bioaccumulation, bioconcentration	Molecular biology
Bioassays	Monitoring, instrumentation
Biodegradation	Occupational hazards
Cellular immunity	Occupational health
Chemical carcinogens	Photochemical air pollution
Chronic inflammation	Policy
Ecosystem analysis	Radiation control
Environmental chemistry	Radiological health
Environmental engineering	Radiotracers
Environmental management	Respiratory mechanics
Environmental microbiology	Risk assessment
Environmental neurobiology	Safety
Environmental physiology	Solid waste management
Environmental radiation	Systems analysis
Epidemiology	Toxicology
Fate of toxics	Vector control
Genetic toxicology	Vector habitats
Groundwater contamination	Virology
Hazardous waste	Volatile organics
Host-parasite interactions	Water quality in developing countries
	Water, wastewater treatment

other third were on tenure track; the percentages of men, professors, and associate professors were higher than for all public health faculty (*5*).

The percentage of joint appointments among environmental health faculty members (18 percent) was considerably lower than that for all public health faculty (27 percent). The crossover from other disciplines is apparent, however, when one considers that 60 percent of faculty members who work in environmental health were educated in other related fields. Similarly, environmental health faculty also contribute to other related fields within the schools of public health (*4*). It is interesting to note that at the graduate level, 75 percent of faculty educated in environmental health also specialize in environmental sciences (*4*).

The most prevalent terminal degree among environmental health faculty is the PhD, followed by the MD and ScD. Two percent of environmental health faculty hold the DrPH, while 6 percent hold the MPH or MS as a terminal degree. The remaining percent have master's degrees in business, engineering, the arts, and law.

Active participation in research and publication of data that contribute new information to the literature are recognized as measures of continuing faculty competence and productivity. A poll of 11 environmental health departments or programs shows a wide variety of research interests. The list (see box) indicates the spectrum of environmental concerns, including such emerging areas as toxicology, hazardous wastes, and risk assessment.

Respondents to the poll indicated that they would like to have federally sponsored continuing education workshops available to faculty, particularly in the emerging technical fields of hazardous wastes, environmental toxicology, risk analysis, and in the managerial fields, such as risk management, policy, and communications. Workshops would serve to update the technical capabilities of faculty members and add an extra dimension to the usual methods that faculty adopt for their continuing education, that is, attendance at conferences and sabbatical leave.

Supply-Demand Trends

The demand for environmental health professionals in the 1970s was largely influenced by legislative initiatives on the environment. Education of specialists in the various fields of environmental health took precedence over generalist education. Similarly, employment opportunities reflected the desire for specialists. From 1976 to 1983 employment for environmental specialists increased 75 percent compared with a 59 percent increase for all types of scientists other than engineers (*6*). This trend is expected to continue.

Specialists

Environmental specialists in greatest demand are projected to be toxicologists, epidemiologists, chemists, hydrologists, biologists, industrial environmentalists, vector control personnel, and environmentalists for institutions such as hospitals and nursing homes. Toxicologists and epidemiologists are projected to be in greatest demand in the future (*6*). The view is supported by the review of the nation's health goals for 1990 (*2*).

Generalists

There is renewed interest in the environmental generalist, particularly at the entry level in agen-

cies, industries, and institutions. Employers are requiring professionals who have a solid foundation in the core areas of environmental health and who are well versed in the field's emerging areas of exposure assessment, risk analysis, management, and communications (*7*). Such generalists can serve as a bridge to facilitate communication among specialists and between specialists and managers.

As the demand for the environmental professionals increases, so will the need for programs and faculty in colleges and universities. However, scientists and engineers versed in the environmental sciences, who are the pool of potential faculty, increasingly are being drawn to industry rather than academia (*8*). From 1981 to 1983, for example, employment of PhD scientists and engineers increased 7 percent annually, compared to a 2.4 percent increase in academia. Industry accounted for the employment of 24 percent of these specialists in 1973 and 32 percent in 1983 (*9*). Nevertheless, the results of the poll of 11 environmental health departments in schools of public health predicted that new personnel for faculty rolls in emerging fields of specialization will be readily available in the market. The poll projected an average of two new faculty per program over the next 5 years. The constraints identified in hiring were finances and space.

Implications of Supply and Demand

Faculty members in schools of public health clearly recognize that there are emerging fields in environmental health. They understand the importance of teaching programs to support these new areas. Teaching and research activities are the primary vehicles for developing new faculty, as well as environmental specialists for agencies and industries. There are significant constraints, however, in developing new teaching programs, primarily the lack of financial support.

Throughout the 1970s the need for Federal support for training programs was recognized. The Bureau of Health Professions in the Department of Health and Human Services was instrumental in the development of numerous programs for both generalist and specialist training in environmental health. Through the decade of the 80s, however, there has been a dearth of funding for training. With the reauthorization of the superfund legislation, traineeship funds are again available. The legislative mandate has been narrowly interpreted, however, and it will allow funding only for research training. This must be changed to support a broader spectrum of training activities, including degree programs, continuing education workshops, and delivery of courses at sites away from the university (such as industries, institutions, and agencies) to encourage participation of part-time students.

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