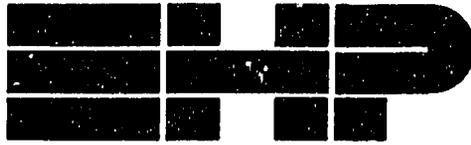


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ENVIRONMENTAL HEALTH PROJECT

ACTIVITY REPORT

No. 7

**TECHNICAL ASSISTANCE IN CURRICULUM
DEVELOPMENT FOR THE UNIVERSITY
OF MEDICINE AND PHARMACY
Cluj, Romania**

**Kathleen Rest, PhD, MPA
University of Massachusetts Medical Center**

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ABOUT THE AUTHOR

Kathleen M. Rest, PhD, MPA is an Assistant Professor in the Occupational Health Program of the Department of Family and Community Medicine at the University of Massachusetts Medical Center, where she teaches occupational and environmental health to medical students and residents in family practice and occupational medicine. She is also an Adjunct Assistant Professor at the University of Massachusetts School of Public Health and at the Medical College of Pennsylvania. Dr. Rest has over 15 years experience in occupational and environmental health education and research.

In the area of education, Dr. Rest has extensive experience in curriculum and faculty development in occupational and environmental health for medical students and primary care physicians, having directed one of the first federally-funded programs in this area. She is the recipient of a University of Massachusetts grant for innovation in medical education and is a founding member of the Boston-based Consortium for Environmental Education in Medicine (CEEM). She has worked with the U.S. Institute of Medicine on projects and reports relating to environmental health education for physicians and nurses.

Her research interests focus on policy issues in occupational and environmental health. She has authored or co-authored numerous articles and book chapters on such subjects as screening and surveillance of occupational illness, regulation and enforcement of workplace safety and health, ethics in occupational and environmental health, workers' compensation, and community right-to-know.

Dr. Rest has presented courses in several countries of Central and Eastern Europe and participated in international symposia on occupational and environmental health.

ACRONYMS

EHP	Environmental Health Project
E/O	environment(al)/occupation(al)
EOH	environmental and occupational health
EPA	environmental protection agency
GPs	general practitioners
IOM	Institute of Medicine, part of the U.S. National Academy of Sciences
MOE	Ministry of the Environment, Water and Forest
MOH	Ministry of Health
UMP-Cluj	University of Medicine and Pharmace-Cluj

EXECUTIVE SUMMARY

Introduction

The University of Medicine and Pharmacy in Cluj-Napoca, Romania, is in the process of establishing a new Department of Community Medicine and Family Practice with a focus on primary health care. This initiative provides a unique opportunity to examine existing curricula; adapt it for a primary care focus; develop new curricula; and experiment with new teaching methodologies. The university requested assistance from the U.S. Agency for International Development (USAID) and the USAID Mission turned to the Environmental Health Project for specific help with environmental and occupational health topics. The purpose of this activity was to provide technical assistance and curriculum consultation in these areas to the university and the new department.

There is widespread recognition that Romania faces severe environmental health hazards and problems. Physicians and other health care providers in Romania encounter individuals, families, and communities that experience (or are at risk of) environmentally related health problems and that have questions, concerns, or needs relating to these problems. It is not clear that physicians are adequately prepared to respond to these needs. Although environmental and occupational health are included in the curricula of medical schools in Romania, there is concern that the training has been overly technical and has failed to address public health, prevention, and primary care aspects of the field. There is also concern that in Romania, as elsewhere, environmentally related health problems are not seen as falling within the purview of community-based physicians.

The focus of this curriculum-based activity related primarily to environmental health;

occupational health was covered only briefly because events and complications at the University of Medicine and Pharmacy (UMP-Cluj) did not permit a detailed look at the latter during the visit.

Lessons from the General Practitioners

When assessing or developing medical school curriculum, it is useful to hear from practicing physicians. Only by understanding what is required *or desirable* in medical practice can one begin to identify the base of knowledge and skills that a course or practical experience should provide. Thus, I met with about 30 general practitioners (GPs) who work in dispensaries in Cluj to hear their views about their own roles in environmental and occupational health and to obtain their opinions about the training they received while in medical school. Some of the more informative points that emerged during the discussion were their perceptions that:

- GPs have little role in environmental and occupational health;
- Other groups are responsible for environmental and occupational health, such as hygiene specialists and the Sanitary Police;
- GPs do not understand how they can be involved in individual and community risk assessment in environmental health;
- Medical education had provided some information about risk factors in the community, but most courses were too theoretical;

- GPs in rural areas have more hygiene responsibilities than those who practice in the towns; and
- Physicians can do little to improve occupational and environmental conditions.

The physicians also indicated an interest in sharing their experiences with medical students and, perhaps, participating in teaching programs.

Existing Curriculum

In Cluj, hygiene (environmental health) is currently taught in the fourth year of medical school; it consists of 3 hours of course work and 3 hours of laboratory per week for 16 weeks, for a total of 48 hours of course work and 48 hours of laboratory. In the course, 30 hours are devoted to environmental hygiene and school hygiene and 18 hours to nutritional hygiene; in the laboratory section, 21 hours are devoted to nutritional hygiene and 27 hours to environmental hygiene and school hygiene.

The labs are taught in small groups.

Occupational health is not taught with environmental health (hygiene), but rather in a separate course and by a different department (the Department of Occupational Medicine) in the fifth year of medical school. It consists of 24 hours of class time and 24 hours of seminar.

There is recognition that the existing hygiene and occupational medicine curricula must be adapted and enhanced to make them more consistent with the mission of the new Department of Community Medicine and Family Practice. There is also concern that students (as well as physicians in practice) fail to appreciate the importance of environmental health and its link to the practical world of health care delivery.

The courses cover many important environmental health and occupational medicine topics. A key deficiency in the curriculum, however, is a failure to articulate the learning objectives or competencies that the courses seek to achieve in their students. The concept of developing competency-based learning objectives does not appear to be applied to curriculum design at the school. Because scientific knowledge in the areas of human health, disease, and the environment advances so rapidly, it will never be possible to teach students everything they will need to know. What is critical is the development of students' critical thinking, communication, and problem-solving skills and defining the competencies that students will be expected to achieve before they graduate.

The Institute of Medicine (IOM), which is part of the U.S. National Academy of Sciences, recently developed a series of competencies in environmental and occupational health for consideration by U.S. medical schools. These may provide a starting point for educators in Cluj.

Competency-Based Learning Objectives Developed by the IOM

1. Graduating medical students should understand the influence of the environment and environmental agents on human health based on knowledge of relevant epidemiologic, toxicologic, and exposure factors.
2. Graduating medical students should be able to recognize signs, symptoms, diseases, and sources of exposure relating to common environmental/occupational (E/O) agents and conditions.
3. Graduating medical students should be able to elicit an appropriately detailed environmental exposure history,

including a work history, from all patients.

4. Graduating medical students should be able to identify and access the informational, clinical, and other resources available to help address patient and community E/O health problems and concerns.
5. Graduating medical students should be able to discuss E/O risks with their patients (and others) and provide understandable information about risk-reduction strategies in ways that exhibit sensitivity to patients' health beliefs and concerns.
6. Graduating medical students should be able to understand the ethical and legal responsibilities of seeing patients with E/O health problems or concerns.

When designing curricula, it may also be useful to identify certain *themes* that should permeate the curriculum—not just in a particular course (such as hygiene) but in the medical school curriculum as a whole. For example, the medical school has already identified primary health care as an important theme. In the area of environmental and occupational health, themes could include: 1) the importance of eliciting the environmental history from patients and using the information to care for both individual patients and communities; 2) including environmental and occupational factors in the promotion of health and the differential diagnosis of disease; 3) primary, secondary, and tertiary prevention of environmental health problems in both individuals and communities; 4) communication skills (how to talk about environmental issues with patients, other physicians (including specialists), officials, and people with authority to make changes); and how to assess environmental risk, knowledge,

and attitudes in populations (of patients or communities).

Teaching Methods

Given resource constraints, the hygiene course (and perhaps most other parts of the curriculum) use traditional, lecture-based teaching methods. While these methods are efficient and appropriate in many cases, they are not optimal for helping students become active learners or for assisting in the development of their problem-solving skills. Given the size of the classes in Cluj (450 students), it may be difficult to implement some of the more innovative teaching methods. However, the structure of the existing hygiene course and labs does permit experimentation with different teaching methods, including case-based discussion and problem-solving exercises, simulated patients, use of community-based physicians as small group facilitators, role-playing, field visits, and use of audiovisuals to supplement or complement lectures.

Opportunities and Constraints

The UMP-Cluj has engaged in an exciting venture, and there are many opportunities to make changes and improvements in the curriculum. With its focus on primary health care and prevention, it is logical (and encouraging) that the new department is committed to making environmental and occupational health integral parts of its curriculum. Additionally, there is considerable enthusiasm and receptivity among the faculty for making changes to enhance the E/O curriculum.

There are, however, many factors that could hamper progress if not addressed. Organizationally, it is not clear that the key players in the new department understand or

have thought through the implications of coalescing as one department. Does it mean that separate departments, e.g., of hygiene, occupational medicine, and public health, will no longer exist, but rather will become units or divisions within the new department? Does it mean that some faculty will have appointments in more than one department? How will these changes affect the autonomy and authority of the department chairs? How will it impact desired changes in course curricula, which, for years, have been the sole responsibility of the professors who have designed and taught them? Department faculty will need to clarify these issues and coalesce around the proposed curricular change and learn to build upon and complement each other's strengths.

There is a need to develop collaborative working relationships among the key groups involved in environmental health, occupational health, and prevention, i.e., the Departments of Hygiene, Occupational Medicine, and the regional Hygiene Institute/Medical Center in Cluj. This will help the cohesiveness and continuity of the environmental and occupational health curriculum; provide educational opportunities for medical students, residents, and practitioners; and extend the ability of each group to fulfill its own functions and meet the needs of the populations they are supposed to serve.

A larger institutional constraint relates to the administrative/budgetary processes used by the Ministry of Education to "approve" curriculum at the medical school. By basing faculty salaries on the number of hours taught, it provides little incentive for faculty to suggest or to make changes which may result in the shifting of topics or hours from one area of the curriculum to another.

On a more practical level, there are other constraints. There is, for example, a tremendous lack of resources. It is difficult for faculty members to access the latest books and

journal articles in their fields. In the hygiene course, students do not have books. Audiovisual equipment and materials are lacking. Computers available for student use are limited, and laboratory equipment is rudimentary. Transportation for site visits or other field activities is a problem.

Faculty are not familiar with the concept of competency-based learning objectives, and they have not had experience with many of the new teaching methods. Thus, there is a need for training and faculty development in curriculum design and instructional methodology. Faculty would benefit from opportunities to observe how curriculum is designed and how courses are taught in other countries.

Conclusions and Recommendations

This report makes both specific and general suggestions regarding the environmental and occupational health curriculum, the most important of which relate to: 1) the need for competency-based learning objectives that reflect an understanding of the roles that most graduating medical students will assume; 2) the need to focus on *health* and to make the courses practical and relevant (for example, by focusing on the particular environmental health problems and conditions in Romania); 3) the need to develop problem-solving skills and a sense of empowerment in the students; 4) the need to introduce new teaching methods that will be more student-centered and participatory; and 5) the need to integrate environmental and occupational health into other areas of the curriculum.

The report emphasizes the need for new resources, including ongoing faculty development, training, equipment, teaching materials, etc. It notes that faculty should be rewarded (and not penalized) for making changes and trying new things. It suggests that

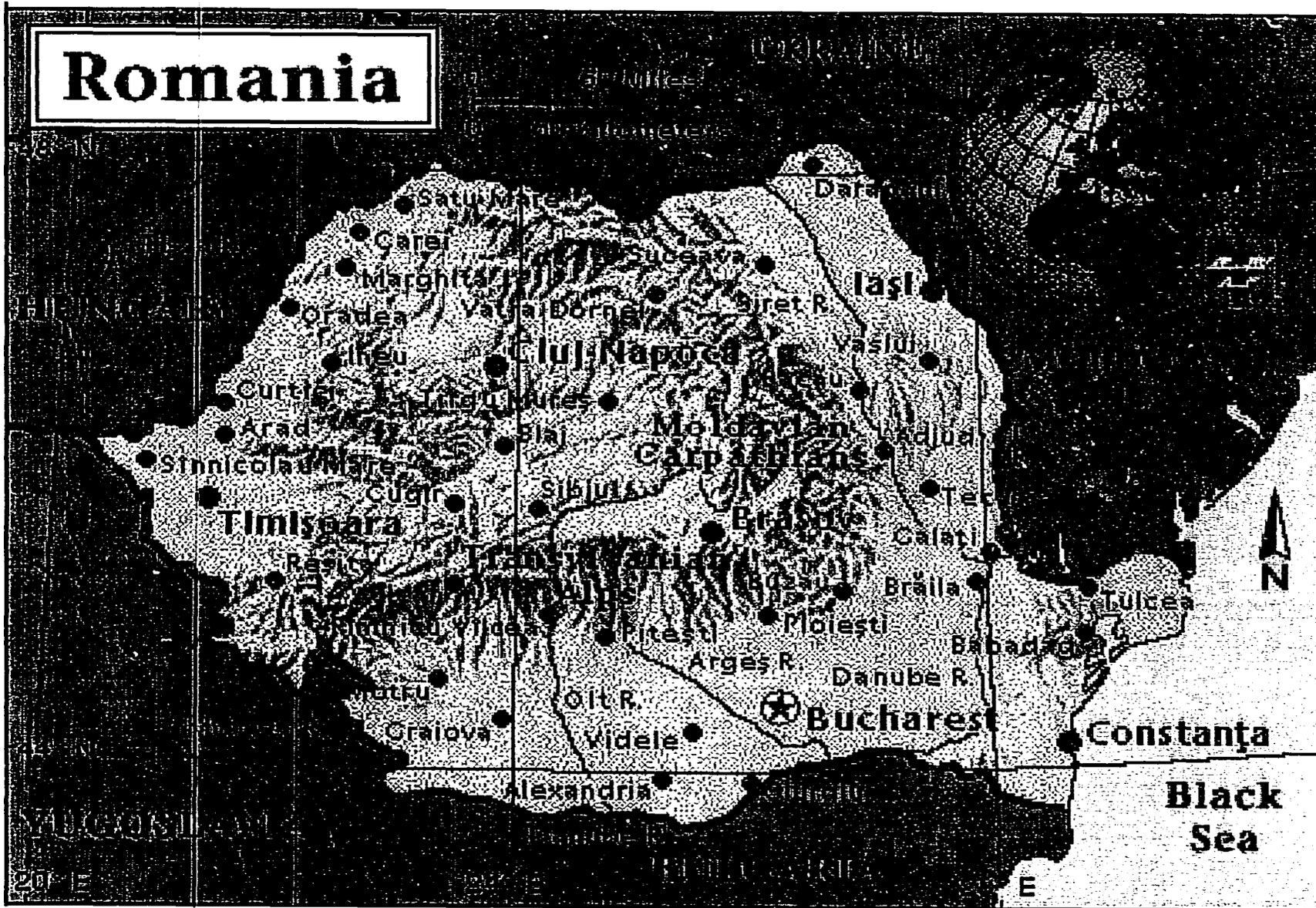
collaboration among groups working towards similar goals be established and nurtured.

At some point, it will be important for the university and the new department to review the entire six-year medical school curriculum in order to assess if and how elements of environmental and occupational health (EOH) are taught. This will help the department identify: 1) the most appropriate loci for introducing different elements of EOH into the curriculum; 2) opportunities for enhancing or reinforcing important areas of knowledge and skill in EOH throughout the curriculum; 3) colleagues and role models who could or would support the infusion of an EOH focus throughout the curriculum; and 4) ideas and strategies for teaching EOH in both basic science and clinical settings.

The Department of Community Medicine and Family Practice and its faculty who teach EOH will need to reach out to faculty in other disciplines. Unless these non-EOH faculty appreciate the relevance of E/O factors in health and disease (and see how it relates to their own disciplines or areas of practice), they may hamper efforts to make EOH important in the curriculum by ignoring, denigrating, or otherwise dismissing it as someone else's problem.

Lastly, there are opportunities to link this curriculum development work with other USAID/EHP activities—especially in the area of continuing education and training for physicians who practice in the community.

Romania



1 INTRODUCTION

1.1 Purpose and Scope of Consultation

The University of Medicine and Pharmacy in Cluj-Napoca, Romania, is in the process of establishing a new Department of Community Medicine and Family Practice with a focus on primary health care. The department will be the first of its kind in Romania and one of the first in Central and Eastern Europe. The new department will provide courses and educational opportunities throughout the six-year medical school curriculum. As shown in Appendix 1, for the 1995-96 academic year, these will include courses in biostatistics and medical informatics, basic epidemiology, environmental health, occupational epidemiology, family medicine, and public health/management. In later years, the department will also develop courses in health education, health promotion, and behavior as well as training in epidemiology and survey methods for selected communicable and chronic diseases. The department also plans to enhance the practical summer training activity to include a focus on primary health care, prevention, and hygiene. The university requested assistance from USAID to develop the new curriculum. USAID chose EHP to offer assistance in curriculum development in environmental and occupational health. (The scope of work is included as Appendix 2.)

This new initiative provides a unique opportunity to examine existing curricula; adapt them for a primary care focus; develop new curricula; and experiment with new teaching methodologies. The purpose of this project was to provide technical assistance and

curriculum consultation in the area of environmental and occupational health to the university and, particularly, to the new department. A revised curriculum for the new department must be submitted to the Ministry of Education in April 1995.

The scope of work included the following tasks:

1. Gather background information and clarify the university's expectations for the consultation;
2. Collect examples of environmental and occupational health curricula used in North America, Western Europe, and elsewhere, including training and educational materials developed by government agencies and other organizations.
3. Participate in a Team Planning Meeting at EHP prior to departure.
4. Provide on-site technical assistance in the development of curricula in environmental and occupational health to the University of Medicine and Pharmacy in Cluj (UMP-Cluj); and
5. Provide an Activity Report to EHP which discusses results and findings of the field work and addresses the feasibility of transferring this type of technical assistance to other medical schools in Romania and Central Europe.

1.2. Project Context

1.2.1 The Need for Environmental Health Education in Medical Schools

There is widespread recognition that Romania faces severe environmental health hazards and problems. Pollution of air, water, food, and soil pose significant risks to the health, safety, and well-being of Romanian citizens, as do the occupational hazards found within the country's industrial, agricultural, and other economic sectors (World Bank 1992; Hertzman 1992). These occupational and environmental hazards have been associated with both acute and chronic health effects, and they exert differential impacts on the populations at risk, which include children, pregnant women, workers, elders, persons with existing health problems, and citizens living in or near "hot spots" of environmental degradation. Physicians and other health care providers in Romania encounter individuals, families, and communities that experience (or are at risk of) environmentally related health problems and that have questions, concerns, or needs relating to these problems. Physicians are also needed to give voice to community and workplace health concerns in discussions, debates, and decisions at the local, regional, and even national levels.

It is not clear that physicians are adequately prepared to respond to these needs. Although environmental and occupational health are included in the curricula of medical schools in Romania, there is concern that the training has been overly technical and has failed to address public health, prevention, and primary care aspects of the field. There is also concern that in Romania, as elsewhere, environmentally related health problems are not seen as falling within the purview of community-based physicians. Rather, they are seen as the responsibility of some other group, such as

regional hygiene research institutes or the regional Sanitary Police.

For these reasons, the Department of Community Medicine and Family Practice requested technical assistance to help review their existing environmental and occupational health curricula and to develop new curricula in these areas.

1.2.2 Related Activities/Projects

This consultation fits nicely within the framework of another USAID activity in Romania, which focuses primarily on environmental protection and the promotion of health. The EHP activity in Zlatna addresses environmental and workplace health problems in the vicinity of the Ampellum copper smelter. The project, developed in part as a model for addressing environmental health problems in other areas of the country, focuses on the reduction of lead exposure in young children, air quality monitoring and control, and worker health and safety training. It necessarily has involved practicing physicians—both specialists (e.g., pediatricians) and generalists—who provide health services to the smelter workers and the residents of Zlatna and who will be involved in the screening and education activities developed through the project. This collaboration has already revealed the need for physician training and education in environmental health, and the project will address these needs through training workshops specifically focused on lead.

There are several areas of linkage between the Zlatna activity and this curriculum development activity. The first relates to the natural continuum of physician education, which begins at the medical school level, progresses through residency training, and ideally continues throughout the physician's professional life. The curriculum development activity tackles the initial part of this

continuum—medical school education—which seeks to provide an adequate foundation for the future practice of medicine. The second area of linkage relates to the need for continuing education to enhance the environmental health knowledge and skills of *practicing* physicians. The Zlatna activity is an ideal vehicle for introducing continuing education in the area of environmental and occupational health.

These linkages could be made concrete. For example, the problems and interventions used in Zlatna could serve as the basis for curriculum development and the design of educational projects, activities, and/or exercises for medical students (and residents). The same educational materials/programs could also be used for continuing medical education. Additionally, faculty at the UMP-Cluj (e.g., in the Departments of Hygiene, Occupational Medicine, and Epidemiology) have expertise that could be tapped for continuing education programs and activities. Other expertise is available through the Center for Medical Research, Health Services, and Management (formerly called the Institute of Hygiene and Public Health and then later the Institute of Public Health and Medical Research), also located in Cluj (and described further below).

Finally, it is important to mention another potentially important linkage for both the Zlatna work and the curriculum activity: that is, a Primary Health Care Project funded by World Vision Relief and Development, Inc. The first phase of the project (now completed) trained health personnel and community leaders in the principles of primary health care and prevention. (One of these trainees was the chairman of the new Department of Community Medicine and Family Practice.) A second phase of the project, which is seeking matching funds from USAID, will focus on the development of primary health care curriculum and practicum sites for the UMP-Cluj; the integration of primary health

care into residency training programs; faculty development; and continuing education for community physicians (general practitioners). Because the focus of the primary health care curriculum will be the preventive approach to meeting community health needs, the areas of environmental and occupational health will be important components.

1.3 Methods

In preparation for the field visit, samples of curricula and educational materials were collected from a variety of sources, including U.S. medical schools, government agencies, professional and other health organizations, and the published literature. These materials were organized by subject area, brought to Romania, and delivered as resource materials to appropriate members of the faculty. A list of the material collected and delivered is shown in Appendix 3.

During the visit, meetings were held with a variety of people to obtain information about the existing curriculum and to begin an assessment of future needs in the area of environmental health for physicians. Meetings were held with 1) key faculty members who will form the basis of the new department—specifically the chairman of the Department of Community Medicine and Family Practice (who is also a professor of epidemiology) and the professor and head of the Hygiene Department; 2) teaching and laboratory assistants from the Department of Hygiene; 3) general practitioners from Cluj dispensaries; 4) the dean of the Faculty of Medicine; 5) physicians involved in health education at the Sanitary Police in Alba Iulia; 6) the director of the World Vision office in Cluj; and 7) the director of the Institute of Hygiene, now called the Center for Medical Research, Health Services, and Management, and members of his staff.

In addition to meetings and personal interviews, existing curricula from the Departments of Hygiene and Occupational Medicine were translated and reviewed. These are discussed below.

Although the consultation was originally designed to focus on both environmental and occupational health, events and complications at the University of Medicine did not permit a detailed look at the latter during this visit. This is discussed further below.

At the conclusion of my visit, I prepared a report on a potential environmental health curriculum and gave it to the chairman of the Department of Community Medicine and Family Practice. I also prepared preliminary suggestions for a curriculum in occupational health. These reports are included as Appendixes 4 and 5. Some of the information from these reports has been abstracted and included in the main body of this field report. In some sections of this report, however, the reader is asked to refer to these appendixes.

2 BACKGROUND

2.1 Medical Education in Romania

Medical education in Romania follows the European system, in which students attend medical school for six years post high school. The basic curriculum is shown in Appendix 5. The six-year undergraduate program is overseen by the Ministry of Education; residency or postgraduate programs are within the purview of the Ministry of Health (MOH). Admission to medical school and placement in residency programs are based on competitive examinations. The number of residency positions is defined by the MOH. Medical school graduates who do not enter residency programs become general practitioners. To date, their locus of practice is designated by the MOH, which is also responsible for paying them.

Medical school faculty are paid by the Ministry of Education; in the nonclinical courses, salaries are based on the number of hours the faculty member teaches. This has important implications for curricular reform. The system provides little incentive for faculty to suggest or to make changes that may result in a shift of hours from one area of the curriculum to another.

2.2 The University of Medicine and Pharmacy in Cluj

The University of Medicine and Pharmacy in Cluj, founded in 1872, is one of several medical schools in Romania. It is considered to be one of the more progressive schools in the country, at the forefront of curricular change. The large

number of students in its entering class—approximately 450—has important implications for teaching methodologies.

The university has residency training programs in both environmental hygiene and occupational medicine. These postgraduate programs can also lead to a PhD in the discipline. Residents in hygiene do their research and practical work in the Center for Medical Research, Health Services, and Management, which at this time has limited interaction with the medical school (or its Department of Hygiene). Both are located in the same building on the medical school campus. This lack of collaboration has created tension, which is amplified by a requirement that PhD candidates in hygiene who may do their research at the Center must have the Professor of Hygiene on their dissertation committees. In other areas of the country, the relationship between the medical school hygiene departments and the regional research institutes are more collaborative than in Cluj. This is discussed further below.

2.3 Some Information on Relationships and Roles in Environmental Health in Cluj

The scope of work for this consultation did not include an institutional assessment of roles, responsibilities, and relationships in environmental health in Romania. However, in the course of this field work, some of this information emerged, and may be important for future EHP activities.

2.3.1 The Center for Medical Research, Health Services, and Management

The Center for Medical Research, Health Services, and Management—formerly the Institute of Hygiene and Public Health and also formerly the Institute of Public Health and Medical Research—is one of five regional centers of MOH's Institute of Hygiene, Public Health, Health Services, and Management/Bucharest. The regional centers are coordinated by MOH's Department of Preventive Medicine. Only three of the five regional centers are involved in the coordination of occupational and environmental health activities within their regions; Cluj is one of these centers. There are ten counties (judets) within the Cluj Center's region; one of these is Alba Iulia, of which Zlatna is a part. The Center does research and provides technical assistance to the Sanitary Directorate and Sanitary Police. The latter entities are responsible for inspection and enforcement of standards; they also have a role in education and technical assistance to communities and employers.

The Cluj Center has a number of "departments": Hygiene (which covers environmental health, school hygiene, food and nutrition hygiene, and radiation); Occupational Health; Public Health, Health Services, and Management; Epidemiology and Communicable Diseases; and a "clinical department" which coordinates research done in the university hospitals (with the exception of cancer research and cardiovascular research, which are performed in the Institute of Oncology and the Institute of Cardiovascular Disease, respectively). Except for this clinical research, the research done by the regional institutes is preventive in nature.

The Center performs or coordinates all of the research within the National Research Program, except as noted above. In Romania, if

a physician wants to do research, he or she works at a research institute. Most physicians delivering care, even specialty care, do not do research. If, for example, a physician wants to do both clinical medicine and research in a subject area, he or she will do so through the research institute.

In addition to research, the Center coordinates environmental health, occupational health, and public health in its ten counties. It also provides technical assistance to the Sanitary Police (part of the MOH) and reviews and approves their annual plans.

The area of workplace safety (as opposed to health) is coordinated by the Ministry of Labor and Social Welfare, not the MOH. Prior to 1990, these safety inspectors were supervised by the leaders of the plants, which obviously did not work well.

The Center and the MOH work with the local environmental protection agencies (EPA) and the national Ministry of the Environment, Water, and Forest (MOE). Since the MOE is new—only established after 1990—it does not yet have the expertise to fully perform some of its functions, such as environmental impact assessments. The MOH and its regional centers continue to help with these types of activities.

2.3.2 Departments at the Medical School

At the UMP-Cluj, there are several academic departments that work in areas addressed by the regional Center in Cluj. Of interest here are the Department of Hygiene and the Department of Occupational Medicine discussed above. The building which now houses both the Center and the Medical School Department of Hygiene originally belonged to the MOH and its regional Center. Some time ago, the Center director "donated" the building

to the medical school. Now, both groups occupy the building, and the Center pays rent to the medical school.

There is virtually no collaboration between the medical school Department of Hygiene and the Center at this time. Researchers in the Center do not participate in medical education nor does the professor of hygiene participate in the research activities of the center. Both the Center director and the professor of hygiene agree that this is detrimental to their common mission of protecting and promoting public health.

The Department of Occupational Medicine is located in the Occupational Disease Clinic. The Clinic was built by the Ministry of Industry, which may still have oversight of its activities. The clinic has contracts with different plants, including the Ampellum plant in Zlatna. The department is clinical in nature, with an internal medicine focus; it is not involved in workplace hygiene, hazard identification, or prevention in either its educational or clinical activities. It is not clear if it has any relationship with the regional Center.

For reasons discussed further below, it was not possible to gather much information about the Department of Occupational Medicine and its relationship with other entities. In brief, at the time of this consultation, the Department of Occupational Medicine was not willing to collaborate with the new Department of Community Medicine and Family Practice in its curriculum development plans. Thus, I did not interview occupational medicine faculty, nor did I have the opportunity to assess the curriculum in any detail. It seemed clear, however, that there was little, if any, interaction between the Departments of Hygiene and Occupational Medicine on issues and programs relating to curriculum and medical education.

2.3.3 Community-Based Physicians' Views of Environmental Health

During the course of this consultation, I met with about 30 general practitioners who work in dispensaries in Cluj. The purpose of the evening meeting was to learn about their roles in environmental and occupational health and to obtain their opinions about the training they received in these areas in medical school. Although they were a quiet group (suggesting to me that they have seldom been asked for their opinions), several important points emerged in the discussion.

- They see little role for GPs in environmental and occupational health, especially in the future, when new laws will allow physicians to choose their own specialty area of practice. They suggested that environmental and occupational health are the responsibility of hygiene specialists and the Sanitary Police. The role of the primary care physician is seen as minimal at best.
- They had little appreciation of how GPs might be involved in individual and community risk assessment in environmental health. The idea of the occupational and environmental health history as a tool for beginning the risk assessment process was essentially foreign to them.
- They noted that their medical education had provided some information about risk factors in the community. The most practical training occurred in their occupational disease course work. They found the hygiene course as well as other areas of the curriculum too theoretical and would prefer more practical instruction. They could not suggest what this more practical instruction would look like, although they expressed a need for "more modern teaching methods."

- They noted that GPs in rural areas have more environmental health responsibilities than those who practice in the towns, and that they must be prepared to know more and do more. Because physicians do not really know where they will practice, all students need a basic level of hygiene knowledge.
- They indicated that they know who or what agencies to call for help with environmental problems (i.e., the Sanitary Police and the regional Center), but they learned this on the job, not in school.
- Many of their comments reflected a sense of powerlessness. They said that physicians could do little if anything to improve occupational and environmental conditions. They saw this as a matter of economics, with the power brokers being industry and the government. They suggested that patients may be reluctant to bring anything to the attention of the Sanitary Police for fear of job loss.
- When asked if they had an interest in sharing their experiences with medical students and, perhaps, participating in teaching programs, they responded positively, noting that their practical experience with patients and communities would be valuable to students.
- Their only specific suggestion for medical education was the need for courses and training in communication skills. They especially noted a need to learn how to talk about difficult and emotional topics with patients.
- There was considerable interest in how health care delivery and financing are organized in the United States.

The information gleaned from all these discussions and meetings suggested a variety of educational needs as well as important opportunities and barriers for institutional collaboration. The following sections of this report return to the main focus of the consultation—the medical school curriculum.

3 EXISTING CURRICULUM

3.1 Description of the Hygiene Curriculum

Hygiene is currently taught in the fourth year of medical school and consists of 96 hours distributed as follows: 3 hours of course work and 3 hours of laboratory per week for one semester (16 weeks). This comes to 48 hours of course work and 48 hours of laboratory for a total of 96 required hours in environmental health/hygiene in Year 4. Because each entering class at the UMP-Cluj is large (approximately 450 students), the class is divided into 6 series of 70-80 students each. The hygiene course and laboratory are taught to 3 series of students per semester. The course is taught to the entire series (70-80 students) and the labs are taught in small groups (15-20 students). The professor of hygiene teaches the course (with assistance from one lecturer); the laboratories are taught by 5 or 6 assistants (all of whom have completed medical school and some of whom are studying for their PhDs).

In the course, 30 hours are devoted to environmental hygiene and school hygiene and 18 hours to nutritional hygiene; in the laboratory section, 21 hours are devoted to nutritional hygiene and 27 hours to environmental hygiene and school hygiene. The topics covered in the existing curriculum are shown in Appendix 7.

3.2 Assessment of the Hygiene Curriculum

The environmental hygiene course has secured a significant amount of curricular time (96

hours). By U.S. standards, where faculty must fight for even 6 to 8 hours of time for this topic, this is almost unbelievable. It becomes more understandable when one recognizes that the course has been designed to cover many aspects of public health not traditionally considered part of environmental health in U.S. medical schools (e.g., school hygiene, nutritional hygiene), and that it covers basic principles of sanitation. In trying to enhance the existing curriculum, it is important to preserve its public health and prevention orientation and avoid revising it down to the inadequate common denominator of U.S. medical school experience.

Like other aspects of the curriculum at the Cluj medical school, the environmental hygiene course is described in terms of topics that are covered in lecture and/or laboratory (as shown in Appendix 7). Many of these topics are appropriate for a course in environmental health. A key deficiency, however, is a failure to articulate the learning objectives or competencies that the course seeks to achieve in its students. The concept of developing competency-based learning objectives does not appear to be applied to curriculum design at the school. As described further below, such learning objectives should be based, in part, on what students will need to know or (should) be able to do upon entering practice.

The existing curriculum was not designed to focus on primary health care principles, and thus, there is recognition that it must be adapted and enhanced to make it more consistent with the mission of the new Department of Community Medicine and

Family Practice. Moreover, within the Department of Hygiene, there is concern that students (as well as physicians in practice) fail to appreciate the importance of environmental health and its link to the practical world of health care delivery. The Hygiene Department is interested in exploring ways to make the course and the labs more practical.

Indeed, it appears that there is a fair amount of theoretical information provided and that, at least in the past, some of the laboratory experiments and demonstrations have been somewhat removed from the practice of many physicians. However, there seems to be a desire to move away from requiring students to perform chemical determinations and analyses in the lab and to focus more on practical aspects of hygiene, such as interpreting and using the results of such testing. It is, however, important to note that while most graduating physicians will not have to perform such testing in their practice, physicians who work in rural areas will have some of this responsibility. This means that some technical aspects of the lab, such as determining water potability and water disinfection, may need to be retained. There also appears to be an interest in experimenting with new ways of teaching in the lab. The structure of the course is ideal in that it already provides a format for small group teaching.

The course covers many important environmental health topics. Others do not appear to be covered. But, as discussed in Appendix 4 in the section on proposals for a new curriculum, it is neither possible nor desirable to cover every topic in environmental health. What is most important is to define *competencies* for graduating medical students; this means defining what they should know and be able to do in the area of environmental health when they graduate and go into practice. Only by understanding what is required or *desirable* in the practice of medicine can one begin to identify the base of

knowledge and skills that a course or practical experience should provide. Because scientific knowledge in the areas of human health, disease, and the environment advances so rapidly, it will never be possible to teach students everything they need to know. What is critical is the development of students' critical thinking and problem-solving abilities. It is useless for students to memorize facts or learn techniques that will be quickly outmoded. More important is their ability to think, communicate, identify and locate the resources they need, and take the appropriate action to begin to solve problems.

Those teaching environmental health and other aspects of public health and preventive medicine at UMP-Cluj share a common problem with their colleagues elsewhere. There is a critical need to reinforce (and certainly not denigrate) the principles of environmental health, hygiene, and prevention in other courses and practical experiences that the students have. Thus, it is important to assess if and how *any* aspects of environmental health are taught in other areas of the curriculum in order to identify opportunities to introduce, enhance, or reinforce important areas of knowledge and skill. This is discussed further under the recommendations section.

An area of environmental health of particular importance to the primary health care initiative relates to the ability of general physicians to routinely obtain information from their patients about their community, home, and workplace environments. This skill of incorporating environmental and occupational health information into the physician's history-taking practice is essential; it should be introduced in the third year Semiology course and reinforced by the clinical faculty in such areas as pediatrics, general internal medicine, obstetrics/gynecology, etc., as well as in the hygiene and occupational medicine courses.

This "integration" approach is difficult to implement but will ultimately be of great benefit to the students. It will help them develop an understanding that the environment and hygiene are not separate areas of medicine and someone else's concern, but rather that environment and hygiene pervade all areas of medical practice because they affect the health and well-being of all age groups. Most U.S. medical schools rely solely on this approach because they do not have separate courses in environmental health.

It is also important to note that, unlike environmental health courses and curriculum in the United States, the existing curriculum in the Department of Hygiene includes sections on nutritional hygiene and school hygiene, the latter of which includes a small amount of time devoted to understanding the somatic and functional development of children. In the United States, these topics are not traditionally considered part of environmental health; if and when these topics are taught, they occur in other parts of the curriculum. I note this here because I am not expert in developing curriculum in these areas. These topics are certainly of central importance to medical education, and there are opportunities to link them to the other aspects of the hygiene course. For example, environmental health can be linked to discussions of child development and nutrition through consideration of lead exposure and blood lead levels in children. This kind of continuity is important because without it, students are unable to appreciate how all the topics fit together to form a coherent picture.

3.3 Overview of the Occupational Medicine Curriculum

As discussed earlier, my field activities focused primarily on environmental health. I was not able to meet with the professor of occupational medicine, nor did I discuss the topic of

occupational health in any detail with others. I did, however, obtain some information about the course, and I was able to review the curriculum as described on paper.

Occupational health is not taught with environmental health (hygiene), but rather in a separate course and by a different department (the Department of Occupational Medicine) in the fourth year of medical school. It consists of 24 hours of class time and 24 hours of seminar.

It is my understanding that, in the 1970s, there were two distinct specialties: occupational health/hygiene and occupational diseases (the former focused on prevention and the latter on clinical medicine). Occupational health was taught in Year 4 and occupational disease in Year 5. In 1973-74, these two specialties merged under the name of occupational medicine, which is what it is called today. The existing curriculum, however, focuses primarily on the diagnosis and treatment of occupational disease; there is little, if any, hygiene or prevention included.

The curriculum, as described on paper and shown in Appendix 8, appears to cover quite a number of occupational diseases. It also appears to introduce students to the important skill of taking an occupational history, and it discusses criteria for determining the work-relatedness of disease. On paper, it is not clear if the course provides students with an understanding of the industrial profile of Romania, the most important occupational hazards in Romania, and the populations at risk. Again, competency-based learning objectives are not defined.

It is unfortunate that the two courses (occupational medicine and hygiene) are not more closely linked. While there are significant areas where the specialties differ, there is a considerable amount of overlap in the basic knowledge and skills that underlie the two disciplines. In the United States, these two

disciplines are most often taught together in one course. This is not necessarily the best way, but there is great potential for interaction, mutual reinforcement, and, perhaps, common classes or practical experiences. This

opportunity may exist within the new Department of Community Medicine and Family Practice, and I encourage pursuit of this type of collaboration.

4 IDEAS FOR NEW CURRICULUM

The most immediate task in this consultation was to provide the chairman of the Department of Community Medicine and Family Practice with suggestions, advice, and technical assistance regarding the hygiene curriculum itself. He requested this in the form of a written report to be prepared and delivered to him at the completion of the field visit. Despite the constraints regarding my ability to assess the occupational medicine curriculum, he also requested some preliminary ideas on this as well. These reports are included as Appendixes 3 and 4. They provide suggestions in the following areas: 1) competency-based learning objectives; 2) themes that might be carried throughout the six-year medical school curriculum; 3) specific topics that might be covered in the hygiene and occupational medicine courses; 4) teaching methods; and 5) barriers to and opportunities

for change. To avoid repeating all this here, I refer the reader to the appendixes.

To summarize, however, the reports made both specific and general suggestions, the most important of which relate to: 1) the need for competency-based learning objectives that reflect an understanding of the roles that most graduating medical students will assume; 2) the need to focus on health and to make the courses practical and relevant (for example, by focusing on the particular environmental health problems and conditions in Romania); 3) the need to develop problem-solving skills and a sense of empowerment in the students; 4) the need to introduce new teaching methods that will be more student-centered and participatory; and 5) the need to integrate environmental and occupational health into other areas of the curriculum.

5 BARRIERS TO AND OPPORTUNITIES FOR CURRICULAR CHANGE

The establishment of a new Department of Community Medicine and Family Practice provides a unique opportunity to examine, modify, and further enhance the preventive medicine, public health, and primary health care curricula in the medical school, including the hygiene and occupational health curricula. It also presents an opportunity to examine other parts of the medical school curriculum so that the courses, seminars, and practical experiences designed for the new department enhance, complement, reinforce, and are not redundant with other parts of the curriculum. The new department is fortunate to have the strong support of the dean and the persistent energy of a committed department chairman.

The goals of the new department appear consistent with changes that are happening elsewhere, in Romania and abroad, such as a focus on primary care and prevention and a need to be responsive to the health care needs of communities. The goals also address some of the needs articulated or suggested by the GPs who attended the meeting described earlier. The new department is well-placed to address the continuum of educational needs of the physician community—students, residents, and physicians in practice—in many areas, including environmental and occupational health.

Many of the specific suggestions made to the department in terms of both curricular content and teaching methods (see Appendixes 3 and 4) could be implemented within the framework of the existing courses. In the hygiene course, for example, many of the topics suggested in my report are already included in the curriculum, and the course is structured to

allow for small group activities. The faculty and teaching assistants recognize a need to make changes, and they are receptive to new ideas about teaching methods and approaches. In fact, some of the suggested methods (e.g., field visits) have been used in the past.

There are, however, certain constraints that may hamper the process of curriculum development and enhancement. Organizationally, it is not clear that the key players in the new department understand or have thought through the implications of coalescing as one department. Does it mean that separate departments, e.g., of hygiene, occupational medicine, and public health, will no longer exist, but rather will become units or divisions within the new department? Does it mean that some faculty will have appointments in more than one department? How will these changes affect the autonomy and authority of the department chairs? How will it impact desired changes in course curricula which, for years, have been the sole responsibility of the professors who have designed and taught them?

An additional constraint relates to working relationships. There is little, if any, collaboration to date between the key groups involved in environmental health, occupational health, and prevention, i.e., the Departments of Hygiene, Occupational Medicine, and the regional Medical Center. Collaborative working relationships could enhance the cohesiveness and continuity of the environmental and occupational health curriculum and provide educational opportunities for medical students, residents, and practitioners who need to learn what these groups do and how they can help with

environmental health problems. Moreover, such collaboration would likely benefit the members of each group and extend their ability to meet the needs of the populations they are supposed to serve.

A larger institutional constraint relates to the administrative/budgetary processes currently used by the Ministry of Education to "approve" curriculum at the medical school. Although the ministry does not actually design curriculum, it does determine faculty salaries, using the number of hours taught as its basis. Thus, there is little incentive for faculty to suggest or to make changes which may result in the shifting of topics or hours from one area of the curriculum to another.

On a more practical level, there are many other constraints. There is, for example, a tremendous lack of resources. It is difficult for the faculty to access the latest books and journal articles in their fields. In the hygiene course, students do not have books. Audiovisual equipment and materials are lacking. (It was suggested that, with a video camera, the hygiene department could actually videotape certain contaminated sites, sub-standard workplaces, or other situations in

Romania, and use the videotape to bring a sense of immediacy and relevance to its teaching.) Computers available for student use are limited, and laboratory equipment is rudimentary. Transportation for site visits or other field activities is a problem.

Faculty are not familiar with the concept of competency-based learning objectives, and they have not had experience with many of the new teaching methods, such as small group teaching, problem-based learning, role playing, and case study development. Thus, there is a need for training and faculty development in curriculum design and instructional methodology. Faculty would benefit from opportunities to observe how curriculum is designed and how courses are taught in other countries.

It was suggested that initially students may not be prepared to learn in new ways. Faculty will need to learn how to help students think and engage in active problem-solving. Others suggested that physicians lack power and influence. Faculty must help students overcome this sense of powerlessness and become more engaged in the protection and promotion of patient and community health.

6

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The University of Medicine and Pharmacy in Cluj has engaged in an exciting venture, and there are many opportunities to make changes and improvements in the curriculum. With its focus on primary health care and prevention, it is logical (and encouraging) that the new department is committed to making environmental and occupational health integral parts of its curriculum. This does not happen everywhere, and the university faculty should be commended. The component of family practice will be an important link among all the disciplines in the department. It is an ideal vehicle for illustrating and reinforcing the principles learned in epidemiology, public health, environmental health, occupational health, etc. This can be done in the classroom and in practical, clinical settings.

I was encouraged by the enthusiasm and receptivity of everyone I talked to, but it is important to remember that change takes time. It is difficult for both students and faculty to change the way they do things. New resources will be needed—training, equipment, teaching materials, etc. Faculty should be rewarded (and not penalized) for making changes and trying new approaches. Collaboration among groups working toward similar goals must be established and nurtured.

Specific recommendations about the curriculum and teaching methodologies are found in Appendixes 3 and 4; they are not repeated here except to say that resources and ongoing assistance are needed. Other areas in need of attention are clear from the discussion about constraints and opportunities included above. The few additional recommendations

that follow are broader and more general in nature.

Timing of and advance information for similar consultations in the future are important factors to consider. There were important reasons for the timeline and schedule of this field visit, mainly the university's need to prepare and present a curriculum proposal to the Ministry of Education by April 1. The visit was difficult, however, for several reasons. First, it occurred during the examination period, which limited the amount of time faculty (and students) could spend with me. Second, there was little advance information available to me about working relationships, hierarchy, institutional arrangements, agendas, interests, and expectations. This made inquiry difficult, somewhat inefficient, and, at times, tense. The entire process probably should have begun much earlier. The faculty will have little time to digest and consider any suggestions because of the April 1 deadline. Because the curriculum assessment and modification process occurs over time, one visit or consultation is not enough. There will be an ongoing need for technical assistance, which should address faculty development as well as curriculum design. Finally, it may be more efficient to involve more than one person in such projects in the future. Different people bring different skills to such a project, and the outcomes may be more creative.

As the UMP-Cluj and other medical schools in Central and Eastern Europe begin to examine and perhaps modify their curricula, it will be important and useful to collect information from practicing physicians about

their roles (and perceptions of their roles) in environmental and occupational health (EOH). Such data will inform efforts to address environmental and occupational health in medical education and residency training programs; these data will also suggest needs for continuing education among practicing physicians.

At some point, it will be important for the UMP-Cluj and the new department to review the entire six-year medical school curriculum in order to assess if, where, and how elements of EOH are taught. This will help the department identify: 1) the most appropriate loci for introducing different elements of EOH into the curriculum; 2) opportunities for enhancing or reinforcing important areas of knowledge and skill in EOH throughout the curriculum; 3) colleagues and role models who could or would support efforts to infuse an EOH focus throughout the curriculum; and 4) ideas and strategies for teaching EOH in both basic science and clinical settings.

The Department of Community Medicine and Family Practice and its faculty who teach EOH will need to reach out to faculty in other disciplines. Unless these non-EOH faculty appreciate the relevance of environmental and occupational factors in health and disease (and see how it relates to their own disciplines or areas of practice), they may hamper efforts make EOH important in the curriculum by ignoring, denigrating, or otherwise dismissing

it as someone else's problem. There are many ways to begin such faculty development, such as conferences or grand rounds in different departments to acquaint faculty with environmental contributions to the diseases/health problems in their areas of practice. USAID (through EHP) and other agencies can help support such faculty development activities, just as they can help support training and education for physicians already in practice in the community, including GPs.

Lastly, there are opportunities to link this curriculum development work with other EHP activities, especially in the area of continuing education and training for physicians who practice in the community. For example, there appears to be less than adequate understanding of the principles and techniques of screening for occupational and environmental health risks. Educational programs (which could be designed to address physicians and physicians-in-training at all levels) could focus on environmental and occupational history taking; integrating such information into problem solving and clinical decision making; the techniques and interpretation of specific screening activities; and record keeping, monitoring, and follow-up of patient populations. I encourage such collaboration and linkage; it would benefit participants in the various EHP activities and help advance the fundamental goals of EHP programs in Romania.

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World Bank. July 1992. *Romania environmental health strategy paper*. Report no. 10613-RO. Washington, D.C.: World Bank Infrastructure Operations Division.

APPENDIX 1

PROPOSED CURRICULUM FOR THE DEPARTMENT OF COMMUNITY MEDICINE AND FAMILY PRACTICE

Curriculum for Department of Community Medicine and Family Practice

Year	Existing (1994-95)	Proposed (1995-96)	Planned* (after 1996)
I	C: Biostatistics and Med. Informatics 16 hrs L + 16 hrs T	C: Biostatistics** and Med. Informatics 16 hrs L + 16 hrs T	C: Biostatistics and Med. Informatics 16 hrs L + 16 hrs T C: Health Education & Promotion 16 hrs L C: Practical Training in a dispensary 3 hrs/wk
II	C: Basic Epidemiology & PHC 16 hrs L	C: Basic Epidemiology & PHC 16 hrs L	C: Basic Epidemiology & PHC 16 hrs/wk L C: Practical training in a dispensary 3 hrs/wk
III		Practical summer training activity in a dispensary 4 weeks P	C: Practical summer training activity in a dispensary 4 weeks P
IV	C: Hygiene and Environmental Health 48 hrs L + 48 hrs T	C: Environmental Health** Child/Teenager Health Promotion, Occupational Epidemiology, Nutrition 48 hrs L + 48 hrs T	C: Environmental Health, Occupational Epidemiology, Nutrition, Child/Teenager Health Promotion and Behavior 48 hrs L + 48 hrs T E: Practical training in a dispensary 3 hrs/wk
V		C: Practical summer training activity in a dispensary 4 weeks P	C: Practical summer training activity in a dispensary 4 weeks P
VI	C: Ambulatory Medicine 48 hrs L + 105 hrs P C: Public Health/Management 32 hrs L + 24 hrs T C: Epidemiology 16 hrs L + 24 hrs T	C: Family Medicine** 48 hrs L + 105 hrs P C: Public Health/Management 32 hrs L + 24 hrs T C: Epidemiology** 16 hrs L + 24 hrs T	C: Family Medicine 48 hrs + 105 hrs C: Public Health/Management & Policy 32 hrs L + 24 hrs T C: Epidemiology/Survey of Selected Communicable and Chronic Diseases 16 hrs L + 24 hrs T

Key: * any proposal/improvement can be made taking into account the 1995-96 academic year experience, and the suggestions coming from external consultants/changes of experience.
 ** proposed curriculum includes integration of PHI concepts

C: compulsory

L: lecture

E: elective

T: tutorial

P: practical activity

APPENDIX 2
SCOPE OF WORK

ENVIRONMENTAL HEALTH PROJECT

Scope of Work

TECHNICAL ASSISTANCE IN CURRICULUM DEVELOPMENT FOR CLUJ MEDICAL SCHOOL IN ENVIRONMENTAL AND OCCUPATIONAL HEALTH

January 26, 1994

BACKGROUND

Physicians and other health care personnel in Romania often must treat patients who have illnesses which result from significant exposure to environmental pollutants. Several reports document the major environmental health problems which both Romanian citizens and their physicians face (Hertzman 1992, World Bank 1992, Hertzman and Ayres 1994). For instance overexposure to lead has been identified in three cities. Documented associations between acute or chronic respiratory disease and air pollution are found in 13 cities. Furthermore, a relationship between abnormal physiological development and air pollution has been demonstrated in another three cities. Nitrates in drinking water are a widespread problem for Romania with 38 of 41 districts reporting excessive concentrations. Problems with inorganic arsenic dust and associated skin cancer have been noted in Arad-Lipora-Ineu District, contiguous with Bekes County, Hungary. High concentrations of carcinogenic substances in drinking water samples have been found in 32 of 41 districts of the country, and chlorinated pesticides have widely contaminated many water supplies. Several towns have high concentrations of airborne asbestos. In Suceava, children exposed to carbon disulfide have shown neurological disease. Five to six hundred new cases of silicosis and accompanying silicotuberculosis arise each year among miners and foundry workers. Overexposure to ionizing radiation has been noted among uranium mine workers.

General practitioner (G.P.) physicians trained in Romania to date have had very little basic or advanced training in environmental and occupational health, in either prevention or case management. The current system addresses environmental health on a very technical level with no emphasis on public health nor primary health care. Yet given the nature of the problems listed above, such training must be included at a significant level in any comprehensive G.P. curriculum if Romania's people are to improve their health.

In meetings with USAID Office of Health and Nutrition and EHP staff in November and December 1994, USAID/Romania has expressed its desire to have EHP provide technical assistance in curriculum development in environmental and occupational medicine to the University of Medicine and Pharmacy in Cluj-Napoca, Romania. A new Department of Community Medicine and Family Practice is being formed and the medical school curriculum is being revised to take advantage of this restructuring. Communications with USAID/Romania in January 1995 requested that the EHP take advantage of this opportunity to help develop a curriculum segment in environmental and

occupational health, by providing technical assistance before April 1, 1995, the date when the new department's curriculum must be submitted to the Romanian Ministry of Education for approval. Once this outline of the curriculum with the mix of lecture and practical hours is approved, the University would then work out the details of implementation of the new curriculum for classes beginning in Fall, 1995.

During a separate scoping visit under ACT 149 RC entitled "Start-Up: Scoping of Technical Assistance and Training in Environmental Health in Central Europe" in March 1995, EHP will also assess several health care institutions in the greater Cluj region (which includes Cluj, Zlatna and Alba-Iulia). Their potential as partners and recipients of training and technical assistance in the prevention, diagnosis and treatment of environmental pollutant-related illnesses in the region will be examined.

PURPOSE

The purpose of this activity is to assist the University of Medicine and Pharmacy in Cluj-Napoca, Romania, and particularly its new Department of Community Medicine and Family Practice, to develop a curriculum in environmental and occupational health suitable to present to the Ministry of Education by April 1, 1995.

This will be accomplished by provision of one consultant to work for 8 days in Romania with the rector, deans and faculty of the University of Medicine and Pharmacy to help develop the curriculum in environmental and occupational health.

TASKS

1. Prior to departure from USA, identify and contact host country individuals and institutions to gather background information on the assignment and the University's expectations and current curriculum..
2. Gather information and reports regarding local environmental health issues and examples of high quality environmental and occupational health curricula as used in Schools of Medicine and Public Health in North America, Western Europe and elsewhere which are relevant to addressing chronic and environmentally-based disease problems and which are suitable for both basic and specialized curricula for medical students (2nd, 4th and 5th year) and G.P.s. in Romania. Also gather training and self-study guides in environmental and occupational health from such agencies as: US Centers for Disease Control and Prevention, NOISH, NIEHS, ATSDR, OSHA, ACGIH and NEHA. Provide copies of these materials to the University during the field visit.
3. Participate in a half-day Team Planning Meeting (TPM) at EHP with other key personnel to develop a workplan for the initial field visit and brief the EHP staff.

4. Travel to Romania to provide examples of curricula and technical assistance in the development of curricula in environmental and occupational health to the University of Medicine and Pharmacy in Cluj.
5. Write up results and findings of the field visit and technical assistance provided in the form of an Activity Report to EHP. This report should also address the feasibility of transferring this type of assistance to other medical and public health schools in Romania and Central Europe.

FINAL PRODUCT and OUTCOMES

1. Final Product: An Activity Report, as specified above.
2. Outcome: Delivery of suitable environmental and occupational health curriculum materials and reports to Cluj Medical School, as discussed above.
3. Outcome: Provision of Technical Assistance to Cluj Medical School in environmental and occupational health, as discussed above.

PROPOSED SCHEDULE: 1995

February 8	TPM at EHP
February 8	Briefing at EHP
February 9-20	Field visit to Slovakia including work-related travel
February 21	Debriefing at EHP
March 3	Draft Activity Report due to EHP

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APPENDIX 3

LIST OF CURRICULAR AND EDUCATIONAL MATERIALS BROUGHT TO CLUJ

**MATERIALS BROUGHT TO CLUJ
(AND TO WHOM THEY WERE GIVEN)
February 1995**

Government Documents

- ATSDR. Packet of fact sheets on chemicals. (CI)¹
- ATSDR. Samples of *Public Health Statements* on various chemicals. (CI)
- ATSDR. Samples of *Case Studies in Environmental Medicine*. (Lead, arsenic, cadmium, asbestos, PAHs, nitrate/nitrite, TCE, radon, Taking an Exposure History, Skin Lesions and Environmental Exposures) (CI)
- EPA. *Terms of Environment—Glossary, Abbreviations, and Acronyms*. April 1994. (CI)
- NIEHS. Samples of Curriculum developed by Academic Awardees, as shown below. (CI)
- NHLBI. Preventive Pulmonary Medicine Curriculum (ISB)²
- Institute of Medicine. *Environmental Medicine: Integrating a Missing Element into Medical Education*. National Academy Press, 1995. DRAFT (CI)
- Institute of Medicine. *Environmental Medicine and the Medical School Curriculum*. National Academy Press, 1993. (CI and ISB)

Curriculum Materials

Preventive Medicine

- An Inventory of Knowledge and Skills Relating to Disease Prevention and Health Promotion, Association of Teachers of Preventive Medicine (ISB)
- Materials from American College of Preventive Medicine: (ISB)
What is Preventive Medicine?
Introduction to Public Health and Preventive Medicine: A Framework
Training Physicians in Preventive Medicine

Epidemiology

- Course objectives and samples of preventive medicine exercise, developed by R. Luckmann, UMMC (ISB)

¹CI = Professor University Dr. Carmen Ionut

²ISB = Professor University Dr. Ioan S. Bocsan

Environmental Epidemiology

- *Problem-Based Training Exercises for Environmental Epidemiology—Group Practice Exercises for Students.* World Health Organization, Geneva, March 1992. (ISB)
- *Problem-Based Training Exercises for Environmental Epidemiology—Instructor's Guide.* World Health Organization, Geneva, 1991.(ISB)
- *Investigating Environmental Disease Outbreaks—A Training Manual.* World Health Organization, Geneva, December 1991.(ISB)
- *Teacher's Guide for One-Week Training Workshop: Basic Environmental Epidemiology.* World Health Organization, Geneva, 1994. (CI)

Occupational Epidemiology

- Samples of case studies from *Teaching Epidemiology in Occupational Health*, a joint publication of NIOSH and WHO, May 1987. (ISB)

Occupational and Environmental Health

- *Kids and the Environment: Toxic Hazards—A Course on Pediatric Environmental Health* California Public Health Foundation, 1992. (ISB)
- *The Environmental and Occupational Exposure History. A Handbook.* Connecticut Department of Health Services. (CI)
- *A Curriculum in Occupational and Environmental Medicine for Physicians in Training.* Produced by the Occupational Health Project, University of Maryland, through NIEHS Award. (CI)
- O/E Learning Objectives plus 6 OSCE's from George Washington University, Dr. Rosie Sokas, through NIEHS Award. (CI)
- *Reproductive Hazards in the Workplace—A Syllabus for Clinicians,* M. Paul and S. Kurtz, April 1990. (ISB)
- Industrial site visit guidelines: (ISB)

The Worksite Visit in the Teaching of Preventive Medicine, by K. Rest et al., 1983.

Samples of workplace walk-through forms/guidelines.

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APPENDIX 4

DRAFT FIELD REPORT ON CURRICULUM IN ENVIRONMENTAL HEALTH FOR THE DEPARTMENT OF COMMUNITY MEDICINE AND FAMILY PRACTICE

**DRAFT FIELD REPORT ON CURRICULUM IN
ENVIRONMENTAL HEALTH FOR
THE DEPARTMENT OF COMMUNITY MEDICINE AND FAMILY PRACTICE**

February 1995

INTRODUCTION

The University of Medicine and Pharmacy in Cluj-Napoca is in the process of establishing a new Department of Community Medicine and Family Practice with a focus on primary health care. The department plans to provide courses and educational opportunities throughout the six-year medical school curriculum. As shown in Appendix 1, for the 1995-1996 academic year, these will include courses in biostatistics and medical informatics, basic epidemiology, environmental health (which to date has included sections on environmental hygiene, school hygiene, and nutritional hygiene), occupational epidemiology, family medicine, and public health/management. The new department also plans to enhance students' practical summer training activity to include a focus on primary health care, prevention, and hygiene. It will also develop courses in health education, health promotion, and behavior as well as training in epidemiology and survey methods for selected communicable and chronic diseases.

These new initiatives provide a unique opportunity to adapt existing curricula for a primary care focus, develop new curricula, and experiment with new teaching methodologies. Through USAID/Romania and the Environmental Health Project, I was asked to provide technical assistance and curriculum consultation in the area of environmental and occupational health to the new department, which must submit a proposal for the new curriculum to the Ministry of Education in April 1995.

METHODS

Meetings were held with a variety of people, including 1) key faculty members who will form the basis of the new department—specifically Professor Dr. Ionut, Professor of Hygiene, and Professor Dr. Bocsan, Professor of Epidemiology and coordinator of the new initiative for the Cluj Medical University; 2) teaching and laboratory assistants from the Department of Hygiene, 3) general practitioners from Cluj dispensaries; 4) Professor Dr. Mircea, the Dean of the University of Medicine; 5) physicians involved in health education at the Sanitary Police in Alba Iulia; 6) the director of the World Vision office in Cluj, Dr. Lapusan, and 6) the Director of the Institute of Hygiene, now called the Center for Medical Research, Health Services, and Management.

In addition to meetings and personal interviews, the existing curriculum in the Department of Hygiene was reviewed.

The principle focus of my activity and consultation involved environmental health and not occupational health. Occupational health is taught in a separate course and by a different department (the Department of Occupational Medicine) in the fifth year of medical school. It consists of 24 hours of class time and 24 hours of seminar. The course is clinical in nature and does not cover prevention

and hygiene aspects. At this time, it is not clear if and how the occupational health course will be integrated in the new Department of Community Medicine and Family Practice. Because of this internal problem, I did not focus on this aspect of the curriculum.

EXISTING CURRICULUM IN ENVIRONMENTAL HEALTH

Structure

Environmental Health (Hygiene) is currently taught in the fourth year of medical school and consists of 48 hours distributed as follows: 3 hours of course work and 3 hours of laboratory per week for one semester (16 weeks). Because each entering class at the University of Medicine is large (approximately 450 students), the class is divided into 6 series of 70-80 students each. The hygiene course and laboratory are taught to 3 series of students per semester. The course is taught to the entire series (70-80 students) and the labs are taught in small groups (15-20 students per group).

Content

In the course, 30 hours are devoted to environmental hygiene and school hygiene and 18 hours to nutritional hygiene; in the laboratory section, 21 hours are devoted to nutritional hygiene and 27 hours to environmental hygiene and school hygiene. The topics covered in the existing curriculum are shown in Appendix 6.

Because books are lacking, students are limited in the amount they are able to read and learn on their own. They must rely on the lectures provided by Professor Dr. Ionut in the course. Professor Dr. Ionut has recently updated her materials and has prepared a new teaching manual which is awaiting publication. The material in the manual is based on and/or extracted from some of the most recent journal articles in the subject areas.

Commentary

The existing curriculum was not designed to focus on primary health care principles, and thus, there is recognition that it must be adapted and enhanced. Moreover, within the Department of Hygiene, there is concern that students (as well as physicians in practice) fail to appreciate the importance of environmental health and its link to the practical world of health care delivery. The Department of Hygiene is most interested in exploring ways to make the course and the labs more practical.

Indeed, it appears that there is a fair amount of theoretical information provided and that, at least in the past, some of the laboratory experiments and demonstrations have been somewhat removed from the practice of many physicians. However, there seems to be a desire to move away from requiring students to perform chemical determinations and analyses in the lab and to focus on more practical aspects of hygiene, such as interpreting and using the results of such testing. It is, however, important to note that, while most graduating physicians will not have to perform such testing in their practice, physicians who will work in rural areas will have some of this responsibility. This means that some technical aspects of the lab, such as determining water potability and water

disinfection, may need to be retained. There also appears to be an interest in experimenting with new ways of teaching in the lab. The structure of the course is ideal in that it already provides a format for small group teaching.

As shown in Appendix 6, the course covers many important environmental health topics. Others do not appear to be covered. But, as discussed further below in the section on proposals for a new curriculum, it is neither possible nor desirable to cover every topic in environmental health. What is most important is to define *competencies* for graduating medical students; this means defining what they should be able to do in the area of environmental health when they graduate and go into practice. Only by understanding what is required or *desirable* in the practice of medicine can one begin to identify the base of knowledge and skills that a course or practical experience should provide. Because scientific knowledge in the areas of human health, disease, and the environment advances so rapidly, it will never be possible to teach students everything they need to know. What is critical is the development of students' thinking and problem-solving abilities. It is useless for students to memorize facts or learn techniques that will be quickly outmoded. More important is their ability to think, communicate, identify and locate the resources they need, and take the appropriate action to begin to solve problems.

Those teaching environmental health and other aspects of public health and preventive medicine at the University of Medicine in Cluj share a common problem with their colleagues elsewhere. There is a critical need to reinforce (and certainly not denigrate) the principles of environmental health, hygiene, and prevention in other courses and practical experiences that the students have. Thus, it is important to assess if and how *any* aspects of environmental health are taught in other areas of the curriculum in order to identify opportunities to introduce, enhance, or reinforce important areas of knowledge and skill. For example, it is likely that students learn about environmental causes of lung disease when they take pathology or learn something about common metabolic pathways and storage sites for xenobiotics when they take biochemistry or pharmacology. It is likely, however, that the environmental factors are not clearly identified as such in these courses and that there is no mention of hygiene and prevention. With some communication and cooperation among the teaching faculty, it may be possible to introduce students to the concept and importance of environmental health in these basic science courses or at least suggest that they will learn more about environmental health when they take the hygiene course in their fourth year.

An area of environmental health of particular importance to the primary health care initiative relates to the ability of general physicians to routinely obtain information from their patients about their community, home, and workplace environments. This skill of incorporating environmental and occupational health information into the physician's history taking practice is essential; it should be introduced in semiology and reinforced by the clinical faculty in such areas as pediatrics, general internal medicine, obstetrics/gynecology, etc., as well as in environmental hygiene.

This "integration" approach is difficult to implement but will ultimately be of great benefit to the students. It will help them develop an understanding that the environment and hygiene are not separate areas of medicine and someone else's concern, but rather that environment and hygiene pervade all areas of medical practice because they affect the health and well-being of all age groups. Most U.S. medical schools must rely on this approach because many are not fortunate enough to have separate courses in environmental health.

It is also important to note that, unlike environmental health courses and curriculum in the United States, the existing curriculum in the Department of Hygiene includes sections on nutritional hygiene and school hygiene, the latter of which includes a small amount of time devoted to understanding the somatic and functional development of children. In the U.S., these topics are not traditionally considered part of environmental health; if and when these topics are taught, they occur in other parts of the curriculum. I note this here because I am not expert in developing curriculum in these areas. These topics are certainly of central importance to medical education, and there are opportunities to link them to the other aspects of the hygiene course. This kind of continuity is important because, without it, students are unable to appreciate how all the topics fit together to make a coherent picture.

PROPOSALS TO CONSIDER IN THE DEVELOPMENT OF NEW CURRICULUM IN ENVIRONMENTAL HEALTH

As discussed above, in developing or enhancing a curriculum in any subject area, it is often more useful to define and specify what students should know and be able to do as a result of their training than it is to list a series of topics. Over time, the topics will change because we acquire new knowledge (for examples, about electromagnetic fields or a new environmental disease) or because conditions change (for examples, water quality improves, lead is removed from gasoline, or factory emissions decline). The topics covered in a course are often simply vehicles for teaching certain principles and helping students learn how to think and solve problems. Of course, the topics should reflect the conditions and problems of major concern.

It is also important to understand the target audience for the curriculum. Most students graduating from the University of Medicine in Cluj do not become specialists in environmental or occupational hygiene. They will become general practitioners or specialists in other areas, such as internal medicine, pediatrics, etc. Thus, the environmental health curriculum must be appropriate for this audience. This is consistent with a primary health care philosophy which seeks to instill certain principles of practice in all physicians.

To begin the process, I include here for consideration a list of competency-based learning objectives developed by the Institute of Medicine (IOM) in the United States. The IOM is part of the National Academy of Sciences and it uses expert committees to develop reports and recommendations on different topics. Recently, a committee of experts met to define competencies in environmental health for all graduating medical students and to suggest strategies for implementing these suggestions in U.S. medical schools. The implementation strategies they suggest reflect the "integration" approach noted earlier; that is, they provide advice and suggestions on how to begin incorporating the requisite knowledge and skills into existing courses. Because the system and structure of the curriculum is different in Romania, other and/or additional strategies will be needed. (Note: the final published IOM report is due in March or April 1995 and will be sent to Cluj at that time).

Competency-Based Learning Objectives Developed by the IOM

1. Graduating medical students should understand the influence of the environment and environmental agents on human health based on knowledge of relevant epidemiologic, toxicologic, and exposure factors.
2. Graduating medical students should be able to recognize signs, symptoms, diseases, and sources of exposure relating to common environmental agents and conditions.
3. Graduating medical students should be able to elicit an appropriately detailed environmental exposure history, including a work history, from all patients.
4. Graduating medical students should be able to identify and access the informational, clinical, and other resources available to help address patient and community environmental health problems and concerns.
5. Graduating medical students should be able to discuss environmental risks with their patients (and others) and provide understandable information about risk-reduction strategies in ways that exhibit sensitivity to patients' health beliefs and concerns.
6. Graduating medical students should be able to understand the ethical and legal responsibilities of seeing patients with environmental and occupational health problems or concerns.

As you can see, these objectives seem rather general; they do not specify particular topics to be covered in helping students become competent in these areas. Determining the particular topics is the job of the teaching faculty. Some topics will be essential because one cannot become competent without them. For example, to achieve competency number 1, students will need to know the basic principles of toxicology—such as the routes of exposure; the concept of dose-response; common metabolic pathways and excretory mechanisms for xenobiotics. Other topics will be selected because of their particular relevance to the population that the graduating physicians will eventually serve. For example, specific environmental health topics would and should probably be somewhat different for medical schools in Romania than for medical schools in other countries. The topics should also relate to the particular health and disease status of the populations that will be served in Romania. If respiratory illness is a major problem in Romania, the curriculum in environmental health should cover the important environmental determinants of respiratory disease. If child development is a problem, then the curriculum should cover the environmental factors that can affect child development, e.g., lead intoxication.

Certainly, there may be additional, different, and somewhat more specific competency-based learning objectives that the new Department of Community Health and Family Practice may wish to develop for its environmental health curriculum. For example,

7. All graduating medical students will be able to define the specific roles and functions of the different organizations involved in environmental hygiene (e.g., the Sanitary Police and the Institute of Hygiene) and give examples of the types of problems these organizations can help resolve.

8. All graduating medical students will appreciate their own role in environmental health—as sentinels who can help identify potential environmental health problems in the population they serve and as advocates for making improvements in environmental hygiene (and nutritional hygiene, etc).
9. All graduating medical students will be able to describe the most important environmental health problems in Romania, including specific populations at risk. (These will change over time.)

These are just examples to stimulate creative thinking. In developing such objectives, it is often useful to talk to practitioners, students, and others to obtain information about their own practical experiences or to obtain their opinions about what and how students should be taught.

It may also be helpful to identify certain *themes* that the curriculum intends to focus on—not only in the curriculum of a particular course (such as environmental hygiene) but in the medical school curriculum as a whole. For example, the medical school has already identified primary health care as an important theme. It is hoped that principles of primary health care will not only serve as the foundation for the new department but will eventually be reflected in other areas of the medical school curriculum. Such themes can be knowledge or skill-based. In the area of environmental and occupational health, for example, important themes may include: 1) the importance of eliciting the environmental history from patients and using the information in caring for both individual patients and communities; 2) including environmental and occupational factors in the promotion of health and the differential diagnosis of disease; 3) primordial, primary, secondary, and tertiary prevention of environmental health problems—in both individuals and communities; 4) communication skills (how to talk about environmental issues with patients, other physicians, including specialists, officials, and people with authority to make changes); and how to assess environmental risk, knowledge, and attitudes in populations (of patients or communities).

Specific Topics of Importance for the Environmental Health Curriculum

As noted above, the actual content or knowledge base of the curriculum should address the learning objectives identified as most important by the faculty. These should relate to the needs of at least two target populations—the students who will graduate from the University of Medicine and the populations they will be serving—that is, the citizens of Romania, both urban and rural. Based on my own experience and the collective wisdom of many colleagues from other U.S. medical schools with whom I have worked, communicated, and collaborated, I can **suggest for consideration** the following topics for inclusion in a comprehensive environmental health curriculum. Some are already part of the existing curriculum and others may be new. I also believe that, in each topic, the emphasis should be more on health than on the technical aspects of monitoring the environment and that every effort be made to relate theoretical knowledge to its practical application. Because it is all too easy to feel powerless in the face of large public health problems, each topic should also include a discussion of the physician's role in the identification, evaluation, and prevention of the problem.

The amount of time (number of hours) devoted to each topic should be determined by the Hygiene faculty in consultation with others in the new Department of Community Medicine and Family Practice. The allocation of these topics between the didactic course and the laboratory exercises

should also be determined by the faculty. It is important that these two parts of the overall course be mutually reinforcing and that serious consideration be given to the best place and format for teaching these (and other) topics. Teaching methods should attempt to enhance students' problem-solving skills. Suggestions on teaching methods are discussed later.

- **Health and the Environment**

A introduction to how the environment (ambient, community, home, work, and school environments) affects health and disease. Include practical examples of how the environment can affect individual and community health. Also introduce (or re-introduce) students to the environmental history as a tool for eliciting information from patients. Begin discussion of the physician's role in environmental health.

- **The Environment and Health in Romania**

Provide data and statistics about the most important environmental health problems in Romania and the populations at risk. Discuss, for example, the "hot spots" (Copsa Mica, Baia Mare, Zlatna, etc). Give examples of acute and chronic health effects associated with common environmental hazards found in these areas (e.g., lead, SO₂, etc.) Discuss also the environmental causes of the most common diseases in Romania—using data from the Ministry of Health and research papers.

- **Basic Principles of Toxicology**

Discuss routes of exposure (inhalation, absorption, ingestion); differentiate occurrence from exposure from dose; refer back to common metabolic pathways, storage sites, and excretory mechanisms for xenobiotics (probably taught earlier in basic science) and give examples; review the concept of dose-response, etc. Discuss the health effects of the most common pollutants and toxicants (heavy metals, carbon monoxide, solvents, asbestos, etc.)

- **Basic Principles of Prevention/Hygiene**

Provide a framework for both population and individual prevention strategies. These include, for example, regulation of environmental hazards; administrative controls on the number of work hours and job rotation; engineering controls to eliminate/control the pollution; personal protective measures (from safety equipment in the workplace to basic hygiene and personal hygiene as methods of protection); medical screening and public health surveillance; patient, worker, and community education, etc.

- **The Structure of Environmental Hygiene in Romania**

Introduce students to the standards, regulations, and standard setting processes in Romania. Compare (briefly) to other standards (e.g., European Community, World Health Organization). Acquaint students with the ministries, organizations, and groups involved in environmental (and occupational) hygiene in Romania. Give examples of their functions and activities. Discuss also the roles and activities of environmental NGOs and local

environmental groups (e.g., Albamont) and how these organizations might be of assistance to physicians, their patients, and communities. Again, discuss when and how the physician can and should interact with these organizations.

- **Ambient Air Pollution and Health**

Sources of pollution, populations at risk, acute and chronic health effects, behaviors that increase/decrease risk, regulations and norms, interpreting monitoring results, screening and public health surveillance, prevention.

- **Indoor Air Pollution and Health**

Sources of pollution (including environmental tobacco smoke), populations at risk, acute and chronic health effects, behaviors that increase/decrease risk, regulations and norms, interpreting monitoring results, screening and public health surveillance, prevention.

- **Water pollution**

Sources of pollution (infectious, noninfectious), acute and chronic health effects, assuring potable water, behaviors that increase/decrease risk, regulations and norms, interpreting monitoring results, screening and public health surveillance, prevention, etc.

- **Soil pollution**

Sources of pollution (with examples of major pollutants, such as lead), populations at risk (especially children), acute and chronic health effects of major pollutants, prevention, etc.

- **Waste (solid, toxic, infectious)**

Types and sources of waste; acute and chronic health effects, regulations and norms, prevention, etc.

- **Physical hazards/elements in the environment (heat, cold, noise, illumination, basic sanitation, etc.)**

Categorize hazards; examples of acute and chronic health effects; regulations and norms; basic principles of assuring hygienic conditions for different types of environments (e.g., homes, schools, nutritional units, etc.); prevention.

- **Radiation in the environment and its health effects**

An introduction to the ionizing and non-ionizing radiation in the environment, natural and man-made sources of radiation, populations at risk, acute and chronic health effects, regulations and norms, prevention, etc.

- **Risk assessment**

An introduction to how risks are assessed for regulatory purposes and how physicians can assess patient and community risk in their practice.

- **Risk communication**

Principles of environmental risk communication and exercises in how a physician can communicate risk to patients and communities. Link to health education courses that may later be taught in the new Department.

- **Food safety**

Classification of types of food contamination, sources of food contamination, populations at risk, acute and chronic health effects of contaminated food, assuring food safety, interpreting analyses of food, personal behaviors that increase/decrease risk of food poisoning, regulations and norms, prevention, etc.

- **Nutritional hygiene**

Basic principles of nutrition; elements of the well-proportioned diet; sources of nutrients; acute and chronic health effects of improper nutrition; populations at risk of improper nutrition; personal behaviors that increase/decrease risk of nutrition deficiencies, prevention of malnutrition, etc. To make the course more coherent, it would be important to discuss the effect of environmental agents, e.g. lead, on the uptake and metabolism of minerals and nutrients.

- **Emerging issues in environmental health**

The exact topics covered in this kind of session can vary, but can address new, interesting (or controversial) topics in environmental health, such as comparative risk assessment, rapid assessment procedures, low-level chemical sensitivity, or the role of anthropologists in public health.

Teaching Methods

The structure of the existing Environmental Hygiene course and labs permits experimenting with a variety of teaching methods—some of which would be new to both faculty and students. In many cases, lectures will continue to be important, especially because students lack basic textbooks in hygiene and must rely on the information imparted in lectures and because classes are so large. Even lectures, however, can be enhanced in a variety of ways. For example, a descriptive case study or situation can be used to introduce the topic; this may help capture the students' interest and quickly illustrate the practicality of the information that will be presented during the lecture. Alternatively, a practitioner from the community can be asked to briefly describe a problem, a situation, or a case that he/she has encountered in practice. The lecture could then refer back to the problem or case to illustrate certain points. Audiovisual material, if available, can be used to supplement or complement

lectures (videotapes, slides). Even with a large group, some interaction or discussion can occur. For example, students could be invited to give examples of or suggest solutions to problems.

Field visits can be used to reinforce (or introduce) the teaching points from lectures. For example, site visits to water treatment facilities, contaminated areas, workplaces and factories, canteens, schools, waste sites, etc., can be very helpful in making the topic more real to students and expanding their experience with the topic. As mentioned below, this requires time and resources. However, some opportunities for field visits require very little in this regard. A particularly effective site that I have used is the clinic (hospital). A walk through the clinic provides an opportunity to teach about and link together quite a number of important topics in environmental health. First, there are many categories of environmental hazards and problems in clinics—chemical, physical, infectious, ergonomic, climatic, psychological, etc. One can teach about the sources and risks of, and preventive strategies for these hazards as the students visit different areas of the clinics—patient care areas, canteens, housekeeping areas, treatment and surgical areas, waste processing areas, etc. One can also point out the different populations at risk in these settings. But most important, one can emphasize that the clinic is the work environment of medical students and physicians. Thus, one can begin to discuss the occupational/professional risks of physicians. When physicians understand that they too are at risk, the concept of environmental health may become more immediate and real.

Small group formats provide an excellent opportunity to experiment with a variety of new teaching methods. These include:

- Simulated patients—faculty (or others) can play the role of a patient and the students can practice taking an environmental history from this “patient.”
- Role playing— students can be presented with a problem or situation on paper and then asked to play certain roles— for example, one can play a patient, another an occupational disease specialist, another a concerned community member, another a member of the Sanitary Police, another a factory owner, another the prefect or government official, another a journalist from the local newspaper, etc. This will provide an opportunity for students to explore the viewpoints, concerns, and arguments of key groups as well as to practice their communication skills.
- Problem-based learning (students are given a problem to solve—usually based on a case or situation described on paper).
- Exercises in which students are asked to work together in small groups of 3-5 to solve a problem. The activity can be limited to the time they have during the class or, perhaps, the students can be instructed to work together outside of the classroom to discuss the problem, collect additional information, and suggest solutions. Each small group can then present its findings or suggestions to the larger group in the next class.

Barriers and Opportunities

Many of these suggestions for both content and teaching methods could be implemented within the existing course. Indeed, many of the topics are already included in the curriculum, and the course is

structured to allow for small group activities. The faculty and teaching assistants in the Department of Hygiene have recognized the need to make changes and are receptive to new ideas about teaching methods and approaches. Some of the suggested methods have been used in the past, so there is some experience with them. For example, at one time, the course included field visits to water treatment facilities. These activities stopped when there were changes in the curriculum and because transportation costs became a problem. Students still, however, visit canteens to assess hygiene and examine the nutritional components of the menu.

Another important asset is the supportive attitude that the head of the department, Professor Dr. Ionut, has towards her young staff. She wants them to advance and is eager for them to have opportunities to acquire new knowledge and learn new skills.

The emergence of the new Department of Community Medicine and Family Practice provides a unique opportunity to modify and further enhance all of the preventive medicine and public health curricula, including the hygiene curriculum. It also provides an opportunity to examine other parts of the medical school curriculum so that the courses, seminars, and practical experiences designed for the new department enhance, complement, reinforce, and are not redundant with other parts of the curriculum. The new department is fortunate to have the strong support of the Dean and the persistent energy of a committed coordinator, Professor Dr. Bocsan. It is important that all the departments and disciplines that will contribute to the new department be actively involved, engaged, and energized by the process. It is seldom that faculty members in medical schools are presented with a clear invitation and opportunity to make changes.

There are, however, certain constraints that may hamper the process. There is a tremendous lack of resources; it is difficult for the faculty to access the latest books and journal articles in their fields. In the hygiene course, students do not have books. Audiovisual equipment and material are lacking. (It was suggested that, with a video camera, the hygiene department could actually videotape certain contaminated sites, substandard workplaces, or other situations in Romania and use the videotape when teaching.) It is not clear that students could benefit from computer-aided programs in occupational and environmental health that have been developed in the United States because of the lack of availability of computers for student use. Laboratory equipment is rudimentary. The cost of transportation for site visits is a problem.

Faculty have not had experience with many of the new teaching methods, such as small group teaching, problem-based learning, role playing, case study development, etc. These skills are not innate—most people must learn them. Thus, there is a need for training and faculty development in instructional methodology. Faculty would benefit from opportunities to observe how topics are taught in other countries.

It was suggested that students may not be prepared to learn in new ways. This is true everywhere. It is a skill that must be developed. But it is crucial that we begin to train our students to think and engage in active problem solving. Medical school is just the first step in a process of life-long learning for physicians. When they are in practice, they can no longer rely on lectures and instructions from their professors; they must think for themselves. Medical education must help get them ready for this.

Many people suggested that physicians are actually powerless to make changes to improve the environment, that the power lies with others, like the government and factory owners. While it is true that some of these groups have more authority and power to make changes, it is not true that physicians have no role. Physicians are the experts in health and disease; they are the persons who can make health part of the debate. And every physician has a role—not just hygiene specialists or physicians who work for the Sanitary Police. Physicians also have a role in improving their status and influence with other groups.

In this context, it is important that we all remember that we are training future doctors. The future will not look like the past. We need to be preparing our students for the future; we must equip them with the skills they will need and encourage them to take on the roles that are needed. We must not concur with the feeling of paralysis, but rather help activate our students.

An additional constraint to new initiatives relates to working relationships. It is critical that collaborative working relationships be established between key groups involved in environmental health and prevention. These include, for example, the Department of Hygiene, the regional Center, and the Department of Occupational Medicine. The first two occupy the same building, but there appears to be little interaction at present. Collaboration would benefit not only the members of these groups but also the medical students and residents. Given that the groups are working with common goals (e.g., the protection of public health), they should develop partnerships.

There may be larger institutional constraints relating to the processes currently used by the Ministry of Education. In many ways, the Ministry controls the curriculum because salaries appear to be dependent on the number of hours one teaches. Therefore, there is little incentive to make changes that may result in the shifting of topics or hours from one place to another. This is a larger issue which cannot be considered further here.

CONCLUSIONS

The University of Medicine in Cluj has engaged in an exciting venture, and there are many opportunities to make changes and improvements in the curriculum. With its focus on primary health care and preventive medicine, it is encouraging to see such a commitment to environmental health and occupational health as integral parts of the initiative. This does not happen everywhere and the university faculty should be commended. The component of family medicine can serve as an important link among all the disciplines in the department. It is an ideal vehicle for illustrating and reinforcing the practicality of the principles learned in epidemiology, public health, environmental health, occupational health, etc. This can be done in the classroom and in the practical experiences. For example, if, in their practical experience, students are required to do surveys of the populations served by their dispensaries, the surveys could include questions on environmental and occupational health. Health education and health promotion activities are also natural components of family medicine, and students could use their practical experiences to develop programs or materials for their patients—including programs and materials in environmental and occupational health.

I am encouraged by the enthusiasm and receptivity of everyone I talked to, but it is important to realize that change takes time. It is difficult for both students and faculty to change the way they do things. And change may require new resources—training, equipment, teaching materials, etc. It is

important that faculty be rewarded (and not penalized) for making changes and trying new approaches.

During my visit, I was able to provide examples of materials to both Professor Dr. Bocsan and Professor Dr. Ionut. Appendix 2 lists these materials. These materials may help stimulate ideas for topics and teaching methods. They can be adapted to include data and cases from Romania; they can serve as a template for the development of other materials.

APPENDIX 5

DRAFT FIELD REPORT ON PRELIMINARY SUGGESTIONS FOR A CURRICULUM IN OCCUPATIONAL HEALTH FOR THE DEPARTMENT OF COMMUNITY MEDICINE AND FAMILY PRACTICE

**DRAFT FIELD REPORT ON PRELIMINARY SUGGESTIONS FOR A
CURRICULUM IN OCCUPATIONAL HEALTH
FOR THE DEPARTMENT OF COMMUNITY MEDICINE AND FAMILY PRACTICE**

February 1995

INTRODUCTION

As described in my draft field report on environmental health curriculum, the purpose of my visit to the University of Medicine in Cluj was to provide technical assistance and curriculum consultation to the new Department of Community Medicine and Family Practice. Because the major focus of my activity was on environmental health, I did not meet with Professor Dr. Cocarla in the Department of Occupational Medicine. I did, however, have the opportunity to review the occupational medicine curriculum as described in a proposal made to World Vision. I have been asked to provide some comments and a few preliminary suggestions at this time.

COMMENTS ON THE EXISTING CURRICULUM IN OCCUPATIONAL MEDICINE

Occupational health is not taught with environmental health, but rather in a separate course and by a different department (the Department of Occupational Medicine) in the fourth year of medical school. It consists of 24 hours of class time and 24 hours of seminar. The course is clinical in nature and does not cover prevention and hygiene aspects at this time.

It is my understanding that, in the 1970s, there were two distinct specialties—occupational health/hygiene and occupational diseases (the former focused on prevention and the latter on clinical medicine). Occupational health was taught in Year 4 and occupational disease in Year 5. In 1973-74, these two specialties merged under the name of occupational medicine and this is what it is called today. The existing curriculum, however, focuses primarily on the diagnosis and treatment of occupational disease; there is little, if any, hygiene or prevention included.

The curriculum, as described on paper, appears to cover quite a number of occupational diseases. It also appears to introduce students to the important skill of taking an occupational history, and it discusses criteria for determining the work-relatedness of disease. On paper, it is not clear if the course provides students with an understanding of the industrial profile of Romania, the most important occupational hazards in Romania, and the populations at risk.

It is unfortunate that the two courses (occupational medicine and environmental health) are not more closely linked. While there are significant areas where the specialties differ, there is a considerable amount of overlap in the basic knowledge and skills that underlie the two disciplines. In the United States, in fact, these two disciplines are most often taught together in one course. This is not necessarily the best way, but there is great potential for interaction, mutual reinforcement, and, perhaps, common classes or practical experiences. This opportunity may exist within the new Department of Community Medicine and Family Practice, and I encourage pursuit of this type of collaboration.

As described in my report on the environmental health curriculum, when designing or changing curriculum, it is best to start with a list of competency-based learning objectives. I will not repeat the discussion here. But I will note that the learning objectives developed by the U.S. Institute of Medicine (IOM) are meant to cover both occupational and environmental health. Certainly, each discipline will have more specific objectives and will develop its curriculum to address topics of relevance to its own areas of practice. I include the IOM learning objectives again here to stimulate creative thinking.

Competency-Based Learning Objectives Developed by the IOM

1. Graduating medical students should understand the influence of the environment and environmental agents on human health based on knowledge of relevant epidemiologic, toxicologic, and exposure factors.
2. Graduating medical students should be able to recognize signs, symptoms, diseases, and sources of exposure relating to common environmental agents and conditions.
3. Graduating medical students should be able to elicit an appropriately detailed environmental exposure history, including a work history, from all patients.
4. Graduating medical students should be able to identify and access the informational, clinical, and other resources available to help address patient and community environmental health problems and concerns.
5. Graduating medical students should be able to discuss environmental risks with their patients (and others) and provide understandable information about risk-reduction strategies in ways that exhibit sensitivity to patients' health beliefs and concerns.
6. Graduating medical students should be able to understand the ethical and legal responsibilities of seeing patients with environmental and occupational health problems or concerns.

PRELIMINARY SUGGESTIONS FOR CONSIDERATION IN THE DEVELOPMENT OF CURRICULUM IN OCCUPATIONAL HEALTH

As in my report on environmental health curriculum, I suggest that the occupational health curriculum be practical, relevant to the most important problems in Romania, illustrative of primary health care principles, appropriate for students who will not become specialists in occupational health, focused on prevention, and reinforcing of particular themes that may be identified as important. These themes may include: 1) the importance of eliciting the occupational (and environmental history) from patients and using the information in caring for both individual patients and communities; 2) including environmental and occupational factors in the promotion of health and the differential diagnosis of disease; 3) primary, secondary, and tertiary prevention of occupational health problems—in both individuals and workplaces; 4) communication skills (how to talk about occupational health issues with patients, other physicians, including specialists, officials, and people with authority to make

changes); 5) how to assess occupational health risk, knowledge, and attitudes in populations (of patients, workers, or communities); and 6) how to access information or assistance to solve problems.

I offer here some suggestions for an occupational health curriculum. Many of the topics are already included in the occupational medicine course offered in Year 4 of the medical school curriculum. I have no knowledge of the teaching methods used; it is possible that some of the seminars are case-based and that the students have the opportunity to visit different types of workplaces. Please refer to the report on environmental health curriculum for a discussion of innovative teaching methods.

Possible Topics for an Occupational Health Curriculum

- History of occupational health and the epidemiology of occupational disease
- Social context of occupational health (economics, labor, politics, etc.) and the influence of personal, social, economic, and environmental factors on worker health and safety
- The occupational and environmental history (and use of the information in caring for patients, workers, and communities)
- Principles of prevention and control of occupational health problems (from engineering controls to personal protective equipment to medical screening and public health surveillance)
- Industrial hygiene and safety in the workplace (and the role of the physician)
- Organizational structure of occupational health in Romania (who does what and how can these organizations be useful to and used by physicians. Include here the role of labor unions.)
- Categories of occupational hazards—physical, ergonomic, chemical, biological, psychological
- Basic principles of toxicology
- Common occupational hazards—prioritized by their importance to the workplaces in Romania. For example, heavy metals, organic compounds, toxic gases, fibers and particulates (including asbestos), infectious agents, etc. Because most students will not become specialists, the focus should be limited to major sources of exposure, populations at risk, acute and chronic health effects, prevention and control, regulations and standards, screening and public health surveillance.
- Occupational hazards in selected industries—perhaps, in Romania, these include mining, smelting, agriculture, manufacturing
- Occupational contributions to common diseases—perhaps with a focus on systems, e.g., respiratory system, reproductive system, neurologic system, etc. (Ideally, this should also be done in other courses—e.g., pediatrics, general medicine, gynecology, neurology, etc.)

- The organization of work and workplace stress
- Ergonomics
- Record keeping, reporting requirements, and the physician's role
- Risk communication, worker education (link also with health education)
- Health promotion in the workplace
- Rehabilitating the injured worker
- Accommodating the ill or injured worker (illness or injury could be occupational, non-occupational, or a combination of both—e.g., musculoskeletal injury, cardiac disease, respiratory disease, etc.)

Obviously, this is a very long list, and it is important to remember that the curriculum should not be designed for specialists in occupational medicine or hygiene.

I encourage some creative thinking about how best to enhance collaboration and teaching opportunities in occupational and environmental health. After all, occupational exposures and workplace emissions do not end at the factory gate; if the relationship between the two is not considered, solutions to one problem may create new problems for other groups.

I note again that the family medicine courses and practical experiences provide an excellent opportunity to illustrate the links between these two disciplines (as well as epidemiology and public health) and to make any theoretical instruction more practical.

Finally, please note that Appendix 2 of my report on the environmental health curriculum includes a list of occupational health and occupational epidemiology materials that I have left with Dr. Bocsan. These and other materials may also be useful in further considerations of the occupational health curriculum.

APPENDIX 6

BASIC SIX-YEAR CURRICULUM AT THE UNIVERSITY OF MEDICINE AND PHARMACY IN CLUJ

TEACHING/LEARNING LAYOUT

Nr	Course Title	Course			Practical Classes Work/Seminars			
		Total	Sem I	Sem II	Total	Sem I	Sem II	

YEAR I

1	Anatomy	60	30	30	315	135	180	E
2	Medical Biochemistry	75	45	30	90	45	45	E
3	Biophysics	30	30	-	45	45	-	E
4	Physiology	30	-	30	30	-	30	E
5	Cellular & Molecular Biology	30	-	30	30	-	30	V
6	Romanian Language	-	-	-	120	60	60	V
7	Physical Education	-	-	-	60	30	30	V
8	Practice	-	-	-	90	-	-	C
Non-Compulsory Classes								
9	Medical Biomathematics	16	16	-	-	-	-	E

YEAR II

1	Anatomy	30	30	-	90	90	-	E
2	Physiology	90	45	45	120	60	60	E
3	Histology & Cytology	60	30	30	90	45	45	E
4	Biology & Embryology	45	-	45	45	-	45	E
5	Microbiology, Virology, Parasitology	75	30	45	90	30	60	E
6	Romanian Language	-	-	-	60	30	30	V
7	Physical Education	-	-	-	60	30	30	V
8	Practice	-	-	-	90	-	-	C
Non-Compulsory Classes								
9	Biostatistics & Informatics	15	15	-	15	15	-	E

YEAR III

1	Morphopathology	60	30	30	75	30	45	E
2	Physiopathology	60	30	30	60	30	30	E
3	Pharmacology	30	30	-	30	30	-	E
4	Internal Medicine—Semiology	90	45	45	315	135	180	E
5	Surgery—Semiology	60	30	30	160	90	70	E
6	Parasitology	15	15	-	15	15	-	E
7	Practice	-	-	-	90	-	-	C

YEAR IV

1	Internal Medicine	64	64	-	192	192	-	E
2	Nephrology	16	16	-	24	24	-	E
3	Pneumophysiology	16	16	-	12	12	-	E
4	Neonatology	16	16	-	32	32	-	E
5	Clinical Pharmacology	32	32	-	32	32	-	E
6	Occupational Medicine—Workers' Diseases	24	24	-	24	24	-	E
7	Clinical Biochemistry	32	32	-	-	-	-	E
8	Tropical Medicine	16	16	-	16	16	-	E
9	General Surgery	48	-	48	192	-	192	E
10	Urology	16	-	16	24	-	24	E
11	Radiology	32	-	32	32	-	32	E
12	Hygiene	48	32	16	48	32	16	E
13	Anesthesiology, Intensive Therapy	16	-	16	24	-	24	E
14	Orthopedics —Traumatology	16	-	16	24	-	24	E
15	Immunopathology	32	-	32	-	-	-	E
16	Practice	-	-	-	90	-	-	C
Non-Compulsory Classes								
17	Medical Biotechniques	30	30	-	30	30	-	E
18	Medical Psychology	16	16	-	-	-	-	E

YEAR V

1	Internal Medicine	64	-	64	180	-	180	E
2	Pediatrics	96	-	96	240	-	240	E
3	Oncology	16	-	16	32	-	32	E
4	Hematology	16	-	16	16	-	16	E
5	Ophthalmology	16	-	16	32	-	32	E
6	Endocrinology	16	-	16	32	-	32	E
7	Medical History	16	-	16	8	-	8	E
8	Neurology	48	48	-	45	45	-	E
9	Infant/Child Neurology	16	16	-	15	15	-	E
10	O R L (Nose, ears and throat)	32	32	-	32	32	-	E
11	Infant/Child Surgery	16	16	-	32	32	-	E
12	Stomatology	6	6	-	9	9	-	E
13	Medical Psychology	16	16	-	-	-	-	E
14	Tropical & Infectious Diseases	16	16	-	16	16	-	E
15	Practice	-	-	-	90	-	-	C
Non-Compusory Classes								
16	Cardiology	32	32	-	-	-	-	E

YEAR VI

1	Ambulatory Medicine	32	32	-	75	75	-	E
2	Pediatric Ambulatory Medicine	16	16	-	30	30	-	E
3	Physiotherapy	16	16	-	15	15	-	E
4	Infectious Diseases	48	48	-	-	-	-	E
5	Epidemiology	16	16	-	24	24	-	E
6	Dermatology	32	32	-	32	32	-	E
7	OB —GYN	64	-	64	144	-	144	E
8	Psychiatry	48	-	48	45	-	45	E
9	Infant/Child Psychiatry	16	-	16	15	-	15	E
10	Legal Medicine	32	-	32	32	-	32	E
11	Public Health	32	-	32	32	-	32	E
12	Clinical Synthesis	64	32	32	-	-	-	E

APPENDIX 7

EXISTING CURRICULUM IN HYGIENE AT THE UNIVERSITY OF MEDICINE AND PHARMACY IN CLUJ

**EXISTING CURRICULUM IN HYGIENE
AT THE UNIVERSITY OF MEDICINE AND PHARMACY
IN CLUJ**

Instruction in hygiene occurs in Year IV. It includes 3 hours of course work and 3 hours of laboratory per week for one semester for a total of 48 hours of each (16 weeks in a semester). The course covers environmental health, food hygiene, and school hygiene.

Health, the Environment, and School Hygiene = 30 hours

1. Object and significance of hygiene; relationship between the organism and environmental factors; definitions of health and prevention.

Atmospheric pollution; sources of impurities; classification of polluting elements; characteristics of polluting indicators in monitoring the quality of the environment; mechanisms of self-purification of air.
2. Impact of air pollution on health; acute and chronic effects produced by irritating substances in the environment.
3. Estimating risks to health from polluting the environment with asphyxiants, fibrogens, systemic toxins, carcinogens, allergens.

Indirect effects of air pollution; methods of prevention and control.
4. Indoor pollution: Hygiene of human habitat, health risks, and major pollutants. Active and passive smoking.
5. Significance of water for man and community: Estimates of resources and optimal consumption; characteristics of main sources of potable water; sources of pollution and mechanisms of self-purification of water; modalities of assuring water quantity and quality to the population.
6. Water pathology re: infectious agents, microbial disease, viral disease, and parasitic disease transmitted through water. Methods of prevention and disinfection of drinking water.
7. Water pathology re: noninfectious agents. Mineralization of water for population health; toxic substances in water (nitrites, pesticides, mercury, etc.); and risks to health.
8. Diagnosis of water potability; organoleptic criteria (appearance); physical, chemical, radioactive, bacterial, and biological criteria.

9. Radioactivity in the environment and its effect on the organism. Evaluation of natural and artificial radioactivity; effects of radioactivity contamination of the environment; norms of protecting the population.
10. Particularities of physical, neurophysical, and mental development of preschool and school children. Biosocial concept of somatic and functional development of children; factors that influence this process; norms of hygiene fundamental to organizing the lifestyle and development of children.

Nutritional Hygiene

1. Objectives of rational (well-balanced) nutrition and effects of improper nutrition. Fundamental basis for appreciating the energy needs of the human body. Establishing energy ratio and comparing it with recommendations of WHO.
2. Nutritional sources of caloric elements: proteins, lipids, sugar. Indicators of nutritional evaluation of those elements and optimal ratio of those elements in a balanced diet. Daily ratio of food and criteria used in establishing the ratio.

Nutritional sources of minerals and vitamins. The importance of macro and micro elements in nutrition and recommendations regarding the daily needs of the organism. Characteristics of water- and lipid-soluble and the adequate ration. Effects of inadequate diets.
3. Nutritional value of animal-origin foods—milk, cheese, meat, fish, eggs. Advantages and disadvantages of those groups for health. Recommended daily ratios and risk of disease.
4. Nutritional value of vegetable-origin foods—vegetables, fruits, cereals, and legumes. Advantages and disadvantages of those groups for health. Recommended daily ratios and risk of disease.
5. Sugar products: classification, nutritional value/ratio, and effects of inadequate consumption. Pathogenic microorganisms transmitted through consumption of sugar-based products and their contamination with chemically destructive substances.
6. Food poisoning: classification and prevention of toxic infections of a microbial nature; food elements most frequently implicated in their transmission; specific manifestations; prevention of food poisoning of nonmicrobial and microbial nature. Appreciation of nutritional state of community. Methodologies and interpreting results in relation to the health of the population.

Postgraduate program includes two courses, which are run by the university. Students are the doctors from dispensaries (general medicine and pediatric). The course occurs one day per week (Monday) over the course of the school year. The detailed curriculum is found elsewhere.

ANALYTICAL CURRICULUM FOR LABORATORY PRACTICE IN HYGIENE

Nutrition and Hygiene (21 hours)

- Hygiene and sanitary requirements regarding nutritional shops. Methods of current sanitary control in food units (e.g., canteens, restaurants, stores)
- Methods of hygiene and sanitary control for nutritional products (e.g., milk, eggs). Collecting samples of food and removing undesirable products from consumption.
- Milk and eggs. Collect samples; meet organic requirements, physical, chemical, and bacterial requirements. Identify falsified papers. Interpret analyses.
- Meat, fish and derivative products. Collect samples, organic, physical-chemical, bacteriologic, parasitic requirements; interpret analyses.
- Products from cereals and fats. Collect samples; organic requirements; determination and evaluation of nutritional value; physical and chemical requirements; identification of falsified papers; interpret analyses.
- Preserved/canned foods: Collect samples, hygienic and sanitary requirements, consumption conditions.
- Nutritional inquiry/statistical inquiry in canteens regarding the nutritional ratio in food elements (e.g., calories) and interpretation of results of lab analysis of food portions/helpings, principles of interpreting results.

Environmental Hygiene and School Hygiene (27 hours)

- Collect samples of water. Determination of indicators of potability, e.g., organic substances, ammonia, nitrates and nitrites (establish sanitary and technical significance of these factors and interpret results).
- Undesirable and toxic substances in water. Establish pH, chloride, dissolved oxygen, biochemical consumption of oxygen, nitrates and nitrites (sanitary and technical significance and interpret results).
- Processing of water for potability: coagulation of water and establishment of optimal dose of coagulant.
- Determination of active chlorine and chlorine derivatives.
- Processing of water for potability: disinfection of water with chlorine, establishing the necessary dose of chlorine; determining residual chlorine.

- **Bacteriological analysis of water; indicators, principles of analysis and interpreting results.**
- **Sanitary requirements regarding private sources of water: fountains, wells.**
- **Collecting samples of air: general principles, methods, necessary equipment for collecting gases, vapors, dusts. Determination of global indicators of pollution, dusts, sulphur dioxide, interpreting results.**
- **Determination of contamination of air and surfaces with microorganisms. Determination of carbon dioxide in closed rooms as indicators of air quality problems.**
- **Appreciation of temperature in closed rooms. Determination of radiation (non-ionizing): ultraviolet, light, heat, and interpreting the results.**
- **Controlling the somatic and functional development of children and adolescents: physiometrics; measurements of somatic development.**
- **Elements of medical statistics used in processing data on physical development and interpreting results.**

APPENDIX 8

EXISTING CURRICULUM IN OCCUPATIONAL MEDICINE AT THE UNIVERSITY OF MEDICINE AND PHARMACY IN CLUJ

EXISTING CURRICULUM IN OCCUPATIONAL MEDICINE AT THE UNIVERSITY OF MEDICINE AND PHARMACY IN CLUJ

COURSE:

- Occupational medicine: definition, objectives, organization of specialized network in Romania.
- Work physiology: the adaptation of apparatus and systems during work process: the respiratory cardiovascular, digestive, renal apparatus.
- Osteo-muscular-tendon overuse during the work process: aging effects of the arteriosclerotic type, bursitis, movement coordination, neurosis (professional conditions, clinical-functional, radiologic manifestations, diagnosis, prophylaxis, treatment).
- Excessive neuropsychological and sensory stress during work.
- Exposure to radiation from computer screens, etc.
- Clinical-functional aspects, prevention. Worker exposure to noise and vibrations (work sites, pathologic determinations, diagnosis, medical and technical prophylaxis).
- General notions about toxic substances: sources, routes of entry, toxic dynamics, action mechanisms, prophylaxis.
- Toxic exposure to metals (Pb, Hg), metallic compounds: work sites, diagnosis, treatment, medical and technical prophylaxis.
- Toxic exposure to organic solvents: work sites, toxic systemic effects of organic solvents: benzene, amino- and nitro-derivatives, aromatic compounds, carbon sulfide, methanol, chloride derivatives of aliphatic hydrocarbons, (work exposure, action mechanisms, clinical and biotoxicologic manifestations, diagnosis, treatment, medical and technical prophylaxis, defense mechanisms at the level of respiratory membrane against particles and noxious gases).
- Pneumoconioses: definition, classification, pathogenetic etiology.
- Radiological classification of ILO, 1980 (classification outline).
- Clinical-radiological, functional aspects in coal miner's pneumoconiosis, silicosis, pathologic determinations of asbestos exposure. Medical and technical prophylaxis.
- Occupational bronchial asthma and extrinsic allergic alveolitis: prophylaxis.

PRACTICAL DEMONSTRATIONS

- History of occupational exposure: how to take the occupational exposure history.

- **Methods for recognizing exposure.**
- **Diagnostic criteria for an occupational disease.**
- **The use of ventilatory functional parameters in occupational medicine.**
- **The method of modifying the respiratory function of the persons exposed to risk factors. Functional cardiovascular tests in occupational medicine (Teslenko, Crampton, Broreha, Master). Methodologic specifications, results, their interpretation.**
- **The interpretation and codification of thoracic radiography standard in pneumoconiosis.**
- **The interpretation of tests for noxious factors (dusts, chemical substances) at work site.**
- **Estimating occupational physical effort by the method of general estimate of energy expenditure.**
- **The diagnosis of pneumoconiosis (clinical and functional criteria, exposure and biologic response indexes, positive and differential diagnosis, treatment, medical and technical prophylaxis, legal provisions).**
- **The diagnosis of occupational bronchial-pulmonary effects (occupational bronchial asthma, extrinsic allergic alveolitis); clinical, functional and allergenic criteria, positive and differential diagnosis, treatment, medical and technical prophylaxis).**
- **The diagnosis of a case of occupational intoxication with lead. Clinical criteria, technical and medical intoxications from exposure.**
- **The diagnosis of cases of occupational intoxication with organic solvents (benzene, toluene, carbon sulphide, methanol); clinical criteria; exposure and biologic response indexes, treatment, medical and technical prophylaxis.**
- **The diagnosis of vibration disease cases (occupational Raynaud's syndrome). Clinical and functional criteria, treatment, medical and technical prophylaxis.**
- **Noise and industrial microclimate determination and estimation.**
- **Estimating the effect of occupational noise on inner ear by total, linear audiometry. The interpretation of audiogram.**
- **Medical examinations when hiring personnel and periodic medical check-ups; the discovery, declaration and outpatient follow-up of occupational diseases; the analysis of morbidity leading to temporary work incapacity.**