Bridging the Gap Between Clinical Medicine and Public Health: An Experimental Course for Medical Students

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PHYSICIANS IN CLINICAL PRACTICE represent a vastly underused public health resource. The health of a population may be favorably influenced through changes in the environment and in patterns of risk behavior, through improvements in the financing and organization of health services, and through clinical care provided to individual patients. The majority of clinicians contribute only to the last of these approaches (*1, 2*).

An experimental course for medical students, held at Columbia University, was aimed at increasing the number of future practitioners who will recognize the public health implications of clinical observations and act or promote actions that go beyond individual clinical care. The course was evaluated in terms of the students' behavioral changes.

Background

Physicians, as well as others who provide clinical care, deal constantly with information derived from the histories, physical examinations, laboratory data, and treatment responses of individual patients. An analysis of this information in the aggregate might reveal significant patterns of environmental hazards, barriers to early care, or other determinants of the health status of the population from which a physician's patients are drawn. The results of this analysis might also suggest possibilities for interventions other than clinical care. It is unfortunate that these patterns are often overlooked by physicians who provide only individual patient care (*3, 4*). Conversely, public health professionals, who should be skilled at analyzing information from a population perspective, have limited access to the clinical details which might provide the necessary clues for nonclinical interventions.

A major public health contribution by a clinician on the Columbia faculty demonstrated that the gap between clinical care and nonclinical interventions can be bridged. The clinician, a plastic surgeon who had treated numerous burned children, found that many of his patients suffered severe burns when their flammable clothing—particularly sleepwear—came in contact with small flames. He became involved in efforts to obtain legislation requiring flame-resistant standards for children's clothing, and he played a major role in the passage of the Flammable Fabrics Act of 1967.

Similar involvement of a sizable number of clinicians would represent a major expansion of the data base and skilled manpower currently devoted to solving public health problems. The physician's special knowledge and community position offer unique opportunities to improve health-related factors on all levels. A pediatrician who has seen a drowned child brought to the emergency room can press for a community water safety program far more dramatically than a public health official armed only with statistics.

Medical students need no new skills to enable them to initiate commonsense interventions. But, they do need a new perspective to supplement the traditional way in which clinical observations are analyzed and to realize that clinicians can act on these analyses in new ways. Teachers of public health often approach this issue from a moral standpoint: "What is the physician's responsibility to his or her community?" (*5*). This approach implies that physicians choose not to act on nonclinical health concerns. We believe that it is much more likely that most clinicians fail to analyze the underlying data in a way that presents a choice. We are dealing primarily with a problem of perception, not ethics. This view is supported by a recent national study of 2,713 physicians, in which 66 percent agreed that "Good

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medicine requires more than just treating people who come for care; it requires that doctors work in programs to improve social conditions." (Personal communication, Dr. John Colombotos, assistant professor of sociomedical sciences, Columbia University School of Public Health, October 1976.)

Experimental Course

Shortly before the start of their third year, students at the Columbia University College of Physicians and Surgeons are asked to indicate the order in which they wish to take their clerkship courses. Assignment to their first or second choice or another sequence is then determined by lottery; thus, the ultimate determination is semirandom. One of us is the course director (Rosenberg) and one is the course coordinator (Haynes) of the required clerkship in public health. Approximately 18 students are assigned to each of 8 rotations during the year. The students in each rotation spend 18 afternoons in the course over a 6-week period.

The course director is also the district health officer for the local region of the New York City Department of Health, and the course is taught at the Washington Heights District Health Center. The integration of public health teaching and practice had improved medical students' acceptance of public health as a relevant medical specialty and contributed to enthusiastic participation by students in the clerkship (*6*). In this context, we thought it feasible to introduce an ambitious objective—a significant increase in perceptions and actions that bridge the gap between clinical medicine and public health.

The 1976–77 third-year class began in April 1976. An experimental clerkship was presented to students in the first, second, fourth, and fifth rotations. It was then evaluated. This clerkship has been continued, with modifications suggested by the evaluation results.

The structure of the experimental course was based on three assumptions: (*a*) students can learn a problem-solving method by applying it, with guidance, to a real problem, (*b*) if students become involved in efforts to solve a problem, they will learn new (nonclinical) approaches when the problem itself (not the instructor) demands it, and (*c*) students will use these newly learned approaches again if they are rewarded for their initial efforts.

Course content. The first session of each experimental rotation was devoted to a definition of public health, a "public health profile" of the local community, and a discussion of the structure and objective of the course. It was stressed that problem solving in public health is entirely open ended. Most interventions, however, are concerned with the environment, health care organization and finance, and social and behavioral influences on health. For this reason, the second, third, and fourth sessions of each rotation were devoted to seminars on these three topics.

Following the seminar sessions, the students were asked to form three to six groups, each with a project topic—a clinical problem of interest to the students, based largely on their previous experiences in wards and clinics. The students were encouraged to focus on specific problems. Among the topics chosen were patients who present with advanced breast carcinoma; patients who come to the emergency room late in the progress of myocardial infarction; repeated episodes of child abuse; unwanted teenage pregnancy; and undetected lead poisoning among children not receiving routine preventive care.

During each rotation, 9 or 10 afternoons were spent in project work by the teams. Each group met periodically with the course director, course coordinator, and selected resource faculty from Columbia and the New York City Department of Health.

Each team was asked to identify as many factors as possible that might contribute to the prevalence or incidence of the topic chosen. Review of clinical records, interviews with patients, and meetings with resource faculty were used to validate contributory factors and to choose one or two particular factors for detailed analysis. Often questionnaires were devised and administered to patients or groups at risk in the community, in an attempt to identify important precursors of the problem.

Each project team then planned an intervention strategy aimed at lowering the incidence or prevalence of their clinical problem. Several teams had the opportunity to test their interventions on a small scale. Each team prepared a brief written outline and an oral presentation of the entire process for the class. Two class sessions were devoted to these reports during each rotation, followed by a summary and evaluation session. When possible, the district health officer took action based on the students' projects, and he kept team members informed of his progress and results.

Course outcomes. Most of the students participated enthusiastically in the projects, and their activities extended beyond scheduled course sessions into evenings and weekends. The project groups focused on significant local problems, showed insight in their

analyses, and developed practical and useful interventions.

One project group was interested in childhood poisoning. After analyzing various contributory factors, the students chose to explore the efficacy of childproof caps on medicine bottles by comparing the caps dispensed at the Columbia-Presbyterian Medical Center with another type. They tested the two cap models by using the Food and Drug Administration protocol for manufacturers of the safety caps. They worked with the hospital pharmacists, who stated that they would implement recommendations based on the students' findings.

During their oral presentations, the students displayed an awareness of the value of nonclinical interventions and an appreciation of their potential roles as initiators of such activities. One group explored several environmental factors possibly associated with infections acquired in the hospital's intensive care units. They discovered five patients whose infections appeared to be related to improperly sterilized respiratory equipment. In their report to the class, these students described the reactions of the medical staff to their findings. One student noted that "They want to treat each infected patient properly, but they don't seem to see any role for themselves in making sure that the sterilization procedures are adequate." After 6 weeks in the course, these students were surprised to find that some clinicians were not eager to become personally involved concerning the environmental factors affecting their patients.

Followup Questionnaire

In December 1976, a questionnaire was sent to third-year medical students. They were asked to describe any conditions they had observed among their patients that might be of public health significance, their proposed solutions, and any actions they had taken. The students were asked to enter their names on the questionnaires if they wanted feedback on followup efforts by the district health officer. The number of each student's public health rotation was preprinted on his or her questionnaire.

Of the 124 students sent questionnaires, 72 had completed the experimental public health clerkship rotations 1 to 6 months earlier, 35 had not yet started their public health rotations, and 17 had completed a "traditional" public health clerkship 3 months earlier. Questionnaires were not sent to 18 students who were in the midst of a clerkship rotation.

The traditional clerkship had been reintroduced for one rotation so that we could determine whether students who had received the experimental course would respond more positively to the questionnaire than the other students—not because of the specific content or structure of the course, but merely because of exposure to the basic concepts of the course or because of a wish to please faculty members. In the traditional rotation, students participated in seminars on diverse public health topics, and they spent three afternoons in small-scale, unstructured projects of their choosing. They were asked to explore any topic with public health significance in any manner they chose. Each group reported orally to the entire class. Although each group focused on a current medical care approach to a health problem or on the medical services received by a specific group in the community, none attempted to explore an unmet need or to develop an intervention. This rotation closely resembled the clerkship as it was taught before the experimental format was introduced.

Results

Of the 124 questionnaires mailed, 92 (74.2 percent) were returned: 86.1 percent from the students who had completed the experimental rotation, 60 percent from the students who had not yet taken the clerkship, and 52.9 percent from the students who had completed the traditional rotation. These differences in the return rates may have reflected the positive effects of the experimental clerkship; however, several interpretations were possible because the responses for two groups were not complete enough to justify analysis. Therefore, followup measures were taken to increase the return rates for the two low-response groups.

Of the 35 students who had not had the clerkship at the time of the initial questionnaire. 17 began their public health rotation in January 1977. They were given the questionnaire at their first class session, and nine additional students responded. The students who had taken the traditional public health rotation were telephoned, and six additional responses were obtained. As a result of these followup procedures, 107 of 124 questionnaires were completed (86.3 percent), with more than 85 percent completion in each subgroup. The students' names and rotation numbers were recorded on a code list before the questionnaires were analyzed.

The responses to the questionnaires are shown in the table. Among the 107 completed questionnaires, 29 (27.1 percent) were judged to contain "meaningful positive responses" to the first question; such responses were defined as those that identified actual or potential health problems in a population. No prob-

lems were seen by 77 students (72 percent), and 1 student (0.9 percent) did not answer this question.

Responses to the first question identified a wide range of problems observed by students. Some were specific local problems for which corrective measures could be taken; for example, poorly trained ambulance attendants at one hospital and flaws in isolation procedures for patients with communicable diseases at another. Other conditions mentioned represented national problems for which effective solutions are not known—widespread alcoholism, drug abuse, and untreated hypertension—but even for these some students suggested practical approaches by pointing out failures to apply known ameliorative measures.

Of the 29 students who responded positively to the first question, 24 went on to suggest actions for alleviating the problems they had identified; 13 of the 24 and 1 who had not suggested an action requested feedback. Six students who had suggested actions and requested feedback stated that they had already taken some action or brought the problems to the attention of others.

In the analysis of responses, marked differences appeared between the students who had completed the experimental public health rotation and those who had not. The proportion of respondents in the experimental group who perceived public health problems was more than twice the proportion in the no-clerkship group (35.5 percent versus 13.3 percent); this was also true for the respondents who suggested some actions to alleviate the problems (29 percent versus 13.3 percent). Of the experimental group, 19.4 percent requested feedback, and 9.7 percent had taken some action or brought the problems to the attention of others. None of the no-clerkship students requested feedback or took action.

The 15 students who had taken the traditional public health rotation produced intermediate questionnaire results, but their responses were more similar to those of the no-clerkship students than to those of the experimental group; 20 percent of the traditional group, 13.3 percent of the no-clerkship group, and 35.5 percent of the experimental group perceived problems. The same percentage of the traditional group as the no-clerkship group (13.3 percent) suggested actions, and none in either group had taken any action. Two students in the traditional group who perceived problems and suggested action also requested feedback; in this last respect, they resembled students in the experimental group.

Discussion

The course described was given to only one class of medical students in one medical school. Its presentation and assessment were quasi-experimental, and the persistence of the behavioral changes that were demonstrated has not yet been measured. Despite these major limitations, the results indicate that it is possible to enlist larger numbers of future physicians in the identification of public health problems and in the development of nonclinical interventions.

Our findings suggest that certain phases of this enlistment process are more readily achieved than

Medical students' responses to questionnaire concerning perception of public health problems and actions to alleviate them, by students' clerkship status

Questions and responses	Clerkship status							
	None (N=35)		Traditional (N=17)		Experimental (N=72)		Total (N=124)	
	Number	Percent of total	Number	Percent of total	Number	Percent of total	Number	Percent of total
In your contact with patients have you come across public health problems?								
Problems seen	4	13.3	3	20.0	22	35.5	29	27.1
No problems seen	25	83.3	12	80.0	40	64.5	77	72.0
No response	1	3.3	0	....	0	....	1	0.9
What type of action to alleviate this problem would you suggest								
Action suggested	4	13.3	2	13.3	18	29.0	24	22.4
Have you taken any action or referred the problem to others?								
Action taken or referral made	0	....	0	....	6	9.7	6	5.6
Enter name if you would like feedback:								
Name entered	0	....	2	13.3	12	19.4	14	13.1
Questionnaires completed	30	85.7	15	88.2	62	86.1	107	86.3

others. Once they perceived problems, most students (24 of 29) went on to suggest nonclinical approaches to their solution. The most difficult steps are the initial recognition and the taking of action. Each of these steps requires acceptance of a new perspective. How does one bring future clinicians to see roles for themselves in identifying and acting on the problems of populations?

Mezirow (*7*), in the related context of community health education, argues that a crucial, but often ignored, first step in changing adult behavior patterns is to bring about changes in perspective. According to Mezirow, "The most significant behavior changes may be functions of perspective transformations, and such transformation is often an essential precondition for such changes. Within a new perspective, people will still require educational assistance in acquiring needed skills and specific competencies they come to see as relevant."

The experimental public health clerkship addressed this issue as its stated objective. It attempted to change students' perspectives—more accurately, to add a new perspective—by actively involving students in the solution of real problems that could not be adequately approached within the students' original frame of reference. This method of perceptual change has been successful in community health education (*8*), and it has been applied in community medicine clerkships with an ambulatory health care focus (*9, 10*).

If courses such as the one described can succeed in adding a new perspective for future clinicians, a start has been made in bridging the gap between clinical practice and public health. It should be stressed that the new perspective concerning populations is added to the students' existing orientation toward individual patients. No attempt is made to replace one frame of reference with another. Nevertheless, it is highly likely that even a supplemental perspective produced in a single, brief course will fade over time (*11*). Reinforcement later in the medical curriculum, during residency training, and in continuing education should be beneficial, and it should be tested for its effect on the persistence of the new perspective. Reinforcement introduced into clinical training itself may be more effective than additional public health courses.

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SYNOPSIS

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An experimental course for third-year medical students, held at Columbia University, was aimed at enlisting larger numbers of future clinicians in the identification of public health problems and the development of nonclinical interventions, such as environmental and health education strategies. The course sought to develop a new perspective for the analysis of clinical observations.

Students chose clinical problems, identified factors influencing incidence or prevalence, or both, and devised intervention strategies while working in a district of the New York City Department of Health. Students found that they could carry out their responsibilities only by going beyond the limitations of care for individual patients and clinical medicine.

Students' perceptions and behavior were measured during periods of their clinical training. Those who had taken the experimental course perceived public health problems and suggested and took corrective actions much more frequently than students in control groups.