tion. The trainees materially help the Ministry of Health attain the goal of health for all by the year 2000. The graduates provide a steady increase in the number of trained field epidemiologists available to take on positions of responsibility in preventive medicine in the country. As the graduates assume these positions, they can provide day-to-day supervision of new trainees and make it possible to gradually increase the number of trainees accepted into the program each year.

Conclusion

Any discussion of the role of epidemiology in public health and the prevention of disease is, in truth, a discussion of the measurement of national and international civilization. The practice of public health at CDC, or any other place, is the practice of social justice. It is the effort to make health a matter of choice for all—not chance for some.

It has been said: “We cannot remain consistent with the world save by growing inconsistent with our own past selves.” There are many things to learn from one another. In the last decades of the 20th century, the measurement of national stature will be the way countries treat their own people and one another. Epidemiology, its practice and persuasion, is a key to universal social justice.

The International Clinical Epidemiology Network

Background

Achievements in biomedical and behavioral research have raised society’s expectations, yet many segments of society risk being disenfranchised from access to the fruits of those successes. A disproportionate amount of the world’s health resources is spent on treating diseases of the urban affluent, while masses of periurban and rural poor suffer and die from common preventable or treatable maladies. This imbalance raises fundamental questions regarding resource allocation, efficacy of interventions, and community priorities—questions which impinge upon the quality and quantity of care for individuals and the health status of populations.

These problems cannot be addressed by basic biomedical research. Nor can investigations conducted on small samples of hospitalized patients alone provide sound bases for either clinical or policy decisions. Indeed, the hospital perspective tends to distort the physician’s impression of the real burden of illness in terms of numbers, distribution, and extent of physical impairment. In all countries, uncontrollable health care costs, to say nothing of inequities in “north-south” and “urban-rural” distribution of services, reinforce the need for more rational approaches to difficult choices.

An adequate picture of the distribution of diseases over time and place requires that data on hospitalized patients be linked to the population from which they come. Further requirements include identification of high-risk groups and critical evaluation of the diagnostic, therapeutic, and preventive interventions (drugs, vaccines, surgery) that will have the greatest effect on the priority health problems of the entire population.

All this is the province of epidemiology, and involves the application of scientific methods and statistical reasoning to the problems of disease and health care in populations as small as the communities served by a health center, hospital, or medical school, or as large as the global community. The use of epidemiological concepts and methods is essential for estimating the burden of illness experienced in a community; for identifying environmental, behavioral, and occupational health hazards; for establishing the efficacy of preventive, diagnostic, and therapeutic measures; and for assessing the relative impact and cost-effectiveness of different combinations of resources and services used to improve the health status of populations.

Epidemiology as a discipline was originally conceived by clinicians, but in the past 60 years it has developed outside the mainstream of clinical medicine, largely within schools of public health. Over time, clinicians became increasingly involved in laboratory research and drew further away from their colleagues.
in schools of public health who were developing the field of epidemiology. The net effect is that clinicians today have lost touch with epidemiological perspectives and skills, and epidemiologists have lost touch with clinical medicine. What is needed is a bridge between the two approaches.

There have been two major efforts over recent decades to bridge the gap—that is, to provide physicians with population-based perspectives and skills. The first effort was to train clinicians in Schools of Public Health, providing them with a Master of Public Health (M.P.H) degree. Useful as this exposure may have been, it really only provided an introduction to the diversity of health problems in the community. For the most part, it failed to give physicians the substantive critical and analytical skills required for independent judgment, and offered few clinical teaching examples. Success was modest at best. During a recent 10-year period, the Johns Hopkins University School of Public Health produced only one graduate who was also a graduate of its School of Medicine. A recent poll of that University's M.P.H. class of about 140 students, found only nine American physicians under the age of 30. Finally, the 23 Schools of Public Health in the United States currently have only 26 assistant professors who are physicians, out of a total assistant professorship cohort of perhaps 400 to 500. The situation in the developing world is much worse.

The second effort involved establishing separate departments concerned with population-based medicine within the medical schools themselves. These have variously been called departments of public health, preventive medicine, social medicine, community medicine, community health, and environmental medicine. Their activities have been coupled with emergency medicine, nutrition, occupational medicine, family medicine, and a range of nontraditional activities that focused on underserved groups such as mothers, infants, the aged, the handicapped, and the poor. Their combined impact on medicine appears to have been minimal. Indeed, they have been described as departments of "miscellaneous medicine" which tend to be perceived as academically weak, lacking in prestige, out of the medical mainstream, and often as irrelevant.

The International Clinical Epidemiology Network

The International Clinical Epidemiology Network (INCLEN), founded in Honolulu, Hawaii, in February 1983, differs conceptually and organizationally from both prior attempts to bridge the gap between clinicians and epidemiologists. INCLEN uses as its model the strategies for introducing the natural sciences into medicine pioneered by Abraham Flexner. The Network seeks to add the population-based sciences, epitomized in medicine by epidemiology, to the mainstream of scientific medicine, and to train and support bright young and established clinical faculty members in this field.

INCLEN's emphasis on clinical epidemiology is consistent with the widespread belief that physicians, especially clinicians, are being trained more and more narrowly. While focusing on molecular events and individual patients, they have lost contact with other factors that influence the health of populations. Knowledge of disease and use of resources allow physicians to play a crucial role with respect to individual health, to the health of populations, and to the economic well-being of the countries themselves. Epidemiology is the basic discipline for studying disease and health, and for organizing cost-effective means of achieving health goals. Although these matters are of great concern to the developed world, they are of overwhelming concern to the developing world.

The expansion of epidemiological thinking and skills is crucial for the evaluation and application of the fruits of biomedical and behavioral research. Without the information about the disease priorities of underserved populations and the relative efficacy of intervention measures, it is unlikely that research efforts, policies, or resources will be directed effectively to meet those priorities.

As Dr. John Evans has noted: "A population perspective of medicine is something which all clinicians need, because of the effects which their decisions have on distribution of resources. This is especially so in developing countries where massive demand competes with puny supply."

Goals and Objectives

There is a worldwide dearth of epidemiologists working in clinical departments. Clinicians, particularly senior professors, have a critical influence on the attitudes of colleagues, student politicians, cabinet ministers, and other decision-makers who determine national and community priorities and allocate resources for health and other enterprises that impinge on health. INCLEN links Clinical Epidemiology Resource and Training Centers (CERTC) to groups of

Clinical epidemiologists placed in major clinical departments receive the benefit of being associated with a prestigious institution, and enjoy daily contact with both undergraduates and postgraduates (house officers) over a minimum four-year span. The impact of the program lies not only in developing Clinical Epidemiology Units (CEU) and training clinical epidemiologists, but in exposing all students to concepts and methods of epidemiology and to perspectives broader than the confines of a single patient and four hospital walls.

INCLEN seeks to promote CEUs in medical schools as focal points for research and training activities. Clinical epidemiology is visualized as a discipline in which physicians are educated to use efficacious, effective, and cost-efficient interventions, and to allocate resources more rationally to improve the health status of populations. This may be accomplished by applying epidemiological principles to health research and by using critical and systematic approaches to research design, measurement, and evaluation.

INCLEN has five operational goals:

1. The establishment of strategic plans that provide reasonable assurances that both external and local resources allocated to this effort are put to the most effective use;

2. The establishment of at least three regional Clinical Epidemiology Resource and Training Centers, using existing institutions in the developed world to serve as catalysts for resource mobilization in less developed countries, to give prestige to the application of epidemiological concepts and methods within major clinical specialties, and to provide educational continuity to the field;

3. The continuing support of graduate training programs leading to a Master of Science degree based in these Centers. When trainees return to their own universities, they are expected to staff the Clinical Epidemiology Units being established in their home universities. The Clinical Epidemiology Resource and Training Centers would then provide support through exchange of faculty, site visits, and regional and global meetings;

4. The establishment and continuing support of Clinical Epidemiology Units in one or more clinical departments of selected medical schools in the developing world, with the participation of trained clinical epidemiologists, biostatisticians, and health economists; and

5. The conduct of periodic regional and global scientific meetings of the individual institutions and agencies affiliated with INCLEN. At least one meeting will be held annually, usually at a location with one or more Clinical Epidemiology Units.

The Network does not aim to develop another clinical specialty within medicine; rather it seeks to promote the dissemination of epidemiological and biostatistical thinking throughout clinical medicine and health policy-making by fostering a focus on epidemiology within the mainstream of scientific medicine in the universities. Appreciation by physicians of epidemiology as both a powerful analytic tool and an essential medical perspective should contribute to the intellectual and scientific underpinnings of preventive and clinical medicine and of public health measures. The incorporation of these perspectives and methods within clinical medicine should result in institutional and public policies and health priorities that conform more closely to the real medical needs of the entire population served.

Clinical Epidemiology Resource and Training Centers

Currently there are three CERTCs at the Universities of Pennsylvania (United States), McMaster (Canada), and Newcastle (Australia), each offering a Master of Science degree following full-time intensive study lasting 12 to 16 months. Courses are for junior faculty members from clinical departments of medical schools in developing countries, and cover the concepts, principles, methods, and practical applications of epidemiology. Participants learn to apply the basic concepts of causation, bias, clinical measurement, natural history, and disease frequency. The concepts are used to acquire more advanced skills in the areas of research questions and design, sampling procedures, measurements of events and attributes, and analyses, as well as the critical appraisal of the clinical literature. Supervised by a designated preceptor, candidates apply these skills in designing a research project to be conducted in their own country upon return. Participants are given the opportunity to take part in faculty research programs designed to provide experience in practical research methods. Consultancy experience and opportunities for participating in the related activities of a designated preceptor are also offered.

Financial support is available to cover the recipient’s tuition, travel, and maintenance expenses. About one year following successful completion of the course, a visit by a preceptor to the candidate’s institution to consult on the research project also may be provided.

Applications, usually initiated by a dean, department head, or senior faculty member, should be made in
writing to the Director of a specific program. The letter should outline the institution's plan for developing a Clinical Epidemiology Unit or similar entity and the candidate's past experiences, current interests and responsibilities, and future professional plans; it should also be accompanied by a curriculum vitae and endorsing letters, which would include reasons the department head and dean have for sponsoring the applicant. Preference will be given to candidates with assured full-time faculty appointments in departments of internal medicine, pediatrics, and family medicine, as well as those from other clinical departments. Evidence of proficiency in English is required.

INCLEN is currently being funded by the Rockefeller Foundation, and other financial resources are being organized by the Australian Development Assistance Board, the Brazilian National Research Council, the International Development Research Center, the Swedish Agency for Research Cooperation with Developing Countries, the World Bank, and the World Health Organization.

To contact the Clinical Epidemiology Resource and Training Centers, write to:

Professor Stephen R. Leeder, Director,
Asian and Pacific Centre for Clinical Epidemiology,
Faculty of Medicine, The University of Newcastle,
New South Wales, 2308, Australia

Professor Paul D. Stolley, Director,
Clinical Epidemiology Unit
Department of Medicine
University of Pennsylvania, NEB/S2
Philadelphia, Pennsylvania 19104, USA

Professor Peter Tugwell, Chairman,
Department of Clinical Epidemiology and Biostatistics
Faculty of Health Sciences
McMaster University
1200 Main Street West
Hamilton, Ontario L8S 4J9, Canada

(Source: Epidemiology Unit, Health Programs Development, PAHO.)

Smallpox: Post-eradication Surveillance

In 1980 the Thirty-third World Health Assembly, following its declaration of the achievement of global eradication of smallpox, recommended that smallpox vaccination should be discontinued in every country, except in the case of investigators at special risk. Currently all 165 Member States and Associate Members of WHO have discontinued routine smallpox vaccination, except for Albania.

The Committee on Orthopoxvirus Infections, which met in Geneva for the third time from 28 to 30 March 1984, has reviewed the situation, and has made the following comment on the vaccination of military personnel:

"Eight countries have informed WHO that smallpox vaccination of military personnel has been discontinued. The Committee expresses the hope that other countries may elect to do likewise since vaccination of such personnel involves risk both to the vaccinees and to their contacts.¹ In fact, a number of patients with vaccine complications are regularly being reported among contacts of recently vaccinated military personnel. Because of this, the Committee recommends that military personnel who have been vaccinated be confined to their bases and prevented from contacting unvaccinated persons for a period of two weeks following vaccination.²"

The eight countries mentioned above are Belgium, Denmark, Finland, the Netherlands, Norway, Switzerland, the United Kingdom, and Zimbabwe. WHO

¹Several reports on vaccination complications in military personnel and their contacts were published in the Weekly Epidemiological Record 57(41):319, 1982; 58(5):32-33, 1983; and 59(11):83, 1984.
²For the report of the Third Meeting of the Committee on Orthopoxvirus Infections, see document WHO/SE/84.162.