I would like to start by defining our terms. Epidemiology is defined broadly, as the study of the health of human populations. Its functions are:

1. To discover the agent, host and environmental factors which affect health in order to provide the scientific basis for the prevention of disease and injury and the promotion of health.
2. To determine the relative importance of causes of illness, disability and death in order to establish priorities for research and action.
3. To identify those sections of the population which have the greatest risk from specific causes of ill health in order that the indicated action may be directed appropriately.
4. To evaluate the effectiveness of health programs and services in improving the health of the population.

For a definition of public health, I have taken the liberty of using C.E.A. Winslow’s 1920 definition, but altering it somewhat to conform to current concepts:

Public health is the science and the art of preventing illness and disability, prolonging life, and promoting physical and mental health and efficiency through organized community efforts for the sanitation of the environment, the control of infectious and noninfectious diseases as well as injuries, the education of the individual in principles of personal hygiene, the organization of services for the diagnosis and treatment of disease and for rehabilitation, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health.

The definition of leadership is found to be more elusive. One dictionary defines a leader as “a person who leads others along a way; a guide,” and “one in charge or in command of others.” This duality of definition appears again in its definition of leadership: “the position, office or term of a leader,” and “the capacity to be a leader; ability to lead.” Leadership, then, has two aspects which may or may not reside in the same individual, namely, who is in charge or in command, and who has the ability to lead or guide.

This presentation will cover three topics: (1) the importance of the public health movement, (2) the role of epidemiology in this movement, and (3) the need to train leaders in the fields of epidemiology and public health. Because time is limited, the discussion of these topics will also be limited; it will serve as an introduction to a more specific exploration of their implications for the countries of the Americas.

The Importance of Public Health

What is the importance of the public health movement? Returning to Winslow, in a report to the American Public Health Association as Consultant on Accreditation of Schools of Public Health, commented that:

The American Public Health Association believes that the general plan and structure of our educational program is sound. It is based on a conception which we in the United States are apt to take for granted but which is strange and unfamiliar in most other countries. This is the concept that public health is not a branch of medicine or of engineering but a profession dedicated to a community service which involves the cooperative effort of a score of different disciplines. The fact that doctors and dentists and nurses and engineers and health educators and microbiologists and statisticians and nutritionists sit together in our schools and take the same degree is of incalculable importance. It is based on bold assumptions; but it has worked. It provides the only basis for true cooperative community service in the future.

Many years later, it has been pointed out, citing Winslow, that the common denominator of the terms “community, social, and preventive medicine” is “medicine,” and that they are considered to be, and in fact are, a subdivision of the overall discipline. Indeed, they constitute a very minor subdivision of medicine, as measured by every parameter: financial support, numbers of personnel, prestige, political influence, etc.

The concept of public health, on the other hand, is that of a major governmental and social activity, multidisciplinary in nature, and extending into almost all aspects of society. Here the key
word is "health," not "medicine," the universe of concern is the health of the public, not the discipline of medicine.

The two concepts—community, social and preventive medicine on the one hand, and public health on the other—are clearly contradictory. One considers public health to be a subdivision of medicine; the other considers medicine to be a subdivision of public health.

In 1944, Winslow also said that "It seems certain that the organized public health profession rather than the private medical practitioner is responsible for a major part of the gains which have been made during the past forty years." Winslow was commenting on the first epidemiologic revolution, the conquest of many of the infectious diseases. The same comment can be made with regard to the second epidemiologic revolution, the conquest of major noninfectious diseases. These too will be conquered primarily by public health—by altering the physical and social environment—rather than by medicine.

Epidemiology and Public Health

It is perfectly clear that epidemiology played a key role in enabling the public health movement to conquer infectious diseases. It is also clear that epidemiology has played a key role in enabling the public health movement to fulfill its present task, the conquest of major noninfectious diseases.

What is not well known is the fact that it was the public health movement that made it possible for epidemiology to shift to the noninfectious diseases. It has been written recently:

"Why did this change occur first in Great Britain and the United States rather than in continental Europe? The hypothesis is developed that a major inhibiting factor in Europe was the concept that public health is a medical discipline; there were no independent public health centers in which epidemiology, biostatistics and other public health disciplines could collaborate. The London School of Hygiene and Tropical Medicine served as such a center in Great Britain. In the United States, the Public Health Service played a primary role in the development and transformation of epidemiology, together with a number of outstanding state and local health departments and the 23 multidisciplinary schools of public health. The mutual dependence of epidemiology and the public health movement is emphasized."

This was hardly a novel judgement. In exploring the history of epidemiology in the 19th century, Abraham and David Lilienfeld concluded:

"Our excursions in the historical development of epidemiology have led us to realize that epidemiology is closely interwoven with the public health movement, and our study of the evolution of the public health movement has indicated that its roots must be firmly implanted in an epidemiologic base. In order to continue with the past successes of both movements, they must be constantly nourished by each other. It is only unfortunate that one must explicitly and continuously note the relationship of epidemiology with public health. For without public health, there is no epidemiology."

The Tasks of Public Health

As mentioned earlier, one dictionary states that "a leader is a person who leads others along a way; a guide." To discuss leadership in epidemiology and public health, one must define which "way" we have in mind.

What are the tasks of public health today in the Americas? Tables 1 and 2 provide a good part of the answer. The leading causes of death in the Americas are: 1) diseases of the heart, 2) malignant neoplasms, 3) cerebrovascular disease, 4) accidents, 5) perinatal conditions, 6) pneumonia and influenza, 7) intestinal infections, and 8) homicide, legal intervention and war. Every one of these causes of death can be either greatly or considerably reduced by appropriate public health actions based on current epidemiologic knowledge.

The main tasks of public health in the Americas today are, first, prevention of the major noninfectious diseases and injuries, and second, prevention of the major infectious diseases. A third major task is health promotion, the achievement of positive health in terms of ability to function, through improved nutrition, better working and living conditions, greater opportunities for rest and recreation, higher levels of education, and other social changes. A fourth major task is to improve medical care and rehabilitation of the sick and disabled.

The Role of Epidemiology

What is the role of epidemiology in the Americas? Of the functions presented earlier, the first one is of relatively minor importance, since the work has already been done for most of the major diseases.
Table 1. Five leading causes of death, some countries in the Americas, 1980-1984.

<table>
<thead>
<tr>
<th>Country</th>
<th>Heart disease</th>
<th>Cerebrovascular disease</th>
<th>Malignant neoplasms</th>
<th>Accidents</th>
<th>Perinatal conditions</th>
<th>Pneumonia and influenza</th>
<th>Diabetes</th>
<th>Congenital anomalies</th>
<th>Intestinal infections</th>
<th>Homicide and war causes</th>
<th>Other causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina, 1981</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td></td>
<td></td>
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<tr>
<td>Bahamas, 1981</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Barbados, 1984</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Belize, 1984</td>
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<td>Canada, 1984</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Cayman Islands, 1983</td>
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<td>Chile, 1983</td>
<td>2</td>
<td>4</td>
<td>1</td>
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<tr>
<td>Costa Rica, 1983</td>
<td>1</td>
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<tr>
<td>Cuba</td>
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<td>4</td>
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<td>Dominica, 1984</td>
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<td>Ecuador, 1980</td>
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<td>El Salvador, 1984</td>
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<tr>
<td>French Guiana, 1983</td>
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<td>2</td>
<td>3</td>
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<td>Grenada, 1984</td>
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<td>Guatemala, 1981</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Guyana, 1979</td>
<td>3</td>
<td>3</td>
<td>1</td>
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<td>Honduras, 1981</td>
<td>2</td>
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<td>Martinique, 1982</td>
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<td>Mexico, 1982</td>
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<tr>
<td>Netherlands Antilles, 1981</td>
<td>2</td>
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<td>Panama, 1984</td>
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<tr>
<td>Paraguay (information area), 1984</td>
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<td>Peru, 1982</td>
<td>4</td>
<td>5</td>
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<td>Porto Rico, 1983</td>
<td>1</td>
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<tr>
<td>Christopher &amp; Nevis, 1983</td>
<td>1</td>
<td>2</td>
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<tr>
<td>St. Lucia, 1981</td>
<td>1</td>
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<tr>
<td>St. Vincent &amp; Granadines, 1983</td>
<td>1</td>
<td>3</td>
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<td>Suriname, 1982</td>
<td>1</td>
<td>4</td>
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<tr>
<td>Trinidad and Tobago, 1979</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<tr>
<td>United States, 1983</td>
<td>1</td>
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<tr>
<td>Uruguay, 1984</td>
<td>1</td>
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<td>Venezuela, 1983</td>
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<tr>
<td>Virgin Islands (US), 1980</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>2</td>
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</tbody>
</table>


Work still needs to be done, of course, for diseases of unknown epidemiology which have significant impact in one or another country.

Functions 2, 3 and 4 are of the utmost importance. This is the area of applied epidemiology, and it is in this area that the epidemiologists can and must play a crucial role.

**Leadership**

How do we move the countries of the Americas in this direction? Here leadership is all-important.

How do we achieve effective leadership? Two general principles are offered. First, we cannot achieve effective leadership in the future unless we ourselves exercise leadership now. This conference represents a good part of the intellectual leadership of public health in the Americas; it is our responsibility, therefore, not to pass the buck.

Second, leadership has to be achieved in both senses of the term. The leaders who are in charge must accept the new direction, and those who have the ability to lead must either be in charge, or convince and help those who are in charge to move in the new direction.

On the basis of these general principles, the following specific recommendations are offered for your consideration and action:

1. Support the development of governmental administrations that place a high priority on the health, education, and well-being of the population.
Table 2. Five leading causes of death.  

<table>
<thead>
<tr>
<th>Order</th>
<th>No. of Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
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</table>

<table>
<thead>
<tr>
<th>Causes of Death</th>
<th>Score</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of the heart</td>
<td>146</td>
<td>23</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Malignant neoplasms</td>
<td>98</td>
<td>3</td>
<td>13</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>84</td>
<td>-</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Accidents</td>
<td>73</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Perinatal conditions</td>
<td>28</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Pneumonia and influenza</td>
<td>26</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>4</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Intestinal infections</td>
<td>25</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Chronic liver disease &amp; cirrhosis</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>Benign neoplasms, carcinoma in situ</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Mental disorders</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>32</td>
</tr>
</tbody>
</table>

\[ \text{Score} = 5 \times \text{no. of 5s} + 4 \times \text{no. of 2s} + 3 \times \text{no. of 3s} + 2 \times \text{no. of 4s} + 1 \times \text{no. of 5s}. \]


2. Support the appointment of leaders of health departments, schools of public health, and departments of community, social and preventive medicine who are committed to the new direction, namely, an epidemiologic and preventive approach to the major health problems of the Americas, rather than the current overemphasis on treatment services.

3. Educate the incumbent public health leadership, as well as the politicians, the public, and the health professions, on the importance of implementing the second epidemiologic revolution, the conquest of the major noninfectious diseases. Such activity on our part is indispensable if we are serious in our aims; it would offer real leadership, to guide and help others along a new and necessary way.

4. Attract the best young people into the field of epidemiology and public health by enhancing its attractiveness as a career: paying salaries that are equal to the incomes of practitioners in the various health, engineering, administrative, statistical and social science professions; providing adequate budgetary support so that real accomplishments can be achieved, progress can be maintained, and job satisfaction assured; and removing bureaucratic obstacles to their creative ideas and programs.

5. Strengthen the schools of public health through increasing their budgetary support; revamping curricula to move in the new direction; infusing the faculty and student body with new and vigorous recruits from the health, engineering, statistical, social science and other public health disciplines; creating an atmosphere of intellectual excitement, inquiry, experimentation, and exploration of new ways to protect the health of the public; emphasizing the development of true professionals dedicated to public health goals rather than the production of narrow technicians; and above all, forging close working relationships with national, regional and local health departments. The ivory-tower complex of some of our U.S. schools is to be avoided at all costs.

6. The Americas need more well-trained noninfectious disease epidemiologists. It is necessary to send promising young people—physicians, statisticians, social scientists and others—to the centers capable of providing such training. In doing so, we must be conscious of two problems. First, those who return from their training must have jobs available where they can put their knowledge to effective use. Second, some will have been infected by the "pure scientist" virus so prevalent among academic epidemiologists; they will wish to retreat to the comfort and security of their computers rather than dirtying their hands with applied epidemiology, working with their colleagues in health departments, and training a whole new generation of noninfectious disease epidemiologists in the countries to which they return.
7. The departments of community, social and preventive medicine need to be greatly strengthened to become major departments in the medical schools, with increased funding to provide more faculty, salaries equal to the income levels of their colleagues in the clinical departments, and curriculum time and prominence commensurate with their importance. Some of these departments can and should move to become multidisciplinary schools of public health, in fact if not in name. It is essential that they follow the new direction toward epidemiology and prevention of major diseases, and that they, as well as others, reject the siren song of international foundations that offer large sums of money for so-called “clinical” epidemiology; this has nothing to do with epidemiology but everything to do with clinical diagnosis and treatment, and can only result in diverting attention, resources and talent from the urgent need to prevent the major causes of illness, disability and death in the Americas.

I am convinced that the future of epidemiology and public health in the Americas is in good hands. Finding a new direction is not easy, and implementing it will be far more difficult. But we have good leadership, and we have made a good start.

(Source: Presentation by Dr. Milton Terris at the XIV Conference of the Latin American and Caribbean Association for Public Health Education [SCLAESP], held in Taxco, Mexico, from 15 to 20 November, 1987.)

References


Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas as of 31 May 1988.

<table>
<thead>
<tr>
<th>Country and administrative subdivision</th>
<th>Cholera cases</th>
<th>Yellow fever Cases</th>
<th>Yellow fever Deaths</th>
<th>Plague cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOLIVIA</td>
<td>—</td>
<td>92</td>
<td>76</td>
<td>—</td>
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<tr>
<td>Beni</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Cochabamba</td>
<td>—</td>
<td>86</td>
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