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Dengue in the Americas, 1983

After the relatively high level of dengue activity in the Region of the Americas in 1981 and 1982, most countries notified only low-level or sporadic transmission in 1983. However, Mexico, Colombia, and El Salvador—all of which experienced epidemics in 1982—had significant, localized outbreaks in 1983. Overall, 37,168 dengue cases were reported in the Region in 1983, compared with 50,450 in 1982 (Table 1).

In Mexico, 23 of the 30 States reported 23,513 dengue cases in 1983, compared to the 30,904 cases notified by 17 States in 1982. It is estimated that dengue virus is circulating in less than 10% of that country, despite an increase in the number of affected States (Table 2). Attack rates over 100 per 100,000 inhabitants were recorded in the States of Chiapas, Guerrero, Oaxaca, and Puebla, and the disease is apparently showing an ascendant trend in those States. For the first time the cities of Guaymas (in the northwestern State of Sonora), Guamúchil (in the neighboring State of Sinaloa), and Zihuatanejo (in the south-central State of Guerrero) reported cases in 1983. Significant virus activity was detected in the cities of Tapachula and Tuxtla Gutiérrez (Chiapas), Acapulco (Guerrero), Mérida (Yucatán), and Veracruz (Veracruz). Laboratory surveillance showed that at least three dengue serotypes were circulating in the country in 1983. Dengue-4 was isolated from two persons in the State of Oaxaca, dengue-2 from two patients from the State of Guerrero, and dengue-1 was recovered from the States of Puebla and Sonora.[1]

Colombia reported 4,977 for the first six months of 1983. Two serotypes, dengue-1 and dengue-4, were isolated from patients' sera in 1983, and both were probably responsible for some outbreaks. Additionally, serologic data obtained by the arbovirus laboratory—Instituto Nacional de Salud in Bogotá—suggest that dengue-2 and dengue-3 may still be transmitted in some areas of the country; if so, Colombia would be the first country in the Region to have simultaneous transmission of all four dengue serotypes.

In El Salvador, 3,814 cases were reported in 1983, compared with over 5,000 in 1982. An increase in the number of cases began in late June and early July 1983, in the capital, San Salvador, where dengue-4 was the isolated serotype. By late August, cases were reported from most areas of the country, but the largest outbreak occurred in the eastern region bordering Honduras.

Barbados, Haiti, Jamaica, and Trinidad experienced

[1]U.S. Centers for Disease Control. *Dengue Surveillance Summary* No. 16, January 1984.

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Table 1. Reported cases of dengue in the Region of the Americas, 1982 and 1983.

Country	1982	1983	1983 virus serotype
Anguilla	–	2[a]	...
Antigua	5	1	...
Barbados	99	63	4
Belize	482	26	...
Colombia	2,344[b]	4,977[c]	1 and 4
Dominica	–	2[d]	...
Dominican Republic	435	538	4
El Salvador	5,095	3,814	4
Grenada	7	6	...
Guatemala	33	2	...
Haiti	211	483	1
Honduras	1,217	729	1
Jamaica	21	26[e]	2 and 4
Mexico	30,904	23,513	1,2, and 4
Puerto Rico	9,536	2,837	4
Trinidad and Tobago	16	122	2 and 4
United States of America[f]	45	27	1,2,3, and 4
Total	50,450	37,168	

[a]Through September, 1983.
[b]Through 12 August, 1982.
[c]Through June, 1983.
[d]Through November, 1983.
[e]Through October, 1983.
[f]Imported and confirmed cases only.
– None.
...Data not available.

Table 2. Reported cases of dengue by State, Mexico, 1983.

State	Number of cases	Rate per 100,000 inhabitants
Baja California Sur	228	88.5
Campeche	9	2.1
Chiapas	3,473	150.6
Coahuila	3	0.2
Colima	5	1.3
Durango	1	0.1
Guerrero	3,597	149.8
Hidalgo	147	10.6
Mexico	69	0.8
Michoacán	1,267	38.0
Morelos	320	30.3
Nayarit	11	1.4
Nuevo León	95	3.4
Oaxaca	3,966	146.1
Puebla	4,468	124.4
Quintana Roo	123	47.7
San Luis Potosí	44	2.4
Sinaloa	1,786	84.1
Sonora	1,440	87.1
Tabasco	269	20.7
Tamaulipas	52	2.5
Veracruz	1,467	25.1
Yucatán	643	56.3
Total	23,513	

Source: Department of Epidemiology, Ministry of Health and Welfare, Mexico.

small dengue outbreaks in 1983. In Jamaica, dengue-2 predominated, although serologic evidence from United States travelers suggested that dengue-4 was still active as well. Dry weather was probably responsible for limited transmission. In Haiti, the outbreak was apparently limited to the city of Belladere and the surrounding area on the border with the Dominican Republic. Dengue-1 virus was isolated, confirming earlier serologic evidence of this serotype occurring among medical missionaries working in Haiti. Despite epidemic dengue activity in Haiti, relatively few cases were confirmed in the Dominican Republic in 1983. Dengue-4 activity remained high in Trinidad and Tobago throughout 1983, with peak transmissions from July through October. This serotype was isolated by the Caribbean Epidemiology Centre (CAREC) laboratory from 115 cases, compared with only four dengue-2 cases isolated in 1983. In Barbados, dengue-4 was active early in the year, but no isolations were made from April through September. Another virus isolate was made in October, but travel history on the patient was not available.

Following two consecutive years with major epidemics (dengue-1 in 1981 and dengue-4 in 1982), Puerto Rico experienced little confirmed dengue activity in 1983. Dengue-4 virus was isolated only once in 1983 (January), but serologic evidence confirmed sporadic transmission of that serotype throughout the year.

An overview of serotypes shows that dengue-4 was the predominant virus in the Region again in 1983, but dengue-1 also had a wide distribution (Figure 1). There was renewed activity of dengue-2 in the western part of the Region (Jamaica, Mexico). Dengue-1 transmission was confirmed only in Colombia, Haiti, Honduras, and Mexico. However, all four types were introduced into the Region, as evidenced in the United States (Table 1, Figure 1).

Clinically, dengue illness in the Americas in 1983 was of the classical type. There were apparently no cases of confirmed dengue hemorrhagic fever (DHF) in the Region. Health authorities in Colombia, however, reported several cases of fatal hemorrhagic disease that were not confirmed as either dengue or yellow fever. Confirmed cases of dengue associated with encephalitic signs were observed in the Dominican Republic.

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

Figure 1. Dengue in the Americas, 1983.

Years of Potential Life Lost—Brazil, 1980

Introduction

Because death is inevitable, the main goal of public health is to prolong life as much as possible—that is, to delay death and provide conditions that are appropriate for an active and healthy life. To achieve this, indicators are needed that serve for establishing priorities and making decisions. For that purpose, the "years of potential life lost" indicator (YPLL) is coming into increasingly frequent use.

The concept, in which total deaths in each age group are multiplied by the difference between the medium age of death in each group and the number of years of life expectancy, was introduced in 1947, as a means of comparing mortality from tuberculosis with mortality from heart disease. Since then several studies have been conducted to improve the methodology *(1)*. Recently, the PAHO *Epidemiological Bulletin (2)* described a model for the study of YPLL designed by the United States Centers for Disease Control and reported in the CDC publication, *Morbidity and Mortality Weekly Report*.

The purpose of the present article is twofold: to present the data on YPLL in Brazilian state and territorial capitals; and to propose "the development in Latin America and the Caribbean of a similar methodology, or perhaps the adaptation of that used by the CDC."[1]

Area of Research

In 1980 Brazil had 119,098,922 inhabitants living in 23 states, three territories, and the Federal District. Of the total deaths that occurred that year—estimated at one million—data are available on 750,000. Since the coverage and quality of the data vary from region to region in the country, this study refers exclusively

[1] *Epidemiological Bulletin* 4(5):1983, p.13.

to the information obtained in the capitals of the states and territories and the Federal District *(3)*. In 1980 the 27 capitals had a combined population of 28,609,905 inhabitants (24% of the national total), and 207,361 deaths of residents were recorded.

Data Sources

In each of the 27 territorial units of the country, the data on deaths from the Civil Registry are compiled by the Secretariat for Health, except in São Paulo and Minas Gerais where this is done by the Secretariats for Planning. The data are coded, transferred to form sheets, and sent to the Ministry of Health, where they are reviewed, corrected, processed, tabulated, and filed.

The states of São Paulo, Minas Gerais, and Rio Grande do Sul send the data on previously reviewed magnetic tapes instead of on form sheets. Rio Grande do Sul also processes and transmits the data for the State of Paraná.

Classification of the Data

The underlying causes of death have been defined as recommended by the World Health Organization in the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death,* Ninth Revision (ICD-9) *(4)*.

For grouping causes of death so as to present them in order of importance, criteria similar to those described in the *Monthly Vital Statistics Report (5)* were used. The basic list used is the "Brazilian Mortality List" (CID-BR) *(6)*, based on recommendations contained in the ICD-9. In Chapter I (Infectious and Parasitic Diseases), for example, the emphasis is on the most important causes of death, such as intestinal infections and diseases preventable by vaccination. As is the case in many other countries, the group entitled "reducible infectious diseases" has been given priority in Brazil and there are specific programs for their control.

The ranking of the most important causes of death includes no category labeled as "others," "all others," or "ill-defined." Moreover, when a category corresponding to a subtotal is defined, none of its components is given separately; for instance, if a category is defined as "tuberculosis," no category is provided for "pulmonary tuberculosis."

Although the classification is based on the CID-BR, for the reader's easy reference, tables 1, 2, and 3 provide the ICD-9's three-digit code numbers for the categories listed. Since one of the purposes of this

Table 1. Numbers and percentages of years of potential life lost by residents aged 1 to 64 years of Brazilian state and territorial capitals for the 10 main causes of death in 1980.

Rank	Groups of causes	ICD-9	Years lost		
			Number	Percentage	Cumulative percentage[a]
	All causes[b]	001-E999	2,298,374	100	
1	Neoplasms	140-239	220,552	9.6	9.6
2	Motor vehicle traffic accidents	E810-819	201,293	8.8	18.4
3	Homicide	E960-E969	164,340	7.2	25.5
4	Pneumonia	480-486	162,452	7.1	32.6
5	Cerebrovascular disease	430-438	114,025	5.0	37.5
6	Infectious intestinal diseases	001-009	97,792	4.3	41.8
7	Ischemic heart disease	410-414	97,196	4.2	46.0
8	Infectious and parasitic diseases	010-018, 137, 020, 030, 060, 071, 084, 085, 086, 090, 097, 120	88,198[c]	3.8	49.9
9	Accidental drowning and submersion	E910	58,639	2.6	52.4
10	Chronic liver disease and cirrhosis	571	54,591	2.4	54.8

[a]Discrepancies in totals due to rounding.
[b]101,637 years lost, or 4.4% of the total for all causes, were due to symptoms, signs and ill-defined conditions, ICD-9 (780-799).
[c]Tuberculosis (010-018, 137) accounted for 59.1% of the total.

Table 2. Numbers and percentages of years of potential life lost by residents aged 0 to 64 years of the Brazilian state and territorial capitals for the 10 main causes of death in 1980.

Rank	Groups of causes	ICD-9	Years lost		
			Number	Percentage	Cumulative percentage[a]
	All causes[b]	001-E999	5,338,324	100	
1	Infectious intestinal diseases	001-009	866,374	16.2	16.2
2	Pneumonia	480-486	55,063	10.4	26.6
3	Intrauterine hypoxia and birth asphyxia, respiratory distress syndrome, and other respiratory conditions of the fetus and newborn	768-770	516,064	9.7	36.3
4	Slow fetal growth and malnutrition, and disorders relating to short gestation and unspecified low birthweight	764-765	236,512	4,4	40.7
5	Neoplasms	140-239	225,002	4.2	44.9
6	Nutritional deficiencies and anemias	260-269 280-285	209,005	3.9	48.9
7	Motor vehicle traffic accidents	E810-E819	203,486	3.8	52.7
8	Congenital anomalies	740-759	173,056	3.2	55.9
9	Homicide	E960-E969	165,243	3.1	59.0
10	Cerebrovascular disease	430-438	115,315	2.2	61.2

[a]Discrepancies in totals due to rounding.
[b]288,429 years lost, or 5.4% of the total of all causes, were due to symptoms, signs and ill-defined conditions, ICD-9 (780-799).

Table 3. Numbers and percentages of years of potential life lost and numbers of deaths among residents aged 7 days to 64 years of the Brazilian state and territorial capitals, for the 10 main causes of death in 1980.[a]

Rank	Groups of causes	ICD-9	Years lost			Deaths		
			Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage[b]
	All causes[c]	001-E999	4,394,366	100		124,531	100	
1	Intestinal infectious diseases	001-009	847,669	19.3	19.3	13,453	10.8	10.8
2	Pneumonia	480-486	526,941	12.0	31.3	9,765	7.8	18.6
3	Neoplasms	140-239	224,808	5.1	36.4	13,255	10.6	29.3
4	Nutritional deficiencies and anemias	260-269 280-285	206,167	4.7	41.1	3,381	2.7	32.0
5	Motor vehicle traffic accidents	E810-E819	203,357	4.6	45.7	6,048	4.9	36.9
6	Homicide	E960-E969	164,985	3.8	49.5	4,813	3.9	40.7
7	Cerebrovascular diseases	430-438	115,120	2.6	52.1	7,928	6.4	47.1
8	Congenital anomalies	740-759	112,748	2.6	54.7	1,832	1.5	48.6
9	Vaccine-preventable diseases	032, 033, 037, 045, 055, 771.3	109,783[d]	2.5	57.2	1,916	1.5	50.1
10	"Reducible" infectious diseases	010-018, 137, 020, 030, 060, 071, 084, 085, 086, 090, 097, 120	98,389[b]	2.2	59.4	4,037	3.2	53.3

[a]The number of deaths of infants aged 0 to 6 days was 14,635, and of persons aged 65 and over 68,195; the total number of deaths for all ages was 207,361.
[b]Tuberculosis (010-018, 137) accounted for 59.1% of the total.
[c]270,240 years lost, or 6.1% of the total for all causes, and 6,147 deaths, or 4.9% of the total for all causes, were due to symptoms, signs, and ill-defined conditions, ICD-9 (780-799).
[d]Measles (055) accounted for 73.6% of the total.

tabulation list is to define or redefine priorities, in general, mixed groups have not been used.

The Method

Following the example of several researchers and the CDC models *(7-9)*, the upper age limit for this study was set at 65 for three reasons: it is the minimum life expectancy desirable; it is frequently taken as the end of the productive years; and the consensus is that including the deaths of persons over 65 would obscure "premature" mortality owing to the bias that could be introduced by the greater weight this would give to chronic degenerative causes.

At the other extreme of the age range, the possibility of excluding infant deaths should be considered. Most studies have eliminated deaths of infants under 1 year of age on the ground that almost all of them are from causes very hard to prevent such as intrauterine hypoxia, birth asphyxia, and other respiratory conditions (ICD-9: 768-770), slow fetal growth and fetal malnutrition (764), short gestation and low birthweight (765), and congenital anomalies (740-759)—which, if included, would disproportionately increase the years of potential life lost.

Table 1 shows the years of potential life lost by persons aged 1-64 in the Brazilian state and territorial capitals in 1980. As can be seen, when infant mortality is eliminated, external and chronic degenerative causes predominate.

On the other hand, it can be argued that infant mortality should not be excluded when it is very high, as is still the case in Brazil and other Latin American countries. Table 2, which gives the YPLL from 0 to 64 years, shows certain differences from Table 1, for—while some chronic degenerative and external causes have disappeared (cirrhosis, drowning, and ischemic heart disease), others have taken their place (congenital anomalies, perinatal conditions, and nutritional deficiencies).

Finally, to achieve equivalence and comparability with CDC data, it would be appropriate to define the lower age limit to be used for this analysis. Although deaths difficult to prevent should be omitted (hypoxia and birth asphyxia, fetal malnutrition, and premature birth, among other causes), infant deaths from diseases preventable by vaccination and from nutritional deficiencies should not be excluded.

Analysis of infant mortality in the Brazilian state and territorial capitals suggests that deaths occurring before the seventh day of life should be excluded. The YPLLs from 7 days to 64 years are given in Table 3, together with the number of deaths occurring from each group of causes. This table reflects more accurately the pattern of mortality in the Brazilian capitals, combining as it does chronic degenerative diseases and external causes with infectious diseases and malnutrition, which are characteristic of developing countries.

Since the causes of perinatal death which are difficult to prevent almost always occur within the first week of life, the lower age limit of 7 days should be considered for its adoption. This would not substantially alter the results and would have the great advantage of allowing comparisons between groups of the same age: 7 days to 64 years.

(Source: Roberto Augusto Becker, Marcia Galdino Moreira and José Leão Costa, National Division of Epidemiology, National Secretariat for Basic Health Measures, Ministry of Health, Brazil.)

Editorial Comment

This article discusses the differing results obtained by using alternative age limits for the formulation and interpretation of an indicator based on the number of years of potential life lost.

The listing of ten leading causes can also be substantially altered by the grouping of causes used as the basis for selection. How that initial grouping is defined will affect the relative importance of the different causes, whether these are selected by means of the indicator discussed here or of indicators more commonly used such as the cause-specific mortality rate or proportion.

Any indicator not yet properly tested should be carefully studied before it is widely adopted, to make sure that the definitions and procedures are suited to the situation under study and to the proposed analytical purposes. Furthermore, it should be noted that in this case the point is to find an indicator that will complement conventional ones rather than replace them.

It is hoped that this study will stimulate others so that a deeper understanding may be gained of the health problems of the countries in the Region.

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(7) Premature Deaths, Monthly Mortality, and Monthly Physician Contacts. *MMWR* 31(9):109-110, 117, 1982.

(8) Table V: Years of potential life lost, deaths, and death rates, by cause of death and estimated number of physician contacts, by principal diagnosis, United States. *MMWR* 31(18):245, 1982.

(9) Table V: Years of potential life lost, deaths, and death rates, by cause of death and estimated number of physician contacts by principal diagnosis, United States. *MMWR* 31(22):299, 1982.

Epidemiology in the Experience of the United States Centers for Disease Control—A Personal View[1]

Disease Control in the United States—An Historical Perspective

This century has been marked by unbelievable progress against infectious diseases everywhere. In 1900, the leading causes of death in the United States were heavily influenced by infectious diseases. Indeed, when the question is raised in terms of years of life lost rather than absolute numbers of deaths, infectious diseases were four of the five leading causes. One by one, these ancient scourges have yielded to medical knowledge and public health practice, resulting in dramatic reductions in, among other diseases, tetanus, diphtheria, poliomyelitis, and typhoid fever. The change has been so astonishing, that diphtheria, the third leading cause of years of life lost in 1900, accounted for only three cases of disease in children under the age of 15 in the entire United States in 1982 (provisional data). The cumulative effect of each of these victories has been an increase of over 25 years in life expectancy at birth for United States citizens in the 20th century.

What is remarkable about this increase in life expectancy is the relatively small part played by miracle drugs, highly technical surgical advances, and a $200 billion a year health care industry. By and large, the improvements can be credited to very simple, yet often poorly organized, activities including improved housing, safe water supplies, waste disposal, food safety regulations, environmental improvement, and immunization programs. The primary effect of these programs has been the reduction of infant and childhood mortality. Indeed, it has been said that if all hospital beds were to disappear overnight, it would have less of an effect on health than would losing one of these simple preventive measures. Epidemiology and epidemiologists have been critically important in developing and implementing these preventive measures.

The Current Situation

A current look at mortality shows a picture unimagined at the beginning of this century. Only one infectious disease (pneumonia and influenza) is still found among the 10 leading causes of death. Not a single infectious disease ranks among the five leading causes of years lost (accidents and adverse effects, malignant neoplasms, diseases of the heart, suicides and homicides, and cerebrovascular diseases). Nevertheless, it is striking how many of these causes of years of life lost are potentially preventable. Violence still eludes the best control efforts. Accidents are largely preventable. Diseases of the cardiovascular system have shown significant declines in the last decade and

[1]Prepared by Dr. William Foege, former Director, U.S. Centers for Disease Control. Presented by Dr. George Hardy at the Seminar on Uses and Perspectives of Epidemiology, Buenos Aires, Argentina, 7-10 November 1983.

are highly vulnerable to prevention procedures. While it is true that overall cancer rates have been increasing in this country, the fact is that noncigarette-induced cancers are declining, and a major impact on total cancer mortality in the United States could be made simply by eliminating cigarette smoking.

In light of the fact that some 1,000 persons (40 per hour) die each day from cigarette smoking, the apparent preoccupation in the United States with nitrates, saccharin, and other food additives will baffle historians 100 years from now. Cigarette smoking claims more lives in three years than all United States wars combined. If the same number of persons died from anthrax or smallpox, society would protest and demand immediate, effective action. Yet the toll exacted by the cigarette-smoking epidemic is concealed behind death certificates which read: heart attack, stroke, cancer. Cigarette-smoking is the smallpox of the 1980s in the developed world, and society will be judged quite harshly in the future for not having dealt with this fact in a straightforward manner.

The epidemiological analysis of these statistics leads to a sobering conclusion: while life expectancy at birth in the United States has increased by over 25 years since 1900, most of this is due to a decrease in infant and childhood mortality. Viewing life expectancy from the standpoint of middle age, 20th-century medicine, science, and technology have actually enabled modern man to outlive his grandparents by only six years.

On the other hand, there is evidence that some very important actions such as not smoking, drinking in moderation, exercise, and proper diet can make a difference of a decade in the life expectancy of a middle-aged person. In essence, what individuals do for and to themselves can be twice as powerful as all the benefits of modern medicine. If this is true, then the major thrust of public health in the 1980s should be to exploit as a priority the life-giving powers of the individual.

The advances of preventive medicine in the past decades have largely been elitest in the sense that small groups have decided, for example, to chlorinate water supplies, drain swamps, and regulate food preparation. These decisions have been carried out through social and environmental manipulation. The advances of the future will still involve some social and environmental manipulation—such as attempts to reduce tar and nicotine levels in cigarettes and to prevent the introduction of chemicals to water supplies—but the major disease prevention accomplishments in the United States will be seen in billions of decisions and actions taken by millions of individuals on a day-to-day basis. Taking and acting on those decisions will require education—promoting the development of good life habits and equipping individuals to make informed decisions—the type of education that has not been a traditional characteristic of the health care industry. Historically, society has looked to families, churches, and education systems to instill such values and skills.

The Developing World Today

What is the contemporary scene in the developing world, meanwhile? The developing world is also marked by a health revolution as it travels through a public health/epidemiological transition, similar in many ways to what happened in the United States. Everywhere, infant mortality is decreasing, life expectancy is increasing, and birth rates are falling.

Life expectancy in the developing world is now at the level found in industrialized countries in the 1920s and the 1930s and it could reach an average of 65 to 70 years by the year 2000. But the developing world has a double problem for the coming decades. It will continue to live with the historical problems of infectious diseases, malnutrition, and population pressures; at the same time, it will increasingly be victimized by some of the negative health consequences of development. Already surfacing are problems of occupational hazards and exposures, environmental issues of chemical waste and toxin exposure, and health difficulties related to affluence. In all likelihood, by the year 2000 the major health problem in the third world will be the effects of cigarette smoking.

Development of sound epidemiological baselines for tomorrow will depend upon actions taken today. Data are needed on the occurrence of disease, populations at risk, points of effective intervention, and population density, movement, and disease patterns.

Disease surveillance is the foundation on which future health programs must be built. Quantification of disease problems and the identification of populations at risk must be completed *before* decisions are made regarding large-scale health programs and the necessary investment of personnel and other resources. In most developing countries, it will be necessary to train health workers to recognize, collect, and analyze such data, especially in predominantly rural populations.

Actions for the Future

If teams of health workers can be taught aggressive surveillance techniques and other epidemiological practices, they will be able to identify with accuracy

the disease problems that demand attention and priority. In turn, they will have the knowledge and authority to teach leaders of their countries to deal effectively with these problems. An analysis of current operational programs indicates that the key deficiency in delivering vaccine to those who need it is managerial, not technical. Developed countries can help by assisting developing ones to train their health workers in planning, implementing, and evaluating their own primary health care programs. However, the situation can improve only if the people of each country, as well as health care personnel, are involved in prevention and primary health care. Community involvement in these processes is key to any major improvement in health in developing countries.

There is growing recognition of the need for epidemiological support for all aspects of disease control and prevention programs in countries throughout the world. The manifold use of epidemiological services is of increasing interest to public health practitioners, including administrators and planners at all levels of management—national, state, and local. It is evident that development of comprehensive epidemiological services and appropriately trained epidemiological specialists is critical to the successful implementation of a country's health policy.

Training Programs

In 1951, the U.S. Centers for Disease Control (CDC) recognized that existing academic-oriented epidemiological training programs were not adequately producing the type of field epidemiologists required to effectively deal with the diseases that caused most of the morbidity and mortality in the United States. To address this need, CDC initiated a preceptorship type of training program in epidemiology called the Epidemiologic Intelligence Service (EIS). The program focused on closely supervising trainees as they worked on real problems in the community and resembled in concept the clinical training programs common to all medical specialties. Credit was given for the experience obtained in the program so that graduates could take the specialty board examination in public health and preventive medicine. During the ensuing 32 years, more than 1,200 trainees, primarily physicians, have participated in the program and have been assigned to training positions at either the country or state level where they have provided useful services while being trained simultaneously. They have worked on a variety of infectious and noninfectious, acute and chronic disease problems; these efforts represent some of the best epidemiological work performed in the United States. EIS officers have become the critical cadre in the country's disease surveillance and investigative network. They analyze and report data, investigate outbreaks of disease, develop methodology for disease control and prevention programs, and utilize these data for planning, managing, and evaluating health services and programs.

Collaborative Efforts

The success of this CDC program and its potential value to health programs in the developing world has been recognized by WHO. In 1980, the WHO Regional Office for South-East Asia (SEARO) in New Delhi, India and CDC initiated the Global EIS and supported Thailand in developing the first such program. CDC contributed an experienced medical epidemiologist from its staff through WHO to serve as a full-time resident consultant to the program. Some additional support funds were provided by SEARO. Yearly classes have consisted of four to five trainees, and their assignments have covered some of the major public health problems in the country. The Ministry of Health has recently given the program permanent status in its organization. There have been nine graduates of the program, all of whom have accepted epidemiological positions in the Ministry of Health. Another program was initiated in Indonesia in October 1982 with CDC and SEARO support, and one CDC medical epidemiologist was again assigned through SEARO to serve as a training consultant.

An epidemiology training program for a specific country must take into account the health problems and available resources of that country. Critical to the program is the concept of a two-year, supervised, field training program where the trainees are exposed to the techniques of applied epidemiology through preceptorial training. The trainees provide service to the central and participating state governments while being trained.

CDC will, if possible, support such programs by assigning an experienced staff epidemiologist to work with a counterpart epidemiologist in supervising the trainees. This support would be provided for approximately five years, at which time full supervisory responsibility for training should be assumed by the host country, potentially utilizing graduates of its own program.

This program can provide epidemiological services to the country while trainees are being exposed to epidemiology and its role in disease control and preven-

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."[1]

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

[1]Evans, J. R. *et al.* Shattuck Lecture—Health Care in the Developing World: Problems of Scarcity and Choice. *N Engl J Med* 305(19):1117-1127, 1981.

clinical epidemiologists in medical schools throughout the developing world.

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

[1]Several 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.

[2]For the report of the Third Meeting of the Committee on Orthopoxvirus Infections, see document WHO/SE/84.162.

would greatly appreciate Member States other than those mentioned above informing the Smallpox Eradication Unit, World Health Organization, 1211 Geneva 27, Switzerland, as to whether they have discontinued vaccination of their defense personnel.

In countries that have not yet decided to discontinue vaccination of military personnel, a temporary regulation of two weeks quarantine for newly vaccinated recruits would decrease the risk of spread to contacts.

(Source: Weekly Epidemiological Record 59(36):278, 1984.)

Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas up to 31 October 1984.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague cases
		Cases	Deaths	
BOLIVIA	–	*5*	*5*	*12*
La Paz	–	5	5	12
BRAZIL	–	*45*	*28*	*17*
Amapá	–	2	2	–
Amazonas	–	9	8	–
Bahía	–	–	–	4
Ceará	–	–	–	11
Minas Gerais	–	–	–	2
Pará	–	31	15	–
Rondônia	–	1	1	–
Roraima	–	2	2	–
COLOMBIA	–	*13*	*13*	–
Arauca	–	1	1	–
Boyacá	–	1	1	–
Casanare	–	4	4	–
Cesar	–	1	1	–
Cundinamarca	–	1	1	–
Meta	–	3	3	–
Santander del Norte	–	1	1	–
Santander del Sur	–	1	1	–
ECUADOR	–	–	–	*6*
Chimborazo	–	–	–	6
PERU	–	*22*	*17*	*289*[a]
Ayacucho	–	1	1	–
Cajamarca	–	–	–	229
Huánuco	–	12	9	–
Junín	–	6	5	–
Madre de Dios	–	1	1	–
San Martín	–	2	1	–
Piura	–	–	–	60
UNITED STATES	–	–	–	*30*
Arizona	–	–	–	2
California	–	–	–	5
Colorado	–	–	–	4
New Mexico	–	–	–	15
Texas	–	–	–	1
Utah	–	–	–	2
Washington	–	–	–	1

[a]Peru notified recently cases occurred between January and September 1984.

Calendar of Courses and Meetings

Latin American Regional Congress of the International Epidemiological Association

This Congress will be held from 16-19 April 1985, at the Faculty of Medicine of Ribeirão Prêto, University of São Paulo, Brazil. Focusing on the theme of the use of new methods in epidemiology, it will consist of the presentation of papers, symposia, and plenary sessions on clinical epidemiology, social epidemiology, methods of epidemiological analysis, and epidemiology and health planning. Also on the agenda are discussions on nutrition, occupational health, communicable diseases, noncommunicable diseases, methodology, environmental health, and health planning.

For more information, write: Dr. Uilho A. Gomes, Department of Social Medicine, Hospital das Clínicas, 14.100 Ribeirão Prêto, Brazil.

International Conference on AIDS

An International Conference on Acquired Immune Deficiency Syndrome (AIDS), to be held 15-17 April 1985, at the World Congress Center, Atlanta, Georgia, will be sponsored by the U.S. Centers for Disease Control; the National Institutes of Health; the Food and Drug Administration; the Alcohol, Drug Abuse, and Mental Health Administration; the Health Resources and Services Administration; and the World Health Organization. The purpose of the meeting is to review strategies for the prevention and control of AIDS, and to exchange information on screening and diagnostic tests for AIDS and on the epidemiology, virology, immunology, clinical manifestations, and treatment of AIDS. Seating will be available for 1,800 participants. The deadline for submitting abstracts is 10 December 1984. To obtain further information and future announcements, please contact: AIDS Conference, Building 1, Room 2047, Centers for Disease Control, Atlanta, Georgia 30333, USA.

International Courses in Statistical, Epidemiological, and Operational Methods Applied in Medicine and Public Health

The course in "Méthodes Statistiques, Epidémiologiques et Opérationnelles appliquées à la Médecine et à la Santé Publique" was created in 1963 in agreement with the WHO Regional Office for Europe (EURO), and consists of a four-month intensive program given each year in Brussels, Belgium, from 1 February to 31 May. The teaching is directed essentially toward the practical and theoretical understanding and acquisition of methodologies. Thanks to the Administration Générale Belge de Coopération au Développement, a second program, identical to the previous one but given in English, was created in 1984 and named: "International Courses in Statistical, Epidemiological, and Operational Methods Applied in Medicine and Public Health."

Oriented toward epidemiological methods and health planning, this course is based on the use of statistical methods and operational research in the application of quantitative analysis in etiological and clinical research and scientific management. It is intended for public health officials, physicians, clinical physicians, research workers, sanitary statisticians, and members of related professions, and stresses the application of methods and techniques rather than the passive acquisition of knowledge.

The overall program includes a small number of advanced courses; the teaching consists essentially of seminars, practical work, group discussions, case and textbook studies, simulations of situations, and decision-making. The teaching program requires fluent use of the English language. Further information may be obtained from: Ecole de Santé Publique U.L.B., Université Libre de Bruxelles, Campus Erasme—cp 590/1, Route de Lennik 808, B-1070 Brussels, Belgium.

Publications

NIOSH Manual of Analytical Methods.3rd ed. Washington, D.C.: U.S. Government Printing Office, 1984. (Vols. I and II now available, Vol. III available in 1985).

The National Institute for Occupational Safety and Health (NIOSH) has announced that Volumes I and II of the *NIOSH Manual of Analytical Methods* (Third Edition) are now available. Volume III is planned for 1985. This Manual is the primary source of analytical methods cited in criteria documents, current intelligence bulletins, and reports produced by NIOSH of health-hazard evaluations, industry-wide studies, and control-technology assessments.

Discussion of each method begins with a summary, followed by a list of the reagents and equipment needed, special safety precautions, and instructions for taking and handling samples. Three indexes are included for cross-reference: (1) method numbers used in the Third Edition; (2) method numbers used in the Second Edition; and (3) names and synonyms of the substance. A section on applicability helps Manual users to choose the most appropriate methods for their purposes. Chapters on the development and evaluation of methods, quality assurance, air sampling techniques, and biological samples are included to expand on the protocols used by NIOSH in developing and applying the methods.

This publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, USA, under a subscription service that includes the basic Manual and all annual supplements through 1987 at a price of US$31.00 (domestic orders) or US$38.75 (outside the United States).

Questions and suggestions for improving the Manual should be sent to: Manual Coordinator, NIOSH, Division of Physical Sciences and Engineering, Mail Stop R-2, 4676 Columbia Parkway, Cincinnati, Ohio 45226, USA.

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