Health Differentials Based on Living Conditions
Future Lines of Research on Health Profiles

The need to adapt the responses of health sector institutions to the health problems of different population groups makes it essential for health situation assessment to be carried out at the local level, disaggregated by different levels of living conditions as well as by types and levels of risk for the most prevalent health problems. Thus, in order to supply criteria for improved design, staffing, equipment, and surveillance of health care delivery services aimed at tending to the needs of these different groups, research proposals on health profiles which will receive priority support from the Pan American Health Organization will center on studying the heterogeneity in morbidity and mortality profiles and the health needs of different local population-areas.

Since the speed and intensity of the urbanization process in most countries has contributed to increasing disparities in levels of living and health, special attention will be paid to those projects which study intra-urban health differentials. Based on the premise that health needs are closely linked to living conditions of the population, and that it is easier to describe the latter than the former, the studies will

explore the possibility of utilizing easily obtainable indicators based on the characteristics of living conditions to construct a map of poverty, and to infer from it the characteristics of the health profiles of different population groups. These indicators–and the map–will be based on the assumption that there is a spatial distribution of poverty, and they should be able to reflect differences in living conditions between various neighborhoods, residential areas, or other geographical subdivisions of a city. Knowledge thus acquired should constitute a contribution of epidemiology to health services planning and evaluation.

This line of research will include, but will not be limited to, projects on the following specific topics:

- Differential mortality profiles based on living conditions and other environmental and genetic risk factors among different population groups in large urban areas. Comparison of the mortality map with that on poverty will make it possible to study differences in the level and

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structure of mortality among different population strata, as related to their living conditions. The structure of discharges from large urban hospitals, by cause and place of residence. These projects will make it possible to obtain a first approximation to the morbidity structure of the inpatient population of public sector establishments. The tabulations of discharges by cause and permanent residence will make it possible to link the results of this line of research to those of the previous one. In addition, it is hoped that the evaluation and possible reformulation of hospital record-keeping systems will be one of the by-products of these projects.

Application of epidemiological thought to the design and validation of an instrument for surveillance of distortions in the utilization of health services in urban areas. This surveillance should enhance understanding of the factors behind the underutilization of some services and the overutilization of others, be this because they involve distortions in demand inherent to the population itself, or distortions resulting from the organization and functioning of health care services, including their problem-solving capacity.

(*Source:* Health Situation Analysis and Trend Assessment Program, PAHO.)

Health Profiles, Argentina, 1980-1982

Introduction

The research project summarized below was based on the hypothesis that the mortality data available could be better utilized in the characterization of health situations at the national and state levels.

At present, delays in data availability somewhat limit utilization, but the lack of appropriate criteria for classifying causes of death is of even greater importance. Mortality by cause has customarily been tabulated according to the detailed list of 999 causes and the Basic Tabulation List of the Ninth Revision of the International Classification of Diseases (ICD-9). In presentations of data aimed at providing orientation on principal health problems, often the 10 or 20 categories of causes that show the greatest frequency are selected from these lists. Thus, among the principal causes of death, symptoms, signs, and ill-defined conditions (780-789) and various residual categories frequently appear, which reduces their informative value for decision-making.

Purpose and Objectives

The purpose of the research project was to help promote periodic analysis, using an epidemiological approach, of the mortality data available for preparing a health profile; to orient the process of data preparation in order to produce tabulations that better meet the needs of the sector; to stimulate development of the analytical capacity of national technicians, and to promote better utilization of available data. The specific objective of this research was to test different groupings of causes of death in relation to certain indicators–proportional mortality, death rate, and potential years of life lost (PYLL), so that they might be used as components of a health profile.

Materials and Methods

The source of the data was the vital statistics system which is the responsibility of the Bureau of Health Statistics, Department of Health, Ministry of Health and Social Action of Argentina. The vital statistics included in this system–births, deaths, fetal deaths, and marriages, are registered for legal and statistical purposes with state administrative units known as Registries of Marital Status and Individual Status. The entire national territory uses the international model for the medical certification of cause of death. A National Commission on the International Classification of Diseases has been created for the purpose of improving the quality of the information about mortality and morbidity.

This study centered on analysis of the health situation based on the principal causes of death for the entire country and for its geographical subunits (states and their capitals); the mortality data for the three-year period 1980-1982 were used.

In order to evaluate the coverage and quality of the information, the relative size of the category ill-defined causes as well as the quality and coverage of medical certification were analyzed.

In the preparation of tabulations and the preliminary evaluation of the classification of causes of death, the criteria employed were those customarily used in the country (ARG/I list) as well as those utilized for classifying causes by PAHO (R list), the National Center for Health Statistics in the USA (72 list), and the Department of Epidemiology of the Ministry of Health in Brazil (B list). Based on the results, a new list was prepared that was better suited to assessment of the health situation in the country (ARG/II list).

For logistical reasons some tests were made using the 1980 data for the entire country. Tables arranged by categories of causes, age, and sex were prepared manually, based on the tabulation of the detailed list of 999 causes, for the four lists being tested: ARG/I, R, 72, and B. It should be noted that the ARG/I list is very similar to the R list, since it was based on that list. In addition, some preliminary tests were carried out on the 1980 data for the indicator of PYLL, which was calculated with lower age limits of 1 year, 28 days, 7 days, and zero, and with upper limits of 60, 65, and 80 years for the four lists.

For the data from the three-year period from 1980-1982 the following indicators were calculated by cause groups, sex, and age (under 1 year; 1-4; 5-14; 15-44; 45-64; 65 years and over): the number of deaths, proportional mortality (calculated in relation to total defined causes), and the death rates. PYLL were calculated with lower age limits of zero and 1 year, and with upper limits of 60 and 65 years.

Finally, the health situation was analyzed in terms of mortality structure by cause.

Results

Initial activities centered around an analysis of data quality. Several estimates of omissions in the death records are available, based on which the records from five states (Federal Capital, Córdoba, Santa Fe, Buenos Aires and Mendoza) may be considered complete. In the remaining states there might be varying levels of underreporting, but in all of them it was higher for children under five (3%) than for persons from 5 to 80 years (2.1%). The highest levels of underreporting for children under five are in Santiago del Estero and Santa Cruz-Tierra del Fuego.

With respect to the quality of medical certification it was observed that of a total of almost 240,000 deaths reported for 1981 in the country, almost 99% were certified by physicians; the proportion was practically 100% in 11 states, and only in one was it less than 90%. Of total deaths, 2.6% were assigned to symptoms, signs, and ill-defined conditions; but if coding rejections due to inconsistencies between cause, age, and sex and to the presence of codes that do not appear in the classification of diseases were added to this category, the percentage would increase to 3.2%. In addition, there were notable differences between states; the category ill-defined was less than 1% in the Federal Capital, Buenos Aires, La Pampa and Mendoza, but in three states (Formosa, Jujuy, and Salta) it was higher than 10%, and in Santiago del Estero it was more than 30%.

Another factor to keep in mind in relation to certification of cause of death is the weight of some categories which, although not listed as ill-defined in the ICD-9, are terminal states that may result from various pathologies. Among these is one frequently reported as sole cause in the death certificate: cardiac arrest, which is listed under cardiac dysrhythmia (ICD-9, 427). The percentage of deaths assigned to this code in 1980 ranged, by state, from 2.7% to 13.4%. The category heart failure (428), was also heavily weighted (between 5% and 11.7%, depending on the state).

Comparative Analysis of the Lists

A preliminary comparison of the four lists using the 1980 data shows that a common characteristic was the predominance of chronic-degenerative causes. Of these, the first five made up around 57% of the total deaths from defined causes. In contrast, infectious diseases (except pneumonia and influenza) were not among the ten leading causes since many were specific individual categories in the four lists. Thus, none of the lists appeared adequate for obtaining health profiles that could differentiate between geographical areas where infectious diseases as a whole constitute a significant problem. Given the results of this first test, it was decided to set up a new list known as ARG/II to replace the B list while still including some of its elements. The principal characteristic of the new list was that it brought into a single category the most frequent infectious diseases, including the acute respiratory infections (460-467 and 480-487).

Next, calculations were made of proportional mortality and death rates per 100,000 inhabitants by cause and by age groups, using data for the three-year period 1980-1982 and the ARG/I, ARG/II, R, and

72 lists. Table 1 gives the ten principal leading causes of death for all the groups combined.

The results for this period, using the ARG/I, R, and 72 lists, were similar to those obtained in the preliminary test for the year 1980. The new ARG/II list–which replaced the B list–achieved the greatest coverage (92.8%). In addition, this list assigned greater importance to the infectious diseases, since the category which included them appeared in fourth place with 6.5% of all deaths.

The following summary makes it possible to evaluate which causes within the category certain infectious diseases in the ARG/II list have the highest rates.

	ICD-9 Code	Rate per 100,000 inhabitants
Intestinal infectious diseases	(001-009)	7.4
Tuberculosis	(010-018)	6.2
Trypanosomiasis	(086)	3.1
Meningitis	(036,047,049,320,322)	2.9
Septicemia	(038)	7.7
Pneumonia and influenza	(480-487)	22.3

With regard to ranking of the first ten groups of causes by sex, depending on the list the following may be observed:

- For males the groups were the same as for both sexes combined, except for the R list, where the last cause (congenital anomalies) was replaced by suicide. In all the lists chronic liver disease and cirrhosis (571) moved up two places and accidents (E800-E949, E980-E989) moved up one; certain conditions originating in the perinatal period (perinatal conditions) (760-779) also moved up one, except in the R list.

- For females accidents occupied a less important position, and atherosclerosis (440) was among the five leading causes in the lists in which it constituted a specific category. Chronic liver disease and cirrhosis (571) was not among the ten leading causes.

- In a comparison of the ten leading causes between sexes, differences in ranking appeared beginning in the fourth place.

A summary of the five principal causes of death by age group shows that, among children under one year, first place in all the lists went to perinatal diseases with practically half of all deaths. Second place was held by congenital anomalies (740-759), with a

weight five times lower, except in the ARG/II list where this pathology moved to third place, displaced by certain infectious diseases (22%). The category pneumonia and influenza–which in the ARG/II list is part of the category certain infectious diseases–appeared in the others in third place with 8%. In the ARG/I and R lists, intestinal infections occupied fourth place (these diseases do not constitute a specific category in the 72 list and are included in the category certain infectious diseases in the ARG/II list).

Among children 1-4 years of age the predominance of accidents could be noted in all the lists, although in the ARG/II it moved to second place, displaced by certain infectious diseases. In the other three lists pneumonia and influenza occupied second place and intestinal infections was third when it appeared as a category in the list. Malnutrition appeared in third place in the ARG/II and 72 and in fourth place in the ARG/I and R. It should be noted that malnutrition is not selected as the basic cause of death when it appears in a death certificate accompanied by any other defined cause; however, it is known to be an associated factor of great relevance. The fact that it had a weight of more than 7% as a basic cause of death reveals the seriousness of the problem in this age group.

Between 5 and 14 years of age infectious diseases had a great deal less importance, and accidents constituted the leading cause (between 36% and 39%, depending on the list). Tumors and diseases of the circulatory system began to take on more importance, and differences between lists were minor with regard to the first five causes. In this age group there was again a high concentration of deaths in the cause that occupied first place (more than one out of every three deaths.)

Between 15 and 44 years, accidents continued to be in first place, although their relative importance declined and there was a contrasting increase in the importance of cardiovascular diseases and tumors. Infectious diseases only appeared in fourth place in the ARG/II list; the expansion of this list made it possible to evaluate the composition of this category for ages 15-44, where tuberculosis, septicemia, and pneumonia and influenza were most heavily weighted.

With increasing age the chronic degenerative diseases took on greater importance and the differences between lists decreased. However, in the ARG/II list the category certain infectious diseases was among the five principal causes. At expanding this category it was observed that the principal components were pneumonia and influenza, tuberculosis, and septicemia.

In comparing the five leading groups of causes of death according to the different lists, more differences between lists could be seen for the younger age groups, when deaths from infectious diseases have greater relative importance.

Table 1. Proportional mortality and mortality rates, top ten categories of causes
according to ARG/I, ARG/II, R, and 72 lists. Argentina, 1980-82.

ARG/I List

Rank	Causes	Number of deaths	Proportional mortality %	Rate per 100,000 inhabitants
1.	Heart disease (390-429)	213,215	30.7	247.7
2.	Malignant neoplasms (140-208)	123,834	17.9	143.8
3.	Cerebrovascular disease (430-438)	69,526	10.0	80.8
4.	Accidents (E800-E949)	35,377	5.1	41.1
5.	Atherosclerosis (440)	33,311	4.8	38.7
6.	Certain conditions originating in the perinatal period (760-779)	30,911	4.5	35.9
7.	Pneumonia and influenza (480-487)	19,187	2.8	22.3
8.	Diabetes mellitus (250)	14,037	2.0	16.3
9.	Nephritis, nephrotic syndrome and nephrosis (580-589)	12,004	1.7	13.9
10.	Chronic liver disease and cirrhosis (571)	11,431	1.7	13.3
	Subtotal first ten causes	562,833	81.2	
	Remaining causes	131,268	18.8	
	Total defined causes	694,101	100.0	806.3

ARG/II List

Rank	Causes	Number of deaths	Proportional mortality %	Rate per 100,000 inhabitants
1.	Heart disease (390-429)	213,215	30.7	247.7
2.	Neoplasms (140-208;210-239)	127,551	18.4	148.2
3.	Cerebrovascular disease (430-438)	69,526	10.0	80.8
4.	Certain infectious diseases (*)	45,198	6.5	52.5
5.	Accidents (E800-E949,E980-E989)	39,009	5.6	45.3
6.	Atherosclerosis (440)	33,311	4.8	38.7
7.	Certain conditions originating in the perinatal period (760-779)	30,911	4.5	35.9
8.	Diabetes mellitus (250)	14,037	2.0	16.3
9.	Nephritis, nephrotic syndrome and nephrosis (580-589)	12,004	1.7	13.9
10.	Chronic liver disease and cirrhosis (571)	11,431	1.7	13.3
	Subtotal first ten causes	596,193	85.9	
	Remaining causes	97,908	14.1	
	Total defined causes	694,101	100.0	806.3

R List

Rank	Causes	Number of deaths	Proportional mortality %	Rate per 100,000 inhabitants
1.	Heart disease (390-429)	213,215	30.7	247.7
2.	Malignant neoplasms (140-208)	123,834	17.9	143.8
3.	Cerebrovascular disease (430-438)	69,526	10.0	80.8
4.	Accidents (E800-E949,E980-E989)	39,009	5.6	45.3
5.	Certain conditions originating in the perinatal period (760-779)	30,911	4.5	35.9
6.	Pneumonia and influenza (480-487)	19,187	2.8	22.3
7.	Diabetes mellitus (250)	14,037	2.0	16.3
8.	Nephritis, nephrotic syndrome nephrosis (580-589)	12,004	1.7	13.9
9.	Chronic liver disease and cirrhosis (571)	11,431	1.7	13.3
10.	Birth defects (740-759)	9,150	1.3	10.6
	Subtotal first ten causes	542,304	78.2	
	Remaining causes	151,797	21.8	
	Total defined causes	694,101	100.0	806.3

72 List

Rank	Causes	Number of Deaths	Proportional mortality %	Rate per 100,000 inhabitants
1.	Heart disease (390-398,402,404-429)	206,082	29.6	293.4
2.	Malignant neoplasms (140-208)	123,834	17.9	143.8
3.	Cerebrovascular disease (430-438)	69,526	10.0	80.8
4.	Accidents (E800-E949)	35,377	5.1	41.1
5.	Atherosclerosis (440)	33,311	4.8	38.7
6.	Certain conditions originating in the perinatal period (760-779)	30,911	4.5	35.9
7.	Pneumonia and influenza (480-487)	19,187	2.8	22.3
8.	Diabetes mellitus (250)	14,037	2.0	16.3
9.	Nephritis, nephrotic syndrome and nephrosis (580-589)	12,004	1.7	13.9
10.	Chronic liver disease and cirrhosis (571)	11,431	1.7	13.3
	Subtotal first ten causes	555,700	80.1	
	Remaining causes	138,401	19.9	
	Total defined causes	694,101	100.0	806.3

(*) 001-009, 010-018, 032, 033, 036-038, 045-047, 049, 055, 070, 086, 137, 320, 322, 460-466, 480-487.

Potential Years of Life Lost (PYLL)

A preliminary analysis using the 1980 data showed that with a lower limit of zero and an upper limit of 60 and 65 years, first place in PYLL went to perinatal diseases; when 80 years was the upper limit this category was displaced by heart diseases. For subsequent positions no significant differences were found between the limits of 60 and 65 years, although for accidents the weight of PYLL is almost double for the span from 0-64 years. With regard to the limits of 0-79, it could be observed, as expected, that there was greater predominance of chronic-degenerative diseases.

With a lower limit of one year, the category perinatal diseases does not appear among the leading causes, thus increasing the relative importance of chronic-degenerative diseases. With regard to the lower limits of 7 and 28 days, there was little difference in the categories included among the first five, although the ranking and, in some measure, the relative weight of these categories changed. In addition, deaths among children less than 7 days old represented approximately 46% of deaths among children under one year, and deaths among children less than 28 days old represented 58% of deaths in this age group. In these age groups deaths from perinatal diseases were slightly over 80% and 76% respectively.

Another noteworthy factor is that, in accordance with the criteria adopted by the Bureaus of Maternal and Child Health and Health Statistics, for classification of childhood deaths based on criteria of their reducibility through health actions, slightly over 70% of deaths among children under 28 days and 65% of deaths occurring between 28 days and 11 months of age are preventable.

For the reasons noted, and considering the fact that with upper limits of 60 and 65 years the differences were minimal, it was decided that the analysis of the 1980-1982 period would be carried out using limits of 0-64 and 1-64 years. These limits would permit analyses of mortality both including and excluding the influence of infant mortality.

Results for the three-year period 1980-1982, given below, include: ranking of the principal causes of death according to PYLL, their relative weight with respect to the total PYLL from defined causes, the rate per 100,000 inhabitants, and the average PYLL by death for the age span from 0-64 and 1-64 years. For the entire country the four lists were utilized and for the states only the ARG/II was used.

When PYLL was analyzed for both sexes for ages 0-64 years, it was observed that three of the lists–ARG/I, R, and 72–showed only slight variations: in all of them perinatal diseases appeared in first place, with nearly a fourth of the PYLL; accidents were in second place, and heart diseases, tumors, and pneumonia and influenza were between third and sixth. In the ARG/II list (see Table 2) perinatal diseases also constituted the leading cause of death, but next in importance were certain infectious diseases, which pushed the causes mentioned in the other lists down one place.

For ages 1-64 years, on the other hand, accidents were in first place in all the lists; and they were responsible for almost one fifth of the PYLL; tumors and heart diseases alternated between second and third place. These first three groups of causes took up more than 50% of the PYLL from defined causes. With much lower weight than these causes, cerebrovascular disease was in fourth place in three of the lists (ARG/I, R, and 72), while in the ARG/II that position was held by certain infectious diseases. When deaths during the first year of life were eliminated, the weight of causes which were concentrated in this age group diminished and, as a result, the relative importance of PYLL due to chronic-degenerative diseases and others more frequently found during the intermediate ages increased. Thus, among the ten principal causes of death in terms of PYLL were homicide, suicide, and tuberculosis.

When the causes were broken down by sex, perinatal diseases remained in first place for PYLL with limits of 0-64 years in all of the lists. In addition, in all of them accidents appeared in second place for males. Among women, for the same age limits certain infectious diseases were in second place in the list ARG/II, and tumors were in second place in the other three.

The average of PYLL per death (PYLL/D) is of 27.9 years for the total deaths for ages 0-64 and diminishes to 18.3 years for ages 1-64. This average is higher for women than for men for both age limits: for the latter the averages are 26.2 and 17.5, and 30.8 and 20.0 for women respectively.

When the PYLL/D for the age group 0-64 were analyzed for both sexes, the highest were for perinatal diseases (64.5 years), congenital anomalies (62.3), nutritional deficiencies and deficiency anemias (56.6), and certain infectious diseases (52.0). Between the last cause and the one which followed–accidents, there was a difference of almost 18 years in the average PYLL by death. The difference in years lost from this cause and from perinatal diseases was more than 30 years.

These diseases presented similar averages for either sex. The lowest averages occurred among the chronic-degenerative diseases, such as heart diseases, tumors, and cerebrovascular disease, and were higher for women.

The category perinatal diseases still held first place among causes of death in calculations of PYLL/D for the 0-64 age group, by sex. For males the second place went to accidents and for women to certain

Table 2. Potential years of life lost between 0-64 and 1-64 years, ten principal causes. ARG/II list. Argentina. 1980-1982.

Causes (ICD-9)	No.	0 - 64 years					No.	1 - 64 years				
		Number of deaths	Years lost	Percentage	Rate[1]	Average[2]		Number of deaths	Years lost	Percentage	Rate[1]	Average[2]
Total deaths	-	313,211	8,747,222	100.0	11,068.2	27.9	-	247,930	4,536,598	100.0	5,891.7	18.3
Ill-defined causes	-	10,156	432,850	4.9	547.7	42.6	-	5,953	161,757	3.6	210.1	27.1
Total deaths from defined causes	-	303,055	8,314,372	100.0	10,520.5	28.2	-	241,977	4,374,850	100.0	5,682.2	18.0
Certain conditions originating in the perinatal period (760-779)	1	30,343	1,963,573	23.6	2,484.5	64.5	-	-	-	-	-	-
Certain infectious diseases[3]	2	24,797	1,289,159	15.5	1,631.2	52.0	4	12,056	467,365	10.7	607.4	30.8
Accidents (E800-949, E980-989)	3	30,235	1,034,408	12.4	1,308.8	34.2	1	28,381	914,825	20.9	1,188.2	32.2
Heart diseases (390-429)	4	63,037	878,557	10.6	1,111.7	13.9	3	61,211	760,780	17.4	988.1	12.4
Neoplasms (140-208, 210-239)	5	57,545	788,418	9.5	997.6	13.7	2	57,357	776,292	17.7	1,002.2	13.5
Congenital anomalies (740-769)	6	8,338	519,666	6.2	657.6	62.3	10	1,834	63,651	1.5	82.7	34.7
Cerebrovascular disease (430-438)	7	20,826	257,406	3.1	325.7	12.3	5	20,746	252,246	5.8	327.6	12.1
Nutritional deficiencies and deficiency anaemias (260-269, 280, 281285)	8	3,220	182,274	2.2	230.6	56.6	-	-	-	-	-	-
Suicide (E950-E959)	9	4,652	111,765	1.3	141.4	24.0	6	4,652	111,765	2.6	145.2	24.0
Chronic liver disease and cirrhosis (571)	10	7,681	108,409	1.3	137.2	14.1	7	7,681	108,409	2.5	140.8	14.1
Homicide (E960-E969)	-	-	-	-	-	-	8	2,869	86,254	2.0	112.0	30.1
Nephritis, nephrotic syndrome and nephrosis (580-589)	-	-	-	-	-	-	9	4,427	81,435	1.9	105.7	18.4

[1] Rate of YPLL per 100.000 inhabitants.
[2] Average of YPLL per death by cause (YPLL/D).
[3] 001-009, 010-018, 032, 033, 036-039, 045-047, 049, 055, 070, 086, 137, 320, 322, 460-466, 480-487.

infectious diseases. In analyzing averages by sex, the observations made regarding both sexes in terms of differences in these indicators by cause were also valid for the two age spans.

For the age span from 1-64 years (both sexes) the differences between the averages for PYLL by death were minimal. Between the cause with the highest average, congenital anomalies (34.7 years) and that which followed, accidents (32.2), the difference was only two years; pneumonia and influenza, which comes after certain infectious diseases in the ARG/II list, had an average of 30.8 years. Septicemia, which was only one of the ten principal causes among women, had an average of 30.5, and complications of pregnancy, childbirth, and the puerperium (630-676) an average of 35.5 years.

The average PYLL by death (PYLL/D) was 27.9 years for total deaths within the age limits 0-64 years and declined to 18.3 years for the limits 1-64. The average was higher for women than for men using both age limit: 26.2 and 17.5 years for men and 30.8 and 20.0 for women.

The principal causes of death were also studied for the different states in the country and for their capital cities, but the results of these analyses have been omitted due to limitations of space.

Conclusions and Observations

- The structure of mortality by groups of causes for the country as a whole was similar in the ARG/I and R lists; the differences between these and the 72 list do not appear to be significant.
- Using the proportional mortality indicator, chronic-degenerative diseases predominated. With the ARG/II list, when the most frequent infectious diseases were grouped, they were among the five leading causes and held more important places in the less developed states.
- Given the placement of the principal groups of causes using the proportional mortality indicator, the ARG/II list appears to be the most discriminating of the four lists employed. However, it is believed that its capacity to assess health conditions and general well-being could be improved if a separate category were set up for acute respiratory infections (460-467 and 480-487).
- Several groups of causes included a large number of three-digit categories from the list of 999 causes in the ICD-9; thus it is proposed that for better epidemiological characterization of the area under study, the ARG/III list be

utilized, based on the ARG/II but with the modification suggested in the previous paragraph and with some expansion (See Table 3).

- For the PYLL indicator no significant differences were observed between the ARG/I, R, and 72 lists. As was the case with proportional mortality, the ARG/II list appears more discriminatory with regard to assessing health conditions and quality of life in the states; this quality was more evident for the age span 0-64 years.
- Ranking of groups of causes changed according to the indicator utilized. In the case of PYLL, chronic-degenerative diseases declined in importance, giving way to those related to early infancy and accidents.
- Complementing traditional indicators with those based on potential years of life lost increased the informative value of mortality data.

In addition to fulfilling the research objective of identifying more appropriate grouping of causes of death, to aid in the characterization of the health situation in different areas of the country, there were also significant by-products: a) evaluation of the quality of mortality data was encouraged, and b) analysis of available data by means of various indicators was promoted.

It should be pointed out that as results were being obtained–for the entire country or for the states, they were being utilized for educational purposes in the area of epidemiology through various educational activities and at national meetings of statisticians, planners, and epidemiologists. Results were also discussed with the National Commission on the Classification of Diseases.

The Bureau of Health Statistics, Department of Health, Ministry of Health and Social Action has incorporated the PYLL indicator (0-64 years) into its publications on mortality. In addition, some states have published mortality data that includes this indicator. The summary list to be utilized in selecting the principal causes of death is the ARG/III list (the modified ARG/II).

In conclusion, it can be said that this research has led to improved utilization of available mortality data, both for better characterization of health profiles and for education.

Table 3. ARG/III list.

Group of causes	ICD-9 Code	Group of causes	Code ICD-9
1. Certain infectious diseases		6. Heart disease	
Intestinal infectious diseases	001-009	Hypertensive disease	401-405
Tuberculosis	010-018	Ischaemic heart disease	410-414
Diphtheria	032	Cardiac dysrhythmias	427
Whooping cough	033	Heart failure	428
Tetanus	037	Other heart disease	
Septicaemia	038	7. Cerebrovascular disease	430-438
Acute poliomyelitis	045	8. Atherosclerosis	440
Measles	055	9. Acute respiratory infections, pneumonia and influenza	460-466; 480-487
Meningitis	036; 047; 049; 320; 322	10. Chronic obstructive pulmonary disease and allied conditions	490-496
Trypanosomiasis	086	11. Disease of eosophagus, stomach and duodenum	530-537
Viral hepatitis	070	12. Appendicitis, hernia of abdominal cavity, and other diseases of intestines and peritoneum	540-569
2. Neoplasms		13. Chronic liver disease and Cirrhosis	571
Malignant neoplasm of stomach	151	14. Diseases of urinary system	580-589
Malignant neoplasm of colon and of rectum, recto sigmoid junction and anus	153,154	15. Complications of pregnancy, childbirth and the puerperium	630-676
Malignant neoplasm of liver and intrahepatic bile ducts	155	16. Congenital anomalies	740-759
Malignant neoplasm of pancreas	157	17. Certain conditions originating in the perinatal period	760-779
Malignant neoplasm of trachea, bronchus and lung	162	18. Accidents	
Malignant neoplasm of female breast	174	Motor vehicle traffic accidents	E810-E819
Malignant neoplasm of cervix uteri and of body of uterus	182	Accidental drowning and submersion	E910
All other malignant neoplasms, carcinoma in situ, and of uncertain behaviour		Other accidents	
Benign neoplasms and of unspecified nature	210-239	Injury undetermined whether accidentally or purposely inflicted	E980-E989
3. Diabetes mellitus	250	19. Suicide	E950-E959
4. Nutritional deficiencies and deficiency anaemias	260-269,280,281,285	20. Homicide	E960-E969
5. Mental disorders			
Alcohol dependence syndrome	303		
Other mental disorders	290-302, 304-319		

Some Thoughts on the Production and Utilization of Knowledge

Although we do not yet have a theory that gives an exact account of the dynamics of technological change, it is clear that the traditional explanation—according to which *learning by doing* is the main factor responsible for technical progress—is not enough to account for the extraordinary development of productive forces being witnessed today. According to this explanation, which is derived from learning theories, development of the procedures and instruments of production is a consequence of the production process itself, which generates, in addition to goods and services, the experience and knowledge necessary for the enhancement thereof.

Without going into a dry theoretical discussion, given the personal limitations and generic nature of the observations, it seems clear that current scientific and technical progress depends above all on the increasing integration of science and technology and, more importantly, on the leading role of science in the development process. The case of the new technologies, such as biotechnology, is a good example of scientific advances spearheading the productive process.

The development of science has long been linked to the needs of the productive process. The latter, by itself, does not have the resources and methods for solving the problems that confront it and has traditionally passed the challenge on to science, pushing it to move forward and discover new laws of nature that can be turned to the benefit of society. The emergence of thermodynamics in the 19th century, in response to the need for improved performance of the steam engine, and the development of cybernetics in the 20th century, to meet the need to control automated production operations, are cases in point. Obviously, not all the dynamics of scientific development can be explained in such simple and direct terms. And indeed, historically there have been social demands that failed to receive an adequate response from science because science had not yet attained the necessary level of development. Thus, even though science is conditioned by practical demands, it has relative autonomy—autonomy derived from the logic intrinsic to development, which in turn is linked to the accumulation of cognitive material, a process in itself that raises new questions and propitiates this development.

Recognition of the increasingly prominent role of science in socioeconomic development, combined with better knowledge of the laws that bear on its own development, have created the basis for the institutionalization and organization of scientific activity, with a view to promoting it and orienting it so that it will better meet social demands. Institutionalized science is asserting itself more and more as a social practice, articulated with other social practices in a process of organization and division of labor at the level of society.

As a result of this process, there is a trend toward the disappearance of isolated researchers with full control over their work process—that is, who are entirely free to define the subject of their research and to use their tools and the product of their work as they see fit. This process of institutionalization may generate resistance from some researchers for the possible threat that it could represent to scientific creativity, although this "freedom" was never absolute. Given the relative autonomy of scientific development and its intrinsic dynamics, which are governed by logical and cognitive factors, the organization of scientific activity should not represent a restraint but an additional impetus for the development of science and for its realization as an instrument for the meeting of social needs.

In Latin America this process is moving ahead at full force, with establishment and strengthening of institutions and programs for scientific and technical development. But there are still some contradictions between the socioeconomic development models that have been adopted by the countries of the Region and the problems caused by the economic crisis they are confronting. Historically, the conditions of underdevelopment have relegated science to a secondary role, the universities being devoted almost exclusively to preparation in the liberal professions. Health research has been somewhat of an exception, since it has enjoyed public support, particularly when the process of urbanization began to demand effective action to control urban epidemics. In the 1960s and 1970s several countries defined policies for scientific and technical development that succeeded in expanding the Region's scientific infrastructure and production. However, these policies were not accompanied by consistent standards for the production of goods and services: preference was given to the importation of industries and technologies generated abroad, thus widening the gap between the scientific communities, still quite small, within these countries and their structures for the production of goods and services. The policies for reducing public spending, the consequence of readjustment measures adopted to cope with the fiscal crisis and the foreign debt, are threatening the survival of the universities and public research institutes, which still depend almost

entirely on government financing. This has jeopardized the possibilities for innovation as well as the scientific capacity of most of the countries.

In the field of health, a notable effort is under way to formulate policies for scientific and technical development, to orient financial resources based on priority health problems, and to promote the training of human resources for research development in priority areas. Nevertheless, the Region continues to be very dependent in terms of basic inputs such as equipment, drugs, and inmunobiologicals, as well as in regard to organizational procedures and formats for the health systems and their services.

In recent years the extraordinary scientific and technical developments in health, the rapid incorporation of new technologies, the rising cost of care, and the pressure from various social agents to reorganize the health systems so as to increase their efficiency and equity–all have highlighted the need to reduce technological dependency and to develop the knowledge needed in order to address the most serious problems.

In addition to the economic and structural constraints already mentioned, the organization of scientific activity in health must deal with other difficulties relating to: the weakness of the institutions responsible for the formulation of policies for scientific and technical development in this field, the precarious command of methodologies suitable for planning, and the weakness of scientific and technical information systems–to mention only a few.

There are clear signs that efforts are being made to overcome these limitations at national and international levels through intercountry technical cooperation agreements and through the work of coopera-

tion agencies such as the Pan American Health Organization (PAHO), which has identified the administration of knowledge as its fundamental mission.

The promotion of research at the level of health services and institutions, conducted by their professionals, is one of the strategies for reducing the gap between the production and the utilization of knowledge in the field of health. Therefore, research will contribute effectively to the formulation of policies and to the improvement of health conditions and care. This strategy makes it possible to better identify the problems and goals of research; it facilitates the incorporation of results; and it fosters a more critical and creative attitude among health professionals relative to their practice.

At a recent Regional Meeting on Guidelines and Procedures for Mortality Analysis the findings of a series of research projects were discussed, which had been undertaken with the financial support from PAHO's Program of Research Subsidies by professionals from health institutions in ten countries, see *Epidemiological Bulletin*, Vol. 9, No. 2, 1988. While observing the indispensable scientific rigor and demonstrating a clear commitment to resolving important problems, these research projects clearly point at one of the avenues that will increasingly assist science and researchers in the Region in accomplishing their role in society.

National Workshop on Epidemiology in the Health Services and the Family Physician in Cuba

From 31 May to 3 June 1988 a National Workshop on Epidemiology in the Health Services and the Family Physician was held in Havana, Cuba, with the participation of professionals from the areas of services, research, and education.

Dr. Hector Terry, Vice-Minister for Hygiene and Epidemiology, opened the workshop, stating that integration of the health organization into a single common effort is indispensable to increasing the life ex-

pectancy of Cubans to 84 years of age by the year 2000, with the decisive support of the family physician as a fundamental link in the new advances proposed in this organization. He indicated that these objectives are perfectly attainable if plans for health promotion come from a general community base and epidemiologists are integrated into this effort. He further indicated that the task of the workshop was to define the epidemiological strategy in the health

services, education, and research for attaining new levels of health.

There were three central presentations, all of which emphasized the need to introduce changes in the essential aspects of epidemiological work. The first referred to the changes that have taken place in the country's health situation due to the elimination or control of most of the communicable diseases, the reduction of infant and maternal mortality, the growing importance of the chronic noncommunicable diseases which now rank at the top of the mortality table, and the increase in life expectancy from 59 to 74.5 years of age.

The second addressed the factors related to the changes that have taken place in the health services, among which the most important is the new health care model, the family physician, which has the highest priority in the country.

The third presentation called for a review of current epidemiological practice, given the implications it has for health assessment, from such important perspectives as the development of services, training, and research.

Within this context, the discussion in the workshop focused on the following three topics:

- epidemiology and the organization of health services,
- training in epidemiology, and
- research on epidemiology.

The participants were divided into four working groups which debated at length and came to the following conclusions and recommendations.

Epidemiology and the Organization of Health Services

1. Epidemiology plays an important role within the health services, its field of activity being identified as the analysis or study of health situations (health assessment), epidemiological surveillance, causal research, and the evaluation of health services, programs, and technologies.
2. Epidemiology is a science with a method for investigating and transforming health situations. It is a means of dealing with the health-disease problem which is not peculiar to the specialists in this area but which is rather part of the work of all health professionals, especially of the family physician and the leadership cadre of the system at its very base.
3. For the family physician, studying health situations within the framework of health services is the ideal approach for identifying the problems related to the health-disease phenomenon in the populations under his care and for seeking solutions thereto with the active participation of the community.

4. It is necessary to train family physicians, their teachers, and the administrators of the polyclinics in the analysis of health situations, given their importance in determining the health actions that are derived therefrom.
5. There are deficiencies in the epidemiological surveillance system and these are caused by difficulties in the subsystem for data entry, a lack of analysis at the level of the polyclinic and the municipality, inadequacies at the provincial and central levels, and shortcomings in the subsystem for outputs, essentially in terms of feedback and executive decision-making. Those aspects of the system that are related to the communicable diseases should be strengthened so that it will be possible to respond quickly to outbreaks, and to strengthen the area of noncommunicable diseases as well.
6. Primary data at the level of the family physician should be improved in terms of quality and speed.
7. Consideration was given to the desirability of neither placing health technicians at the level of several outpatient clinics nor of placing an epidemiologist at the level of health areas at the current time. The collective is committed to developing and strengthening the working relations between the Municipal Center for Hygiene and Epidemiology (CMHE) and family physicians and polyclinics, as conceived in the Program for Comprehensive Family Care, integrating technicians and specialists in hygiene and epidemiology into the meetings of the basic working groups of family physicians.
   It is further recommended that there be an exchange of experiences between the administrations of the CMHE and the educational teams from the polyclinics so as to improve the clinical, epidemiological, and social approaches to the solution of the health problems of individuals, families, and the community.
8. More work needs to be done on care of the chronic noncommunicable diseases as well as on the common risk factors, increasing causal research and thus improving the approach to this problem.
9. Epidemiology plays an important role in causal research, which should be multidisciplinary, reflecting the research design and integrating the other disciplines.
10. All of the participants agreed that improvements are needed in the work of epidemiological evaluation of services, programs, and techniques, which should be based on their impact on the health situation and the results therein and not on indicators or goals.
11. With regard to the development strategies in the services it was felt that the individual disease approach and the population group approach are two facets of the epidemiological process and that they are complementary.
    It is suggested that the individual approach to disease be amplified through the special care of

the risk groups, which implies adequate follow-up and control, as well as an increased role for epidemiology in the population group approach, with an intersectoral focus.

The policy of mass intervention favored by the broad coverage provided by the family physician should be supported, but at the same time the individual characteristics of the high-risk groups should not be overlooked.

12. Health and health promotion are categories that rank higher than disease and disease prevention. Health promotion should be a priority task, with emphasis on the younger members of the population.

13. It was clearly stated that the specialist in hygiene and epidemiology should serve as a resource for the primary care service and the family physician, propitiating the development of the unified health program that they handle: Comprehensive Family Care. This is a horizontal program that integrates all health problems and which is administered by family physicians and not merely the sum of each and every one of the existing programs.

    Epidemiology has to be brought in line and articulated with the family physician model by being included in the work of family physicians within the framework of basic working groups and in the polyclinics.

14. The desirability was seen of disseminating and promulgating the comprehensive family care program among the health professionals at the different levels of care, among undergraduate and graduate students, and also in the specific population in which the program would be carried out.

15. There was a consensus regarding the need to review the evaluative and informative procedures in order to avoid the bureaucratic overload that restricts optimization of the work at all levels, requesting and making sure the resolution by the Minister of Public Health, to establish the controls to be undertaken by family physicians and nurses, which should not overburden them, is being carried out.

16. The need was seen to strengthen the administrative apparatus of the polyclinics with capable teams who are provided with the elements that enable them to have scientific direction along with epidemiological philosophy and action, something which should also be developed in family physicians themselves, as well as among teachers.

17. In analyzing the difficulties with the utilization of advanced technology, it became obvious that the fundamental role of epidemiology is to transform advanced technology into appropriate technology.

18. Although the community is the environment best suited for the development of the epidemiological approach, the presence of this approach in the hospital environment should not be overlooked, and this should be taken into account in any studies or analyses of the health situation as well as in epidemiological surveillance, causal research, and the evaluation of services.

Training

1. Attempt, whenever feasible, to have the teachers with the CMHE belong to the faculty in their municipality.

2. The working groups considered of importance the linkage of faculty personnel to the services for hygiene and epidemiology.

3. Analyze the way that epidemiology is represented in the different parts of the curriculum, assessing its fulfillment, in order to make future adjustments.

4. Allow more room for the sociomedical sciences in the curriculum so as to form the comprehensive general practitioner that we are seeking.

5. Ensure an interdisciplinary approach in the clinical educational process so as to develop abilities in the future family physician which will permit the professional to formulate and to solve, based on a clinical-epidemiological and social philosophy, the health problems confronted while caring for individuals, families, and the community.

6. Focus on continuous enhancement of plans and programs so that it will be possible to incorporate recent advances and make the modifications that the practice itself shows to be necessary.

7. Bear in mind that the residencies program is a higher level of teaching. It means entering and being integrated into the health team.

8. Evaluate the integration of hygiene and epidemiology into a single undergraduate residency, making it possible to comprehensively link the medical student to the educational activities surrounding these specialties.

9. Recommend that the epidemiological content in the project on the new curriculum in stomatology be analyzed.

10. Evaluate the incorporation of biostatistics as a subject in the health departments of all the faculties.

11. Combine hygiene and epidemiology into a single specialty.

12. Consider the advantage of forming specialists in epidemiology from specialists in comprehensive general medicine, based on strict selection, since this specialty requires a scientific philosophy, creativity, a critical approach, analytical abilities, etc.

13. Envisage the possibility of forming specialists in hygiene and epidemiology who will be more integrated into the services.

14. Recommend that specialist training focus more on health services organization, education, and research, rather than on program administration. Increase instruction on the chronic noncommunicable diseases, without forgetting the com-

municable diseases which constitute health problems in the countries that receive our internationalist help.

15. Establish conditions in the outpatient clinics, polyclinics, Provincial Centers for Hygiene and Epidemiology (CPHE), CMHE, and in all the health units in general that will ensure the integration of education into the services, at both the undergraduate and graduate levels.
16. Consider the need to grant the status of instructor to the specialists at the CPHE and the CMHE who are involved in teaching.
17. Consider including epidemiological content in the program of residencies for other specialties so that the epidemiological thought and action are part of all our health professionals.
18. As a problem for immediate solution, give training in epidemiology to the teachers with the basic working groups and the directors of the polyclinics.
19. Suggest that the National Bureau of Epidemiology coordinate with the National Bureau of Leadership Training in order to prioritize epidemiology as a fundamental basic science in the formation of health leaders.
20. Consider the need to set up courses to upgrade educators and specialists in epidemiology.
21. Emphasize the importance of self instruction as a key aspect of graduate-level education.
22. Organize graduate-level courses in epidemiology for the teachers in the clinical area so that they may teach their students using a clinical-epidemiological and social approach.
23. Consider the need to train nursing personnel in epidemiological thought and practice.
24. Increase the amount of scientific and technical information that specialists and medical personnel in general receive, promoting the publication of work in epidemiology in the various Cuban journals of medicine.
25. Encourage specialists in public health and epidemiology to earn scientific degrees as a result of work carried out or that needs to be carried out.
26. Increase the epidemiology component in the residency for comprehensive general medicine, with focus on community orientation and learning through problem-solving.
27. Ensure that continuing education is related to the duties and scope of the tasks being performed and not limited a priori to the concept referred to as the narrow profile.
28. Keep in mind the fact that the most important step in administrative management has been to obtain the new curriculum, but that this means more work and more devotion on the part of the students and teachers.
29. Ensure that more specialists are trained in epidemiology so that they can work in the field of noncommunicable diseases, in the Units for Science and Technology (UCT.)

Research

1. There is a well-defined research plan, as a point of departure of the scientific policy of the country, with participation by not only epidemiologists but other health professionals as well. These lines of research have been facilitating the gradual development of epidemiological research in the community which, using the new family physician model, has expanded perspectives and created conditions that facilitate and strengthen the integration of research into the services, not only in the polyclinics but also in the centers for hygiene and epidemiology, hospitals, research institutes, and faculties of medicine.
2. Epidemiological research has been present in epidemiological work since the beginning of the Revolution and has at all times answered existing needs and resources.
3. There was a consensus that research is one of the basic functions of the epidemiologist and that epidemiologists, whatever their working positions are, should be researchers.
4. There is a need to prioritize not only epidemiological research on health problems but also the epidemiological study of health, seeking positive indicators that measure the health situations of individuals, families, and the community, as a response to new questions that arise in the fulfillment of current social needs.
5. The development of causal research and the evaluation of services, programs, and technologies constitute important elements in the development of public health and as such should be increased.
6. Improvements need to be made in the dissemination of the results of epidemiological research.
7. The dynamic analysis of health situations at the different levels, beginning with the Basic General Practitioner, should constitute the fundamental element in the incorporation of epidemiological research into the services.
8. A positive element of the current epidemiological work is the close interrelationship between several research institutes and such primary care units as the polyclinics, the centers for hygiene and epidemiology, and for ambulatory medical care throughout the country.
9. More adequate integration and a better working relationship is needed between the different Units of Science and Technology that do research on health problems related essentially to the noncommunicable diseases and other health problems.
10. In some national research projects with participation by different levels of the organization, there has not been due recognition of the work carried out by some professionals, nor has there been active participation by all personnel in the analysis and interpretation of the results, which has not helped with research training and the training of our professionals.

11. It is recommended that some types of organization be created in the research institutes that would facilitate the extension of research to the community.
12. It is necessary to promote the research policy that integrates the faculties, hospitals, and health areas into the research plan, which envisages the methodological training of the physicians and the incorporation of the Topics for Completion of the Residency.
13. Despite the fact that significant achievements have been introduced on a timely basis into social practice, it is essential to continue to improve the relationship between the development of research and the application of the results.
14. It is recommended that the Minister's Directing Council hold an Annual Methodological Seminar with all the leaders of the National Health System, as a means of training and adequately reporting to all the teams.

The final conclusion of this workshop is that it helps to make the policy of integration of the Ministry of Public Health more concrete in terms of improving and enhancing the work, since its projection is basically ideological, and that it should serve in addition as a working document for the National Commission on the Family Physician.

(*Source:* Final report, National Workshop on Epidemiology in the Health Services and the Family Physician.)

Diseases Subject to the International Health Regulations

Total cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas as of 30 September 1988.

Country and administrative subdivision	Cholera Cases	Yellow fever Cases	Yellow fever Deaths	Plague Cases
BOLIVIA	-	*12*	*11*	*2*
Cochabamba	-	1	1	-
La Paz	-	11	10	2
BRAZIL	-	*20*	*14*	*4*
Amazonas	-	1	1	-
Bahía	-	-	-	4
Goiás	-	2	2	-
Mato Grosso	-	1	1	-
Minas Gerais	-	13	7	-
Pará	-	3	3	-
CANADA	*1*[a]	-	-	-
British Columbia	1[a]	-	-	-
PERU	-	*123*	*106*	*10*
Cuzco	-	6	3	-
Huánuco	-	29	23	-
Junín	-	14	12	-
Madre de Dios	-	25	22	-
Pasco	-	1	1	-
Piura	-	-	-	10
Puno	-	25	25	-
San Martín	-	18	15	-
Ucayali	-	5	5	-
UNITED STATES OF AMERICA	*5*	-	-	*14*
Arizona	-	-	-	1
California	-	-	-	2
Colorado	1	-	-	4
Guam	1[a]	-	-	-
Kansas	1	-	-	-
Louisiana	1	-	-	-
Maryland	1	-	-	-
New Mexico	-	-	-	6
Texas	-	-	-	1

[a]Imported case.

AIDS Surveillance in the Americas
Cumulative number of cases and deaths.

Subregion Country	Cases[a]	Deaths	First report	Last report
REGIONAL TOTAL	83,510	45,570		
LATIN AMERICA[b]	8,458	3,234		
ANDEAN GROUP	535	255		
Bolivia	8	6	31 Dec 85	30 Jun 88
Colombia	244	70	31 Dec 86	30 Jun 88
Ecuador	45	26	31 Dec 85	30 Jun 88
Peru	98	53	30 Jun 82	30 Jun 88
Venezuela	140	100	31 Dec 84	31 Dec 87
SOUTHERN CONE	314	169		
Argentina	197	112	31 Dec 83	30 Jun 88
Chile	83	36	31 Dec 84	30 Jun 88
Paraguay	8	8	31 Dec 86	30 Jun 88
Uruguay	26	13	31 Dec 83	30 Jun 88
BRAZIL	3,687	1,902	31 Dec 82	30 Jun 88
CENTRAL AMERICAN ISTHMUS	365	202		
Belize	8	5	31 Mar 87	31 Mar 88
Costa Rica	66	35	31 Dec 83	30 Jun 88
El Salvador	23	14	31 Dec 85	31 Dec 87
Guatemala	39	33	30 Sep 86	30 Jun 88
Honduras	164	76	30 Jun 85	30 Jun 88
Nicaragua	1	-	30 Sep 87	30 Jun 88
Panama	64	39	31 Dec 84	30 Jun 88
MEXICO	1,502	379	30 Jun 81	30 Jun 88
LATIN CARIBBEAN[c]	2,055	327		
Cuba	34	8	31 Dec 86	30 Jun 88
Dominican Republic	566	59	31 Dec 85	30 Jun 88
Haiti	1,455	260	31 Dec 83	30 Jun 88
CARIBBEAN	1,012	585		
Anguilla	1	-	31 Mar 87	30 Jun 88
Antigua	3	3	31 Dec 85	30 Jun 88
Bahamas	214	104	31 Dec 85	30 Jun 88
Barbados	63	43	31 Dec 84	30 Jun 88
Cayman Islands	4	2	31 Dec 85	30 Jun 88
Dominica	6	6	31 Mar 87	31 Mar 88
French Guiana	113	78	31 Dec 86	31 Mar 88
Grenada	11	5	31 Dec 84	31 Mar 88
Guadeloupe	74	36	31 Dec 86	31 Dec 87
Guyana	16	8	30 Sep 86	31 Mar 88
Jamaica	66	43	30 Jun 86	30 Jun 88
Martinique	38	22	31 Dec 86	31 Dec 87
Montserrat	-	-	30 Jun 87	31 Mar 88
Netherlands Antilles	26	16	31 Mar 87	31 Mar 88
Saint Lucia	11	6	31 Dec 84	31 Mar 88
St. Christopher-Nevis	1	-	31 Dec 85	31 Mar 88
St. Vincent and the Grenadines	10	5	30 Jun 85	31 Mar 88
Suriname	9	7	30 Jun 84	31 Mar 88
Trinidad and Tobago	302	190	30 Jun 83	30 Jun 88
Turks and Caicos Islands	5	3	31 Dec 86	31 Dec 87
Virgin Islands (UK)	-	-	31 Mar 87	31 Mar 88
Virgin Islands (US)	39	8	31 Mar 87	30 Jun 88
NORTH AMERICA	74,040	41,751		
Bermuda	81	66	31 Dec 84	30 Jun 88
Canada	1,974	1,100	31 Dec 79	30 Sep 88
United States of America[c]	71,985	40,585	30 Jun 81	30 Sep 88

[a]Differences or changes in case-definition may lead to discrepancies with other published data.
[b]French Guiana, Guyana, and Suriname included in Caribbean.
[c]Puerto Rico included in USA.