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Revisions of the International Classification of Diseases (ICD-9 and ICD-10): Impact on Health Statistics

Introduction

One of the continuing concerns about changing from one revision of the International Classification of Diseases (ICD) to the next is the potential impact of the changes on health statistics. To what extent do the differences between revisions affect the continuity of historical series and facilitate, hamper, or impede comparison of the data?

This concern is even more valid for the current implementation of the Tenth Revision because the new revision contains the most sweeping changes since the Sixth Revision, which was introduced in 1949.

An article in an earlier issue of the PAHO *Epidemiological Bulletin* (Vol. 16, No. 1, March 1995) outlined the broad features of the Tenth Revision of the *International Statistical Classification of Diseases and Related Health Problems*. The main differences between the Ninth and the Tenth Revisions that could have an impact on health statistics are listed below.

Main Differences between the Ninth and Tenth Revisions:

- The exclusion notes at the beginning of each chapter have been expanded to explain the relative hierarchy of chapters, and to make it clear that the **"special group"** chapters have priority of assignment over the organ or system chapters and that among the special group chapters, those on *Pregnancy, childbirth, and the puerperium* and on *Certain conditions originating in the perinatal period* have priority over the others.

- Categories have been created at the end of certain chapters for postprocedural disorders. These categories include important conditions that constitute medical problems in their own right--for example, endocrine and metabolic diseases following ablation of an organ and other specific conditions, such as postgastrectomy dumping syndrome. Postprocedural conditions that are not specific to a particular organ or body system, including immediate complications such as air embolism and postoperative shock, continue to be classified under the chapter *Injury, poisoning and certain other consequences of external causes*.

- For tumors (neoplasms), a category (C97) was created for *Malignant neoplasm of independent (primary) multiple sites*. As a result, causes previously coded to one of the sites mentioned, are now assigned to this new category. Another important change is that in the Tenth Revision the existing codes for "secondary malignant neoplasm"

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are acceptable as underlying cause of death when there is no information as to the primary site and the morphologic type does not identify it. In the Ninth Revision this was not acceptable, and in such cases "unspecified site" was to be coded with respect to the morphologic type (199.1 for carcinoma, 171.9 for sarcoma, and 172.9 for melanoma).

- The Ninth Revision rules, and related notes for selection and modification of the underlying cause of death were revised and a number of changes were introduced-- in the rules and, particularly, the notes. The modification rules were simplified and went from 9 in the Ninth Revision to 6, identified by the letters **A-F**.

- The notes for use in coding the underlying cause of death underwent extensive modifications which are found in Volume 2 (pp. 50-62).

Some changes in the acceptance of causality (sequence) can also create difficulties for the comparison of data, for example:

- Pneumonia and bronchopneumonia can be accepted as *terminal complications*, if they are registered as *due to*, or *with mention of* malignant neoplasms, malnutrition, paralyzing diseases, communicable diseases, or serious injuries. This could lead to an apparent reduction in pneumonia and bronchopneumonia, with a consequent increase in the aforementioned disorders.

- Chickenpox and herpes zoster can be accepted as consequences of diabetes mellitus, tuberculosis, or lymphoproliferative neoplasms, with consequences identical to those mentioned above.

- Malignant neoplasms and infectious and parasitic diseases can be accepted as a consequence of HIV infection. They can also be accepted as a consequence of immunosuppression by chemotherapy and radiation or of tumors affecting the immune system.

The table that follow summarize some of the most significant differences between the two revisions that could make it difficult to compare historical series of health statistics.

Table 1
Comparison between the Ninth and Tenth Revisions of the International Classification of Diseases

Ninth Revision	Tenth Revision
- International Statistical Classification of Diseases, Injuries and Causes of Death	- International Statistical Classification of Diseases and Related Health Problems
- 17 sections	- 21 chapters
- Two supplementary classifications:	- Are now in the core classification:
(a) External Causes of Injury and Poisoning (E800-E999) (b) Factors Influencing Health Status and Contact with Health Services (V01-V82)	(a) Chapter XX, External causes of morbidity and mortality (V01-Y98) (b) Chapter XXI, Factors influencing health status and contact with health services (Z00-Z99)
- Section III, Endocrine, Nutritional, and Metabolic Diseases, and Immunity Disorders (240-279)	- Chapter III, Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)
- Section VI, Diseases of the Nervous System and Sense Organs (320-389)	- Chapter VI, Diseases of the nervous system (G00 - G99) - Chapter VII, Diseases of the eye and adnexa (H00 - H59) - Chapter VIII, Diseases of the ear and mastoid process (H60-H95)

Ninth Revision	Tenth Revision
- **Classification**:	- **Classification**:
Base: 909 categories (183 "X" categories--that is, categories that do not have fourth digit)	2,036 categories (261 "X" categories)
5,161 subcategories	12,159 subcategories
Suppl. "E:" 192 categories 1,001 subcategories Suppl. "V:" 77 categories 537 subcategories	Both are Chapters of the main classification
Total: 6,882 codes	**Total**: 12,420 codes
- **Groups**: 141 - "*:" 4 categories and 67 subcategories dispersed among different categories, with a total of 98 "*" codes."	- **Groups**: 261 - "*": 83 complete categories, with a total of 298 codes
- **Fifth digit**:	- **Fifth character**:
Tuberculosis: confirmation Diabetes: adult/juvenile Complications of childbirth: method of delivery Musculoskeletal: anatomical site no: subcategory level no: subcategory level Accidents: place of occurrence . not used	. no: category level . not used . no: category level anatomical site Fractures: open/closed, internal injuries: with or without open wound no: subcategory level Accidents: activity involved
- Some infectious diseases are coded in different sections.	- Moved to Chapter I (Certain infectious and parasitic diseases)
037 Tetanus **634-639** with fourth digit .0--tetanus complicating abortion **670** Obstetrical tetanus **771.3** Tetanus neonatorum	**A35** Other tetanus **A34** Obstetrical tetanus **A33** Tetanus neonatorum
- AIDS is coded in 279.5 and 279.6 (free subcategories of category **279**, Disorders involving the immune mechanism)	- Coded in **B20-B24**, under Chapter I (Certain infectious and parasitic diseases)
- Complications affecting specified body systems are coded in 997.-, under section XVII (Injury and poisoning). Example:	- Coded within the chapters corresponding to the body systems. (E89.-, G97.-, H59.-, H95.-, I97.-, J95.-, K01.-, M96. - and N99.-)
997.0 Central nervous system complications	G97. - Postprocedural disorders of the nervous system, not elsewhere classified.

Bridge Studies

The term "bridge studies" is customarily used to describe the procedures for coding medical information (death certificates or morbidity registries) with two successive revisions of the ICD in order to study the impact of the change in Classification. These studies are generally conducted by the WHO Collaborating Centers in Classification of Diseases during the preparation of a new revision.

An example of such a study is the one conducted in 1987 by CEVECE (Venezuelan Center for the Classification of Diseases), whose findings were presented at an expert meeting sponsored by PAHO in Buenos Aires, Argentina.

Although the study was conducted using draft versions of the ICD-10 chapters, the adjustments resulting from the final version do not alter the results.

A sample of 3,838 death certificates was used, with selection of the underlying cause of death based on the Ninth and Tenth Revisions. The results are presented in Table 2.

Table 2
Distribution of Death Certificates by Cause, ICD-9 and ICD-10, Venezuela, 1995

ICD - 9	(1)	ICD-10	(2)	(2)/(1)
I - 001 - 139	325	A00-B99	330	1.0154
II - 140 - 239	506	C00-D48	507	1.0020
III - 240 - 279	173	E00-E90	159	0.9191
IV - 280 - 289	29	D50-D89	30	1.0345
V - 290 - 319	12	F00-F99	12	1.0000
VI - 320 - 389	88	G00-H95	92	1.0455
VII - 390 - 459	1136	I00-I99	1136	1.0000
VIII - 460 - 519	325	J00-J99	350	1.0769
IX - 520 - 579	157	K00-K93	158	1.0064
X - 580 - 629	43	N00-N99	43	1.0000
XI - 630 - 676	11	O00-O99	11	1.0000
XII - 680 - 709	9	L00-L99	9	1.0000
XIII - 710 - 739	23	M00-M99	22	0.9565
XIV - 740 - 759	90	Q00-Q99	91	1.0111
XV - 760 - 779	302	P00-P96	297	0.9834
XVI - 780 - 799	138	R00-R99	119	0.8623
EXT - E800-E999	471	V01-Y98	472	1.0021
Total	3838	Total	3838	1.0000

As the data indicates, 39 death certificates (1.02%) were coded to different chapters in the ICD-10 compared to the ICD-9. The most relevant differences are found in sections III (Nutritional and Metabolic Disorders), VIII (Diseases of the Respiratory System) and XVI (Signs, Symptoms and Ill-defined Conditions). Such differences are attributable to the criteria for coding terms such as "dehydration," "insufficiency," and "respiratory failure," and not to real changes in the Classification. The increase in Section I (Infectious and Parasitic Diseases) corresponds to cases of neonatal tetanus, previously coded to Section XV (Certain Conditions Originating in the Perinatal Period).

Naturally, if chapter subdivisions or isolated categories are compared, differences will be found to be greater.

At the Meeting of Directors of WHO Collaborating Centers for Classification of Diseases held in Canberra, Australia (October 10-16, 1995), preliminary data was presented from another bridge study conducted by the National Health Council of Denmark, which compared ICD-8 and ICD-10 coding of 5,256 death certificates (Denmark has never used the ICD-9).

The study, which is in press, found that 95% of the certificates were coded to the same chapter of both revisions, determining that in most cases, the differences lie in the criteria utilized and not the Classification. The distribution of the causes of death in the 49 categories of the "Danish List" ("DK-listen"), indicated that 92% of certificates were coded to the same category.

Conclusion

As was verified, there is no equivalence between codes of the successive revisions. The Ninth and the Tenth Revisions have perhaps a 60% 1 x 1 equivalence--that is, a code (category or subcategory) in the Ninth corresponds to a single code in the Tenth, where the same diagnostic terms would be coded. As for the rest, in general there are more codes in the Tenth. Table 2 shows that the total number of codes in the ICD-10 is almost double the codes in ICD-9. Notably, however, there are situations in which 2 or more ICD-9 codes correspond to only one ICD-10 code. In addition, there are codes that exclude only some of the terms of the previous Revision, or that exclude certain age groups.

When trends are compared over time and the statistics is interpreted, it is important to bear in mind that the **presumptions** can change from one ICD revision to the next. For example, before the Eighth Revision, an unspecified aneurism of the aorta was presumed to be due to syphilis which is no longer the case.

The last sentence of Volume 1, page 26, paragraph 6 of the ICD-10 in English ("A key for conversion from the Ninth to the Tenth Revision, and the reverse, should be available before the implementation of the Tenth Revision.") should not be interpreted to mean a kind of "software" capable of assigning Tenth Revision codes on the basis of data coded under the Ninth Revision and vice versa. What is actually being developed is a kind of "Index" where, using a code (for example, from the ICD-9), it is possible to obtain one or, frequently, many codes corresponding to the ICD-10, in addition to a "multi revision index," in which the code corresponding to a term in more than one revision can be obtained.

What makes it possible to the maintain the historical series and comparability of the data coded under different revisions is the preparation and management of the **lists for the presentation of the data**. Normally, the data are not analyzed or broken down into all the ICD codes but into defined lists (e.g., Eighth Revision, Lists A, B, C; Ninth Revision, Basic Tabulation List, PAHO 6/61, ICD-BR2, ARG-3; Tenth Revision, Mortality tabulation lists 1, 2, 3; etc.). Lists can be prepared for a particular revision that retain the same structure and the same basic categories as the lists used with other revisions of the ICD. The "conversion key" should therefore be individually adapted to each list utilized.

Source: Division of Health and Human Development, Program on Health Situation Analysis, HDP/HDA, PAHO.

Organizing an Information Network on Health Conditions in Brazil: A Synopsis of the Development Process

As part of the process of building democracy and promoting sustained human development, the Federal Constitution of 1988 provided for the organization of a "Unified Health System" (UHS) as a Brazilian health reform mechanism. This constitutional goal has implied major changes in attitudes about health and citizenship issues, both in terms of sector responsibilities and of the key factors that influence or determine health status. This type of approach is complicated even further by the size of Brazil and the enormous disparities in economic and social development, combined with significant economic constraints and the context of the globalization movements that have characterized the 1990s. To overcome the problems inherent in any rapid process of adaptation and change, efforts to set up the UHS should obviously be grounded in strategic planning principles that reconcile growing social needs and aspirations with current limitations in resources and nationwide implementation capabilities.

Major problems associated with the administration of this new system include the need to organize regularly updated databases to provide management information to UHS decision makers at the three levels of government: federal, state and local. Existing information systems are disjointed, inaccurate, and out moded, resulting in a decision-making and management process that does not take full advantage of available information. The seriousness of this matter is further heightened by the lack of regular health situation analysis and trend assessment which could provide critical supporting data for system administration and technical management efforts. A survey conducted in 1993 revealed large numbers of databases and information systems operated by agencies within the public sector, without regular reporting by these agencies that would contribute to the formulation of health policy and corresponding initiatives. Likewise, countless government agencies, academic institutions, and nongovernmental organizations are engaged in gathering data and producing specific studies of interest to the health sector, but such information is generally used only in academic circles. It is well-known that the Brazilian health system lacks needed coordination mechanisms to take full advantage of the country's extensive technical and institutional resources. This situation is also reflected in the problems faced by the Pan American Health Organization (PAHO) in fulfilling its responsibilities, namely its attempts to monitor, study, document, and report changes and progress in health conditions in its Member Countries.

Diverse initiatives in the country to overcome these obstacles have been unsuccessful, despite the efforts of their promoters. The main problem lies in the absence of coordination mechanisms to bolster interagency cooperation efforts which are generally difficult to manage. These efforts depend on sustained decision-making at the sectoral level, supported by assistance from international organizations such as PAHO and specialized national agencies such as the Instituto Nacional de Geografia e Estatística (IBGE) [National Bureau of Geography and Statistics].

In search of a possible solution to a problem of this importance and magnitude, the PAHO Representative Office in Brazil has joined forces with that country's Ministry of Health, with critical backing from PAHO's senior management, to frame a proposal to set up an integrated information system designed to ensure the regular production of timely baseline data, the monitoring of selected health status indicators, the production of specific reports containing data analyses, health situation assessments, applied bibliographic literature databases, and the regular publication of indicators and reports on national health conditions and trends.

The proposal calls for the organization of a network of information producers through a joint enterprise consisting of selected agencies and organizations that are not only devoted to producing information, but are equally interested in exploring health-related issues in greater depth. Network operations will be designed to bolster policy-making and evaluation efforts as well as government health initiatives by supplying pertinent assessments and

analyses. They would also monitor trends in problems whose management falls within the purview of PAHO itself.

The design of this network is predicated on a commitment by all interested parties to ensure and maintain a dynamic, regular flow of analytical data--insofar as possible, transmitted electronically--on health problems and initiatives, as well as on overall economic, social, and political conditions that determine or affect health conditions. The anticipated increase in interagency cooperation in information-sharing should provide the necessary foundation for maximizing the use of important technical and scientific databases and the nation's cadre of professionals. Once the integrated network is officially in place, the next steps would be the signature of working agreements with each participating agency and organization on project implementation and management issues; the collection, updating, and analysis of data and indicators; and the performance of health situation analyses.

Participating agencies and organizations would be organized into interdisciplinary, interagency committees according to the needs and the dynamics required by the information network to perform specific tasks aiming at the improvement and strategic formulation of health policies. These committees would be responsible for: (i) evaluating the importance, uses, and limitations of health indicators; (ii) identifying ways and means of collecting the respective baseline data; (iii) facilitating the coordination efforts of interested agencies; (iv) evaluating the supply of analytical data of interest to the network; and, (v) recommending bibliographic references for data production purposes.

This project will lay the necessary groundwork for linking PAHO with the Ministry of Health and network agencies and organizations in all operations carried out in Brazil by establishing a coordinated, integrated information system to bolster sectoral planning and programming efforts and vest the health sector with the capacity for joint action within the framework of the government policies that have a bearing on health conditions. The Brazilian proposal is an integral part of ongoing efforts by PAHO-Headquarters to collaborate with Member Countries to create or maintain a system of core data, which began with the publication of the pamphlet entitled *Health Situation in the Americas: Basic Indicators 1995*.

The proposal is being framed and implemented under the aegis of an *ad hoc* working party comprised of representatives from the Brazilian Ministry of Health and the PAHO Representative Office whose work is being coordinated by the Executive Secretariat of the country's Ministry of Health. It has already made progress in identifying and defining a set of basic indicators for health situation analysis and trend assessment, in framing proposals for desegregating these indicators into analytical categories, and in identifying the major national information sources, as well as the most prominent agencies and organizations working in each specialized area. The next step will be to discuss the proposal with these agencies and organizations and to hold a technical meeting at the country level to finalize the organizational structure of the integrated information network.

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Source: Brazil, Executive Secretariat, Ministry of Health; PAHO/Brazil.

PAHO Technical Cooperation in Geographic Information Systems Applied to Epidemiology (GIS-Epi) in the Americas

Health services in countries of the Americas are undergoing different processes of change which require effective and timely information systems to permit diagnosis of health situations, planning and programming of activities for specific problems, and evaluation and monitoring of interventions for solving these problems. Geographic information systems (GIS) represent an alternate computerized tool for these processes, since they make it possible to store, handle, analyze, and visualize data and information that have been referenced geographically. Although the usefulness of GIS is being recognized increasingly, there is a technological gap in the countries both in terms of developing the system itself and developing the human resources to incorporate the system in routine public health tasks.

In response to this need, the Program on Health Situation Analysis (HDA) of the Division of Health and Human Development of the Pan American Health Organization has included a technical cooperation project among its efforts to strengthen epidemiology in the health services. The objectives of the program are to facilitate and disseminate the use and development of GIS and to provide technical assistance for its application to epidemiology and public health (GIS-Epi). Project activities consist of support for training, development of cartographic databases, epidemiological analyses and preparation of thematic maps of priority areas, all within the context of developing simplified applications for direct users, i.e., health services, educational institutions, planning offices, etc. Given the difficulties encountered in obtaining the basic maps, an important goal of HDA is to become a depository for country border libraries, which will be shared with users in Member Countries as a part of the cooperation.

Due to the magnitude of requests for cooperation in this area, HDA has promoted the establishment of a network of Collaborating Centers to facilitate training and development of GIS in the countries of the region. To date, three Centers are involved : one in Chile (Department of Epidemiology, Ministry of Health, and Department of Cartography, Metropolitan Technical University), another in Cuba (Department of Biostatistics and Computation, Pedro Kourí Institute and Unit for Analysis and Trends in Health, Ministry of Health), and one in Mexico (University Health Sciences Center, University of Guadalajara). Two additional Centers are being established in Guatemala (Health Authority of Petén, Ministry of Health and in Regional Delegation IV, SEGEPLAN) and in Colombia (Bureau of Information Systems, Ministry of Health). The Collaborating Centers have enabled increased coverage in training, greater development in different areas of GIS, more numerous and varied simplified applications, and maximized opportunities for direct technical assistance to users interested in GIS.

As part of its human resource development activities, HDA has facilitated the organization of six Workshops on GIS Applied to Epidemiology (GIS-Epi) for direct users, from which more than 120 participants from 8 countries have benefitted in a period of less than a year and a half (Figure 1).

To date, there have been workshops in Tampa (USA), Havana (Cuba), Guadalajara (Mexico), Kingston (Jamaica), Bogota (Colombia) and Managua (Nicaragua) and others are being planned for this year. These workshops have been designed with different levels of complexity, including a basic level and an intermediate level; the advanced level is referred to other institutions. It is hoped that the basic level can be studied by managers of local health services, whereas the intermediate level is more pertinent for regional or national health services and for academic and research institutions. Equipment and training requirements are summarized in Table 1. The basic level includes use of the EpiInfo and EpiMap packages, while the more advanced level uses MapInfo and ArcView.

Figure. Collaborating Network in Epi-GIS in the Region

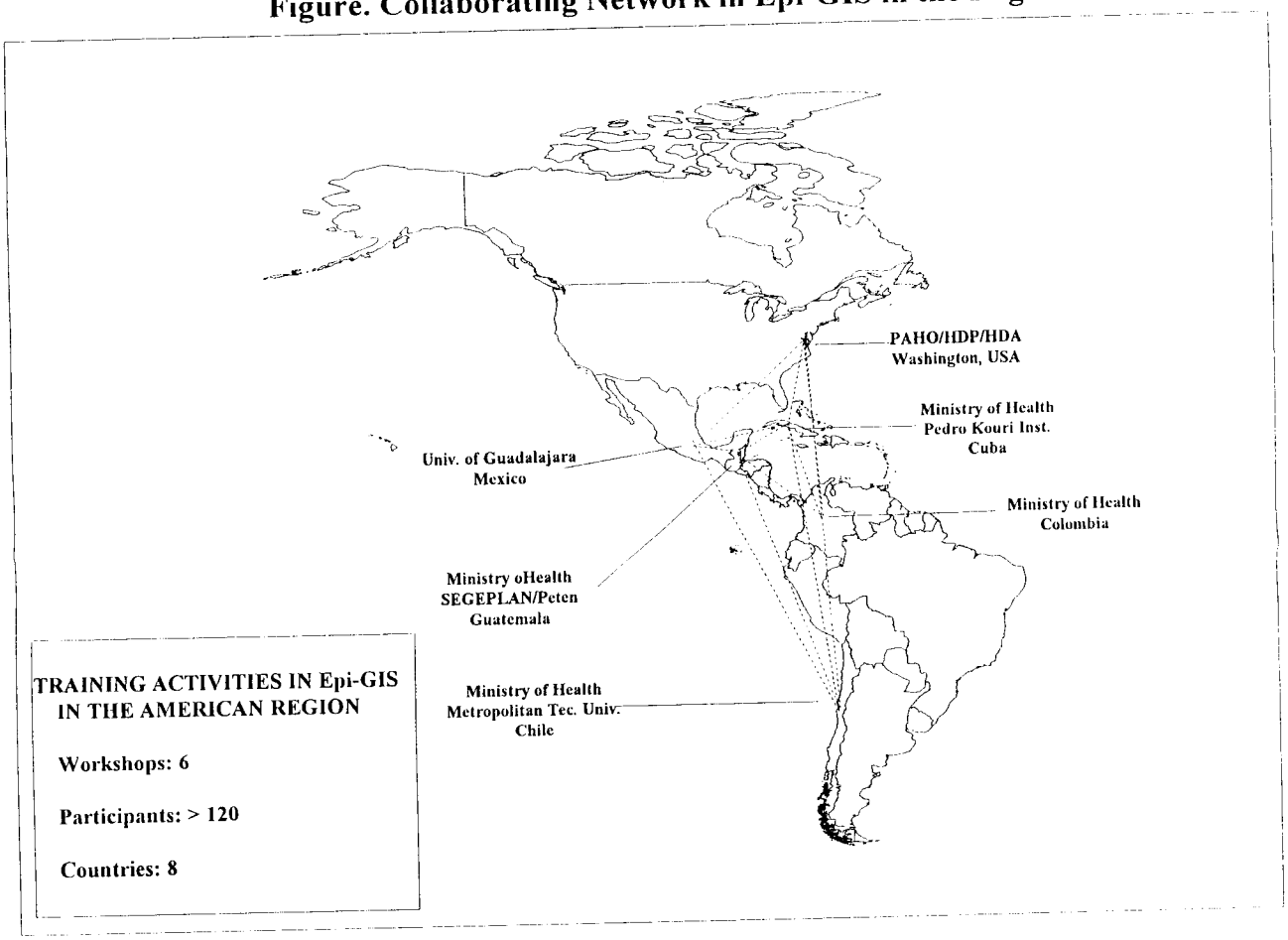

Table 1

Requirements in information systems applied to epidemiology as part of PAHO cooperation for different levels of health system development

Requirements for implementation of the GIS at each level	Level of development		
	Site (Basic)	**Regional (Intermediate)**	**Central (Advanced)**
GIS software	Epimap 2.0	MapInfo, ArcView	ArcInfo, GenMap
Cost of GIS software	Free distribution	Affordable (ca. US$1000.00)	Considerable (> US$1000.00)
Computer equipment	PC with 512K of memory	PC with at least 8 Mb of memory	PC with 8 or more Mb of memory
Computer operating platform	MS-DOS	Windows	MS-DOS, Unix
Type of training	Simple, possible self-instruction	Specific, more complex	Specific, advanced programming
Training time	Days	Weeks	Months

The first training workshops revealed the need for more materials in the field of epidemiology and public health with language and content more suited to the needs and skills generally found among users. This material should serve as a reference after the workshop. Thus, participants from the Collaborating Centers and HDA have contributed to the preparation of several theoretical manuals and practical exercises for each level of training and for the respective GIS computer package. It is hoped that these materials will be available for other workshops during the third quarter of 1996, once they have been validated.

Considering the need for simplicity in programs and menus applications (programs or routines) are being developed to summarize processes and perform analytical operations that are more suitable for public health activities. These have not yet been included in the GIS software packages. Operations and procedures that users have mentioned for incorporation include merger of different databases within a single geographical unit, calculation of rates and other risk indicators, procedures for adjusting indicators for comparisons among geographical units, identification of time and spatial aggregations, and monitoring of time series to determine trends. These products are being developed primarily in collaboration with the Centers in Cuba and Mexico.

This collaborative effort seeks to promote the development of other projects in different areas of epidemiology and public health in the countries of the Americas. The Collaborating Centers and the HDA program have developed some GIS applications related to the situational analysis of mortality in regions and communes in Chile, morbidity due to malaria in localities in northern Guatemala, morbidity in health jurisdictions in Jalisco (Mexico), certain epidemic diseases in Cuba, environmental risks in Colombia and basic health indicators in the Americas. Unfortunately, there are few published or well-known works that could be used as examples for other interested parties. An additional effort will be made to disseminate these developments in different forums and publications.

Source: Division of Health and Human Development, Health Situation Analysis Program, HDP/HDA, PAHO.

Note

In the last issue of the Epidemiological Bulletin (Vol. 17, No. 4, March 1996), figure 6 of the article on GIS-Epi makes reference to an epidemic of meningococcal infection in Cuba during 1993. In reality the figure presented a cumulative data from 1983 to 1993. Most of the cases occurred in 1983. In 1989 a mass vaccination program was carried out when the epidemic was already declining. From 1984 to 1994 mortality rates by meningococcal infection decreased from 14.1 to 0.8 per 100,000.

Utilization of Blood Samples Taken on Filter Paper for Detection of IgM Antibodies to Dengue Virus

During the International Course on Dengue and Dengue Hemorrhagic Fever in the Americas conducted at the "Pedro Kouri" Institute of Tropical Medicine (IPK) of Havana in August 1995, participants from 12 countries of the Region recommended standardization of the conditions for ELISA screening for detection of IgM antibodies to the dengue virus using blood samples taken on filter paper. The IPK, the Virology laboratories at the National Diagnosis and Reference Center (CNDR) of Nicaragua, the Costa Rican Institute for Research and Education in Nutrition and Health (INCIENSA), and PAHO decided to combine their efforts to provide a rapid response that would facilitate activities related to sero-epidemiological surveillance of dengue in Member Countries.

During the months of October and November 1995, two whole capillary blood samples were taken on filter paper (Blood Sampling Paper, NOBUTO, Tokyo Roshi Kaisha, Ltd. Japan) and serum from patients clinically suspected of having dengue was received through dengue surveillance in Costa Rica and Nicaragua. Cuban donor samples were also included. The samples taken on filter paper were kept at 4°C and room temperature until processing. For each sample (serum and blood taken on filter paper) the presence of IgM antibodies was determined using the Dengue*IgM kit (IPK).

When the results obtained from sera and from samples taken on filter paper held for a period of 3 to 5 months at 4°C were compared, sensitivity of 98.1%, specificity of 98.5% and coincidence of 98.3% were observed in 118 samples of each type processed. In 62 blood samples taken on filter paper and kept at room temperature for 3-5 months until processing, sensitivity of 94%, specificity of 100% and coincidence of 95.2% in comparison with the serum samples kept at 4°C were observed. It is to be expected that samples kept at room temperature over a shorter period (15 days to a month) would show higher percentages for sensitivity and coincidence.

The results obtained make it possible to recommend the utilization of filter paper as a useful, simple and economic alternative for collection of blood samples for the serological surveillance of the dengue virus which does not require the collection of venous blood or the processing of blood to obtain the corresponding serum and facilitates shipment to the laboratory. It should be pointed out that the utilization of filter paper does not eliminate the need to collect serum samples useful for isolating and identifying the serotypes in circulation and for carrying out the genomic characterization of the strains present in the Region, studies that are of great interest in virological surveillance.

Source: Institute Pedro Kouri (IPK), Cuba; National Diagnosis and Reference Center (CNDR), Nicaragua; Costa Rican Institute for Research and Education in Nutrition and Health (INCENSA), Costa Rica..

E-Mail Course in Epidemiology and Biostatistics

The Pan American Health Organization (PAHO), in conjunction with the University of Technology (UTech) in Kingston, Jamaica, *is sponsoring an electronic mail (E-Mail) Course in Epidemiology and Biostatistics. The program will take place during the 1996 Summer Session of UTech. The curriculum includes: Introduction to Epidemiology and Biostatistics, Public Health Surveillance and Emergency Health Management after Natural Disasters. The software EpiInfo 6.03 and Biostat are being used for training exercises. Seventeen pharmacy students from UTech, four health personnel from the Ministry of Health (Jamaica) and six employees of the PAHO (Jamaica Office) will be online during the course. After a four-day introductory period during which students will become familiar with equipment, procedures, and basic course concepts, lectures will be transmitted principally from the Pan American Organization Headquarters in Washington D.C.; one module will be transmitted from the University of Western Ontario in London, Ontario, Canada.*

Further information is available from:

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E-Mail:A Viable Technology for Distance Training in Developing Countries

In the 1990s, Electronic Mail (E-Mail), audioconferencing, videoconferencing and docuconferencing distance training technologies became available in the most up-to-date communication systems. Educators remarked that these innovations are the precursor of a paradigm shift in education from classroom to distance training. One educator wrote, "Those of us who are traditional classroom instructors may be the last of a breed, at least at the postsecondary level."(1) As early as 1990, the General Assembly of the United Nations in Resolution 45/191 recognized the importance of distance training in the context of human resource development. However, educators emphasized that choices in approaches to education and types of technologies used should be evaluated in terms of available communications links, course content and objectives, student and tutor interests, work experience, academic background, and computer literacy, as well as participants experience with distance training.(1-3) This article discusses important factors that affect the choice of distance training approaches and technologies, excluding correspondence distance training where student-teacher interactions are limited.

Notably, in 1989 Dr. Truls Ostbye, a medical epidemiologist, then at Dalhousie University in Halifax Canada, successfully tested a distance training E-Mail course in epidemiology and medical statistics for health personnel in sites across Canada and one in Norway.(4) The decision to use E-Mail was driven by the need for a less expensive and more convenient form of training than possible in a standard classroom setting. E-Mail could reach government health workers not able to leave jobs or homes for extended periods of time. It allowed them to interact with each other in a timely fashion independent of geographic location or time.(4-5)

Again, in 1989, E-Mail training was used successfully by the health authorities in Manitoba, Canada to provide nurses with access to courses necessary for them to qualify for certain jobs.(6) By 1994, the magnitude of distance training courses in the United States was remarkable. The Distance Education and Training Council in Washington D.C., estimated that three million students were registered in accredited programs and that half of the 230 surveyed colleges and universities offered "cybercourses" (7).

Determining factors for consideration of E-Mail Distance Training

Three factors, convenience, cost, and quality characterize effective training approaches and technologies. With respect to convenience, E-Mail communication with the instructor or among students is possible where there is hardware and software network link between them. Individuals do not have to leave their place of work or families to receive training. An instructor may communicate directly with one student independently or with all students. Students have the flexibility to complete assignments within a wider time frame than permitted by traditional classroom courses. E-Mail Distance Training promotes equity of access by offering opportunities to those unable to attend traditional education settings.(3) This type of distance training is maximized when used to reach students who are separated geographically. It also permits instructors from distant points to reach students working in the traditional classroom setting.

E-Mail Distance Training is often inconvenient where it is needed most. In many areas of developing countries, there is no access to networks from health institutions. Appreciating this constraint, a telemedicine expert, the President of Applied Communications Concepts, (ACC), Mr. Sarkis Zartarian urged the Pan American Health Organization in March 1996 to promote up-to-date communication links within countries as a high priority for health planning. However, some argue that this delivery mode of distance training lacks face-to-face interaction between student and instructor, contributing to higher drop-out rates than with traditional classroom education.(8)

Cost is a major factor in education. E-Mail Distance Training cuts costs related to travel, room and board, providing substantial savings. Corporations, such as IBM, state that distance training has cut their training costs by half.(9) However, distance training logistics problems can be expensive and frustrating to solve, where problems expand in direct proportion to the number of training sites.(1) In comparison to logistics problems, designing distance training curricula is relatively easy. Nevertheless, traditional curricula must be modified to suit evolving technologies and the challenges these technologies present to students.

Although it might be assumed that new technologies automatically enhance the quality of distance training making it more effective than instruction in a classroom setting, available research indicates that there is no significant difference in knowledge transfer between classroom and distance learning approaches.(10) Quality of learning can also be evaluated from a different perspective. Students and teachers in an E-Mail course may begin to communicate intramurally as well as extramurally more with each other and learn more about network bulletin boards and information sources in the World Wide Web.(11) Also, where distance learning extends beyond countries, international understanding, cultural development and links with other institutions of higher learning are encouraged.(11) The decision to select distance or classroom training requires careful study of available human and physical resources, technologies, convenience, cost, and quality as determining factors.

Strategies for implementing E-Mail Distance Training

A first step in the planning process is the creation of a distance education capability within a cooperating educational institution or government agency. It is logical to select a training environment that minimizes logistics problems. Other steps include the strengthening of a resource group of trainers and support staff who understand or can

learn the use of new technologies around which the new curricula will be designed. Although not necessarily the long term site of choice for in-service government training, a university setting will possibly provide the best chance of success in the early development of an E-Mail Distance Training program. A university has needed physical and human resources and very likely has institutional experience with other types of distance training. Once trained, university staff could provide a valuable base of expertise to institute future E-Mail training in primary target areas, such as health establishments of rural or isolated towns and villages. In addition to the availability of computers, the planning process must also include the connection of dedicated lines to health establishments in secured rooms.

It is imperative to select only the most appropriate technologies to support distance training. According to Mr. Zartarian, we ought not promote costly technologies necessary to emulate real time communications when distance training or telemedicine can be effectively provided in developing countries at much less expense. E-Mail is an example of using a time-delayed training methodology instead of a real-time audioconferencing or videoconferencing technology associated with traditional classroom education. This suggestion is particularly true where communications are most difficult. E-Mail works well using older modems with slower baud rates than are required for effective real-time file transfer of voice or video.

Although E-Mail's potential is maximized reaching students at distant geographic points, in the initial phase of distance training, success may be increased by maintaining a semblance of the traditional classroom routine, where E-Mail interactions supplement the expertise of the instructor. This would lessen drop-out problems and limit the need to radically change existing course curricula until trainers have mastered the technologies. Where courses are being transmitted from one country to others, it is of critical importance to have at each site a contact person who can resolve technical or logistics problems. Knowing as much about the target population as possible is extremely important for E-Mail Distance Training. With the target population in mind, every aspect of the reading material must be considered: sequence of presentation, style of writing, organization of content and reading aids employed.(12) Therefore, it is very helpful to have local trainers evaluate the proposed course curriculum and suggest changes. During the initial phase of an E-Mail course, there must be a well designed and implemented evaluation process which assists trainers to meet the special needs and skill levels of students. Through careful research, planning, and evaluation educators can develop E-Mail training strategies including appropriate technologies which match existing budgets with the needs of a target population.

Conclusion

E-Mail Distance Training is a convenient and cost effective mode of training, that is equal in quality to classroom training. It permits interaction between student and teacher and among students independent of geographic location or time. It has been used successfully by health authorities since 1989 and has an ever-increasing presence in colleges and universities in the United States. Success with E-Mail Distance Training requires students to be more self-motivated, which means accepting responsibility for study tasks, acquiring basic computer skills, and actively interacting with the instructor. At a minimum, students must be able to log on to the network, upload files, and type and transmit simple messages. E-Mail courses are successful when tutors can report that they know students online personalities as well as they would faces and voices.(7) Successful E-Mail courses are characterized by innovation both in the delivery and teaching-learning methodologies.(5) E-Mail Distance Training can be a viable mode of training when careful research, planning, and evaluation form the basis for selection of appropriate strategies and supporting technologies which match existing budgets with the training needs of a target population.

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Source: Division of Health and Human Development, Health Situation Analysis Program, HDP/HDA, PAHO.

Congresses

IV National Congress of Hygiene and Epidemiology in Havana, Cuba - 18-22 November 1996

The IV Congress of Hygiene and Epidemiology will take place on 18-22 November 1996 in Havana, Cuba, and will coincide with several other events, symposiums, and workshops, such as the I National Congress on Infectious Diseases; the I Scientific Meeting of the Ibero-American Association of Epidemiology; and the I National Symposium on Epidemiological Surveillance.

Pre-Congress courses (12-16 hours) will be offered on 18-19 November 1996, for a total of 20 participants per course.

The principal subjects will be: Health Surveillance; Clinical Epidemiology; Social Approach to Epidemiology; Environment and Health; Micronutrient Surveillance; Rapid Epidemiological Assessment; Use of Epidemiology in the Planning and Evaluation of Health Services; Cancer Epidemiology; Health Promotion in Primary Care; and Social Security System in Cuba.

For additional information, please contact:
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IV Congreso Nacional de Higiene y Epidemiología;
Consejo Nacional Sociedades Científicas del MINSAP.
Teléfono: (537) 333973; Fax: (537) 781497.

Fiftieth National Meeting, Fifth State Meeting, and First International Public Health Meeting Toluca, State of Mexico, 16-19 October 1996

The Mexican Society of Public Health and the Academy of Public Health of the State of Mexico will hold the Fiftieth National Meeting, the Fifth State Meeting, and the First International Meeting in Toluca, State of Mexico, 16-19 October 1996, on the subject "Public Health in Mexico and the Americas." Topics of professional interest concerning public health and related disciplines will be discussed. Particular attention will be accorded the progress achieved in public health in some countries of Latin America, the participation of civil society, human rights, guidelines for indigenous populations in the Hemisphere, human resources development, epidemiological transition, trends in financing, and science and technology as related to public health. The participation of international organizations, financial and technological support, and training will also be discussed.

The aforementioned subjects will be discussed in invited lectures, plenary sessions, and national and international panels, as well as through the presentation of papers.

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IV Argentina Congress of Epidemiology and Health Care Sixth Scientific Seminar on Health Services Administration, 2-4 September 1996

The IV Argentina Congress of Epidemiology and Health Care will be held on 2-4 September 1996.

The main themes of the Congress will be addressed under two general subject areas:

* Epidemiology and Local Health Systems: Epidemiological Techniques for Rapid Local Evaluations and Interventions; Geo-based Epidemiological Analysis in Public Health; Quantitative Methods in Epidemiology; Ethno-epidemiology, Critical Epidemiology, and So Epidemiology.

* Epidemiology and Administration of Services: Progress in the Epidemiological Control of Hospital Infections; Strategic Planning; and Total Quality Management.

During the Congress, the First Meeting of Argentine Members of the *International Epidemiological Association* will be held.

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