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## An Integrated Approach to Communicable Disease Surveillance

Effective communicable disease control relies on effective response systems and effective response systems rely on effective disease surveillance. A functional surveillance system is essential in providing information for action on priority communicable diseases; it is a crucial instrument for public health decision-making in all countries. Surveillance data provide information, which can be used, for priority setting, policy decisions, planning, implementation, resource mobilization and allocation, and prediction and early detection of epidemics. A surveillance system can also be used for monitoring, evaluation and improvement of disease prevention and control programs. Disease surveillance is thus a critical component of the health system since it provides essential information for optimal health care delivery and a cost-effective health strategy.

### Current situation

Many countries conduct surveillance activities for communicable diseases in order to monitor those with a high burden, detect outbreaks of epidemic-prone disease and monitor progress towards the national or international control or eradication targets set for endemic diseases. Surveillance activities have developed in an uneven way however, reflecting the particular history of infectious disease threats and the response to them in individual countries. Today most surveillance activities are supported and managed by a variety of vertical disease-control programs. Some are effective and linked to well-supported programs, while others have lost momentum, are poorly maintained or have virtually collapsed. In some cases the surveillance function is far removed from any corresponding action such as disease control efforts, outbreak response, health resource allocation or national health policy.

Outdated surveillance systems, in which new surveillance targets have been added but old ones never removed, often lead to central bodies collecting huge amounts of data with little or no analysis and use of the corresponding information. Feedback to the data collectors is rarely provided. The surveillance system becomes driven by the need to collect and move data while scant attention is given to using the data at each level of the health service for decision-making.

National surveillance data on infectious diseases is usually collected by programs under different authorities, including the ministry of health (diseases and health system monitoring), the ministry of agriculture (environment, animals, plants and food products) and the ministry of the interior (central statistics offices). In addition, academic or research institutes may conduct specific surveillance activities while the private sector and nongovernmental organizations (NGOs) may also run surveillance systems in their area of interest. Within the health sector, multiple surveillance systems may operate in parallel, sometimes in complete independence. This problem can be exacerbated by the influence of strong outside donors who may support specific surveillance and control programs.

Establishing surveillance activities within vertical programs allows the surveillance and control functions to remain closely linked. On the other hand, the overall surveillance function in a country may become badly disjointed and inefficient, with field workers participating in multiple complicated systems, which use different surveillance methodologies, terminology, and reporting frequencies and forms. This leads to extra costs and training requirements, and often results in health workers becoming overloaded and demotivated.

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ted. Furthermore, new priorities such as surveillance of antimicrobial drug resistance need to be addressed across vertical programs.

### **Paradigm shift – An integrated approach to surveillance**

Integrated surveillance of communicable diseases is the sum of all surveillance activities which add up to the national surveillance system. The various surveillance activities become integrated into one system within the broader national health information system.

#### **One national surveillance system**

An integrated approach to communicable disease surveillance envisages all surveillance activities in a country as a common public service, which carries out many functions using similar structures, processes and personnel. The surveillance activities that are well developed in one area may act as driving forces for strengthening other surveillance activities, offering possible synergies and common resources.

Specialized surveillance systems are important, especially where surveillance is complex and has specific data needs. For example, eradication and elimination programs require strong surveillance systems aimed at detecting every case. Yet although specific disease control programs require different surveillance data, they all require similar core activities (case detection, reporting, investigation, confirmation, analysis, interpretation and action) and support functions (surveillance standards, epidemiology training, supervision, geographical mapping, communications, laboratory support and financial resources).

It should thus be possible to envisage a holistic approach, which takes into consideration all core activities and support functions, in order to strengthen the national surveillance system through coordination, prioritization and streamlining of all surveillance activities.

On the basis of an inventory of surveillance activities and the prioritization of surveillance targets, a gap analysis can be carried out, possible synergies identified, and existing activities reoriented as needed, while at the same time recognizing the special needs of individual programs. Integration should focus particularly on the support functions of all individual surveillance systems.

#### **One national network of people**

Personnel that contribute to the national surveillance and response system are the most valuable part of the sys-

tem itself. Whether at the peripheral, intermediate or national level, each individual plays an essential role to ensure that the system is functional, appropriate, timely and responsive. Experience has shown that the human factor is more important than the design of the surveillance system. In this perspective, it is essential that appropriate training, support, feedback and motivation be guaranteed within the design of the surveillance system, and through its supervision and overall support mechanisms.

It is essential that feedback loops be built into national surveillance systems. This may be a regular epidemiological bulletin or website with tables and graphs showing trends, progress towards targets, and reports on the investigation and control of outbreaks. To maintain the momentum for the surveillance effort, it is crucial that the personnel involved in surveillance activities regularly see the impact of their work, since at the peripheral level it is usually done in addition to a heavy clinical workload.

Participants in the surveillance system should be properly trained for their surveillance tasks, through both initial and ongoing inservice training. In an integrated multi-disease approach, field or intervention epidemiology training will provide general surveillance and response skills, which can be applied almost anywhere in the system and for any disease surveillance and response needs. General surveillance and response skills are crucial in the event of the emergence of diseases not anticipated by the surveillance system. Short-term and long-term training courses in field epidemiology should be available in all countries.

Training in laboratory techniques should also take an integrated multidisease approach where the same or a similar technique (e.g. microscopy, serological assay) is used to diagnose various diseases. The integrated approach to training should also encourage basic laboratory training for epidemiologists and some epidemiology training for laboratory technicians, in order to ensure that both groups understand each other's needs and approach to surveillance.

#### **National coordination**

Taking an integrated approach to the streamlining and strengthening of surveillance and response activities requires a national coordinating body with the authority to shift priorities and resources according to changes in surveillance needs. Disease-specific surveillance systems naturally compete with each other, and coordination is necessary to ensure that the overall national priorities are fulfilled. Coordina-

tion is indispensable to provide overall supervision, identify possible synergies between activities and develop norms and standards for the surveillance system.

At the regional level, coordination of all national surveillance systems is also required through regional prioritization, standardization and the strengthening of integrated multidisease epidemiological and laboratory capacity. Specific regional capacity may be needed, such as regional reference laboratories, regional epidemic response teams and regional stocks of supplies (e.g. vaccine and drug storage).

At the international level the need to coordinate surveillance and response activities is growing with the increasing globalization of trade and travel. Global surveillance standards for communicable diseases are recommended by WHO to support the global analysis of surveillance data through common terminology, common case definition and common surveillance methods.

### **Assessing the national surveillance system**

Because of the changing pattern of infectious disease threats reflecting the dynamism of the microbial world, countries need to assess regularly the targets of their overall surveillance and response systems. The priorities of a national surveillance system should take into account the burden of each disease, but also the global and regional changes in disease epidemiology and their likely impact. The emergence of antimicrobial drug resistance, the possibility of new emerging diseases and the possible impact of environmental changes should be carefully considered. Also, global targets such as those of eradication and elimination programs should be included as appropriate.

Any assessment should aim to develop or update a national plan for communicable disease surveillance so that the national surveillance and response system is improved overall. In a given country, it should bring together all those who have responsibility for surveillance of communicable diseases and assess systematically the national surveillance activities as one system. There should be participation where possible from those working in public sectors other than the health sector, such as the agricultural sector. In addition, the private sector and other relevant partners such as NGOs should be included in the assessment. The integrated or multidisease approach to assessment of the national surveillance system may be based on the WHO protocol developed

and field-tested in several countries and may complement the assessment of individual systems as developed by CDC. More specific multidisease assessment guidelines have also been developed by WHO for vaccine-preventable diseases and are under development for antimicrobial resistance surveillance.

### **Taking advantage of news tools**

The arrival of electronic tools in all countries has already changed surveillance activities, going in the direction of integrated multidisease surveillance. Electronic reporting of surveillance data is increasingly common, initially using diskettes and now using web-based reporting mechanisms.

Thanks to electronic databases, data can be analyzed more easily and rapidly and when geographical information is available, they can be linked to geographical information systems (GIS).<sup>1</sup> The joint WHO-UNICEF HealthMap project, initially developed and successfully used by the program for eradication of guinea-worm disease, has evolved into a multidisease tool for data collection, mapping and geographical analysis. It provides a unique possibility for multidisease, multilevel and multisectoral surveillance. The dissemination of surveillance data and their presentation to a wider audience, as well as internal feedback, are now also achieved through dedicated websites and compact disks.

The difficulties related to the timely collection of disease specific data have led to the concept of collecting information about syndromes. This syndromic approach is used successfully by the poliomyelitis eradication program, which collects data on acute flaccid paralysis (AFP) caused by several infectious or non-infectious diseases, but that will trigger an immediate response from the poliomyelitis surveillance system. The same approach could be applied in areas where rapid laboratory diagnosis cannot be obtained (such as at the periphery of many health systems). Although lacking specificity, the syndromic approach offers: a simple and stable case definition; reliability (as it reports what is actually seen); immediate reporting (as there is no laboratory delay); a wider surveillance coverage allowing for the detection of emerging diseases; and, in some cases, the avoidance of disease-associated stigma. This approach is complementary to a disease-specific list of notifiable diseases, and is also being considered in the context of the revision of the International Health Regulations.

<sup>1</sup> WHO. *Weekly Epidemiological Record*, No. 34, 1999, pp. 281-285

## Investing in surveillance

A national plan to strengthen surveillance of priority diseases is the starting point for a long-term obligation to which governments and countries, at all levels, must be committed. The success of national surveillance will depend heavily on the highest political commitment and significant financial support.

In 1999, the Director-General of WHO issued a call to invest in healthy development, which should also translate into investing in disease surveillance.<sup>2</sup> Disease surveillance is a long-term effort that requires investment in national capacity-building, such as laboratory strengthening and field epidemiology training. Short-term and relatively low investment can rapidly have a visible impact in the specific area of epidemic surveillance and response. However, the overall strengthening and sophistication of routine surveillance systems is critical but necessarily more costly, and can only produce tangible results on a mid- or long-term basis.

Investing in surveillance should take into account the investment already made to support specific control, elimination or eradication programs, and transform these time-limited efforts into a long-term undertaking, capitalizing on special efforts such as the onchocerciasis control program in the African Region and the global poliomyelitis eradication program. Since disease surveillance is a basic component of a health information system, and thus also of a national health system, partnership with development agencies (whether international, governmental or nongovernmental) is essential to improve national surveillance and response systems. This is particularly true in the context of health sector reform and other long-term development projects.

## Lessons learnt and conclusion

There is little doubt that coordination streamlines both the surveillance and response activities, minimizes their cost and improves the overall efficiency of the national surveillance system. Building or strengthening national and regional capacity can be achieved through 4 elements: training in epidemiology; laboratory strengthening; improved communications infrastructure; and special attention to the health care sector, public or private, that constitutes the surveillance front-line. In addition to the lack of adequate supervision and coordination, experience has shown that the central

level too often criticizes the periphery for insufficient reporting, while not being geared itself to quickly analyze and respond to information coming from the periphery. This illustrates the potential value of an integrated multidisease approach to the assessment of national surveillance systems, with the participation of external experts.

In the area of epidemic surveillance and response, public health authorities should give more attention to information from sources other than the public health sector, including NGOs and the media. The capacity of public health authorities to rapidly respond to outbreak-related information from any source is essential for the efficiency and credibility of the entire surveillance effort. In order to achieve such credibility, building an integrated multidisease response capacity should be the first step towards improving national and regional surveillance systems, the second step being to build on existing and successful surveillance activities.

A special effort is needed to design quality indicators for a multidisease surveillance and response system. It should take into account not only the need for generic universal indicators, but also the diversity of national surveillance systems and their specific situations.

Overall, the commitment of all interested parties, including health and other sectors such as agriculture and commerce, whether public or private, and the resolute support of the highest national authorities, are essential for the success of an integrated multidisease national surveillance and response system.

Source: This article was initially published in WHO's *Weekly Epidemiological Record*, Vol. 75, No. 1 (2000). To obtain more information and download the documents mentioned in this article, please refer to: <http://www.who.int/emc/surveill/index.html>.

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<sup>2</sup> WHO Report on Infectious Diseases – Removing obstacles to healthy development. Geneva, WHO, 1999. (<http://www.who.int/infectious-disease-report/>)

# Elimination of Leprosy in the Americas

Two conferences on the elimination of leprosy in the Region of the Americas and in the world took place during the month of November 1999. The *Third PAHO/WHO Regional Conference on the Elimination of Leprosy from the Americas* was held in Caracas, Venezuela from 3 to 5 November, in order to define a plan of action for the Region of the Americas. Convened by WHO from 15 to 17 November, the *Third International Conference for the Elimination of Leprosy* took place in Abidjan, Ivory Coast, and led to the announcement of the "Global Alliance to Eliminate Leprosy as a Public Health Problem in every country by the year 2005." This initiative will give the effort against leprosy its final impulse.

The implementation of multidrug therapy (MDT) has dramatically changed the epidemiological situation of leprosy in the Region of the Americas. The number of registered cases decreased from 369,846 in 1992 to 88,053 in 1999, while the detection rate per 10,000 population slightly increased at the regional level in the same period, with important progress in some countries such as Brazil. The geometrical mean of the annual decrease of the prevalence rate, now at the level of 18.7%, also reflects a decrease in the number of countries where leprosy is a public health problem, from 14 to 2 in Latin America<sup>1</sup> (Brazil and Paraguay), and from 27 to 3 in the American continent as a whole.

The elimination of leprosy from the Americas by the year 2000, through a decrease of the prevalence rate to a level below 1 case per 10,000 population, is a reachable goal that involves a reduction in the current number of registered cases of less than 10% in most countries. In the case of Brazil, where the reduction from 75,000 to 16,000 registered cases is more significant, leprosy could be eliminated within 3 to 4 years.

The countries of the American Region can be classified into the five following groups, based on different levels of priority and according to criteria such as prevalence rate, absolute number of registered cases and newly detected cases in 1998:

- Group 1: Brazil. This country is a top priority since it represents between 80 and 90% of the total burden of leprosy in the continent. Consequently, special and intensified efforts will be required to eliminate the disease

<sup>1</sup> Latin-America includes: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Mexico, Nicaragua, Paraguay and Venezuela.

through the active involvement of municipalities.

- Group 2: Paraguay and Suriname. Neither country has eliminated leprosy at the national level, but both present less than 1,000 registered cases, and initiatives to accelerate the elimination of leprosy should be put in place in these countries.
- Group 3: Argentina, Colombia, Mexico and Venezuela. These countries have already eliminated leprosy at the national level, but still present over 1,000 registered cases.
- Group 4: Cuba and the Dominican Republic. Both have eliminated leprosy at the national level and have less than 1,000 registered cases, but more than 200 new cases were detected in 1998.
- Group 5: the other countries of the Region, with the exception of Chile (where leprosy is not endemic), the English-speaking Caribbean islands, Canada and the United States of America. These countries present more favorable official indicators. Some Central American countries had achieved elimination before MDT was implemented. In the other countries, difficulties with the information systems require detailed validation of the official data.

In the case of Latin America, due to the socioeconomic situation and some characteristics of the national health systems, it is reasonable to suspect that the elimination programmes did not detect all of the existing cases in the area. Consequently, a hidden prevalence could exist, which can be estimated from the characteristics of the newly detected cases. Its importance was characterized in the following study, which includes some countries of Latin America only, due to the lack of data for the other countries.

In a group of 9 Latin American countries<sup>2</sup> representing around 80% of the population and of the leprosy prevalence in all the countries where leprosy was eliminated at the national level, the hidden prevalence was estimated at 5,000 cases. From this figure, it can be estimated that there are about 7,000 unknown cases in Latin American countries that have already eliminated leprosy, i.e. excluding Brazil and Paraguay.

In order to emphasize the importance and priority of the

<sup>2</sup> Argentina, Bolivia, Colombia, Cuba, Dominican Republic, Ecuador, Mexico, Perú, and Venezuela

leprosy problem in areas where the elimination at the national level has already occurred, another group of 8 Latin American countries<sup>3</sup> where leprosy was eliminated was considered. Again, this sample included 80% of the population and of the leprosy prevalence in all the countries with eliminated leprosy at the national level. In these countries, approximately 30 million people live in the territories of the first sub-national level (state, province or department) where leprosy has not been eliminated. Thus we can estimate that about 40 million people live in areas where leprosy is still a public health problem, in countries of Latin America where leprosy is considered to be eliminated at the national level. Further, of the 191 entities forming the first sub-national level, 37 (19%) have not eliminated leprosy.

Therefore, elimination strategies should be sustained even when a given country has reached elimination of leprosy at the national level. Two steps are involved in the integrated approach to insure political commitment and technical cooperation:

- The first step is confirmation, with prevalence as an indicator. In the confirmation stage, entities are classified according to their respective estimated prevalence rate and different strategies are put in place in order to evaluate hidden prevalence. Once the search and evaluation of the hidden prevalence are achieved, if it is confirmed that the prevalence is below one case per 10,000 population, other strategies will be implemented in order to confirm this “status”, using detection (incidence) as an indicator through the promotion of community awareness and training of local health teams.
- At a later stage, when no case is detected after a five-year period, the progressive introduction of an epidemiological surveillance system adequate for a low prevalence scenario is proposed, using tools such as sentinel surveillance and zero reporting, until the interruption of transmission is reached, which means that the area is no longer endemic for leprosy.

The “Global Alliance” proposed the following key strategies for the 2000-2006 period: 1) implement the diagnostic and treatment of leprosy in all the services of the endemic area; 2) guarantee the availability of free MDT treatment in health centers through appropriate logistic; 3) motivate people to ask for treatment, through creative and higher quality interventions, to spread the information on signs and symptoms of the disease; 4) ensure high healing indices through

<sup>3</sup> Argentina, Bolivia, Colombia, Cuba, Mexico, Peru, Dominican Republic, and Venezuela

**Situation of Leprosy in Latin America - 1998**

COUNTRY	Registered Cases	Rate Prev. per 10,000	New cases	Rate Detected per 10,000	Coverage MDT (%)
Argentina	2,624	0.73	569	0.16	100
Bolivia	302	0.38	31	0.04	...
Brazil*	75,000	4.54	44,000	2.66	99
Colombia	2850	0.76	586	0.16	99.9
Costa Rica	143	0.39	14	0.04	43.4
Cuba	597	0.54	246	0.22	98.8
Dominican Rep.	346	0.42	220	0.27	96
Ecuador	373	0.31	110	0.09	100
El Salvador	43	0.07	5	0.01	100
Guatemala	50	0.04	5	0	100
Haiti	924	1.23	50	0.07	...
Honduras	76	0.12	...	...	...
Mexico	2,320	0.24	415	0.04	78
Nicaragua	114	0.26	42	0.1	100
Panama	15	0.06	4	0.01	86.7
Paraguay	652	1.25	362	0.69	100
Peru	266	0.11	107	0.04	89.5
Uruguay	14	0.04	10	0.03	100
Venezuela	1,344	0.58	662	0.28	99.6
<b>Latin America</b>	<b>88,053</b>	<b>1.86</b>	<b>47,438</b>	<b>1.00</b>	<b>96.9</b>

Sources: 1) SIL/PAHO; 2) WHO; 3) Population: PAHO/WHO, Health Situation in the Americas - Basic Indicators 1998

(\*) Estimated      (...) Data not available

the introduction of innovative and flexible systems of administration of MDT; and 5) monitor actively the situation to adopt appropriate actions to solve the detected problems rapidly.

In order to accelerate progress towards elimination of leprosy in Brazil, Paraguay and Suriname and to build innovative strategies to validate and consolidate the results obtained in the other countries, a pro-active and sustained effort is proposed, through the implementation of a Regional Plan coordinated by PAHO/WHO. As agreed during the Venezuela conference, this action plan will be elaborated in 2000. From the time of its formulation, it should count on the full commitment of a wide spectrum of partners, and a close collaboration between health care providers and users at every level of leprosy care. The objectives of the Regional Plan should be to prevent the re-emergence of the disease as well as, through the use of new technologies, the total interruption of its transmission, i.e. the eradication of leprosy from the Americas.

Source: PAHO. Division of Disease Prevention and Control. Communicable Diseases Program.

# Argentina: Health Situation Analysis and Trends, 1986-1995

The following study attempts to discover patterns of geographical and socioeconomic distribution, by age, sex, and Years of Potential Life Lost (YPLL), considering total, child, and maternal mortality as well as health trends, mainly for the period 1986 to 1995.

Death certificates<sup>1</sup> corresponding to the period of the study were reviewed, in which the causes of deaths were coded according to the International Classification of Diseases (ICD-9), and population projections from the National Institute of Statistics and Census (INDEC)<sup>2</sup> were used as well. The causes of death were classified in 15 groups, as in previous studies.<sup>3</sup> The mortality rates were adjusted by age and sex, and YPLL were calculated for every group of causes. The resulting indicators were stratified according to 5 geographical regions, in which the mortality gaps were analyzed.

Argentina has an area of 2,780,400 km<sup>2</sup>, with a population of 36.1 million inhabitants (1998) and an average density of population of 12.8 inhabitants by km<sup>2</sup>. The country is highly urbanized with 88% of the population living in urban areas and more than 50% residing in the five larger cities.

Argentina is a federal country that comprises 23 independent provinces and a Federal Capital (figure 1). Each province has its own constitution, with its own executive, legislative and judicial branches. The president is elected by direct popular vote every four years and can be reelected only once.

The gross domestic product (GDP) of Argentina in 1997 was of 323.4 billion dollars, corresponding to a per capita GDP of US\$9,066. The parity of the Peso to the US dollar has

been kept since 1991. The principal productive and economic activities include agriculture, livestock, trade, and service industries. It is estimated that 42% of the population is economically active (1997) and the official unemployment rate was of 12.4% in 1998.

The health sector is divided into three sub-sectors: a public health sector, a social works sector and a private sector that includes pre-payment and personal fee-for-service mechanisms. The per capita health expenditures were US\$795 in 1995, of which 45% corresponded to the public sector and



1 Ministry of Health, Argentina. Vital Statistics. Basic Information. 1986-1995  
2 INDEC: Statistical Report of the Republic of Argentina, 1996  
3 Ministry of Health and Social Action, Argentina and Pan American Health Organization, "Perspectiva Epidemiológica Argentina" 1996. The 15 groups of causes are: cardiovascular diseases, cancer, infectious diseases, accidents, other abdominal diseases, respiratory diseases, metabolic causes, urinary diseases, perinatal causes, violence, birth defects, other perinatal causes, maternal causes, ill-defined and other causes.

55% to the other sectors. Of the total population, 46% (15,900,000 inhabitants) had access to the public sector only, while 51.2% (18,700,000 inhabitants) were covered by social works and private mechanisms.

While the total mortality rate declined from 8.2 per 1,000 in the 1986-1988 period to 7.8 per 1,000 in 1995, the total age-adjusted mortality rate showed significant differences between the regions, with higher figures in the northern regions than the rest of the country. The distribution of the leading causes of death was heterogeneous as well. Deaths from infectious diseases occurred in greater proportion in the northern regions with lower-income population. Between 1986 and 1994 for example, mortality rates due to infectious diseases in the northern provinces went from 69.2 to 83.7 per 100,000, while rates in Patagonia ranged from 22.5 to 43.6 (Figure 2). Meanwhile, deaths due to cancer had a higher proportional weight in the Center and South. In Patagonia and in the center for example, mortality rates due to cancer fluctuated between 163 and 194, while rates in the northwest went from 86 to 124 per 100,000 population (figure 3). Higher

Figure 2 - Age-adjusted mortality rates for infectious diseases, Argentina, 1986-1994

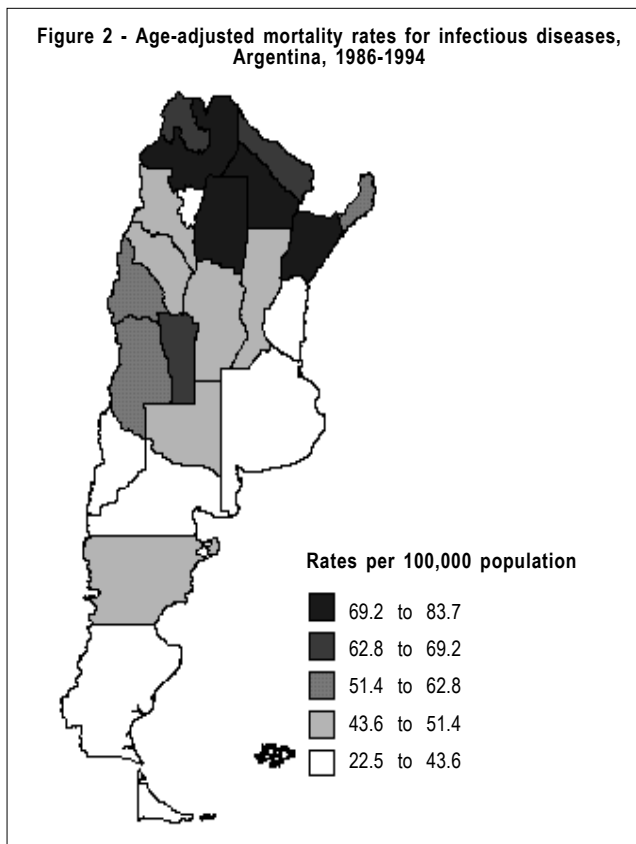


Figure 3 - Age-adjusted mortality rates for cancer, Argentina, 1992-1994

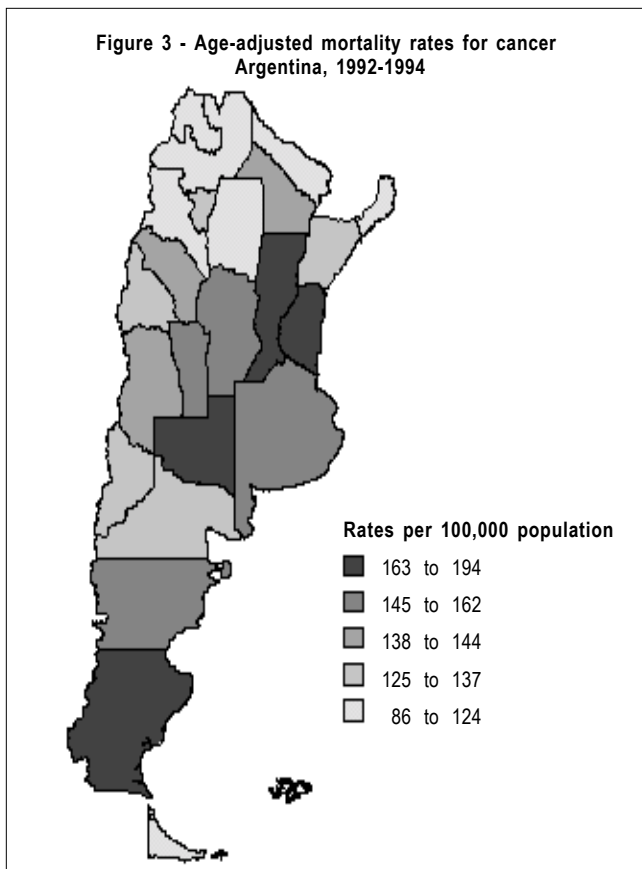
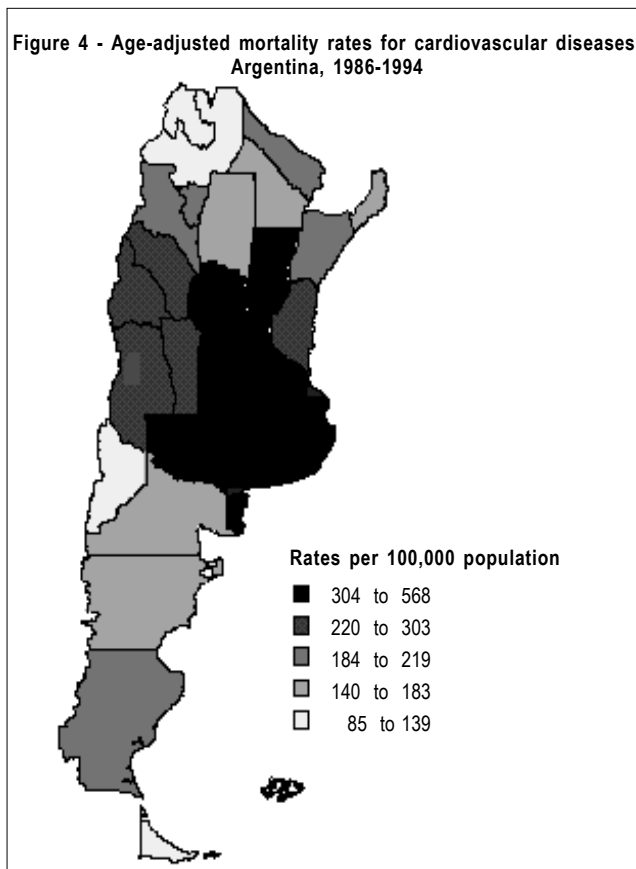


Figure 4 - Age-adjusted mortality rates for cardiovascular diseases, Argentina, 1986-1994





mortality rates due to cardiovascular diseases were registered in the Center and Cuyo, showing a correlation with the most developed areas (figure 4). Within the regions except in the northeastern, the differences in mortality from those cardiovascular diseases were greater among women.

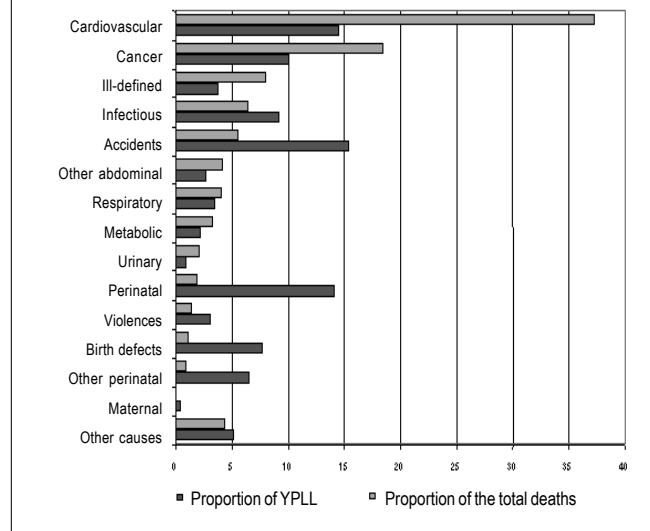
Even though cardiovascular diseases constituted the leading cause of death, accidents were responsible for the greatest number of years of potential life lost (YPLL), with 16% compared to about 14% for perinatal causes and cardiovascular diseases (figure 5). Similarly, perinatal diseases, birth defects, infectious diseases and violences took greater weight when the YPLL were considered.

Infant mortality declined from 26.9 per 1,000 live births in 1986 to 18.8 in 1997 but this reduction differed in the different regions. Patagonia showed the more significant decrease, with 38.7%, compared to a reduction of only 28.4% in the Northeastern region (Figure 6). This difference is even more remarkable when considering that Patagonia had one of the lowest, and the northeast one of the highest infant mortality rates (IMR) at the beginning of the period. Consequently, inequity is currently greater than at the beginning of the period. Significant infant mortality gaps were also found within each region.

Maternal Mortality showed a pattern similar to infant and total mortality. The regions of the Northeast and of the Northwest presented rates twice and three times higher than the regions of the Center and Patagonia (figure 7). The leading causes of these deaths were related to abortions (28.1%), prenatal care (23.2%) and delivery care (23.3%) (figure 8).

Different mortality patterns were discovered between regions and provinces. Although climatic and lifestyle factors could partly explain these differences, socioeconomic and demographic factors are more closely related to the inequities and gaps that were found. The northern regions, where the proportion of people living in poverty is higher, show worse health indicators. Some of these differences were larger at the end of the period of analysis.

**Figure 5 - Causes of death: proportion of the total number of deaths and proportion of YPLL, Argentina, 1992-1994**



**Figure 6 - Changes in infant mortality by region, Argentina, 1986-1997**

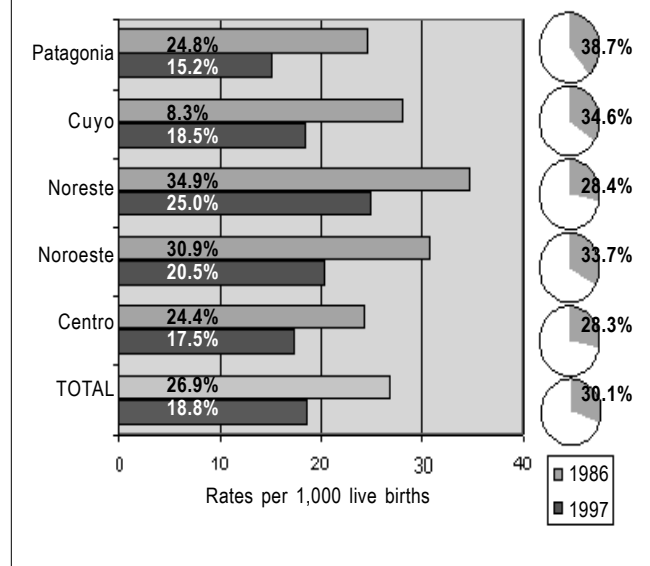


Figure 7 - Maternal mortality by region, Argentina 1986-1997

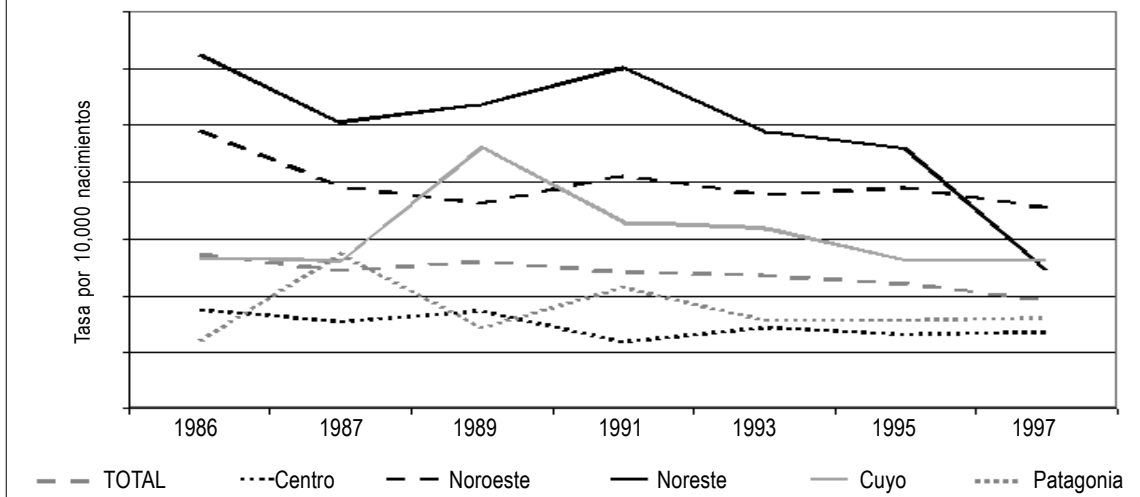
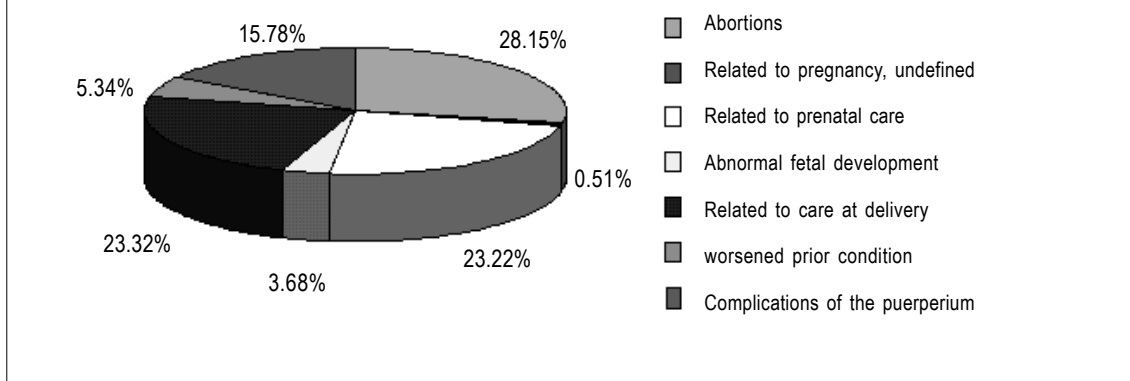


Figure 8 - Maternal mortality by causes of death, Argentina, 1986-1994

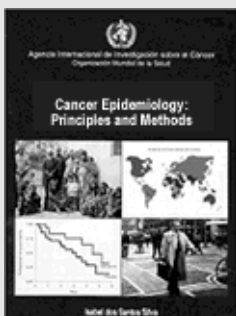


Source: Verdejo G, Bortman M. Study presented during the XV International Scientific Meeting of the IEA, Italy, 1999.

Data from the Argentinian Health Statistics Direction of the Ministry of Health and Social Action and from the National Institute for Statistics and Census (INDEC).

**Cancer Epidemiology: Principles and Methods**

International Agency for Research on Cancer (IARC)



This book is addressed primarily to medical and public health students, clinicians, health professionals and all those seeking to understand the principles and methods used in cancer epidemiology. Its aim is not to convert the readers into epidemiological experts but to make them competent in the use of basic epidemiological tools and capable of exercising critical judgement when assessing results reported by others.

The book is designed to provide an easy understanding of the basic concepts and methods through the use of illustrative ex-

amples, often using real research data. Knowledge of statistics is indispensable to the proper conduct, analysis and interpretation of epidemiological studies. Thus, statistical concepts (and formulae) are also presented but the emphasis is on the interpretation of the data rather than on the actual calculations.

To obtain a copy of the English version of *Cancer Epidemiology* please contact WHO Fax: (41-22) 791-4857; E-mail [publications@who.ch](mailto:publications@who.ch). For the Spanish version within Latin America, please contact PAHO, Fax: (301) 206-9789; E-mail: [paho@pmds.com](mailto:paho@pmds.com); Internet: <http://publications.paho.org>

1999, 442 pp., ISBN 92 832 0405 0  
US\$40.00

# Case definitions

## *Neonatal Tetanus*

### **Rationale for surveillance**

Neonatal tetanus was targeted for elimination (9GPW) by WHO. In the American Region, the 3 primary strategies towards this goal are: 1) identification of high risk areas; 2) vaccination of all women of child-bearing age who live in at-risk municipalities; and 3) clean delivery and post-delivery practices.

Epidemiological surveillance is particularly useful in order to identify high-risk areas and monitor the impact of interventions

### **Recommended case definition**

**Suspected case:** Any infant with a history of tetanus-compatible illness during the first month of life that fed and cried normally for the first 2 days of life;

**Or:** Any neonatal death (death within the first 28 days after birth) in a child who could suck and cry normally during the first 48 hours of life.

**Confirmed case:** A confirmed case of neonatal tetanus defined as a child with a history of all three of the following: 1) normal feeding and crying for the first 2 days of life; 2) onset of illness between 3 and 28 days of life; and 3) inability to suck (trismus), followed by stiffness (generalized muscle rigidity) and/or convulsions (muscle spasms).

**Discarded Case:** A discarded case is one that has been investigated and does not fit the case definition. The diagnosis should be specified. A summary of diagnoses for discarded cases should be made routinely.

### **Recommended types of surveillance**

The number of confirmed neonatal tetanus cases must be included in routine monthly surveillance reports of all countries and reported as a separate item from other (non-neonatal) tetanus. Even if there are no cases, the mention of “zero case” in the report is required, as well as active surveillance in major health facilities on a regular basis (at least once a year). In “low risk” geographical areas (incidence < 1/1000 live births with effective surveillance), all suspect cases should be investigated to confirm the case and identify the

cause. Community surveillance is recommended in “silent” areas (i.e. where routine reporting is not functional but where, based on socioeconomic indicators, neonatal tetanus could be a problem).

### **Recommended minimum data elements**

#### *Aggregated data for reporting*

- Number of cases.
- Number of TT1, TT2 or TT3 doses administered to women of child-bearing age and number of women of child-bearing age who live in the municipality.
- Completeness / timeliness of monthly reports.

#### *Case-based data, individual patient records for investigation:*

(i) Unique identifier, (ii) Geographical information, (iii) Date of birth, (iv) Age (in days) of infant at onset, (v) Sex of infant, (vi) Parity of mother (total number of deliveries including current delivery or pregnancy), (vii) Date of case investigation, (viii) Type of birth: 1=institution; 2=home with trained attendant; 3=home with untrained attendant; 4=home without attendant; 5=other; 9=unknown, (ix) Tetanus immunization status of mother when she gave birth: 1=up-to-date; 2=not up-to-date; 3=unimmunized; 9=unknown, (x) Final classification: 1=confirmed; 2=suspected; 3=discarded, (xi) Mother given protective TT dose within 3 months of report: 1=yes; 2=no; 9=unknown, (xii) Supplemental immunization conducted within same locality as case: 1=yes; 2=no; 9=unknown.

### **Principal use of data for decision-making**

- Monitor progress towards achieving and sustaining high routine TT2+ coverage in high-risk areas.
- Monitor progress towards eliminating neonatal tetanus in every geographical area.
- Investigate suspected neonatal tetanus cases in areas not considered at risk for neonatal tetanus to confirm and determine cause.
- Identify high-risk geographical areas and conduct 3 rounds of supplemental TT immunization in those areas.
- Periodically validate sensitivity of neonatal tetanus reporting and surveillance by comparing the number of reported cases with the number of cases identified through active surveillance.

# Tuberculosis

## Rationale for surveillance

The overall objective of tuberculosis (TB) control is to reduce mortality, morbidity and transmission of the disease until it no longer poses a threat to public health. To achieve this objective, the 1991 World Health Assembly endorsed the following targets for global tuberculosis control: successful treatment for 85% of the detected new smear-positive cases and detection for 70% of smear-positive cases by the year 2000.

About one third of the world's population is infected by *Mycobacterium tuberculosis*. Between 7 and 8.8 million new cases occur each year, 95% in developing countries; some 3.3 million cases of tuberculosis are notified each year. Projections into the next century suggest that the impact of tuberculosis will increase if no adequate control is established immediately in all countries. Surveillance of tuberculosis helps obtain an accurate picture of the course of the epidemic in a community over time so as to allow timely intervention.

## Recommended case definition:

### ***Pulmonary tuberculosis, sputum smear positive (PTB+):***

- Tuberculosis in a patient with at least two initial sputum smear examinations (direct smear microscopy) positive for Acid-Fast Bacilli (AFB), **or**
- Tuberculosis in a patient with one sputum examination positive for acid-fast bacilli and radiographic abnormalities consistent with active pulmonary tuberculosis as determined by the treating medical officer, **or**
- Tuberculosis in a patient with one sputum specimen positive for acid-fast bacilli and at least one sputum that is culture positive for acid-fast bacilli.

### ***Pulmonary tuberculosis, sputum smear negative (PTB-):***

**Either:** a patient who fulfills all the following criteria:

- two sets (taken at least 2 weeks apart) of at least two sputum specimens negative for acid-fast bacilli on microscopy;
- radiographic abnormalities consistent with pulmonary TB and a lack of clinical response despite one week of a broad-spectrum antibiotic;
- a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

**Or:** a patient who fulfills all the following criteria:

- severely ill;
- at least two sputum specimens negative for acid-fast bacilli by microscopy;
- radiographic abnormalities consistent with extensive pulmonary TB (interstitial or miliary);
- a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

**Or:** a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

### ***Extra-pulmonary tuberculosis:***

- Tuberculosis of organs other than lungs: pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints and bones, tuberculous meningitis, etc.
- Diagnosis should be based on one culture positive specimen from an extra-pulmonary site, or histological or strong clinical evidence consistent with active extra-pulmonary tuberculosis, followed by a decision by a medical officer to treat with a full course of anti-tuberculous therapy.

**Note:** Any patient diagnosed with both pulmonary and extra-pulmonary tuberculosis should be classified as a case of pulmonary tuberculosis.

**New case:** A patient who has never had treatment for tuberculosis or took anti-tuberculous drugs for less than 4 weeks.

**Relapse case:** A patient previously treated for tuberculosis and declared cured by a medical officer after one full course of chemotherapy, but who reports back to the health service bacteriologically positive (smear or culture).

## Recommended surveillance measures

Quarterly reports on case notifications and cohort analysis of treatment outcomes (at peripheral, intermediate, and central level).

## Recommended minimum data elements

- Number of new pulmonary sputum smear positive cases
- Number of pulmonary relapse cases
- Number of new pulmonary sputum smear negative cases
- Number of new extra-pulmonary cases

- Number of new pulmonary sputum smear positive cases by age and gender (suggested age groups: 0-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65+ years)

*Treatment results for new sputum smear positive cases:* (usually as a percentage of all new sputum smear positive cases registered during the same period of time):

- Number of cases who converted to negative after initial phase of treatment.
- Number of cases cured (i.e., completed treatment and at least 2 negative sputum smear results during the continuation phase of treatment, one of which occurred at the end of treatment).
- Number of cases who, after smear conversion at the end of initial phase of treatment, completed treatment, but without smear results at the end of treatment.
- Number of cases who died (regardless of cause).
- Number of cases who failed treatment (i.e., became positive again or remained smear positive, 5 months or more after starting treatment).

- Number of cases who interrupted treatment / defaulted (i.e., did not collect drugs for 2 months or more after registration).
- Number of cases who were transferred out (i.e., transferred to another reporting unit and results not known).

### Principal uses of data for decision-making

- *At local level:* ensure that appropriate treatment services are offered, contact tracing is carried out, local outbreaks are recognized, and local epidemiology is monitored.
- *At national level:* facilitate monitoring of the epidemiology of the disease and of the performance of treatment programmes (ability of a National Tuberculosis Programme to detect tuberculosis cases, diagnose sputum positive cases, treat tuberculosis cases successfully); and facilitate planning for programme activities (e.g., securing drug supply, lab supply, etc.).
- *At international level:* examine trends over time and make inter-country comparisons with the aim of coordinating control efforts.

## Fifth Conference on Health Promotion, Mexico, 5-9 June 2000



The Pan American Health Organization, the World Health Organization and the Ministry of Health of Mexico are jointly organizing the **Fifth Global Conference on Health Promotion** from 5 to 9 June, 2000 in Mexico City, Mexico.

The goal of the Conference is to take forward the five priorities for health

promotion for the 21st century that were introduced at the 4th International Conference on Health Promotion in Jakarta in 1997 and confirmed in the World Health Assembly's Health Promotion Resolution of May 1998. The priorities include:

- Promoting social responsibility for health.
- Increasing community capacity and empowering the individual.
- Expanding and consolidating partnerships for health.
- Increasing investments for health development.
- Securing an infrastructure for health promotion.

Specific Conference objectives are to illustrate the impact of health promotion strategies on health and quality of life; contribute to efforts that place health high on the development agenda within international, national and local agencies; and shape a Global Alliance for Health Promotion which would create new partnerships for the promotion of health and human development between diverse sectors at all levels of society.

Further information is available on the Internet at <http://www.who.int/hpr/conference/index.html>

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