National and local health authorities launched a campaign to trap and poison rodents and to clean dwellings inside and outside in Magdalena, San Ramón, San Joaquín, and some livestock holdings. The campaign was carried out with community participation; emergency committees were organized and health education provided. Health workers, and especially brigades of rodent catchers from the BHF Control Program, actively participated in the control operation. By late August, only three *C. callosus* were caught in the Magdalena area, and in September, nine; from these, samples were taken to determine infection by Machupo virus. Since rodent control measures were instituted following the family outbreak, the small number of *C. callosus* trapped may either reflect the result of rodent control efforts or naturally occurring low frequency of *C. calomys* in recent months.

The last laboratory-confirmed outbreak of BHF was nosocomial and occurred in Cochabamba in 1971—the result of a case from the endemic area who was hospitalized in that city. However, outbreaks in Magdalena and San Joaquín were reported until 1975, diagnosed both clinically and epidemiologically. From 1976 to 1992, there were no reported cases in Bolivia. In 1993, a fatal laboratory-confirmed case occurred in the San Ramón area. Between February and March of 1994, several suspected cases of BHF were reported around San Ramón, and two of them, from a ranch in Popona, were confirmed serologically by the Centers for Disease Control and Prevention (CDC), Atlanta.

The current household outbreak coincided with the visit of a group of experts sent by the Pan American Health Organization (PAHO) to Bolivia to collaborate in the strengthening of the National BHF Control Program. The advisors provided technical cooperation and drew up a Plan of Action, which includes training in clinical diagnosis and case management, health education, laboratory diagnosis, epidemiologic surveillance, and epidemiologic and ecologic studies. In late August, three experts from the CDC (supported by the United States Agency for International Development) were sent to Bolivia to provide cooperation in clinical, epidemiologic, and ecological aspects of the disease. From 26 to 30 September, a PAHO consultant conducted a workshop on clinical diagnosis and patient management was held in Trinidad. Authorities from the National BHF Program actively collaborated with the experts from PAHO and the CDC.

Source: National BHF Program, National Health Secretariat of Bolivia; Regional Health Secretary, El Beni Department, Bolivia; National Bureau of Disease Surveillance and Risk Control, Pan American Health Organization, PAHO (Communicable Disease Program and PAHO Representative Office in Bolivia), and Centers for Disease Control and Prevention (CDC), Atlanta.

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Epidemiological Surveillance in Haiti: Experiences and Outlook

With the purpose of analyzing the trends in certain diseases and in the use of the health services, a surveillance system was set up in Haiti in November 1991 that has been functioning as a network of sentinel centers. This system has two components, one consisting of monthly data collection and another that covers certain specific pathologies, such as poliomyelitis, neonatal tetanus, tuberculosis, cholera, typhoid fever, malaria, and AIDS. The system is simple, sensitive, flexible, and relatively cost-effective, and it makes it possible to adopt appropriate and timely measures. The results obtained to date are very encouraging.

The health sector in Haiti, which largely depends on external assistance to finance its activities, has been adversely affected by the political problems that began in 1986. As a result of the aborted elections in 1987, the donor countries suspended financing of all the programs and projects carried out by the Ministry of Public Health (MPH). Certain priority activities were financed indirectly, the administration of their funding being guaranteed by multilateral agencies. The events of 30 September 1991 led to a total cutoff of external aid and technical assistance and culminated in the suspension of all projects carried out by nongovernmental organizations (NGOs). This situation lasted until March 1992.

Faced with a total and sudden lack of health information, the Haitian Children’s Institute (HCI), with technical and financial assistance from several organizations, established an Epidemiological Surveillance System (ESS) that has made it possible so far to monitor the evolution of certain pathologies such as malnutrition, diseases preventable by vaccination, diarrheal diseases, and acute respiratory infections.
The ESS was set up to monitor changes in the health status of the Haitian population and to evaluate:

- the nutritional status of the preschool population living in the areas served by NGO's and
- the morbidity and mortality rates of the general population in these same areas, particularly in regard to measles, neonatal tetanus, poliomyelitis, malaria, acute respiratory infections and diarrheal diseases, including cholera.

The ESS is essentially based on the collection of data by auxiliary personnel of the HCI and on reporting by sentinel centers of morbidity and mortality data related to nutritional status and the aforementioned pathologies.

The ESS uses anthropometry, specifically the weight-for-age indicator according to the Gómez classification, as the sole indicator of the prevalence of malnutrition among children from 0 to 5 years of age attending the surveillance centers. Low birthweight is considered an indicator of fetal and maternal malnutrition.

With respect to morbidity, the number of cases of diseases by age group is used as an indicator; and for mortality, the number of deaths registered by age group in the sentinel centers.

The ESS was developed initially in five health establishments in the metropolitan area, located in Delmas and Cité Soleil. It was subsequently extended to 37 other establishments and currently numbers 42 centers, including a public hospital. These centers are distributed as follows: 5 in the Department of the Northwest; 16 in the Departments of the North, the Northeast, the Center, and Artibonite; 5 in the metropolitan area; and 16 in the Departments of the West, the Southeast, the South, and Grand-Anse.

Simple forms were developed for surveillance purposes, using the Ministry of Public Health's reporting form for poliomyelitis.

Collection of data on malnutrition, acute respiratory infections measles, typhoid fever, malaria, and diarrheal diseases is carried out by «motorized» auxiliary personnel from the HCI who have received special training, in collaboration with the archivist or another employee of the health institution. Data collection for monitoring purposes occurs twice monthly.

In the same establishments a negative reporting system is in operation for cases of acute flaccid paralysis in children under 15 years of age, acute watery diarrhea in children over 10 years of age, and for cases of neonatal tetanus. The motorized auxiliaries visit the centers weekly; those responsible for these sentinel centers fill out the Ministry of Health reporting forms and send them to the Haitian Children's Institute.

In case of positive reports—that is, probable cases or cases consistent with poliomyelitis, cholera, or neonatal tetanus—the Haitian Children's Institute investigates within 48 hours of receipt of the report and initiates focal control measures.

In the case of paralysis, an exhaustive clinical examination is made of the patient; two stool samples from the patient are taken at 24-hour intervals, in addition to one specimen of each five close contacts. These specimens are sent to the laboratory of the Caribbean Epidemiology Center (CAREC) for poliovirus testing, and the patient is examined 70 hours later. Cases likely to require rehabilitation are sent to the St. Vincent de Paul School in Port-au-Prince.

In cases characterized by the sudden onset of vomiting and copious watery diarrhea like «rice water,» two stool samples are taken from the patient and sent to CAREC and to a private biological research laboratory in Port-au-Prince, to be tested for Vibrio cholerae.

The data are processed by the Computing Unit of the Haitian Children's Institute. Analysis is conducted on two levels: the HCI carries out a simple individual level analysis of the «monitoring» data and transmits the data systematically to each of the sentinel centers as part of a quarterly feedback. The data on reported cases suspected of poliomyelitis and cholera become part of more detailed reports that are sent to PAHO/WHO.

A second analysis of the «monitoring» data, excluding the reported cases suspected of polio and cholera, is carried out by the Monitoring Unit of the U.S. Agency for International Development (AID) and its Division of Health, Population, and Nutrition, in collaboration with the Epidemiology Service of the HCI. The results of this second level of analysis are published monthly in AID's Monitoring Report.

At the present time, the HCI has the data compiled in 30 health centers over three consecutive years: 1991, 1992, and 1993. The data on use of the services vary according to the particular situation; nevertheless, they point to a progressive increase over the years.

The data on nutrition indicate an increasing deterioration in the nutritional status of children from 0 to 5 years of age who have been weighed in the health institutions and at the health posts maintained by the health workers working in these centers. The proportional distribution of cases of children with moderate and severe malnutrition, while seasonal in nature, is gradually increasing over normal or slightly malnourished children. In geographic terms, the three centers in the Northwest (Bassin-Bleu, Hospital of the Immaculate Conception, and Baraca) regularly report the highest rates of severe
malnutrition. Overall, the children in Cité Soleil appear to be the most undernourished, and the Boston and Brooklyn centers register the highest rates of children who suffer any form of malnutrition.

Another indicator of deterioration in the nutritional status of vulnerable Haitian population groups is the increase in newborns with a birthweight under 2,500 grams. This increase has been observed especially in reports from the Turgeau center and the hospitals located in the Departments of the Northwest and the Center. In the northwestern area, a malnutrition rate of 10.9% was recorded in 1993, compared to 4.8% in 1992; the central area registered 14.1% compared to 11.3% for the same years. An annual average of 12% of children born at the Sainte-Catherine Labouére Hospital in Cité Soleil, have low birthweight.

The data on measles indicate that the epidemic that surfaced in July 1991 and persisted for about 20 months showed signs of abating over the following 6 months, with a total of 3,582 cases in 1992 and 2,011 in 1993.

The data on presumed or clinical cases of malaria indicate a prevalence of the disease in the northern region of the country, in which 14,140 cases were recorded in 1993, compared to 6,818 reported cases in the southern area and 2,025 in the central area. Typhoid cases occur in greater numbers in the southern region, which reported 4,618 cases in 1993, whereas the northern area had 1,085 cases and the central area 1,039 cases in the same year. Acute respiratory infections and diarrheal diseases are the two leading causes of morbidity among children attending the sentinel centers.

With regard to the reporting of probable cases of poliomyelitis and cholera, 8 cases of acute flaccid paralysis were reported in 1992 and 16 in 1993. Poliovirus has not been detected in any patient stool samples or in patient contacts. Since this network became operational, 12 cases of acute watery diarrhea have been reported, six of which occurred in 1992, five between January and June 1993, and one between July and December 1993. All have been investigated and stool examinations have not detected the presence of Vibrio.

An important limitation of the Epidemiological Surveillance System is that it is not based on population data, which means that neither the incidence nor the prevalence of the diseases under surveillance can be determined by the data compiled system. Nonetheless, the system is so sensitive that it is rapidly able to detect every change in trend in the epidemiological patterns of diseases. Another limitation is that the system uses case definitions already established in other institutions, rather than standardizing them. No less important is the limited coverage of system in certain areas of the country and the fact that it is almost nonexistent in the public sector centers, which points to the need for expansion or redistribution of the System's locations.

On the other hand, the advantages of the system are many. It is simple, from data collection to data processing; it is relatively cost-effective; it is sensitive, in that it detects effectively the smallest changes in trends; it is flexible; and the regularity with which the centers are visited, and the ability to carry out epidemiological or biological research, makes it possible to update the data compiled and to confirm or invalidate previous findings. The system makes it possible to adopt appropriate and timely measures.

Regarding poliomyelitis surveillance, Haiti succeeded in obtaining a Certification of Eradication of this disease when it attained a weekly coverage rate for continuous reporting above 80% for all the institutions. Surveillance could be expanded to include other public and private institutions. At the departmental level, epidemiologists could strengthen their own relations and carry out training activities targeted toward the personnel staff of the sentinel centers; supervise the agents in charge of data collection, processing, and analysis; transmit collection and reporting forms to the Haitian Children's Institute, and direct epidemiological research. The Surveillance System could be strengthened by setting up a biological research laboratory, possibly at the level of each department, and developing a local information science network to facilitate transmission of data between the departments and the central level.

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Source: Haiti Epidemio. Volume 2, Number 1, Summer 1994.