Multidisciplinary EPI Evaluation: Bolivia

Following Colombia’s national EPI evaluation in November 1980, Bolivia became the second country in the Region of the Americas to carry out a multidisciplinary study of its immunization program. From 8 to 19 December 1980, an evaluation team studied Bolivia’s Expanded Program on Immunization in order to identify its greatest strengths and weaknesses, and to make a list of recommendations for improving each component of the program. The methodology used for this evaluation was described in EPI Newsletter, Vol. III, No. 3, “Multidisciplinary EPI Evaluation.”

The major achievements, problems and recommendations identified by the EPI evaluation team in Bolivia are described below.

Accomplishments

As a result of the accomplishments enumerated below, it can generally be said that the operational level now has the motivation, information and means to undertake measures for the protection of children against the EPI target diseases.

Programming

A good programming system has been implemented at the central level and in the “take-off areas” (one demonstration area was chosen for each Health Unit and designated a “take-off area”); this system is also being extended to other areas.

Cold chain

The cold chain is being implemented at the central and regional levels and partly at the operational level; refrigerators, insulated containers and thermometers have been distributed in accordance with the needs of the program. The staff has been observed to be more conscientious, as attested by the fact that refrigerator temperatures are being registered daily.

Delivery of biologicals

- The system for the acceptance, storage and distribution of biologicals is functioning well from the central down to the operational level.
- Throughout 1980 stocks of all vaccines except BCG were sufficient at all levels.

Training

- In collaboration with the Division of Maternal and Child Health, the EPI Manual of Operations has been published in an edition of 5,000 copies, of which 2,000 have already been distributed at the different levels.
- Following the national EPI workshop in June 1979, which was attended by 82 professionals, similar workshops have been held in all Health Units, in which 355 health personnel of all levels have participated.
- Good motivation and an understanding of EPI norms have been found at all levels.

Information system and epidemiological surveillance

- An information system has been implemented that can promptly deliver to the central level the data on immunizations performed at the operational level.
- An epidemiological surveillance system suitable for investigating outbreaks of communicable diseases is being developed.

Promotion

- The EPI has published a variety of educational materials, including 180,000 booklets, 1,000 flip charts, 55 sets of slides, and 1,500 posters on vaccination, and has distributed them to the operational levels.
- In most take-off areas visited it was found that efforts were being made to promote immunizations in the community.

Supervision

In some areas the frequency of supervisory visits to the various levels was found to have increased, both for the EPI and for other health programs.

Funding

Funding for the EPI has been obtained from USAID in the amounts of $6,000,000 in 1979, $8,000,000 in 1980, and $13,000,000 for 1981, under Title III of P.L. 480. It should be emphasized that these funds have made possible the launching and implementation of the EPI.
Coordination

Good coordination has been achieved with the Division of Maternal and Child Health in the early phases of program implementation.

Administration

An efficient administration and management of the program has been established at the central level.

Problems

It should be mentioned that, in recent years, complete immunization coverage of children under 1 year of age has been less than 15 percent; moreover, tetanus toxoid is not administered to pregnant women in areas where neonatal tetanus is endemic.

Programming

- The operational level has no role in programming, and does not know either the population in its area of influence or the number of children to be vaccinated.
- In some establishments visited, the only vaccination strategy is to attend spontaneous demand which, together with scant promotional work, could account for the low coverages.
- In areas where the strategy of vaccination by quarters is followed, there is no system for seeking out the unvaccinated, nor is any vaccination offered during the intervening periods. Moreover, there is no screening system to ensure completion of the vaccine series.
- Vaccination norms do not provide for the administration of tetanus toxoid to pregnant women.

Cold chain

- At the central level, the Vaccine Bank does not own its own premises, and the program personnel do not enjoy free access to them. As a result, temperature readings are not taken daily.
- The specially trained cold-chain technician is no longer employed in that capacity, and the Central Vaccine Warehouse has no one in charge who is trained to act in an emergency.
- At the operational level there are facilities where the cold chain has not been implemented due to lack of equipment.
- In some areas visited, an understanding of the norms for the preservation of vaccines and daily temperature readings has been found to be lacking.

Supplies and biologicals

- It was found that BCG was the only vaccine not supplied in sufficient quantity during 1980.
- At many establishments, syringes and hypodermic needles are in short supply.

Training

Since the EPI training program was only begun in 1980, it has not been possible to train all the operational personnel. This problem is being aggravated by frequent transfers of trained personnel.

Immunization information system and epidemiological surveillance

- Health establishments frequently do not have copies of their own EPI-8 forms (monthly immunization reports) or morbidity reports.
- No health establishment visited kept any cumulative data for the year.
- The Health Units do not oversee compliance by the operational units with the reporting requirements, nor do they have any system for following up on establishments which fail to submit reports.
- Some 20 percent of the health establishments do not send in weekly morbidity reports.

Community promotion and participation

- It has been found that about 70 percent of the children under 1 year of age who were given the first dose of polio and DPT vaccines did not receive their third dose.
- There is resistance to immunizations and high dropout rates in communities that are highly traditional or of low sociocultural level.
- Coordination between the EPI and the Division of National Health Education is poor.
- Although the EPI priority target is children under 1 year of age, it is found that a significant number of children older than 1 year are being vaccinated.

Supervision

- While the frequency of supervision has increased, it has not yet reached optimum levels, and timetables are not met.
- There are no norms for supervision and, as a rule, written reports are not left in the supervised establishment.
- There is no supervision of EPI nursing personnel in rural areas.
- The only person available at the central level for supervision of the EPI throughout the country is the Program Manager.

Resources

- Office space for the EPI is insufficient.
- There is a marked shortage of transportation facilities both for vaccination and for supervision.
- The budget for travel expenses is insufficient to cover all the supervisory travel.

Coordination

- In general, the health services of the paragovernmental and private institutions do not perform vaccinations.
- Intra- and extra-institutional coordination is inadequate.

Administration

- Customs formalities are complex and cumbersome, and can delay the receipt of imported materials for as long as several months.
- In most Health Units, the number of hours prescribed in the General Labor Law are not worked in full.
Recommendations

Programming, strategies and operational aspects

- Personnel at the operational level should participate in programming so that they know the population in their area of influence and the number of children to be vaccinated.
- It is recommended that a single programming system be implemented in the several divisions of the Ministry of Public Health and Welfare (MPSSP).
- Establishments providing vaccinations on demand must endeavor to reach out into the field to extend their coverage, and should establish an active follow-up procedure to reduce dropouts between the first and third doses.
- In areas following the strategy of vaccination by quarters, a system must be set up so that vaccinations are provided during the periods between quarters.
- Each child should be provided with his own vaccination card at the time of his first vaccination.
- In the first phase of EPI implementation, the more densely populated areas must be made the first priority, with the more scattered populations to be covered subsequently.

Cold chain

- The physical premises of the Vaccine Bank at the central level should be remodeled, and the EPI personnel should be allowed free access to it to take daily temperature readings.
- There must be specially trained cold-chain personnel to oversee and maintain equipment at the central and regional levels.
- Implementation of the cold chain at the operational level must be progressively completed.

Supplies and biologicals

- The EPI should take responsibility for supplying BCG vaccine for children under 3 years of age.
- Adequate supplies of syringes and needles must be reliably provided for the operational level.

Training

- The operational staff must be given an improved understanding of EPI norms by means of: a) new regional workshops for personnel not yet trained, b) continuing education, and c) the preparation of a simplified EPI manual for use at the local level.
- The Department of Human resources of the MPSSP should include information on the EPI in all its training programs.

Information systems and epidemiological surveillance

- The EPI-8 form must be revised to gather together children over 3 years of age and should include cumulative figures for each age group.
- Copies of all reports should be available in all health establishments.
- The Health Units should verify that reports are received and sent out on time.

- A report on immunization activities should be published and circulated down to the operational level every six months.
- The tabulation, consolidation and analysis of epidemiological surveillance data at the regional and national levels should be streamlined and provision made for feedback to the operational level.

Promotion

- A study should be made of the causes for dropout from the program between the first and third doses of DPT/polio.
- Vaccination at the community level should be promoted using every appropriate technique in close coordination with the Division of National Health Education.
- There should be more emphasis on the vaccination of children under 1 year of age.

Supervision

- At the central level of the EPI there should be enough personnel to improve the currently limited supervisory capability.
- A manual on supervision should be prepared and emphasis placed on the need to leave reports at all levels supervised.
- Supervision should be extended to EPI nursing activities in rural areas.
- The staff of the Maternal and Child Health Division should include aspects of EPI supervision in their routine supervisory visits.
- PAHO should be asked to have one of its permanent consultants give part of his/her time to support implementation of the EPI.

Resources

- Adequate premises should be provided for the EPI offices.
- The EPI should be provided with appropriate transportation for purposes of vaccination and supervision.
- Adequate travel funds should be provided for EPI supervision. The present system of providing a fixed amount for travel regardless of whether any trips are taken is a deterrent to travel: it should be replaced by the payment of per diem rates based on the trips a person has actually made.

Coordination

- Non-MPSSP institutions with health services should be encouraged to perform vaccination services.
- Intra- and extra-institutional coordination should be promoted through periodic informational meetings, particularly with the Divisions of Maternal and Child Health, Health Education, Nursing, and Manpower.
- Since teachers can play an important role in promoting vaccination, activities to make them aware of the EPI objectives should be coordinated with the Ministry of Education.

Administration

- Health personnel should be required to keep to the official daily work schedule.
• Customs formalities should be streamlined as much as possible, in coordination with the appropriate agencies.

• The national EPI evaluation team should hold quarterly meetings to determine the progress made in implementing these recommendations. These meetings will be promoted and coordinated by the EPI Program Manager.

• A new evaluation of the EPI in Bolivia should be made in the first quarter of 1982.

The evaluation team

The team was made up of nine persons from the Ministry of Public Health and Welfare, three officials from PAHO/WHO, and one observer from Argentina. All members of the team devoted their fulltime efforts to the EPI evaluation for two weeks.

On completion of the evaluation, the team drew up a timetable outlining the steps to be taken in order to implement their recommendations.

The complete report on the EPI evaluation in Bolivia may be obtained from:

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División de Epidemiología
La Paz, Bolivia

Poliomyelitis: Colombia, 1981

During the period 1 January through 9 July 1981, the Divisions of Epidemiology and Statistics of the Ministry of Health in Bogotá received reports of 272 cases of poliomyelitis, including 18 deaths (case-fatality ratio of 6.6 percent), among residents of 14 of the 31 Sectional Health Services (departments, territories and special district). Figure 1 shows the geographic distribution of the reported cases. One hundred forty-six (54 percent) of the cases were associated with an epidemic occurring in the department of Atlántico.

The first notification of probable epidemic activity of poliomyelitis in Atlántico was in mid-May, coincident with a large epidemic of gastroenteritis following unusually heavy rains during the month. As of 2 July 1981, there were reports of 146 cases of poliomyelitis in residents of Atlántico, of which all but three (97.9 percent) were residents of the city of Barranquilla. There were 14 deaths reported (case-fatality ratio of 9.6 percent). Cases were reported from all areas of the city, with a predominance from the outlying neighborhoods.

Figure 2 shows the number of cases, by week of admission to hospital. Dates of onset of illness were not available for all cases, but in the 18 cases where dates were available, the mean interval between date of onset of symptoms and date of admission to the hospital was 7.3 days (range 2–21 days, ± 6.15). The male:female ratio was 1:1:1.

Cases ranged in age from 45 days to 11 years. Table 1 shows the age distribution and age-specific attack rates of the cases. While 89.5 percent of the cases occurred in individuals less than 3 years of age, the age group most affected was children between 6–11 months of age (attack rate 26.70/10,000 population).

Of the 142 cases for which immunization histories were known, 133 (93.7 percent) had never received polio vaccine; five (3.5 percent) had received their first dose of polio vaccine within 10 days preceding onset of their symptoms; two (1.4 percent) had a history of receiving two doses of polio vaccine, and two (1.4 percent) had a history of receiving three doses of vaccine.
TABLE 1. Age distribution and age-specific attack rates per
10,000 population of 142 reported cases of poliomyelitis
among residents of Atlántico, Colombia, 1981.

<table>
<thead>
<tr>
<th>Age</th>
<th>No. of cases</th>
<th>% of total cases</th>
<th>Attack rate per 100,000 population¹</th>
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</thead>
<tbody>
<tr>
<td>less than 6 months</td>
<td>8</td>
<td>5.6</td>
<td>4.85</td>
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<tr>
<td>6-11 months</td>
<td>44</td>
<td>31.0</td>
<td>26.70b</td>
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<td>1 year</td>
<td>61</td>
<td>43.0</td>
<td>19.09</td>
</tr>
<tr>
<td>2 years</td>
<td>14</td>
<td>9.9</td>
<td>4.32</td>
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<td>3 years</td>
<td>7</td>
<td>4.9</td>
<td>2.26</td>
</tr>
<tr>
<td>4 years</td>
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<tr>
<td>5-14 years</td>
<td>5</td>
<td>3.5</td>
<td>0.25c</td>
</tr>
<tr>
<td>Total</td>
<td>142</td>
<td>100.0</td>
<td>3.14d</td>
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</table>

¹Populations used were the 1981 projections of the National Department of Planning, based on the 1973 census.
²Population used assumes that 50 percent of the population less than 1 year old is less than 6 months old, and 50 percent is between 6-11 months old.
³Population statistics only available for the age group 4-14 years.
⁴Attack rate for the 0-14 year old age group.

Table 2 shows the number of doses of polio vaccine administered during the period January–May 1981 in Atlántico, by age group of vaccinee and percentage of total vaccine administered. Forty-eight percent (27,321 doses) of the polio vaccine administered during 1981 was given during the month of May, coincident with the publicity surrounding the epidemic.

Table 3 shows a comparison of coverage of the less than 1-year old population with polio vaccine in 1980 versus 1981 (through 1 June 1981). While there is an improvement in the coverage with three doses of polio vaccine, the dropout rate (percent difference between the number of children receiving their first dose of vaccine and the number of children completing the 3-dose series) has not changed.

TABLE 2. Number of doses of polio vaccine administered, by
age of vaccine recipient and percentage of total doses
administered. Atlántico, Colombia, January–May 1981.

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of doses administered</th>
<th>Percentage of total doses</th>
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<td>less than 1 year</td>
<td>16,400</td>
<td>28.7</td>
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<td>1 year</td>
<td>9,743</td>
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<td>2 years</td>
<td>8,327</td>
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<td>3 years</td>
<td>10,923</td>
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<td>4 years and older</td>
<td>11,807</td>
<td>20.8</td>
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<tr>
<td>Total</td>
<td>57,240</td>
<td>99.9</td>
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TABLE 3. Percent coverage of the less than 1 year old
population with polio vaccine, by dose in series, and percent
dropout between first and third dose in series. Atlántico,
Colombia, January–December 1980 compared with
January–May 1981.

<table>
<thead>
<tr>
<th>Year</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>% dropout</th>
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<td>1980</td>
<td>36.9</td>
<td>24.4</td>
<td>15.7</td>
<td>57.4</td>
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<tr>
<td>1981</td>
<td>66.1</td>
<td>25.5</td>
<td>28.1</td>
<td>57.5</td>
</tr>
</tbody>
</table>

Intensive country-wide control measures, recommending polio immunization of all children less than 5 years old, are presently underway.

Source: Ministry of Health, Colombia.

Editorial note: Poliomyelitis continues to be a major health problem in many countries in the Americas. The epidemic in Atlántico, Colombia, illustrates several problems faced in the Americas in the control of poliomyelitis.

Delays in the notification of cases to health authorities lead to delays in the institution of control measures, so that by the time control measures are implemented, many children have already been infected by the poliovirus. A review of Figure 2 illustrates this point: assuming an average incubation period of 10-14 days, by the time health authorities had been notified of the first cases of polio, a minimum of 63 children were already infected with poliovirus.

Poliomyelitis has been occurring in Atlántico, Colombia, in epidemic cycles of two years, with the preceding epidemic years being 1977 and 1979. This is confirmed by a review of the age distribution of cases, which shows that 80 percent of the 1981 cases have occurred in individuals less than 2 years of age, who were born after the last major epidemic. Further substantiation is seen in the age-specific attack rates per 10,000 population: the age groups at highest risk are those children between 6-11 months of age, followed by children 1 year of age.

A comparison of Tables 1 and 2 shows that, while the age groups most affected are those children less than 2 years of age, only 44.2 percent of the polio vaccine administered in response to the epidemic in May 1981 was administered to this population. This probably contributed to the continued occurrence of cases in Atlántico after the institution of control measures. In addition, the high attack rate in children less than 1 year of age lends further support to the recommendation of the EPI to identify the less than 1-year old population as the target group for immunization programs.

One method of evaluating EPI performance and needs is presented in Figure 3. This figure represents a comparison of the percentage of children actually completing...
the 3-dose series of polio vaccine, with the percentage of children scheduled to complete the series. Thus, by the end of May, 41.7 percent of the population less than 1 year of age in Atlántico should have completed the 3-dose series of polio vaccine, whereas only 11.7 percent had actually completed the series.

In response to the country-wide EPI evaluation which took place in Colombia in November 1980 (see EPI Newsletter, Vol. III, No. 3), health authorities are intensifying measures to increase coverage with all the EPI vaccines. Considerable progress has already been made in implementing the recommendations of the evaluation team. For example, a new strategy for reaching the target population has been implemented in several states. This strategy emphasizes community education and active followup of the target population to ensure they reach the immunization centers. Preliminary results are encouraging, showing coverages of greater than 85 percent in most areas.

The Thermostability of Different BCG Products

Introduction

BCG is a live vaccine, and its viability is known to diminish according to both the duration and the temperature of storage. A considerable improvement in the keeping quality may be obtained by freeze-drying the vaccine. Although this procedure itself causes a certain loss of viability, the dried product keeps for many years when stored at a temperature not exceeding 6°C. Under such conditions, therefore, BCG vaccine could be considered as "storage stable." Unfortunately, this increase in keeping quality has been confused with "heat-stable," at higher temperatures the dried vaccine also gradually loses its viability, and the higher the temperature the higher the loss of viability.

Whereas in general it is possible to keep the vaccine at the required temperature in the production laboratory and at central storage centers, exposure to higher temperatures during transport and field storage may occur inadvertently or may simply be unavoidable. To illustrate what happens in such cases, the degradation curves at certain temperatures have been determined for a number of vaccines. The curves may be used to devise biochemical indicators of viability that can be packed with the vaccines. It has been suggested that repeated freezing and thawing could be deleterious to the vaccine owing to recrystallization of residual moisture. A special experiment was set up to investigate this point.

The vaccines examined in this investigation were those commonly supplied by UNICEF: from the Japan BCG Laboratory, Tokyo; Glaxo Laboratories, Greenford; and the Institut Pasteur, Dakar; as well as the product from the Statens Seruminstitut, Copenhagen.

Results

As was expected, there were slight differences between the counts for the different batches of each product, but these differences were not related to ampoule size. Moreover, the degradation curves for the different batches of each product were very similar.

For practical guidance, smooth curves have been con-
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<sup>a</sup>16 May 1981  
<sup>b</sup>Data not available for 1981. Data for 1980 through last epidemiological week in August.  
<sup>c</sup>31 January 1981  
<sup>d</sup>27 June 1981  
<sup>e</sup>1 paralytic case  
<sup>f</sup>4 paralytic cases  
<sup>g</sup>06 June 1981  
<sup>h</sup>25 April 1981  
<sup>i</sup>No cases  
<sup>j</sup>Data not available
tuates, i.e. whether degradation would be as steep if the vaccine were exposed for a second time to a high temperature. Experience seems to indicate that this is not the case, and that the effects of different exposures are simply additive.

The crucial question, which obviously is not answered by this study, is how much loss of viability is permissible before the vaccine should be discarded. From studies on BCG-induced tuberculin sensitivity it is known that the response to vaccination is dose-dependent. Which dose is needed to give maximum protection, however, is not known, and for this reason it is always attempted to give the highest dose that is tolerated. The vaccines have been calibrated accordingly. Loss of viability has an effect similar to reducing the dosage in terms of post-vaccination tuberculin sensitivity (what this means in terms of protection is not known) but not in terms of the lesion produced. Thus loss of viability cannot be compensated for by giving a higher dose, and certainly any vaccine that may have lost as much as, say, 50 percent of its viability should be discarded (or reexamined for viability; see document WHO/TB/Technical Guide/77.8). In this connection, one should keep in mind that a certain reduction in the number of culturable particles may correspond to a much higher reduction in the number of live bacilli, a particle presumably being culturable as long as a single bacillus in it is live.


Regional Meeting for EPI Program Managers From English-speaking Countries: Jamaica, 14-18 September 1981

Following the regional EPI meeting for Spanish-speaking countries held in Quito, Ecuador, from 18 to 22 May 1981 (see EPI Newsletter, Vol. III, No. 3), a similar meeting for English-speaking countries is being planned for 14-18 September in Kingston, Jamaica. The EPI Program Managers and other national health authorities from each of the 18 English-speaking countries in the Caribbean and Suriname have been invited to attend the 5-day meeting.

The purpose of the meeting is to give participants an opportunity to evaluate the progress being made in implementing the EPI in each of their countries, to identify major problem areas and to propose better ways of implementing immunization programs within the strategy of primary health care. The meeting is being cosponsored by the Pan American Health Organization and the American Public Health Association.

EPI Courses in Bolivia

Two local EPI courses have recently taken place in Bolivia. One workshop was held from 1 to 4 July 1981 in the city of Santa Cruz, and was attended by 47 nurses and vaccinators and 6 monitors. Another EPI workshop took place in the city of Trinidad, Department of Beni, from 9 to 10 July 1981. Thirty-eight nursing auxiliaries and vaccinators and 4 monitors participated in the latter workshop.

The EPI Newsletter is a periodic publication prepared by the Expanded Program on Immunization (EPI) of the Pan American Health Organization, Regional Office for the Americas of WHO. Its purpose is to facilitate the exchange of ideas and information concerning immunization programs in the Region in order to promote greater knowledge of the problems faced and their possible solutions.

References to commercial products and the publication of signed articles in this newsletter do not constitute endorsement by PAHO/WHO, nor do they necessarily represent the policy of the Organization.

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