

PA-ABF-934

ASSESSMENT OF NEONATAL TETANUS AND ITS CONTROL IN BOLIVIA

USAID/La Paz

August 23 to September 2, 1989

Resources for Child Health Project

REACH



John Snow, Inc.
1100 Wilson Boulevard, 9th Floor
Arlington, VA
22209 USA
Telex: 272896 JSIW UR
Telephone: (703) 528-7474

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ISA 67760

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Dr. Claude Daniel Betts, M.D., MPH.

REACH Consultant

The Resources for Child Health Project
1100 Wilson Blvd., Ninth Floor
Arlington, VA 22209

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ABBREVIATIONS

EPI	Expanded Program on Immunization
MOH	Ministry of Health
NNT	Neonatal Tetanus
PAHO	Pan American Health Organization
PVO	Private Voluntary Organization
REACH	Resources for Child Health Project
TT	Tetanus Toxoid
USAID	United States Agency for International Development
WHO	World Health Organization

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I. EXECUTIVE SUMMARY

USAID/La Paz requested the REACH Project to send a consultant with expertise in neonatal tetanus (NNT) control to Bolivia from August 23 to September 12, 1989. The purpose of this mission was to assess the incidence of NNT and the status of control activities in Bolivia.

The overall goal of the trip was to provide guidance to USAID/La Paz, the Ministry of Health (MOH), and the other supporting agencies of the EPI Interagency Coordinating Committee on:

1. Recent advances in NNT control, a disease which WHO has targeted for global elimination by the year 1995.
2. Magnitude of the NNT problem in Bolivia.
3. Present status of NNT control activities in Bolivia.
4. Establishment of a comprehensive NNT control program in Bolivia.

The general approach to undertake this task was as follows:

1. Contacts with MOH officials to identify available data that could characterize NNT epidemiology and control activities in Bolivia.
2. Training workshop with MOH, USAID, PAHO, and UNICEF officials in Bolivia to determine present involvement in NNT control and to discuss plans for the future.
3. Field visits to known high risk areas such as Santa Cruz and Montero to get first-hand data.
4. Contacts, conferences, and a training workshop with participants of the Bolivian Pediatric Society and its Santa Cruz branch to generate support for NNT control activities.

The key findings can be summarized as follows:

1. Positive features favoring NNT control activities include the following:
 - a) Improved surveillance has identified 117 reported cases in 1988, compared to only three in 1985.
 - b) NNT is being reported separately from other tetanus cases, and a special form for NNT case investigation is being used in 45% of the cases.
 - c) A PAHO-funded study presently underway will enhance NNT surveillance.

- d) The inclusion of TT in the social mobilizations during the last two years has had a positive effect on health care workers and mothers, which may increase acceptability and support for other NNT control strategies in the future.
2. Yet, NNT control in Bolivia has been one of the least important priorities of the EPI. According to a 1987 EPI coverage survey in urban areas, only 3.2% of women of childbearing age were vaccinated with TT2. In contrast, coverage for other EPI vaccines ranged between 60.2% and 76.3%. TT vaccination of women of childbearing age in recent mobilizations has probably increased TT coverage, but in a preliminary evaluation by a PAHO consultant, TT coverage during the first and second mobilizations of 1988 was only 20%, and in Santa Cruz 16%.
 3. The 1987 survey revealed a TT2 coverage in the Santa Cruz urban area of only 1.1%, which is even lower than the 3.2% national urban average.
 4. The Santa Cruz Department reported 51 (88%) of the 58 NNT cases reported in the country during the first semester of 1989. Reported cases belonged to only 5 of the 13 provinces of the Santa Cruz Department (see appendix No. 7), and investigated cases were reported by only 12 (4%) of the 283 health institutions in the Santa Cruz Department.¹
 5. Other Departments reporting NNT cases during the first semester of 1989 were: Cochabamba (5 cases), Chuquisaca (1 case), and Pando (1 case).
 6. According to official figures, Bolivia as a whole reported to WHO a total of 48 cases of NNT during 1987 (see Appendices 4 and 5).² This represents an annual incidence rate of only 0.17 x 1,000 live births. The true rates are probably 30 to 50 times higher. In a written report of the Children's Hospital of Santa Cruz, there are 57 NNT cases documented in the infectious diseases ward of that hospital alone during 1987 (see Appendix 8) in contrast to the official 48 NNT cases for all of Bolivia.³
 7. Written reports from the Children's Hospital of Santa Cruz and Montero indicate that 8% of cases in Santa Cruz and 36% of cases in Montero come from urban areas.
 8. During the visit to the Children's Hospital of Santa Cruz, it was possible to document a NNT case of urban origin, living only 15 minutes away from the hospital by public transportation, served by 4 different bus lines. The house is very close to a primary care PVO clinic where the mother has been receiving periodic check-ups because of tuberculosis, including home visits for prophylactic treatment of other household members. During her last pregnancy she received prenatal care when she was 4 months pregnant at the same clinic. The mother had a previous child who died after being unsuccessfully treated in a private clinic in Santa Cruz. Despite the many opportunities for TT vaccination of the mother, first by the private clinic that treated the first NNT case, and later by the primary care PVO clinic which included a prenatal

care visit, all TT vaccination opportunities were missed. The resulting NNT case was, by all standards, preventable.

9. The PVO justified not having vaccinated the mother during the prenatal visit on the grounds that the MOH has strict guidelines that prohibit TT vaccination before the 6th month of pregnancy.
10. The Epidemiology Department of the MOH stated that such a policy did exist in the past, but that it has been over-ruled by new EPI guidelines that establish TT vaccination during childbearing age, independent of pregnancy or of month of pregnancy.
11. The MOH's Mother and Child Program, under which the prenatal care services are administered, was unaware of the changes indicated by the Epidemiology Department with regard to TT vaccination at any time during pregnancy. It is, therefore, obvious that communication gaps about TT vaccination schedules have occurred both vertically and horizontally within the health system.
12. The directors of the Bolivian Pediatric Society and of their Santa Cruz branch are very interested in NNT control, and expressed their support of NNT control activities.
13. The MOH is presently engaged in a PAHO-funded survey, which is looking for NNT cases diagnosed, but not reported, by health institutions throughout the country, and also looking into some socio-cultural aspects of the NNT problem. It should be noted, however, that this survey is not designed as a NNT household mortality survey, but as an institutional survey.

A NNT Control Workshop was held in La Paz with the participation of representatives of the MOH and main supporting agencies of the EPI Interagency Coordinating Committee, including a representative of the Bolivian Pediatric Society.

The participants of the workshop arrived at the following conclusions and recommendations:

1. Enhance the surveillance system: strengthen supervision of institutions presently reporting, identify those which are not, and start requiring reports (positive or negative) of NNT from all health institutions.
2. Measure TT vaccination coverage using vaccination records, or field surveys if necessary.
3. Study missed opportunities for TT vaccination, particularly in the known high-risk areas.
4. Give training and orientation to health personnel about recent advances in NNT control. Stress the importance of avoiding missed opportunities for TT vaccination of women of childbearing age.

5. Improve communication about NNT control activities within the health sector and to the general public.
6. Coordinate with medical and nursing associations to get their support for promotion of NNT control.
7. Communicate NNT control messages through the mass media to the public as a permanent health promotion activities throughout the year.
8. Strengthen regular EPI activities at institutional levels.
9. Develop mechanisms to increase the rate of attendance for follow-up doses of TT according to the WHO schedule.
10. Establish a systematic review of vaccination status whenever a woman of childbearing age, with or without her child, comes to a health service for any reason.

II. PURPOSE OF THE TRIP

This trip was programmed in such a way as to take advantage of the opportunity given by the Bolivian Pediatric Society to participate in the National Pediatric Congress and also develop a Symposium on NNT with the pediatricians of Santa Cruz. Potential areas for the development and implementation of NNT control strategies by the MOH and donors who constitute the EPI Inter-agency Coordinating Committee were identified.

The scope of work was developed covering 6 different topics:

1. brief MOH and donors who constitute the Inter-agency Coordinating Committee on latest NNT control strategies and policies;
2. review available data and policies and recommend to MOH control strategies and policies appropriate to different areas of Bolivia, including Santa Cruz;
3. present sessions at the Pediatric Congress in La Paz 24-25 August and to a chapter in Santa Cruz 28-29 August on "Neonatal Tetanus in Bolivia" and "Recent Advances in the Control of Neonatal Tetanus";
4. ascertain MOH interest in conducting studies of missed opportunities for immunization, including TT;
5. provide guidance to MOH and UNICEF in using Dr. J. Bastien's REACH study of cultural perceptions of NNT to customize health education messages and service delivery; and
6. de-brief USAID mission.

III. BACKGROUND

WHO has recently established the goal of global elimination of NNT by the year 1995. The feasibility of this goal is based on a series of recent advances in the existing knowledge about the immunogenicity of various vaccination schedules, and the possibility of using immunologically-sound vaccination schemes and epidemiologically-sound control strategies by existing EPIs in each country.

Since Bolivia, and particularly Bolivian lowlands and valleys, have high reported incidence rates of NNT (according to data from the MOH surveillance system) and even much higher estimated incidence rates (based on special mortality studies), it is consistent with the global NNT elimination goal to pay special attention to the NNT problem in Bolivia.^{4 5} Also, Bolivia has given high political priority to the EPI, which has resulted in appreciable success in enhancing vaccination coverage of children, especially in urban but also in rural areas. A comparable success is to be expected by including TT vaccination of women of childbearing age in the mass vaccination campaigns.

In November 1987, a team of REACH consultants, including the author of this report, prepared a diagnostic document on Child Survival for USAID Bolivia.⁶ In this report, special attention was given to the NNT problem, and it was recommended that epidemiologic studies be conducted to assess the NNT situation in the country.

In February 1988, Robert Steinglass, REACH Senior Technical Officer, and the author prepared an analysis of the EPI Annual Plan in Bolivia for 1988.⁷ In the 1988 EPI plan, vaccination against tetanus was included for the first time in the mass vaccination campaigns. USAID funds were assigned for a medico-anthropological study of socio-cultural perceptions of NNT. This study was carried out in August 1988 by Dr. Joseph W. Bastien, also a REACH consultant.⁸ During this same month, a workshop for EPI and ARI was held, as well as a meeting of the Inter-agency Coordinating Committee. A report of the participation of USAID in both meetings was prepared by Robert Steinglass.⁹ In these meetings, the MOH's TT coverage indicators for women of childbearing age were presented.

During February and March, 1988, Dr. Claudio Silveira, Washington-based PAHO consultant, and Percy Halkyer, PAHO National Consultant, prepared a report on NNT control in Bolivia.¹⁰ Dr. Silveira also visited other Latin American countries during this period and prepared a regional report on high-risk areas for NNT, which includes information on Bolivia.¹¹ Data officially reported to PAHO by the MOH between 1985 and 1988, indicated that 64% of the NNT cases had occurred in urban areas, according to the findings of Dr. Silveira. This highlights the fact that NNT is still occurring frequently in urban areas, where health services exist. Therefore, there is an urgent need for NNT prevention within the urban areas, where few additional resources would be necessary for immediate results. Activities such as assessment of missed opportunities for vaccination, revision of vaccination guidelines where necessary, and training and motivation of health personnel could make a great difference.

IV. TRIP ACTIVITIES

The author participated in the Bolivian Pediatric Society Congress in La Paz, as invited professor, giving a lecture on "Recent Advances in NNT Control". This activity was followed by a solemn ceremony in which the Mayor of La Paz, Ronald Mac Lean Abaroa, bestowed the honor of "Distinguished Visitor of La Paz".

Contacts with USAID health officers, PAHO officials and MOH officials were initiated and a NNT control workshop was planned for the following week.

A trip to Santa Cruz was made. It included visits to local hospitals, a trip to Montero (a small community about 60 kilometers from Santa Cruz), and conducting a symposium during two consecutive nights to pediatricians and other health personnel of Santa Cruz and other close-by communities. There were over 50 participants during both sessions. Participation and motivation during the symposium were excellent.

Back in La Paz, preparations for the workshop continued, as well as further contacts with Dr. Roberto Vargas and his team at the MOH's Epidemiology Division. The NNT Control Workshop was held in the PAHO meeting room. Most inter-agency coordinating committee members were represented at the workshop, as well as representatives of the Bolivian Pediatric Society. The MOH also participated with representatives of the Santa Cruz and Cochabamba areas, from where most of the reported NNT cases come. A good deal of immunological and epidemiological data were shared during the process, and this created a positive response among the participants. The conclusions of the workshop will be presented and discussed in the next part of this document.

V. RESULTS/CONCLUSIONS

There are many very positive features in Bolivia that favor NNT control activities. Improved surveillance has identified 117 reported cases in 1988 compared to only three cases in 1985 (see Appendices 4 and 5). Even though a NNT case definition is still being elaborated, NNT is being reported separately from other tetanus cases. There is a special form for NNT case investigation, designed and in use in Santa Cruz (see Appendix 13). A PAHO-funded study that is presently taking place will probably increase, both quantitatively and qualitatively, NNT surveillance in areas where there is access to health services. The inclusion of TT in the mobilizations during the last two years has had a positive effect on health workers and mothers, which could increase acceptability and support for other NNT control strategies in the future.

From both statistical data (see Appendices 5 and 10) and circumstantial evidence, it is quite obvious that there is very low incidence of NNT in the highlands of Bolivia as compared to the lowlands.¹² The optimal conditions for very high rates of perinatal infection with *C. tetani* are present in all ecological regions of Bolivia and TT vaccination coverage are also very low in all regions (see Appendices 11 and 12). This is consistent with observations from other parts of the world, which indicate extremely low incidence rates of NNT above 3,000 meters.¹³

There is a nearly absolute under-reporting of NNT from the rural areas of the lowlands and valleys (see Appendix 7). Almost all of the NNT cases reported during the first half of 1989 were from institutions located in urban areas. Yet, as mentioned above, even the cases diagnosed and treated in important urban hospitals do not necessarily get reported to the central levels of surveillance. Therefore, the official number of NNT cases reported annually is only a small part of the true picture of NNT incidence in Bolivia. On the other hand, NNT control in Bolivia has been one of the least important priorities of the EPI. According to a 1987 EPI coverage survey of urban areas, only 3.2% of women of childbearing age were vaccinated with TT2. In contrast, coverage with other EPI vaccines ranged between 60.2% and 76.3%. During the last three mass vaccination campaigns of 1988 and 1989, TT vaccination of women of childbearing age was included for the first time. This has probably increased TT coverage to levels above those found during the 1987 survey. Yet, according to a preliminary evaluation by Dr. Silveira (PAHO consultant), TT coverage during the first and second mobilizations of 1988 was only 20% of women of childbearing age; while in Santa Cruz coverage was only 16% (see appendix 12).

An updated EPI coverage survey, including TT coverage of women of childbearing age in both urban and rural areas of Bolivia would allow a more precise knowledge of the present need for TT vaccination. It should be noted, however, that the lowlands and valleys must be targetted over the highlands for high TT coverage. The former have extremely high NNT incidence rates compared to the latter, although TT coverage levels are similar. Even so, highlands should receive TT vaccination as a second priority because internal migration between ecological areas occurs frequently. Protected

highlanders will benefit from past TT vaccination when giving birth in the valleys or lowlands.

The 1987 survey revealed TT2 coverage to be only 1.1% in the urban capital of the lowland department of Santa Cruz, even lower than the 3.2% national urban average.

In contrast, the Santa Cruz Department reported 51 (88%) of the 58 cases of NNT reported to the central offices of the MOH Epidemiologic Surveillance Unit during the first half of 1989. Reported cases occurred in only five of the 13 provinces of the Santa Cruz Department (see appendix No. 7), and investigated cases were reported by only 12 (4%) of the 283 health institutions in the Santa Cruz Department.¹⁴ According to the reported NNT cases, the incidence rate of NNT in the Santa Cruz Department will be around 2.0 per thousand live births during 1989. The true incidence is certainly above 10.0 per 1,000 live births.

Other Departments reporting NNT cases during the first semester of 1989 were: Cochabamba (5 cases), Chuquisaca (1 case), and Pando (1 case). Knowing the septic conditions of the majority of births and extremely low TT coverage in these departments, it is obvious that there is mass under-reporting, not to mention other high risk departments like Beni and Tarija that reported zero NNT cases.

The gross levels of under-reporting can be evidenced by the following observation: According to official figures, Bolivia as a whole reported to WHO a total of 48 cases of NNT during 1987. In a written report of the Children's Hospital of Santa Cruz, there are 57 NNT cases documented in the infectious diseases ward of that hospital alone during 1987.

According to hospital reports in Santa Cruz and Montero, 8% of cases in Santa Cruz and 36% of cases in Montero come from urban areas.^{15 16 17}

Urban NNT poses a serious public health question since NNT still occurs in and immediately around urban areas, where there are human and material resources available to diagnose, give treatment, register, and, in many cases, fill out death certificates of NNT cases. The authorities should begin prevention activities immediately in these areas, channeling resources already available towards TT vaccination at each and every contact of the health care services with a woman of childbearing age.

During the visit to the Children's Hospital of Santa Cruz, it was possible to document a NNT case of unquestionable urban origin. The family lived only 15 minutes away from the hospital by public transportation, served by 4 different bus lines. The house is very close to a primary care PVO clinic where the mother has been receiving periodic check-ups because of tuberculosis, including home visits for TB prophylaxis of other household members. During her last pregnancy, she received prenatal care when she was 4 months pregnant at the same PVO. The mother had a previous child with NNT who died after being unsuccessfully treated in a private clinic in Santa Cruz. Despite the many opportunities for TT vaccination of the mother by the private clinic that treated the first NNT case, and by the primary care PVO clinic,

which included a prenatal care visit, all TT vaccination opportunities were missed, resulting in a preventable case of NNT.

The operations director of the PVO justified not having vaccinated the mother during the prenatal care visit on the grounds that the MOH has strict guidelines that prohibit the TT vaccination before the 6th month of pregnancy. Continuing implementation of this norm was illustrated by the fact that the director herself, who was 5 months pregnant at the time of our visit, had still not received TT because she was not yet 6 months pregnant.

When the Director of Epidemiology of the MOH was informed of the case, he stated that a similar norm did exist in the past, but that it has been over-ruled by new EPI guidelines, approved and amply publicized during the last two or more years, establishing TT vaccination for all women of childbearing age, independent of pregnancy or of month of pregnancy. Conversely, the Director of the MOH's Mother and Child Program, under which the prenatal care services are administered, was unaware of the changes indicated by the Director of Epidemiology with relation to TT vaccination. It is, therefore, obvious that communication gaps about current TT vaccination schedules have occurred both vertically and horizontally within the health system. Awareness of this is essential for corrective measures to be taken.

As far as the NNT problem in rural areas is concerned, there is no doubt that it is worse than in the urban areas. Most deliveries take place at home under minimal hygienic conditions, and the majority of the population are not immunized. Human and material resources of the health sector in these areas are typically scarce; therefore, TT and other EPI vaccination activities require special efforts and resources.

The directors of the Bolivian and Santa Cruz Pediatric Societies showed great interest and motivation in the developments surrounding NNT control. The Bolivian and particularly the Santa Cruz pediatricians expressed their willingness to support NNT prevention and control activities in any way they can. This commitment was made patent by the active participation of Dr. Mazzi, President of the Bolivian Pediatric Society, in the NNT Control Workshop.

An additional finding was that the MOH is presently engaged in a PAHO-funded survey, which is apparently looking into some socio-cultural aspects of the NNT problem. It should be noted, however, that this survey is not designed as a NNT household mortality survey. It was not possible to get detailed information about the survey's methodology, present stage of development, or preliminary findings. When Dr. J. Bastien's study for REACH on cultural perceptions of NNT was mentioned to both MOH and PAHO officials, there was some reluctance in accepting its validity and usefulness. One aspect of the study that was considered relevant by both MOH and PAHO was the need to review vaccination techniques that might be the cause of so many complaints from mothers about adverse reactions to the vaccine. The difficulty of transmitting to the population a message about which disease the TT vaccine will prevent, when tetanus itself is not differentiated from many other conditions that the vaccine will not prevent, was also a shared concern. The author feels that even though Bastien's document has many good

observations, the stress on cultural variables to explain almost everything, combined with some epidemiological flaws, has created a somewhat skeptical attitude towards the document. This might limit the use of its most relevant parts.

VI. RECOMMENDATIONS

1. Enhance the surveillance system: strengthen the supervision of institutions presently reporting, identify those which are not, and start requiring reports (positive or negative) of NNT from all health institutions.
2. Measure TT vaccination coverage using vaccination records, or surveys if necessary.
3. Study missed opportunities for TT vaccination, particularly in the known high-risk areas.
4. Give training and orientation to health personnel about recent advances in NNT control. Stress the importance of avoiding missed opportunities for TT vaccination of women of childbearing age.
5. Improve communication about NNT control activities within the health sector and to the general public.
6. Coordinate with medical and nursing associations to get their support for promotion of NNT control.
7. NNT control messages through mass media should be given to the public as permanent health promotion activities throughout the year.
8. Strengthen regular EPI activities at institutional levels.
9. Develop mechanisms to increase the rate of attendance for follow-up doses of TT according to the WHO schedule.
10. Establish a systematic review of vaccination status whenever a woman of childbearing age and/or her child comes to a health service for any reason.

VII. FOLLOW-UP ACTION REQUIRED

1. USAID/La Paz will present the key recommendations derived from the NNT Control Workshop to the Interagency Coordinating Committee for discussion and approval, examining the need for adjustments within the approved budget in case these are necessary.
2. USAID/La Paz will stress during the Interagency Coordinating Committee meeting the importance of reducing missed opportunities for TT

vaccination within the existing health services as a means to control NNT in urban and peri-urban areas at little extra cost.

3. FEACH is willing to offer technical assistance, if needed, for the design, implementation, and analysis of studies of missed TT vaccination opportunities in some of the most representative health facilities in Santa Cruz.
4. USAID/La Paz will recommend to the MOH that it give first priority to NNT control in the Santa Cruz Department.
5. USAID/La Paz should strengthen its ties with the Bolivian Pediatric Society, and recommend to the MOH that it involve the Santa Cruz branch of the Pediatric Society in the promotion and implementation of TT vaccination strategies in Santa Cruz.

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APPENDIX 1

Places Visited:

<u>CITY</u>	<u>PLACE/ORGANIZATION</u>
La Paz	Sheraton Hotel / Pediatric Congress
La Paz	Epidemiology Department / Ministry of Health
La Paz	Health Office / USAID Bolivia
La Paz	Panamerican Health Organization (PAHO)
La Paz	UNICEF
Santa Cruz	Japanese Hospital
Santa Cruz	Children's Hospital
Montero	Children's Hospital

Persons Visited:

<u>NAME</u>	<u>ORGANIZATION</u>
Paul Hartenberger	Health Office / USAID Bolivia
Joel Kuritsky, M.D.	Health Office / USAID Bolivia
Charles Llewellyn	Health Office / USAID Bolivia
Ronald Mac Lean	Honorable Mayor of La Paz, Bolivia
Javier Torres Goitia C. MD.	Bolivian Pediatric Association
Eduardo Mazzi MD.	Bolivian Pediatric Association
Jorge Tejerina MD.	Bolivian Pediatric Association
Andres Bartos MD.	Bolivian Pediatric Association Journal
Juan Manuel Sotelo MD.	PAHO Country Representative in Bolivia
Rosa Maria Cardoso	Regional EPI Coordinator / PAHO
Fernando Rocabado	Country EPI Coordinator / PAHO
James Mayrides	UNICEF Representative in Bolivia
Jorge Mariscal MD.	EPI Coordinator / UNICEF
Carlos A. Mercado MD.	Santa Cruz Pediatric Association
Jose Gutierrez MD.	Santa Cruz Pediatric Association
Augusto Rodriguez MD.	Santa Cruz Pediatric Association
Jose Zambrana MD.	Santa Cruz Pediatric Association
Jorge Rojas MD.	Santa Cruz Pediatric Association
Luis Octavio Moscoso MD.	Santa Cruz Pediatric Association
Orlando Jordan MD.	Santa Cruz Pediatric Association
David Rosado Ph.D.	Laboratory Chief / Japanese Hospital S.C.
Gloria Sambrana	Archives Chief / Japanese Hospital S.C.
Vitalia Hinojosa	Mother of NNT patient in Santa Cruz
Sonia Moscoso	Nurse of Prosalud Clinic / Radial 19 S.C.
Pilar Sebastian	Director of Operations of Prosalud S.C.
Roger Nuñez MD.	Medical Director / Montero Children's Hosp.
Roberto Vargas MD.	Epidemiology Director/ Ministry of Health
Mario Lagrava MD.	Surveillance Chief / Ministry of Health
Omar Portanda	Surveillance Tech. / Ministry of Health
Maria Luisa Melgar MD.	STD/AIDS Program / Ministry of Health
Eliana Ceruti MD.	Invited Professor / Pediatric Congress
William Zinkham MD.	Invited Professor / Pediatric Congress

APPENDIX 2

DEMOGRAPHIC DATA ON BOLIVIA, 1985

CHARACTERISTIC	URBAN	RURAL	TOTAL
Total Population	3,068,051	3,361,175	6,429,226
Women 15 to 49	754,909	699,424	1,454,333
% of Women 15-49	24.6%	20.8%	22.6%
Sex Ratio (%)	95.4	99.6	97.5
Live Births	127,600	148,866	276,466

Source: Bolivia en Cifras, 1985, I.N.E.

APPENDIX 3

9. Provisional Classification of Countries

Classification Scheme for
Elimination of NNT

American Region

CLASSIFICATION				
V	IV	III	II	I
Haiti	Nicaragua Peru	Bolivia Columbia Honduras Paraguay	Belize Brazil Chile Costa Rica Dominican Republic Ecuador El Salvador Mexico Panama Venezuela	Antigua and Barbuda Bahamas Barbados Bermuda Caysan Is. Cuba Dominica Grenada Guadeloupe Guyana St. Kitts and Nevis St. Lucia St. Vincent Suriname Trinidad and Tobago Uruguay Canada USA
<p>Not reporting separately/No information available: Anquilla, Argentina, French Guyana, Guatemala, Montserrat, Netherlands Antilles, Puerto Rico, Turks and Caicos, Virgin Islands (UK), Virgin Islands (USA)</p>				

**Figure 10. CLASSIFICATION OF COUNTRIES FOR
NEONATAL TETANUS ELIMINATION**

TT Coverage /D.T.A.	NNT Incidence	Class	Priority Activities
0-50%	Reported	5	<ul style="list-style-type: none"> • increase TT coverage • immunize child bearing age women • increase immunization posts • screen and immunize women at all contacts • consider use of regular campaigns
51-75%	≥ 5/1000	4	<ul style="list-style-type: none"> • increase TT coverage • identify districts with low coverage • carry out missed opportunity surveys • investigate NNT cases • report NNT cases by district
	2-5/1000	3	<ul style="list-style-type: none"> • ensure that no cases are occurring in deliveries by trained persons • focus immunization activities on affected districts/areas • identify districts which are not reporting • increase coverage with TT
76-100%	<2/1000	2	<ul style="list-style-type: none"> • investigate every case of NNT • eliminate missed opportunities for TT immunization • identify health centers which are not reporting • maintain TT coverage/hygienic deliveries
	0 cases	1	<ul style="list-style-type: none"> • maintain high level of TT coverage and/or high level of hygienic deliveries • maintain surveillance activities
<p>Countries which do not have separate reporting remain unclassified irrespective of other indicators.</p>			

Casos notificados de enfermedades del PAI

Número de casos de sarampión, poliomielitis, tétanos, difteria y tos ferina notificados desde el 1o. de enero de 1968 hasta la fecha del último informe, y para el mismo período epidemiológico de 1969, por país.

Subregión y país	Fecha del último informe	Sarampión		Poliomielitis #		Tétanos				Difteria		Tos Ferina	
						No Neonatorum		Neonatorum					
		1968	1967	1968	1967	1968	1967	1968	1967	1968	1967	1968	1967
AMERICA LATINA													
Región Andina													
Bolivia	31 Dic.	1 793	967	2	7	...	56	117	48	9	16	794	520
Colombia	31 Dic.	14 801	20 630	49	114	279	...	173	189	23	45	1 746	3 372
Ecuador	31 Dic.	8 004	1 537	9	10	129	105	128	81	9	18	193	312
Perú	31 Dic.	3 180	4 652	61	45	10	33	112	138	36	54	806	2 344
Venezuela	31 Dic.	11 203	19 261	33	45	1	18	23	18	2	2	465	915
Cono Sur													
Argentina ^(v)	31 Dic.	4 836	6 890	4	1	80	76	8	10	3 175	1 722
Chile	31 Dic.	46 201	2 652	0	1	13	18	3	3	121	168	213	45
Paraguay	31 Dic.	772	1 360	0	0	101	46	9	59	13	18	886	261
Uruguay (v)	31 Dic.	76	1 190	0	0	2	11	0	0	0	0	25	384
Brazil	31 Dic.	23 844	61 645	110	236	1 851	1 861	328	441	1 108	1 399	8 366	16 556
Centroamérica													
Bélica**	31 Dic.	74	224	0	0	0	0	...	0	0	1	0	0
Costa Rica	31 Dic.	358	...	0	0	4	7	0	0	0	0	95	132
El Salvador	31 Dic.	434	251	10	54	...	40	15	26	0	2	...	162
Guatemala	31 Dic.	208	...	38	22	67	55	29	23	2	...	725	53
Honduras	31 Dic.	619	858	6	15	13	6	24	16	0	0	107	344
Nicaragua	31 Dic.	314	693	0	0	...	12	...	32	0	3	144	293
Panamá	31 Dic.	364	1 085	0	0	5	9	6	5	1	...	29	45
México**	31 Dic.	3 748	2 691	20	80	272	311	...	34	2	21	464	763
Caribe Latino													
Cuba	31 Dic.	121	858	0	0	5	6	0	0	0	0	32	103
Haití	31 Dic.	17	...	8	12	...	85	...	41	0	83	23	307
República Dominicana (v)	31 Dic.	336	...	1	2	...	76	...	7	...	126	34	149
CARIBE													
Antigua y Barbuda	31 Dic.	2	0	0	0	0	0	0	0	0	0	0	0
Bahamas	31 Dic.	22	42	0	0	1	0	0	0	0	0	0	0
Barbados	31 Dic.	1	2	0	0	1	3	0	0	0	0	0	0
Dominica	31 Dic.	10	82	0	0	1	1	0	0	0	0	0	0
Grenada	31 Dic.	4	6	0	0	0	0	0	0	1	0	2	1
Guyana	31 Dic.	917	22	0	0	6	2	0	0	0	0	0	0
Jamaica	31 Dic.	35	35	0	0	3	1	0	0	5	2	7	20
San Cristóbal/Nieves	31 Dic.	12	...	0	0	0	...	0	0	0	0	0	0
San Vicente y Granadinas	31 Dic.	10	1	0	0	1	0	0	0	0	0	0	0
Santa Lucía	31 Dic.	4	4	0	0	1	0	0	0	0	0	0	0
Suriname	31 Dic.	68	5	0	0	2	2	0	0	1	0	0	0
Trinidad y Tabago	31 Dic.	388	441	0	0	6	3	0	0	0	0	11	12
AMERICA DEL NORTE													
Canadá**	31 Dic.	549	14 585	1	0	4	7	...	0	11	4	738	1 927
Estados Unidos**	31 Dic.	2 933	3 588	0	5	49	48	1	3	3 008	2 529

** País no notifica casos de tétanos neonatorum por separado.

Datos de polio cubren hasta la semana 52 de 1968 (terminada el 31 de Diciembre de 1968).

(v) Casos de polio son vacunales.

(i) Casos de polio son importados.

... No se dispone de datos.

APPENDIX 5

NEONATAL TETANUS CASES REPORTED IN BOLIVIA BY DEPARTMENT
1985 - 1988

SANITARY UNITS	1985	1986	1987	1988*
Santa Cruz	-	7	26	27
Cochabamba	3	23	7	3
Trinidad	-	1	11	1
La Paz	-	3	4	-
Riberalta	-	-	-	1
Tupiza	-	4	-	-
Pando	-	1	-	-
T O T A L	3	39	48	32

Source: National Epidemiology Directorate, MOH of Bolivia.
According to Report of PAHO Consultant Dr. Claudio Silveira,
"Preliminary Evaluation of TT Vaccination between 15 and 44 Years
of Age during Social Mobilizacion", Mimeo, La Paz, Bolivia,
August 1988.

(*) Data up to March, 1988.

APPENDIX 6

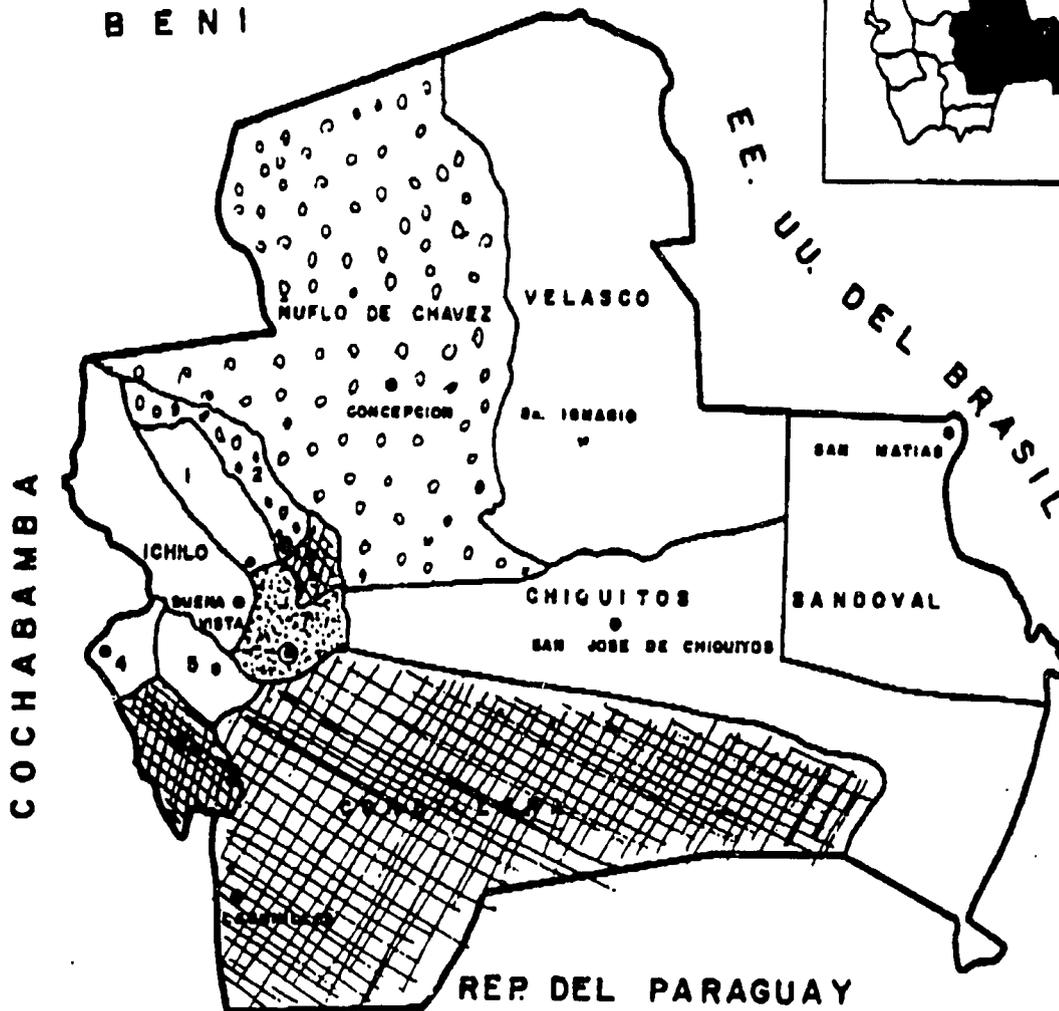
**NNT CASES REPORTED AND INVESTIGATED BY DEPARTMENT
JANUARY 1 TO JUNE 30, 1989**

DEPARTMENT	REPORTED CASES		INVESTIGATED CASES*	
	No.	(%)	No.	(%)
Santa Cruz	48	(83)	23	(48)
Cochabamba	6	(10)	1	(17)
Potosí	2	(3)	2	(100)
Chuquisaca	1	(2)	0	(0)
Pando	1	(2)	0	(0)
T O T A L	58	(100)	26	(45)

Source: National Epidemiology Directorate, MOH, Bolivia.

(*) All investigated cases were reported by the Santa Cruz Sanitary Unit. Three of the investigated cases (one from the Cochabamba Department, and two from the Potosí Department) lived in these Departments. These three cases were added to the reported cases of these departments even though they were not reported by the Sanitary Units of these departments.

INSTITUTO NACIONAL DE ESTADISTICA
 CENSO NACIONAL DE POBLACION Y VIVIENDA
 DIVISION POLITICO ADMINISTRATIVA DEL DPTO DE STA. CRUZ



CHUQUISACA
 INCIDENCIA DE TNN x 1000 Hac. Vivos

0.0	0.1-1.9
2.0-3.9	4.0 y Mas

PROVINCIA	CAPITAL
1- SARAH	PORTACHUELO
2- SANTIESTEBAN	MONTERO
3- WARNES	WARNES
4- CABALLERO	COMARAPA
5- FLORIDA	SAMAIPATA
6- VALLE GRANDE	VALLE GRANDE
7- A. IBANEZ	STA. CRUZ

Según Casos Reportados entre
 Enero - Junio 1989 - M.P.S.P.

APPENDIX 8

NEONATAL TETANUS CASES AT THE M.O.S. CHILDREN'S HOSPITAL,
SANTA CRUZ, 1983 - 1987

YEARS	No. of NNT Cases
1983	24
1984	32
1985	43
1986	49
1987	57

Source: Gutierrez J., Neonatal Tetanus in the Childrens' Hospital
"Dr. Mario Ortiz Suarez", 1987, Mimeo.

APPENDIX 9

NNT FINDINGS FROM TWO HOSPITALS

A. FIELD VISIT TO THE JAPANESE HOSPITAL IN SANTA CRUZ

Activity: Review of Discharge Diagnosis Records during 1988.

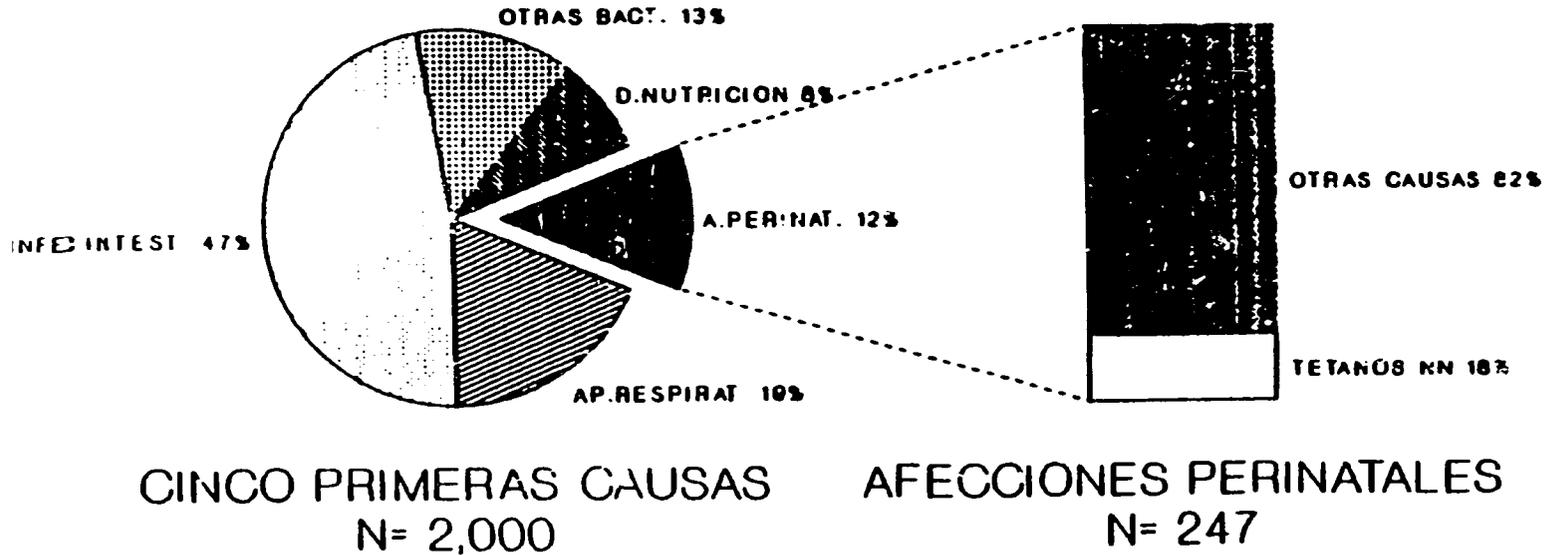
Findings: 6 NNT cases
1 NNT death
46 cases of total perinatal diseases
6/46 (13%) of perinatal diseases were NNT.

B. FIELD VISIT TO THE CHILDREN'S HOSPITAL "DR. RENE BALDERAS LOPEZ" OF MONTERO

Activity: Review of Communicable Diseases Reports and Discharge Diagnosis Records during 1988.

Findings: 18 NNT cases "reported"
14 NNT cases hospitalized
11 NNT cases with hospitalization records found
1 NNT death
2 NNT family requested discharge
4 NNT hospitalized cases from urban area (36%)
6 NNT hospitalized cases from rural area (55%)
1 NNT hospitalized case from non-specified area

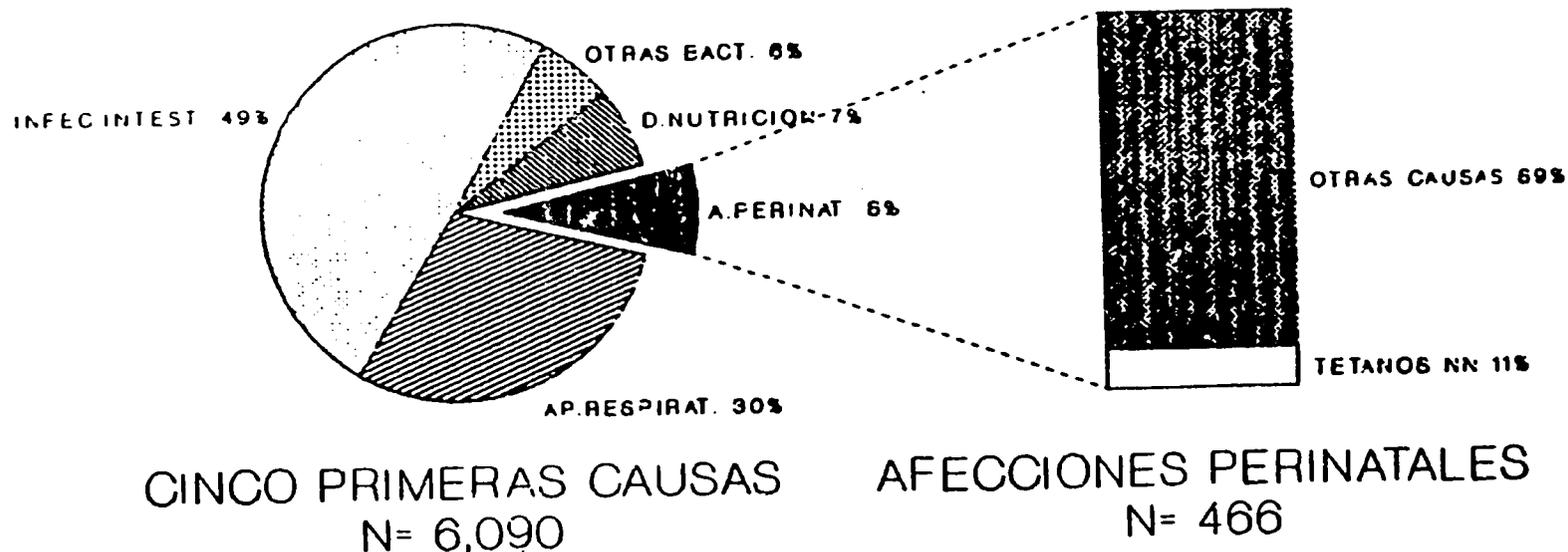
MORTALIDAD DE 0 A 3 AÑOS REGISTROS HOSPITALARIOS URBANOS BOLIVIA, AGOSTO 1982 A JULIO 1983



APPENDIX 10

Fuente Toro et al, Mortalidad en los
Tres Primeros Años en Bolivia.

MORTALIDAD DE 0 A 3 AÑOS REGISTROS CIVILES DE AREAS URBANAS BOLIVIA, AGOSTO 1982 A JULIO 1983

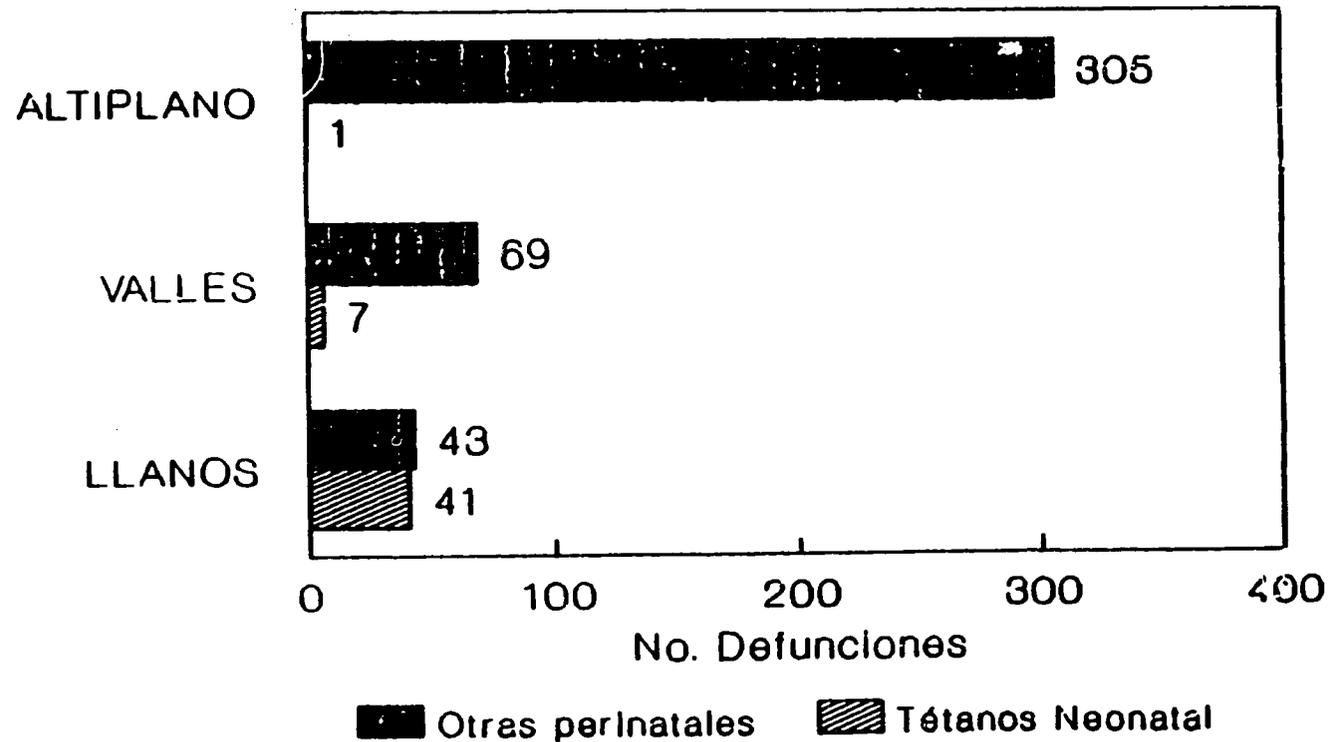


Fuente: Toro et al, Mortalidad en los
Tres Primeros Años en Bolivia.

hp

TETANOS NEONATAL POR REGION REGISTROS CIVILES DE AREAS URBANAS BOLIVIA, AGOSTO 1982 A JULIO 1983

REG. ECOLOGICAS



Fuente: Toro et al, Mortalidad en los
Tres Primeros Años en Bolivia.

APPENDIX 11

CUADRO 7

**COBERTURA DE INMUNIZACION DE NIÑOS DE 12 A 23 MESES DE EDAD
EN CAPITALES URBANAS DE UNIDADES SANITARIAS
BOLIVIA, 1987**

<u>Area</u>	<u>BCG</u>	<u>Polio 3</u>	<u>DPT 3</u>	<u>Sarampión</u>	<u>TT 2*</u>
Bolivia (ponderados)	76,3	61,6	60,2	65,8	3,2
<hr/>					
<u>Unidades sanitarias</u>					
- La Paz	71,0	61,3	60,3	63,6	4,9
- Cobba	81,0	64,5	60,1	70,9	2,7
- Santa Cruz	88,1	65,2	64,1	65,5	1,1
- Trinidad	55,7	54,3	51,6	78,3	2,7
- Cobija	56,3	69,6	68,8	83,0	36,6
- Sucre	65,0	61,2	60,7	63,6	0,0
- Potosí	74,3	41,6	41,6	50,5	0,9
- Tupiza	64,2	65,1	65,6	76,9	0,0
- Tarija	81,0	78,5	78,5	84,9	3,9
- Riberalta	80,9	63,3	61,9	80,5	25,1
- Oruro	77,8	57,1	55,7	67,9	0,0

* Madre del niño.

Fuente: MPSSP, Departamento de Epidemiología.

CUADRO 8

COBERTURA DE INMUNIZACION DE NIÑOS DE 12 a 23 MESES DE EDAD
EN DISTRITOS RURALES SELECCIONADOS, BOLIVIA, 1987

Un. Sanitaria	Distrito	No. niños	Porcentaje inmunizado con:				
			BCG	Polio 3	DTP 3	Saramp.	TT2*
La Paz	Ayo Ayo	230	24.3	12.6	12.2	36.5	0.0
	Tihsuanacu	200	56.3	35.6	30.6	49.5	5.0
Cobba	Guillacollo	197	44.7	33.5	27.9	45.2	0.0
	Sacaba	202	55.9	41.1	30.2	47.5	0.5
	Chapare	205	72.7	21.5	17.1	30.5	1.0
Santa Cruz	Jorochito	212	54.7	33.0	33.5	50.9	0.9
	Sanaypota	200	76.0	43.3	41.0	59.1	0.0
	Charagua	210	63.4	16.7	35.7	50.1	3.0
Chuquisaca	Asurduy	200	11.5	30.0	30.0	40.0	1.1
Oruru	Challapata	199	30.7	30.6	19.6	45.7	0.0
Potosí	Botanos	207	17.4	22.7	21.7	47.0	0.5
Taraja	Entrerrios	209	40.3	39.2	30.3	66.0	0.0
Tupiza	Cotagaita	230	76.2	43.3	44.3	62.9	0.0

* madre del niño

Fuente: MPSSP, Departamento de Epidemiología

APPENDIX 12

TT COVERAGE OF WOMEN OF CHILDBEARING AGE IN URBAN AREAS OF BOLIVIA, MASS VACCINATION MOBILIZATIONS, APRIL AND JULY, 1988.

SANITARY UNITS	POPULATION	APRIL No. Doses (%)		JULY No. Doses (%)	
Santa Cruz	111,647	18,681	16.7	18,041	16.2
Cochabamba	74,747	16,460	22.0	13,488	18.0
Trinidad	9,089	1,465	16.1	1,348	14.8
Other	348,741	87,863	25.0	80,879	23.0
T O T A L	544,224	124,469	22.7	113,756	20.9

Source: National Epidemiology Directorate, MOH, Bolivia.
According to Report of PAHO Consultant Dr. Claudio
Silveira, "Preliminary Evaluation of TT Vaccination
between 15 and 44 Years of Age during Social
Mobilization", Mimeo, La Paz, Bolivia, August 1988.

APPENDIX 13

MINISTERIO DE PREVISION SOCIAL Y SALUD PUBLICA
DIRECCION NACIONAL DE EPIDEMIOLOGIA

VIGILANCIA DE TETANOS NEONATAL

UNIDAD SANITARIA..... CASO No.....
 DISTRITO..... MES.....
 AREA..... AÑO.....
 CENTRO DE SALUD.....

Nombre y Apellido..... Edad..... Sexo F ____ M ____

Domicilio Actual.....

Procedencia..... Departamento.....

Provincia..... Localidad.....

Fecha de notificación del caso.....

Fecha de iniciación de la enfermedad.....

Fue hospitalizado? SI ____ NO ____ Indique el hospital.....

Fecha de internación.....

ANTECEDENTES GINECO-OBSTETRICOS DE LA MADRE:

- Edad de la Madre.....Gestación..... Paridad.....Abortos.....

- Parto Institucional.....Indique el lugar.....

- Parto Domiciliar.....Indique el lugar.....

Atendida por : Médico ____ Enfermera - Auxiliar ____ Partera ____ Otros ____

La Madre recibió vacuna? SI ____ NO ____

TOXOIDE: 1ra. Dosis.....Mes de gestación.....Fecha.....

TETANICO 2da. Dosis.....Mes de gestación.....Fecha.....

D : T'. 1ra. Dosis..... Fecha.....

2da. Dosis..... Fecha.....

Lugar de Vacanación.....

Productor Vacuna.....NO Lote.....Fecha de Vencimiento.....

PRODUCTO DE LA GESTACION :

Pretérmino ____

A término ____

Post término ____

DATOS CLINICOS :

- Lactancia y llanto en los 3 primeros días de vida..... SI NO

- Dificultad progresiva en la succión del 3er.día al 28,día de vida.....

- Dificultad en la apertura de la boca (TRISMO).....

- Risa Sardónica.....

- Epistótomos (RIGIDEZ MUSCULAR).....

- TRATAMIENTO.....Dosis.....

Fecha de Defunción.....

Nombre del Investigador.....Firma

Lugar.....

SANTA CRUZ (MONTERO),.....