



Plurinational State of Bolivia
Ministry of Health



EPI
Family and Community

Expanded Programme on Immunisations

Bolivia

Five-year Plan 2016 - 2020

*On the move for the right to Health and Life
Good Living for All*

12 October 2015

1. INTRODUCTION

The Expanded Programme on Immunisation (EPI) started out in Bolivia in 1979 with four basic vaccines, offering protection against six diseases: BCG (TB), DPT (diphtheria, pertussis and tetanus), VPO (polio) and the measles vaccine. In 2000 it was expanded to include new vaccines, including the pentavalent and MMR vaccines, replacing the DPT and measles vaccines, respectively. That same year, the yellow fever (YF) vaccine was incorporated into the routine schedule, which now covered 11 serious childhood diseases, as hepatitis B, *Haemophilus influenzae* type B invasive infections, rubella, mumps and yellow fever were added to the list of vaccine-preventable diseases. In 2008, with the support of the Gavi Alliance, the rotavirus vaccine was added to the schedule, and in 2010 regular immunisation began against the pandemic strain of the influenza virus and later against seasonal flu. In 2014, the 13-valent pneumococcal vaccine (PCV-13) was introduced, extending protection to 17 serious childhood diseases. The country's immunisation schedule is currently at the forefront in terms of the vaccines recommended by PAHO/WHO, and is one of the most complete schedules in operation in the Americas.

In 2004, a Supreme Decree guaranteed the allocation of funding for vaccine procurement out of national resources, originating from short-term insurance payments. Later, in 2005, the Vaccines Act N 3030 was passed, urging the State to supply the necessary permanent funding for vaccination activities in the country and ratifying the terms of the 2004 Supreme Decree.

From 2006 to the present, the EPI, moreover, has undergone transition from a children's immunisation programme towards a family programme, with the systematic inclusion of immunisation against dT for adolescents and adults; YF for specific populations, particularly high risk groups (in endemic areas and for workers in woodland zones); and seasonal flu in groups at risk (children under, chronic patients, pregnant women, the elderly) and healthcare personnel. Underscored among future challenges is the introduction of Human Papilloma Virus (HPV) vaccine for adolescent women and the incorporation of injectable polio vaccine (IPV) into the children's schedule.

The most recent version of the EPI Standards and Procedures dates to 2014. Likewise, the Vaccines Act is currently under revision and is being updated to guarantee the inclusion of functional aspects of the programme.

The Government of Bolivia restates its commitment to the country's children, providing timely, top-class EPI immunisation free of charge to ensure the right of Bolivian children to health, protecting them against the 17 childhood diseases covered by the national immunisation schedule.

The 2016-2020 5-year plan is based on achievements attained over the past decade, while also incorporating current proposals and demands. The plan is intended as an instrument to transform challenges into opportunities, as well as a call to collective action by all interested parties and all persons involved in constituting a single health system and a family, community, inter-cultural healthcare policy, making possible the dream of better living.

The plan will guide us over the next five years in generating a permanent dialogue along and between all sectors and building consolidated strategic alliances with cooperation agencies in the framework of the Sustainable Development Goals (SDGs) and the Paris Declaration on aid effectiveness.

The guidelines, lines of action, projects, aims and targets are all viable and can be renewed in the short, medium and long terms. They strive towards a new common objective - advancing the process of change to bring health to the country as a whole.

CONCEPTUAL FRAMEWORK

In January 2006 Bolivia began a new phase of her history, implementing a new policy, under the National Development Plan, which aims to elevate and dignify the Bolivian population, for the first time taking into account the cultural and social practices of her peoples, based on a vision of a new, dignified, sovereign, productive Bolivia.

In this regard, the National Intercultural Community Family Health Policy (SACFI) is the strategy used to attain the right of people, families and communities in this country to a decent life. Based on the philosophy that "Health is a Right for Good Living", it aims to strengthen the Expanded Programme of Immunisation, with the fundamental aim of helping to reduce morbidity and mortality caused by vaccine-preventable diseases among the infant population. The purpose of the health sector is to contribute to a national climate of healthy living and to eradicate poverty and inequality, stamping out social exclusion and improving general health. The health sector works towards achieving these aims alongside other development sectors.

As stated in the 2010-2020 Sector Development Plan, health neither is nor should be considered in isolation from the social, economic, political and cultural characteristics of Bolivia and Bolivian diversity. Accordingly, it is not sufficient to recognise the causes behind the health/illness process, without also considering its determinants and conditioners.

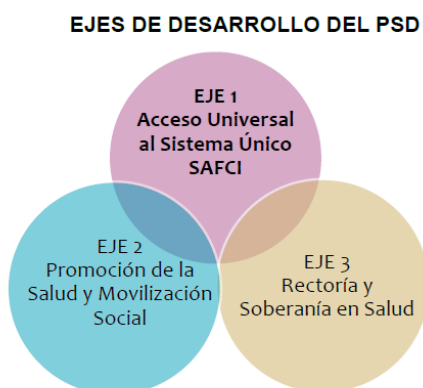
The National Development Plan summarises Good Living as having access to material goods and to affective, subjective, intellectual and spiritual self-realisation, in harmony with nature and in community with one's fellow human beings.

Inter-culturalism is defined under the framework of the SAFCI as a complementarity between different types of medicine (SD 29601) and reciprocity between persons, families, urban and rural communities, native peasants nations and peoples, inter-cultural communities and Afro-Bolivians, all given the same opportunity to express their feelings, knowledge and practices, recognising and enriching each other and promoting harmonious, horizontal, equitable interaction, with the ultimate aim of constructing symmetric power relationships in healthcare and decisions on health.

Programmatic structure of the Sector Development Plan (SDP)

With regard to SAFCI and health promotion operations, the Sector Development Plan, which guides actions in the sector, pivots around three core elements.

PSD DEVELOPMENT COMPONENTS



Component 1: Universal access to the single intercultural family and community health system

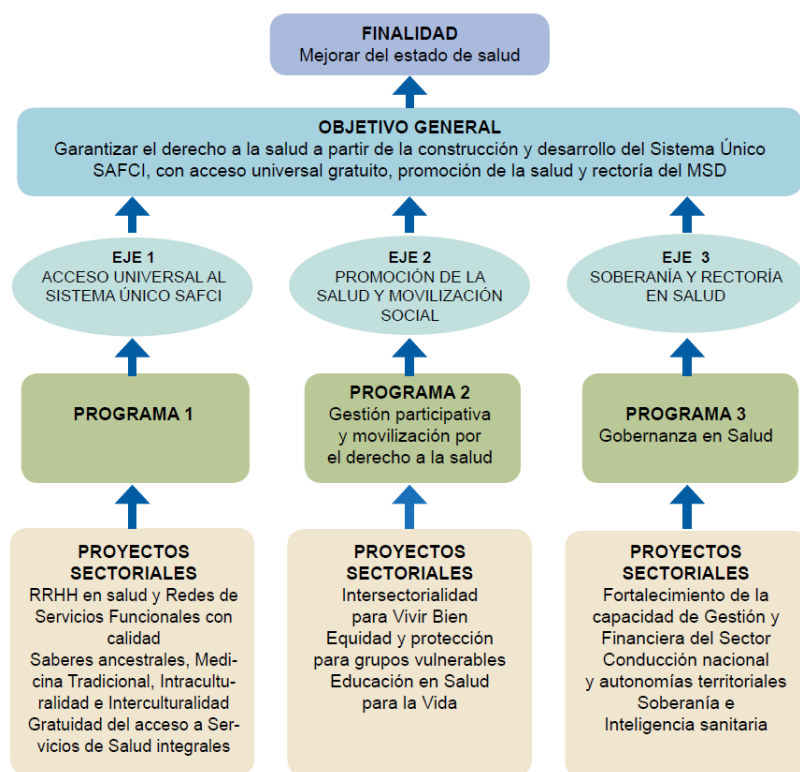
For each of these components, the SDP has put forward sectoral programmes and projects, with their respective aims, with a view to contributing to living well and improving the health of the population as a whole.

The purpose of the sectoral plan is to consolidate the exercise of the right to health, based on the construction and development of the SAFCI single inter-cultural family and community health system with cost-free universal access at point of delivery, prioritising health promotion, participation and social control, under the governance of the Ministry of Health. The aim of the programme for universal, fair access to the health system is to eliminate economic, geographical, cultural and quality-related barriers to access.

The principal targets to be reached by 2020 with regard to core component No. 1: Universal access to the single intercultural family and community health system, are:

- **At least 95% of children aged under 1 year vaccinated against MMR.**
- More than 90% of the population with access to the SACFI single health system when needed.
- More than 90% of childbirths attended by healthcare personnel.

SPD PROGRAMME STRUCTURE 2010 - 2020
ESTRUCTURA PROGRAMÁTICA DEL PSD 2010-2020



One of the aims of the EPI is to prevent, monitor and control vaccine-preventable diseases, through universal vaccination coverage and the eradication and elimination targets of some of the diseases, as part of its commitment to the nations of the South American continent and of the world.

General Objective

To reduce the risk of contracting and dying of VPDs, by means of universal immunisation and timely, effective, high-quality epidemiological surveillance, conducted by trained healthcare personnel.

Specific Objectives

- To attain and maintain coverage rates of at least 95% for the vaccines on the national immunisation schedule, at national, department and municipal level.

- To ensure the availability of all basic schedule vaccines, in order to guarantee systematic, timely and full immunisation with all vaccines throughout Bolivian territory.
- To ensure the correct preservation and storage of vaccines, as well as their correct transport from laboratories and health establishments to the final user, i.e. the community.
- To ensure the effectiveness of VPD epidemiological surveillance, for the timely detection of cases and as an essential tool in the decision-making process.
- To introduce new vaccines into the national schedule, in accordance with the epidemiological situation, population requirements and availability of vaccines.
- To guarantee secure immunisation by means of using high-quality vaccines, monitoring human resource performance throughout the immunisation process and responding to adverse events following immunisation (AEFI), until their final disposal.
- To put in place a system for following up, monitoring and evaluating immunisation and epidemiological surveillance processes at all levels.
- To develop and apply community work and negotiation tools for EPI management, particularly at local level.
- To consolidate the transition of EPI from a child-centred programme to one that is family-based and articulated with other public health programmes and interventions.

Targets

- Sustained eradication of poliomyelitis.
- Sustained elimination of measles, rubella and congenital rubella syndrome.
- Control of tetanus and neonatal tetanus, diphtheria, pertussis, yellow fever, *Haemophilus influenzae* type B and pneumococcal pneumonia and meningitis, seasonal flu and severe rotavirus diarrhoea.
- Commencing control of VPH infection and, in the long term, cervical cancer.

Vision

A Bolivian population, free of VPD, exercising its right to universal, timely, safe immunisation services, free of charge and conducted in high-quality, welcoming health establishments, thus contributing to better public health.

Mission

The EPI is a preventive programme that falls within the framework of the healthcare policies put in place by the Plurinational State of Bolivia. It acts by providing universal, timely and safe immunisation services, free of charge, in health establishments, and by

conducting effective epidemiological surveillance, to guarantee the control, elimination and eradication of VPD, contributing decisively to reducing VPD morbidity and mortality in the country, particularly among children aged under five years, and helping to improve quality of life.

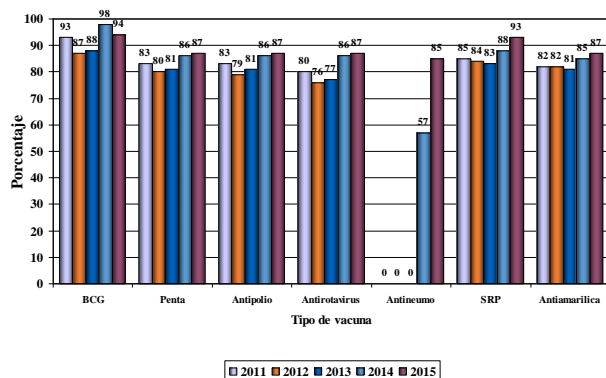
2. ANALYSIS OF THE SITUATION

2.1 Immunisation coverage

Administrative coverage of EPI tracer vaccines from 2011 to August 2015 are shown in Figure 1.

**Figure 1:
Evolution of vaccine coverage in children, by years
Bolivia, 2011 – 2015***

**Evolución de coberturas de Vacunación
en niños y niñas por años
Bolivia 2011 – 2015***



Fuente: SNIS / PAI.
* Inf. parcial a diciembre)
H. Aguila

The highest coverage rates in the five-year period were recorded in 2015, although this is partly due to a smaller population denominator. However, it also means sustained national coverage of more than 80% for all vaccines. YF vaccination rates are lower than MMR rates, although the difference is greater in 2015, this being the year that immunisation of susceptible children aged under five years was being completed. Although both vaccines are supposed to be applied simultaneously, the difference can be explained by a world shortage of YF vaccine and its presentation in multi-dose bottles with a short expiry time. Having to apply it on specific days, in order to prevent wastage, contributed to missed opportunities for vaccination.

The increase in the coverage of biologcals since 2015 is due to:

- a) the greater quality of EPI data and greater training supervision;
- b) national and department population figures partly adjusted to reflect reality;
- c) difficulties in providing immunisation services due to social problems that reduce production and throw up barriers to access.

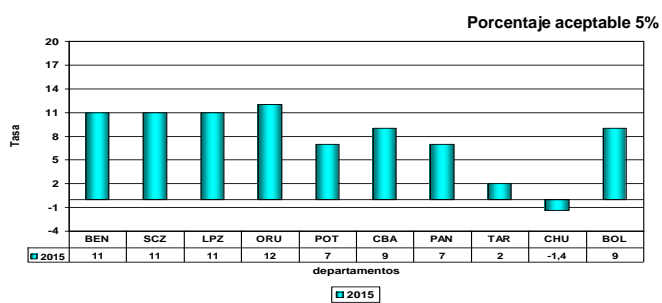
Table 1. 2015 coverage indicators and targets for 2016-2020

INDICATOR	2015*	2016 - 2020
Coverage of single dose BCG vaccine in children aged < 1 year, by departments, Bolivia, January-June 2015	99%	≥ 95%
Coverage of 3rd dose pentavalent vaccine in children aged < 1 year, by departments, Bolivia, January-June 2015*	88.6	≥ 95%
Coverage of 2nd dose rotavirus vaccine in children aged < 1 year, by departments, Bolivia, January-June 2015*	88.7%	≥ 95%
Coverage of 3rd dose pneumococcal vaccine in children aged < 1 year, by departments, Bolivia, January-June 2015*	86.1%	≥ 95%
Coverage of single dose MMR vaccine in children aged 12-23 months, by departments, Bolivia, January - June 2015*	94.9%	≥ 95%
Coverage of single dose YF vaccine in children aged 12 - 23 months , by departments, Bolivia, January - August 2015	88.1%	≥ 95%
Coverage with two doses of HPV vaccine in girls aged 9 years, from 2017 on	NA	≥ 95%
Integration of immunisation with IPV, pentavalent vaccine 1st dose and pneumococcal vaccine 1st dose		≥ 95%
Pentavalent drop-out rate	9%	< 5%

2.2 Drop-out indicator

Figure 2
Drop-out rate – Pentavalent vaccine
by Departments – Bolivia 2015

**Tasa de deserción con vacuna pentavalente
por departamentos Bolivia – 2015***



Fuente : SNIS / PAI
Inf. Parcial a diciembre
H. Agulla

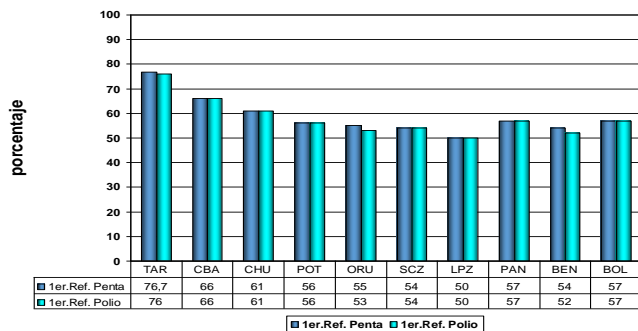
This indicator measures continuity in the vaccination schedule and the capacity of the health service to administer full schedules. The accepted minimum is 5%. At national level, Bolivia exceeds the minimum (see Fig. 2); at department level, only Tarija complies with the accepted minimum.

2.3 OPV and pentavalent boosters

Booster coverage has been low in recent years, with ENCOVA estimating coverage rates of 25% for first boosters and 5% for second boosters. Accordingly, an extra push was made, attaining a 57% coverage of first boosters of both vaccines in 2015.

Figure 3

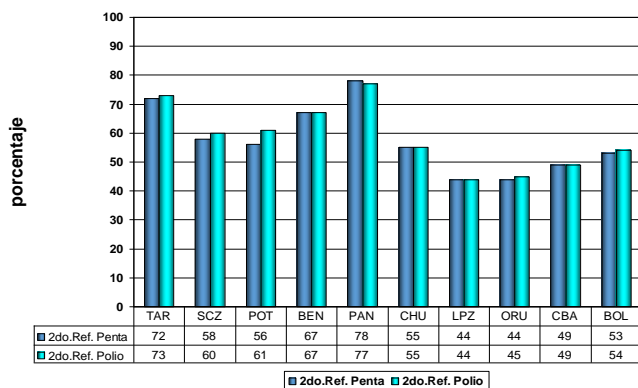
% de vacunados con 4ta d. (1er. Refuerzo) de PENTA y POLIO en niños 12-23 meses de edad por departamentos Bolivia, Enero a diciembre – 2015



Fuente : PAI regional
H. Aguila

Figure 4

% de vacunados con 5ta d. (2do. Refuerzo) de PENTA y POLIO en niños de 4 años de edad por departamentos Bolivia, Enero a diciembre – 2015



Fuente : PAI regional
H. Aguila

Second booster rates followed a similar pattern. Good progress has been made, although increasing first and second booster coverage rates to 95% remains a challenge for the EPI. At a national meeting of EPI leaders, it was decided to change the name of these doses from "boosters" to "3rd/4th doses", underlining their importance among healthcare providers and families.

2.4. Epidemiological surveillance

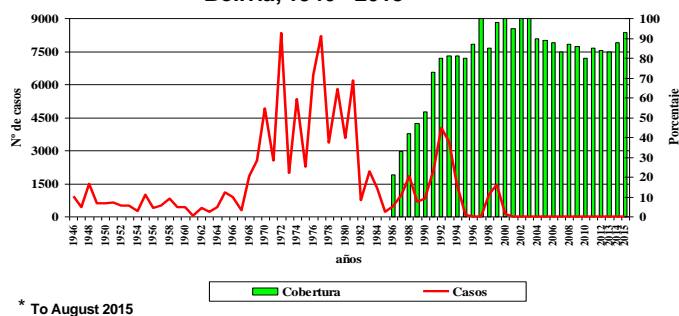
Over 38 years in operation, the EPI has dramatically changed Bolivia's epidemiological profile. VPDs no longer figure among the leading 10 causes of morbidity and there are no longer any reported deaths from polio, measles or CRS; deaths from other VPD are minimal.

The incidence of VPD has been drastically reduced in recent years. The last reported cases of polio, measles and rubella were reported in 1986, 2000 and 2006, respectively. Other VPDs are under control (Table 2). In recent years there has been an upsurge in the number of pertussis cases, mainly in infants aged under six months. This increase appears to be due to an enlarged diagnostic capacity to identify the disease in older infants with the introduction of polymerase chain reaction diagnostic technique (PCR) in 2013.

2.4.1 Measles surveillance

The latest confirmed case of measles occurred in 2000 epi week 40, presenting towards the end of the 1998-2000 epidemic.

Figure 5. Confirmed cases of measles and measles/MMR vaccine coverage Bolivia, 1946 - 2015*



* To August 2015

In 2006 a successful national campaign to eliminate rubella and CRS among the 15-39 years age group was conducted, using the measles/rubella vaccine that was successful in advancing towards the elimination of measles in the country. Bolivia has received rubella-free and CRS-free certification and is currently awaiting measles-free certification.

Table 3

Casos sospechosos notificados/esperados de Sarampión / Rubéola por departamento de acuerdo a la población, Bolivia 2014

Departamentos	Población	Casos Reportados 2014	Tasa actual	Casos esperados	Tasa esperada
La Paz	2.887.075	18	0,6	58	2,0
Santa Cruz	2.822.388	49	1,7	58	2,1
Cochabamba	1.871.451	16	0,9	38	2,0
Potosí	879.204	18	2,0	18	2,0
Chuquisaca	617.174	14	2,3	14	2,3
Tarija	513.387	35	6,8	11	2,1
Oruro	525.102	6	1,1	11	2,1
Beni	448.228	1	0,2	9	2,0
Pando	117.358	0	-	3	2,6
TOTAL	10.681.367	157	1,5	220	2,1

Fuente: MESS
Tasa es 2 por 100,000 habitantes
Inf. hasta sem: 52

Casos sospechosos notificados/esperados de Sarampión / Rubéola por departamento de acuerdo a la población, Bolivia 2015

Departamentos	Población	Casos Reportados 2015	Tasa actual	Casos esperados	Tasa esperada
La Paz	2.931.785	31	1,1	58	2,0
Santa Cruz	2.866.080	34	1,2	58	2,0
Cochabamba	1.900.434	7	0,4	38	2,0
Potosí	892.818	16	1,8	18	2,0
Chuquisaca	626.733	5	0,8	14	2,2
Tarija	521.337	12	2,3	11	2,1
Oruro	533.233	5	0,9	11	2,1
Beni	455.165	4	0,9	9	2,0
Pando	119.172	1	0,8	3	2,5
TOTAL	10.846.757	115	1,1	220	2,0

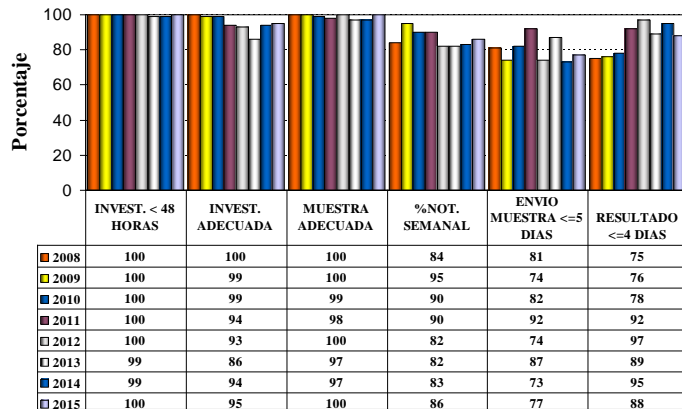
Fuente: MESS
Tasa es 2 por 100,000 habitantes
Inf. hasta sem: 52

Surveillance data for 2014-2015 show a rate of two suspected cases per 100,000 inhabitants for both years. Nevertheless, the system continues to be validated with active searching in the community and the healthcare services. The latest national meeting of the EPI agreed to reorganise the surveillance network to include negative weekly reporting, thus strengthening epidemiological surveillance.

Bolivia has been complying with four of the six indicators since 2008 and with timeliness in laboratory results over the past five years, although certain irregularities remain with regard to rapid sending of samples.

Figure 6

INDICADORES BASICOS DE VIGILANCIA DEL SARAMPION
BOLIVIA, 2008 – 2015*



Fuente: MESS
Inf. hasta sem: 52
H. Aguila.

Table 4. 2015 surveillance indicators and targets for 2016-2020

MEASLES	2015	2016 - 2020
No. of reported cases investigated in < 48 hours	100%	100%
No. of reported cases investigated	90%	100%
No. cases reported with adequate sampling	100%	100%
% weekly reports negative	86%	100%
Samples sent < 5 days	85%	100%
Results < 4 days	77%	100%
Measles/Rubella report rates (per 100,000 inhabitants)	0.4	2
POLIO	2015	2016-2020
No. reported cases investigated in < 48 hours	83%	100%
AFP report rate per 100,000 inhabitants aged < 15 years	0.51	> 1
Percentage AFP cases reported with adequate faeces sampling	94%	80
Percentage AFP cases reported weekly	86%	95

2.4.2 Rubella and congenital rubella syndrome (CRS) surveillance

Integrated surveillance of measles and rubella commenced in 1998. Characteristic rubella endemoepidemics occurred from 1998 to 2005, the maximum peak occurring in 2000-2001. In May-June 2006 Bolivia put in place a successful campaign to eliminate rubella and CRS in the 15-49 years age group, using the measles vaccine (for reasons of accessibility and population dispersal, in the departments of Beni and Pando the cohort immunised was the 5-39 years age group). Over six weeks, 4,229,580 people were vaccinated.

The campaign was evaluated in July, using a **group survey** at national and department level. The survey reported 93% coverage in the 15-39 years age group. The approximate cost of the campaign was US\$4,214,000, of which 75% came from abroad and 25% out of national funding. Of this amount, US\$2,300,00 (i.e. 55% of the budget) came from an IDB loan, to be repaid out of national funds. For the first time ever, oil tax funds were applied in several municipalities. The campaign received widespread support from authorities at national, department and municipal level, and had active participation from healthcare professionals from the different areas, administrative workers and auxiliary staff from around the country and cooperation organisations and agencies, all coordinated by the Inter-agency coordinating committee, along with social organisations, churches, the armed forces and the private sector.

It was the first campaign ever to incorporate inter-institutional technical handling of solid waste. Actions were coordinated with blood banks, for the organised management of donors. Some 834 pregnant women who had been inadvertently vaccinated were tested. 10% of them received follow-up monitoring, although no adverse effects on pregnancies or foetuses were observed.

In 2015, a follow-up campaign was put in place with regular immunisation at each health establishment, with the aim of attaining 95% coverage.

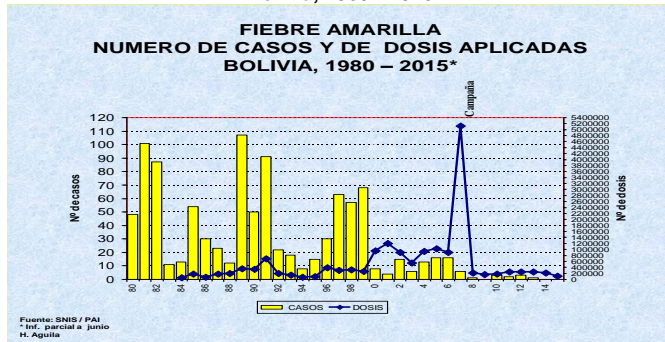
2.4.3 Yellow fever

Yellow fever is endemic in 65% of Bolivian territory, covering the sub-tropical plains and the foothills of the Andes, with enzootic foci affecting mainly populations living in critical socio-economic conditions. The proximity of some cases to urban nuclei highlights the danger of YF spreading to urban areas, particularly in Santa Cruz de la Sierra. The situation is aggravated by high population migration rates from western areas into endemic zones.

Figure 7 shows how immunisation campaigns have been conducted in response to outbreaks. Sustained immunisation has been in place since 2000, resulting in a dramatic drop in the number of cases, though no changes in case fatality rates. A national campaign against yellow fever, targeted at people aged 2 - 44 years, was put in place in April-May 2007, attaining 97% coverage.

Figure 7
YELLOW FEVER

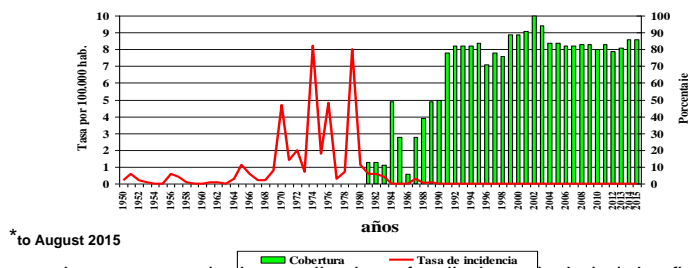
Number of cases and doses applied
Bolivia, 1980 - 2015



2.4.4 Polio

The latest polio epidemic in Bolivia occurred in 1979, with 433 registered cases. The most recent confirmed case of polio occurred in 1987, and in 1994 the Americas were declared free of polio. Nevertheless, acute flaccid paralysis (AFP) surveillance will continue until polio has been eradicated worldwide, with the aim of identifying vaccine-associated polio and vaccine-derived poliovirus.

Figure 8 Polio rate and OPV coverage,
Bolivia, 1950 - 2015*



Other commitments towards the eradication of polio have included the finalisation of the plan for containing the virus in laboratories, in 2002-2003. Bolivia was the only country to survey all its establishments, obtaining certification of the non-existence of potentially contaminated samples for each one. The country is currently complying with the recommendations for the final phase of world eradication, which involves introducing IPV in February 2016 and replacing trivalent OPV with bivalent OPV from 18 April onwards.

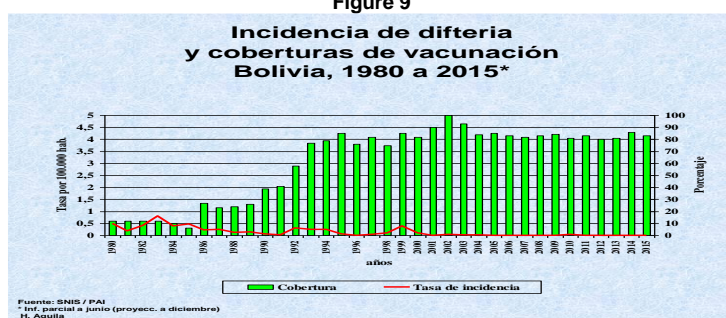
In 1997, with the launch of the regional initiative to eradicate polio in the hemisphere by 1990, a close collaboration process was set up with international agencies, using a

coordination mechanism known as the EPI Inter-agency coordinating committee (EPI-ICC). This has been in operation uninterruptedly in Bolivia since 1987, favouring technical advisory services and the mobilisation of resources for the EPI.

2.4.5 Diphtheria

Diphtheria is on the decrease, transmission levels are low and the disease is limited to certain regions. In 1999 four cases were reported, all among school children.

Figure 9

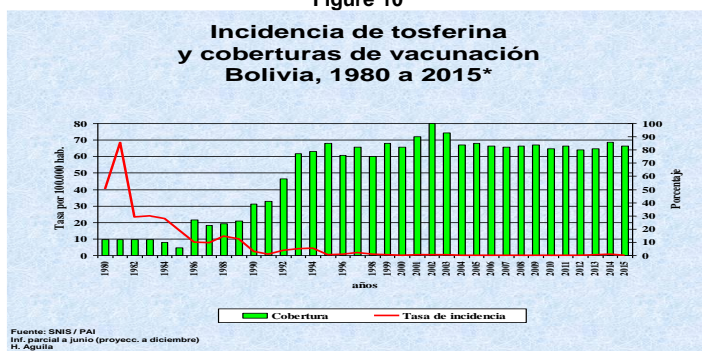


In 2006, all municipalities which had reported cases in the previous three years and had less than 80% coverage in infants aged under one year were defined as being at risk. At the time, 41% municipalities were declared at risk, although by December of that year there had been no new cases of diphtheria.

2.4.6 Pertussis

Pertussis is also on the retreat, thanks to the progressive increase in immunisation coverage.

Figure 10



The number of municipalities at risk is similar as for diphtheria. It should be pointed out that case notification is inadequate, with cases being reported on the NHIS as *coqueluche* or *coqueluchoïd syndrome*. Nevertheless, in recent years there has been an upturn in El Alto, Beni, Potosí and Oruro. Table 4 presents the epidemiological surveillance figures for up to 2015 week 39.

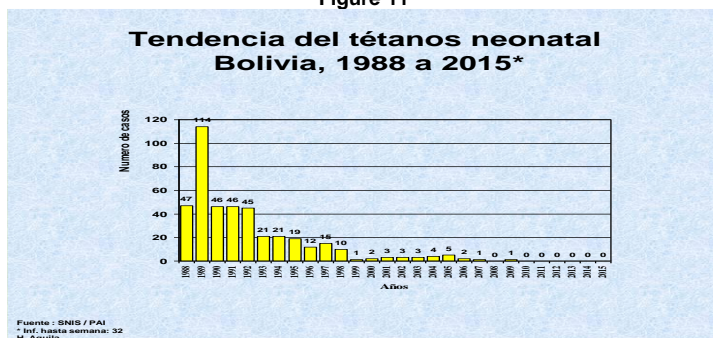
Cuadro 5. Casos sospechosos y confirmados de Tos ferina Bolivia, 2015*

DEPARTAMENTOS	Vigilancia de la Tos ferina	
	Casos sospechosos	Casos confirmados por laboratorio
La Paz	35	10
Santa Cruz	15	1
Cochabamba	13	0
Chuquisaca	16	0
Oruro	5	2
Potosí	1	2
Beni	0	3
Tarija	1	0
Pando	0	0
Total	136	18

FUENTE: PAI-NACIONAL, Reporte hasta la semana 39 de 2015

2.4.7 Surveillance and control of neonatal tetanus

Figure 11



The chart clearly shows the downward tendency of the disease. In the 80s there were more than 100 cases a year. In the early 90s this figure dropped to approximately 40 cases a year. From 2000 to 2010 fewer than five cases were reported, and over the past five years no new cases have been reported. This complies with the target of less than one case per 100,000 live births. This is one of the best pieces of evidence of the impact of immunisation on a disease.

2.4.8 Sentinel surveillance and control of *Haemophilus influenzae* type b invasive diseases

In July 2000 Bolivia incorporated the pentavalent vaccine, including the *Haemophilus influenzae* type b antigen, into its basic immunisation schedule and put the corresponding epidemiologic surveillance into place. Bolivia has a network of 6 sentinel hospitals: Albina Patiño Children's Hospital and Germán Urquidi, Cochabamba; Mario

Ortiz and the Japanese University Hospital in Santa Cruz; and Ovidio Aliaga and the Mother and Child Hospital in La Paz.

2.4.9 Sentinel vigilance of pneumococcal pneumonia and meningitis, meningococcal meningitis and septicaemia, and severe acute rotavirus diarrhoea.

In 2008, epidemiological monitoring was extended to include diseases associated with *Streptococcus pneumoniae* (pneumococcal virus) and *Neisseria meningitidis* (meningococcal virus), to monitor the strains in circulation in the country and document the problem, with the aim of introducing pneumococcal vaccine.

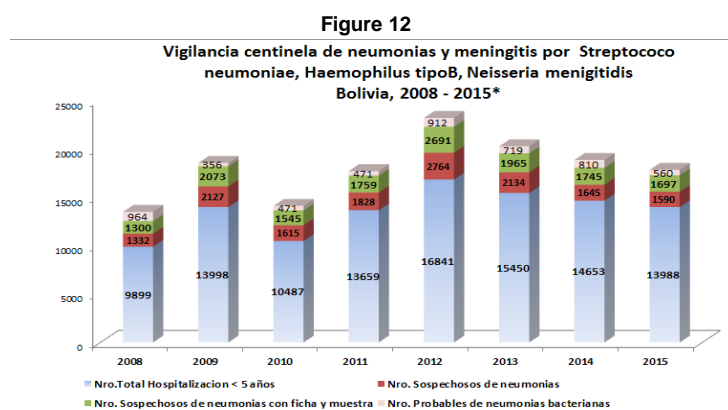


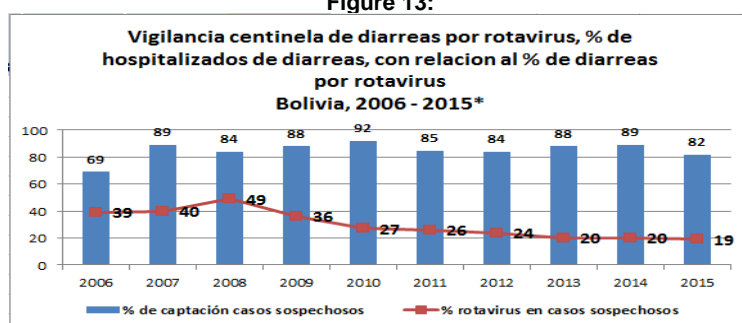
Figure 12 shows the uptake of possible cases of pneumonia, using the records of hospitalised children aged less than five years. The protocol identifies suspected cases of pneumonia and performs x-ray and microbial testing on them, subsequently screening or filtering those who comply with the criteria for bacterial pneumonia. The results are used to confirm the pneumonia diagnosis and to identify the aetiology, making it possible to identify the serotype of isolated strains.

Pneumonia, meningitis and rotavirus surveillance is performed at 7 hospitals in Bolivia: Albina Patiño Children's Hospital, Manuel Ascencio Villarroel, San Martin de Porres (Chapare) in Cochabamba; Mario Ortiz Suárez, in Santa Cruz; Ovidio Aliaga, Boliviano Holandés and Los Andes, in La Paz.

2.4.10 Sentinel surveillance and control of rotavirus

The Ministry of Health, through the EPI, commenced rotavirus surveillance in October 2005 to monitor the impact of rotavirus in Bolivia and identify the strains in circulation in the country. This monitoring has provided valuable figures for the introduction of the rotavirus vaccine and for the evaluation of the impact of incorporating the vaccine into the national immunisation schedule.

Figure 13:



*Figures to July 2015

Figure 13 shows the percentage of suspected cases of rotavirus diarrhoea and the percentage of rotavirus-positive diarrhoea. The impact of the introduction of the vaccine is evident in the drop in the number of rotavirus cases hospitalised since 2011.

2.5 National vaccination coverage survey

Major immunisation coverage surveys have already been carried out in Bolivia, such as **ENDSA 2008, which revealed important differences in coverage among children aged 18 - 29 months** with regard to official coverage rates. On the other hand, in spite of major efforts to attain 95% coverage, pentavalent third dose coverage (tracer vaccine) has not exceeded 86% since 2005, due mainly to problems with the population denominators. In view of the difficulties involved in using official records to obtain real coverage levels, the national health authorities have conducted a population-based probabilistic survey to obtain a more realistic view of real coverage. Other EPI components were also put in place, including population perception and acceptance, access to and quality of immunisation services, and reasons why children are not vaccinated. With support from Gavi, UNICEF and the PAHO, a new survey (ENCOVA 2013²) was designed, covering the nine departments, urban and rural areas, and the El Alto, the country's largest urban nucleus. The survey was aimed at children aged 12-59 months of age living in more than 13,000 homes, providing information on 3600 children in 30 population groups. Because of the study design, data are weighted for analysis.

As well as providing more realistic coverage figures, the survey has made it possible to analyse several operative aspects of the programme in depth. The following are some of the more important results:

- In general, the survey found coverage rates 10-15% higher than the official rates, for all biologicals (Table 6).
- No significant differences were found with regard to gender, mothers' s age or educational level, ethnicity or other variables.
- Mothers were well informed and aware of the doses applied to their children.
- Throughout the survey, efforts were made to compile written information on vaccination history, conducting up to three visits to each home to get the child's vaccination booklet. If the information could not be obtained in this manner, a visit was made to the health centre where the child was vaccinated, with a view of obtaining their vaccination information.
- 98.4% received a vaccination booklet; the doses applied to 86.4% of the children surveyed were documented in a vaccination booklet kept in the home; and written details were found for 9% of children from health centre records, adding up to a total of 95% documented doses.

Table 6. Coverage by vaccine, department and area - ENCOVA 2013

Percentage of children aged 12-59 months vaccinated, according to booklets and mothers' responses, by geographical area.									
Characteristics		BCG:	OPV3(*)	Penta3	MMR	All vaccines	Rotavirus2	AA	Influenza
Residence	Urban	99.2	92.7	92.5	92.1	87.1	88.0	87.3	21.9
	Rural	99.8	96.2	96.5	97.2	94.0	92.0	93.8	36.0
Region	Plateau	99.7	93.8	93.8	94.1	89.8	89.2	89.4	28.7
	Valle	99.9	95.8	96.1	95.9	92.7	92.2	91.1	31.2
	Lowland	99.1	94.6	94.4	94.5	90.2	89.4	91.9	28.3
Department									
Chuquisaca	Urban	99.4	98.9	98.9	95.0	94.4	97.8	93.3	29.4
	Rural	100.0	97.8	97.8	98.9	97.2	98.9	97.8	57.8
	Total	99.7	98.3	98.3	97.1	96.0	98.4	95.8	45.0
La Paz	Ciudad La Paz	100.0	89.4	89.4	90.0	83.9	84.4	83.3	19.4
	Ciudad El Alto	98.9	89.4	90.0	89.2	82.8	85.8	80.8	21.1
	Rural	100.0	97.8	97.2	98.9	96.1	95.0	97.2	38.9
	Total	99.7	92.8	92.8	93.3	88.5	89.1	88.2	27.8
Cochabamba	Urban	100.0	98.3	98.3	95.6	93.3	95.0	91.1	20.6
	Rural	100.0	92.2	92.8	95.0	89.4	87.2	87.2	26.7
	Total	100.0	94.4	94.8	95.2	90.8	90.0	88.6	24.5
Oruro	Urban	100.0	91.1	91.1	92.8	86.1	83.9	88.3	25.0
	Rural	100.0	98.9	97.2	97.2	95.0	92.2	95.6	24.4
	Total	100.0	94.7	93.9	94.8	90.2	87.8	91.7	24.7
Potosí	Urban	99.4	95.6	94.4	91.7	90.0	90.6	86.7	32.2
	Rural	99.4	96.7	97.8	97.8	95.0	90.0	93.9	34.4
	Total	99.4	96.4	97.0	96.4	93.8	90.1	92.2	33.9
Tarija	Urban	100.0	96.7	97.8	96.7	94.4	93.9	93.3	30.6
	Rural	100.0	98.3	98.9	97.2	96.1	92.2	95.6	46.1
	Total	100.0	97.6	98.4	97.0	95.4	92.9	94.6	39.5
Santa Cruz	Urban	98.3	92.2	91.1	92.2	86.1	85.6	89.4	18.9
	Rural	100.0	97.2	97.8	96.7	95.0	93.3	94.4	37.2
	Total	99.1	94.5	94.1	94.2	90.1	89.1	91.7	27.2
Beni	Urban	100.0	92.8	93.3	90.0	84.4	89.4	85.6	21.7
	Rural	98.3	96.7	97.8	97.8	93.3	92.8	95.6	36.7
	Total	98.8	95.7	96.7	95.8	91.1	91.9	93.0	32.9
Pando	Urban	100.0	93.9	92.2	95.6	90.0	91.7	93.3	46.1
	Rural	99.4	90.6	90.0	96.1	85.0	83.9	93.3	31.7
	Total	99.7	92.0	90.9	95.9	87.1	87.1	93.3	37.7
BOLIVIA	Total	99.5	94.6	94.6	94.7	90.7	90.1	90.7	29.3

(*) Boosters available where third doses are not available, with an approximate distribution of 4/1000

Source: ENCOVA 2013

- Of the 3600 children surveyed, **only 6 (0.17%)** had received 0 doses of the vaccine.
- Penta3 coverage is 94.6%
- MMR coverage is 94.7%
- The lowest coverage rates were found in La Paz (urban), El Alto, Trinidad, Cochabamba and Santa Cruz.
- Full schedule coverage (BCG-Polio3-Penta3-MMR) is 90.7%.
- Coverage in rural areas (94.0%) is significantly higher than in urban areas (87.1%).
- Immunisation timeliness is high: the median age for pentavalent 3rd dose is 6.2 months, 12.6 months for MMR.
- OPV and the pentavalent vaccine are applied simultaneously, though not MMR and YF (69%).
- Access to BCG is 99.4%; 98.4% for pentavalent 1st dose.
- 91.4% of mothers prefer to vaccinate their children in public sector establishments; only 0.3% wait for the immunisation brigades to visit their home.

- The drop-out rate for pentavalent vaccine 1st and 3rd doses is 4.7%; 6.6% in the case of rotavirus vaccine 1st and 2nd doses.
- First booster coverage of OPV and pentavalent vaccine is 30.1% and 32.1%, respectively, with second booster rates of 3.4% each.
- 99% of mothers interviewed consider vaccines to be important.
- 92.6% of mothers interviewed said that they would prefer not to have their children simultaneously injected with two vaccines in the same thigh; 76% would prefer to return a second time.
- 93.2% of health personnel interviewed said that they would not simultaneously apply two injected vaccines.

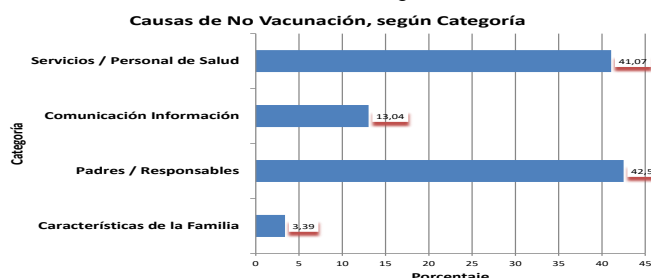
2.6 Survey of causes of failure to vaccinate and missed opportunities for vaccination in La Paz and El Alto.

ENCOVA included a study on the causes of failure to vaccinate, although it threw up no clear conclusions: 50.4% of mothers responded that they did not know or could not remember why their child had not received all the vaccines for which they were eligible, while 24.2% gave other, non-specific reasons.

The fact that the lowest coverage rates occur in the country's largest cities (La Paz, El Alto, Cochabamba and Santa Cruz), indicates the existence of obstacles to access, demand and use of immunisation services. Accordingly, an additional study³ was conducted, as a part of the secondary analysis of the ENCOVA, to improve the collection of information on causes of failure to vaccinate and missed opportunities for vaccination.

The study commenced in the La Paz and El Alto urban areas, home to more than 25% of Bolivia's population. Similar studies are necessary for other locations, mainly rural areas, where the causes may differ substantially. Following the methodology implemented by other international studies on failure to vaccinate and missed opportunities for vaccination, causes are classified into four categories (Figure 14). The majority occurred in those relating to parents and carers (42.5%) and healthcare services and personnel (41.1%).

Figure 14



If we analyse the sub-categories relating to healthcare services/personnel (Figure 15), we see that most relate to service quality (51.4%), mainly because staffers do not inject two vaccines in the same session or because they believe that the child has already received all the corresponding vaccines (particularly important with regard to OPV and pentavalent vaccines). These are followed by causes relating to service organisation (20.3%), where the main sub-categories have to do with the limited number of daily vaccination sheets available, only one child being vaccinated for each parent or carer, or limited vaccination dates/times.

The main cause related to communication between healthcare personnel and users (Figure 16) is that information and instructions on how to complete the immunisation schedule is either not provided or not interpreted correctly. Focus groups held during the surveys found that in most cases there was absolutely no communication between vaccination personnel and the person responsible for having the child vaccinated, leading to incomplete understanding of the vaccination schedule and the date of the following dose. This is also related to the quality of healthcare services and personnel.

Figure 15 Health service-associated causes of failure to vaccinate.

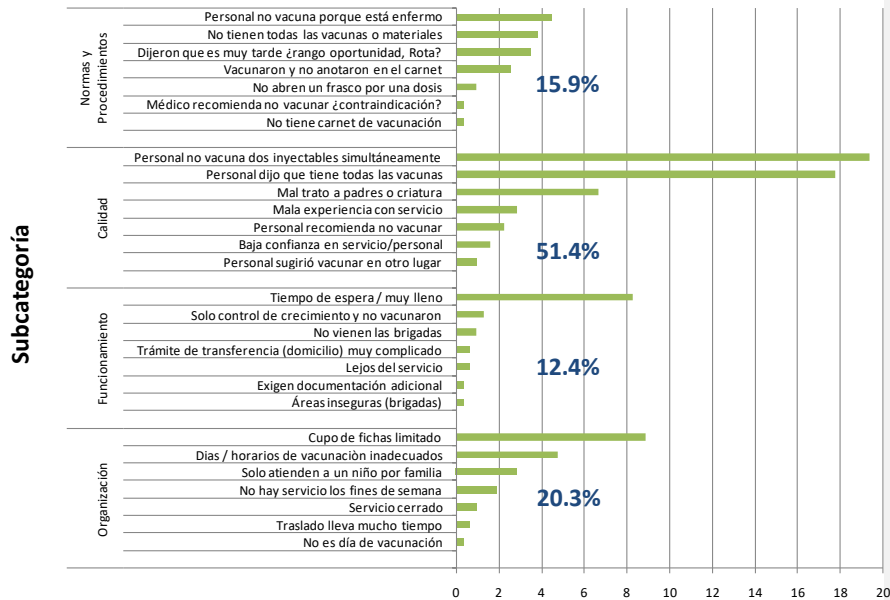
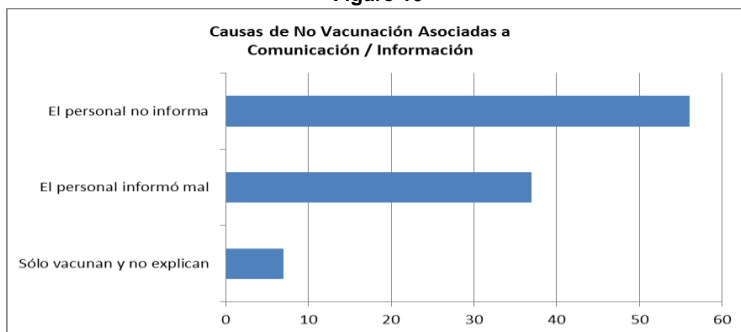


Figure 16



Causes associated with parents or the persons responsible for having the child vaccinate include the fact that most admit that the main reason is carelessness or "putting things off" (Figure 13). This leads to missed opportunities for vaccination and may delay the application of vaccines by weeks or months. It may also be related with the fact that many mothers in urban areas are often the main earners in their households and are occupied in formal or informal employment throughout the day (Figure 18), generally coinciding with vaccination service timetables. This, along with the fact that they often have to wait for several hours before they receive the service (paperwork, forms, vaccination personnel occupied in other tasks, etc.) leads them to postpone vaccination.

Figure 17

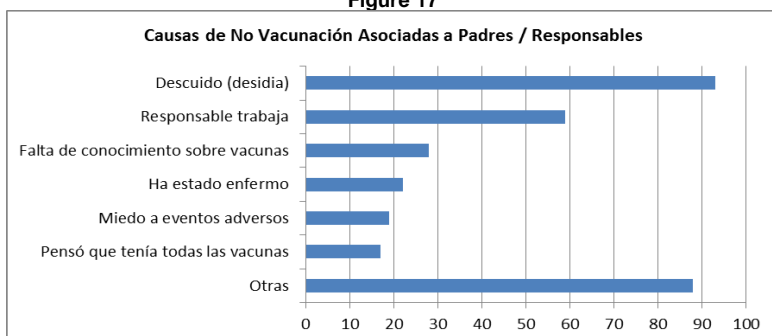


Figure 18

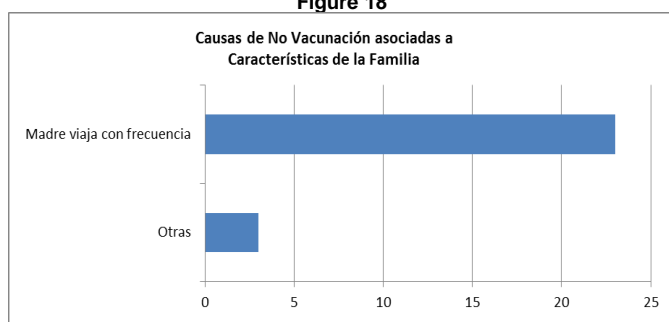
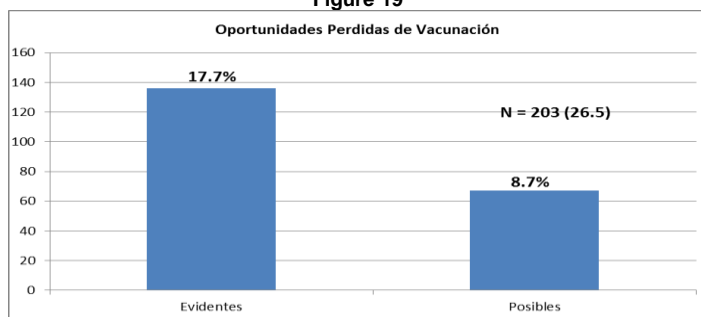


Figure 19



These causes of failure to vaccinate eventually lead to a high rate of missed opportunities for vaccination, accounting for more than 25% of MOV in La Paz and El Alto (Figure 19). The majority of these missed opportunities are due to evident causes (personnel said that they had all the vaccines, false contra-indications, non-application of two injected doses simultaneously, etc.), although in other cases it is not possible to determine whether there was a real reason for not applying the vaccine (severe or

moderate disease). Further studies will be required in order to determine the real causes and circumstances of missed opportunities for vaccination.

2.7 Cost and sustainability analysis of Bolivia's EPI

From a financial point of view¹, Bolivia's EPI is backed by the National Vaccines Act, which establishes that part of the national budget be set aside to guarantee the provision of programme resources, under the framework of the National General Budget Act. During 2011-2015, average annual spending on the EPI was US\$21.3 million, accounting for 0.076% of GDP and 1.6% of total healthcare spending; general per capita spending is US\$1.94, amounting to US\$30.51 for children aged under five years (population target of the programme). More than 50% of spending on the EPI goes on acquiring vaccines and supplies.

Figure 20. Expenditure on EPI, by source of financing, Bolivia, 2011-2013

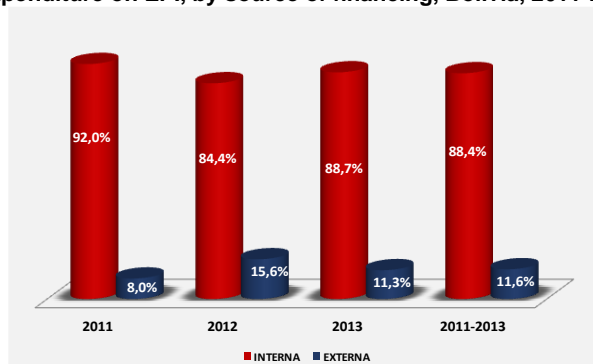


Figure 20 shows the percentage of spending for each source of funding; in 2011-2015, domestic funding, basically the National Treasury, financed on average 11.6% of total expenditure on the EPI. With regard to other agencies, Gavi Alliance provided the most funding - 8.2% - corresponding basically to the introduction of the rotavirus vaccine. (See Table 7).

Table 7. Expenditure on EPI, by funding agencies, Bolivia, 2011-2013

(US\$ and percentage)

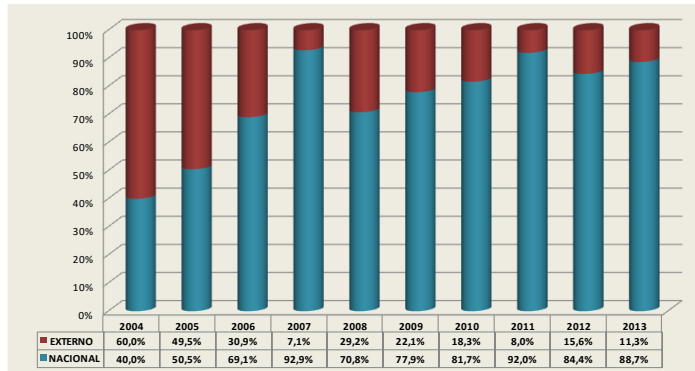
ORGANISMO FINANCIADOR	2011	%	2012	%	2013	%	2011-2013	%
EXTERNOS	1.663.582	8,0%	3.237.339	15,6%	2.207.755	11,3%	7.108.677	11,6%
Agencia Canadiense para el Desarrollo Internacional	527.599	2,5%					527.599	0,9%
Banco Interamericano de Desarrollo	32.461	0,2%					32.461	0,1%
Agencia Suiza para el Desarrollo y la Cooperación	1.889	0,0%					1.889	0,0%
GAVI	759.842	3,7%	2.726.072	13,1%	1.540.198	7,9%	5.026.112	8,2%
HIPC II	48.430	0,2%	50.182	0,2%	50.228	0,3%	148.840	0,2%
Organización Mundial de la Salud	65.934	0,3%	38.389	0,2%	24.085	0,1%	128.408	0,2%
Organización Panamericana de la Salud	102.509	0,5%	223.902	1,1%	461.060	2,4%	787.472	1,3%
Fondo de las Naciones Unidas para la Infancia	124.918	0,6%	198.794	1,0%	132.184	0,7%	455.896	0,7%
INTERNOS	19.037.007	92,0%	17.563.204	84,4%	17.338.774	88,7%	53.938.985	88,4%
TGN	3.633.180	17,6%	4.044.658	19,4%	4.169.161	21,3%	11.846.999	19,4%
TGN - Coparticipación Tributaria	528.935	2,6%	510.839	2,5%	454.452	2,3%	1.494.226	2,4%
TGN - Impuesto Directo a los Hidrocarburos	132.311	0,6%	180.555	0,9%	196.076	1,0%	508.941	0,8%
TGN - Papeles	2.307.829	11,1%	1.064.368	5,1%	1.082.937	5,5%	4.455.135	7,3%
Regalías	5.676	0,0%	28.952	0,1%	52.836	0,3%	87.464	0,1%
Recursos de Contravalor					11.695	0,1%	11.695	0,0%
Recursos Específicos Municipios	65.263	0,3%	21.519	0,1%	33.501	0,2%	120.283	0,2%
Recursos Específicos Otros	11.627.780	56,2%	10.911.875	52,5%	10.511.595	53,8%	33.051.249	54,1%
Recursos Seguridad Social	260.582	1,3%	303.477	1,5%	370.895	1,9%	934.954	1,5%
Recursos Privados	475.452	2,3%	496.961	2,4%	455.626	2,3%	1.428.039	2,3%
Total Organismo Financiador	20.700.590	100%	20.800.543	100%	19.546.530	100%	61.047.662	100%

Spending trends have changed greatly (Figure 21). In 2004, 60% of expenditure on the EPI came from foreign resources, mainly two projects financed by the World Bank and the Inter-American Development Bank. In 2008, the percentage of foreign funding again increased, due to the introduction of the rotavirus vaccines, and again in 2014 with the introduction of the pneumococcal vaccine. Gavi support for new vaccines includes the gradual acquisition of vaccines and supplies by the Government of Bolivia, with the State bearing the full cost burden after the fifth year.

The introduction of new vaccines accounts for an increase of more than US\$2.5 million in the total EPI budget each year. The Vaccines Act ensures that funds are allocated for the programme out of the national budget. Moreover, the EPI is articulated along the lines of the 2010-2020 Sector Development Plan, which helps to guarantee its sustainability. Likewise, the participation of the Ministry of the Economy and Public Finances in planning and coordinating new vaccine introduction processes guarantees their priority and sustainability. In coming years, assimilating the total cost of new vaccine introduction processes (rotavirus and pneumococcal vaccines) will be a challenge for the EPI budget.

Figure 21:
Distribution of EPI expenditure, by source of financing, Bolivia, 2004-2013

%



3. EPI priorities

- To contribute to the development of a healthy population in conditions to make use of and contribute to the social and economic development of the country, to improve quality of life and enjoy Good Living.
- To contribute to universal coverage with quality services and to strengthen primary healthcare strategies, using the programme as a spearhead to penetrate hard-to-reach areas, based on principles of fairness and a vision of constructing a single healthcare system.
- To guarantee the right to health and life, preventing diseases, disability and death, free of charge, and eliminating other barriers to universal access.
- To reduce VPD morbidity and mortality, by means of universal immunisation and improved epidemiological surveillance of all VPDs for evidenced-based decision making.
- To maintain polio eradication and the elimination of autochthonous transmission of measles, rubella, CRS and neonatal tetanus.
- To improve epidemiological control of diphtheria, pertussis, tetanus, yellow fever, severe rotavirus diarrhoea, bacterial pneumonia caused by pneumococcal, Hib and influenza viruses, and meningeal and miliary tuberculosis.
- To introduce new, cost-effective vaccines corresponding to documented priority problems, with the corresponding epidemiological surveillance.

- **Along these lines, introducing the IPV and HPV vaccines have priority, as part, respectively, of the world polio eradication programme and the cervical cancer mortality reduction programme (cervical cancer the leading cause of death among women of childbearing age).**
- To ensure permanent availability of all biologicals along the immunisation service network, ensuring timely compliance with the full schedule (including boosters) with quality vaccines, contributing to develop strategies to ensure that vaccination opportunities are leveraged, with the aim of attaining effective, homogeneous coverage in urban and rural areas, as an indicator of equality.
- To attain or maintain international indicators for quality epidemiological surveillance, with the aim of eradicating, eliminating and controlling VPDs, by means of applying intensive, universal and sentinel methods, strengthening data-analysis capacity and applying validation and quality procedures such as active institutional and community searching.
- Qualifying human resources by means of ongoing training, certification processes, ensuring the bio-security of personnel, users and the community, recognising merits, positioning with regard to users and conducting performance monitoring.
- To improve programme management at all levels, strengthening the capacity for scheduling, monitoring, supervising, training, analysing EPI management indicators, integral programme evaluation and decision-making.
- To develop a single, nominal vaccination information system for all institutions in the country, for personal and birth cohort-based monitoring of immunisation status, unifying individual and collective records countrywide, standardising data flow, protecting the integrity of the system and coordinating with movements of vaccines and supplies.
- To maintain an up-to-date inventory of cold chain elements and equipment, to be used to formulate investment plans to improve and increase vaccine and supply storage capacity at national, regional and local level, according to current and future needs, taking open-bottle policies and real wastage factors into account.
- To contribute to the generation of knowledge, by means of promoting and conducting epidemiological and laboratory investigation and surveys on coverage, missed opportunities for vaccination, KAP surveys and other Ministry of Health operations, forging alliances with research centres, universities, bilateral agencies and cooperation agencies throughout the country and in other countries.

- To establish social and community participation mechanisms in order to mobilise civil society organisations, leaders and the community in general, adapting services to population dynamics and needs to ensure universal access and coverage, with quality vaccines, applied in welcoming surroundings, and user satisfaction.
- To design, finance, implement and evaluate regular social communication strategies aimed at attaining permanent immunisation, as well as special campaigns in individual, group and collective processes, through a range of media.
- To empower the EPI in local and municipal governments to mobilise resources to guarantee correct operation at operative levels, as well as advocating before key agents and strategic alliances throughout the State and civil society in order to mobilise efforts and negotiate mechanisms to safeguard the Vaccines Act and guarantee the sustainability of EPI activities.

4. National objectives, targets and milestones

By the end of the 2016-2020 period:

1. Bolivia will be free of autochthonous polio, measles, rubella and CRS, and the neonatal tetanus rate will be less than 1 per thousand live births in 95% of municipalities.
2. Bolivia will have the lowest frequency and incidence in its history of diphtheria, meningial TB and miliary TB in children aged under five years; pertussis and tetanus in young people and adults; pneumonia and meningitis caused by the viruses targeted by EPI vaccines; acute rotavirus diarrhoea; less severe outbreaks of yellow fever; hospital admissions and deaths from influenza.
3. Bolivia will have complied with the world plan for polio eradication, having introduced one dose of IPV into the basic schedule, having replaced trivalent OPV with bivalent OPV, having destroyed all excess doses of trivalent OPV and having adapted AFP surveillance to ensure the timely detection of type 2 polio, vaccine-associated polio and vaccine-derived poliovirus. By 2017 it will also have concluded the activities required by second phase containment of poliovirus in laboratories.
4. Bolivia will have incorporated the HPV vaccine for girls aged 9-12 years into the schedule and will have extended the target group for season flu immunisation to children aged under five years and adults aged 50 years and over.

5. By 2019, Bolivia will have identified municipalities at risk of dengue fever, having estimated the population at risk according to the guidelines agreed by the EPI technical advisory group on the use of the dengue fever vaccine classified by the WHO.
6. By 2019, Bolivia will have implemented laboratory techniques to make possible sentinel monitoring of the HPV strains circulating among women aged 20 years, and to compare them with those included in the vaccine and those with which the vaccine has a cross effect.
7. By the end of the period, Bolivia will have reported no shortage of EPI vaccines or supplies, as they will be acquired through the PAHO/WHO Rotary Fund out of the national budget or other national funding, along with Gavi external funding, on the bases of the shared budgets for each year.
8. By the end of the period, vaccination staff will have received integral training on EPI components at operative level on at least two occasions, including skills for face-to-face relaying of basic messages regarding VPD vaccines to parents, carers or guardians of children and other users in a simple, culturally-appropriate manner; 80% will have received certification.
9. Healthcare professionals performing managerial functions at EPI regional and municipal levels will have received integral training in EPI components, the use of the programme's technical and administrative tools, training monitoring and supervisory skills, data analysis and decision-making.
10. Opportunities for vaccination and contacts with the population will be leveraged, as vaccination personnel apply two or more injectable vaccines simultaneously, as necessary and parents, carers and guardians will have received accurate, appropriate information.
11. Distribution, supervision and training plans, tables and graphs analysing monthly coverage, drop-out rates, access, comprehensiveness and number of people completing the schedule, will be made available at SEDES and municipalities every quarter.
12. A weekly technical-administrative meeting and an annual integral evaluation will be performed at each SEDES, by municipalities, or by sectors if there are enough.
13. The country will have complied satisfactorily each year with all international indicators for intensified epidemiological surveillance of AFP, measles, rubella and CRS, and outbreaks of pertussis, yellow fever, diphtheria and influenza (SARI, SARD), as well as with sentinel monitoring standards for meningitis, bacterial pneumonia and severe rotavirus diarrhoea.

14. By 2020, the immunisation booklet format will have been unified, the primary record of immunisation details and the consolidated monthly figures will have been updated and standardised, and guidelines will have been formulated for manual or electronic monitoring of children and for identifying non-immunised children and delayed vaccinations.
15. By 2020, the information needs of the EPI will have been diagnosed, including the perspectives for the inclusion of new vaccines, the required gender, age and place of residence variables, the presentation of the vaccines, defining information outlets, connectivity between municipalities, and data integrity, protection and security requirements; these will be the inputs for the design of the nominal information system.
16. By 2020, the design and development plan for the single nominal vaccination information system will have been agreed with SALMI-SIAL, pilot testing will have been conducted in a range of contexts and scenarios, and the characteristics of IT and connectivity equipment for real time operation or other alternatives will have been defined.
17. By 2020, the schedule of needs, funding and acquisition for the necessary equipment will have been formulated, as will the training plan, based on human resource requirements, and the schedule for the implementation of the nominal information system, through SALMI-SIAL.
18. By 2020, SEDES, municipalities and health units will have received the necessary equipment and the nominal information system will be up and running and monitored.
19. From 2016 onwards, the local inventory of cold chain elements and equipment will have been conducted, updated and consolidated at municipal and department region; from 2017 onwards, the PAHO/WHO model will be in use and the preventive/corrective maintenance plan will have been formulated or outsourced.
20. An investment plan will have been formulated to replace, update and extend the cold chain at national, regional, department, municipal, local and health unit level.
21. ENCOVA surveys will have been conducted in 2017 and 2020, broken down into national and department level and El Alto, and associated with a KAP survey on the causes of failure to vaccinate.
22. Surveys on missed opportunities for vaccination, based on coverage, will have been conducted in critical large municipalities and compared with other major municipalities or department capitals where coverage is good. These surveys

will reveal the causes of missed opportunities and the timeliness and simultaneousness of vaccine applications, according to the schedule.

23. Vaccination services will have been extended to attend people every day during office hours, with extended hours or other hours being arranged in accordance with the dynamics and characteristics of each community.
24. The programme will be flexible enough to make it possible to organize or outsource field teams for hard to reach areas (geographically or culturally) in peripheral or poor areas of major cities.
25. A social outreach plan will be in place, funded for different levels and occasions, implemented in accordance to schedule, and evaluated.
26. The departments and municipalities will schedule financial, logistic, communication and incentivisation resources for vaccination personnel, in order to identify and immunise pockets of susceptible subjects, increasing and maintaining high coverage rates.
27. The departments and municipalities will programme resources to improve the cold chain and IT equipment, based on to the technical specifications of the Ministry of Health, and will support training, based on Ministry of Health guidelines.

5. Strategic component-based planning

5.1 Political priority and basic legal principles

5.1.1. Revising and updating the Vaccines Act to ensure the financial sustainability of providing sufficient high-quality vaccines in a transparent, effective and timely manner, and allocating exclusive funding to extend the spending required for the programme to function. Reinforcing the legal and ethical concept of vaccines as a public asset delivered free of charge, universally, equitably and cost-effectively, justifying the exemption of certain taxes which could be invested in the programme.

5.1.2. Revising and applying the mechanisms established in the Autonomies Act to foster the joint mobilisation of resources to ensure that the programme functions at operative levels, co-financing an ambitious and necessary five-year action plan which aims to close gaps, improve universal access and guarantee management quality, consolidating the transition towards a family-oriented programme that requires bringing users and local governments closer together.

5.1.3. Conducting promotion activities, by means of advocating before the authorities, at national, department and municipal level, so that the EPI is explicitly included in government plans and accounting reports, bearing in mind the positive effect of political leadership on the community and the indisputable potential that the programme has to influence public health in the short term and be highlighted in local government plans.

5.1.4. Revising regulations and issuing national standards on the single immunisation information system and the obligation for all sub-sectors throughout the country to use standardised recording tools, technologies and instruments.

5.1.5. Updating EPI technical-administrative standards to bring them into line with new vaccines and strategies, and printing quick reference pocket versions for healthcare personnel and communicators, in addition to the extended version, which will be a reference document.

5.1.6. Proposing to the national political authorities that vaccination result and health impact indicators be adopted as municipal and regional government indicators.

5.1.7. Raising awareness among the national political authorities regarding the importance of maintaining a continuous flow of national funds and complying in a timely manner with the applications and reports needed to receive the external funding used to provide vaccines, as well as using this funding to conduct the activities agreed in the annual plans of action.

5.1.8. Raising awareness among the authorities with regard to the inclusion of new vaccines that respond to population needs, such as the HPV vaccine and others that may become available in the future.

5.2. Planning and coordination

5.2.1. Reviewing and redesigning the functions of the National Immunisation Committee so that it fosters the role of scientific associations, universities, the mass media and opinion leaders as motivators and links with the community.

5.2.2. Regular functioning of the Inter-Agency Coordinating Committee.

5.2.3. Strengthening coordination with other programmes and agencies that conduct EPI-related activities, who have the same target population and who use the primary care strategy, with a focus on integral healthcare.

5.3. Biologicals and supplies

5.3.1. Reviewing and disseminating guidelines for scheduling requirements of biologicals and other supplies applied at department and municipal level, so as to guarantee the permanent availability of biologicals currently included on the schedule and new vaccines to be incorporated into the schedule at operative levels.

5.3.2. Reviewing and updating the definition of the amounts defined as critical stocks of biologicals and other supplies at national, department and municipal level, of both biologicals currently included on the schedule and new vaccines to be incorporated into the schedule.

5.3.3. Reviewing and adjusting guidelines for the formulation of distribution plans for biologicals and other supplies, in order to ensure sufficient supplies, with adequate transport conditions, high-quality cold chain and defined delivery and reception procedures.

5.4 Cold Chain

5.4.1. Updating the inventory of cold chain equipment and elements every six months at all levels, using the PAHO/WHO tool and establishing sufficient storage for the biologicals included on the current schedule.

5.4.2. Identifying acquisition requirements to replace expired equipment or equipment about to expire, at each level.

5.4.3. Estimating the necessary capacity for the storage of the new vaccines to be introduced and verifying the existence of current capacity shortfalls, at each level.

5.4.4. Readapting spaces and equipment to modernise and extend the storage capacity of the national and departmental warehouse as required for the introduction of new vaccines and single-dose vaccines.

5.4.5. Formulating an acquisition plan for cold chain equipment and elements requiring replacement, and extending new vaccine storage capacity at each level, with the respective budgets, specifying domestic and foreign sources of funding.

5.4.6. Verifying the existence of preventive and corrective cold chain maintenance in departments and municipalities, and estimating requirements and costs to ensure that they can be met in all places.

5.4.7. Mobilising resources at national, department and municipal level to guarantee preventive and corrective cold chain maintenance, funded by the Autonomies Act and the National Treasury.

5.4.8. Verifying proper waste management, in accordance with current regulations, to protect the user, healthcare personnel and the environment; and identifying the needs for its proper implementation and application in all municipalities.

5.4.9. Negotiating funding for proper EPI waste management disposal with department and municipal authorities, under the framework of the Autonomies Act.

5.4.10. Verifying compliance with the open-bottle rule at health units and, simultaneously, evaluating stocks of biologicals to avoid shortfalls or near shortfalls.

5.4.11. Funding personnel, travel, fuel and vehicle maintenance costs, in order to comply with the annual distribution plan.

5.5 Training

5.5.1. Defining modern ongoing training methods for operative and managerial personnel, striving for excellence in human resource performance at all levels of the EPI.

5.5.2. Defining training content, methodology, and materials for integral vaccination personnel training in all healthcare sub-sectors, with pre- and post-training evaluation of knowledge and skills.

5.5.3. Defining training contents, methodology and materials to train professionals entrusted with managing the programme at department and municipal level and at health units with great demand among all health sub-sectors and with pre- and post-training evaluation of knowledge and skills.

5.5.3. Estimating the number, site and costs of workshops, and negotiating financing for the implementation of the vaccination personnel training plan at least twice in the five-year period.

Commented [A1]: 5.5.3 is repeated as in the original

5.5.4. Estimating the number, site and cost of workshops and negotiating financing for the implementation of the EPI management personnel training plan at least twice in the five-year period.

5.5.5. Formulating and implementing the training plan for EPI management personnel training plan at all levels throughout national territory, and the respective budget, broken down by domestic and foreign sources, at least twice in the five-year period.

5.5.6. Defining training contents, methodology and materials for training VPD epidemiological surveillance professionals at department and municipal level and at health units with great demand among all health sub-sectors, with pre- and post-training evaluation of knowledge and skills.

5.5.7. Estimating the number, site and cost of workshops, and negotiating financing for the implementation of the VPD management personnel training plan at least twice in the five-year period.

5.5.8. Formulating and implementing a plan for training VPD epidemiological surveillance professionals in the specific protocols of each VPD and active institutional searching to validate reports, with pre- and post-training evaluation of knowledge and skills and the respective budget, broken down by domestic and foreign funding, at least twice in the five-year period.

5.6 Communication and social mobilisation

5.6.1. Formulating a social outreach plan for different age segments, using a range of media and methods at national, department, municipal and operative level, both as part of the permanent schedule and for special campaigns.

5.6.2. Negotiating the financing of the social outreach plan, indicating domestic (national and department) and foreign funding.

5.6.3. Implementing the social outreach plan and evaluating how it is perceived, particularly in the media, and the impact of each special campaign, as well as formulating an annual compliance report.

5.6.4. Designing and producing informational and educational material for the permanent campaign and special campaigns, adapted to the native languages and social and cultural characteristics of the regions.

5.6.5. Identifying community broadcasting networks and arranging for them to broadcast radio messages, and liaising with community organisations that support vaccination to provide them with educational and informational material.

5.6.6. Identifying civil leaders and popular personalities who could act as voluntary promoters of vaccination.

5.6.7. Identifying non-governmental, civil society, church, women's, youth and private and public education sector organisations which could mobilise in favour of vaccination.

5.6.8. Holding workshops on safe vaccination practices, media handling and crisis plans at national and department level and in major cities, at least twice in the five-year period.

5.6.9. Holding educational workshops on vaccines, VPDs, targets and international targets, for directors, editors, journalists and mass media communicators at national and regional level and in the state social sector, building a network of sensitized communicators, at least twice in the five-year period.

5.6.10. Incorporating messages responding to findings in surveys regarding beliefs, fears, causes of failure to vaccinate, customs that hinder vaccination, and public satisfaction with vaccination services, into media campaigns and other communication strategies.

5.7 Operating expenditure

5.7.1. Drawing up a specific, exclusive, detailed, sufficient budget for the programme, to cover personnel expenditures and the stable, continuous payment of salaries, travel and expenses, as well as operating expenditures including fuel, vehicle maintenance, preventive and corrective cold chain maintenance, payment of public services,

telephone, internet, stationery, copy equipment and office supplies, IT equipment, waste management services, security at facilities, monitoring and responding to electric outages affecting national and department vaccines warehouses, buying laboratory equipment, reagents and vehicles, sending samples to the reference laboratory, and training vaccination and epidemiological surveillance personnel and communicators.

5.8 Supervision and monitoring

5.8.1. Reviewing and updating monitoring and supervisory methods, with a focus on training.

5.8.2. Formulating national and department supervisory plans, which would include a first visit for integral annual supervision, findings-based criteria to define the nature of following visits, focussing and intensifying in critical units and municipalities to improve performance, according to national EPI priorities, with an average of three annual visits by each vaccination services, with funding broken down according to domestic and foreign sources.

5.8.3. Evaluating supervisory plans with regard to compliance and documented changes taking place with regard to initial findings.

5.9. Epidemiological surveillance with laboratory support and secure vaccination aspects

5.9.1. Revising and updating surveillance protocols with laboratory support, and introducing new and underused vaccines.

5.9.2. Annual evaluation of epidemiological surveillance at national and department level and in major cities regarding compliance with processes, availability of human and laboratory resources and compliance with international indicators.

5.9.3. Annual evaluation of sentinel monitoring of severe hospitalised diarrhoea, pneumonia and bacterial meningitis, and dissemination of the findings.

5.9.4. Drawing up improvement plans as required for departments, major cities and sentinel hospitals.

5.9.5. Formulating a plan for the development of new diagnostic technologies to support VPD surveillance, with emphasis on viruses against which new vaccines are being introduced, such as HPV, underused vaccines, such as the influenza vaccine, or

diseases for which new vaccines are expected to be developed, such as dengue and TB.

5.9.10. Reviewing and updating the AEFI protocol, emphasising new vaccines, and medical literature on post-licensing adverse reactions.

5.9.11. Providing training to VPD epidemiological surveillance professionals, EPI management professionals, and national and department level communicators in secure vaccination, media handling and crisis plans for AEFI or other situations endangering the credibility and activities of the EPI, at least twice in the five-year period.

5.9.12. Regular publication of the VPD epidemiological newsletter and its dissemination by internet or print, containing the report, accumulated monthly VPD behaviour and international surveillance indicators.

5.9.13. Weekly electronic dissemination of the weekly PAHO/WHO newsletters on polio, measles, rubella and CRS for the Americas.

5.9.14. Advice and support for departments and municipalities in field investigation of outbreaks, particularly highly-lethal, wide-ranging VPDs targeted for eradication and elimination, such as pertussis and yellow fever, for in-the-field training.

5.9.15. Publication of an annual information brochure on VPD behaviour, vigilance and vaccination coverage, using non-technical language and simple graphs, targeted at national, department and municipal authorities.

5.9.16. Annual formulation and dissemination of maps of VPD risk areas and epidemic potential, risk of vaccine-derived poliovirus, importance of measles and rubella and municipalities with a neonatal tetanus rate of one case per 1000 live births or more.

5.9.17. Regular active case finding at health units in department capitals or municipalities with more than 100,000 inhabitants with lower than expected notification rates of AFP or eruptive fevers.

5.10 Information System

5.10.1. Reviewing and updating the vaccination booklet according to the vaccination target groups, daily activity recording instruments, including gender and place of

residence, defining data flow, identifying the persons responsible for analysing data quality at each level, consolidation technology, assigning denominators for monthly estimation of accumulated coverage, taking into account the current vaccination schedule plus boosters, new vaccines to be introduced.

5.10.2. Designing and printing forms after revision and updating, according to the rules for the reproduction and distribution of these materials.

5.10.3. Issuance of a Supreme Decree establishing the compulsory use of EPI instruments at all health sub-sectors and institutions throughout the country and the issuance of vaccination booklets free of charge, and explaining the process to be followed to renew lost or damaged booklets.

5.10.4. Centralising the programme's technical and administrative IT systems, including movements of vaccines and supplies, cold chain inventory, epidemiological surveillance data, vaccination doses and coverage, approved and implemented budget, vaccination services network and creation of a database containing all this information, available only for reading tables and charts and, progressively incorporating the cube tool for civil servants, managers, investigators, universities, communicators and citizens, based on registration rules and data accessibility.

5.10.5. Identifying information needs, defining variables, breaking down information, building indicators, system integrity protection and security measures, regulations for providing data to internal and external users and people unrelated to the programme.

5.10.6. Designing and developing a nominal information system for the programme, following previously-established criteria and specifications and with PAHO/WHO advice.

5.10.7. Identifying technology needs (hardware and software), with the corresponding specifications, amount of IT equipment, servers, inventory of technology stocks, availability of access and quality of internet connection in the municipalities.

5.10.8. Identifying needs, based on human resource profiles, in order to implement, manage and maintain the nominal information system at national, department and municipal level, and estimating the funding required to maintain the system in operation.

5.10.9. Developing an implementation and follow-up plan for the nominal information system, to include a pilot test run; signing agreements with the information and communications technology (ITC) sector to ensure connectivity.

5.10.10. Developing and funding an IT system professional recruitment and training plan at all levels.

5.10.11. Developing and funding a supervision plan for the implementation and operation of the nominal information system.

5.10.12. Performing two data quality evaluations in each department, using PAHO-adapted DQS methods.

5.11. Evaluation

5.11.1. Half-yearly evaluation of EPI coverage and other management indicators, universal and sentinel epidemiological surveillance, incorporating recommendations into action plans and assessing their application to progress in VPD eradication, elimination and control targets at all levels.

5.11.2. Monthly evaluation of progress in the implementation of recruitment, supervision, cold chain investment, nominal information system development and budgetary execution plans.

5.11.3. Monthly monitoring of recommendations arising from the evaluation of other components and activities, and their incorporation into the corresponding plans.

5.11.4. Adjusting annual action plans, based on the evaluation of programme components, the analysis of the VPD situation, the results of the programme, compliance with targets and new recommendations.

5.11.5. Periodically evaluating and adjusting the national vaccination schedule, based on the most recent information regarding immuno-preventable disease and health technologies.

5.12. Investigation

5.12.1. Identifying EPI priorities in immunological investigation, laboratories, economic analysis and operating aspects.

5.12.1. Identifying potential partners for EPI-related investigation.

5.12.2. Drawing up a schedule of operative investigation and specific studies, investigation protocols and a provisional timeline for their implementation by the Ministry of Health, either independently or in alliance with other agents, and advocating for funding for the implementation and dissemination of the findings.

5.12.3. Conducting knowledge, attitude and practice (KAP) surveys among communities and healthcare personnel, and surveys on the perception of causes of failure to vaccinate.

5.12.4. Conducting surveys on missed opportunities for vaccination (MOV) in major municipalities, with different coverage rates, cultural contexts and geographical scenarios.

5.12.5. Ensuring that ENCOVA surveys are conducted in 2016 and 2019, on vaccination booklet ownership, coverage, vaccination opportunities, satisfaction with the immunisation service, and causes of failure to vaccinate.

5.12.6. Evaluating the cost to benefit ratio of integrating vaccination activities with other interventions, depending on a range of strategies.

6. Aligning the plan with global, regional and national strategies.

6.1. Applying the final phase of the Global Polio Eradication Plan

6.1.1. Introducing IPV and replacing trivalent OPV with bivalent OPV, synchronising the introduction with other countries of the world, following the guidelines and at the time specified by the WHO.

6.1.2. Acquiring inactivated polio vaccine (IPV) for rollout from 2016 onwards and ensuring that sufficient supplies are in place for the following years, initially with Gavi funding and with the National Treasury gradually assuming the cost of funding the EPI.

6.1.3. Formulating and implementing a plan to train healthcare personnel in changes to the schedule and raising awareness regarding the benefits and harmlessness of the simultaneous application of injectable vaccines.

6.1.4. Formulating and implementing a communication strategy, aimed at the public, on the rollout of IPV, underlining the importance of the personal, face-to-face delivery of messages regarding the benefits and harmlessness of simultaneously applying several injectable vaccines and convincing parents, carers or guardians to have their children vaccinated.

6.2. Consolidating the elimination of measles, rubella and CRS

6.2.1. Incorporating the second dose of the MMR vaccine into the basic immunisation schedule.

6.2.2. Implementing the public outreach plan, via the mass media and individual and group outreach at health units, to promote demand for the second dose.

6.2.3. Formulating and implementing a plan to train healthcare personnel in the importance of the second dose of the MMR vaccine for the elimination of measles, rubella and CRS, and raising awareness regarding the benefits and harmlessness of the simultaneous application of injectable vaccines.

6.3. Reincorporating the fourth and fifth doses (first and second boosters, respectively) of OPV and the pentavalent vaccine into the basic schedule.

6.3.1. Training and raising awareness among healthcare personnel, especially vaccination staff, in the importance of completing the schedule with these doses to ensure longer immunity, emphasizing the last opportunity to receive trivalent OPV and its replacement by bivalent OPV.

6.3.1. Formulating and implementing a social outreach strategy to motivate parents, carers and guardians to complete the basic schedule with timely application of these doses.

7. Cost analysis, funding and funding gaps

7.1. Analysing the health sector

According to government and multilateral international organisation forecasts, Bolivia's GDP is set to grow between 4.1% and 5%. This indicates that the economy will generate the resources necessary to extend social budgets, based on the national development policy of advancing towards a dignified, sovereign, productive nation, that recognises health as a right for good living and has established a national intercultural community family policy. This scenario favours the prioritisation of the EPI, while the programme acts as a tool to highlight the policy, having shown that it contributes to equality by reaching remote places and communities, that it is the public health programme with the highest coverage and biggest impact on the health of children, while also attending pregnant women with activities in favour of child health, and that, transitioning towards a family programme, it has begun to cover adolescents and older adults, envisaging the immunisation of schoolgirls with the HPV vaccine.

The perspective of using the Autonomies Act effectively makes it possible to mobilise additional resources in a programme that economists agree has a good rate of return. Moreover, the Taylor report of the 80s showed that the EPI has contributed towards extending the primary healthcare strategy and first level health services. These results are crucial to attaining universal access to health services.

Although there are gaps, and the EPI five-year plan is ambitious, it is a means of transforming challenges into opportunities, providing a natural laboratory in which to evidence real changes in the short term, by means of integrated planning based on a well-documented diagnosis, the use of target-oriented resources, and specific, measurable, attainable, relevant targets and milestones in established time periods. The plan is equipped with a dynamic monitoring and evaluation model, responding to national, regional and world objectives, along with an information improvement processes which strives to ensure the quality and reliability of data generated at municipal and operative level, endorsing the measurement of results and the impact of VPDs on morbidity and mortality.

A costing exercise has been conducted, providing data with which to estimate current and future funding in a rational and realistic manner to improve the programme's financial sustainability. This involves strengthening costing mechanisms, creating cost centres and constructing financial sustainability indices, one of which was the introduction of new vaccines and technologies under the agreement with Gavi Alliance (thanks to its economic development, the country is currently graduating), making it

possible to advance towards self-sufficiency as external funding expires or is withdrawn.