

Maternal and congenital syphilis in selected Latin America and Caribbean countries: a multi-country analysis using data from the Perinatal Information System

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Abstract. *Background:* Maternal syphilis has an important impact on reproductive health. In 2010, World Health Organization (WHO)/Pan American Health Organization (PAHO) member countries approved the Strategy and Plan of Action for Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis in the Americas by 2015. This paper aims to describe epidemiological and programmatic characteristics related to maternal and congenital syphilis in selected countries of Latin America and Caribbean for the period 2010–12. *Methods:* The report is based on a multi-country, quantitative and qualitative analysis from data collected from several sources, representing a compilation of country reports from nine countries as part of the 2012 mid-term evaluation of the Strategy. Data was collected based on standardised procedures at country level. *Results:* Results are variable among countries. All countries have a strategic national plan to eliminate congenital syphilis, with some distinct characteristics for each country. Protocols and guidelines for the management and treatment of maternal and congenital syphilis in all countries were updated between 2011 and 2013. A high rate of missing information for all countries for some indicators was noticed. *Conclusions:* The main limitation of the analyses is the huge amount of missing data. Countries must continue to be supported to build capacity for collecting high-quality data on intervention coverage and inequities, and to use it as a basis for decisions about how best to reach women and children with interventions. A high level political commitment is necessary to put into practice the Regional Initiative to Eliminate Congenital Syphilis, with the support of Health Ministries.

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Introduction

Maternal syphilis (MS) has an important impact on reproductive health, including miscarriages, stillbirths and several newborn conditions that can lead to disability or death. Effective and feasible interventions for preventing syphilis mother-to-child transmission (MTCT) have been available for many years and can substantially reduce mortality and morbidity related to MS and congenital syphilis (CS). Prevention of CS significantly reduces economic costs associated with treatment and care of affected children, as well as the psychological and social ill-effects on the affected families and communities. Investing in screening and treatment for syphilis in pregnant women ranks as one of the most cost-effective antenatal interventions and is feasible, using simple and low-cost technologies even in low-resource countries.¹ Screening for MS early in pregnancy allows rapid treatment. Cases of CS are thus generally markers of health system failure and in particular of inadequate antenatal care.

According to the World Health Organization (WHO), Latin America and the Caribbean (LAC) is the region with the third highest estimated prevalence of syphilis in the world.² The estimated number of infected pregnant women in the Americas for 2008 was of 106 500, with an estimated syphilis seroprevalence of 0.84%.³ The integration of programs for controlling syphilis among pregnant women and congenital syphilis, with those for preventing mother-to-child transmission of HIV and other sexually transmissible infections (STI), has led to increased visibility of this important public health problem in the political agenda of the region's governments and social organisations.

In September 2010, the WHO member countries in the region of the Americas (Pan American Health Organization (PAHO)) approved the Strategy and Plan of Action for Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis in the Americas (resolution 50/12, 50^o Directive Council Meeting). The initiative aims to achieve the elimination of

maternal-to-child transmission of HIV and syphilis by 2015, through recommendations that guide and support development of national operational and strategic plans.⁴ The proposed goals are: (i) to reduce HIV maternal-to-child transmission to 2% or less; (ii) to reduce the incidence of paediatric HIV cases to 0.3 or less per 1000 live births; and (iii) to reduce congenital syphilis incidence (including stillbirths) to 0.5 or less per 1000 live births by 2015.⁵ These targets are in line with the Millennium Development Goals 4 (reduce infant mortality), 5 (improve maternal health) and 6 (combat HIV, Malaria and other diseases).

The Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Syphilis in Latin America and the Caribbean also aims to: (i) strengthen surveillance systems for maternal and congenital syphilis; (ii) improve country capacity in using the Perinatal Information System in operational research; (iii) strengthen the capacity for epidemiological analyses and decision-making; and (iv) maximise synergies between actions in progress in these countries by avoiding duplication of efforts and rationalising the investment of resources. All the engaged countries were committed to different actions regarding advocacy, health care and information systems and to reporting advances in those fields.

During the past few years, the availability of data in the region has improved and regional information systems have been set up. PAHO now receives annual data related to the elimination of maternal-to-child transmission of HIV and syphilis goals from most countries in the region through the Global AIDS Response Progress Reporting System (GARPR).⁶

Despite the observed improvement, estimates based on data reported by countries suggest substantial undercounting and underreporting of syphilis cases in the general population, as well as among pregnant women and newborns.⁷⁻¹⁰

The Latin American Center of Perinatology, Women's and Reproductive Health (CLAP/PAHO) has organised a network seeking to strengthen the use of information and evidence for decision-making in MS and CS using the Perinatal Information System bases, supported by United

States Agency for International Development (USAID) funds. Selected countries were supported to conduct an analysis of their Perinatal Information System databases or systems that are in use to collect data on gestational and congenital syphilis in order to strengthen surveillance, epidemiological analysis capacity and decision-making on the issue of maternal and congenital syphilis.

The objective of this paper is to analyse the main relevant program and impact indicators, aiming to describe epidemiological and programmatic characteristics related to maternal and congenital syphilis in selected countries of LAC for the period 2010–12, in order to improve understanding of progress towards the elimination of maternal and congenital syphilis in the region.

Methods

The report is based on a multi-country, quantitative and qualitative analysis, based on data collected from several sources. This article represents a compilation of country reports from nine countries (Argentina, Bolivia, Costa Rica, El Salvador, Honduras, Nicaragua, Panama, Paraguay and Uruguay) produced as part of the mid-term evaluation of the Initiative conducted in 2012. Countries with major gaps in their Perinatal Information System database, such as the Dominican Republic, were excluded from this analysis.

Data collection included the analysis, which was performed at country level and was based on data collected in the Perinatal Information System or other systems used to collect data about maternal and congenital syphilis. As a second step, a survey was sent to each country to determine the status of the progress in terms of the implementation of the elimination program for maternal-to-child transmission of HIV and congenital syphilis.

Information about the existence of national strategic plans, programs to eliminate maternal to child transmission of HIV and syphilis and their characteristics was included in the data collection.

Table 1. Coverage and representativeness of the Perinatal Information System database in 10 countries, 2011–2012
LB, live births

Country	Perinatal Information System coverage 2011	Description of representativeness
Argentina	28.6% country (49.5% public sector)	Database covers 122 maternity hospitals (73.6% of all annual births from the public sector). 2011: 758 042 LB; 412 006 LB public sector, 338 426 private sector and 7610 others.
Bolivia	48.0% country	Database: 11 from 26 hospitals, 2nd trimester, 2011 and 2012 (2012: 289865 LB, Perinatal Information System records: 139 043)
Costa Rica	On implementation	Database of Hospital San Juan de Dios network (5 hospitals and 20 clinics, 722 records)
El Salvador	80.0% country	28 maternities (all Health Ministry centers)
Honduras	87.8% country	21 maternities, 19 from Secretary of Health and 2 from Social Security. 2012: 225 306 LB; Perinatal Information System database: 197 887
Nicaragua	28.0% country	Data from 43% (10) of hospitals using Perinatal Information System 38 816 records (2012)
Panama	40.1% country (49.0% public sector)	Perinatal Information System records: 29 068 LB, 2012
Paraguay	No data	–
Dominican Republic	No data	Data from 7 public hospitals with 17 241 patients (9391 with no data)
Uruguay	95.0%	National level coverage

Finally, data required to estimate maternal-to-child transmission of maternal syphilis¹¹ was collected, including the congenital syphilis rate (CS cases/1000 live births/year, according to national case definitions); stillbirths rate (number of fetal deaths/1000 live births + stillbirths with 500 g or more or 22 weeks of gestational age/year); proportion of stillbirths attributable to maternal syphilis (stillbirths from women with at least one positive serologic test during pregnancy/total stillbirths); and the estimated syphilis prevalence rate (number of pregnant women with syphilis diagnosis/1.000 pregnant women/year). Also, program indicators related to antenatal care, testing for syphilis and results for both pregnant women and newborns were collected.

Data was collected based on standardised procedures at country level. Consistency analysis was performed, consolidated and centrally processed.

In an attempt to assess data quality, we also compared some of the impact and program indicators results from the present study with data reported from countries to WHO and UNAIDS, as part of the Global AIDS response progress reporting process, and data from the Perinatal Information System Latin America and Caribbean database (more than 721 081 births from 1 January 2009 to 31 December 2012 were found to have occurred in Latin America and Caribbean countries using the Perinatal Information System; this data was shared with the Latin American Center of Perinatology, Women's and Reproductive Health (CLAP).

The analysis focussed on the following key indicators: (i) the existence and scope of a strategic or operational plan for the elimination of maternal-to-child transmission of HIV and syphilis; (ii) protocols and guidelines for the management and treatment of maternal and congenital syphilis; (iii) service delivery, including antenatal care and syphilis screening; and (iv) progress towards the congenital syphilis impact goal.

Results

The report presents results from nine countries that participated in the study: Argentina, Bolivia, Costa Rica, El Salvador, Honduras, Nicaragua, Panama, Paraguay and Uruguay.

In Table 1, we summarise the Perinatal Information System coverage from 2010 to 2012 in each country. The coverage has great variability among countries; countries with high coverage included El Salvador, Honduras and Uruguay and countries with less than 50% coverage included Argentina, Bolivia, Panama and Nicaragua. As the system is being implemented in Costa Rica, data for the Perinatal Information System coverage was not obtained; it was not obtained for Paraguay either.

Table 2 shows a summary of the present situation regarding the elimination of maternal-to-child transmission of HIV and syphilis in these nine countries. All nine countries have a strategic national plan to eliminate maternal-to-child transmission of HIV and syphilis, with some distinct characteristics for each country. In Argentina the strategy is linked to STDs and Maternal and Child Coordination. In Costa Rica and Panama, the plan was elaborated by the Ministry of Health/Social Security Fund, Civil Society and the Private Sector. In El Salvador, an effort has been made to

Table 2. Current situation of the elimination of maternal-to-child transmission of congenital syphilis in nine Latin America and the Caribbean countries

Subject	Argentina	Bolivia	Costa Rica	El Salvador	Honduras	Nicaragua	Panama	Paraguay	Uruguay
Linkage of maternal and congenital syphilis program to other programs	Partial: HIV vertical transmission area (AIDS Coordination) and Sexual and Reproductive Health Programs	In the process of integration to Reproductive and Sexual Health or Maternal and Child Health	Participation of Civil Society and Private Sector	Integration with guidelines for women's health (preconception, pregnancy, delivery, postpartum and newborn)	Not mentioned	Not Mentioned	Not mentioned	Sexual and Reproductive Health programs	Sexual and Reproductive Health, Child Health, Women's Health
Last update of guidelines and protocols	2011	2012	2012	2013	2011	2012	2012	2012	2012
Point-of-care syphilis rapid test	No, only in maternities	No	30 to 40% of all services (small clinics); seldom used at hospitals; allows immediate action in labour	Treponem ic rapid test in validation; Rapid Plasma Reagin in services with laboratorial	Health services without laboratories; immediate treatment if positive	Only in 10 municipalities, one state -external funding	30 to 40% of all services (small clinics); seldom used at hospitals; allows immediate action in labour	All services, results used for treatment	All services, results used for treatment

integrate management and early diagnosis of HIV and syphilis for the mother and child duo. In Paraguay, the implementation plan is linked with maternal and child programs within the sexual and reproductive health plan. In addition, Uruguay has a national plan that involves government programs on reproductive and sexual, children and women's health (Table 2).

The protocols and guidelines for management and treatment of maternal and congenital syphilis in all countries were updated between 2011 and 2013.

In relation to rapid tests use, we observed different results. In Argentina, syphilis treponemic rapid tests are not used at point of care, which is in contrast to what occurs in Bolivia. In Costa Rica and Panama, treponemic rapid tests are used in 30–40% of the clinics, especially small clinics, as a screening test but is less used in hospitals and only used for action in the event of labour. El Salvador uses Rapid Plasma Reagin (RPR) as a rapid test at clinics with laboratories, and it is also used in the validation process of treponemic rapid tests. Honduras uses treponemic rapid tests in clinics without laboratories and also in decision-making for the treatment in case of positivity. Nicaragua uses treponemic rapid tests in one department and in 10 municipalities but this is funded by external sources. Paraguay and Uruguay provide treponemic rapid tests in all healthcare services, using positive results to establish treatment (Table 2).

In Table 3, we describe the program indicators. In relation to antenatal care, in most of the studied databases, more than 80% of pregnant women had at least one antenatal care visit, with the exception of Paraguay (76.6%). However, with the exception of Uruguay, where 57.6% of pregnant women started antenatal care in the first trimester, the percentage for other

countries was less than 50%; if we consider early antenatal care start until the second trimester in the measurement, the percentage remains below 60% in Bolivia and Honduras. We do not have data for Costa Rica.

For the indicator 'percentage of pregnant women screened with at least one syphilis test', only four countries (Argentina, El Salvador, Paraguay and Uruguay) screen more than 70% of women. The percentage of women treated was low for all countries with this information, and even lower was the sexual contacts treatment. Regarding newborn care, the only countries reporting more than 50% of screening, both for babies born from seropositive mothers and cord blood test, were Honduras and Uruguay. We noticed a high rate of missing information for all countries for the information about exposed newborn treatment (Table 3).

Table 4 contains impact indicators of congenital syphilis in the studied countries. Congenital syphilis percentage ranges from 0.1% in Honduras to 10.8% in Panama. The stillbirth rate in Bolivia was the highest, with 16 deaths and Bolivia also presented the highest prevalence of maternal syphilis (2.1%). The stillbirth rate attributable to maternal syphilis ranges from 0 in Nicaragua and Costa Rica to 3.5% in Paraguay (Table 3).

In Table 5, a comparison is made between some of the impact and program indicators results from the present study and data reported from countries to WHO and UNAIDS as part of the Global AIDS response progress reporting process and from the Perinatal Information System Latin American and Caribbean database (more than 721 081 births from 1 January 2009 to 31 December 2012 in LAC countries using the Perinatal Information System, which shared their data with CLAP).

Table 3. Program indicators on maternal and congenital syphilis reported by programs through a Perinatal Information System, 2011–2012

Indicator (%)	Argentina	Bolivia	Costa Rica	El Salvador	Honduras	Nicaragua	Panama	Paraguay	Uruguay
% Antenatal care (≥ 1 visit)	82.9	88.3	96.7	84.0	82.8	85.2	85.3	76.6	95.3
Enrolment at 1st trimester	36.7	21.3	No data	48.5	32.9	49.9	46.5	36.6	57.6
Enrolment at 2nd trimester	43.9	29.7	No data	31.10	22.6	33.2	35.6	39.5	28.5
Without date information	10.0	23.3	100.0	5.6	16.4	No data	5.4	27.3	7.5
Syphilis test coverage among pregnant women	79.1	30.2	56.2	89	61.4	44.7	39.7	71.3	91.4
Missing data	20.9	69.8	No data	10.4	38.6	55.3	60.3	28.7	8.6
% of syphilis positive pregnant women treated	18.5	1.5	37.5	12.3	3.7	6.5	10.2	0	52.5
Not applicable	7.9	8.1	0	62.3	30.4	18.2	0	0	5.0
Missing data	61.6	88.3	0	8.0	29.3	58.4	82.0	100.00	25.6
% of syphilis positive pregnant women sexual contacts treated	5.9	0.7	No data	6.5	6.3	2.6	7.0	0	6.8
Not applicable	8.9	8.3		60.1	28.5	24.7	10.2	0	6.1
Missing data	69.9	88.0		10.9	35.2	66.2	77.3	100.0	74.8
% of newborns from positive women screened	20.9	3.1	No data	5.0	65.2	6.5	0	11.6	78.6
Missing data	69.1	43.0		4.3	34.4	19.5	99.2	10.8	21.3
% of newborns screened in cord blood	18.8	1.6	No data	3.2	66.7	6.3	0.3	9.9	83.7
% of newborns positive in cord blood treated	15.3	4.0	No data	2.1	0.0	20.7	0.0	0	7.9
Not applicable	7.6	6.9		22.9	2.1	3.4	22.2	0	1.6
Missing data	74.8	86.7		72.9	95.7	69.0	77.8	100.0	88.6

Table 4. Impact indicators on maternal and congenital syphilis reported by programs through a Perinatal Information System, 2011–2012

Indicator	Argentina	Bolivia	Costa Rica	El Salvador	Honduras	Nicaragua	Panama	Paraguay	Uruguay
Congenital syphilis (CS) rate (number of CS cases/1000 live births)	8.1	75.6	13.0	24.0	1.0	24.0	108.0	16.0	12.0
Maternal syphilis seropositivity (%)	1.6	2.1	1.9	0.2	0.6	0.4	1.1	1.2	1.9
Stillbirths rate	7.7	16.0	No data	7.7	11.6	7.0	8.2	8.7	6.1
Proportion of stillbirths attributable to maternal syphilis (%)	2.9	1.5	1.0	1.4	1.1	0	0.8	3.5	0.7

Table 5. Comparison of some impact and program indicators according to the Perinatal Information System (PIS) database from 2011–2012 with countries reports

Results are presented as %

Country	Syphilis test coverage among pregnant women		Maternal syphilis prevalence		% of syphilis-positive pregnant women treated		% Antenatal care (≥ 1 visit)	
	SIP ^B	Countries' reports ^A	SIP ^B	Countries' reports ^A	SIP ^B	Countries' reports ^A	SIP ^B	Countries' reports ^A
Argentina	79.1	90.9	1.6	1.1	18.5	74.1	82.9	No data
Bolivia	30.2	58.0	2.1	1.3	1.5	100.0	88.3	83.0
Costa Rica	56.2	No data	1.9	0.3 ^C	37.5	No data	96.7	No data
El Salvador	89.6	89.6	0.2	0.3	12.3	12.3	84.0	85.0
Honduras	61.4	40.72	0.6	0.1	3.7	100	82.8	97.0
Nicaragua	44.7	97.9	0.4	0.2	6.5	98.5	85.2	96.0
Panama	39.7	35.8	1.1	1.2 ^D	10.2	9.2 ^D	85.3	73.0 ^C
Paraguay	71.3	60.5	1.2	2.1	0	64.0	76.6	No data
Uruguay	91.4	98.9	1.9	1.5	52.5	80.5	95.3	96.0
SIP–LAC ^B	67.4	–	–	–	35.1	–	85.0	–

^AData reported from countries to WHO and UNAIDS as part of the Global AIDS response progress reporting process (Nicaragua, Panama and Uruguay–data from 2013; El Salvador used a SIP database).

^BBirths from 1 January 2009 to 31 December 2012 in Latin America and the Caribbean (LAC) countries using a Perinatal Information System and sharing their data with Latin American Center of Perinatology, Women's and Reproductive Health: Argentina, Bolivia, Colombia, Ecuador, Guyana, Haiti, Honduras, Nicaragua, Paraguay, El Salvador and Uruguay.

^CData from 2011.

^DData from 2013.

For most countries, the information differs significantly between these two sources.

Discussion and Recommendations

The primary function of a health information system is to provide data that enhances decision-making in the provision of health services, so it is important that it provides high-quality data, with both unbiased and complete information.¹² It is known that surveillance systems have some limitations, including sensitivity, representativeness, completeness and accuracy. In this particular study, these issues were compounded by a large proportion of missing data, as described above.

The status of different countries regarding the use of the Perinatal Information System and its tools is very heterogeneous. The main limitation of the present analyses is the huge amount of missing data. Perinatal Information System coverage is variable among countries, and this also applies to the quality of information. An extreme example of this is the Dominican Republic, where the Perinatal Information

System database had more than 80% of data missing for maternal syphilis and newborn syphilis screening. For this reason, this country was excluded from the analyses.

The situation assessment in terms of impact and program indicators has also been extremely affected in Costa Rica because several important indicators were not reported.

In most countries studied, indicators that evaluate treatment in pregnant women and their sexual partners had many missing values, thus impairing the evaluation of health care at all levels of care.

A review of the literature was unable to find any publications resulting from population-based studies about syphilis prevalence among pregnant women in these countries. For this reason, it is not possible to compare the above results with nationally representative estimates, although it is possible to make the comparison with data from the GARPR.⁶

The Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Syphilis in Latin America and Caribbean's objectives included strengthening surveillance systems for maternal and congenital syphilis, improve

country capacity in using the Perinatal Information System in operational research and strengthen the capacity for epidemiological analyses and decision-making. All the engaged countries committed to the different actions needed to reach these objectives and agree with the need to report their advances.

However, accountability cannot exist without data. Countries must continue to be supported to build capacity for collecting high-quality data on intervention coverage and inequities, and to use it as a basis for decisions about how best to reach women and children with interventions. Baseline data must be collected now for the post-2015 era.¹³ Also, the WHO hopes that countries improve at least the three core indicators related to maternal-to-child transmission of syphilis in their population: (i) what proportion of antenatal care attendees are tested for syphilis; (ii) what proportion are seropositive; and (iii) what proportion of syphilis seropositive antenatal care attendees are adequately treated.³

A high level political commitment is necessary to put into practice the Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Syphilis with the support of Health Ministries. For this purpose, it is essential to strengthen the integration between programs addressing sexual and reproductive health, STDs/AIDS, maternal and child health and health surveillance, in order to maximise the use of public resources and to contribute to evidence-based decision-making.

Conflicts of interest

None declared.

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