Can the Perinatal Information System in Peru be used to measure the proportion of adverse birth outcomes attributable to maternal syphilis infection?

Heather Bradley,[1] Vilma Tapia,[2] Mary L. Kamb,[1] Lori M. Newman,[3] Patricia J. Garcia,[4] Suzanne J. Serruya,[5] Alfredo L. Fort,[6] Nathalie Broutet,[3] Robert Nelson,[1] Robert D. Kirkcaldy,[1] and Gustavo F. Gonzales[2]

ABSTRACT

Objective.   *To describe the capacity of Peru's Perinatal Information System (Sistema Informático Perinatal, SIP) to provide estimates for monitoring the proportion of stillbirths and other adverse birth outcomes attributable to maternal syphilis.*

Methods.   *A descriptive study was conducted to assess the quality and completeness of SIP data from six Peruvian public hospitals that used the SIP continuously from 2000–2010 and had maternal syphilis prevalence of at least 0.5% during that period. In-depth interviews were conducted with Peruvian stakeholders about their experiences using the SIP.*

Results.   *Information was found on 123 575 births from 2000–2010 and syphilis test results were available for 99 840 births. Among those 99 840 births, there were 1 075 maternal syphilis infections (1.1%) and 619 stillbirths (0.62%). Among women with syphilis infection in pregnancy, 1.7% had a stillbirth, compared to 0.6% of women without syphilis infection. Much of the information needed to estimate the proportion of stillbirths attributable to maternal syphilis was available in the SIP, with the exception of syphilis treatment information, which was not collected. However, SIP data collection is complex and time-consuming for clinicians. Data were unlinked across hospitals and not routinely used or quality-checked. Despite these limitations, the SIP data examined were complete and valid; in 98% of records, information on whether or not the infant was stillborn was the same in both the SIP and clinical charts. Nearly 89% of women had the same syphilis test result in clinical charts and the SIP.*

Conclusions.   *The large number of syphilis infections reported in Peru's SIP and the ability to link maternal characteristics to newborn outcomes make the system potentially useful for monitoring the proportion of stillbirths attributable to congenital syphilis in Peru. To ensure good data quality and sustainability of Peru's SIP, data collection should be simplified and information should be continually quality-checked and used for the benefit of participating facilities.*

Key words   Syphilis, congenital; stillbirth; public health surveillance; Peru.

[1] Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia, United States of America. Send correspondence to: Heather Bradley, iyk5@cdc.gov

[2] School of Science and Philosophy, Universidad Peruana Cayetano Heredia, Lima, Peru.
[3] World Health Organization, Geneva, Switzerland.
[4] Epidemiology Unit, STI and HIV, School of Public Health and Administration, Universidad Peruana Cayetano Heredia, Lima, Peru.

[5] Pan American Health Organization, Centro Latinoamericano de Perinatología, Salud de la Mujer y Reproductiva, Montevideo, Uruguay.
[6] IntraHealth International, Arlington, Virginia, United States of America.

An estimated 1.4 million pregnant women worldwide had active syphilis infection in 2008 (1). Because syphilis is transmitted from mother to child during pregnancy, more than half of infected, untreated women experience an adverse pregnancy outcome, including stillbirth, neonatal death, prematurity or low birth weight, or clinical infection in the infant (2). Mother-to-child transmission of syphilis is almost entirely preventable through antenatal screening and prompt penicillin treatment. These interventions have consistently demonstrated prevention success (3–4) and cost-effectiveness in diverse settings around the world (5–8).

The World Health Organization (WHO) launched a global initiative in 2007 to eliminate mother-to-child transmission of syphilis, following a similar 2006 Pan American Health Organization (PAHO) initiative (9). The WHO initiative's primary goals are that, by 2015, 1) 90% of all pregnant women are tested for syphilis, and 2) 90% of syphilis-infected women receive adequate treatment (10). Process indicators recommended by WHO to monitor attainment of these targets are 1) percentage of pregnant women tested for syphilis at first antenatal visit, 2) percentage of pregnant women testing positive for syphilis, and 3) percentage of syphilis-seropositive pregnant women treated for syphilis (11).

Identifying an indicator to measure long-term impact of congenital syphilis elimination has been more difficult. Use of a target case rate (e.g., fewer than five congenital syphilis cases per 1 000 live births) would require adoption of a common congenital syphilis definition, which has not yet been accepted by all countries. The percentage of stillbirths attributable to mother-to-child transmission of syphilis has been proposed as an alternative indicator to measure the public health impact of elimination activities. Measurement of this indicator is also challenging, as it would require detailed maternal health information as well as infant birth outcomes.

The Perinatal Information System (*Sistema Informático Perinatal*, SIP) might provide such data. SIP is a standardized perinatal clinical record used in 32 Latin American and Caribbean countries. SIP was developed in 1983 by PAHO's Latin American Center for Perinatology/ Women and Reproductive Health (*Cen-

tro Latinoamericano de Perinatología/Salud de la Mujer y Reproductiva*, CLAP/SMR) to improve perinatal services and outcomes through standardized quality of care monitoring (12–13). This data system collects information on pregnant women from their first antenatal visit through delivery. A unique feature of SIP is that antenatal data are linked with birth outcome data.

Peru is one of the Latin American countries currently using the SIP. Peru's SIP was introduced as a national perinatal information system in 1985. Nationwide, 75% of women are tested for syphilis at their first antenatal visit, and 0.3%–1.3% test positive for syphilis during pregnancy (14–15). Peru was one of the first countries in Latin America to introduce point-of-care, rapid syphilis testing for pregnant women, and evaluations have demonstrated this mode of testing to be feasible and effective for increasing diagnosis and treatment of syphilis-seropositive pregnant women (15–17).

This report describes the capacity of SIP data in Peru to provide estimates for monitoring the proportion of stillbirths and other adverse birth outcomes attributable to maternal syphilis.

MATERIALS AND METHODS

A descriptive study was conducted from May to December 2011, during which time SIP data were being collected in 43 of 156 public hospitals in Peru. The 43 hospitals represent all 25 administrative regions of the country. Eight in-depth interviews were conducted with Peruvian stakeholders, including academic researchers, health providers, and information technology specialists, about their experiences using the SIP database. Perceived benefits and limitations of the data system, user-friendliness of data entry and report functions, and resources required to sustain the system were discussed, along with other record-keeping systems for maternal and infant information and general protocols for syphilis testing and treatment in Peru.

Next, data were extracted on all pregnancies and corresponding birth outcomes recorded in six Peruvian hospitals that collected SIP data continuously from 2000–2010. These facilities were chosen because in each of the six hospitals at least 0.5% of pregnant women tested positive for syphilis over the 11 years

under study, providing sufficient numbers of syphilis infections to allow for meaningful analysis. All relevant data collected in these hospitals were examined to ascertain how much information was available to estimate the proportion of stillbirths and other adverse birth outcomes attributable to maternal syphilis. The data required for the most robust estimation of this proportion (3) are 1) maternal characteristics, including demographic information, general health, health in previous pregnancies, prenatal care received, and current maternal morbidities other than syphilis infection; 2) history of maternal syphilis infections, including serologic test results, clinical manifestations, and treatment administered; and 3) infant birth outcomes, including information on fetal loss and infant death, as well as birth weight and gestational age for live-born infants.

The completeness of the recorded information was then assessed by examining the percentage of missing data for a subset of nine variables. These nine variables were fundamental to the analysis and available in the SIP data set. They represented three types of information: 1) general maternal characteristics, 2) indicators of maternal syphilis infection, and 3) birth outcome. Specifically, these variables were: mother's age at delivery; date of last menstrual period; any previous stillbirth(s); mother's syphilis test result and date; birth outcome (live birth, abortion, miscarriage (defined as pregnancy loss at < 28 weeks gestation), or stillbirth (defined as pregnancy loss at ≥ 28 weeks gestation)); infant's delivery date; gestational age at delivery; and birth weight. Syphilis treatment is not collected as part of SIP data in Peru.

The subset of nine variables was also validated for all women with positive syphilis test results (*n* = 1 075) and (due to resource constraints) 50 randomly selected women with no history of syphilis infection from each of the six facilities (*n* = 300). Researchers visited the six facilities and recorded information corresponding to the nine variables from the 1 375 women's clinical charts. Clinical charts were matched to SIP data based on a unique, numeric identifier present on both the SIP form and the clinical chart. Researchers also collected syphilis treatment data including medication administered, dosage, and timing of treatment from the clinical charts of

women who tested positive for syphilis. Researchers were blinded to the SIP data when collecting data from clinical charts. Information from clinical charts was compared to the SIP data, allowing minor variation around an exact match for each of the nine variables.

RESULTS

Stakeholder interviews

Although Peru's SIP was introduced as a national information system in 1985, many hospitals discontinued use of the system over time. Funding sources for the SIP have changed since the project's inception, but the most recent financial support came from a large, international, donor-funded project that began in 2000. Funding for the SIP ended with the conclusion of the project in 2007, at which point many hospitals no longer had resources to support data entry and management staff. In addition, the loss of central program administrators meant SIP data were no longer being collected periodically from hospitals for quality assurance purposes.

In hospitals still using the SIP during the time of this assessment, data were abstracted by clinicians from clinical charts and other records after each delivery, using a hard-copy form. The four-page SIP form included up to 490 information fields, depending upon skip patterns, and required approximately 40 minutes for clinicians to complete. Perinatal information was also entered into as many as 14 additional forms for other record-keeping systems. Information in the hard-copy SIP form was later entered by clerks into a database using SIP software.

The SIP software version used by all hospitals in this study for SIP data entry and reporting functions was 1) developed in Peru and therefore different from the SIP software used in other Latin American countries, and 2) more than 10 years old at the time of this assessment. However, the data entry interface was straightforward and user-friendly. It allowed hospitals to enter data using common coding schemes, resulting in comparable information across facilities. A major limitation of the software was its inability to analyze line-listed data, so it could not generate outputs such as frequencies by patient characteristics and

thus did not allow an analyst to examine relationships between patient characteristics and health outcomes. For example, while system users could report the racial/ethnic composition of patients and, separately, the overall prevalence of stillbirth among patients, they could not determine the prevalence of stillbirth by patient race/ethnicity.

Although data could be output and analyzed using separate statistical software, data extraction was cumbersome and required in-depth manipulation. Consequently, analyses at health facilities were limited to simple reports from the software's analytic interface, and hospitals were unlikely to aggregate their data for multi-facility analyses. These data output challenges resulted in infrequent use of the data for reporting,

monitoring, or research purposes both within and across facilities.

Availability of data for analysis of maternal syphilis and adverse birth outcomes

Information was found on 123 575 births over 11 years (2000–2010) in the six focus hospitals (Figure 1). These births represented 1.8% of the estimated 6.7 million births nationwide over the 11-year study interval (18). Although the six hospitals are not nationally representative, they are most likely relatively representative of the parts of the country most affected by syphilis.

Much of the information needed to estimate the proportion of stillbirths and other adverse birth outcomes attributable

FIGURE 1. Geographic distribution of six hospitals in analytic data set for study on potential use of the Perinatal Information System for measuring the proportion of adverse birth outcomes attributable to maternal syphilis infection, Peru, 2000–2010

to maternal syphilis was available from the SIP database in these hospitals. There were three notable exceptions. First, the SIP database did not include information on maternal syphilis treatment. Second, although several variables indicated birth outcome, none of them distinguished among different types of intrauterine death (e.g., there was no distinction between intentional and spontaneous abortion). Information from stakeholders indicated that, because intentional abortion is illegal and stigmatized in Peru, the vague "intrauterine death" descriptor was likely purposeful. Stakeholder interviews also indicated that stillbirth is difficult to measure in Peru due to cultural reluctance or discomfort in discussing pregnancy loss. Some stakeholders noted that mothers, families, and even medical staff were reluctant to discuss stillbirth due to the "pain and sadness" of the event, with some saying it would be better to simply allow "the angel to rest." Third, although information was theoretically available for many maternal health conditions and birth outcomes, some variables were difficult to interpret because of their reliance on write-in responses. Common numeric codes were used to indicate these conditions, but the data entry form did not force a "yes" or "no" response. When data were entered electronically, clerks dichotomized these variables by recording un-indicated conditions as "no."

Information for key variables in the SIP was generally quite complete; information on variables of interest was available in 80%–100% of observations (Table 1). However, on clinical chart review, syphilis treatment information was available for less than 22% of the 1 075 women who tested positive for syphilis in the six facilities (Table 2). About 16% of mothers had a treatment date in their clinical chart.

Data validity

More than 72% of the 1 375 clinical charts (1 075 cases with documented syphilis, plus the randomly selected control group of 50 cases without syphilis from each of the six facilities (n = 300)) were located for validation. The percentage of clinical charts located for validation ranged from 50%–92% by facility and from 61% for births in 2001 to 86% for births in 2010. Information on variables of interest was located in 48%–72% of charts

TABLE 1. Availability of complete hospital Perinatal Information System (SIP) maternal health data for mothers (n = 123 575) delivering in six hospitals participating in study on use of SIP for measuring proportion of adverse birth outcomes attributable to maternal syphilis infection, Peru, 2000–2010

Maternal health variable	Cases with complete data in hospital SIP (%)
Mother's age at delivery	100.0
Mother's date of last menstrual period	98.7
Mother had previous stillbirths (yes/no)[a]	100.0
Index birth was stillbirth (yes/no)[a]	100.0
Infant's delivery date	100.0
Infant's gestational age at delivery	83.8
Infant's birth weight	85.3
Mother's syphilis test result	80.8
Mother's syphilis test date	80.7

[a] Write-in variable; if not indicated, coded as "0" in data file.

TABLE 2. Availability of complete maternal health data in hospital clinical charts for mothers with documented syphilis infection (n = 1 075) delivering in six hospitals participating in study on use of SIP for measuring proportion of adverse birth outcomes attributable to maternal syphilis infection, Peru, 2000–2010

Syphilis treatment variable	Cases with complete data in hospital clinical chart (%)
Mother treated for syphilis if positive (yes/no)	21.7
Syphilis treatment type of medication	20.7
Syphilis treatment dosage	20.6
Syphilis treatment number of doses	20.2
Syphilis treatment date	16.1
Fetal gestational age at time of treatment	7.7

TABLE 3. Comparison of maternal health data in hospital clinical charts and hospital Perinatal Information System (SIP) for mothers (n = 1 375[a]) delivering in six hospitals participating in study on use of SIP for measuring proportion of adverse birth outcomes attributable to maternal syphilis infection, Peru, 2000–2010

Maternal health variable	Cases with available data in hospital clinical chart (%)	Cases with corresponding data in SIP (%)
Infant's delivery date	72.2	98.3[b]
Mother's age at delivery	68.5	94.2[c]
Index birth was stillbirth (yes/no)	65.5	98.1
Infant's gestational age at delivery	64.5	67.5[d]
Mother had previous stillbirths (yes/no)	63.5	96.0
Infant's birth weight	58.5	84.4[e]
Mother's syphilis test result	54.0	88.8
Mother's syphilis test date	50.5	69.4[f]
Mother's date of last menstrual period	48.4	84.9[g]

[a] 1 075 cases with documented syphilis, plus randomly selected control group of 50 cases without syphilis from each of the six facilities (n = 300).
[b] Matching within 1 day.
[c] Matching within 1 year of age.
[d] Matching within 1 week.
[e] Matching within 10 g.
[f] Matching within 1 day.
[g] Matching within 1 week.

(Table 3). Where information corresponding to the nine variables was found in clinical charts, it was comparable to the SIP data. For example, in more than 98% of records, information on whether or not the infant was stillborn was the same in both the SIP and the clinical charts.

Association between maternal syphilis and stillbirth

Information was found on maternal syphilis test result for 99 840 (80.8%) of the 123 575 births in the six hospitals over 11 years (Table 4). Of these 99 840

TABLE 4. Association between maternal syphilis and stillbirth based on hospital Perinatal Information System (SIP) data for 99 840 women delivering at six hospitals participating in study on use of SIP for measuring adverse birth outcomes, Peru, 2000–2010

Maternal syphilis	Stillbirth		Total cases
	Yes	No	
Yes	18	1 057	1 075
No	601	98 164	98 765

Odds ratio of stillbirth given syphilis infection in pregnancy = 2.78; χ^2 =19.61; P = 0.01

[a] Data on mother's syphilis test result or birth outcome were missing for 23 735 participants (19.2%) in the study sample (n = 123 575).

births, 1 075 maternal syphilis infections (1.1%) and 619 stillbirths (0.62%) were found. Of the 619 stillbirths, 18 were among women with syphilis infection. Women with syphilis infection in pregnancy had 2.8 times the odds of having a stillbirth compared to women without syphilis infection ($P < 0.01$). However, information on syphilis treatment was only available for very few women, precluding assessment of how the likelihood of stillbirth might have differed for women who were treated versus those who were untreated for their syphilis infection.

DISCUSSION

The SIP in Peru is a large database containing linked maternal and infant information. Common data collection protocols and coding schemes allowed data to be linked across multiple years and facilities. Data fields that were examined were reasonably complete and validated well when compared to clinical charts. Most of the clinical charts for the 1 375 women included in the validation data set were located and indicated that, for the variables examined, SIP data were very likely to reflect information in women's clinical charts. Due to the myriad data elements collected in the SIP and the reasonably good data quality observed, these data might be useful for examining a variety of maternal health conditions.

Nevertheless, the SIP data in Peru were not sufficient for examining the proportion of stillbirths and other adverse birth outcomes resulting from maternal syphilis for three main reasons. First, there was no information captured on maternal syphilis treatment in the SIP database. Untreated syphilis infections in pregnancy are much more likely to result in adverse birth outcomes compared to those adequately treated in a timely manner (3–6). Without information on treatment, it is impossible to confirm whether stillbirths in these data were attributable to syphilis or some other cause. Second, the inability to distinguish among different types of intrauterine death has obvious implications for potential misclassification of stillbirth. The SIP data elements were not designed to distinguish among different types of intrauterine death. While these data elements might be purposefully vague because of cultural norms limiting discussion of intentional abortion and stillbirth, this poses significant challenges for analyses examining any birth outcome apart from those observed in live-born infants (i.e., birth weight or gestational age). This is not likely to be a measurement challenge that is unique to SIP. Cultural norms inform willingness to report sensitive information, as well as the way it is recorded, in nearly every setting. Third, the SIP data were not stored or managed in such a way that facility-level users could effectively manipulate their own data or contribute data to multisite analyses. To provide national data on complex indicators such as the proportion of stillbirths and other adverse birth outcomes resulting from maternal syphilis, data must be continually analyzed and examined for quality assurance purposes. Ideally, data should also be collected on a larger scale or from nationally representative facilities.

Despite these limitations, the SIP data might be well suited for monitoring other core indicators for the elimination of mother-to-child transmission of syphilis, as has been suggested in previous research in other Latin American countries (19). SIP currently measures two WHO process indicators for elimination—the percentage of pregnant women tested for syphilis and the percentage of pregnant women testing positive for syphilis. Most records in the six focus hospitals included both syphilis test result and date. If syphilis treatment was also routinely collected in clinical charts and as part of SIP, all three WHO process indicators could be measured. However, valid measurement of these indicators would require that either 1) the SIP be more widely used throughout the country or 2) SIP hospitals be nationally representative enough to function as a sentinel surveillance system.

Factors currently limiting hospitals' use of the SIP in Peru seem to be complexity of data entry and limited usability of the data for hospital and cross-facility analyses. This study found that a significant amount of clinician time is required for SIP data entry and that the data have limited utility to hospitals in their present form. The six hospitals in the study's analytic data set continually entered information into the SIP database for the 11-year period but were unable to use the data to examine relationships between patient characteristics and disease or other adverse health outcomes.

To continue collecting quality data from participating hospitals and potentially increase hospital participation, system administrators might consider simplifying the system, as well as increasing its value to users. A more flexible data output system would allow hospitals to routinely examine and disseminate their data, as well as to combine data with other hospitals to look more broadly at maternal health trends. Data could be routinely quality-checked with continuous feedback to users at hospitals and higher levels of system administration. Although there are multiple record-keeping systems in Peru, the SIP could make a unique contribution to the body of maternal and child health knowledge in the country as it is the only system collecting linked maternal and infant outcomes. This might be done most effectively by collecting more in-depth data on a few priority issues agreed upon by local stakeholders.

Data are still needed to monitor the long-term impact of congenital syphilis elimination, potentially through the proportion of stillbirths and other adverse birth outcomes attributable to syphilis infections in pregnancy. This is an important indicator for evaluating global efforts aiming to eliminate mother-to-child transmission of syphilis. The current study's attempt to use SIP data for this purpose highlighted some of the challenges inherent in finding and using existing data to examine this complex issue. For an ideal measurement of this indicator, valid and reliable data are needed on maternal syphilis serology, maternal syphilis treatment, birth outcome, and other potential causes of stillbirth. However, all of these data are

rarely available in program data or even in large perinatal data systems like the SIP. For this indicator to be comparable across countries and regions, the definition of a stillbirth attributable to maternal syphilis infection must be simplified and standardized, with required inputs for measurement. At the very least, transparent estimates would allow for appropriate interpretation, given potential missing data and other limitations.

Other studies that have examined maternal syphilis and adverse birth outcomes have typically used a case-control design to assess the risk of stillbirth in women with and without syphilis infection. A recent meta-analysis reported the pooled proportion of stillbirths among women with untreated syphilis infection to be 25.6%, compared to 4.6% among women without syphilis infection (2). One could infer from these pooled proportions that the risk of stillbirth was roughly six times higher among women with untreated syphilis infection compared to women without syphilis infection. The magnitude of the relative risk of stillbirth given syphilis infection in this meta-analysis is substantially higher than the nearly threefold relative risk observed in the current study. This is likely due to this study's inability to examine women with untreated syphilis infection separately, plus possible misclassification of the study's stillbirth outcome. Many women with syphilis infection were likely adequately treated, thus lim-iting their stillbirth risk and biasing the risk ratio toward the null.

Limitations

This study had some limitations. First, the assessment was focused on only six out of 43 hospitals using the SIP. The authors chose these hospitals because they had sufficiently high maternal syphilis prevalence for their analysis and collected data continuously from 2000–2010. These characteristics might have also contributed to other differences between these clinics and the other 37 hospitals collecting SIP data in Peru, including a potentially heightened awareness of syphilis infection that might have affected data collection practices. Second, all of the facility-level stakeholders interviewed were current users of the SIP. Staff members from hospitals who had discontinued use of the SIP were not interviewed, and they might have provided a different perspective. Third, the authors were unable to draw reliable conclusions about the use of the SIP for monitoring syphilitic stillbirth or other adverse maternal health outcomes in other Latin American countries. Peru is only one of 32 Latin American and Caribbean countries that were collecting SIP data at the time of the evaluation (12). Finally, there was no dedicated funding supporting the maintenance and evaluation of Peru's national SIP use at the time of this assessment. It is likely that the system performed at a higher level when funding was available for national SIP implementation and management, so the current findings cannot be extrapolated to that time.

Conclusions

As countries move toward the elimination of mother-to-child transmission of syphilis, measurable indicators will be critical for demonstrating success. Stillbirths and other adverse birth outcomes attributable to maternal syphilis are difficult to measure and monitor, even when using large perinatal data systems like Peru's SIP. Fewer stillbirths attributable to maternal syphilis over time would certainly indicate a long-term, positive impact of elimination efforts. Until these data are available, shorter-term indicators might be used to measure progress. Two of three WHO process indicators for elimination—the percentage of pregnant women tested for syphilis and syphilis positivity among these women—can be monitored using existing SIP data. If syphilis treatment data were added, all three indicators could be measured. Simplifying the SIP and increasing its utility to users would help to ensure maximum participation by hospitals, thereby increasing the data system's value for informing critical maternal and child health programs and services.

Conflicts of interest. None.

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RESUMEN

¿Se puede utilizar el Sistema Informático Perinatal del Perú para medir la proporción de resultados adversos del nacimiento atribuibles a sífilis materna?

Objetivo.   Describir la capacidad del Sistema Informático Perinatal (SIP) del Perú para proporcionar estimaciones que permitan vigilar la proporción de mortinatos y otros resultados adversos del nacimiento atribuibles a sífilis materna.

Métodos.   Se llevó a cabo un estudio descriptivo para evaluar la calidad y la integridad de los datos del SIP correspondientes a seis hospitales públicos peruanos que utilizaron el SIP de forma continuada del 2000 al 2010, y presentaron una prevalencia de sífilis materna de como mínimo 0,5% durante ese período. Se realizaron entrevistas exhaustivas con interesados directos de Perú acerca de sus experiencias con el uso del SIP.

Resultados.   Se obtuvo información sobre 123 575 nacimientos ocurridos del 2000 al 2010 y se dispuso de resultados de pruebas serológicas de sífilis correspondientes a 99 840 nacimientos. Se produjeron 1 075 casos de sífilis materna (1,1%) y 619 mortinatos (0,62%). El 1,7% de las mujeres con sífilis gestacional tuvieron un mortinato, en comparación con el 0,6% de las mujeres sin infección sifilítica. En el SIP se disponía de gran parte de la información necesaria para calcular la proporción de mortinatos atribuibles a sífilis materna, a excepción de la información sobre el tratamiento de la sífilis, que no se recopiló. Sin embargo, la recopilación de datos del SIP es compleja y exige a los médicos clínicos dedicar tiempo. Los datos de los diferentes hospitales no estaban vinculados, no se utilizaban habitualmente ni se sometían a controles de calidad. A pesar de estas limitaciones, los datos del SIP analizados estaban completos y eran válidos; en 98% de los registros, la información sobre si se trataba o no de un mortinato coincidía entre el SIP y las historias clínicas. En casi 89% de las mujeres los resultados de las pruebas serológicas de sífilis eran los mismos en las historias clínicas y el SIP.

Conclusiones.   El gran número de infecciones sifilíticas notificadas en el SIP del Perú y la capacidad de vincular las características maternas con los resultados de los recién nacidos hacen que el sistema sea potencialmente útil para vigilar la proporción de mortinatos atribuibles a sífilis congénita en Perú. Con objeto de garantizar la buena calidad de los datos y la sostenibilidad del SIP en Perú, es preciso simplificar la recopilación de datos y mantener un control permanente de la calidad de la información, que debe utilizarse en beneficio de los establecimientos participantes.

Palabras clave   Sífilis congénita; mortinato; vigilancia en salud pública; Perú.