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ORIGINAL ARTICLE

Epidemiological situation of new cases of congenital syphilis in Chile, 2010-2022

Situación epidemiológica de los nuevos casos de sífilis congénita en Chile, 2010-2022

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What do we know about the subject matter of this study?

Congenital syphilis is the transplacental transmission of *Treponema pallidum* subsp. Pallidum to the fetus, with potentially devastating consequences. Syphilis incidence has been rising globally, and a recent increase among pregnant women has been reported in Chile[3].

What does this study contribute to what is already known?

This study presents changes in the trend of reported cases of congenital syphilis in Chile over the last twelve years, showing a clear increase since 2018 and reaching its highest value in 2021. Most cases were concentrated in three regions: the Metropolitan Region, Valparaíso, and Biobío.

Abstract

Congenital syphilis is the transplacental transmission of the *Treponema pallidum* subspecies *pallidum*. The incidence of syphilis has increased worldwide and in Chile. **Objective**: To describe the characteristics of new cases of congenital syphilis in Chile between 2010 and 2022. **Subjects and Method**: Descriptive design, review of the database of notifiable diseases. Variables included sex, region, clinical stage, co-infection with other STIs, and year, among others. Statistical analyses were performed using Stata v.18. **Results**: The incidence has shown an upward trend since 2018, with 2021 having the highest number of reports. 63% of cases were reported in three regions: the Metropolitan Region, Valparaíso, and Biobío. Of the total cases, 63% were classified as early congenital (n = 288), and among these, 31% presented with symptoms. **Conclusion**: Congenital syphilis is on the rise in Chile.

Keywords:
Syphilis;
Congenital Syphilis;
Sexually Transmitted Diseases;
Epidemiological Surveillance;
COVID-19

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Introduction

Syphilis is a sexually transmitted infection (STI) caused by *Treponema pallidum* subsp. *Pallidum*[1]. Worldwide, its incidence has increased[1,2], and it is the STI with the highest notification rate in Chile[3]. Congenital syphilis (CS) is caused by transplacental transmission of this bacterium to the fetus, with potentially devastating consequences, including fetal death, low birth weight, and neurological and ocular disorders[1,4]. Despite this, it is entirely preventable through prenatal screening and appropriate treatment with penicillin for infected pregnant women[4]. CS screening in pregnant women is recommended worldwide[5]. In Chile, the pregnancy control program consists of four non-treponemal tests during pregnancy (VDRL or RPR). In 2016, our country reported a congenital syphilis rate of 0.1 per 1,000 corrected live births[6], reaching figures in line with eliminating syphilis transmission in the Americas of 0.5 cases per 1,000 live births[7]. However, an explosive increase in syphilis cases in pregnant women in our country was recently reported[6]. Despite this, the epidemiological situation of CS in Chile is unknown.

The objective of this study was to characterize new cases reported as congenital syphilis and describe their evolution in the regions of Chile.

Subjects and Method

Descriptive population-based ecological design. All new reported diagnoses of congenital syphilis in Chile were analyzed for the period 2010-2022.

Variables and data source

The database of Notifiable Diseases was obtained through the transparency law. The variables were sex, nationality, clinical stage, indigenous origin, co-infection with other STIs, and region of diagnosis (location of the facility from which the sample originated). The denominators for the rates were based on the figures for live births published by the National Institute of Statistics (INE)[8, 9] for the period studied. Since secondary data sources were used, the intervention of the ethics committee was not required.

Statistical analysis

The sample was described in numbers and percentages, and then the incidence rate was estimated by year and region. Stata v.18 was used for statistical analysis.

Results

During the studied period (2010-2022), 454 cases of congenital syphilis were reported in Chile. Of these, 53.7% were male (n = 244). 1.5% (n = 7) were recorded as belonging to indigenous peoples. 63% of cases were classified as early CS (n = 288) and 1.3% as late CS (n = 6). Among early CS cases, 31% presented symptoms (n = 145). Four cases of co-infection were reported, with no specification of the pathogen in any of them, and all outside the Metropolitan Region (MR) (Table 1).

The annual trend in CS rates shows a progressive decline until 2017 and a rebound in recent years. The year with the most reported cases was 2021, with 57 cases, doubling the number of new infections compared to the previous year (Figure 1a). Between the beginning and end of the period, there was a net reduction of 9% in cases. However, if we analyze only the last 5 years, we observe an average annual growth of 25%.

In terms of geographical distribution, new infections were concentrated in the MR with 30% (n = 135), followed by Valparaíso with 23% (n = 105), and Biobío with 10% (n = 47) (Table 1). The MR was the only region that saw an increase in the absolute number of cases between the beginning and end of the period. However, an analysis of the evolution of incidence rates shows an overall increase (Figure 1b).

Discussion

There has been a resurgence of congenital syphilis in our country, similar to that seen in other developed countries[10]. The increase in recent years means that Chile is moving further away from the goal of eliminating CS in the Americas region[7], requiring immediate action.

The increase in syphilis among women of childbearing age reflects its increase in the general population, especially in vulnerable groups such as indigenous, marginalized[4], and migrant populations[6]. However, the incidence of congenital syphilis remains considerably lower compared to the increase observed in pregnant women, reflecting the wide coverage and effectiveness of prenatal care in Chile[6].

In this study, 63% and 1.5% of cases were classified as early and late CS, respectively, depending on whether the diagnosis was made before or after two years of age[1,11]. Late presentation was uncommon, consistent with reports in other series[11].

The diagnosis of CS requires a thorough analysis of epidemiological history (such as a history of syphilis in the mother, treatment received, and subsequent

follow-up), clinical or radiological findings in the newborn, and laboratory tests, the most important being the comparison between maternal and neonatal serology[11]. In this context, the CDC proposes three scenarios[11]:

1. Presumed or probable CS

Newborn with abnormal physical examination consistent with CS and/or neonatal non-treponemal serology titer four times higher than the mother's titer at delivery (example 1:8 neonatal and 1:2 maternal). Other tests less available in clinical practice include dark-field microscopy, PCR of the placenta, umbilical cord, lesions, or fluids, or a positive silver stain of the placenta or cord. Diagnosis is usually based on clinical and/or serological results. Extensive testing and treatment are recommended[11].

2. Possible CS

Newborn with normal physical examination, non-treponemal serological titers with a difference of one titer (or 2 times) but with a history of inadequately treated mother (undocumented treatment, treatment completed less than 30 days before delivery, or treatment with an antibiotic other than penicillin). Extensive study and treatment are recommended[11].

3. Unlikely CS

Newborn with normal physical examination, adequately treated mother, no signs of infection. No study or treatment is recommended[11].

One-third of cases of early CS presented signs or symptoms, consistent with the literature, which indicates that 60% of cases will be asymptomatic at birth[11]. Therefore, serology testing and maternal history are essential for timely diagnosis and treatment.

The rise in CS began in 2018 and peaked in 2021. This phenomenon was evident in other STI studies, coinciding with the wave of migration and the fact that, due to the requirements for entry into the country, migration in informal conditions has intensified, which could lead to gaps in access to healthcare[12]. In addition, the peak observed in 2021 could be related to the loss of pregnancy controls during the COVID-19 pandemic[13]. However, further analysis is needed to elucidate the causes of this behavior.

In terms of geographic distribution, incidence rates were heterogeneous but high overall. This could indicate other associated environmental factors in some areas of Chile. The central regions (MR, Valparaíso, and Biobío) accounted for more than 60% of cases. Although these are the most densely populated regions in Chile, they are among the regions with the lowest fertility rates, which explains the high incidence rate[8]. The MR is the region with the highest number of births,

Table 1. Characteristics of newly reported cases of congenital syphilis in Chile, 2010–2022

Variable	Total 454 (100)
Sex – n (%)	
Male	244 (53.7)
Female	210 (46.3)
Country of birth – n (%)	
Chile	454 (100)
Clinical stage	
Early Congenital	288 (63.4)
Early Symptomatic congenital	145 (50.3)
Early latent congenital	51 (17.8)
Early congenital, unspecified	92 (31.9)
Late Congenital	6 (1.3)
Congenital, unspecified	160 (35.2)
Indigenous peoples - n (%)	
Yes	7 (1.5)
No	447 (98.5)
Co-infection with other STI – n (%)	
Yes	4 (0.9)
No	450 (99.1)
Region n (%)	
Metropolitan Region (M)	135 (29.7)
Arica y Parinacota	15 (3.3)
I (Tarapacá)	18 (4.0)
II (Antofagasta)	18 (4.0)
III (Atacama)	15 (3.3)
IV (Coquimbo)	24 (5.3)
V (Valparaíso)	105 (23.1)
VI (O´Higgins)	11 (2.4)
VII (Maule)	24 (5.3)
Ñuble	4 (0.9)
VIII (Bío Bío)	47 (10.4)
IX (Araucanía)	23 (5.1)
XIV (Los Ríos)	4 (0.9)
X (Los Lagos)	8 (1.8)
XI (Aysén)	1 (0.2)
XII (Magallanes)	2 (0.4)

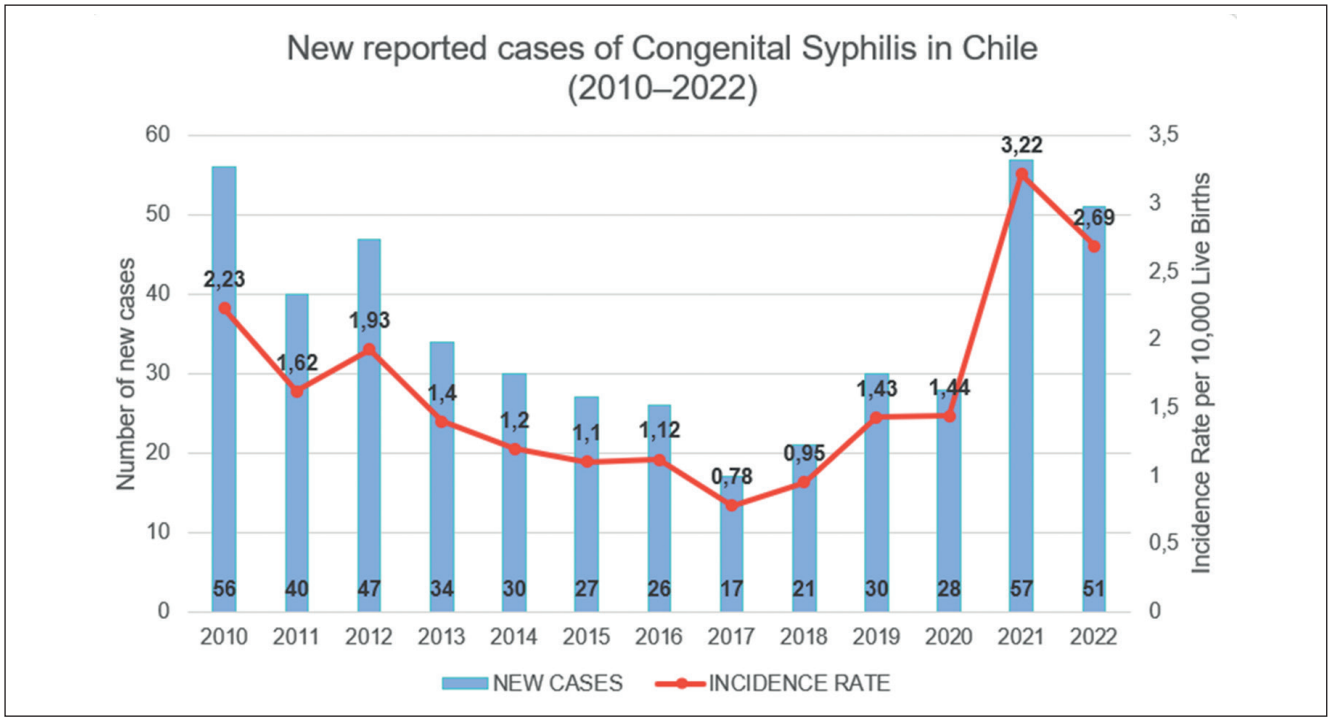

Figure 1a. Annual distribution of the number of reported cases and incidence rates of congenital syphilis during the study period. Chile, 2010–2022.

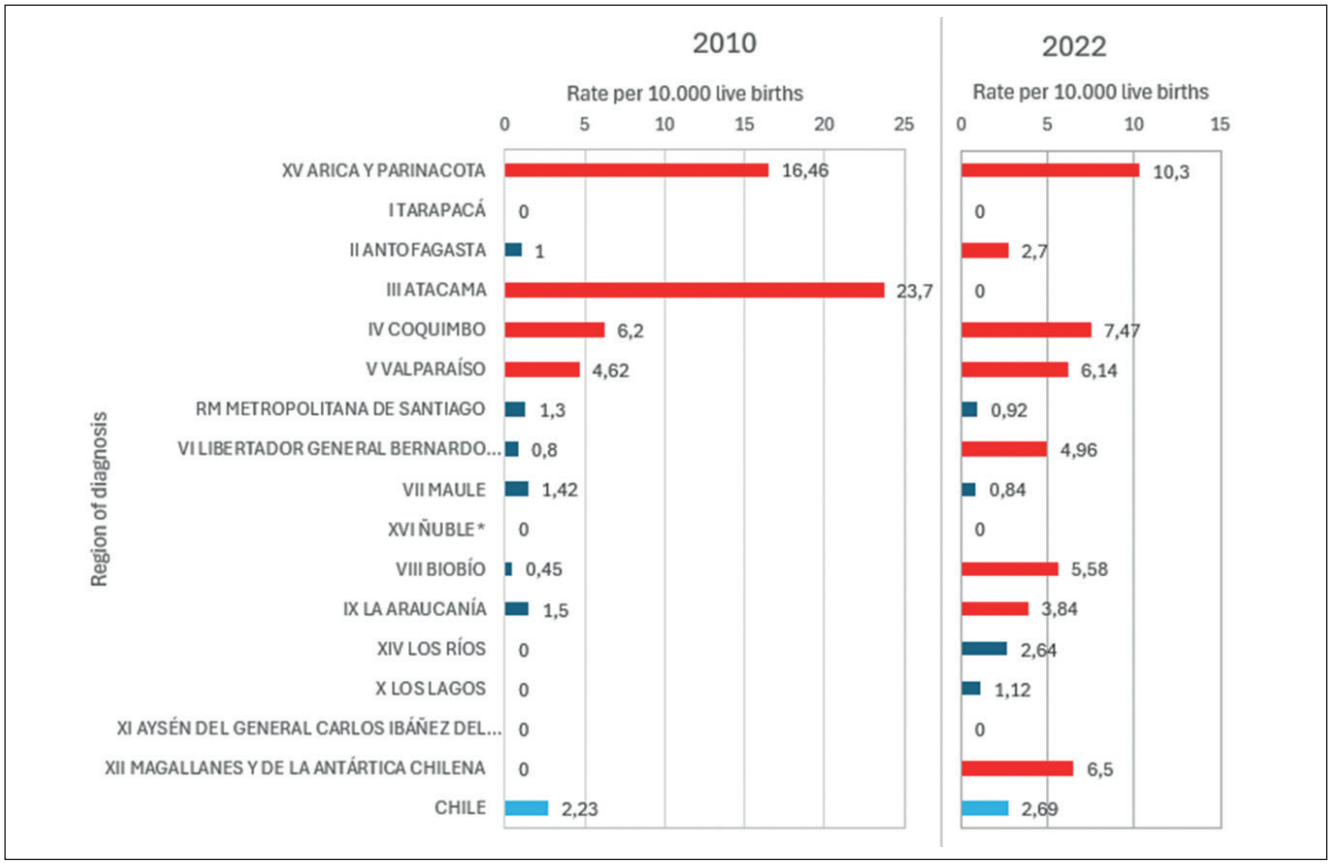

Figure 1b. Regional distribution of congenital syphilis incidence rates. Chile, 2010–2022. Data obtained from reported congenital syphilis cases (ENO) and Vital Statistics provided by the National Institute of Statistics (INE). Regions with high incidence rates (rates above the national incidence rate) are highlighted in red.

which could explain the low rate despite the high number of cases. Finally, MR and Valparaíso are regions that receive migrant populations, yet the percentage of live births to foreign mothers is 25% and 11%, respectively, much lower than the figures for northern Chile[8], regions that did not show an increase in CS but did show an increase in syphilis in pregnant women in other studies[6].

In this context, syphilis surveillance based on mandatory case reporting is a crucial strategy for identifying gaps and prioritizing actions, ensuring accurate data and an adequate public health response[7].

Among the limitations of this study, the databases contain a limited number of variables. For example, they do not specify the results of diagnostic tests (treponemal and non-treponemal) for the mother or newborn, and the mother's nationality and psychosocial variables such as immigration status, rurality, and adherence to prenatal care, among other conditions described as risk factors for CS, are unknown[7]. Additionally, the region of diagnosis does not necessarily coincide with the region of residence. One of the strengths of this study is that it analyzed secondary data with confirmed diagnosis and not with suspicion[3].

Conclusions

This study presents changes in the trend of reported cases of congenital syphilis in Chile over the last twelve years. The prevention of vertical transmission of syphilis requires an interdisciplinary approach involving dermatologists, obstetricians, and pediatricians in order to avoid potentially serious consequences for the mother and child.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: This article was based solely on a secondary analysis of a publicly available database, available at the following link: https://epi.minsal.cl/bases-de-datos-eno/.
Consequently, the Ethics Committee determined that the work did not require ethical review or approval, as recorded in the respective minutes.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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