

ANALYSIS OF THE SITUATION OF CONGENITAL SYPHILIS IN THE NORTHERN MACRO-REGION OF RIO GRANDE DO SUL: A STUDY OF A DECADE IN CHILDREN UNDER ONE YEAR OF AGE



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ABSTRACT

Objective: to analyze the situation of the incidence of congenital syphilis (CS) in the Northern Macro-region of the state of Rio Grande do Sul (RS) from January 2010 to December 2019 and what are the main associated sociodemographic and clinical factors. **Methodology:** ecological time series study conducted with 837 cases of CS with data from the Notifiable Diseases Information System of the Ministry of Health (SINAN). The mean annual incidence rate of CS and the following variables were analyzed: gender, age group, skin color, final classification, and evolution. Temporal trend analyses were performed using the Prais-Winsten model. **Results:** The mean incidence rate and temporal trend of CS in

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children under one year of age was 5.62 cases per 1,000 children in the North Macro-region, with the highest rate in R17-Planalto, with 12.22 cases per 1,000 children. All the Health Regions of Macronorte showed an increasing trend, except for R19-Botucaraí, which showed a stationary trend. Municipalities with larger populations and lower coverage of Primary Health Care (PHC) had a higher incidence of CS, probably due to difficulties in ensuring access to prenatal and postpartum care. Conclusion Since CS is a sentinel event of the quality of care in the maternal and child care line, these results can guide decision-making based on epidemiological indicators, optimizing resources and ensuring compliance with the goals established by the Sustainable Development Goals/2030 Agenda.

Keywords: Congenital Syphilis. Time Series Study. Prenatal care.

INTRODUCTION

Congenital syphilis (CS) is an infectious disease transmitted transplacentally to the fetus during a pregnancy in which the mother has an untreated or inadequate bacterial infection. The etiological agent is *Treponema pallidum*, a spirochete-shaped bacterium that, when it causes vertical transmission from the pregnant woman to the baby, can manifest itself through different clinical stages. Transmission occurs mainly during the early stages of the disease, when the lesions are active and with a high bacterial load, facilitating dissemination and contagion (LAGO et al, 2013; MOREIRA et al, 2008).

From a public health perspective, despite advances in controlling the spread and treatment of the disease, congenital syphilis persists as a serious global problem due to its high prevalence and health risks and represents a challenge for maternal and child care in Brazil (MONTEIRO et al., 2025). Tackling this pathology is also part of one of the Sustainable Development Goals (SDGs/2030 Agenda) established by the United Nations General Assembly, within the scope of SDG 3 - Health and well-being, which aims to "ensure access to quality health and promote well-being for all, at all ages". The breakdown of SDG 3 targets related to maternal and child care include reducing the global maternal mortality rate (target 3.1), ending preventable deaths of newborns and children under five years of age (target 3.2) and ending epidemics of communicable diseases (target 3.3 by the year 2030) (UN, 2015)

According to the Syphilis Epidemiological Bulletin published by the Ministry of Health in 2023, 83,034 cases of syphilis in pregnant women were reported in Brazil in 2022, of which 14.6% occurred in the South region. Of these, 55.3% were diagnosed in the first trimester of pregnancy. The South region was also responsible for the second highest case detection rate in the country (33.8 cases per 1,000 live births), above the national average of 32.4 cases per 1,000 live births. In Brazil, the most prevalent age group for detection of syphilis during pregnancy was 20 to 29 years (59.7%). Regarding the color/race criterion, the prevalence was brown women (52%), followed by white (28.6%) and black (11.8%) women (BRASIL, 2023).

Regarding congenital syphilis, in 2022, 26,468 cases were reported in children under one year of age, with an incidence of 10.3 cases per 1,000 LB. Of the total, 13.2% are equivalent to the prevalence in the South region. In the period from 2019 to 2022, there was a 16% increase in reported cases of congenital syphilis, of which 14.2% were from the southern region of the country (BRASIL, 2023).

The Northern Macro-region of Rio Grande do Sul currently covers 1,289,914 inhabitants (RIO GRANDE DO SUL, 2022) and so far does not have updated scientific evidence to guide the evaluation of the quality of care in the maternal and child health care network with regard to CS. This fact makes this study relevant, as it allows mapping the effectiveness of the health strategies implemented for screening and screening for syphilis in pregnant women, newborns and children under five years of age according to the protocols established by the Ministry of Health.

Thus, the objective of this study was to analyze the situation of the incidence of congenital syphilis in the Northern Macro-region of the State of Rio Grande do Sul (RS) and what are the main associated sociodemographic and clinical factors.

METHODOLOGY

This is an ecological time series study (ANTUNES, 2015) carried out from secondary public data of children diagnosed with congenital syphilis in the Northern Macro-region of the state of Rio Grande do Sul (RS), from the Notifiable Diseases Information System (SINAN) available on the Tabnet – DATASUS website. It was waived by the Research Ethics Committee for complying with Resolution No. 510 of April 7, 2016 of the National Health Council on the use of publicly accessible and shared domain information, which ensures the recognition of freedom, autonomy and the defense of human rights (BRASIL, 2016).

The state of Rio Grande do Sul (RS) is located in the southern region of Brazil and, according to the last demographic census carried out by the Brazilian Institute of Geography and Statistics (IBGE) in 2022, it has a population of 10,880,506 inhabitants and 497 municipalities (IBGE, 2023).

According to the State Health Plan of RS (2020-2023), the care network of the Unified Health System covers thirty Health Regions and seven Macro-regions (Midwest, Metropolitan, Missioneira, North, South, Serra and Vales), which are the basis for planning and management (RIO GRANDE DO SUL, 2020). The Northern Health Macro-region is composed of regions R15-Caminho das Águas, R16-Alto Uruguai Gaúcho, R17-Planalto, R18-Araucarias, R19-Botucaraí and R20-Rota da Produção (RIO GRANDE DO SUL, 2022).

The delimited period for data collection was from January 1, 2010 to December 31, 2019. To this end, the Tabnet Platform – DATASUS was accessed, selecting the section

"Epidemiological and Morbidity" followed by the topic "Notifiable Diseases and Conditions – From 2007 onwards (SINAN)", and, subsequently, "congenital syphilis" and geographic coverage for the state of Rio Grande do Sul (RS). Data on the population of children under 1 year of age residing in the municipalities that make up the analyzed region were obtained from the Study of Population Estimates by municipality, sex and age for the period 2000 - 2021.

The following variables and categories were analyzed: sex (female and male); age group (up to 6 days, from 7 to 27 days, from 28 to 364 days); skin color (white and non-white); final classification (congenital syphilis, stillbirth/abortion, discarded) and evolution (unknown/not informed, alive, death from injury, death from other causes).

For data analysis, the average annual incidence rate for the decade was calculated using the formula: $\text{Incidence} = (\text{New Cases}) / (\text{Population} \times \text{Time Period})$. Temporal trend analyses were performed using the Prais-Winsten model (ANTUNES, 2015). The logarithmic transformation of base 10 of the incidence was considered as the dependent variable ($\log[y]$) and the year as the independent variable (x). Subsequently, the annual percentage change (APC) of the incidence and their respective 95% confidence intervals (95%CI) were estimated. The trend was considered statistically significant when zero was not contained in the 95%CI of the APC. The positive APC value represented an increasing trend and the negative APC value a decreasing trend. When the zero value was contained in the 95%CI of the APC, the trend was considered stationary. The statistical program used was the *Statistical Package by the Social Sciences*, version 24.0 (SPSS), with the commercially accessible PSM (*Propensity Score Matching*) extension.

RESULTS

In the decade analyzed (2010 to 2019), 837 cases of congenital syphilis in children under one year of age were reported in the Notifiable Diseases Information System (SINAN) in the Macronorte region of Rio Grande do Sul. The lowest indicator was in 2010 (13 cases) and the highest in 2017 (153 cases). The frequency according to the sociodemographic and clinical profile of the children is shown in Table 1.

Table 1. Characterization of congenital syphilis cases in the Macronorte region of the state of Rio Grande do Sul, Brazil, and their respective health regions, from 2010 to 2019, according to the sociodemographic and clinical profile of the children.

Child Feature 2010-2019	R15		R16		R17		R18		R19		R20		Macronorth	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sex														
Female	11	52,3 8	52	53,6 1	280	44,6 6	13	39,3 9	9	42,8 6	16	41,0 3	381	45,47
Male	9	42,8 6	44	45,3 6	288	45,9 3	20	60,6 1	12	57,1 4	23	58,9 7	396	47,26
Ignored	1	4,76	1	1,03	59	9,41	0	0,00	0	0,00	0	0,00	61	7,28
Age group														
Up to 6 days	17	85,0 0	94	96,9 1	620	98,8 8	31	93,9 4	19	90,4 8	37	94,8 7	818	97,73
From 7 to 27 days	2	10,0 0	1	1,03	5	0,80	0	0,00	2	9,52	1	2,56	11	1,31
From 28 to 364 days	1	5,00	2	2,06	2	0,32	2	6,06	0	0,00	1	2,56	8	0,96
Skin color														
White	12	60,0 0	72	74,2 3	516	10,0 0	26	78,7 9	17	80,9 5	31	79,4 9	674	80,62
Non-white	6	30,0 0	10	10,3 1	46	7,35	6	18,1 8	4	19,0 5	4	10,2 6	76	9,09
Ignored	2	10,0 0	15	15,4 6	64	10,2 2	1	3,03	0	0,00	4	10,2 6	86	10,29
Final classification														
Congenital syphilis	17	85,0 0	97	100, 0	557	88,8 4	32	96,9 7	21	100, 0	36	92,3 1	760	90,80
Stillbirth/abortion	0	0,00	0	0,00	48	7,66	0	0,00	0	0,00	1	2,56	49	5,85
Discarded	3	15,0 0	0	0,00	22	3,51	1	3,03	0	0,00	2	5,13	28	3,35
Evolution														
Ignored/Not Informed	0	0,00	6	6,25	24	4,31	1	3,13	1	4,76	1	2,78	33	4,35
Alive	16	94,1 2	90	93,7 5	527	94,6 1	30	93,7 5	19	90,4 8	35	35	717	94,47
Death due to the aggravation	1	5,88	0	0,00	2	0,36	0	0,00	1	4,76	0	0,00	4	0,53
Death other causes	0	0,00	0	0,00	4	0,72	1	3,13	0	0,00	0	0,00	5	0,66

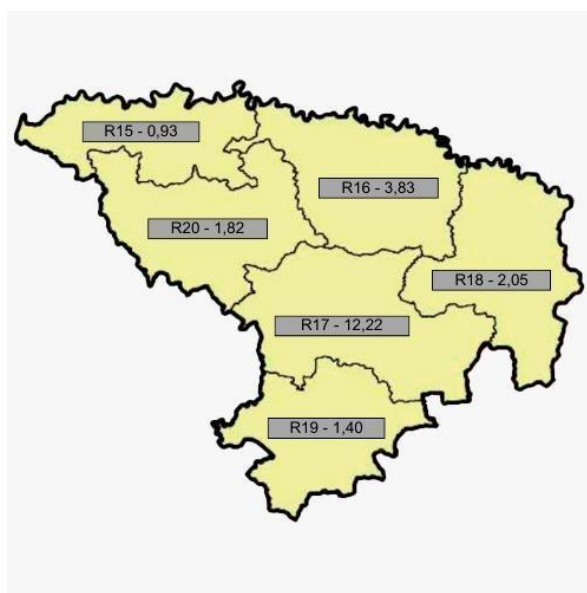
Source: DATASUS, Ministry of Health, Brazil. Note: the numbers may vary according to the notifications on the SINAN form. Legend: R15-Path of the waters, R16-Alto Uruguai Gaúcho, R17-Planalto, R18-Araucarias, R19-Botucaraí, R20-Production Route; "n" corresponds to the absolute frequency and "%" to the relative frequency.

The distribution of the 837 cases that occurred throughout the Macronorte was 627 (74.91%) in the R17-Planalto region, 97 (11.58%) in the R16-Alto Uruguai Gaúcho region, 39 (4.65%) in the R20-Production Route, 33 (3.94%) in the R18-Araucarias, 21 (2.50%) in the R19-Botucaraí and 20 (2.38%) in the R15-Caminho das Águas.

The mean incidence rate and temporal trend of cases of congenital syphilis in children under one year of age was 5.62 cases per 1,000 children for the entire Macronorte region, with the highest in R17-Planalto, with 12.22 cases per 1,000 children (Figure 1 and

Table 2). All regions showed an increasing trend, except for R19-Botucaraí, which showed a stationary trend (Table 2).

Figure 1. Distribution of the average incidence rate of congenital syphilis in children under one year of age per 1000 children, from 2010 to 2019, according to the health regions that make up the Northern Macro-region of Rio Grande do Sul, Brazil.



Source: prepared by the authors. Legend: R15-Caminho das águas, R16-Alto Uruguai Gaúcho, R17-Planalto, R18-Araucarias, R19-Botucaraí and R20-Production Route.

Table 2 – Comparison between the mean annual incidence rates and analysis of the temporal trend of congenital syphilis in children under one year of age in the Northern Macro-region of Rio Grande do Sul, Brazil, and their respective regions, in the period from 2010 to 2019.

Region	Incidence rate*	VPA**	95%CI	Value p***	Tendency
R15-Caminho das Águas	0,93	14,63	9.23 to 20.30	≤ 0,001	Crescent
R16-Alto Uruguai Gaúcho	3,83	42,44	23.20 to 64.68	0,001	Crescent
R17-Plateau	12,22	29,94	12.95 to 49.50	0,004	Crescent
R18-Araucaria	2,05	22,07	12.31 to 32.69	0,001	Crescent
R19-Botucaraí	1,40	0,33	-10.25 to 12.15	0,950	Stationary
R20-Production Route	1,82	28,09	10.32 to 48.71	0,008	Crescent
Macronorte*	5,62	29,95	13.81 to 48.39	0,003	Crescent

Source: DATASUS, Ministry of Health, Brazil. Caption: *Average annual incidence rate 1000 children under one year of age; **VPA: annual percentage change; Prais-Winsten regression.

The mean annual incidence rate and the analysis of the temporal trend of congenital syphilis according to the sociodemographic and clinical profile of children throughout the Macronorte region identified females with a slight predominance over males, but both showed an increasing trend. Regarding the age groups, the category up to 6 days of life had the highest incidence, with 5.49 cases and an increasing trend ($p=0.002$), while the

other groups were stationary. White skin color prevailed over non-white skin, with 3.58 and 0.11 per 1,000 children, respectively, maintaining an increasing temporal trend in both categories (Table 3).

Table 3. Analysis of the temporal trend of congenital syphilis and comparison of the mean annual incidence rate and incidence in children under one year of age, from 2010 to 2019, according to the sociodemographic and clinical profile of children for the entire Macronorte region of the state of Rio Grande do Sul, Brazil.

Child's characteristic	Incidence rate*	VPA**	95%CI	Value p***	Tendency
Sex					
Female	5,24	783,00	154.19 to 2967.39	0,006	Crescent
Male	5,20	924,12	372.75 to 2118.55	≤ 0,001	Crescent
Age group					
Up to 6 days	5,49	1022,94	269.08 to 3316.65	0,002	Crescent
From 7 to 27 days	0,07	1,32	-1.10 to 3.80	0,267	Stationary
From 28 to 364 days	0,05	-1,42	-6.82 to 4.30	0,590	Stationary
Skin color					
White	3,58	336,70	138.06 to 701.09	0,001	Crescent
Non-white	0,11	6,17	1.38 to 11.19	0,023	Crescent
Final classification					
Congenital syphilis	5,10	788,18	248.98 to 2160.47	0,001	Crescent
Stillbirth/abortion	0,33	12,98	-7.98 to 38.71	0,224	Stationary
Discarded	0,19	12,57	8.14 to 17.18	≤ 0,001	Crescent
Evolution					
Ignored/Not Informed	0,22	-0,09	-12.04 to 13.48	0,988	Stationary
Alive	4,82	720,88	209.86 to 2074.68	0,002	Crescent
Death due to the aggravation	0,03	0,48	-2.07 to 3.09	0,691	Stationary
Death other causes	0,03	0,18	-1.69 to 20.9	0,836	Stationary

Source: DATASUS, Ministry of Health, Brazil. *Average annual incidence rate / 1000 children under one year of age, disregarding unknown/blank data according to each characteristic; **APC: annual percentage change; ***Prais-Winsten regression.

Regarding the clinical variables, the final classification with a confirmed diagnosis of congenital syphilis presented an annual incidence rate of 5.10, followed by 0.33 for the abortion/stillbirth category and 0.19 were discarded, with an increasing trend for confirmed cases (Table 3).

Most children did not die, and the "alive" category had an incidence of 4.82 per 1,000 notifications, with an increasing trend ($p=0.002$). Both deaths from congenital syphilis and those from other causes had identical incidence rates, with a stationary trend (Table 3).

DISCUSSION

Congenital syphilis (CS) is a challenge for the Unified Health System (SUS), because in addition to miscarriages, premature births and stillbirths, there are risks of chronic health complications in the child. Even with simple diagnosis, easily accessible treatment and high resolution, it is known that in Brazil there are weaknesses in the performance of maternal screening tests and in prenatal care, indicated by the increasing vertical transmission of the disease (BRASIL, 2012; CAVICHIOLI *et al.*, 2024). Therefore, the occurrence of CS represents a sentinel event for monitoring access and quality of Primary Health Care (PHC) (DOMINGUES *et al.*, 2013).

The absolute numbers of CS in the Northern Macro-region of RS showed a growing increase in notifications since the beginning of the decade studied, with progressive growth in diagnoses, starting with 13 cases in 2010 and reaching 128 cases in 2019 (RIO GRANDE DO SUL, 2022). This finding is in line with the 2022 Epidemiological Bulletin released by the Health Department of the state of RS (RIO GRANDE DO SUL, 2023), which pointed to a continuous increase in CS cases in children under one year of age until 2017, with a subsequent reduction between 2018 and 2020, and a new increase in 2021. This growing trend was possibly influenced by the greater number of pregnant women who adhered to prenatal care and were tested.

In the national scenario, between 2007 and 2016, there was an increase in the number of notifications of congenital and acquired syphilis in pregnant women (BRASIL, 2023). According to Araújo *et al.* (2018), in 2010, 10,084 cases of syphilis were reported in pregnant women in Brazil, 14% of which were in the North Region. Between 2012 and 2018, the detection rates of acquired syphilis showed an average annual growth of 35.4% in the country (BRASIL, 2023). However, in 2019 it remained stable and had a reduction of 23.4% in 2020, possibly because in the period of the covid-19 pandemic fewer women were tested (BRASIL, 2023). Between 2021 and 2022, this rate increased by 26.6% (BRASIL, 2023).

In 2021, 1,914 cases of acquired syphilis were registered in Porto Alegre (capital of Rio Grande do Sul), 1,141 in pregnant women and 610 cases of congenital syphilis. The rate of acquired syphilis per 100,000 inhabitants fell from 162.9 in 2019 to 128.2 in 2020. However, for congenital syphilis, there was an increase from 25.5 in 2019 to 34.4 cases per 100 thousand inhabitants in 2020 (PORTO ALEGRE, 2023). These indicators suggest that

at the beginning of the COVID-19 pandemic there were fewer diagnoses of syphilis and, consequently, more cases of vertical transmission (PORTO ALEGRE, 2023).

R17-Planalto was responsible for more than half of the total cases of CS registered in the entire North Macro-region. The municipality of Passo Fundo, with the largest resident population, reported 87.4% of the cases, corresponding to an incidence rate of 20.52 cases per 1,000 children under one year of age. This incidence profile is possibly due to the presence of two hospitals with reference maternity hospitals for high complexity in the city and their own epidemiological surveillance sectors, which carry out an active search for cases.

The Macro-regional Health Plan of RS highlights that in the health regions with the greatest supply of hospital services, there is less coverage of Primary Health Care (PHC) (RIO GRANDE DO SUL, 2022), possibly due to the greater contribution of resources in the tertiary sector, resulting in underreporting of syphilis in pregnant women in PHC and an increase in the number of syphilis in newborns when they are tested at the time of delivery.

The 2022 indicators published by the State Health Department of Rio Grande do Sul validate those found in our study: R17-Planalto had the highest numbers of syphilis in pregnant women and children under 1 year of age in the period from 2016 to 2020 (RIO GRANDE DO SUL, 2022). Although R15-Caminho das Águas had the lowest absolute number of cases, it showed an increasing trend of infection in pregnant women in the same period (Table 2) (RIO GRANDE DO SUL, 2022).

The analysis of the mean incidence rates of CS in children under one year of age showed a distancing of the Northern Macro-region from the goals established by the Pan American Health Organization and the Ministry of Health. Since 2015, a reduction in vertical transmission to 0.5 cases per 1,000 live births is expected, and this goal has been ratified for the year 2030 (PAHO, 2017; BRAZIL, 2022). Our findings are in line with the evidence of Domingues et al. (2016), who used data from all over Brazil and detected an estimated incidence of CS more than six times higher than the elimination target proposed for the year 2015 (DOMINGUES et al., 2016).

Prenatal care is a fundamental strategy to change this scenario and positively impact epidemiological indicators. PHC aims to welcome pregnant women early, ensuring maternal, paternal, neonatal well-being and the early diagnosis of diseases, including syphilis. However, without access to the health system through this "gateway", the quality of care is compromised (CAVICHOLI *et al.*, 2024).

Prenatal care and screening for syphilis and other sexually transmitted infections represent two of the seven indicators of the Ministry of Health's Previnhe Brasil Program, with the following goals for the year 2022: to ensure that 45% of pregnant women have at least 6 (six) prenatal consultations, from the 1st (first) to the 12th (twelfth) week of pregnancy; at least 60% of pregnant women are tested for syphilis and HIV. Failure to comply with these performance indicators compromises the transfer of financial resources to PHC (BRASIL, 2022).

The maternal and child care line is directly influenced by PHC care coverage: if it is low, the number of pregnant women who depend on the public health system for prenatal care will be below what is desired.

In 2019, the government of the state of Rio Grande do Sul released the distribution of PHC coverage rates in the North Macro-region, being 97.07% in R15-Caminho das Águas, 88.20% in R16-Alto Uruguai Gaúcho, 67.74% in R17-Planalto, 90.16% in R18-Araucarias, 98.70% in R19-Botucaraí and 93.85% in R20-Rota da Produção (RIO GRANDE DO SUL, 2020). When comparing the average CS incidence rates between the regions, it can be seen that those with smaller municipalities had the best PHC coverage and had the lowest CS incidence rates. Araújo et al. (2018) found a similar situation in the Brazilian state of Pará, in which the average PHC coverage was 73.17%. They also report that the lack of bonding with women, common in large centers, contributes to the loss of pregnancy monitoring, in addition to hindering the active search for cases of acquired syphilis and/or congenital syphilis in this population group (ARAÚJO et al., 2018).

The R17-Planalto had an average incidence rate 2.17 times higher than that recorded in the entire North Macro-region. This is probably because the region is home to larger municipalities, such as Passo Fundo and Carazinho, which may reflect in difficulties in pregnant women's access to prenatal services, given that PHC coverage is less than 70%. R15-Caminho das Águas had the lowest average incidence rate with 0.93 cases per 1,000 and PHC coverage close to 100%, corroborating the positive influence of prenatal care in PHC.

The observation of the temporal trend of CS cases throughout the North Macro-region showed that five of its 6 health regions showed an increasing trend. R19-Botucaraí was the only one to show a stationary trend (Table 2), which may reflect the wide coverage and effectiveness of PHC. In other words, as already argued, we assume that the fact that

smaller regions offer better access to prenatal care with early detection and treatment of syphilis cases in PHC services results in a reduction in the risks of vertical transmission.

Throughout the Macronorte region, the occurrence of congenital syphilis was predominant in females compared to males, both with an increasing trend and white skin color prevailed (Table 1). This scenario was also observed in a study carried out in Santa Catarina between 2011 and 2021 (FERREIRA et al., 2021). On the contrary, in Paraná, between 2012 and 2020, a predominance of cases was detected in males, but with similar skin color to the other two places (SOUZA et al., 2023). The higher occurrence of cases in white children in the South region may be due to predominantly European colonization (DE BRITO et al., 2022). In the case of pregnant women, in states such as Rio de Janeiro and Bahia, a higher prevalence of gestational syphilis was demonstrated in non-white women, which may also be related to local colonization (DOMINGUES et al., 2013; SOARES et al., 2021).

Domingues et al. (2021) found that most cases of CS are due to failures in testing during prenatal care or inadequate treatment and/or absence of maternal syphilis. The Clinical Protocol and Therapeutic Guidelines for Comprehensive Care for People with Sexually Transmitted Infections (STIs) of the Ministry of Health determines that all newborns born to mothers with syphilis during pregnancy should undergo a non-treponemal test on peripheral blood, with the immediate postpartum being the best time for testing. It also emphasizes the need for greater attention to intrapartum screening (BRASIL, 2022). It is likely that the increasing trend of CS in the age group up to 6 days of age evidenced in this study is a reflection of the diagnoses made in the maternity ward.

Regarding the final classification of the cases, the diagnostic category of congenital syphilis predominated, and few cases were classified as miscarriage/stillbirth. This situation is supposedly related to the self-sufficiency of the Northern Macro-region ensuring access to adequate treatment and support measures for the newborn.

Brazil, by joining the 2030 Agenda, is committed to aligning its policies and actions with the principles and goals defined by the Sustainable Development Goals (SDGs) (UN, 2015), but faces several challenges due to social and geographical diversity. Silva and Canevari (2024) emphasize the need for health policies to promote the implementation of the principles of equity, universality, and social justice, despite challenges and limitations such as insufficient funding and regional inequalities.

Within the scope of SDG 3 - Health and Well-being, it implies ensuring universal access to health services, materializing the principles of universality, integrality and equity, mitigating historically existing disparities. The improvement of SDG indicator 3.2 is directly linked to the prevention, detection, and appropriate treatment of CS in Brazil. Public health strategies, such as adequate prenatal care, testing of pregnant women, and active search for cases are essential to prevent vertical transmission of the disease.

One limitation of this study is inherent to the use of secondary databases (DATASUS - Sinan) that depend on the notifications of diseases carried out by the municipalities, in addition to the risk of loss to follow-up of the mother and newborn in PHC. Therefore, it is essential to promote the continuing education of health teams that are on the front line of maternal and child care so that they understand the relevance of adequately filling out the instruments that directly interfere in the analysis of the health situation in public management.

Knowing and analyzing the epidemiological profile of CS cases in the Northern Macro-region of Rio Grande do Sul (RS), the objective of the present study, allows directing efforts and adjusting the allocation of resources, in addition to assisting in the prevention of outbreaks and epidemics. In addition, the analysis of the mean annual incidence rates and the temporal trend of CS, according to the sociodemographic and clinical profile of the children, are essential tools for the development of public policies for the control of CS.

CONCLUSION

The occurrence of congenital syphilis in the Northern Macro-region of Rio Grande do Sul, from 2010 to 2019, was higher in female children of white skin color, with a predominant diagnosis up to 6 days of life and evolution in the "alive" category.

Municipalities with larger populations and lower coverage of Primary Health Care (PHC) had a higher incidence of CS, probably due to difficulties in ensuring access to prenatal care and postpartum follow-up. The region showed an increasing evolution in CS indicators, signaling the need to qualify the maternal and child care line.

To this end, more in-depth studies on the reality of CS are necessary so that managers can know the behavior of *Treponema pallidum* infection and make decisions based on epidemiological indicators, optimizing resources and qualifying health care in the search for the eradication of CS and in the fulfillment of the goals established by the Sustainable Development Goals/2030 Agenda.

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CONFLICTS OF INTEREST

All authors declared that there was no potential conflict of interest regarding this article.

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