

# Syphilis Trend in Pregnant and Congenital Municipalities in the Central South Health Region, Goiás, 2007-2018<sup>1</sup>

## Tendência de Sífilis em Gestante e Congênita nos municípios da Região de Saúde Centro Sul, Goiás, 2007-2018

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### Abstract

**Objective:** to estimate trends in the detection of syphilis in pregnant and congenital women in the municipalities of the Centro Sul de Goiás Health Region. **Methods:** epidemiological study of time series with data on syphilis notifications from 2007 to 2018. Data obtained from the Diseases and Notifications System, available on the website of the Unified Health System Database (DATASUS). **Results:** 1,217 syphilis cases were identified in pregnant women and 362 cases of congenital syphilis. The detection rate of syphilis in pregnant women was increasing for Aparecida de Goiânia, Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Cristinópolis, Edeia, Indiara, Jandaia, Leopoldo de Bulhões, Orizona, Senador Canedo, Vianópolis and Vicentinópolis. The detection rate of congenital syphilis was increasing for Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Leopoldo de bulhões and Orizona. **Conclusions:** the incidence of syphilis suggests failures in health care and indicates the need for new strategies to reduce disease transmission.

**Keywords:** congenital syphilis; pregnancy; time series studies.

### Resumo

**Objetivo:** estimar tendências de detecção da sífilis em gestante e congênita nos municípios da Região de Saúde Centro Sul de Goiás. **Métodos:** estudo epidemiológico de séries temporais com dados de notificações de sífilis de 2007 a 2018. Dados obtidos do Sistema de Informação de Agravos de Notificação, disponível no site do Banco de Dados do Sistema Único de Saúde (DATASUS). **Resultados:** identificou-se 1.217 casos de sífilis em gestante e 362 casos de sífilis congênita. A taxa de detecção de sífilis em gestante foi crescente para Aparecida de Goiânia, Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Cristinópolis, Edeia, Indiara, Jandaia, Leopoldo de Bulhões, Orizona, Senador Canedo, Vianópolis e Vicentinópolis. A taxa de detecção de sífilis congênita foi crescente para Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Leopoldo de bulhões e Orizona. **Conclusões:** a incidência de sífilis sugere falhas na assistência à saúde e indica a necessidade de novas estratégias para redução da transmissão da doença.

**Palavras-chave:** sífilis congênita; gravidez; estudos de séries temporais.

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## Introduction

Maternal syphilis has become a serious public health problem worldwide<sup>1</sup>. Early detection of syphilis in pregnant women is essential to prevent vertical transmission and consequent malformations in the fetus. In Brazil, in 2017, the detection rate of syphilis in pregnant women (SPW) was 16.2/1,000 live births and in Goiás for the same year, the rate was 15.0/1,000 live births<sup>2</sup>.

The notification of congenital syphilis (CS) cases has also increased in all regions of the country, with an incidence rate of 8.2 cases per thousand live births in Brazil and 4.4 cases per thousand live births in Goiás in 2017<sup>2</sup>.

Vertical transmission occurs at any gestational stage, being influenced by the stage of infection in the mother and the time the fetus was exposed and can entail consequences, such as abortion, stillbirth, preterm birth, neonatal death, and early or late congenital manifestations<sup>3</sup>.

The treatment of diagnosed cases promotes the remission of signs and symptoms within a few days, and the only safe and effective option for the proper treatment of pregnant women is the drug benzylpenicillin benzathine<sup>4</sup>.

Congenital syphilis is 100% preventable, as long as the pregnant woman is identified and the recommended measures are taken in a timely manner. With the increase in the number of syphilis cases, Brazil has established, as of 2016, the Strategic Actions Agenda for Syphilis Reduction, with emphasis on the qualification of epidemiological surveillance<sup>3</sup>.

The increase in the detection rate of maternal syphilis in developing countries contributes to the development in infant mortality rates, a situation that if not modified will translate into the regression of the results already achieved

by Reproductive Health Plans worldwide. Accordingly, this study aims to analyze the magnitude and trend of the detection rate of syphilis in pregnant women and the detection rate of congenital syphilis in the municipalities of the South-Central Health Region, in the period from 2007 to 2018.

## Materials and Methods

### Sample and type of study

An ecological time-series study using data of maternal and congenital syphilis notifications in the municipalities of the South-Central Health Region of Goiás, occurring in the period from 2007 to 2018.

The state of Goiás is composed of 18 Health Regions: South Central, Estrada de Ferro, South, North, Serra da Mesa, São Patrício I, Pirineus, São Patrício II, Central, West I, West II, Rio Vermelho, North Entorno, South Entorno, Northeast I, Northeast II, Southwest I, Southwest II.

The South Central Health Region is part of the Central Southeast macro-regional and is composed of 25 municipalities: Aparecida de Goiânia, Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Caldazinha, Cezarina, Cristianópolis, Cromínia, Edealina, Edéia, Hidrolândia, Indiara, Jandaia, Leopoldo de Bulhões, Mairipotaba, Orizona, Piracanjuba, Pontalina, Professor Jamil, São Miguel do Passa Quatro, Senador Canedo, Silvânia, Varjão, Vianópolis, and Vicentinópolis.

### Research design

Data on maternal and congenital syphilis notifications were obtained from the Information System of Diseases and Notifications (SINAN). Data regarding the live birth population were obtained from the Live Births Information System

(SINASC) available on the website of the Data Bank of the Single Health System (DATASUS).

### **Inclusion and Exclusion Criteria**

All maternal and congenital syphilis notifications in the municipalities of the South-Central Health Region of Goiás were included.

### **Procedimentos**

Os dados foram extraídos em 10 de outubro de 2019 e tabulados usando-se o programa Microsoft Excel. As análises estatísticas foram executadas com utilização do programa estatístico Stata (Stata Statistical Software: Release 13, College Station, TX: StataCorp LP), versão 13.

Foram calculadas as taxas anuais de detecção para sífilis materna e taxas anuais de incidência para sífilis congênita por 1.000 nascidos vivos (NV).

Por sua vez, as taxas anuais foram utilizadas para a análise de tendência. O método de Prais-Winsten para regressão linear generalizada foi utilizado para quantificar as tendências para cada município.

Este método foi o preferido, em vez da regressão linear simples, por se tratar de um procedimento de análise de regressão linear generalizada especialmente delineado para dados que possam ser influenciados pela autocorrelação serial, o que frequentemente ocorre em medidas de dados populacionais. Por meio da regressão de Prais-Winsten, foi possível obter o valor de  $b$ , referente à inclinação

da reta. A significância estatística foi dada pela comparação entre o valor de  $P$  e o valor dado pela curva normal padrão ( $t$ ) e pelo intervalo de confiança de 95% (IC95%). Foi calculada a Taxa de Incremento Anual (TIA) para cada uma das séries, de modo a ser facilitada a comparação entre elas. Foram calculados, também, os limites inferior (LI) e superior (LS) do intervalo de confiança de 95% desta taxa.

Não houve necessidade de submissão ao Comitê de Ética em Pesquisa, uma vez que se trata de um estudo que utiliza dados secundários, sem identificação dos participantes. A Resolução do Conselho Nacional de Saúde (CNS) no 466, de 12 de dezembro de 2012, foi atendida<sup>4</sup>.

### **Results**

From 2007 to 2018, 1,217 cases of syphilis in pregnant women were identified. Cases were most frequently detected in the 2nd trimester (39.5%) and 3rd trimester (36%) of gestation. Most mothers (53.7%) were between 20 and 29 years old, and 25.3% of the notifications were filled out as unknown education, followed by incomplete high school (18.6%) and complete high school (17.8%). The race/color brown was the most frequent (53.2%). The drug regimen used for treatment was filled in as ignored for most cases (99.3%) and the clinical classifications with the highest frequencies were latent syphilis (37.4%) and primary syphilis (32.8%) (Table 1).

Table 1. Epidemiological characteristics of syphilis cases in pregnant women in the municipalities of the South Central Health Region, period 2007 to 2018.

<b>Variables</b>	<b>N</b>	<b>%</b>
<b>Gestational Age</b>		
1° Trimester	256	21,0
2° Trimester	481	39,5
3° Trimester	438	36,0
Ignored	42	3,5
<b>Age</b>		
10 to 14 years	14	1,2
15 to 19 years	274	22,5
20 to 29 years	653	53,7
30 to 39 years	259	21,3
40 years or more	17	1,4
Ignored	0	0,0
<b>Education</b>		
Illiterate	4	0,3
1st to 4th grades incomplete	41	3,4
4th grade complete	50	4,1
5th to 8th grade incomplete	212	17,4
Elementary School Complete	132	10,8
Incomplete High School	226	18,6
High School Complete	217	17,8
Superior Incomplete	16	1,3
Superior Complete	11	0,9
Not applicable	0	0,0
Ignored	308	25,3
<b>Race or Color</b>		
White	325	26,7
Black	132	10,8
Yellow	41	3,4
Brown	647	53,2
Indigenous	4	0,3
Ignored	68	5,6
<b>Treatment Scheme</b>		
Penicillin	8	0,7
Other	1	0,1
Not performed	0	0,0
Ignored	1208	99,3
<b>Clinical Classification</b>		
Primary Syphilis	399	32,8
Secondary Syphilis	74	6,1
Tertiary Syphilis	145	11,9
Latent Syphilis	455	37,4
Ignored	144	11,8
<b>Total</b>	<b>1217</b>	<b>100,0</b>

In the analyzed period, 362 notified cases of congenital syphilis were identified. Most were in children less than 7 days old (94.8%), with a final

diagnosis of recent congenital syphilis (94.2%). Partner treatment was not performed for most cases (59.1%) (Table 2).

Table 2. Epidemiological characteristics of congenital syphilis cases in the municipalities of the South Central Health Region, period 2007 to 2018.

Variables	N	%
<b>Child's Age</b>		
Less than 7 days	343	94,8
7 to 27 days	6	1,7
28 to 364 days	9	2,5
1 year	1	0,3
2 to 4 years	0	0,0
5 to 12 years	0	0,0
Ignored	3	0,8
<b>Final Diagnosis</b>		
Early onset congenital syphilis	341	94,2
Late syphilis congenita	5	1,4
Syphilis abortion	7	1,9
Stillbirth due to syphilis	9	2,5
<b>Mother's Age Group</b>		
10 to 14 years	4	1,1
15 to 19 years	78	21,5
20 to 29 years	181	50,0
30 to 39 years	52	14,4
40 years or more	2	0,6
Ignored	45	12,4
<b>Mother's Education</b>		
Illiterate	7	1,9
1st to 4th grade incomplete	27	7,5
4th grade complete	5	1,4
5th to 8th grade incomplete	79	21,8
Elementary School Complete	23	6,4
Incomplete High School	42	11,6
High School Complete	26	7,2
Superior Incomplete	5	1,4
Superior Complete	1	0,3
Not applicable	5	1,4
Ignored	142	39,2
<b>Mother's Race or Color</b>		
White	35	9,7
Black	11	3,0
Yellow	19	5,2

Brown	176	48,6
Indigenous	0	0,0
Ignored	121	33,4
<b>Realization of prenatal care</b>		
Yes	262	72,4
No	56	15,5
Ignored	44	12,2
<b>Moment of diagnosis of maternal syphilis</b>		
During prenatal care	170	47,0
At the time of child-birth/curettage	106	29,3
After the child-birth	32	8,8
Not performed	3	0,8
Ignored	51	14,1
<b>Maternal treatment regimen</b>		
Adequate	32	8,8
Inadequate	211	58,3
Not Performed	73	20,2
Ignored	46	12,7
<b>Partner treated</b>		
Yes	84	23,2
No	214	59,1
Ignored	64	17,7
<b>Total</b>	<b>362</b>	<b>100</b>

Regarding the characteristics of mothers, there was a higher frequency of notifications among mothers of brown race/color (48.6%), age group 20 to 29 years old (50.0%), and education was filled in as ignored in 39.2% of cases, followed by 5th to 8th grade (21.8%). Most mothers had prenatal care (72.4%), with a diagnosis of maternal syphilis during prenatal care (47.0%) and at the time of childbirth/ curettage (29.3%). The treatment regimen was considered inadequate in 58.3% of cases.

The highest detection rates of syphilis in pregnant women observed were in the year 2017 for the municipalities of Cristinópolis (74.1/1,000 LV), Vianópolis (69.5/1,000 NV), and Leopoldo de Bulhões (63.2/1,000 LV) and the lowest was in the municipality of Mairipotaba as it had no reported cases in the studied period (Table 3).

Table 3. Magnitude and trend of maternal syphilis detection rates per 1,000 live births according to the municipality of residence. South Central Health Region, 2007-2018.

City	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TIA %	P-value	IC 95%		Trend
															Inferior Limit	Upper Limit	
Aparecida de Goiânia	2,1	3,4	3,1	4,2	5,5	8,4	7,3	11,4	11,5	14,9	16,1	9,4	0,2	0,000	0,1	0,3	growing
Aragoiânia	0,0	0,0	0,0	0,0	0,0	8,5	23,6	8,8	6,6	13,2	39,5	7,9	0,4	0,002	0,1	0,6	growing
Bela Vista de Goiás	0,0	0,0	3,3	3,4	3,5	2,8	8,2	2,7	9,5	7,1	4,8	8,7	0,2	0,000	0,1	0,3	growing
Bonfinópolis	0,0	0,0	9,9	0,0	0,0	0,0	9,2	8,8	33,6	8,4	25,2	17,7	0,3	0,003	0,1	0,6	growing
Caldazinha	0,0	0,0	0,0	0,0	0,0	50,0	0,0	0,0	0,0	23,3	0,0	20,8	0,2	0,072	0,0	0,4	stable
Cezarina	11,6	0,0	0,0	0,0	17,2	15,4	7,8	24,2	27,6	0,0	27,6	0,0	0,1	0,490	-0,2	0,4	stable
Cristianópolis	0,0	0,0	0,0	0,0	0,0	0,0	0,0	52,6	0,0	37	74,1	0,0	0,4	0,003	0,2	0,7	growing
Cromínia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	27,8	0,0	0,1	0,053	0,0	0,3	stable
Edealina	0,0	0,0	0,0	0,0	0,0	0,0	21,3	0,0	0,0	0,0	0,0	0,0	0,0	0,878	-0,1	0,2	stable
Edéia	0,0	0,0	0,0	0,0	6,6	0,0	0,0	8,1	7,5	22,4	22,4	6,7	0,3	0,001	0,2	0,6	growing
Hidrolândia	0,0	10,1	4,8	0,0	4,7	8,6	14,4	12,9	9,1	6,1	6,1	3,3	0,1	0,275	-0,1	0,3	stable
Indiara	0,0	0,0	0,0	0,0	9,3	0,0	34,3	20	3,8	7,6	15,3	0,0	0,2	0,037	0,0	0,5	growing
Jandaia	0,0	0,0	0,0	11,6	0,0	13,9	14,7	31,3	21,3	0,0	21,3	13,5	0,3	0,027	0,0	0,6	growing
Leopoldo de Bulhões	0,0	0,0	12,8	0,0	0,0	0,0	0,0	9,8	0,0	16,7	63,2	31,6	0,4	0,027	0,0	0,8	growing
Mairipotaba	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,000	0,0	0,0	stable
Orizona	0,0	5,6	0,0	0,0	0,0	6,1	6,5	5,8	10,4	10,4	5,2	4,9	0,2	0,026	0,0	0,4	growing
Piracanjuba	0,0	0,0	7,2	4,2	3,6	4,6	3,9	0,0	4,0	4,0	7,9	4,1	0,1	0,186	0,0	0,2	stable
Pontalina	0,0	4,9	6,1	5,9	5,4	5,3	23	0,0	20,6	0,0	10,3	4,8	0,0	0,592	-0,1	0,1	stable
Professor Jamil	0,0	0,0	0,0	0,0	0,0	0,0	0,0	35,7	41,7	41,7	41,7	0,0	0,3	0,203	-0,1	0,8	stable
São Miguel do Passa Quatro	0,0	0,0	0,0	0,0	0,0	0,0	0,0	27,8	24,4	0,0	0,0	0,0	0,1	0,618	-0,2	0,4	stable
Senador Canedo	0,0	3,3	3,0	2,7	1,8	7,6	6,2	4,1	11,2	12,5	16,0	11,0	0,2	0,000	0,2	0,3	growing
Sillvânia	4,1	5	7,7	0,0	0,0	7,8	0	0	8,1	12,1	24,3	0,0	0,0	0,715	-0,2	0,3	stable
Varjão	0,0	0,0	0,0	0,0	0,0	0,0	87	0,0	0,0	0,0	0,0	0,0	0,0	0,878	-0,2	0,3	stable
Vianópolis	0,0	0,0	0,0	11,9	5,1	11,5	12,2	27	0,0	16	69,5	35,7	0,4	0,005	0,1	0,7	growing
Vicentinópolis	0,0	0,0	0,0	0,0	0,0	0,0	18,5	7,8	9,5	38,1	28,6	0,0	0,3	0,029	0,0	0,7	growing

The SPW detection rate was increasing in Aparecida de Goiânia (ARI= 0.2%; p =0.000), Aragoiânia (ARI = 0.4%; p =0.002), Bela Vista de Goiás (ARI = 0.2%; p =0.000), Bonfinópolis (ARI = 0.3%; p =0.003), Cristinópolis (ARI = 0.3%; p =0.003), Edeia (ARI = 0.3%; p =0.001), Indiara (ARI = 0.2%; p =0.037), Jandaia (ARI = 0.3%; p =0.027), Leopoldo de Bulhões (ARI = 0.4%; p =0.027), Orizona (ARI = 0.2%; p =0.026), Senador Canedo (ARI = 0.2%; p =0.000), Vianópolis (ARI =

0.4%; p =0.005), and Vicentinópolis (ARI = 0.3%; p =0.029).

The highest congenital syphilis detection rates were observed in the municipalities of Mairipotaba (47.1/1,000 LV) and São Miguel do Passa Quatro (47.1/1,000 LV) in 2007 and the lowest in the municipality of Caldazinha, Cromínia, Edealina, Edeia, Jandaia, Piracanjuba, and Professor Jamil, since no cases were reported during the study period (Table 4).



Table 4. Magnitude and trend of incidence rates of congenital syphilis per 1,000 live births according to the municipality of residence. South Central Health Region, 2007-2018.

City	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TI A %	P- value	IC 95%		Trend	
															Infe rior Li mit	Upper Limit		
Aparecida de Goiânia	3,9	0	0,4	0,4	0,9	1,5	2,1	2,4	5,8	6,5	6,0	3,0	1,3	0,438	-0,1	0,4	stable	
Aragoiânia	0	0	0	0	0	0	7,9	0	6,6	0	13,2	0	0,7	0,000	0,1	0,2	growing	
Bela Vista de Goiás	0	0	0	0	3,5	0	0	0	4,8	2,4	4,8	0	0,6	0,024	0,0	0,2	growing	
Bonfinópolis	0	0	0	0	0	0	9,2	0	8,4	0	8,4	0	0,7	0,001	0,1	0,2	growing	
Caldazinha	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Cezarina	0	0	0	0	0	0	0	0	6,9	6,9	0	0	0,8	0,381	-0,1	0,2	stable	
Cristianópolis	0	0	0	0	0	0	0	0	0	37	0	0	1,0	0,194	-0,1	0,3	stable	
Cromínia	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Edealina	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Edéia	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Hidrolândia	0	0	0	0	0	0	0	3,2	3,0	3,0	3,0	0	0,6	0,203	0,0	0,2	stable	
Indiara	0	0	0	0	0	0	8,6	12	0	0	0	0	0,9	0,806	-0,2	0,3	stable	
Jandaia	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Leopoldo de Bulhões	0	0	0	0	0	0	0	9,8	0	0	16,7	0	0,8	0,014	0,0	0,3	growing	
Mairipotaba	41,7	0	0	0	0	0	0	0	0	0	0	0	0,1	0,113	-0,3	0,0	stable	
Orizona	0	0	0	0	0	0	6,5	5,8	0	5,2	10,4	0	1,1	0,016	0,0	0,3	growing	
Piracanjuba	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
Pontalina	0	0	0	0	5,4	0	0	0	0	0	5,2	0	0,4	0,391	-0,1	0,1	stable	
Professor Jamil	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0,000	0,0	0,0	stable	
São Miguel do Passa																		stable
Quatro	41,7	0	0	0	0	0	0	0	0	0	0	0	0,1	0,113	-0,3	0,0		
Senador Canedo	2,3	0	0	0	0,6	0	1	0,5	3,5	3,9	3	1,3	0,6	0,517	-0,1	0,2	stable	
Silvânia	0	0	0	0	0	0	0	0	0	4	8,1	0	0,7	0,088	0,0	0,2	stable	
Varjão	0	0	0	0	0	0	0	20,4	0	0	0	0	0,6	0,636	-0,1	0,2	stable	
Vianópolis	0	0	0	0	0	0	0	0	0	0	10,7	0	0,6	0,636	-0,1	0,2	stable	
Vicentinópolis	0	0	0	0	0	0	0	7,8	0	0	0	0	0,5	0,053	0,0	0,2	stable	

The CS detection rate was increasing for Aragoiânia (ARI = 0.7%;  $p = 0.000$ ), Bela Vista de Goiás (ARI = 0.6%;  $p = 0.024$ ), Bonfinópolis (ARI = 0.7%;  $p = 0.001$ ), Leopoldo de bulhões (ARI = 0.8%;  $p = 0.014$ ) and Orizona (ARI = 1.1%;  $p = 0.016$ ).

## Discussion

During the study period, most cases of syphilis in pregnant women were detected in mothers aged 20-29 years and of mixed race/color. Similar results were found in a cohort study carried out in Belo Horizonte<sup>5</sup>, and a study carried out in the city of Montes Claros, Minas Gerais<sup>6</sup>.

The SPW detection rate was increasing for Aparecida de Goiânia, Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Edeia, Indiara, Jandaia, Orizona, and Senador Canedo. The highest detection rates observed were in the year 2017 for the municipalities of Cristinópolis, Vianópolis, and Leopoldo de Bulhões. Due to the high incidence of GS in this study, it is assumed that difficulties still persist in the diagnosis, management of the disease, capture, and treatment of partner(s), this being one of the major challenges for the control of syphilis in the country<sup>5</sup>.

The detection and treatment of syphilis in pregnant women represent important Public Health measures, essential for the control and prevention of congenital syphilis. In this sense, the Family Health Strategy professionals has an important role in the application of corrective measures for the control of vertical transmission of syphilis, by performing routine tests and reducing adverse events, such as premature births, abortions, and stillbirths<sup>3,5</sup>.

It is known that the diagnosis of primary syphilis in pregnant women is rare, since its manifestation, the hard

canker, has a limited and short time of permanence, and may appear in non-visible regions of the genitalia or outside the genital region. For this reason, it is believed that the vast majority of diagnoses occur in the latent or late stage<sup>7</sup>. However, this study has revealed that the clinical classifications with higher frequencies were latent syphilis and primary syphilis.

The drug regimen used for treatment was filled in as ignored for most cases (99.3%), which shows the low quality of the data for this variable. However, for the treatment of syphilis, benzylpenicillin benzathine is the drug of choice and is the only drug with documented efficacy for syphilis during pregnancy. Although the administration of only one dose of benzathine penicillin is not appropriate for pregnant women with tertiary or late latent forms of the disease and is considered an inadequate treatment by the Ministry of Health, the guarantee of this first dose would allow the reduction of adverse perinatal outcomes associated with syphilis infection, although it would not result in reduced incidence of congenital syphilis cases in the country<sup>3</sup>.

The pregnant woman with syphilis should be treated immediately, as should her sexual partners. Therefore, the most effective infection control measure is to comply with the recommendations in the Clinical Protocol and Therapeutic Guidelines (PCDT) for prevention of mother-to-child transmission of HIV, syphilis, and viral hepatitis, and in the PCDT for comprehensive care of people with STIs. Control measures should cover the moments before and during pregnancy, as well as the moment of hospitalization for childbirth or abortion curettage<sup>3</sup>.

In this study, most mothers had prenatal care, with the diagnosis of maternal syphilis in this, detected more

frequently between the 2nd trimester and 3rd trimester of gestation. Therefore, these results show that the control of syphilis and pregnant women was deficient, which may lead to a high incidence of congenital syphilis, vertical transmission rate, and occurrence of negative outcomes since the therapeutic treatment scheme was considered inadequate for most cases. Another explanation for this result would be the fact that pregnant women probably started prenatal care after the first trimester of pregnancy, a factor associated with a higher risk of congenital syphilis<sup>5</sup>.

The World Health Organization (WHO) and the Pan American Health Organization (PAHO) have the goal of eliminating congenital syphilis, defined as the occurrence of 0.5 or fewer cases of congenital syphilis per thousand live births<sup>8,9</sup>, this role has been using by the Ministry of Health<sup>10</sup>, however, it was observed in this study that in some municipalities the CS incidence rate reached 47.1/1,000 NV (Mairipotaba and São Miguel do Passa Quatro) in 2007, with an increasing incidence trend for five municipalities in the South-Central Health Region: Aragoiânia, Bela Vista de Goiás, Bonfinópolis, Leopoldo de Bulhões, and Orizona.

Congenital syphilis can be prevented when the pregnant woman infected with syphilis is properly treated<sup>11-13</sup>. However, the difficulties encountered in the striving against congenital syphilis are numerous and, in order to better elucidate the main obstacles to the control of vertical transmission of the disease in the context of different Brazilian realities, the Ministry of Health encourages the creation of CS case investigation committees<sup>3, 13-16</sup>.

Treatment of pregnant women is considered adequate when it is carried

out with penicillin, completed 30 days before childbirth, using doses of medication according to the stage of the disease<sup>3</sup>. In this study, for most cases, the treatment was considered inadequate and the partner was not treated. Although partner treatment is no longer recommended for the adequate treatment of pregnant women, there is a high frequency of untreated partners. The Ministry of Health recommends that health professionals encourage men to undergo preventive examinations to detect possible diseases harmful to their health, to the health of the woman and the fetus<sup>3</sup>. Similar results were found in a study conducted in Fortaleza, Ceará, in which 85.0% of the SPW treatments were inadequate and 62.9% of the sexual partners were untreated or with ignored information<sup>7</sup>.

This study had some limitations for its development, such as the use of secondary data, conditioned to the quality of the records. A high number of blank data was evidenced, a possible reflection of the lack of registration by the professional. Furthermore, the use of secondary data from passive notification of syphilis cases may represent only a portion of the existing cases, and there is also the possibility of overestimating the number of cases due to the difficulties in investigating these cases to confirm the diagnosis.

Another limitation of this study is related to the information on the treatment of pregnant women since it was not possible to verify at what gestational age the treatment was carried out for what phase of the disease or the prescribed dose, and the time elapsed from the end of the treatment until childbirth, and what drug was used. Moreover, the low percentage of treated partners may be related to the number of ignored records, underestimating this information.

## Conclusion

The occurrence of syphilis still presents alarming levels and constitutes a challenge for all spheres of government, health professionals, and the population in general. Some municipalities in the South-Central Health Region present alarming detection rates of the disease in some periods.

Early detection, counseling, and awareness of condom use are feasible and affordable methods for the decline of the disease. The results of this research

have great epidemiological and strategic importance for health services.

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