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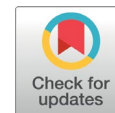HEALTH SCIENCES JOURNAL   e-ISSN 2236-3785

ORIGINAL ARTICLE

Acquired Syphilis: epidemiological profile of cases in state of Pará from 2017 to 2019

Sífilis Adquirida: perfil epidemiológico dos casos no estado do Pará de 2017 a 2019

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ABSTRACT

Objective: To quantify patients diagnosed with acquired syphilis and the prevalence of the disease in the state of Pará, Brazil, from January 2017 to June 2019, in addition to characterizing the demographic aspects of patients included in the sample.
Methods: observational, descriptive and cross-sectional study, conducted by reviewing the database of the Notifiable Diseases Information System made available by the State Health Department of Pará, of reported cases of acquired syphilis, in the defined period. This study included patients of both sexes, aged 18 years or older, who had acquired syphilis and were notified.
Results: 5,620 cases of acquired syphilis were reported, of which the majority were male (n = 3,229; 57.45%), mixed race (n = 4,058; 72.2%), low education (n = 2,250; 40%) and in the young adult range (18-30 years; n = 2,514; 44.74%). The highest concentration of cases was observed in the metropolitan mesoregion of Belém and the Lower Amazon.
Conclusions: Acquired syphilis is still prevalent and is characterized as a public health problem. Epidemiological surveillance needs to be constant, and more efficient public policies need to be employed in primary care to reduce the number of cases and make early diagnoses with appropriate treatment.

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PALAVRAS-CHAVE

Amazônia
Sífilis
Sífilis cutânea
Epidemiologia
Fatores de risco

RESUMO

Objetivo: Quantificar os pacientes com diagnóstico de sífilis adquirida e a prevalência da doença no estado do Pará, Brasil, de janeiro de 2017 a junho de 2019, além de caracterizar os aspectos demográficos dos pacientes inclusos na amostra.
Métodos: estudo observacional, descritivo e transversal, realizado por meio de revisão do banco de dados do Sistema de Informação de Agravos de Notificação disponibilizado pela Secretaria de Saúde do Estado do Pará, dos casos notificados de sífilis adquirida, no período delimitado. Incluiu-se neste estudo pacientes de ambos os sexos, com idade igual ou superior a 18 anos, que apresentaram a forma adquirida da sífilis e foram notificados.
Resultados: foram notificados 5.620 casos de sífilis adquirida no estado do Pará, dos quais a maioria era do sexo masculino (n = 3.229; 57,45%), raça parda (n = 4.058; 72,2%), baixa escolaridade (n = 2.250; 40%) e na faixa de adulto jovem (18-30 anos; n = 2.514; 44,74%). A maior concentração de casos foi observada na mesorregião metropolitana de Belém e no Baixo Amazonas.
Conclusões: A sífilis adquirida ainda é muito prevalente e se caracteriza como um problema de saúde pública. A vigilância epidemiológica precisa ser constante e políticas públicas mais eficientes precisam ser empregadas na atenção primária na tentativa de diminuir o número de casos e fazer diagnósticos precoces com adequado tratamento.

INTRODUCTION

Syphilis is a constant sexually transmitted infection (STI) and requires compulsory notification. In 2018, according to World Health Organization (WHO), it affected more than 12 million people per year worldwide, and its elimination continues to challenge the health systems of several countries. It should be notified as congenital syphilis, gestational syphilis and acquired syphilis. It was noted that Brazil and its regions showed increased detection rates of acquired syphilis between 2017 and 2018. The increase was 28.3% (from 59.1 to 75.8 cases per 100,000 inhabitants) in the country. Furthermore, growth was 59.3% in Northern Region (from 34.1 to 54.4 cases per 100,000 inhabitants)[1].

Syphilis is a systemic infection caused by a spirochete bacterium, *Treponema pallidum,* predominantly transmitted sexually or vertically. It is an infection that, without or with incorrect treatment, progresses to different phases and latency periods. WHO classifies the disease in early or late syphilis according to the elapsed period from infection to diagnosis[2].

Acquired syphilis develops and progresses in three phases: primary, secondary and tertiary. The agent penetrates the mucosa or injured skin and, after the incubation period (21 days), the lesions appear. Initially it is a unique painless papule with a clean bottom, firm and raised edges, classically anogenital, causing primary syphilis[3].

Secondary syphilis presents itself as a disseminated mucocutaneous eruption and generalized lymphadenopathy. It usually arises between 2 and 8 weeks after the disappearance of the primary ulcer. The lesions usually begin in the trunk or the proximal extremities as pink macules, which persist from a few days to 8 weeks, evolving into papules and, in some patients, to pustule lesions[3].

Tertiary syphilis is a slowly progressive disease that can affect any organ and produce clinical disease 20 to 40 years after initial infection[4].

Secondary syphilis occurs in 25% of untreated infected patients. Most lesions are not pruriginous. They can manifest different morphologies at the same time and affect any skin site, especially palms and plants; when affected, strongly suggest the diagnosis. In friction areas, papules can increase, coalesce and corrode, forming moist, painless, and highly infectious plates, called flat condylomas[5.]

The syphilis diagnosis is performed using serological tests that can be separated into treponemal and non-treponemal. Non-treponemal tests (VDRL and *Rapid Plasma Regain* - RPR) are nonspecific and can result positive in other diseases, their results are obtained faster, and costs lower. They are widely used in the screening and detection of diseases. Treponemal tests (FTA-ABS, *T. pallidum* hemagglutination - TPHA) are more specific and sensitive and become positive in the early disease stages; however, they are more expensive. To confirm syphilis diagnosis, both tests, treponemal and non-treponemal, should be used. In secondary syphilis, all antibody-seeking tests are reagents. At this disease stage, it is expected to find elevated titers in non-treponemal quantitative test[6].

According to the Brazilian Health Ministry[7], the drug of choice for syphilis treatment is benzathine G penicillin. The dose and time between doses depend on disease stages. Alternative drugs are doxycycline and ceftriaxone, which can be used when patients have allergy to penicillin. After the first dose of penicillin, Jarisch-Herxheimer's reaction may occur, characterized by skin lesions exacerbation, with erythema, pain, or itching, which regresses spontaneously after 12 to 24 h, without needing discontinuity treatment.

In Brazil, according to the Health Ministry Epidemiological Bulletin 2019[1] the rate of detection of acquired syphilis increased from 34.1 to 75.8 cases per 100.000 inhabitants, from 2015 to 2018. In the Northern region, the total number of cases in 2018 was 9,890 (6.3%), comprising 30.8 cases per 1,000 inhabitants in the Pará state, without underreporting cases. It is considered a public health challenge throughout the country, and since 2010, acquired syphilis is considered a compulsory notification disease.

Syphilis is a disease that often goes unnoticed in its primary phase, which culminates with its late diagnosis. Thus, this study sought to describe the acquired syphilis epidemiological characteristics

reported in the state of Pará to better know this disease distribution in the state and to be able to assist coping strategies in the Amazon region. Furthermore, it sought to correlate the disease prevalence in each Pará states mesoregion with their socioeconomic indices.

METHODS

Study characterization

This is an observational, descriptive, and cross-sectional study.

Search location and period

We used the Notifiable Diseases Information System (SINAN) database made available by the Department of Health of the State of Pará (SESPA), with notified acquired syphilis data from January 2017 to June 2019. The survey was conducted from July to August 2019. Data were collected by one researcher and analyzed by another.

Sample

The sample consisted of all notified cases of acquired syphilis in Pará state during the proposed period. SINAN included as acquired syphilis 1) asymptomatic individuals, with non-treponemal reagent test with any treponemal titration or reagent treponemal test and no prior treatment record, or 2) symptomatic patient with syphilis, with at least one treponemal or non-treponemal reagent test with any titration.

Ethical aspects

The research was conducted in compliance with the Declaration of Helsinki's precepts and the Nuremberg Code, and the Research Standards involving Human Beings (Res. CNS 466/12) of the National Health Council. The study is part of a larger Project approved by the Research Ethics Committee (REC) in human beings of the Institute of Health Sciences of the State University of Pará, under CAAE 90617218.5.0000.0018 (decision no. 2.765.506). The study only started after the REC approval.

Inclusion and exclusion criteria

It was included patients of both genres, aged 18 years or older, who presented the acquired syphilis and were notified. It was excluded those without treponemal or non-treponemal examination fields of the notification form filled out adequately.

Data collection

For data analysis, it was performed a review of the SINAN database of patients with acquired syphilis from January 2017 to June 2019 treated in the state of Pará, which met the inclusion criteria. The following variables were collected and analyzed: gender, age, self-declared race, schooling, case distribution by mesoregions (Low Amazon, Marajó, Metropolitan of Belém, Northeast, Southwest, and Southeast)[8], and notified cases of acquired syphilis. Incomplete notification forms have been excluded from work.

Data analysis

The sample was evaluated using descriptive statistical analysis through absolute and relative frequency distributions. For the evaluation between the observation years (2017, 2018 and 2019) G test was used. The chi-square test of adherence was used to assess the totality of data. In the evaluation presented, the chi-square test of adherence is valid because it assumes that there are no proportions that would be expected equal at a significant p-value. Thus, the use of the test in the context indicates that the categories presented have statistical differences exemplified by the epidemiological and territorial characteristics of the disease being studied. The G test, as shown, is used for the independence of the groups studied, where it would also indicate that variations would tend to occur only by sample variation, but that in the presence of significance, they could reflect public health actions, identification of new cases by screening or other variants also appropriate to the epidemiology or sociodemography of the disease. The tests were used according to the software's recommendation and following other published studies similar to this work[9]. The tables were made using MS Excel and Word 2016. The following formula was used to calculate the prevalence:

$$\text{Prevalence} = \frac{\text{cases number in the period}}{\text{territory population}} \times 100,000$$

The maps were created in the Qgis v. 2.18.20 software with a further edition in CorelDraw X7. All statistical inference was calculated in BioEstat v. 5.4, considering a significant p-value ≤ 0.05.

RESULTS

Five thousand six hundred twenty cases of acquired syphilis in Pará state occurred during the period analyzed, 1,675 occurred in 2017, 2,591 in 2018, and 1,354 until June 2019. Table 1 shows the predominance of male cases (n = 3,229; 57.45%), young adults aged 18–30 years (n = 2,514; 44.74%) and with elementary school 37.27%. More than half of cases were related to the brown race (n = 4,058; 72.20%), although many ignored cases were detected (11.16%). The distribution of cases was analyzed according to the state's mesoregion, and in the study period, the cases were concentrated in the metropolitan mesoregion of Belém, followed by the Northeast of Pará and Southeast of Pará (Figure 1). The number of cases was higher in 2018, showing more than 511 occurrences in the Northeast of Pará and more than 681 in the metropolitan area of Belém. Table 2 shows the analysis of the prevalence per 1,000 inhabitants in each mesoregion, with the Lower Amazon presenting a result of 103.98 per 100 thousand inhabitants (p < 0.0001) compared to other areas and the state itself.

Table 1 — Sociodemographic characteristics of patients with acquired syphilis, Pará, January 2017 to June 2019.

Features	2017		2018		2019		Total		p-value
	N	%	N	%	N	%	N	%	
Sex									
Male	965	57.61	1,472	56.81	792	58.49	3,229	57.45	0.5614*
Female	710	42.39	1,119	43.19	560	41.36	2,389	42.51	< 0.0001**
No information	-	-	-	-	2	0.15	2	0.04	
Total	1,675	100	2,591	100	1,354	100	5,620	100	
Age group									
18 to 30 years	733	43.76	1,164	44.93	617	45.57	2,514	44.74	0.8386*
31 to 40 years	384	22.93	541	20.88	297	21.94	1,222	21.74	< 0.0001**
41 to 50 years	259	15.46	410	15.82	208	15.36	877	15.60	
51 to 60 years	171	10.21	283	10.92	131	9.68	585	10.41	
60 years or older	128	7.64	193	7.45	101	7.46	422	7.51	
Total	1,675	100	2,591	100	1,354	100	5,620	100	
Race									
White	187	11.16	211	8.14	109	8.05	507	9.02	0.0016*
Black	122	7.28	164	6.33	67	4.95	353	6.28	< 0.0001**
Brown	1,249	74.57	1,902	73.40	907	66.98	4,058	72.20	
Yellow	7	0.42	32	1.24	4	0.30	43	0.77	
Indigenous	9	0.54	17	0.66	6	0.44	32	0.57	
No information	101	6.03	265	10.23	261	19.28	627	11.16	
Total	1,675	100	2,591	100	1,354	100	5,620	100	
Schooling									
Illiterate	59	3.52	70	2.70	26	1.92	155	2.76	< 0.0001*
Elementary school	617	36.83	1,041	40.17	437	32.27	2,095	37.27	< 0.0001**
High school	583	34.81	819	31.61	485	35.83	1,887	33.58	
Higher education	102	6.09	160	6.18	107	7.90	369	6.57	
No information	314	18.75	501	19.34	299	22.08	1,114	19.82	
Total	1,675	100	2,591	100	1,354	100	5,620	100	

*G test conducted between the 2017, 2018 and 2019 groups.
**Chi-square test of adherence performed between the Total group.

Table 2 — Prevalence (per 100,000 inhabitants) of acquired syphilis in the mesoregions and in the Pará state, January 2017 to June 2019.

Territory	Population	Prevalence (cases/100,000 inhab)	p-value*
Metropolitan Mesoregion	2,582,599	82.13	
Mesoregion Lower Amazon	804,010	103.98	
Marajó Mesoregion	443,941	19.60	
South Western Mesoregion	465,910	43.36	< 0.0001
Northeast Mesoregion	1,939,107	66.11	
Southeast Mesoregion	1,945,035	56.14	
Stop	8,180,602	68.70	

*Test of chi-square grip

DISCUSSION

Analyzing the number of syphilis cases acquired in Brazil from 2010 to June 2019, 650,258 cases were reported in SINAN, 4.9% in the North. Between 2017 and 2018, there was an increase of more than 50% in the curve of Brazil and North region, the latter even higher than the national increase[1]. It is possible to infer that the early diagnosis of the disease is still flawed, mainly because the local health networks present a deficient service to cover all the requirements of a disease classified as a public health problem. This culminates in
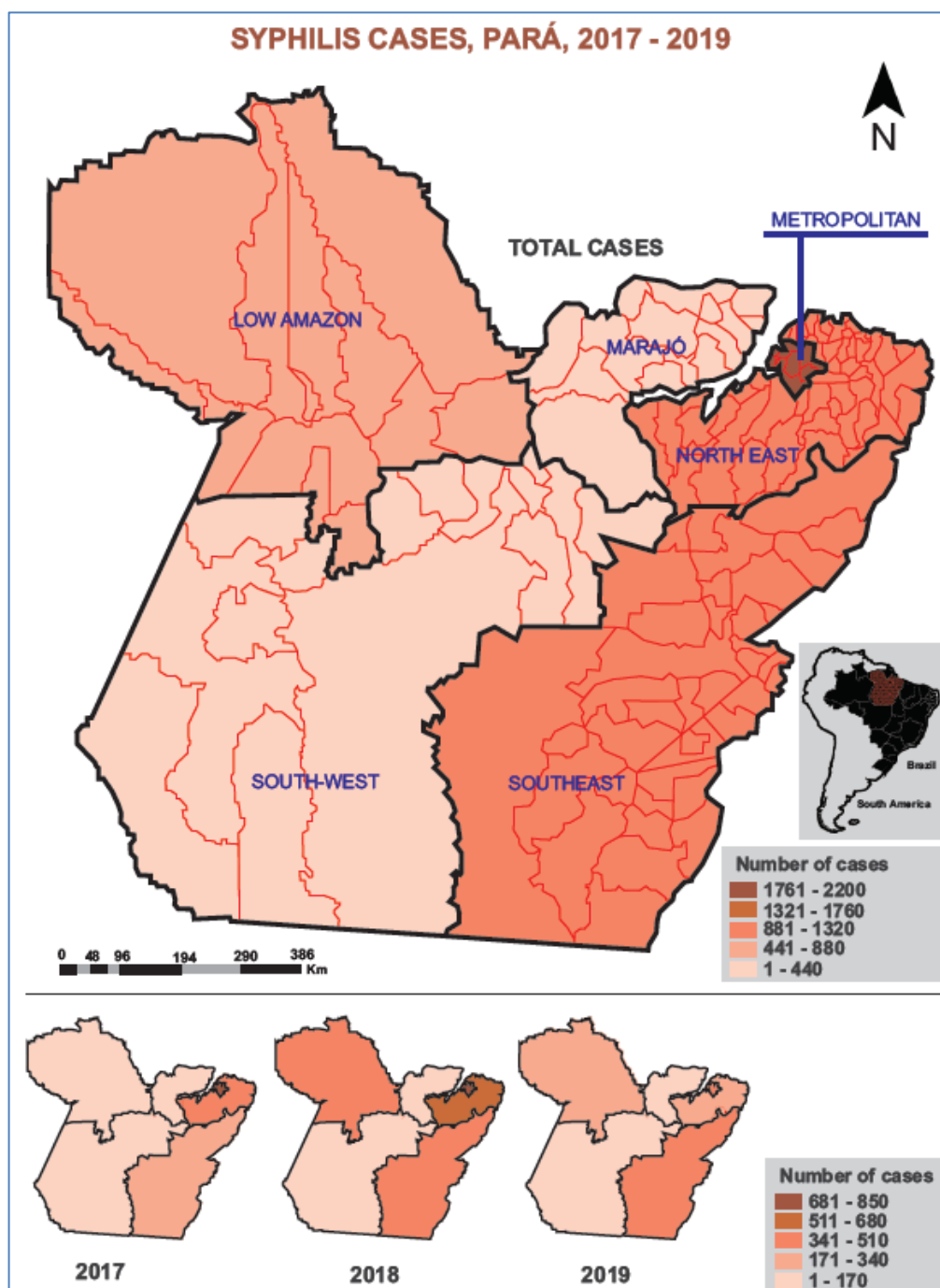
SYPHILIS CASES, PARÁ, 2017 - 2019

Figure 1 — Acquired syphilis reported cases spatial distribution according to Pará state mesoregion, January 2017 to June 2019.

underreported cases increased public spending on easily treated or prevented diseases, and inadequate documentation, reinforcing the same statement in other studies[10].

Observing each variable in isolation, it was possible to notice marked differences in the disease incidence. Concerning gender, the number of cases remained higher in males; however, from 2017 to 2018, the percentage of growth was higher in females (57%) than males (52%). The higher incidence in males corroborates with a retrospective study conducted in India, in which cases were analyzed for five years[11], emphasizing that the pattern of greater involvement in

men remains. However, the growth among women can also be attributed to reducing condom use by this group[12].

The incidence of the disease was markedly decreased as age advances. From 2017 to 2018, there was a substantial growth of cases in all age groups; however, young adults (18 to 30 years old) still constitute the most prevalent group. According to Garbin et al.[10], who also found this age group was predominant, the absence of public sex education policies for the population would contribute to the spread of the disease.

There was a worsening in filling the field

concerning race, with 11.15% of ignored notifications. However, the race with the highest prevalence was still brown, accounting for 72% of all cases, according to the Brazilian Institute of Geography and Statistics (IBGE), which states that 72.2% of the northern region population is brown[13]. According to the Ministry of Health, in 2018, most of the people notified were brown (36.8%), followed by white (36.2%) and black (10.3%)[1].

Syphilis, in all its forms of presentation, as an infection predominantly transmitted by sexual intercourse or via maternal-fetal route, is closely related to the country's socioeconomic development. The reflection of the country's development can also be assessed by most of the population's education. The number of disease cases was higher in individuals with low education, with a discrepant ratio compared to individuals with higher education, complete or not. This result corroborates with the data reported in a Chilean study[14], in which the highest rates of reported cases were from the least developed regions of the country. Besides, individuals with a lower education level tended to have an even more significant delay in diagnosis. This was mostly due to the lack of information on the subject, which corroborates the largest number of cases[1,15].

Regarding the spatial distribution, there was an alarming number of cases in the metropolitan region of Belém. Regions with large populations may have a large number of cases, but proportionally the Lower Amazon was more prevalent, with a significant increase from 2017 to 2018, even with a population amount considerably smaller than that of the metropolitan region. It is important to emphasize that there is a scarcity of studies related to the locations of the disease cases in Brazil, mainly those aimed explicitly at the prevalence in each state. However, some studies with particular associations help seek an explanatory possibility that explains the differing prevalences.

There are already studies that associate acquired syphilis with sexual habits. However, Souza et al.[16] also elucidated the possibility of associating the disease with drug users since they also have sexual habits that favor sexually transmitted infections, such as not using condoms and have multiple partners. In their study conducted in 2017, they found a high prevalence of syphilis acquired in drug users in the state of Pará, even higher than that presented in individuals involved in prostitution. This reinforces the present study since the Metropolitan region tends to have easier access to illicit drugs than less urbanized regions.

Moreover, it can be inferred that the higher prevalence in the Lower Amazon is associated with a lack of information since the locations that are not part of the metropolitan region tend to be more neglected than those closer to the capital. It is a phenomenon that was reported by Silva et al.[17] as framing a profile of vulnerability, characterized by care gaps. However, neglected mesoregions such as the Northeast and Southeast of Pará, as much as they are as populous as the Metropolitan, showed a considerably lower prevalence. The failure in the healthcare network is even greater in these regions, increasing underreporting.

Therefore, health surveillance needs to be constant, and more efficient public policies need to be employed in primary care to reduce the number of cases and make early diagnoses with appropriate treatment. Improving knowledge about the epidemiological data on syphilis is essential to guide health professionals toward an earlier diagnosis and serve as a basis for intervention strategies to prevent the disease.

Limitations

Cross-sectional studies are recommended to analyze the distribution of diseases in a specific population, plan and control them, and guide public actions. This study has the advantage of being inexpensive and of fast realization. Additionally, it may generate many hypotheses concerning what was analyzed. However, some limitations are erroneous filling in the notification form that goes to SINAN and the selective survival bias. Furthermore, the study has no temporality, which cannot infer causality.

CONCLUSION

This study corroborates the reports on new syphilis burden recently. Five thousand six hundred twenty cases of acquired syphilis were recorded in the state of Pará. The study results showed that this form of the disease is still quite prevalent in the Amazon region, especially in the state of Pará, which is marked as a public health problem that requires intervention. It was still found in more significant numbers in the lower socioeconomic levels and, mainly, in young adults, males, reaching mostly the metropolitan mesoregion of Belém.

REFERENCES

1. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Boletim epidemiológico de sífilis [Internet]. Brasília, DF: Ministério da Saúde; [published 2019 Oct 24; cited 2021 Feb 03]. 44 p. Avaiable from: http://www.aids.gov.br/pt-br/pub/2019/boletim-epidemiologico-sifilis-2019
2. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Sífilis: Estratégias para diagnóstico no Brasil [Internet]. Brasília, DF: Ministério da Saúde; 2010 [cited 2021 Feb 03]. 100 p. Avaiable from: http://bvsms.saude.gov.br/bvs/publicacoes/sifilis_estrategia_diagnostico_brasil.pdf
3. Matias MDP, Jesus AO, Resende RG, Caldeira PC, Aguiar MCF. Diagnosing acquired syphilis through oral lesions: the 12-year

experience of an oral medicine center. Braz J Otorhinolaryngol. 2020;86(3):358-63. https://doi.org/10.1016/j.bjorl.2018.12.010 PMid:30956150
4. Lasagabaster MA, Guerra LO. Sífilis. Enferm Infecc Microbiol Clin. 2019;37(6):398-404. https://doi.org/10.1016/j.eimc.2018.12.009 PMid:30738716
5. Reinehr CPH, Kalil CLPV, Reinehr VPH. Secondary Syphilis: The great imitator can't be forgotten. Rev Assoc Med Bras. 2017;63(6):481-3. https://doi.org/10.1590/1806-9282.63.06.481 PMid:28876421
6. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Manual técnico para diagnóstico da sífilis. Brasília, DF: Ministério da Saúde; [published 2016 Oct 20; cited 2021 Feb

03]. 54 p. Avaiable from: http://www.aids.gov.br/pt-br/pub/2016/manual-tecnico-para-diagnostico-da-sifilis

7. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Protocolo clínico e diretrizes terapêuticas para atenção integral às pessoas com infecções sexualmente transmissíveis [Internet]. Brasília, DF: Ministério da Saúde; [published 2015 Nov 13; cited 2021 Feb 03]; 120 p. Avaiable from: https://bit.ly/3oHFcwF

8. Brasil. Fundação Instituto Brasileiro de Geografia e Estatística (IBGE). Divisão regional do Brasil em mesorregiões e microrregiões geográficas (vol.1). Rio de Janeiro, RJ: IBGE; 1990 [cited 2021 Feb 03]. 135 p. Avaiable from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv2269_1.pdf

9. Ayres M, Ayres Jr M, Ayres DL, dos Santos AAS. BioEstat 5.4 - Aplicações estatísticas nas áreas das ciências biológicas e médicas [Internet]. Belém, PA: Sociedade Civil Mamirauá - IDSM/ MCT/ CNPq; 2007 [cited 2021 Feb 03]. Avaiable from: https://bit.ly/3pF29Sm

10. Garbin AJI, Martins RJ, Belila NM, Exaltação SM, Garbin CAS. Reemerging diseases in Brazil: sociodemographic and epidemiological characteristics of syphilis and its under-reporting. Rev Soc Bras Med Trop. 2019;52:e20180226. https://doi.org/10.1590/0037-8682-0226-2018 PMid:30810654

11. Jain A, Mendiratta V, Chander R. Current status of acquired syphilis: A hospital-based 5-year study. Indian J Sex Transm Dis AIDS. 2012;33(1):32-4. https://doi.org/10.4103/0253-7184.93814 PMid:22529451 PMCid:PMC3326846

12. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Protocolo clínico e diretrizes terapêuticas para atenção integral às pessoas com infecções sexualmente transmissíveis. 2019; p 55-90.

13. Brasil. Instituto Brasileiro de Geografia e Estatística (IBGE). Características gerais dos domicílios e dos moradores: 2019 [Internet]. Rio de Janeiro: IBGE; 2020 [cited 2021 Feb 03; updated 2020 May 26]. Avaiable from: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2101707

14. Chile. Ministerio de Salud de Chile. Departamento de Epidemiologia. Situación epidemiológica de sífilis. Rev Chilena Infectol. 2018;35(3):284-96. https://doi.org/10.4067/s0716-10182018000300284 PMid:30534908

15. Wong NS, Huang S, Zheng H, Chen L, Zhao P, Tucker JD, Yang LG, Goh BT, Yang B. Stages of syphilis in South China - a multilevel analysis of early diagnosis. BMC Public Health. 2017;17(1):135. https://doi.org/10.1186/s12889-016-4004-y PMid: 28143448 PMCid:PMC5282730

16. Sousa RAC, Marques ED, Frade PCR, Cordeiro ACC, Martins LC, Resque RL, et al. Syphilis among illicit drugs users in the State of Pará, Brazilian Amazon [Internet]. Chapter 1. Avid Science [Internet]. 2017 Jul 21. 27 p. Avaiable from: https://bit.ly/39HOuo3

17. Silva EC, Tupinambá MR, Silva FASD, Vieira JR, Borges SCR, Nascimento LS. Resultados de sorologia para casos de sífilis em campanha de município no norte do Brasil. Rev Pan-Amaz Saúde. 2016;7(1):39-43. https://doi.org/10.5123/S2176-62232016000100005