

SURVEILLANCE SYSTEM OF CUTANEOUS LEISHMANIASIS IN CEARÁ, 2012-2022

SISTEMA DE VIGILÂNCIA DA LEISHMANIOSE TEGUMENTAR NO CEARÁ, 2012-2022

SISTEMA DE VIGILANCIA DE LA LEISHMANIASIS CUTÁNEA EN CEARÁ, 2012-2022

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ABSTRACT

Objective: To evaluate the Surveillance System for cutaneous leishmaniasis in Ceará between 2012 and 2022. **Methods:** Data from Sinan were analyzed regarding the completeness, consistency, and representativeness of the variables of residents notified in Ceará, Brazil, from 2012 to 2022. **Results:** A total of 6,170 cases were recorded. The variables race and date of treatment start showed good completeness, while occupation and evolution were deficient. Data consistency was excellent, except for the confirmation criterion. The most frequent clinical form was cutaneous (96.45%). The disease recorded 5.2% of recurrence and 0.92% of Human Immunodeficiency Virus coinfection. Most cases occurred in men (54.41%), brown people (79.77%), and people with incomplete elementary education (42.07%). **Conclusion:** The system presents good consistency, but limitations in representativeness and completeness, especially in variables essential for disease control. These flaws compromise the effectiveness of surveillance actions, making the system insufficient for the adequate management of cutaneous leishmaniasis in the state.

Keywords: *Leishmaniasis; Cutaneous; Health Information Systems; Leishmania braziliensis; Health Surveillance System.*

RESUMO

Objetivo: Avaliar o Sistema de Vigilância da leishmaniose tegumentar no Ceará entre 2012 e 2022. **Métodos:** Analisaram-se dados do Sinan quanto à completitude, consistência e representatividade das variáveis de residentes notificados no Ceará, Brasil, de 2012 a 2022. **Resultados:** Foram registrados 6.170 casos. As variáveis raça e data de início do tratamento apresentaram boa completitude, enquanto ocupação e evolução foram deficientes. A consistência dos dados foi excelente, exceto no critério de confirmação. A forma clínica mais frequente foi a cutânea (96,45%). A doença registrou 5,2% de recidiva e 0,92% de coinfeção por vírus da imunodeficiência humana. A maioria dos casos ocorreu em homens (54,41%), pardos (79,77%) e pessoas com ensino fundamental incompleto (42,07%). **Conclusão:** O sistema apresenta boa consistência, mas limitações na representatividade e completitude, especialmente em variáveis essenciais para o controle da doença. Essas falhas comprometem a eficácia das ações de vigilância, tornando o sistema insuficiente para a adequada gestão da leishmaniose tegumentar no estado.

Descritores: *Leishmaniose cutânea; Sistemas de informação em saúde; Leishmania braziliensis; Sistema de Vigilância em Saúde.*

RESUMEN

Objetivo: Evaluar el Sistema de Vigilancia de la leishmaniasis cutánea en Ceará entre 2012 y 2022. **Métodos:** Se analizaron los datos del Sinan para verificar su integridad, consistencia y representatividad de las variables de los residentes en Ceará, Brasil, notificados entre 2012 y 2022. **Resultados:** Se notificaron 6.170 casos. Las variables raza y fecha de inicio del tratamiento mostraron buena completitud, mientras que ocupación y evolución fueron deficientes. La consistencia de los datos fue excelente, excepto por el criterio de confirmación. La forma clínica más frecuente fue la cutánea (96,45%), con un 5,2% de recurrencia y un 0,92% de coinfección por virus de la inmunodeficiencia humana. La mayoría de los casos se presentaron en hombres (54,41%), mestizos (79,77%) y personas con educación primaria incompleta (42,07%). **Conclusión:** El sistema presenta buena consistencia, pero limitaciones en representatividad y completitud, especialmente en variables esenciales para el control de enfermedades. Estas fallas comprometen la efectividad de las acciones de vigilancia, tornando al sistema insuficiente para el adecuado manejo de leishmaniasis cutánea en el estado.

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Descriptores: *Leishmaniasis Cutânea; Sistemas de Información en Salud; Leishmanibraziliensis; Sistema de Vigilancia Sanitaria.*

INTRODUCTION

Cutaneous leishmaniasis (CL), known as "Bauru ulcer" or "wild wound", is a disease that has been detected in Brazil since 1855¹ and has a high prevalence in the country. In the state of Ceará, 11,632 cases of the disease were diagnosed between 2007 and 2023, with 88.3% autochthonous². It has a variable clinical course and can take from two weeks to two years for symptoms to manifest³, in its cutaneous or mucous form⁴.

In the State of Ceará, the CL surveillance system is passive, when patients come to the health services complaining of non-healing lesions. Laboratory confirmation is carried out primarily at the Central Public Health Laboratory in Ceará and in some municipalities that have a qualified team to carry out the direct parasitological examination. After laboratory or clinical epidemiological confirmation of the disease, the case is notified on Sinan (Notifiable Diseases Information System) by the municipality where the medication is requested via online spreadsheets to the State Health Department. The medication must be administered on an ambulatory⁵.

An effective health surveillance system for CL is essential to reduce morbidity and mortality from the disease and prevent the development of deformities in the patient⁶. When monitoring data from notifications of cases of the disease and a process of continuous evaluation of this information is carried out, it is possible to obtain valuable elements to understand the local health-disease process and to qualify actions to identify, treat and control this disease. In addition, it reduces the risks related to the disease, collaborates in the investigation of cases and outbreaks of the disease, guarantees timely treatment and prevents new occurrences³.

Given the endemicity of the disease and the lack of studies evaluating the attributes of CL surveillance in Ceará, this research is justified in order to detect gaps in the surveillance system, qualify the information provided by health services and make it possible to improve treatment, prevention and control of the disease in the state. This research is justified in order to detect gaps in the surveillance system, qualify the information provided by health services and enable improvements in the treatment, prevention and control of the disease in the state. The aim of this study was to evaluate the CL surveillance system in the state of Ceará from 2012 to 2022.

METHODS

This is an evaluative study of the CL Surveillance System, with a quantitative approach, with the aim of describing the analyses regarding the following attributes: completeness, consistency and representativeness of cases reported in Sinan NET with the Federation Unit (UF) of residence in the state of Ceará, from 2012 to 2022.

Ceará is part of the Northeast region of Brazil, bordered by the Atlantic Ocean and the states Pernambuco, Rio Grande do Norte, Paraíba and Piauí⁷. The state has 184 municipalities, with a total area of 148,894.447 km², of which 1,594.42 km² is urbanized. It is the 8th most populous state in the country, with a population density of 59.07 inhabitants per km² and 8,794,957 inhabitants³.

The data was obtained from the electronic portal of the Information Technology Department of the Unified Health System (Datasus), using the Tabwin® platform of notifications from all over Brazil via Sinan through the notifying bodies in the municipalities and states. Data was collected in August 2024.

A description of the notified cases of CL was carried out in order to verify the epidemiological profile of the disease in the period 2012-2022. The absolute and relative frequency (%) of person (age, sex, race/color, schooling, clinical course of the disease), place (autochthonous cases) and time (month and year of diagnosis) were considered.

The Center for Disease Control and Prevention guidelines⁸ were used to evaluate the CL surveillance system. With regard to the qualitative attributes, data quality was assessed for completeness and consistency and for the quantitative attribute, representativeness was assessed.

For the completeness analysis, we considered the robustness of the data in terms of the degree to which the information was filled⁸. The average percentage of blank fields (race, drug used, schooling, treatment start date, end date, evolution and occupation) and information filled in as unknown (race, gestational age, classification of case entry, schooling and HIV co-infection) was calculated the information filled in as unknown (race, gestational age, case entry classification, work-related illness, schooling and HIV co-infection). This average was calculated by adding the number of notifications for the variable analyzed divided by the total number of notifications for the period.

For the analyze the consistency, we checked for contradictions or inconsistencies in the records⁸. For the calculation, the number of inconsistent data was divided by the total number of notifications for the period. The following inconsistencies were assessed:

1. No mucosal or integumentary lesions;
2. Mucosal or integumentary clinical form incompatible with the type of lesion;
3. Record of weight of 0kg when prescribed pentavalent antimonial;
4. Pregnant male;
5. Notification date < diagnosis date;
6. Closing date < start of treatment;
7. Cases with positive test results for laboratory diagnosis and the confirmation criterion marked in the record as clinical-epidemiological.

The analysis of representativeness consists of describing the event precisely where, when and to whom the health event is occurring⁸. Based on the description of confirmed cases of CL in the state of Ceará from 2012 to 2022, the data was compared to the set of information from the other federal units in Brazil, made available through a dashboard by the Ministry of Health³.

To analyze the Surveillance System the variables were evaluated individually for each attribute. The data was summarized and evaluated together for each parameter. Finally, the attributes evaluated were analyzed together and the final assessment of the surveillance system was defined.

Table 1 - Descriptive summary of the individual, joint and representative evaluations

Parameter	Qualitative			Quantitative
Items	Completeness		Consistency	Representativeness
Classification	Completed fields	Ignored fields	Fields with inconsistencies	Agreement on representativeness
Analysis of each item				
Excellent	> 90%	< 10%	< 10%	<= 10% variation
Regular	70-89%	10-30%	10-30%	11-30%
Bad	< 70%	> 30%	> 30%	> 30%
Analysis of the set of items for each parameter				
No. of variables	15		7	8
Excellent	>=13 excellent and/or regular		>=06 excellent and/or regular	>= 07 excellent and/or regular
Regular	10 a 12 excellent and/or regular		04 to 05 excellent and/or regular	05 to 06 excellent and/or regular
Bad			At least 01 bad	
Final classification of the Surveillance system				
Excellent	All parameters excellent			
Regular	At least one regular parameter			
Bad	At least one bad parameter			

Source: Authors, 2025.

The data was initially processed and analyzed using TabWin® version 4.1.5., where the database to be evaluated was selected, consisting of notified cases of CL with UF (Federation Unit) of residence in the state of Ceará (CE), registered from 2012 to 2022. The data was saved in a CSV file and evaluated using Excel® Office 16 and Epi info™ version 7.2.6.0.

The databases used were available on official websites with free access, composed of anonymized information, without the possibility of identifying individuals, research that exclusively uses public and anonymized data does not require submission to the Research Ethics Committee.

RESULTS

From January 2012 to December 2022, in the state of Ceará, there were 6,170 reported cases, with an average of 561 cases per year and 5.2% of recurrence (321). The most frequent clinical manifestation was 96.45% with the cutaneous form (5,951). Of the total reported, 0.92% (57) had co-infection with HIV, but 40.34% (2,489 cases) did not record information on the examination.

The majority of cases reported in Ceará were male (3,357; 54.41%), with an average age of 40.64 years and a median of 39 years (minimum 0 and maximum 106 years), brown (4,838; 79.77%) and with incomplete primary education (2,596; 42.07%).

The highest number of notifications was in 2012 (978; 15.85%) and the months of January, October and November accounted for 32.07% of the notifications in the historical series. Of the notified cases, 5,506 have the state of Ceará as their municipality of occurrence, however, only 84.38% of the cases (5,206) are considered autochthonous, i.e. they reside in the probable place of infection (95%CI: 83.45 to 85.26%).

The average time between case notification and closure was 85.78 days and the median was 70 days. The majority of patients were discharged due to clinical cure of the disease (3,893; 93.29% - 95%CI: 92.49% to 94.01%).

Completeness was rated poorly, with 08 excellent, 04 fair and 03 poor. Of the 07 variables analyzed for unrecorded data, 02 were rated excellent, 03 regular and 02 poor. Of the 08 variables evaluated in terms of ignored fields, 06 were rated excellent, 01 regular and 01 poor.

Table 2 - Percentage (%) of average completeness, considering fields filled in and fields not filled in, of the LT database of Ceará, 2012-2022 (N=6,170) and classification of each variable.

Fields	Essential variables	Total Records	Average (%)	Classification
Completed fields	Race	6,065	98.3	Excellent
	Drug used	5,777	93.6	Excellent
	Education	5,377	87.1	Regular
	Treatment Start Date	5,162	83.7	Regular
	Closing Date	4,330	70.2	Regular
	Evolution	4,173	67.6	Bad
	Occupation	3,832	62.1	Bad
Fields ignored	Race	35	0.6	Excellent
	Gestational age	60	1.0	Excellent
	Case entry classification	70	1.1	Excellent
	Work-related illness	514	8.3	Excellent
	Education	1,057	17.1	Regular
	HIV co-infection	2,489	40.3	Bad

Source: Authors, 2025. According to data collected from Sinan/DATASUS.

The variables race and schooling were evaluated twice for consistency, in the completed fields (98.3 and 87.1%) and ignored (0.6 and 17.1%), remaining as excellent and regular, respectively.

The consistency of the data was excellent, with 6 excellent parameters and only 1 regular parameter (confirmation of a case of leishmaniasis by laboratory examination recorded as clinical-epidemiological - 11.2% of inconsistent data).

Table 3 - Percentage (%) of inconsistency for LT cases in Ceará from 2012-2022 (N=6,170).

Inconsistent records	n	%	Classification
No mucosal or integumentary lesions	1	0,0	Excellent
Mucosal or integumentary clinical form incompatible with type of lesion	1	0,0	Excellent
Prescription of pentavalent antimonial with weight record of 0kg	210	3,4	Excellent
Pregnant male	0	0,0	Excellent
Notification date < diagnosis date	0	0,0	Excellent
Closing date < start of treatment	149	2,4	Excellent
Positive laboratory diagnostic test and the confirmation criterion marked in the record as clinical-epidemiological	693	11,2	Regular

Source: Authors, 2025. According to data collected from Sinan/DATASUS.

Representativeness was considered regular, with 05 excellent and 03 regular parameters. Comparing the data from Brazil with Ceará, the profile identified in the state follows the national pattern, with a predominance of men, and more frequent among young people and adults aged 15 to 39, of brown skin color, although these parameters differ by more than 10% between them. There was a similar frequency when considering schooling, incomplete primary education, clinical form with a lower frequency of the mucosal form, occurrence of HIV co-infection in less than 1% of the population and recurrence of less than 6%.

Table 4 - Representativeness of the results of the study comparing data from Ceará and Brazil in the country's other federated units, 2012-2022.

Analyzed parameter	Data from Ceará N=6,170	Data from Brazil ¹ N=182,242	Representativeness
Male	54.41%	74.02%	Regular
Age group 15 to 39	33.89%	50.03%	Regular
Race/Color Brown	79.77%	64.72%	Regular
Education - Primary school incomplete	42.07%	47.71%	Excellent
Year with the highest number of cases - 2012	15.81%	12.41%	Excellent
Clinical form - Mucosal	3.55%	5.42%	Excellent
HIV co-infection	0.92%	0.83%	Excellent
Recurrence	5.20%	5.66%	Excellent

¹Except Ceará. **Source:** Authors, 2025. According to data collected from Sinan/DATASUS.

The CL surveillance system in the state of Ceará is considered poor, as it has poor completeness, excellent consistency and regular representativeness.

DISCUSSION

The results of this evaluation show that the CL surveillance system in Ceará has attributes that vary from poor to excellent, reflecting both its potential and the gaps that exist.

The occupation variable shows significant weakness, with a completeness rate of less than 70%, also observed in the state of Acre¹⁰. However, the work-related illness variable was rated as excellent, leaving some doubt as to whether the interviewer had even minimally assessed the working conditions associated with the occurrence of the illness.

The variable clinical evolution of LT cases was considered low in the state (<70%) and limited the epidemiological analysis. A study carried out in Brazil, with data from 2015 to 2022, presented 73,964 cases of cure, 88 deaths due to LT and 484 due to other causes of death, 2,912 cases of abandonment and 26,203 records of ignored clinical evolution. This omission reflects failures in data collection by surveillance, highlighting the need to improve information systems to ensure more accurate analyses and efficient planning of interventions.

Leishmania/HIV co-infection represents a challenge, aggravating clinical outcomes, increasing drug side effects, the risk of therapeutic failure and lethality¹². Although positivity for Leishmania/HIV co-infection has remained below 1% in Brazil, the rate of ignored records has exceeded 40%, a pattern also observed in the state of Maranhão¹². This information is alarming and reinforces the need to expand testing and ensure that results are properly recorded during case investigations.

In the historical series analyzed, the year 2017 stood out in terms of registered notifications, followed by biennia the 2020 and 2021, a characteristic also observed in Maranhão¹³. A study in Ceará¹⁴ covering 2007 to 2016, and the current one, from 2012 to 2022, show similar epidemiological profiles of CL in Ceará, with a higher frequency among men (52.65%; 54.41%), low schooling (38.14%; 42.07%) and high autochthony (90.98%; 84.38%). This data reflects occupational and social factors that increase exposure to the vector, such as activities in rural areas, less access to information on prevention and poor living conditions. The persistence of these patterns highlights challenges in reducing endemicity and reinforces the need for interventions focused on vector control, environmental management and health education.

The representativeness of the data is fair when compared to data from Brazil, demonstrating differences in the profile of occurrence of the disease, but it also highlights gaps in essential variables, such as occupation and progression, which compromise completeness, making it poor. The high rates of autochthony and the predominance of cases among young men with low levels of education reflect the maintenance of environmental and social conditions that favor transmission.

The increase in the mean (36 to 41 years) and median ages (34 to 39 years) among the studies on CL in Ceará¹⁴ indicates a transition in the age profile of cases. This change may suggest an ageing population or changes in the dynamics of exposure to the vector. The wide age range observed (0 to 106 years) highlights the heterogeneity of people who can be affected by the disease and the importance of preventive strategies that consider different age groups and their specificities in relation to exposure and vulnerability.

Limitations in filling in variables and inconsistencies, although impactful, can be mitigated by training and awareness-raising strategies for the professionals responsible for notifications.

CONCLUSIONS

The assessment of the Ceará CL surveillance system reveals excellent consistency, regular representation and poor completeness, so that the system in the state is considered poor. Although the data analyzed show progress, the high rate of ignored records in some variables is worrying.

The challenges highlighted suggest that notifications are not properly completed, directly impacting the analysis of the surveillance system, and signaling the need to prioritize training and audits at the municipal and state levels.

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