

# EPIDEMIOLOGY OF HIV/AIDS CASES IN CEARÁ IN THE LAST 10 YEARS

*EPIDEMIOLOGIA DE CASOS DE HIV/AIDS NO CEARÁ NOS ÚLTIMOS 10 ANOS*

*EPIDEMIOLOGÍA DE CASOS DE VIH/SIDA EN EL CEARÁ EN LOS ÚLTIMOS 10 AÑOS*

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## ABSTRACT

**Objective:** To identify the epidemiological profile of HIV/AIDS cases in the state of Ceará in the last 10 years, using the health information system Departamento de Informática do Sistema Único de Saúde (DATASUS). **Methods:** documentary study, with quantitative approach. Data were collected electronically through DATASUS during the month of August 2024, including SINAN and SIH/SUS, analyzing variables such as sex, color/race and age group, in addition to incidence calculations from 2014 to 2023 with IBGE data. **Results:** 12,231 cases of HIV/AIDS were reported, with a male predominance and higher incidence in the age group 40-49 years. The color/race of brown had the highest percentage of cases, with 18,356 hospitalizations and 1,899 deaths. **Final considerations:** The HIV/AIDS epidemic is a public health concern in Ceará, highlighting disparities between social groups, and it is essential to develop policies for access to health.

**Keywords:** *Epidemiology; HIV/AIDS; Incidence.*

## RESUMO

**Objetivo:** Identificar o perfil epidemiológico dos casos de HIV/AIDS no estado do Ceará nos últimos 10 anos, utilizando o sistema de informações de saúde Departamento de Informática do Sistema Único de Saúde (DATASUS). **Métodos:** Estudo documental, com abordagem quantitativa. Os dados foram coletados eletronicamente, por meio do DATASUS, durante o mês de agosto de 2024, incluindo SINAN e SIH/SUS, analisando variáveis como sexo, cor/raça e faixa etária, além de cálculos de incidência de 2014 a 2023 com dados do IBGE. **Resultados:** Foram registrados 12.231 casos de HIV/AIDS, com predominância masculina e maior incidência na faixa etária de 40-49 anos. A cor/raça parda teve a maior porcentagem de casos, com 18.356 internações e 1.899 óbitos. **Considerações finais:** A epidemia de HIV/AIDS é uma preocupação de saúde pública no Ceará, evidenciando disparidades entre grupos sociais, sendo fundamental desenvolver políticas de acesso à saúde.

**Descritores:** *Epidemiologia; HIV/AIDS; Incidência.*


## RESUMEN

**Objetivo:** Identificar el perfil epidemiológico de los casos de VIH/SIDA en el estado de Ceará en los últimos 10 años, utilizando el sistema de información de salud Departamento de Informática del Sistema Único de Salud (DATASUS). **Métodos:** estudio documental, con enfoque cuantitativo. Los datos fueron recogidos electrónicamente a través del DATASUS durante el mes de agosto de 2024, incluyendo SINAN y SIH/SUS, analizando variables como sexo, color/raza y rango de edad, además de cálculos de incidencia de 2014 a 2023 con datos del IBGE. **Resultados:** Se registraron 12.231 casos de VIH/SIDA, con predominio masculino y mayor incidencia en el grupo de edad de 40-49 años. El color/raza parda tuvo el mayor porcentaje de casos, con 18.356 hospitalizaciones y 1.899 defunciones. **Consideraciones finales:** La epidemia de VIH/SIDA es una preocupación de salud pública en el Ceará, evidenciando disparidades entre grupos sociales, siendo fundamental desarrollar políticas de acceso a la salud.

**Descriptores:** *Epidemiología; VIH/SIDA; Incidencia.*

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## INTRODUCTION

Human Immunodeficiency Virus (HIV) is a retrovirus that causes Acquired Immunodeficiency Syndrome (AIDS). This virus alters the DNA of cells to replicate and attack immune system cells, especially TCD4<sup>+</sup> lymphocytes, weakening the entire immune system and leading to the appearance of opportunistic diseases<sup>1</sup>.

Currently, the AIDS epidemic represents a public health problem at a global level, and the epidemiological notification of HIV/AIDS is an important process for the control of the disease. Epidemiological surveillance of HIV and AIDS uses data provided by the Notifiable Diseases Information System (SINAN), the Mortality Information System (SIM; death records), the Laboratory Tests Control System (SISCEL), the Medication Logistics Control System (SICLOM) and the Clinical Monitoring System for people living with HIV (SIMC)<sup>2</sup>.

This disease has a high capacity to cause extensive damage to the population, both at the physiological level, with the weakening of the immune system, and at the social level, with treatment costs. In this context, public measures are needed to serve people living with this disease. In Ceará, state law No. 16,362/2017 provides for free state public transport services for people living with HIV and AIDS, upon documentary evidence issued by the institution where the treatment is carried out<sup>3</sup>.

Knowing the most impacted groups helps to improve prevention strategies aimed at the most vulnerable segments, although data analysis is hampered by the dependence on available secondary data. In 2022, the absolute frequency of HIV/AIDS cases in Ceará was 816, which represents a relative frequency of approximately 0.9% of the total population of 8,794,957 inhabitants<sup>4,5</sup>.

By mapping the epidemiological profile of HIV/AIDS cases in Ceará, the study provides crucial information about which groups are most affected. This data is essential for developing targeted and effective prevention strategies. Therefore, the objective of the present study was to identify the epidemiological profile of HIV/AIDS cases in the state of Ceará in the last 10 years (2014 to 2023, considering that the year of construction of the present study was disregarded, due to the data not yet being finalized according to the year), using the DATASUS health information system.

## METHODS

The present work is a descriptive, documentary, retrospective epidemiological study with a quantitative approach, carried out by students of the Medicine course, in the second semester, at the State University of Ceará, Campus Crateús, Ceará, in August 2024.

The steps for the research followed the following flow: data collection on the Health Portal website (DATASUS - <https://datasus.saude.gov.br/>); later, to enter the collection systems, it was necessary to have the mechanisms of the TABNET tab, in the topics "epidemiological and morbidity" (Information System and Notifiable Diseases - SINAN) and "health care" (Hospital Admissions System - SIH/SUS) and the subtopics "AIDS cases - since 1980" and "hospital production", respectively. This data collection was carried out in August 2024.

The division of these systems was important so that the present study could make a quantitative analysis of the rates of HIV/AIDS cases in the state of Ceará and how many of these cases reflect in situations of hospitalization and/or death. In the search for data using SINAN, the demographic variables sex, color/race, and age group were used. In the SIH, the following variables were used: health, year of care, hospitalizations, and deaths. Both surveys cover the time span of the last 10 years (2014 to 2023).

To calculate the incidence (number of new cases x 100,000/total inhabitant of the place), the estimates provided by the IBGE's management of studies and analysis of demographic dynamics (2018 edition) during the years 2014 to 2023 were used as the population number, considering the 2022 demographic census. It was decided to use the data from the census itself in 2022, as it is more concrete information than the projection made, aiming at a more reliable calculation of incidence. Incidence calculation is a fundamental tool for epidemiological analysis, which is essential to assess the frequency of HIV/AIDS more explicitly.

Regarding the capture of epidemiological data, attention was paid to an important aspect in the selection and collection: the care with the contamination of data for different periods. In this case, when selecting a period and forming a table, depending on the information chosen, there may be the addition of data from previous periods not selected to generate the table. Therefore, there was a need to remove this information that was not the target of this analysis, through tools from the Excel 2019 spreadsheet system or manually, removing the quantities found unwanted from the total.

The data extracted are of a public nature, and do not require an Ethics Committee, according to Resolution 466/126. Finally, the information collected was organized and transformed into tables and graphs using the Excel 2019 software (descriptive statistics). Along with the data, the basis of the discussion was built according to the literature involving the area of public/collective health.

## RESULTS

Table 1 shows a discrepancy in the number of male cases in relation to female cases. As a rule, females show a significant decrease over the years (there are some exceptions, such as 2018, 2019, and 2022).

**Table 1 - Distribution of HIV/AIDS cases by year reported in Ceará between 2014 and 2023. The variable gender was used.**

Year of diagnosis	Male	Incidence of cases - Male	Female	Incidence of cases - Female	Total
2014	934	10,5572141	394	4,45347145	1.328
2015	1.016	11,4089785	362	4,06501007	1.378
2016	987	11,0221419	355	3,96080079	1.342
2017	975	10,810794	301	3,33748616	1.276
2018	1.025	11,2929913	338	3,72393275	1.363

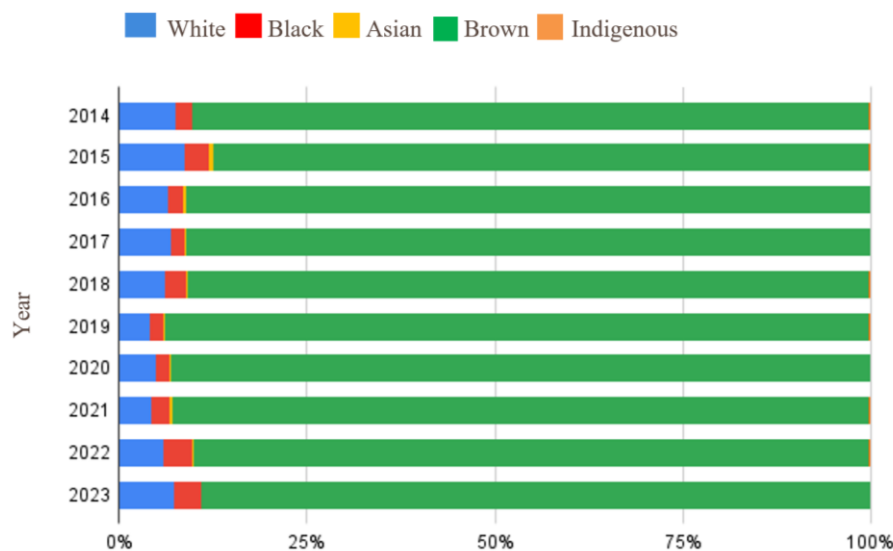
Year of diagnosis	Male	Incidence of cases - Male	Female	Incidence of cases - Female	Total
2019	1.055	11,563091	348	3,81417598	1.403
2020	805	*9,15297255	274	*3,11542171	1.079
2021	854	9,24105809	283	3,06231784	1.137
2022	983	10,5777268	317	3,99220412	1.300
2023	468	5,009144705	157	1,68041899	625
Total	9.102	-	3.129	-	12.231

**Source:** MS/SVSA/Department of HIV/AIDS, Tuberculosis, Viral Hepatitis and Sexually Transmitted Infections (Dathi).

**Notes:** (1) Siclom used to validate SISCEL data. (2) Sinan and Siscel until 06/30/2023 and SIM from 2000 to 2022. (3) Preliminary data subject to change. \* Calculation of the incidence based on the resident population of the 2022 demographic census itself.

Graph 1 shows that brown color/race has the highest percentages of cases, followed by white color/race. The black population also has remarkable rates of cases. On the other hand, the other two classifications presented almost imperceptible percentages compared to the brown, mainly.

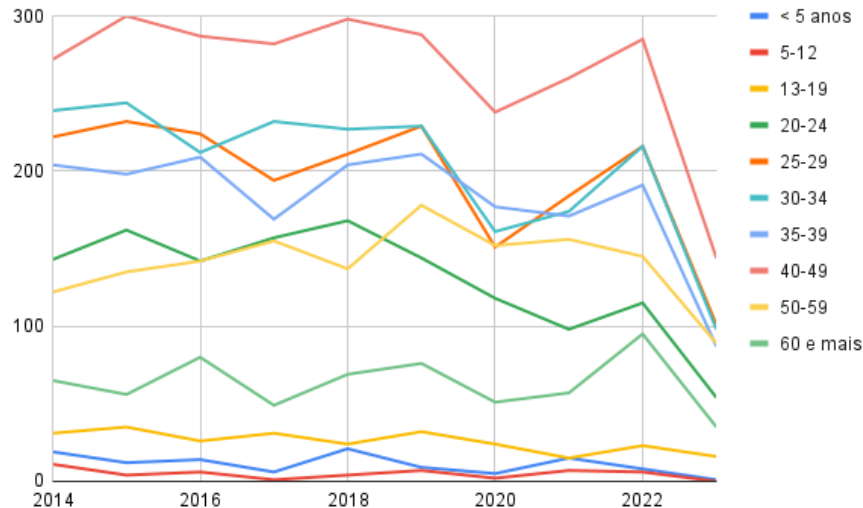
**Graph 1 - Column of new AIDS cases by year in the state of Ceará. Colour/race was used as a variable.**



**Source:** MS/SVSA/Department of HIV/AIDS, Tuberculosis, Viral Hepatitis and Sexually Transmitted Infections (Dathi).

**Notes:** (1) Siclom used to validate SISCEL data. (2) Sinan and Siscel until 06/30/2023 and SIM from 2000 to 2022. (3) Preliminary data subject to change.

Graph 2 shows the highest rates of AIDS cases, according to age group. At the top, the highest incidence is noted in the 40-49 age group, followed by relevant indices of 25-29, 30-34, 35-39, 50-59, 20-24.

**Graph 2 - New cases of AIDS per year in the state of Ceará using age group as a variable.**

**Source:** MS/SVSA/Department of HIV/AIDS, Tuberculosis, Viral Hepatitis and Sexually Transmitted Infections (Dathi).

**Notes:** (1) Siclom used to validate SISCEL data. (2) Sinan and Siscel until 06/30/2023 and SIM from 2000 to 2022. (3) Preliminary data subject to change.

Table 2 contains data collected from the SIH and reveals a progression in the number of hospitalizations and deaths during the period from 2014 to 2019, while in 2020 these numbers suffered a significant reduction, possibly related to the Covid-19 pandemic and its implications for public health.

**Table 2 - Distribution of hospital admissions and deaths related to HIV/AIDS cases in the state of Ceará during January 2014 to December 2023.**

Year of service	Admissions	Incidence of cases – hospitalizations	Deaths	Incidence of cases-deaths
2014	1.551	17,53282	162	1,83128
2015	1.720	19,31608	214	2,40328
2016	1.642	18,32167	197	2,19815
2017	1.755	19,4611	186	2,04944
2018	1.750	19,28237	185	2,03842
2019	1.874	20,52107	196	2,14628
2020	1.433	15,59795	173	1,88307
2021	1.685	18,23479	165	1,7856
2022	1.837	*20,89474	178	*2,02464
2023	2.028	21,7063	158	1,69112
Total	18.356	-	1.899	-

**Source:** Ministry of Health - SUS Hospital Information System (SIH/SUS)

**Notes:** (1) Data for the last six months, subject to update. \* Calculation of the incidence based on the resident population of the 2022 demographic census itself.

## DISCUSSION

According to the last demographic census carried out by the IBGE in 2022, the state of Ceará has an approximate population of 8,794,957. The growing number of individuals from Ceará since the last census (2010) is also notorious, with an increase of approximately 342,576 individuals<sup>7</sup>.

The demography of the state of Ceará is a first fundamental factor to analyze the geographic distribution and the variables present, in order to correlate with the conditioning and determinant factors of health and to provide numerical materials for public policies to combat diseases, especially in the context of chronic communicable diseases such as HIV/AIDS<sup>8</sup>.

In the context of HIV/AIDS, there is a huge worldwide effort to reduce infection rates as much as possible. In Brazil, 39,185 cases of the disease were registered in 2012. In Ceará, in the same year, about 800 cases of AIDS were reported, of which 53.7% reside in the capital. In addition, 96% of all municipalities in Ceará have already identified at least one case of AIDS. However, another point that is still worrying is the issue of underreporting. This is not only in the context of HIV/AIDS, but of many other diseases<sup>9</sup>.

The notification of cases is part of epidemiological surveillance. Based on these data, it is the duty of the state to study in detail and analyze the context of the population, in order to ensure the necessary subsidies to reduce this problem<sup>10</sup>.

Table 1 shows a disparity in the number of male and female HIV/AIDS cases. Sexual behavior is a factor that corroborates a high rate of cases, as unprotected sexual intercourse, especially by men, justifies the huge difference in HIV/AIDS cases between the sexes. In addition, the cultural issue of carelessness of men's health is also another point to be taken into consideration. In the calculation of incidence, it is possible to note that for every 100,000 people, 10 men receive the diagnosis of HIV/AIDS, while only 3 women receive the same diagnosis. The high rate of cases may also be justified by the extramarital relations of men without protection, another worrying factor<sup>11</sup>.

An essential aspect to highlight the data in Table 1 is risky sexual behavior (CSR), which occurs in cases of abuse or unprotected sex. In this sense, there is a prevalence of this type of behavior in males, since factors such as extramarital relations, lack of sexual education and abusive practices are concentrated in this population<sup>12</sup>.

The highest prevalence of cases can be observed by brown color/race (Graph 1). One point that helps in this sample is the demographic distribution of this variable in Ceará. According to the IBGE (2022)<sup>13</sup>, most people in Ceará identify themselves as brown, therefore, this denotes a huge disparity (from a quantitative perspective) in cases involving other colors/races. Another point that needs to be investigated is social inequality, as the brown and black populations are more vulnerable than the white population, for example. The consequence of this impacts access to health and information, further boosting the number of cases.

The transmission of the virus is most commonly related to sexual intercourse (Graph 2), so we can correlate (without disregarding other factors such as pregnancy and blood transfusion, for example) that unprotected sexual activity directly influences individuals to be more likely to contract the virus, which is why the < 5 years age group, 5-12, 13-19 have a much lower number of cases, since the sexual activity of individuals may vary considerably or not happen at all (childhood) due to personal, cultural and religious factors.

Extramarital relations may explain the spike in cases in the 40-49 range; On the other hand, the sudden drop, from 60 years of age onwards, can also be justified by the decrease in sexual activity, for example<sup>14</sup>.



Table 2 shows the number of hospitalizations related to the disease in question. Due to the complications of this disease, it is understandable that there is a frequency of hospitalizations, in view of the reduction in the individual's immunity, allowing other diseases to settle and generate more serious conditions, even common diseases such as the flu. Another important detail to comment on is the sharp drop in hospitalizations in 2020 and the slow growth over the following years. This phenomenon can be explained by the Covid-19 pandemic, which brought new issues and nuances to diseases in general, in addition to being responsible for filling hospital beds throughout the country<sup>15, 16</sup>.

Complementing the information discussed, there is a constancy in the incidence quantities. Thus, it is possible to verify that, out of every 100,000 people in the state, approximately 18 people are hospitalized for HIV/AIDS and approximately 2 people die from this disease<sup>17</sup>.

Regarding deaths, there is a discrepancy when compared to the number of hospitalizations, mainly due to the advances obtained in medicine, because although there is no cure, there are treatments that prolong the life span of patients and give them quality of life. In general, the numbers were very constant, and it is worth mentioning that the data for the year 2022, regarding the population and calculation of incidence, differ from the others because they use information from the census carried out by the IBGE and not estimates. Therefore, it is noticeable that the situation of this disease in the state is not alarming and is accompanied by public policies and preventive measures developed over the years by advances in studies on the immunodeficiency virus<sup>18</sup>.

## FINAL CONSIDERATIONS

The analysis of the epidemiological profile in the state of Ceará in the last ten years reveals a higher prevalence of cases among men, with a notable decrease in female rates over the years. The demographic analysis indicates that the brown and black populations are still greatly affected, reflecting social inequalities and unequal access to health services. The collection of data through DATASUS, SINAN and SIH/SUS, in addition to the use of the IBGE census, ensures a well-founded and quantitative analysis.

In epidemiological surveillance, correct case notifications are of fundamental importance to monitor and plan effective control interventions, especially for these more vulnerable groups. However, the limitations of the study include the dependence on secondary data available in the information systems, which may be subject to underreporting and inconsistencies, which limits the study of this population of people affected by HIV/AIDS in Ceará.

The research carried out has limitations in data collection due to the problems associated with notifications, since the data computed in the tables generated by DATASUS may be relatively inaccurate due to eventualities such as underreporting, especially in the pandemic period. Therefore, this study shows the importance of data being as close to reality as possible, in order to enhance both future research on the subject and for the development of public policies.

Finally, the study addresses a topic of great importance for public health, especially in the context in which HIV/AIDS continues to be a significant challenge, justifying the need for interventions and public policies. In this context, support measures,

such as free public transport for people living with HIV/AIDS in the state of Ceará, help to promote social inclusion, access and adherence to treatment. Thus, ongoing HIV/AIDS prevention and control strategies, including condom use and sexual health education, are needed to reduce the spread of the virus and improve the quality of life of those affected.

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