

# Epidemiological analysis of human immunodeficiency virus [HIV] disease between 2010 and 2019

*Análise epidemiológica da doença pelo vírus da imunodeficiência humana [HIV] entre 2010 e 2019*

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## ABSTRACT

**Introduction:** Human immunodeficiency virus (HIV) had its history changed due to new technologies and drugs that made it possible to increase the life expectancy of infected patients. However, it is possible to raise the hypothesis that the inequalities of the public networks of each Brazilian state can affect the treatment of this disease, leading to a greater mortality. **Objective:** Analyzing the evolution of hospitalizations and deaths in Brazilian regions in relation to HIV between 2010 and 2019. **Methods:** literature review (qualitative type) and observational, quantitative, descriptive and transversal collection, carried out from information contained in Datasus. The bibliographic study was carried out in the Scielo and Pubmed depositories, finding 68 studies and selecting 15 for the discussions proposed herein. **Results:** These studies showed, as a result, that the rate of transmission, hospitalization and death from HIV in Brazil is still very high, especially in the Southeast and Northeast regions, with deaths remaining very stable despite existing treatment. These data showed to be convergent with bibliographic information from the studies discussed herein. **Conclusion:** despite the great possibilities of treatments for HIV, there are significant differences in each state, due to sociocultural issues and access to health care.

**Keywords:** HIV. Hospitalization. Mortality. Epidemiology.

## RESUMO

**Introdução:** O vírus da imunodeficiência humana teve o rumo da sua história mudado dadas as novas tecnologias e medicamentos que possibilitaram o aumento da expectativa de vida dos pacientes infectados. No entanto, é possível levantar a hipótese de que as desigualdades das redes públicas de cada estado brasileiro podem afetar o tratamento dessa doença, levando a uma maior mortandade em certos estados. Trata-se de uma questão de suma importância, dada a gravidade dessa doença ainda sem cura e bastante estigmatizada. Ela já infectou mais de 70 milhões de pessoas no mundo desde o início de sua pandemia, matando mais de 32 milhões. **Objetivo:** Analisar a evolução das internações e mortes nas regiões brasileiras em relação ao vírus da imunodeficiência humana entre os anos de 2010 e 2019. **Métodos:** Revisão de literatura (do tipo qualitativa) e coleta observacional, quantitativa, descritiva e transversal, realizada com base em informações contidas no Datasus. O estudo bibliográfico foi realizado nos depositórios Scielo e Pubmed, encontrando 68 estudos e selecionando 15 para as discussões aqui propostas. **Resultados:** Esses estudos mostraram, como resultados, que a taxa de transmissão, internação e morte por vírus da imunodeficiência humana no Brasil ainda segue muito alta, principalmente nas regiões Sudeste e Nordeste, com óbitos permanecendo muito estáveis apesar do tratamento existente. Esses dados se mostraram convergentes com informações bibliográficas dos estudos aqui discutidos. **Conclusão:** Apesar das grandes possibilidades de tratamentos para o vírus da imunodeficiência humana, há diferenças significativas em cada estado, por questões socioculturais e de acesso à saúde.

**Palavras-chave:** HIV. Hospitalização. Mortalidade. Epidemiologia.

## INTRODUCTION

This study aimed to carry out an epidemiological analysis about the disease caused by the human immunodeficiency virus [HIV], especially from the disease statistical data in different states of the country, with the purpose of analyzing the evolution of hospitalizations and deaths in Brazilian regions in relation to HIV between the years 2010 to 2019. However, firstly, it is necessary to understand what this disease is, its history, causes, symptoms and treatments.

HIV is a retrovirus, classified in the Lentiviridae subfamily, that attacks the immune system, responsible for defending the organism<sup>(1)</sup>. It can be transmitted during sexual intercourse, through the inoculation of blood and derivatives, and from an infected mother to her child during vaginal birth<sup>(2)</sup>.

This virus can lead the individual to contract the acquired immunodeficiency syndrome (AIDS), a chronic disease that affects the immune system, causing several health problems, and which can lead to death<sup>(3)</sup>. The first HIV outbreak in the world scenario was in the 1980s, surprising scientists, physicians and lay people because of its brutal and inexplicable manifestation<sup>(4)</sup>.

The HIV virus changes the immune system in a chronic and progressive way, causing a decline in lymphocyte levels<sup>(5)</sup>, and the lower these levels, the greater the probability of developing AIDS<sup>(6)</sup>. In this condition, the most affected cells are CD4 T lymphocytes+ (white blood cells of the immune system), which begin to reduce, leaving the body increasingly weak and vulnerable to common infections<sup>(1,2)</sup>.

However, we must always remember that having HIV is not the same thing as having AIDS. The disease itself occurs when the patient starts having opportunistic diseases due to the low immunity caused by the virus<sup>(2,3)</sup>. The first symptoms of the virus are like common flu syndrome, going unnoticed in most cases<sup>(4)</sup>.

Knowing from the beginning the positive serology for HIV increases the life expectancy of carriers of this virus greatly, as they have the right to start treatment with antiretrovirals, and thus spare the immune system<sup>(7)</sup>. The cocktail prevents the virus from replicating within the CD4+ T-cells, and thus prevent immunity from falling and AIDS from appearing<sup>(1,2)</sup>. The human immunodeficiency virus infection epidemic is global, dynamic and unstable, and its form of occurrence in different regions of Brazil depends on factors such as individual and collective human behavior<sup>(7)</sup>.

The number of people who died from AIDS-related causes reached its peak in 1997, and began declining in the mid-2000s, as a result of antiretroviral therapy and the reduction of HIV incidence<sup>(8)</sup>. In Brazil,

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the expansion of the disease areas that are distant from urban centers, smaller and poorer has increased the cases among people with lower levels of education<sup>(9)</sup>.

That is the importance of this study, which considers such a delicate disease, still stigmatized, that has infected more than 70 million people since the beginning of its pandemic, killing more than 32 million, and still present in the lives of another 38 million people all over the world<sup>(2,3,10)</sup>.

## OBJECTIVE

To analyze the evolution of hospitalizations and deaths in Brazilian regions in relation to HIV between 2010 and 2019.

## METHODS

This study took place in two stages, and based on two methodologies: initially, a qualitative literature review searched general information about the disease (HIV) in the Scielo and Pubmed repositories, for understanding and general contextualization of the topic; in a second moment, an observational, quantitative, descriptive and transversal collection was carried out from information contained in the Datasus – SUS hospital information system (<http://www2.datasus.gov.br/>), to specifically ascertain the numbers of the disease in Brazil, considering hospitalizations for HIV between 2010 and 2019, and the differences found between Brazilian states.

Thus, the initial search carried out on Scielo portal, with the keywords: “HIV hospitalizations in Brazil / HIV admissions in Brazil”, was filtered for the period of 2010–2019, and only in Portuguese and English, resulting in 7 articles, of which 3 were excluded because they were repeated, and 1 was excluded because it dealt with sexually transmitted diseases in general, without a focus on HIV, Resulting, therefore, in 3 articles inserted in this study, to facilitate the understanding of the proposed theme.

The research carried out in the Pubmed repository used the same descriptors (“HIV hospitalizations in Brazil/HIV admissions in Brazil”), as well as the same period (from 2010–2019). However, the “Free full text” filter was used on this platform, resulting in 61 studies found, of which 12 were included, and 49 excluded because they were repeated or irrelevant to the issue of hospitalization for HIV, the focus of this study.

As a result, 15 articles (3 from Scielo and 12 from Pubmed) were included in the second phase of this research (quantitative study).

In this government portal (Datasus), the option “Health Information” (TABNET) was selected, then “Epidemiological and Morbidity”, followed by “Hospital Morbidity of the SUS (SIH/SUS)”. Next, the General option was selected, by place of residence - from 2008, choosing Brazil by Region and Federative Unit. Finally, the restriction for the years 2010–2019, ICD-10 Morb List (Human Immunodeficiency Virus Disease [HIV]) was carried out, exploring the options for hospitalizations, hospital service prices and deaths.

In addition, to contextualize the HIV disease, its causes, symptoms and situation in the world, information from a book about that subject<sup>(1)</sup>, as well as from the portal of the Ministry of Health<sup>(1-5)</sup> and UNAIDS<sup>(10)</sup> were used.

## RESULTS

Initially, it is important to notice that, despite the great success of the fight against AIDS in recent decades, with a number of deaths much lower than in the first years of the pandemic, it is far from being a controlled disease or in regression in the world<sup>(11-15)</sup>. Neither the contamination disappeared, nor the aggravation of the disease, which, if well treated, can progress very satisfactorily<sup>(15,16)</sup>.

Between 2010 and 2019, only in Brazil, there were 332,636 cases of hospitalization caused by complications from AIDS/HIV. According to data collected from Data SUS, the number of hospitalizations due to HIV only had a significant drop in the state of São Paulo, while it remains more or less stable in the rest of the country.

That way, the Southeast region went from 15,823 cases in 2011 (its peak), to 7,006 cases in 2019. A drop of 44.2%, quite expressive, but which does not remove the state from the first positions in this ranking. Thus, observing data from DataSUS, it is possible to perceive the accumulated number of hospitalizations for HIV in the decade, by state. That makes the leadership of the Southeast region visible, even with the recent drop, accumulating 125,224 cases, against 84,362 in the second place (Northeast region), and against 24,295 cases in the Center-West region (the one with the lowest number of cases in the country).

As a result, the Southeast region has 38% of all cases of hospitalization for HIV accumulated in 10 years. While the second place, the northeast region, appears with 25% of cases, almost equal to the third place, while the south region has 22%. The two regions with fewer cases are also very close when accumulated, respectively with 8% (north) and 7% (central-west). Something that has to do with several factors, including the population issue of these states, but not only that.

DataSUS information shows stability, revealing the evolution of HIV deaths in Brazil between 2010 and 2019 (by state), since the accumulated number of deaths in the decade, by region, once again, places the Southeast as the winner in casualties (14,789 cases), against 9,543 cases in the second place (Northeast region) and far from the 2,564 cases in the Midwest region, with the last place.

## DISCUSSION

HIV is a serious public health issue<sup>(11)</sup>, because even after decades of studies there is no effective cure or vaccine that protects the population against this virus<sup>(13,17-24)</sup>. Thus, even if many efforts have been made worldwide to control and treat the disease, giving greater life expectancy to its carriers, the levels of hospitalization and death due to the infection remain high<sup>(12,14,15,20,22)</sup>, as well as the increase of the infection, which is still seen in some populations not traditionally associated with the illness, as women and heterosexuals<sup>(13,16)</sup>.

Therefore, it is important to discover HIV infection early<sup>(11,23,25)</sup>, so that the patient can start the antiretroviral treatments as soon as possible<sup>(20,21)</sup> which in Brazil are made available by the SUS, preventing opportunistic diseases from developing, leading to hospitalizations and even death<sup>(18,25)</sup>. However, many of these hospitalizations and deaths could be avoided, since different countries, and even different states within a country, have different rates of these manifestations<sup>(16,19)</sup>, which demonstrates that hospitalizations and deaths resulting from HIV present interregional differences, evidencing the

need for reflection on the disproportion of the numbers presented<sup>(1,2)</sup>, making HIV evidence the ills of society and the deficiencies of our social systems<sup>(18,19)</sup>.

In view of this perception, it is necessary that more epidemiological studies could be carried out, to serve as instruments for the definition of public policies, allowing the identification and characterization of priority geographic spaces for intervention, and to highlight existing inequalities in access to health<sup>(15)</sup>. The SUS organization itself concentrates a greater capacity of management and services, especially of medium and high complexities, in the South and Southeast regions, and in cities with a larger population size<sup>(4,5)</sup>.

The existing inequalities in the insertion of the response to HIV and in the presence of situations that can favor directions for the occurrence of AIDS are shown to be quite complex, configuring aggregation of regional sub-epidemics<sup>(15,19)</sup>. Despite the achievements made in mortality reduction, awareness campaigns should not be reduced, as well as the distribution of condoms, the encouragement of rapid tests and the expansion of knowledge regarding to this disease among the population<sup>(23,24)</sup>.

These campaigns are important, because even though there have been drops in hospitalizations and mortality due to the HIV virus over the years, there are, in some countries and Brazilian states, much higher rates than expected, as corroborated by our research on Datasus.

It also made clear the need to rethink government campaigns designed to the regions, states and cities most affected by the disease, as well as targeting priority audiences. As shown by studies that state that most hospitalizations and deaths resulting from HIV are of men (almost 70%), young people, between 28 and 41 years old (almost 50%), and also by ethnicity, since almost 70% are of *pardos*<sup>(22,25)</sup>, evidencing once again the strong socioeconomic issue involved.

These data showed that in Brazil there is in fact a great difference in the rates of hospitalizations and deaths by region, with the Southeast region, for example, being the champion of these cases, presenting more than three times the number of cases in other regions, such as the Central-West, which is something that needs to be further investigated so that new actions and campaigns could be carried out in these regions.

That is because these numbers do not match the various factors that reduce the risks and mortality of the disease, such as technological advances, better knowledge of the etiopathogenesis of the virus<sup>(3)</sup>, anti-HIV<sup>(4)</sup> testing, new prophylactic and therapeutic methods, such as antiretrovirals<sup>(20,21)</sup>.

In Brazil, the STD AIDS program created by the Ministry of Health over the years was taken as an international example of fighting the disease, demonstrating that the actions to control the HIV virus have increased in order to prevent the progression of AIDS, the numbers of hospitalization and mortality<sup>(2-5)</sup>. However, for the numbers to continue decreasing even further, it is essential that new education actions, especially for young people, must be associated with the free distribution of condoms, testing and Post-Exposure Prophylaxis (PEP)<sup>(2,5)</sup>, mainly in the states of Southeast, South and Northeast regions, which have not been able to reduce these rates, as the North and Central-West regions have (according to DataSUS).

Strengths: The “strength” of this study is the fact that it is based on observational, quantitative, descriptive and transversal data collection research, carried out from information contained in Datasus.

Thus, it brings real and updated information, provided by the federal government and the Ministry of Health.

Limitation: The “limitation” is the fact that it brings information from 2010 to 2019, not counting, therefore, with information from the last 3 years, a very troubled and atypical period, due to the coronavirus pandemic, which may present a very different evolution compared with the previous periods. They present themselves as a new possibility of study for any additional research that is interested in the topic.

## CONCLUSION

This study concluded that HIV/AIDS is still a serious disease, manifesting itself as a public health problem for most countries, especially in Brazil, where several regions have not been able to reduce the rates of hospitalizations and deaths as expected.

The general objective answers itself, analyzing the evolution of hospitalizations and deaths in Brazilian regions in relation to HIV between the years 2010 and 2019, prove the initial hypothesis that, despite the severity and lack of a cure or vaccine for the disease, it could be better controlled.

Data on the evolution and mortality of the disease show that the country has not been able to reduce the rates of hospitalization and mortality from HIV, and that these remain stable, in spite of all the efforts of the government and the Ministry of Health to reduce these rates, with the Southeast appearing as the first region in contamination by the virus, as well as in hospitalization and mortality.

## Approval by the Human Research Ethics Committee

This study did not need approval by the ethics committee of “Universidade Vassouras”, as it only worked with bibliographic data and information available in Datasus.

## Participation of each author

BF: Writing – original draft, Writing – review & editing.  
SG: Writing – review e editing.

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## Conflict of interest

The authors declare no conflicts of interest.

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