

## **Analysis of epidemiological aspects of tuberculosis in municipalities of the interstate health care network of the middle São Francisco Valley, Brazil**

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### **ABSTRACT**

The text addresses tuberculosis (TB), an infectious disease caused by *Mycobacterium tuberculosis*, with varied forms of manifestation and prevalence mainly in the lungs. He discusses the situation of TB in Brazil, highlighting the country as one of the countries with a high burden of the disease. The study analyzes epidemiological aspects of TB in the Interstate Health Care Network of the Middle São Francisco Valley (PEBA Network), investigating factors such as ethnicity, gender, education and age group of the individuals, in addition to the correlation with HIV co-infection. Data were collected from 2001 to 2023 from the Notifiable Diseases Information System (SINAN) and analyzed in relation to the incidence and prevalence of the disease in the study area. The PEBA Network, established in 2011, aims to facilitate access to health care in the municipalities that comprise it, serving about 2 million users. The analysis shows an increase in the number of TB cases in Brazil between 2001 and 2022, with the Southeast Region having the highest prevalence. In the PEBA Network, there was a small decrease in cases in the same period, with the health regions of Petrolina/PE and Juazeiro/BA presenting the highest number of cases.

**Keywords:** Tuberculosis, Neglected diseases, Epidemiology, Collective health.

### **INTRODUCTION**

Tuberculosis (TB) is an infectious and transmissible disease caused by *Mycobacterium tuberculosis*. Although it mainly affects the lungs, it can affect other organs and systems of the body. This extrapulmonary form is more frequent in people living with HIV, especially those with weakened immune systems<sup>1</sup>. Regarding its evolution, the disease manifests itself in a varied way, with asymptomatic infection (about 95%), latent infection and active infection, depending on the individual's immune response. Despite advances in diagnosis and treatment, TB persists as a relevant public health problem in some countries. Currently, Brazil occupies a prominent global position in relation to the total number of cases, being classified by the World Health Organization as a country with a high burden of the disease<sup>2</sup>.

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This study aims to analyze epidemiological aspects of TB in municipalities that make up the Interstate Health Care Network of the Middle São Francisco Valley (PEBA Network), investigating the correlation of the disease with ethnicity, sex, education and age group of individuals, co-infection with HIV and forms of the disease, in addition to verifying the updating and representativeness of the data available in SINAN-Net in relation to the local reality of the municipalities.

## **MATERIALS AND METHODS**

This is an ecological, cross-sectional, and descriptive study of confirmed TB cases treated at the PEBA Network from January 2001 to December 2023. Data were obtained from secondary sources and in the public domain, in the Notifiable Diseases Information System (SINAN), available at the Department of Informatics of the Unified Health System (DATASUS) of the Ministry of Health, according to the municipality of residence, in the area covered and in the period delimited for the study. Subsequently, the incidence coefficients and prevalence of diseases in the study area were calculated, entered into Excel® spreadsheets, and then graphs and tables were generated for descriptive analysis, with absolute values and percentages, showing the prevalence and incidence of the findings.

## **RESULTS**

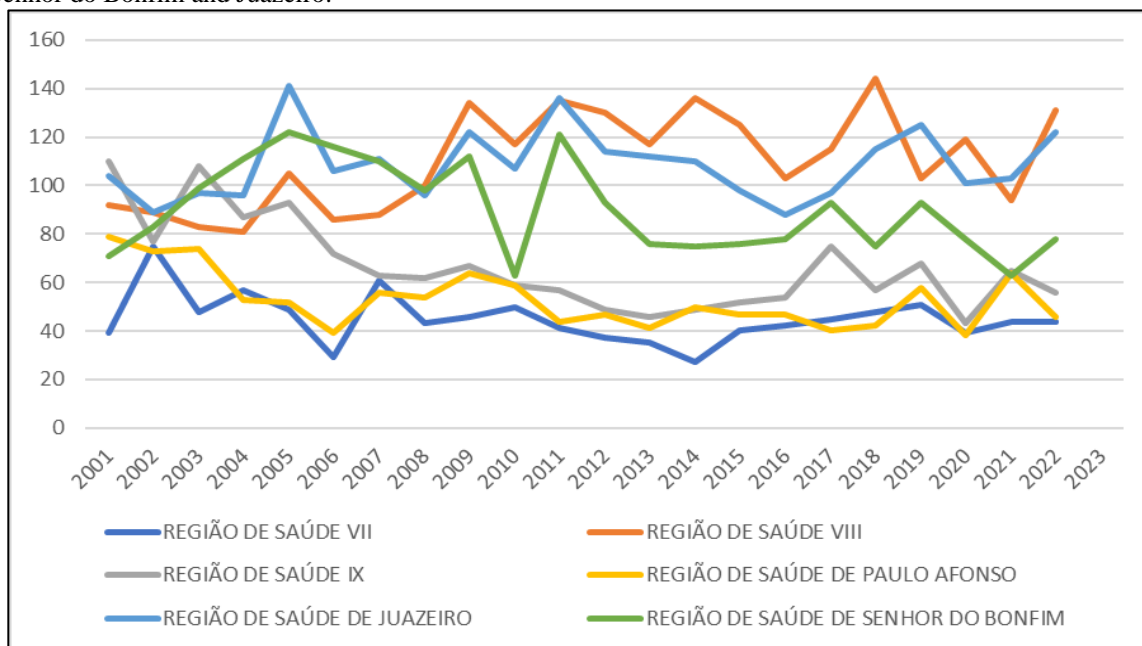
The PEBA Network was established in 2011, with the purpose of reorganizing services and facilitating access to medium and high complexity health care in the 53 municipalities that make up it in the states of Pernambuco and Bahia, serving about 2 million users. In the state of Pernambuco, the health regions of Salgueiro, Petrolina and Ouricuri belong to the network, while the health regions of Paulo Afonso, Senhor do Bonfim and Juazeiro belong to the state of Bahia.

The analysis of the national TB scenario between 2001 and 2022 shows an increase in the number of cases, with 81,432 cases recorded in 2001 and 103,766 cases in 2022 (27.4% increase). Cases of the disease predominate in the Southeast Region (44.3%), followed by the Northeast Region (26.26%), North Region (13.4%), South Region (11.8%) and Central-West Region (4.8%).

In the PEBA Network, in the same period, a small decrease in the number of cases (3.64%) was recorded, considering that in 2001 495 cases of the disease were registered and, in 2022, 477 cases. Throughout the study period, no great variation was observed in this percentage, with an average value of 494.45 cases registered per year. The analysis of the absolute number of cases reported by health region of the PEBA network shows that the largest number of TB cases is concentrated in the health regions of Petrolina/PE (23.33%) and Juazeiro/BA (22.9%), the two most populous in the study area, with 1,084,505 inhabitants in 2022, corresponding to 51.6% of the community analyzed.

The municipalities of Petrolina/PE (17.7% of cases by 2022), Juazeiro/BA (14.11% of cases by 2022) and Cabrobó/PE (1.9% of cases by 2022) deserve to be highlighted. Outside the health regions of Petrolina and Juazeiro, the municipalities of Salgueiro/PE (5.5% of cases by 2022) and Senhor do Bonfim/BA (6.57% of cases by 2022) stand out, which are the main municipalities of their respective health regions (Figure 1).

Figure 1 - Number of tuberculosis cases in the PEBA Network, from 2001 to 2023. Health regions in Pernambuco: VII region - Salgueiro region, VIII region - Petrolina region, IX region - Ouricuri region. Health regions in Bahia: health regions of Paulo Afonso, Senhor do Bonfim and Juazeiro.



Regarding the incidence and number of cases in relation to gender, there is a predominance of cases in males (66.5%). Throughout the network, there was a predominance of cases in individuals aged 30 to 39 years (20.4%), followed by populations aged 40 to 49 years (18.5%), 20 to 29 years (17.07%) and 50 to 59 years (14.85%). It should be noted that in children under 1 year of age, there were only 100 occurrences recorded (0.86%) and from 1 to 4 years old, the number was 97 (0.83%). With regard to race, the predominance of the disease in the brown race (63%) is notorious, in addition to a large number of notifications with data on unknown/white race (10% of the total).

During the period analyzed, 493 cases of HIV-associated TB were recorded, about 4% of the total cases. A fact that draws attention in this scenario is the number of ignored/blank cases for this parameter, 54% of the total. Regarding the forms of tuberculosis, there was a predominance of the pulmonary form (90.7%), followed by the extrapulmonary form (8.08%) and the pulmonary + extrapulmonary form (1.1%). In the period analyzed, there were 3 cases in which no form of tuberculosis was identified.



## **FINAL CONSIDERATIONS**

The interpretation of these data should be considered broadly, given that, although there was a reduction in the absolute number of cases, over the period analyzed, there was no significant decrease in the number, a fact that shows the great negligence regarding the implementation of measures aimed at the eradication of the pathology and its proper treatment. In addition, undiagnosed and underreported cases during the period cannot be disregarded. During data collection in TABNET/DATASUS, a large number of cases were reported incompletely, with unknown/blank information, resulting, above all, from the incomplete completion of notifications in the system, which directly impacts the real understanding of the epidemiological behavior of the disease. By understanding this information, government agencies and civil organizations will be able to direct efforts to intensify surveillance, control and coping actions with infections, aiming to reduce or eliminate them, in addition to strengthening the actions of managers in the execution of their roles with society.



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