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ORIGINAL ARTICLE

# CLINICAL-EPIDEMIOLOGICAL PROFILE OF PEOPLE AFFECTED BY HIV/AIDS, TUBERCULOSIS AND LEPROSY IN PARANÁ, BRAZIL, 2010-2019

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## ABSTRACT

**Objective:** to characterize the clinical-epidemiological profile of people affected by HIV/Aids, tuberculosis and leprosy in Paraná, between 2010 and 2019. **Method:** descriptive study, quantitative approach, with data from the Information System of Notifiable Diseases. The population was defined as new cases of HIV/Aids, tuberculosis and leprosy reported between 2010 and 2019 in Paraná. For the analysis, descriptive statistical techniques were used. **Results:** between 2010 and 2019, 14,149 cases of HIV/Aids, 7,868 of leprosy and 22,147 of tuberculosis were registered. There was a predominance of cases among men, with white race/color and (in)complete elementary school for the three diseases. There was a higher number of HIV/Aids notifications among adolescents and adults up to 39 years old, tuberculosis among adults in an economically active phase and leprosy among adults over 50 years old. In addition, there was an increase in HIV/Aids among homosexuals and bisexuals, deaths from tuberculosis and children/adolescents with leprosy. **Conclusion:** the profile of adult men with low schooling evidenced in this study was similar to the literature, which suggests possibilities of management, with a view to proposing strategies aimed at controlling HIV/Aids, tuberculosis and leprosy at the state level.

**Keywords:** Communicable diseases. HIV. Tuberculosis. Leprosy. Health profile.

## INTRODUCTION

In Brazil, despite the reduction in morbidity and mortality observed in the last 60 years, infectious diseases persist as a public health problem[1-2]. Although the country has undergone several demographic, social and health changes, especially with the implementation of the Unified Health System (UHS), the care model was not adjusted to the current needs, which result from the coexistence of transmissible and non-communicable conditions, both acute and chronic[3-4].

Infection with human immunodeficiency virus (HIV), tuberculosis (TB) and leprosy are considered chronic transmissible conditions due to the persistence in time in the individual and the need for an integrated health system, able to provide permanent and continuous care through adequate, effective and qualified prevention, treatment and control strategies[4].

In this context, HIV/Aids, TB and leprosy are part of a multifaceted scenario, which makes the work of health surveillance complex concerning the identification, consolidation, evaluation and dissemination of information that aims to support actions and decisions in health, emphasizing the importance of investigations, especially in the particularities of each region, with a view to local surveillance of those

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diseases[5].

Brazil is the second most endemic country in the world for leprosy. However, between 1990 and 2016, there was a reduction of around 94.3% of its prevalence[3]. Regarding TB, since the beginning of its monitoring in 1981, there has been a decrease in the incidence[3], although Brazil continues to have a high burden of infection. In addition, the HIV/Aids epidemic in the country showed an increasing trend at the beginning of this millennium, with stability in the number of cases between 2007 and 2016[3].

In 2019, Brazil registered 76,791 new cases of TB, of which 2,278 (2.9%) corresponded to the state of Paraná[6]. In the same year, the country registered 27,759 new cases of leprosy, of which 582 (2.1%) were reported in Paraná[6]. Regarding HIV/Aids, 37,731 cases were diagnosed in Brazil in 2019, and the state of Paraná represented 4.9% (1,868) of this number[6].

It has been sought, with difficulty, the inversion of the care system of reactive and episodic responses, which aim at coping with acute conditions, for a proactive, continuous and integrated model in networks that seeks to monitor chronic conditions[4]. Therefore, the need for effective articulation between health services, interconnected by an effective and timely surveillance system, becomes urgent.

In this sense, the design of the clinical-epidemiological profile of health conditions allows pointing out the specificities of a given population and, thus, subsidizing the development and implementation of actions and public policies aimed at the attention of their needs, considering the particularities evidenced, in order to guarantee assertive measures regarding surveillance, treatment and control, especially in the context of emerging and reemerging transmissible conditions.

Therefore, recognizing the importance of HIV/Aids, TB and leprosy for public health, health surveillance and organization of health services, and considering that the three listed infections are priorities in the health agenda of the state of Paraná, as well as for the Ministry of Health, this study intended to answer the question: What is the clinical-epidemiological profile of cases of HIV, tuberculosis and leprosy in the state of Paraná?

The results found may contribute to the identification of the characteristics of people affected by the aforementioned diseases and, thus, base the best direction of actions, strategies and public health policies in the region. Therefore, the objective was to characterize the clinical-epidemiological profile of people affected by HIV/Aids, tuberculosis and leprosy in Paraná, between 2010 and 2019.

## METHOD

This is a descriptive, quantitative study, based on secondary data and based on the checklist Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for observational studies in epidemiology[7]. Data were collected in the Information System of Notifiable Diseases (SINAN), of the Department of Informatics of the Unified Health System (DATASUS)[6], on August 2, 2022.

Paraná, the scenario of this study, presented, in 2021, an estimated population of 11,597,484 inhabitants, with a territorial area of 199,298,981 km$^2$ and human development index, for 2010, of 0.749[8]. The study population consisted of cases of HIV/Aids, TB and leprosy diagnosed between 2010 and 2019 in the state of Paraná. Only records whose entry in the SINAN referred to a new case were included and variables with unknown/blank records were disregarded.

The time frame is justified by the possibility of influence of the COVID-19 pandemic in the records of the listed diseases, Therefore, it was decided not to consider the pandemic years in this study in order to avoid possible interferences arising from underreporting and/or underdetection of cases during the period, which could mask the epidemiological reality of the characteristics of the affected individuals.

To systematize the collection, variables were listed for each infection, considering the availability in SINAN. The data were compiled and presented in tables with absolute and relative frequency. Furthermore, the percentage change of variables from the ratio of subtraction between the percentages of 2018-2019 (end of series) and 2010-2011 (beginning of series), by the percentages of 2010-2011, and the result multiplied by 100. The analyses were performed

in the software SPSS®, version 20.1.

This study was developed in line with the norms and guidelines of Resolutions n. 466/2012 and n. 510/2016 of the National Health Council. Therefore, it was authorized by the 15th Regional Health of Paraná and was approved by the Research Ethics Committee of the State University of Maringá, under Certificate of Presentation of Ethical Assessment (CAAE) n. 34788720.8.0000.0104.

## RESULTS

Between 2010 and 2019, 14,149 cases of HIV/Aids were recorded in the state of Paraná, the majority (67.6%) being male, with a predominance of the age group of 15 to 39 years (55.7%). Regarding race/color and schooling, the majority were white (74.0%) and had (in)complete elementary school (50.0%). There was a predominance of heterosexuals as an exposure category (67.7%) (Table 1).

**Table 1.** Clinical-epidemiological characteristics of HIV/Aids cases in the state of Paraná – Paraná, Brazil, 2010-2019.

| Variable | | n | % | Var |
|---|---|---|---|---|
| **Sex (n=14,149)** | | | | |
| | Male | 9,570 | 67.6 | 21.3 |
| | Female | 4,579 | 32.4 | -34.1 |
| **Age group(n=14,149)** | | | | |
| | 0 - 14 years | 154 | 1.1 | -70.1 |
| | 15 - 29 years | 3,700 | 26.2 | 18.3 |
| | 30 - 39 years | 4,168 | 29.5 | -17.5 |
| | 40 - 49 years | 3,312 | 23.4 | -12.4 |
| | 50 - 59 years | 1,998 | 14.1 | 10.4 |
| | 60 yearsor more | 817 | 5.8 | 85.0 |
| **Race/color (n=13,657)** | | | | |
| | White | 10,113 | 74.0 | -9.5 |
| | Black/brown | 3,433 | 25.1 | 33.4 |
| | Yellow/indigenous | 111 | 0.8 | 10.7 |
| **Education (n=11,930)** | | | | |
| | Illiterate | 207 | 1.7 | -45.9 |
| | (In)complete elementary school | 5,969 | 50.0 | -30.4 |
| | (In)complete high school | 3,711 | 31.1 | 38.8 |
| | (In)complete higher education | 1,945 | 16.3 | 81.9 |
| | Not applicable | 98 | 0.8 | -69.0 |
| **Exposure category (n=12,983)** | | | | |
| | Homosexual | 2,858 | 22.0 | 81.1 |
| | Bisexual | 651 | 5.0 | 85.4 |
| | Heterosexual | 8,787 | 67.7 | -16.6 |
| | Injecting drug use | 498 | 3.8 | -56.7 |
| | Hemophiliac | 3 | 0.0 | 194.5 |
| | Transfusion | 4 | 0.0 | 0.0 |
| | Vertical transmission | 182 | 1.4 | -61.5 |

**Source:** SINAN.

There was a 34.1% reduction in HIV/Aids in women and 70.1% in individuals between 0 and 14 years. On the other hand, there was an increase of 95.4% in people aged 50 years or more, 33.4% of the occurrence of HIV/Aids in black/brown people and 81.9% in people with (in)complete higher education. There was also an increase of 81.1% in exposure among homosexuals and 85.4% among bisexuals (Table 1).

Regarding tuberculosis, 22,147 new cases were recorded in the state of Paraná, the majority (68.5%) being male, white (67.1%), with (in)complete elementary school (64.3%) and predominance of the age group from 25 to 44 years (42.0%). There was a higher number of cases reported with the pulmonary form (81.5%) and evolution to cure (82.2%) (Table 2).

There was a reduction of 11.0% in TB in women and 14.5% in individuals between 0 and 14 years. On the other hand, there was an increase of 22.6% in people aged 55 years or more, of 11.5% of the occurrence of TB in black/brown people and of 27.1% in people with (in)complete high school. There was also an increase of 14.8% of the pulmonary + extrapulmonary form and 19.7% of the outcome death from TB (Table 2).

**Table 2.** Clinical-epidemiological characteristics of tuberculosis cases in the state of Paraná – Paraná, Brazil, 2010-2019.

| Variable | | n | % | Var |
|---|---|---|---|---|
| **Sex (n=22,147)** | | | | |
| | Male | 15,166 | 68.5 | 5.7 |
| | Female | 6,981 | 31.5 | -11.0 |
| **Age group (n=22,147)** | | | | |
| | 0 - 14 years | 567 | 2.6 | -14.5 |
| | 15 - 24 years | 3,538 | 16 | 11.6 |
| | 25 - 34 years | 4,769 | 21.5 | -2.7 |
| | 35 - 44 years | 4,550 | 20.5 | -10.6 |
| | 45 - 54 years | 3,904 | 17.6 | -4.6 |
| | 55 - 64 years | 2,694 | 12.2 | 14.8 |
| | 65 yearsor more | 2,125 | 9.6 | 7.8 |
| **Race/color (n=21,644)** | | | | |
| | White | 14,523 | 67.1 | -5.0 |
| | Black/brown | 6,810 | 31.5 | 11.5 |
| | Yellow/indigenous | 311 | 1.4 | -3.6 |
| **Education (n=18,384)** | | | | |
| | Illiterate | 763 | 4.2 | -23.9 |
| | (In)complete elementary school | 11,813 | 64.3 | -5.4 |
| | (In)complete high school | 4,326 | 23.5 | 27.1 |
| | (In)complete higher education | 1,194 | 6.5 | 19.0 |
| | Not applicable | 288 | 1.6 | -8.5 |
| **Form (n=22,143)** | | | | |
| | Pulmonary | 18,044 | 81.5 | 1.5 |
| | Extrapulmonary | 3,405 | 15.4 | -10.2 |
| | Pulmonary + Extrapulmonary | 694 | 3.1 | 14.8 |
| **Outcome situation (n=20,502)*** | | | | |
| | Cure | 16,861 | 82.2 | 1.5 |
| | Abandonment | 1,418 | 6.9 | -7.9 |
| | Death from tuberculosis | 855 | 4.2 | 19.7 |
| | Death from other causes | 1,368 | 6.7 | -20.7 |

*The other closing variables were disregarded, since the inclusion in the notification/investigation form only occurred in 2015.

**Source:** SINAN.

Finally, in relation to leprosy, in the study period, 7,868 new cases were recorded in the state of Paraná, the majority (59.0%) being male, with a predominance of the age group of 50 years or more (56.6%). Most were white (71.5%) and had (in)complete elementary school (70.1%). There was a higher number of cases of multibacillary form (77.8%) and evolution to cure (87.3%) (Table 3).

**Table 3 –** Clinical-epidemiological characteristics of leprosy cases in the state of Paraná – Paraná, Brazil, 2010-2019.

| Variable | | n | % | Var |
|---|---|---|---|---|
| **Sex (n=7,867)** | | | | |
| | Male | 4,642 | 59.0 | -1.9 |
| | Female | 3,225 | 41.0 | 2.9 |
| **Age group (n=7,868)** | | | | |
| | 0 - 14 years | 103 | 1.3 | 8.8 |
| | 15 - 29 years | 780 | 9.9 | -12.9 |
| | 30 - 39 years | 1,052 | 13.4 | -19.7 |
| | 40 - 49 years | 1,474 | 18.7 | -19.4 |
| | 50 - 59 years | 1,963 | 24.9 | -6.5 |
| | 60 yearsor more | 2,496 | 31.7 | 36.6 |
| **Race/color (n=7,767)** | | | | |
| | White | 5,554 | 71.5 | -6.1 |
| | Black/brown | 2,154 | 27.7 | 17.1 |
| | Yellow/indigenous | 59 | 0.8 | -12.0 |
| **Education (n=6,988)** | | | | |
| | Illiterate | 789 | 11.3 | -22.0 |
| | (In)complete elementary school | 4,896 | 70.1 | -8.0 |
| | (In)complete high school | 1,017 | 14.6 | 57.0 |
| | (In)complete higher education | 267 | 3.8 | 41.6 |
| | Not applicable | 19 | 0.3 | 93.1 |
| **Operational classification in diagnosis (n=7,868)** | | | | |
| | Paucibacillary | 1,745 | 22.2 | -36.6 |
| | Multibacillary | 6,123 | 77.8 | 13.1 |
| **Type of outcome (n=7,868)** | | | | |
| | Cure | 6,865 | 87.3 | -10.2 |
| | Transfer | 338 | 4.3 | 71.7 |
| | Death | 200 | 2.5 | -3.9 |
| | Abandonment | 169 | 2.1 | 37.9 |
| | Not filled | 163 | 2.1 | 806.2 |
| | Diagnostic error | 133 | 1.7 | -26.6 |

**Source:** SINAN.

There was a 2.9% increase in leprosy in women and 8.8% in individuals between 0 and 14 years. There was also an increase of 36.6% in people aged 60 years or more, 17.1% of the occurrence of leprosy in black/brown people and 57.0% in people with (in)complete high school education. It was also noted a decrease of 36.6% of the paucibacillary form and 10.2% of the evolution to cure, and an increase of 37.9% of the treatment abandonment (Table 3).

## DISCUSSION

The findings showed a predominance of cases of HIV/Aids, TB and leprosy among men, with white race/color and (in)complete elementary school. There was a higher number of HIV/Aids notifications among adolescents and adults up to 39 years, among adults in periods of occupational productivity and leprosy among adults over 50 years. In addition, there was an increase in HIV/Aids among homosexuals and bisexuals, deaths from TB and children/adolescents with leprosy.

The higher frequency of males in the health conditions listed coincides with evidence that places men as more vulnerable to the occurrence of numerous health problems[9]. This fact can be attributed to the devaluation of the innumerable conditions to which man is most susceptible, to the unawareness of poor strategies for prevention and promotion of men's health, and to the adoption of attitudes and risk behaviors for various diseases, especially those of transmissible character[9-10].

The identification of the highest incidence of those diseases in males is important to direct public policies and thus develop actions with a greater focus on men's health, both at the local and state levels[9]. Thus, it is evident an agenda that needs to be improved in the state of Paraná, in order to expand the promotion of preventive and care practices with the male population at the interface with chronic diseases on the agenda.

In relation to the epidemiological aspects of leprosy, the results are similar to studies whose results indicate a predominance in people with low education and white race/color[11-13]. It is known that the disease tends to be common in adults, however, the occurrence in children is an important marker of surveillance of community transmission[14]. In this study, there was an increase in the number of cases in the age group from 0 to 14 years, following an alert to state authorities.

Concerning clinical aspects, the findings corroborate research by showing a higher frequency of multibacillary form[14-15]. This reality represents a public health problem, given the high potential to cause complications and physical disabilities, especially in individuals affected by the multibacillary form, which have a higher bacterial load[15]directly and indirectly in the social and occupational life of the carrier.

In the case of TB, the results are in line with the literature by showing a predominance in people with low education and aged between 20 and 39 years[16-17]. It is necessary to take into account the determinant social aspect linked to TB, which is directly related to poverty, low level of education and poor sanitary conditions[18]. Moreover, TB is associated with the economically active age group, in which individuals develop activities for family support and reduce the search for health services[17].

Therefore, it is imperative the interlocution of the TB control program with other public policies, especially those of social assistance, in an attempt to outline intersectoral strategies as a way to enable social protection for people with TB, in an integral and humanized way. This problem becomes even more critical in the state of Paraná, since there was an increase in the frequency of deaths from the disease between 2010 and 2019, arising the need for immediate intervention.

In relation to the epidemiological profile of HIV/Aids, the findings corroborate the literature by finding greater occurrence in individuals between 20 and 39 years old, heterosexual and with low education[19-20]. Nevertheless, there was an increase in infection among the elderly, which may be associated with active sexual life among the public, whose sexual relations are still permeated by various risk behaviors for exposure and transmission of HIV[21].

On the other hand, there was a decrease in the number of cases among individuals aged 0 to 14 years, as well as a reduction in transmission from mother to fetus. These findings suggest successful results of the implementation of

public policies of maternal and child health in Paraná, especially because of the strategies linked to the *Rede MãeParanaense*, among which stands out the effective performance of the prenatal care for high-risk pregnant women in a timely manner[22].

Furthermore, it is worth mentioning the increase in the number of cases among homosexual and bisexual people evidenced in the state between 2010 and 2019. Among the scenarios, such data may be associated with the adoption of risky sexual practices, such as the non-use of condoms and multiple partnerships, which are drastically aggravated when these individuals experience situations of prejudice and discrimination[23].

In short, the results of the clinical-epidemiological profile of people affected by the diseases listed in Paraná were not divergent between the years analyzed and corroborated the evidence in the literature. Thus, the information in this study reinforces the need for greater investments in prevention, early diagnosis and adherence to treatment, given that HIV/Aids, TB and leprosy remain as conditions of importance for public health, mainly by the chronic character.

Thus, control programs for those diseases should act together, in order to structure local action plans aimed at the promotion of health education strategies, and employ surveillance to active search of cases – especially between contacts –, expansion of testing and early access to treatments. Thus, the intention is to break with the hegemony of the current care model in the country, adapting to the needs of chronic transmissible conditions.

Given the above, studies analyzing the clinical-epidemiological profile are extremely necessary to direct measures aimed at reducing new cases by breaking the chain of transmission[24]. Therefore, it is essential to use secondary data, which serve as a source of information for the evaluation and planning of public policies.

Thus, there is an urgent need for actions to increase the compliance of notification in the surveillance system, since the absence of information and underreporting compromise the planning of health actions and hinder epidemiological control, decreasing the reliability of the data[25]. This problem may have been even more evident in the pandemic context due to the prioritization of the provision of services and actions to face COVID-19 at the expense of pre-existing conditions.

This study has limitations, since there is the possibility of poorly filling/not filling out data in notification forms, records in systems and records in health services, which can culminate in a non-representativeness of the data in front of reality. Thus, inadequate filling can mask or suggest gaps in the clinical-epidemiological profile evidenced.

## CONCLUSION

Between 2010 and 2019, there was a predominance of males, of white race/color and in the young/adult age group for the occurrence of HIV/Aids, TB and leprosy in Paraná. As for the specificities, there was persistence of multiculturalism cases of leprosy, an increase in the number of deaths due to TB and the number of HIV/Aids cases among homosexual and bisexual people.

In this sense, the results found may, in addition to enabling the identification of the most common characteristics among individuals affected by the listed infections, suggest possibilities of action for management, with a view to proposing strategies aimed at controlling HIV/Aids, TB and leprosy at the state level.

Thus, there is the need to intensify prevention and diagnosis strategies, as well as health promotion and education actions, aiming at breaking the chain of transmission and, consequently, reducing the number of new cases of those infections in the state. Moreover, new investigations about the clinical-epidemiological panorama of those diseases are raised, especially in the pandemic context.

## PERFIL CLÍNICO-EPIDEMIOLÓGICO DAS PESSOAS ACOMETIDAS POR HIV/AIDS, TUBERCULOSE E HANSENÍASE NO PARANÁ, BRASIL, 2010-2019

## RESUMO

**Objetivo:** caracterizar o perfil cínico-epidemiológico das pessoas acometidas por HIV/Aids, tuberculose e hanseníase no Paraná, entre 2010 e 2019. **Método:** estudo descritivo, de abordagem quantitativa, com dados provenientes do Sistema de Informação de Agravos de Notificação. A população foi definida como os casos novos de HIV/Aids, tuberculose e hanseníase notificados entre 2010e 2019, no Paraná. Para a análise, foram utilizadas técnicas de estatística descritiva. **Resultados:** entre 2010 e 2019, foram registrados 14.149 casos de HIV/Aids, 7.868 de hanseníase e 22.147 de tuberculose. Houve predomínio de casosentre homens, com raça/cor branca e ensino fundamental (in)completo para os três agravos. Evidenciou-se maior número de notificações do HIV/Aids entre adolescentes e adultos com até 39 anos, da tuberculose entre adultos em fase economicamente ativa e da hanseníase entre adultos com mais de 50 anos. Ademais, observou-se aumento do HIV/Aids entrehomossexuais e bissexuais, dos óbitos por tuberculose e de crianças/adolescentes com hanseníase. **Conclusão:** o perfil de homens adultos com baixa escolaridade evidenciado neste estudofoi semelhante à literatura, o que sugere possibilidades de atuação para profissionais da assistência, vigilância e gestão, com vistas à proposição de estratégias direcionadas ao controle do HIV/Aids, da tuberculose e da hanseníasea nível estadual.

**Palavras-chave**: Doenças transmissíveis. HIV. Tuberculose. Hanseníase. Perfil de saúde.

## PERFIL CLÍNICO-EPIDEMIOLÓGICO DE LAS PERSONAS AFECTADAS POR VIH/SIDA, TUBERCULOSIS Y LEPRA EN PARANÁ, BRASIL, 2010-2019

## RESUMEN

**Objetivo**: caracterizar el perfil clínico-epidemiológico de las personas afectadas por VIH/sida, tuberculosis y lepra en Paraná/Brasil, entre 2010 y 2019. **Método**: estudio descriptivo, de abordaje cuantitativo, con datos provenientes del Sistema de Información de Agravios de Notificación. La población fue definida como los casos nuevos de VIH/sida, tuberculosis y lepra notificados entre 2010 y 2019, en Paraná/Brasil. Para el análisis, se utilizaron técnicas de estadística descriptiva. **Resultados**: entre 2010 y 2019 se registraron 14.149 casos de VIH/sida, 7.868 de lepra y 22.147 de tuberculosis. Hubo predominio de casos entre hombres, con raza/color blanco y enseñanza primaria (in)completa para los tres agravios. Se evidenció mayor número de notificaciones del VIH/sida entre adolescentes y adultos de hasta 39 años, de la tuberculosis entre adultos en fase económicamente activa y de la lepra entre adultos de más de 50 años. Además, se observó aumento del VIH/sida entre homosexuales y bisexuales, de los óbitos por tuberculosis y de niños/adolescentes con lepra. **Conclusión**: el perfil de hombres adultos con baja escolaridad evidenciado en este estudio fue similar a la literatura, lo que sugiere posibilidades de actuación para profesionales de la asistencia, vigilancia y gestión, con vistas a proponer estrategias dirigidas al control del VIH/sida, la tuberculosis y la lepra a nivel estatal.

**Palabras clave**: Enfermedades transmisibles. VIH. Tuberculosis. Lepra. Perfil de salud.

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