


## **QUALITY AND MANAGEMENT OF CARE TO TUBERCULOSIS/HIV COINFECTION IN THE STATE OF SÃO PAULO, BRAZIL**


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### **ABSTRACT**

**Objective:** to analyze the quality and management of care to tuberculosis/HIV coinfection in the state of São Paulo, Brazil.

**Methods:** a descriptive study involving municipalities having at least five cases of tuberculosis/HIV coinfection in the Brazilian state of São Paulo notified in the tuberculosis notification system. To analyze the quality and management of care to tuberculosis/HIV coinfection, indicators were designed, based on tuberculosis evaluability assessment studies, and validated in Brazil. The municipalities were grouped according to their care quality and then submitted to multiple correspondence analysis.

**Results:** the study formed a group with 18 municipalities (42.86%) with satisfactory care and management quality, and another group with 24 municipalities (57.14%) with a quality characterized as unsatisfactory. In the municipalities that showed a satisfactory result, the investigation identified a low proportion of tuberculosis/HIV coinfection, a low AIDS incidence rate, intermediate population size, and high coverage of the Community Health Workers' Program and Family Health Strategy. The municipalities with unsatisfactory quality had a high proportion of tuberculosis/HIV coinfection and a high AIDS incidence rate.

**Conclusion:** the study reveals the defining characteristics of quality and management of care to tuberculosis/HIV coinfection as chronic conditions, bringing relevant elements regarding the mobilization of resources and investments in the municipalities where these are necessary. Additionally, the investigation shows that health results are critical where care quality is unsatisfactory, pointing out the need for reorganizing care and the management of actions involving control of tuberculosis/HIV coinfection in these contexts.

**DESCRIPTORS:** Acquired immunodeficiency syndrome. Tuberculosis. Health services research. Operations research. Quality of health care. Health management.

**HOW CITED:** Campoy LT, Arakawa T, Andrade RLP, Netto AR, Monroe AA, Arcênio RA. Quality and management of care to tuberculosis/HIV coinfection in the state of São Paulo, Brazil. *Texto Contexto Enferm* [Internet]. 2019 [cited YEAR MONTH DAY]; 28:e20180166. Available from <http://dx.doi.org/10.1590/1980-265X-TCE-2018-0166>

# A QUALIDADE E GESTÃO DA ATENÇÃO À COINFECÇÃO TUBERCULOSE E HIV NO ESTADO DE SÃO PAULO

## RESUMO

**Objetivo:** analisar a qualidade e gestão da atenção à coinfeção tuberculose e HIV no estado de São Paulo.

**Método:** estudo descritivo, realizado com municípios de residência de pelo menos cinco casos de coinfeção tuberculose e HIV no estado de São Paulo, notificados no sistema de notificações de tuberculose. Para análise da qualidade da atenção e gerenciamento da coinfeção tuberculose e HIV foram construídos indicadores, com base em estudos de avaliabilidade em tuberculose, validados no Brasil. Os municípios foram agrupados conforme sua qualidade da atenção e depois foram submetidos à análise de correspondência múltipla.

**Resultados:** no estudo, formou-se um grupo com 18 municípios (42,86%) com satisfatória qualidade da atenção e gerenciamento, e outro grupo com 24 (57,14%) municípios caracterizados como não satisfatório. Nos municípios com resultado satisfatório, identificou-se baixa proporção de coinfeção tuberculose HIV, baixa taxa de incidência de aids, porte populacional médio, elevada cobertura de Programas de Agentes Comunitários de Saúde e Estratégia Saúde da Família. Para os demais municípios com qualidade não satisfatória, observou-se alta proporção de coinfeção tuberculose e HIV e taxa de incidência de aids.

**Conclusão:** o estudo evidencia as características definidoras da qualidade da atenção e gerenciamento da coinfeção tuberculose e HIV enquanto condições crônicas, trazendo elementos relevantes no que tange à mobilização de recursos e investimentos nos municípios onde isso se faz necessário. Além disso, mostra que os resultados sanitários são críticos onde não há satisfatória qualidade da atenção, mostrando a necessidade de reorganização da assistência e do gerenciamento das ações que envolvem o controle da coinfeção tuberculose e HIV nesses contextos.

**DESCRITORES:** Síndrome de imunodeficiência adquirida. Tuberculose. Avaliação de serviços de saúde. Pesquisa operacional. Qualidade da assistência à saúde. Gestão em saúde.

# CALIDAD Y GESTIÓN EN LA ATENCIÓN DE LA COINFECCIÓN TUBERCULOSIS Y VIH EN EL ESTADO DE SÃO PAULO

## RESUMEN

**Objetivo:** analizar la calidad y gestión en la atención de la coinfección tuberculosis y VIH en el estado de São Paulo.

**Método:** estudio descriptivo, realizado en municipios donde residen al menos cinco casos de coinfección de tuberculosis y VIH en el estado de São Paulo, informados al sistema de notificaciones de tuberculosis. Para analizar la calidad de atención y gestión de la coinfección tuberculosis/VIH fueron elaborados indicadores basados en estudios evaluativos en tuberculosis validados en Brasil. Los municipios fueron agrupados según su calidad de atención, sometiéndoselos luego a análisis de correspondencia múltiple.

**Resultados:** el estudio conformó un grupo con 18 municipios (42,86%) de calidad de atención y gestión satisfactorias, y otro con 24 (57,14%) municipios caracterizados como no satisfactorios. En los municipios con resultados satisfactorios se identificó baja proporción de coinfección tuberculosis y VIH, baja tasa de incidencia de SIDA, cantidad poblacional mediana, elevada cobertura de Agentes Comunitarios de Salud y Estrategia Salud de la Familia. En los municipios no satisfactorios se observó alta proporción de coinfección tuberculosis e VIH y tasa de incidencia de SIDA.

**Conclusión:** el estudio evidencia las características que definen la calidad de atención y gestión de la coinfección tuberculosis y VIH como condiciones crónicas, destacando elementos relevantes respecto de movilización de recursos e inversión en los municipios donde eso resulta necesario. Además, muestra que los resultados sanitarios son críticos donde no hay calidad de atención satisfactoria, expresando necesidad de reorganización de la atención y gestión de las acciones que involucran al control de la coinfección tuberculosis y VIH en tales contextos.

**DESCRIPTORES:** Síndrome de inmunodeficiencia adquirida; Tuberculosis; Investigación en servicios de salud; Investigación operativa; Calidad de la atención de salud; Gestión en salud.

## INTRODUCTION

The World Health Organization (WHO) registered around 10.4 million new cases of tuberculosis (TB) in 2015 and 1.8 million deaths resulting from the disease in the same year, of which 400 thousand were of people living with HIV/AIDS (PLWHA).<sup>1</sup> In Brazil, TB/HIV coinfection is a relevant subject, given that individuals coinfecting with TB and HIV show high treatment default (11.6%) and death (17.8%) rates,<sup>2</sup> and that TB is the main disease associated with death among PLWHA.<sup>3-4</sup>

In Brazil, the state of São Paulo stands out with the highest number of TB and AIDS cases in the country and having approximately 9.9% of the cases of TB with coinfection by HIV<sup>2</sup>. In 2016, the state had an incidence of 36.4 TB cases per 100 thousand people, with a cure rate of 78.9% and a treatment default rate of 10.2%. Among the total number of new TB cases, 84% tested for HIV and 44.7% received a directly observed treatment (DOT). Among people coinfecting by HIV, 22.5% were under antiretroviral therapy.<sup>5</sup>

The overlap of TB and HIV epidemics has posed a challenge to public health regarding the detection and therapy of both chronic conditions, as well as to the organization of health services and governmental agencies,<sup>6-8</sup> given that the problem demands a proactive, integrated, and continuous system, focused on promoting and maintaining health and surpassing the cure approach.<sup>9-10</sup> Consequently, there is a great need for a shared action between the Brazilian Tuberculosis Control Program (TCP) and the Brazilian Sexually Transmitted Diseases/AIDS and Viral Hepatitis Program to establish as priorities the reduction of the load of the diseases, outline and operationalization of strategies oriented toward early detection, and proper and timely treatment and follow-up of the cases.<sup>11</sup>

The End TB Strategy, proposed by WHO, points out TB/HIV coinfection, the fragility of health systems, and the lack of human resources as the main barriers to control TB. This situation confirms the need for commitment and attention to the third pillar of the strategy, regarding promotion and execution of operational research, especially in countries with a high disease load, such as Brazil.<sup>12-15</sup> These studies are important to TB and HIV programs because they contribute to improving these actions and help identify the operational challenges to be overcome to control both diseases.<sup>16-21</sup>

A bibliographic search carried out in the Latin America and Caribbean Center on Health Science Information (LILACS) and PubMed (MEDLINE) databases aiming at finding operational studies related to care to TB/HIV coinfection published between 2012 and 2017 identified 13 articles pertinent to the examined subject, which were classified into five main axes according to their results: Active search for TB/HIV;<sup>22-24</sup> TB/HIV diagnosis and treatment;<sup>25-26</sup> Educational activities to control TB/HIV;<sup>27</sup> Interaction between TB/HIV-related services;<sup>28-29</sup> and Evaluation of operational indicators of the TB/HIV program.<sup>16-20</sup> The last one is the focus of the present study, in addition to contributing to the production of knowledge about care to TB/HIV coinfection in the Brazilian context.

Currently, there is great concern about achieving high quality not just in adapting services for disease diagnosis and handling, but also organizing services toward prevention, avoiding new episodes and/or recurrences.<sup>30</sup> A study on the evaluability assessment by the TCP indicated that evaluating quality indicators may contribute to producing knowledge and improving control actions, leading to a reduction in losses and social problems.<sup>31</sup>

Taking the study by Coelho et al.<sup>31</sup> as a comparison matrix, the present investigation had the objective of analyzing the quality and management of care to TB/HIV coinfection in the state of São Paulo, Brazil.

## METHODS

This was an epidemiological descriptive study<sup>32</sup> carried out in 42 municipalities in the Brazilian state of São Paulo. The municipalities with new cases of TB coinfecting by HIV notified and registered at the Notification and Monitoring of TB Cases System (TBWEB) in 2014 were considered as observation units. In the mentioned year, 1,345 cases of TB with coinfection by HIV were registered in 200 municipalities in the state. The investigation included municipalities with over 20 thousand people which notified at least five new cases of TB with coinfection by HIV in 2014, excluding cases in the penitentiary system and those which showed a change of diagnosis or patients who moved to another state. As a result, the present study included 42 municipalities, which accounted for 73.3% of the TB/HIV cases registered in the state.

The investigation was performed in two steps, following the proposal for normative assessment of programs.<sup>33</sup>

In the first step, TBWEB data were collected in January 2017, consisting of clinical (clinical type, diagnostic sputum smear microscopy, diagnostic sputum culture, and culture of other materials) and treatment follow-up variables of the new TB cases with coinfection by HIV (DOT indication, DOT execution, sputum microscopy for monthly control, number of identified contacts, number of examined contacts, and outcome).

At this point in the study, the indicators of quality of care and management of TB/HIV coinfection were calculated for 2014. The calculation followed the standards established by the TCP Handbook of Recommendations<sup>34</sup> and used the investigation on evaluability assessment for care to TB by Coelho et al.<sup>31</sup> as a reference. The quality indicators were: proportion of cure among the new TB cases coinfecting by HIV; proportion of treatment default among the new TB cases coinfecting by HIV (primary defaults were not considered in this calculation); proportion of deaths among new TB cases coinfecting by HIV; proportion of new cases notified by the municipality where TB patients lived; proportion of new cases of pulmonary TB coinfecting by HIV that underwent sputum microscopy in the beginning of the treatment; proportion of new TB cases coinfecting by HIV and diagnosed with bacteriological confirmation (positive result for TB in sputum microscopy, sputum culture, and histology tests); proportion of indicated DOT among the new TB cases coinfecting by HIV; proportion of DOT carried out among the new TB cases coinfecting by HIV with indication; and proportion of examined contacts among the identified contacts of the new TB cases coinfecting by HIV.

Starting from the value calculated in these indicators, the classification of the municipalities was carried out using cluster analysis (CA) through the k-means nonhierarchical method,<sup>35</sup> making up groups according to the quality of the TB/HIV coinfection care and management. Cluster analysis allowed the identification of two groups, one with municipalities showing satisfactory quality and another with municipalities showing unsatisfactory quality.

The second step of the study tested the association between the groups formed in CA (passive variable) and the characteristics of the examined municipalities (active variables) based on multiple correspondence analysis (MCA).<sup>36</sup>

The characteristics of the municipalities considered in the present investigation were: population size, region in the Epidemiological Surveillance Group, classification regarding being a priority for TB control, population coverage of the Community Health Agents Program (*Programa de Agentes Comunitários de Saúde* – PACS), and Family Health Strategy (*Estratégia Saúde da Família* – ESF), TB and AIDS incidence rates, and proportion of TB/HIV coinfection.

The classification regarding being a priority for TB control was based on the technical note of the Brazilian Ministry of Health no.15 CGPNCTIDEVEP/SVSIMS, which establishes priority criteria for TB control in Brazil.<sup>37</sup>

Data collection was carried out in July 2017 by consulting TBWEB, public databases of the Brazilian Institute of Geography and Statistics, the Departments of Primary Care of the Ministry of Health, and the Department of Data Processing of the Unified Health System (DATASUS), and the website of the Center for Epidemiological Surveillance (CVE, as per its acronym in Portuguese) of the Health Secretariat of the State of São Paulo.<sup>38</sup> The quantitative variables were categorized into three ranges based on the 30 and 70 percentiles, with range 1 designated as low, range 2 classified as intermediate, and range 3 considered high.

To meet the recommendations listed in Resolution no. 466/12 of the Brazilian National Health Council and in guidelines and standards that regulate human research. As the study used secondary data, exemption of the free and informed consent form was requested. The coordinator of the Tuberculosis Control State Program of CVE/CCD/SES-SP authorized data collection. Confidentiality and secrecy of any piece of information collected were ensured in all the steps of development of the project and kept after its completion.

## RESULTS

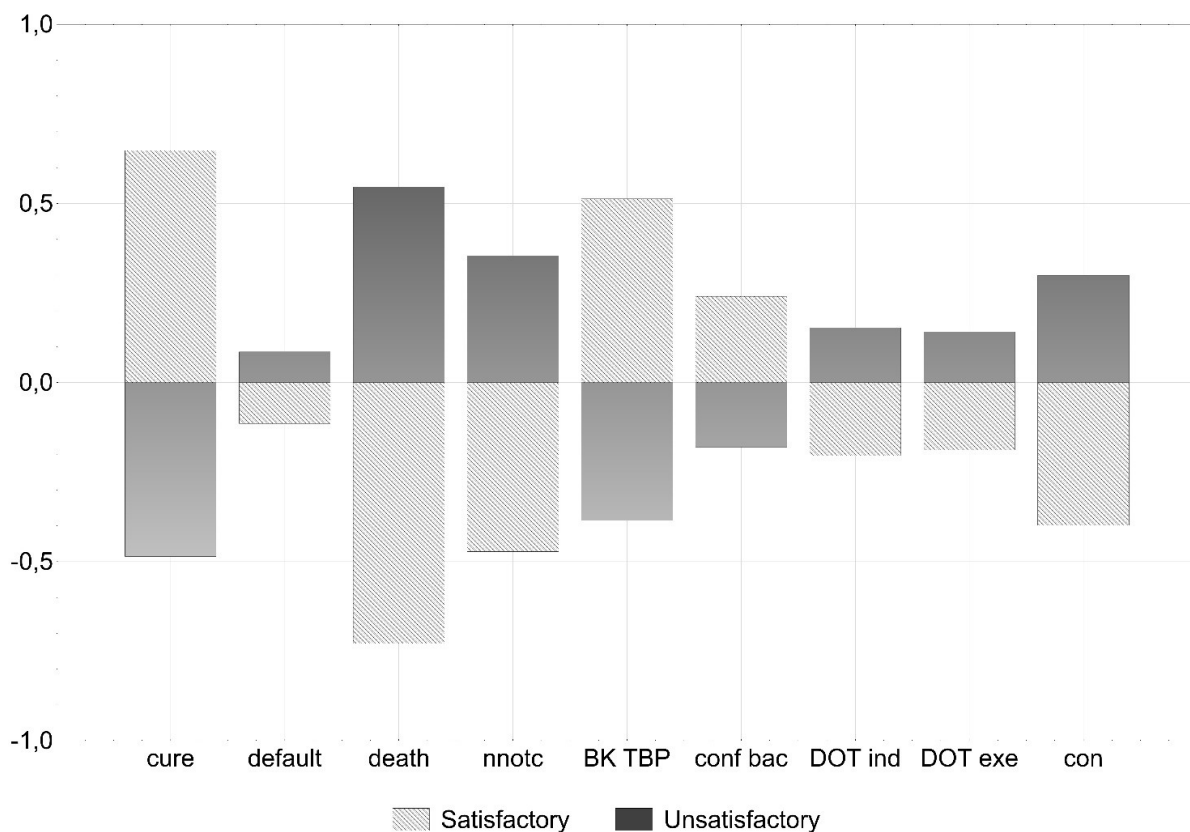
The first step of the present study resulted in the formation of group 1, with 18 municipalities (42.86%) that showed satisfactory performance, and group 2, with 24 municipalities (57.14%) that had unsatisfactory quality (Chart 1).

**Chart 1** - Distribution of the municipalities included in the present study, according to the classification obtained using cluster analysis, São Paulo (2014)

Groups	Municipalities
Group 1 Satisfactory (n=18)	Araraquara, Campinas, Carapicuíba, Diadema, Embu das Artes, Ferraz de Vasconcelos, Guarujá, Hortolândia, Itanhaém, Itapetininga, Itapevi, Jundiaí, Mogi das Cruzes, Osasco, Praia Grande, São Vicente, Sumaré, and Ubatuba.
Group 2 Unsatisfactory (n=24)	Americana, Barretos, Barueri, Bauru, Cotia, Cubatão, Franca, Guarulhos, Itaquaquecetuba, Jacareí, Mauá, Piracicaba, Presidente Prudente, Ribeirão Preto, Rio Claro, Santo André, Santos, São Bernardo do Campo, São José do Rio Preto, São José dos Campos, São Paulo, Sertãozinho, Sorocaba, and Taubaté.

Examination of the groups formed using nonhierarchical CA identified that group 1 showed a high cure rate and a low death rate, in addition to a low proportion of new TB cases notified by the municipality where the TB patients lived and a high proportion of microscopy tests in the diagnosis of pulmonary cases. Because of these characteristics, this group was classified as having a satisfactory performance (Figure 1).

Group 2 was classified as showing unsatisfactory quality for having a lower cure rate and more deaths. It also had a high proportion of new cases notified by the municipality where the TB patients lived and low proportion of microscopy tests in the diagnosis of pulmonary cases (Figure 1).



**Figure 1** – Histogram of municipality groups resulting from nonhierarchical cluster analysis regarding the performance in tuberculosis control in people living with HIV/AIDS, São Paulo (2014)

**Caption:** cure: Proportion of cure among the new TB cases coinfecting by HIV; default: Proportion of treatment default among the new TB cases coinfecting by HIV; death: Proportion of deaths among the new TB cases infected by HIV; nnotc: Proportion of new TB cases notified by the municipality where the TB patients lived; BK TBP: Proportion of new pulmonary TB cases coinfecting by HIV that underwent sputum microscopy in the beginning of the treatment; conf bac: Proportion of new TB cases coinfecting by HIV diagnosed with bacteriological confirmation; DOT ind: Proportion of directly observed treatment (DOT) indicated among the new TB cases coinfecting by HIV; DOT exe: Proportion of DOT performed among the new TB cases coinfecting by HIV with indication; con: Proportion of examined contacts among the identified contacts of the new TB cases coinfecting by HIV. Observation: standardized values.

The means of the care and management quality indicators of the municipalities in São Paulo regarding TB control in people living with HIV showed a statistically significant difference in the group comparison in the following items: proportion of cure among the new TB cases coinfecting by HIV, proportion of deaths, proportion of new TB cases notified by the municipality where the TB patients lived, proportion of sputum microscopy tests carried out in the diagnosis of new pulmonary TB cases coinfecting by HIV, and proportion of examined contacts among the identified ones (Table 1).

In the second step of the present study, application of MCA allowed to define dimensions 1 and 2 with eigenvalues equal to 0.354 and 0.311. Table 2 indicates the dimension each variable belongs to according to the highest absolute contribution ( $\text{Cos}^2$ ).

**Table 1** – Distribution of means and standard deviations of operational indicators of municipalities in the Brazilian state of São Paulo according to their performance regarding tuberculosis control in people living with HIV/AIDS. São Paulo, Brazil, 2014

Indicator	Satisfactory (n=18)	Unsatisfactory (n=24)	p*
	Mean±SD	Mean±SD	
Proportion of cure among new TB cases coinfecting by HIV	72.1±14.3	51.5±15.8	0.0001†
Proportion of treatment default among new TB cases coinfecting by HIV	13.8±14.5	16.5±12.7	0.5271
Proportion of deaths among new TB cases coinfecting by HIV	12.6±8.4	30.3±12.3	0.0000†
Proportion of new TB cases notified by the municipality where the TB patients lived	66.9±26.8	85.9±15.8	0.0065†
Proportion of sputum smear microscopy tests in the diagnosis of new cases of pulmonary TB coinfecting by HIV	98.6±3.3	85.9±16.6	0.0028†
Proportion of new TB cases coinfecting by HIV diagnosed with bacteriological confirmation	67.2±16.0	58.7±22.6	0.1807
Proportion of indicated DOT among new TB cases coinfecting by HIV	61.4±28.2	71.1±26.3	0.2559
Proportion of carried out DOT among new TB cases coinfecting by HIV with indication	25.1±25.3	33.7±27.0	0.2965
Proportion of examined contacts among new TB cases coinfecting by HIV among the identified contacts	36.0±34.9	60.0±30.7	0.0232†

\*F test; †p<0.05

**Table 2** – Correlation measures for the categories of demographic, health system organization, and epidemiological characteristics, and the respective dimensions associated in the factorial plane. São Paulo, Brazil, 2014

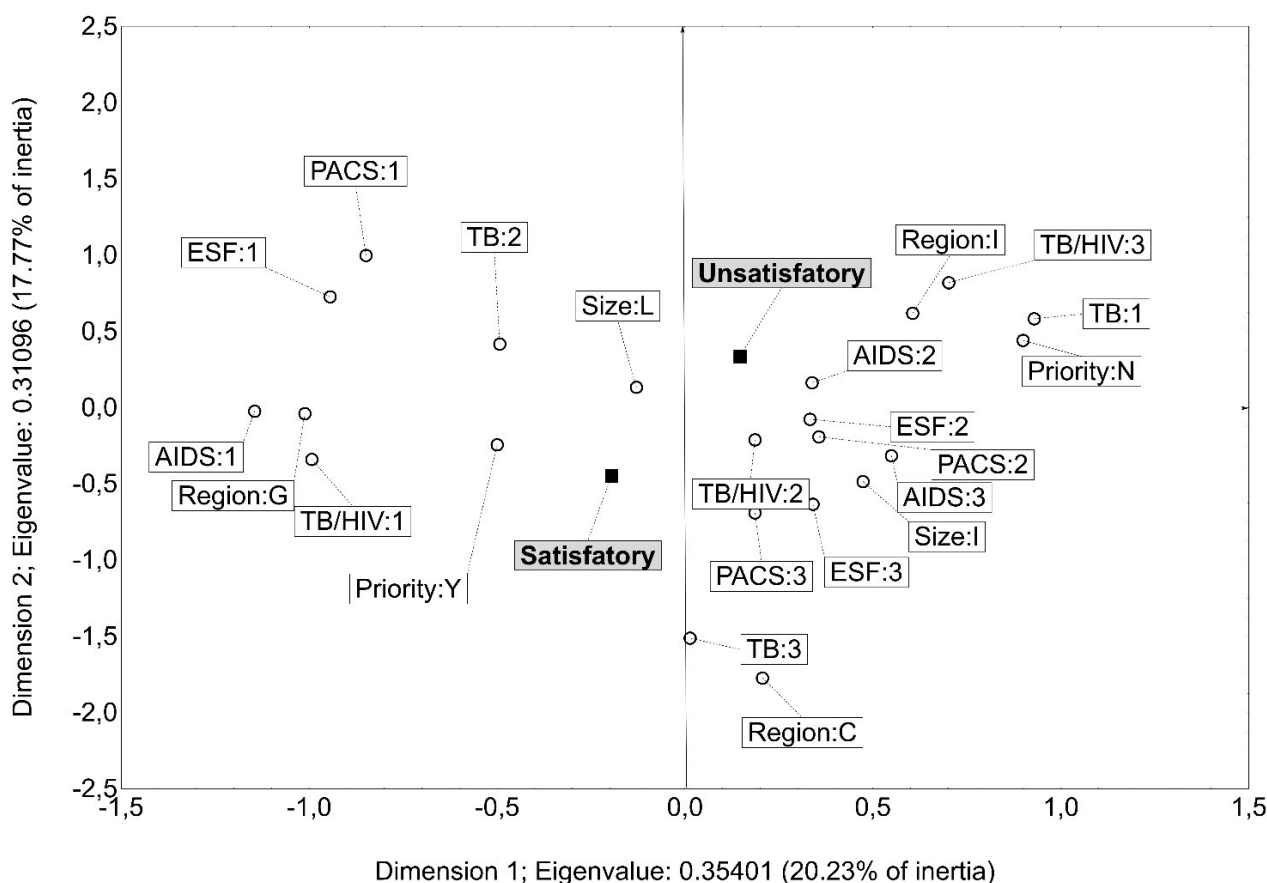
Category	Cos <sup>2*</sup>	Cos <sup>2*</sup>	Dimension
	Dimension 1	Dimension 2	
Populational size			
Intermediate	0.0611	0.0644	2
Large	0.0611	0.0644	
Region			
Coast	0.0085	0.6292	2
Interior	0.3670	0.3822	
Greater São Paulo area and capital	0.5117	0.0008	
Priority			
Yes	0.4495	0.1079	1
No	0.4495	0.1079	
Coverage of the Community Health Workers' Program			
PACS_1	0.2556	0.3531	2
PACS_2	0.1267	0.0373	
PACS_3	0.0108	0.1495	
Coverage of Family Health Strategy			
ESF_1	0.3165	0.1869	2
ESF_2	0.1106	0.0061	
ESF_3	0.0362	0.1259	

**Table 2 – Cont.**

Category	Cos <sup>2*</sup> Dimension 1	Cos <sup>2*</sup> Dimension 2	Dimension
Tuberculosis incidence rate			
TB_1	0.3063	0.1200	2
TB_2	0.2432	0.1729	
TB_3	0.0001	0.7153	
AIDS incidence rate			
AIDS_1	0.4653	0.0002	1
AIDS_2	0.1144	0.0054	
AIDS_3	0.0943	0.0313	
Tuberculosis/HIV coinfection rate			
TB/HIV_1	0.3499	0.0411	1
TB/HIV_2	0.0346	0.0090	
TB/HIV_3	0.1538	0.0641	

\*Cos<sup>2</sup> = correlation measures

Both dimensions, when represented in the MCA perceptual map, showed inertia of 38.0%, as shown in Figure 2.



**Figure 2 –** Perceptual map of the association between clusters and demographic, health system organization, and epidemiological characteristics of tuberculosis and AIDS, São Paulo (2014)

**Caption:** Size – I: Intermediate population size, L: Large population size; Region – I: Interior, C: Coast, G: Greater São Paulo area and capital; Priority – Y: priority municipality in TB control, N: nonpriority municipality in TB control; TB: TB incidence rate and its respective ranges (1-low, 2-intermediate, 3-high); AIDS: AIDS incidence rate and its respective ranges (1-low, 2-intermediate, 3-high); TB/HIV: Proportion of cases of TB/HIV coinfection and its respective ranges (1-low, 2-intermediate, 3-high); ESF: Coverage of Family Health Strategy and its respective ranges (1-low, 2-intermediate, 3-high); PACS: Coverage of the Community Health Agents Program and its respective ranges (1-low, 2-intermediate, 3-high).



Analysis of the perceptual map revealed that the characteristics “priority municipality in TB control”, “proportion of TB/HIV coinfection cases - range 1”, and “AIDS incidence rate - range 1” are on the negative side of dimension 1. The municipalities with satisfactory performance in controlling TB in PLHA are associated with these characteristics. The characteristics “non-priority municipality”, “proportion of TB/HIV coinfection cases – ranges 2 and 3”, and “AIDS incidence rate - ranges 2 and 3” are associated with the municipalities with unsatisfactory performance on the positive side of dimension 1 (Figure 2).

The negative side of dimension 2 contains the municipalities with satisfactory performance associated with the variables “intermediate population size (50 thousand to 200 thousand people)”, “coast region”, “coverage of the Community Health Workers’ Program - range 3”, “coverage of Health Family Strategy - range 3”, and “TB incidence rate - range 3”. The positive side of this dimension shows the unsatisfactory group associated with the variables “interior region”, “coverage of the Community Health Agents Program - range 1”, “coverage of Health Family Strategy - range 1”, and “TB incidence rate – ranges 1 and 2” (Figure 2).

The variables “Greater São Paulo area and capital”, “large population size”, “coverage of the Community Health Agents Program - range 2”, and “coverage of Health Family Strategy – range 2” approached the origin of the perceptual map (zero point), representing the profile of most examined municipalities (Figure 2).

## DISCUSSION

The study showed that there are significant differences among the municipalities regarding care quality. The municipalities in the state of São Paulo that had a satisfactory performance also had a high PACS and ESF coverage and are considered priority in TB control, whereas the municipalities with an unsatisfactory performance had a high AIDS incidence and a high proportion of TB/HIV coinfection.

The challenges to control TB in people coinfecting by HIV can be illustrated by the proportion of default and deaths, both of which higher than the value advocated by the Brazilian Ministry of Health (5% and 1%, respectively) in the two examined groups, resulting in a low cure rate.

For TB treatment, the Ministry of Health recommends that the DOT be indicated to every case. But both DOT indication and execution are low in the studied municipalities, which may hinder achieving satisfactory treatment outcome indicators, since that was the result obtained in an operational study carried out in the state of São Paulo to evaluate the performance of the TCP.<sup>21</sup>

The high coverage of PACS and ESF in the municipalities with a satisfactory quality was identified as one of the strengths in the control of the TB/HIV coinfection. It is believed that these municipalities have a more structured primary care and, consequently, a better ordering and coordination of the care network. Additionally, the decentralization of TB control actions, which occurred in most smaller municipalities, presupposes the incorporation of an active search for respiratory symptoms in primary care, together with the request of diagnostic tests, patient follow-up through monthly appointments, DOT, contacts’ control, active search for patients who missed appointments, and discharge.<sup>39–40</sup> Larger municipalities, in turn, despite having a higher health service coverage, may face problems in implementing PACS and ESF, either because of insufficient population coverage by primary care, or inefficient reference systems between the complexity levels, or low adherence of professionals to these services.<sup>21,41</sup>

Another study demonstrated that ESF played a relevant role in TB control, given that the examined municipalities adopted this strategy as a primary care public policy and carried out actions not only at Health Units, but also at home, working on the active search for infected individuals and promotion of adherence to the TB treatment.<sup>42</sup>

Another variable associated with the satisfactory performance refers to the ranking of a certain municipality as a priority in TB control. This classification followed epidemiological and operational criteria, and the last edition was issued in a technical note of the TCP in 2011.<sup>38</sup> Priority municipalities had the responsibility of achieving goals established by the Ministry of Health, which resulted in institutional learning regarding the execution of TB control activities. It is important to stress that these municipalities received financial incentives and visits to monitor the actions developed to control the disease locally.<sup>5</sup>

The group of municipalities with satisfactory performance was associated with the conditions of being located on the coast and having an intermediate population size. A possible explanation for this result is the fact that these characteristics are also found in most (71.4% and 55.6%, respectively) priority municipalities in TB control.

Concerning case notification, it is important to consider that TB and AIDS are stigmatized by individuals, families, and the community<sup>43</sup>, which may cause patients to seek a different place to obtain a diagnosis, including a nearby municipality, especially in the Great São Paulo and the coast region, where intermunicipal population flow is significant. The search for these areas confirms a remarkable centrality in health services, similarly to what is observed in education, culture, leisure, and job offers in these urban centers.<sup>44-45</sup>

Regarding pulmonary TB diagnosis in patients coinfecting by HIV, the proportion of sputum smear microscopy was high but the proportion of bacteriological confirmation was low in the group with satisfactory quality. These results may reflect operational barriers for the execution of diagnostic tests in health services, for instance low quality of sputum collection, resulting from inadequate guidance on the procedure, inadequate storage and transportation of samples, coinfection by HIV, which hinders the test reading, and flaws in the structure of the laboratories and during information exchange with health services.

The municipalities with an unsatisfactory performance were associated with a high proportion of TB/HIV coinfection and a high AIDS incidence rate, revealing that the difficulty in controlling HIV/AIDS leads to the difficulty in controlling TB. The literature shows that barriers and fragilities in prevention and control of TB in PLHA and HIV detection among new TB cases,<sup>46-48</sup> pointing out a lack of structuring of control programs of both diseases,<sup>46-47,49</sup> caused by administrative discontinuing, absence of autonomy in executive decisions and political patronage, and conflict of interests between political-partisan opponents.<sup>50</sup>

Consequently, the authors emphasize the importance of coordination and cooperation among TB and HIV/AIDS control programs, which, faced with the inherent complexity of the diseases, must strive to offer better care. Studies that evaluated the integration of TB and HIV services reported successful results in the control of the diseases, especially when home follow-up of vulnerable people is included.<sup>28-29</sup>

Another weakness shown by the municipalities examined in the present study refers to the control of people who had contact with infected patients, given that the proportion of examined contacts in the new TB/HIV cases was lower in the group with satisfactory quality, showing that this group neglects TB diagnosis among contacts while emphasizes actions involving the treatment of the cases. An investigation carried out in the south region of Brazil discusses the difficulty in examining household contacts, recommending the participation of primary care professionals in combination with patients' families to allow timely diagnosis and break the TB transmission chain.<sup>42</sup> A study lists the difficulties in detecting cases and points out the current care model as a limitation, because it hinders the development of collective work, coordinated with the real needs of the community, which contributes to keeping TB as a problem and a challenge for public health.<sup>51-52</sup>

The present study brings significant progress to the field by evaluating the quality of care and management in TB/HIV coinfection, identifying key variables to control both diseases, such as the need to increase the coverage of DOT, PACS, and ESF, improve TB diagnosis by controlling contacts, and promote actions oriented toward prevention of infection by HIV, contributing to reducing its incidence. Therefore, the present study offers resources for the achievement of the End TB goal and joint decision-making, seeking to improve the work process of health teams and consequently the quality of care and management in TB/HIV coinfection in the state of São Paulo.

The limitations identified in the present study were: a possible information bias resulting from the use of secondary data extracted from TBWEB and the impossibility of generalizing the results and identifying the details in the organization of care to TB in the municipalities, which makes it impossible to know whether the development of TB control actions is decentralized toward primary care.

## CONCLUSION

The municipalities with satisfactory performance are those that considered TB control a priority and showed high PACS and ESF coverage. In contrast, the municipalities with unsatisfactory performance had an association with a high AIDS incidence rate and a high proportion of TB/HIV coinfection cases, and showed better results regarding contacts' control. The present study shows the importance of the institutional learning required by care to TB/HIV coinfection in municipalities indicated to give priority to the development of TB control actions and reinforces the need for coordination of the TCP with the Brazilian HIV/AIDS Program and primary care services that offer care to people with TB coinfecting by HIV.

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## NOTES

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Data analysis and interpretation: Campoy LT, Arakawa T, Andrade RLP, Netto AR

Discussion of the results: Campoy LT, Arakawa T, Andrade RLP, Monroe AA, Arcênio RA

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### FUNDING INFORMATION

Projeto Universal CNPq - process no. 404124/2016-0.

### ETHICS COMMITTEE IN RESEARCH

Approved by the Ethics Committee in Research with Human Beings of the *Universidade de São Paulo, Escola de Enfermagem de Ribeirão Preto* no.1,617,513, CAAE: 54341216.9.0000.5393.

### CONFLICT OF INTEREST

There are no conflicts of interest.

### HISTORICAL

Received: May 04, 2018

Accepted: October 15, 2018

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