








## Bacteriological diagnosis of tuberculosis in prison inmates: actions taken by the primary health care teams in prisons

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### TO THE EDITOR:

Tuberculosis is a major public health problem in the penal institutions of Brazil, with a prevalence of 1,236 cases/100,000 population.<sup>(1)</sup> In a five-year period, the number of prison inmates in the Brazilian state of Rio Grande do Sul increased by 28%, reaching a total of 40,000 in 2018. In the same period, the prevalence of tuberculosis in prison inmates increased from 1,995 cases/100,000 population to 2,488 cases/100,000 population.<sup>(2,3)</sup>

The *Política Nacional de Atenção Integral à Saúde das Pessoas Privadas de Liberdade no Sistema Prisional* (PNAISP, National Policy for Comprehensive Health Care for Inmates of the Prison System) provides for the establishment of prison primary health care teams (pPHCTs) as a strategy to ensure the right of prison inmates to health. The pPHCTs are part of the Health Care Network, and their function is to improve the quality of primary health care in prisons and the quality of territorial coordination.<sup>(4)</sup> The duties of the pPHCTs include effective and timely surveillance of infectious diseases, such as tuberculosis.<sup>(5)</sup> In Rio Grande do Sul, the pPHCTs provide coverage for approximately 70% of prison inmates.<sup>(6)</sup> The expansion of coverage depends on municipal adherence to the PNAISP.

The bacteriological diagnosis of pulmonary tuberculosis (PTB) is established by the identification of individuals with respiratory symptoms and laboratory test results. Prison inmates are considered a specific, highly vulnerable population. Inmates who had had a cough for two weeks or more were classified as having respiratory symptoms. Bacteriological investigation includes sputum smear microscopy, mycobacterial culture, drug susceptibility testing, and rapid molecular testing.<sup>(7,8)</sup>

To collect data on actions for the bacteriological diagnosis of PTB in prison inmates treated by the 29 pPHCTs in Rio Grande do Sul, an e-mail invitation to complete a questionnaire, hosted on the LimeSurvey platform, was sent to all 29 teams. Data were requested for the period January to December 2017. Quantitative data were analyzed with the IBM SPSS Statistics software package, version 23.0 (IBM Corporation, Armonk, NY, USA). Values are expressed as absolute and relative frequencies.

The present survey is an arm of the project known as "Analysis of the dynamics of tuberculosis transmission and tuberculosis control strategies in prison settings in Rio Grande do Sul" and was approved by the Research Ethics Committee of the University of Santa Cruz do Sul,

located in the city of Santa Cruz do Sul, Brazil (Reference no. 2.170.472), in accordance with Brazilian National Health Council Resolution no. 466/2012. All participants gave written informed consent.

Of the 29 pPHCTs, 22 (75.9%) completed the questionnaire: 14 (48.3%) within the stipulated time period and 8 (27.6%) after being contacted again by e-mail or telephone. A total of 15,529 inmates, 14,634 (94.2%) of whom were male, were under the responsibility of these pPHCTs during the study period, corresponding to 55% of all prison inmates with pPHCT coverage in Rio Grande do Sul. Sixteen pPHCTs (72.7%) reported that their staff was complete and included all professionals recommended by current legislation.

The actions for the bacteriological diagnosis of PTB taken by the pPHCTs in 2017 are summarized in Table 1. The number of individuals identified with respiratory symptoms (N = 3,516) could be higher, because tuberculosis screening at prison entry and identification of individuals with respiratory symptoms were not performed by all pPHCTs. A study conducted in Rio Grande do Sul in 2010 identified a prevalence of 20.6% of individuals with respiratory symptoms among prison inmates in the city of Santa Cruz do Sul.<sup>(9)</sup>

All cases newly diagnosed through sputum smear microscopy, sputum culture, or rapid molecular testing were added to those already under treatment, resulting in a total of 463 cases of PTB in 2017, which corresponds to a prevalence of 2,981/100,000 population. Previous studies have reported lower prevalence rates, ranging from 1,236 cases/100,000 population among prison inmates in Brazil as a whole to 1,898 cases/100,000 population among those in southern Brazil.<sup>(1,8,9)</sup>

Sputum smear microscopy is the main diagnostic test and can detect 60-80% of PTB cases.<sup>(7)</sup> Eighteen pPHCTs (81.1%) reported being prepared to collect sputum samples. Mycobacterial culture is recommended for prison inmates, regardless of sputum smear results, because it increases the bacteriological diagnostic yield by 30%.<sup>(7)</sup> In the present study, we found that 9 pPHCTs (40.9%) followed that recommendation. The main reasons for not following the recommendation included a lack of knowledge, the fact that there was no protocol in place, and the absence of a regional referral center to perform the tests. Culture results confirm mycobacterial infection, species identification characterizes tuberculosis, and drug susceptibility testing determines whether the strain is resistant to the first-line drugs used to treat tuberculosis.<sup>(7)</sup>

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**Table 1.** Actions for the bacteriological diagnosis of pulmonary tuberculosis taken by prison primary health care teams (N = 22). Rio Grande do Sul, Brazil, 2017.

Diagnostic actions	pPHCT <sup>a</sup>		Actions taken, n
	n	%	
Tuberculosis screening	14	48.3	6,379
Identification of individuals with respiratory symptoms	16	72.7	3,516
Sputum smear microscopy	18	81.8	3,637
Sputum culture	16	72.7	2,005
Drug susceptibility testing	10	45.5	551
Rapid molecular testing	3	13.6	2,239

pPHCT: prison primary health care team. <sup>a</sup>pPHCTs that took diagnostic actions.

Rapid molecular testing for tuberculosis was routinely available to 3 pPHCTs (13.6%), which diagnosed 309 (70.1%) of the cases of tuberculosis and were responsible for 8,040 (51.7%) of the inmates. Rapid molecular testing is of great relevance to the timely diagnosis, treatment initiation, detection of rifampin resistance, and increased detection of tuberculosis cases among smear-negative patients.<sup>(7)</sup> The pPHCTs to which rapid molecular testing was available to diagnose tuberculosis are those that had access to a laboratory and ordered a significant number of sputum smear microscopy examinations as recommended by the Brazilian National Ministry of Health.<sup>(10)</sup>

One pPHCT ordered no diagnostic laboratory tests for PTB. Four pPHCTs working in small prisons did not diagnose any cases of tuberculosis, and 3 of those collectively investigated 23 patients and were responsible for 250 inmates (1.6%). In general, 18 pPHCTs (81.8%) took actions for the bacteriological diagnosis of PTB in prison inmates.

In our sample, 4 pPHCTs (18.2%) reported asking inmates about the presence of cough at prison entry. Tuberculosis screening at prison entry and periodic active case finding among individuals with respiratory symptoms are relevant strategies for tuberculosis control, because they allow early detection of the disease and disruption of the chain of transmission.<sup>(7)</sup>

All pPHCTs reported difficulties completing the questionnaire because of the frequent change or lack of lead professionals, lack/inadequacy of records, lack of technical knowledge, and lack of protocols for taking actions for the bacteriological diagnosis of PTB, all of which can be considered limitations of the present study.

In addition, the health care professionals reported that putting protocols into practice depended largely on the prison staff (guards), that there was insufficient staff to meet the demand, and that the physical plant was not appropriate for health care.

In summary, we identified a set of effective strategies for the diagnosis of PTB in the penal institutions in Rio Grande do Sul that limit the burden of the disease and its economic and social costs, thereby reducing the transmission of the disease to the general population. However, there is a need for monitoring, organization of workflows, and continuing education and training of health care and health safety workers in order to improve the quality of the diagnostic actions taken by the pPHCTs.

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