Reservoirs of Injustice:

How incarceration for drug-related offenses fuels the spread of tuberculosis in Brazil

A Report by the Yale Global Health Justice Partnership of the Yale Law School and School of Public Health

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The GHJP, established in 2012, is a collaboration by Yale Law School and Yale School of Public Health that promotes interdisciplinary teaching, scholarship, and practice to address problems at the intersection of global health, human rights, and social justice. It seeks to address these issues by bringing together scholars and leaders with diverse backgrounds and expertise.

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I. Executive Summary

Worldwide, tuberculosis (TB) kills more people than any other infectious disease.[1] TB is detectable and curable; however, connecting under-served populations—who are at a disproportionately high risk of contracting TB—with diagnostic tools and treatment remains a critical barrier to combating it.[2] Prisoners are especially vulnerable, and are on average 23 times as likely to contract TB as members of the general population.[3] Alarmingly, incarceration rates are accelerating in many countries,[4] driven in large part by harsh penalties for minor drug-related crimes, punitive sentencing, and lengthy pre-trial detention.[5] Human rights defenders and criminal justice organizations highlight these policies as an explanation for the explosion of the prison population and rampant overcrowding. Growing prison populations also threaten public health by increasing the total population exposed to TB and facilitating the spread of TB from prisons to free communities. Research has demonstrated that population-level increases in TB can plausibly be attributed to high levels of imprisonment.[6] Due to the interrelatedness of punitive drug policies, mass incarceration, and the spread of TB, efforts to curb the disease incidence must incorporate drug policy reform.

This report uses Brazil as a case study to demonstrate that punitive drug policies and the ensuing growth in incarceration have contributed to the spread of TB in the country. Research covered primary and secondary sources, including epidemiological studies, government reports, news articles, and scholarly research. The authors of this report also conducted interviews, remotely and in-person, with drug policy experts, public health researchers, advocates for prison reform, medical doctors, legal professionals, and other stakeholders in and outside of Brazil. By bringing together research from diverse sources, this report demonstrates the public health imperative to reform drug policy.

The criminal justice system in Brazil creates a perfect storm for TB transmission both inside and outside of prisons by targeting marginalized groups and thereby exacerbating social inequities and the underlying vulnerability of incarcerated populations. Prisoners are more likely to have additional risk factors that increase their likelihood of developing active TB, including malnutrition, substance abuse, and HIV.[7] People who are non-white, of low socio-economic status, and of low educational attainment are more likely to be incarcerated, where they face greater risk of contracting TB and transmitting the disease to people in their communities upon release. These groups are also more likely to have TB to begin with.[8] Channeling members of marginalized populations into a prison system that heightens their risk of disease perpetuates health inequities and class divisions within Brazil's society.

Brazilian drug policy, and its discriminatory implementation, have contributed to the huge growth in the prison population and have disproportionately impacted non-whites and women.[9,10] The proportion of prisoners incarcerated for drug-related offenses has risen dramatically in recent years,[11] in large part due to a 2006 drug law, which created a more punitive system for drug trafficking. The law fails to differentiate clearly between drug users and traffickers, providing arresting officers with broad discretion in determining whether individuals are arrested for trafficking or possession.[12] As a result, an influx of people charged with drug crimes is currently overburdening the prison system. Lengthy pre-trial detention and delays in transitioning prisoners to the next phase of their sentences has exacerbated overcrowding. While the use of custody hearings—in which individuals are brought before a judge within 24 hours of arrest to determine whether or not they should be detained prior to trial—has shown promising results for reducing overcrowding in pre-trial detention centers, various barriers have inhibited widespread implementation of the practice.

The rise in drug-related incarceration and ensuing growth in the prison population has far-reaching public health repercussions. TB remains a major public health threat in Brazil,[13] in large part due to the unchecked health crisis within its overcrowded, under-resourced prisons, where the TB notification rate is 31 times as high as that for the general population.[14] The incidence of TB among prisoners as well as the proportion of TB cases occurring among prisoners have both been increasing in recent years,[15,16] while the size of the prison population has increased drastically.[17] In 2016, prisons held almost twice as many prisoners as they were designed to house.[18] Overcrowded, poorly ventilated prisons promote the transmission of TB,[19] and overwhelmed prison systems cannot hope to provide medical care for all prisoners. In the current Brazilian political climate, prison conditions seem likely to deteriorate and overcrowding to intensify.

Prisons also act as reservoirs and amplifiers for TB, facilitating its spread to surrounding communities. Prison staff, visitors, and released prisoners can transmit the disease to their home communities. Epidemiological research in Brazil drawing on molecular technology has connected TB strains from within prisons to those identified beyond their walls.[20,21] Inadequate screening and diagnostic tools prevent prisoners with TB from being identified, and many prisons rely on prisoners to report their symptoms, which typically only occur at an advanced stage of the disease. The prevalent attitude that quality healthcare should be withheld from prisoners therefore undermines the health of free citizens.

This report offers recommendations for concrete and actionable strategies to curb the spread of TB both within and beyond prisons, while recognizing decarceration and drug policy reform as ultimately necessary to address these problems.

II. Foreword

The culture of incarceration in Brazil has a direct impact on the disturbing situation in the national penitentiary system. It contributes to the precariousness of prison conditions. In a country with continental dimensions, the diversity in political, ethnic, and cultural composition as well as socio-economic and health conditions are visible and palpable, varying from state to state. The levels of vulnerability of different populations are similarly varied, but those who are incarcerated stand out as particularly vulnerable.

Brazil's prison population has ranked in the world's top three largest. In most states, overcrowding is an important issue, along with inadequate delivery of basic and essential health care. These conditions hinder the possibilities of rehabilitation and render the prisoners more vulnerable, as they are likely to be exposed to communicable and chronic diseases. This problem has broader implications for public health.

The World Health Organization (WHO) reported that the incidence rate of tuberculosis (TB) in Brazil is 11 percent,[22] quite alarming for an estimated population of 209 million people. The WHO has also identified the HIV and TB co-infection incidence rate as 5.3 percent in the country. In prisons, the TB notification rate is over 31 times higher than in the general population.[23] These numbers illustrate the severity of the risks of transmission among prisoners. Consequently, the diagnosis and management of TB and other co-infections among those who are in prisons is a huge challenge.

It is worth remarking that this report shows alarming inequalities and health vulnerabilities among inmates, which will require cross-sector public policy actions to remedy. This study is an eye-opener and a reminder to reconsider efforts to incarcerate people for minor offenses and to detain those waiting for their trials, which expose more people to greater risks. Those who survive incarceration often must bear the burden of both diseases contracted in prison as well as the stigma of having been imprisoned–clear examples of double marginalization.

The study will be a source of reference and hopefully will spark initiatives from policy makers. Congratulations to the team who did the research.

—Erwin Lloyd Guillergan, MD, MPH
Director of the Brazilian Medical Unit, Doctors without Borders/Médecins Sans Frontières

III. Introduction

Tuberculosis (TB) remains a major public health threat in Brazil, which ranks among the World Health Organization's top 30 high-burden countries for TB.[24] The persistence of TB within the Brazilian prison system is an important factor that undermines national efforts to combat the disease. The TB notification rate among those in prison is more than 31 times higher than that of the overall population,[25] and the number of people at risk of acquiring TB within prisons continues to rise dramatically. The prison population more than doubled between 2005 and 2016,[26] and punitive drug policies have driven much of this growth.[27] This report will demonstrate how mass incarceration of low-level drug offenders has led to overcrowding and deplorable conditions in prisons, which fosters the spread of TB and renders adequate access to medical care for prisoners virtually impossible.

This situation has dire consequences for the health of prisoners, but they are not the only ones affected, as TB contracted within prison facilities spreads beyond to free communities. Mass incarceration may therefore increase the risk of TB across the national population, crippling national efforts to control the disease.

This report argues that reducing incarceration for drug offenses is a critical and overlooked strategy for fighting TB in Brazil. It brings together research from diverse sources to advance a heretofore novel argument on the public health imperative to reform drug policy. The link between punitive changes in drug policies and increases in incarceration rates has been extensively documented by organizations and academics studying human rights and criminal justice. Likewise, the understanding that prisons foster the spread of infectious disease, particularly TB, has been well-established for over a century.

To build this argument, Section V of this report charts the rapid rise in the prison population in recent years and the resulting deterioration in prison conditions. It also covers the institutional factors that contribute to the spread of TB and the demographic characteristics of those most affected.

Detainees at the Curado prison complex in Recife sleep in a hallway due to overcrowding. *Photo Credit: Human Rights Watch, 2015*

Next, Section VI addresses the factors that have resulted in more people entering prison, focusing on drug policies and their implementation. Section VII discusses the wider public health repercussions of TB in prisons, explaining how prisons act as reservoirs and amplifiers for the disease. Drawing from recent epidemiological research, this section explains how TB spreads from prisons to communities. Finally, this report puts forward recommendations that are intended to describe concrete and actionable ways to address TB inside prisons in Brazil, including ways to reduce the numbers of people passing through the prison system who are exposed to higher risks of the disease.

In Brazil, the current prison system functions to reinforce and exacerbate societal inequities, with marginalized groups over-represented in the prison population. Those who are racial and ethnic minorities, of low socio-economic status, and of low educational attainment are more likely to be incarcerated, particularly for drug offenses, and prisoners face increased risks of contracting TB. Being incarcerated and having TB both have the effect of deepening poverty and vulnerability by leading to stigmatization, disruptions to employment, and dislocations from communities.[28] Channeling members of oppressed groups into a disease-ridden prison system limits their chances for social mobility and perpetuates class divisions within society. As this report suggests, addressing mass incarceration for nonviolent crimes, including minor drug offenses, is a critical component of achieving progress towards a more equitable society in Brazil. Current policies that contribute to high incarceration levels and the recent economic crisis and recession have far-reaching health consequences that extend beyond prisoners, potentially making the entire population less healthy.

The connections between punitive drug policies, the rise in imprisonment, and the spread of TB documented in this report are not unique to Brazil. Rather, they point to a crisis at a global scale that demands that drug policy reform be introduced into discussions of international efforts to curb TB. TB continues to kill more people worldwide than any other infectious disease.[29] In 2015, on average over three people died of TB every minute.[30] Effective diagnosis and treatment exist, but reaching vulnerable, under-served populations, particularly people who are incarcerated, remains a key challenge to combating the disease. Worldwide, those in prison are at a 23 times higher risk of having TB compared to those in the general population.[31] This at-risk population has been rising dramatically, due in large part to policies stemming from the global War on Drugs. The imprisonment of people for low-level offenses and for minor drug crimes, compounded by policies such as mandatory minimum sentences and lengthy pre-trial detention are global phenomena that increase the number of people passing through prisons.[32] The result is that the rate of incarceration and the number of people in prison has been growing globally.[33] Over 10.3 million people are in prison worldwide,[34] and as many as 60 million pass through prisons each year,[35] substantially increasing the number of individuals at a high risk of having TB.

Widespread prison overcrowding further complicates efforts to fight TB. In 24 countries, prisons now hold more than two people on average for each vacancy,[36] leading to crowded, poorly ventilated conditions and over-burdened medical staff. Scaling up high quality medical services for people who are incarcerated has long been recognized as a crucial measure for fighting TB. However, such measures stop short of pursuing the systemic change necessary for effectively combating the spread of disease behind bars. Reducing the size of the prison population is a sustainable and equity-oriented solution for combating TB, a strategy which this report attempts to explore in depth.

KEY EPIDEMIOLOGY TERMS

Incidence: The number of new cases of a disease over a defined time frame (expressed as either a rate or as a fraction of the population that is susceptible to the disease)

Prevalence: The number of cases of a disease in a population at a defined time point (expressed as a fraction of the total population)

Case notification rate: The number of new and relapse cases reported to the World Health Organization over a defined time period (expressed as a fraction of the total population)

IV. About this Report

Researchers from the Yale University School of Public Health, Stanford Medical School, and the Oswaldo Cruz Foundation (FIOCRUZ), a major public health research institution based in Rio de Janeiro, have partnered to research TB in Brazilian prisons. Past work and forthcoming research have identified high rates of TB within incarcerated populations and suggested that prisons may act as reservoirs for the disease thereby increasing the spread of TB among the general population.[37,38] This report aims to complement this recent and ongoing epidemiological research by placing it within a broader policy context.

Students and faculty from the Yale Law School, the Yale School of Public Health, and the Jackson Institute for Global Affairs who were all affiliated with the Yale Global Health Justice Partnership (GHJP) carried out the research, writing, and editing for this report. The team undertook desk research, reviewing both primary and secondary sources, including epidemiological studies, government reports, news articles, and scholarly research. Student authors conducted extensive interviews, both remotely and in-person, with drug policy experts, public health researchers, advocates for prison reform, medical doctors, legal professionals, and other stakeholders in and outside of Brazil. Some interviews required the assistance of an interpreter. The final draft of the report incorporates comments and feedback from consultations with stakeholders from both in and outside of Brazil who were given a draft summary of the report.

In March 2018, the student authors traveled to Brazil, where they consulted key experts in the cities of São Paulo, Rio de Janeiro, and Recife, which are located in geographically and socioculturally distinct regions of Brazil. Experts in government, academia, and civil society across the areas of drug policy, criminal justice reform, and TB control and prevention were interviewed. (For a full list of all individuals interviewed and their affiliations, see Appendix I). The project received an IRB exemption as it did not qualify as human subjects research. The GHJP team selected these three cities to visit due to pre-established contacts with experts who would be able to facilitate connections to rich networks of local stakeholders. In addition, these three states were deemed to be particularly relevant and important for understanding issues facing the prison system across the country. The state of São Paulo had the greatest share of the national prison population of any single state in 2016, at over 33 percent.[39] The state of Rio de Janeiro, the seat of the former capital, is often described as acting as a laboratory for innovative criminal justice policies that other states adopt. Pernambuco, where Recife is situated, has received international attention for prison overcrowding due to a case on the issue brought before the Inter-American Court.[40]

V. Overcrowding in Brazil's Prisons and the Spread of Tuberculosis

TB AMONG THE INCARCERATED POPULATION

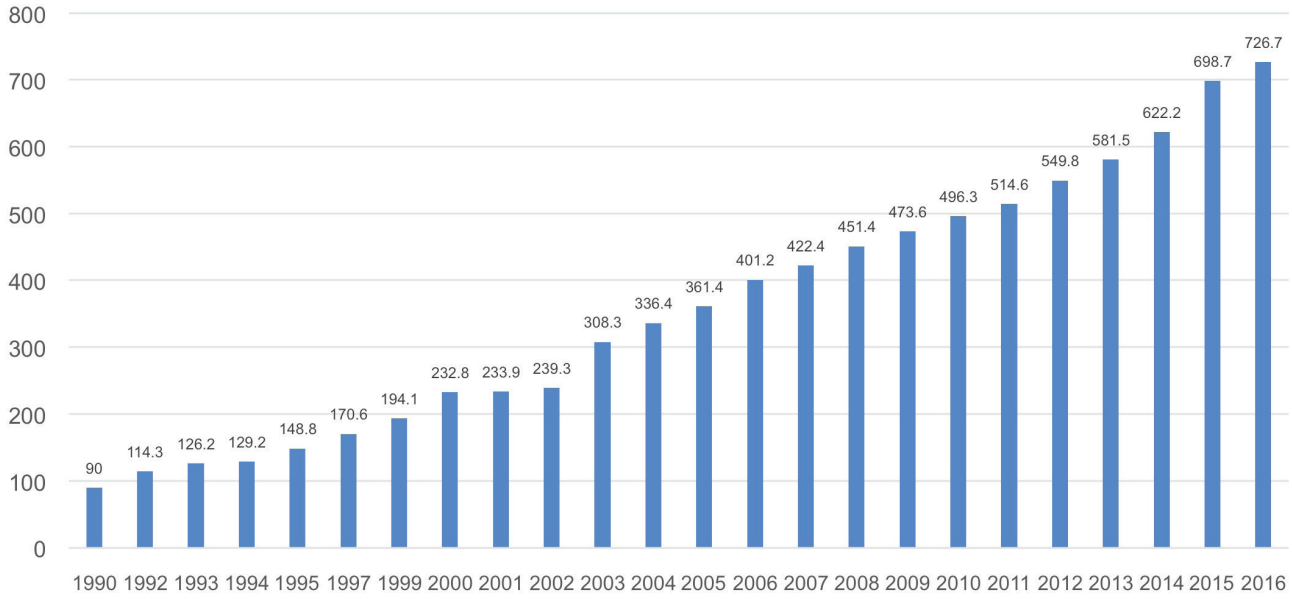
The prevalence of TB within the Brazilian prison system undermines national efforts to control the disease, with the incidence of TB in prisons being approximately 20 times greater than the incidence in the general population.[41] While TB rates have been declining in the overall population for more than a decade, the incidence among prisoners rose nearly 40 percent between 2009 and 2016.[42] Notably, the proportion of all TB cases occurring among prisoners increased from 6.2 percent in 2009 to 8.4 percent in 2014.[43] During that period, prisoners—who make up 0.3 percent of the total population—[44,45] had an annual TB notification rate that was over 31 times higher than the rate in the overall population.[46] Prisoners are clearly a group at elevated risk of tuberculosis. Concerningly, the number of prisoners has been rising dramatically.

INCREASING INCARCERATION

There are now more prisoners in Brazil than in any other country aside from China and the United States.[47] In June 2016, 726,712 people were in prison according to the Ministry of Justice and Public Security's statistics.[48] The prison population has grown dramatically, surging more than eight-fold since 1990 [see Figure 1][49] and increasing at an annual rate of 7 percent between 2001 and 2016—10 times faster than overall population growth during that time.[50] There are now 352.6 prisoners for every 100,000 people in the general population, up from 137 in 2000.[51] The incarceration rate has shown no sign of slowing down: in the first half of 2016, on average, 100 people entered prison for every 73 people leaving.[52] By one estimate, the incarcerated population will reach 1.9 million people by 2030 if current trends continue.[53]

Prisoners in Pavilion 7 of the Presídio Juiz Antônio Luiz L. de Barros prison in Recife.
Photo Credit: Human Rights Watch, 2015

FIGURE 1: Number of incarcerated people in Brazil (in thousands)



Source: *Levantamento Nacional de informaçãos penitenciárias, Ministério da Justiça e Segurança Pública,* 2017

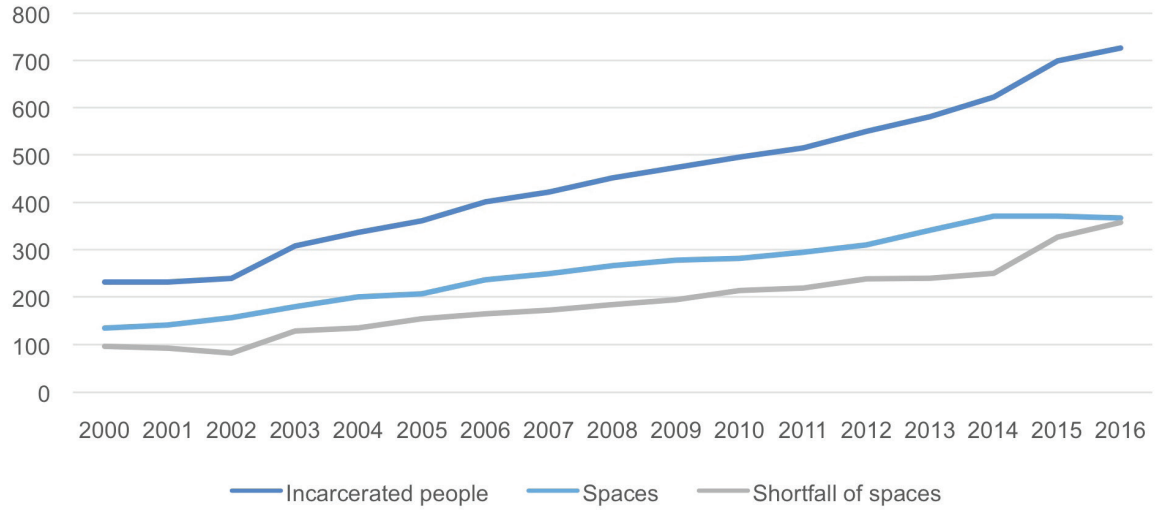
OVERCROWDING IN BRAZILIAN PRISONS

The runaway growth of the incarcerated population has led to severe overcrowding in Brazil's prisons [see Figure 2]. In 2016, there were nearly twice as many prisoners as spaces officially available in prison facilities, according to national government statistics.[54] The prison system held more than 358,000 people in excess of its official capacity of 367,217 people.[55] Nationwide, this is the norm: in 2016, 89 percent of the incarcerated population was living in prisons that were overcrowded.[56]

While prison overcrowding is a national problem, it is particularly acute in some states and facilities. For example, in 2016, the state of Amazonas, with an average prison occupancy rate of 484 percent, had nearly five times more people in the prisons than they were designed to hold. In 2014, the Curado prison complex in Recife, Brazil received international attention when the Inter-American Court of Human Rights ordered the state to undertake emergency measures to reduce severe overcrowding.[57] However, by 2016, overcrowding at Curado had actually worsened, and the complex held 7,000 prisoners in a facility equipped for only 1,800.[58] According to one expert interviewed, some judges have ordered specific prisons to reduce the number of prisoners in their facilities.

Overcrowding also contributes to acute staff shortages in prisons: the ratio of prison staff guards to prisoners is often as low as one for every 200 to 300,[59] and can reach as low as one per 575.[60] (By contrast, in the US, the average ratio of correctional officers to prisoners in jails was 1 to 3.9 in 2016).[61] In some cases, prisoners fill the gap, taking on key roles in the day-to-day management of prisons, such as cleaning, carrying out clerical work, and acting as guards.[62]

FIGURE 2: Prison population, number of available spaces,and shortfall of spaces (in thousands)



Source: *Levantamento Nacional de informaçãos penitenciárias, Ministério da Justiça e Segurança Pública,* 2017

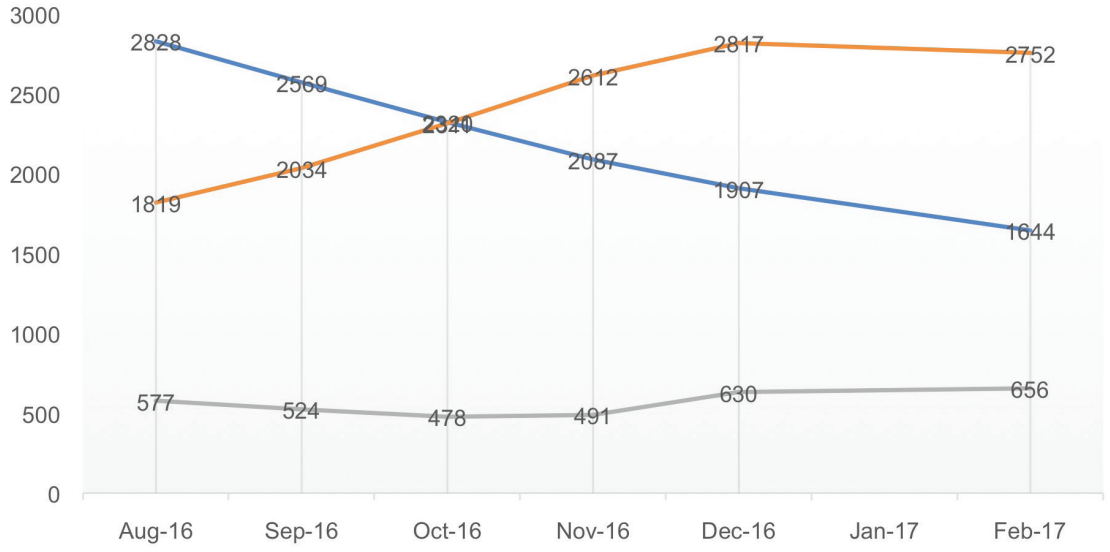
Phases of the Brazilian Prison System

The three phases of the Brazilian prison system are: closed, semi-open, and open.[63] In the closed phase, individuals spend the entirety of their time within the prison complex. Experts interviewed for this report noted that the bulk of the individuals' time during the closed phase is spent within the prison cell itself. Importantly, individuals in pre-trial detention often face conditions analogous to those in the closed stage – but frequently with fewer benefits. After their time in the closed phase, prisoners are transitioned to the semi-open stage, which consists of different facilities but often similar conditions as the closed stage. During this period, prisoners are allowed to pursue employment or visit their families.[64] Additionally, during this phase, prisoners are permitted to apply for extended amounts of time away from the prison (for occasions such as funerals, birthdays, holidays).[65] Finally, the open phase aligns most closely with the concept of parole in foreign jurisdictions; in this phase, prisoners serve the remainder of their sentence outside of the prison, and are periodically required to sign-in and report to a judge or prison officer.

In an interview, a Rio de Janeiro State public prosecutor stressed that policies surrounding overcrowding are not being followed.[66] A Supreme Court decision ruled that if a prison does not have large enough capacity, prisoners must be released to a different type of regime, for example, from the "closed" system to the "semi-open" system. Another federal regulation stated that if a prison is overcrowded, there must be a plan in place to reduce overcrowding. Due to limited budgets and staffing, often no such plans exist.

Even if one prison manages to reduce overcrowding, the prisoners are often simply shifted to another prison, leading to overcrowding in the new prison. Figure 3 illustrates this situation among prisons in Rio de Janeiro, where although the number of prisoners decreased in the SEAPVP Prison semi-open regime from August 2016 to February 2017, the number of prisoners in the SEAPMS Prison closed regime increased during the same time period.[67] Moving prisoners from one prison to another does not solve the problem of overcrowding: it merely shifts the problem to another part of the system.

FIGURE 3: Number of prisoners in three prisons in Rio de Janeiro



Source: *Avaliação Integrada Do Estado de Superlotação Do Sistema Prisional Fluminense: Promotoria de Justiça de Tutela Coletiva do Sistema Prisional e Direitos Humanos*, 2017

"MEDIEVAL" HEALTH AND HYGIENE CONDITIONS

Rampant overcrowding has also led to extremely poor health and hygiene conditions within the prison system, which a former Minister of Justice has called "medieval."[68] Experts interviewed described prisons as unsanitary and stuffy, with windowless cells reeking of acrid sweat and mold.[69] In 2015, Human Rights Watch reported raw sewage flowing through a prison yard and 85 people sharing a single toilet in another prison.[70] Basic necessities such as soap and toothpaste are frequently not provided, and prisoners complain of being underfed and served spoiled and uncooked food.[71] Access to running water is also limited in some facilities.[72] For example, one large prison in Rio de Janeiro was facing severe water shortages in the spring of 2018. Running water was not consistently available in this prison and was only turned on at specific times. Prisoners instead collected water in large receptacles for personal use.[73] Interview subjects also described how prisoners' inability to sleep well in prisons left them weakened and more vulnerable

Detainees who do not have access to running water fill buckets from a tap that only runs 1.5 hours each day in a yard at the Penitenciária Agro-Industrial São João in Itamaracá in Pernambuco. Water from these buckets is used for showering, flushing toilets, and drinking. *Photo Credit: Human Rights Watch, 2015*

to disease. A shortage of beds forces prisoners to sleep on the floor, sometimes on scraps of cardboard. One doctor interviewed who was working in prisons in Pernambuco said he had treated prisoners who had been incarcerated for three years without sleeping in a bed a single night.[74] In some facilities, space to lie down on the floor is so rare that prisoners have resorted to sleeping in bathrooms or sleeping in a seated position tied to the bars of the cell.[75] Some prisoners sleep outside in makeshift tents leaning against the prison walls.[76]

The combination of unsanitary conditions, intermittent water supply and poor provision of basic necessities contribute to negative health outcomes overall and increased risk of disease, including TB.

In addition, the constant threat of violence elevates stress levels for prisoners. Overcrowding has contributed to difficulties in preventing violence, and several massacres have broken out in recent years. In January 2017, violence linked to organized criminal groups broke out across a string of prisons. Prisoners escaped, and at least 138 were murdered.[77] At one prison in Amazonas, where 56 inmates died, a facility intended to hold 590 people was housing 2,230.[78] In 2016, 379 violent deaths were recorded across Brazilian prisons, including at least 100 from massacres connected to a rivalry between two organized criminal groups.[79]

PRISON CONDITIONS CONDUCIVE TO TB TRANSMISSION

TB spreads easily in overcrowded, poorly ventilated, and dimly lit spaces—conditions which are all too common in prisons.[80] Since proper ventilation is critical for reducing the risk of TB transmission (TB spreads through the air), those living in poorly ventilated, crowded spaces, such as prison cells, are at a higher risk of becoming infected.[81]

Overcrowding within a prison worsens ventilation for inmates, thereby increasing the risk of TB transmission. One study conducted in 2015 documented this problem by estimating ventilation rates in three medium-security prisons in Central-West Brazil. Only three of the 141 cells included in the study met the World Health Organization standards for per-person ventilation.[82] These three prisons had a mean occupancy of 8.6 inmates per cell, with 2.1 meters squared per occupant, which is less than half of the minimum standard recommended by the American Public Health Association.[83] Researchers projected that over three-fourths of prisoners exposed to an active case of TB for a period of six months would become infected with the pathogen, under the prevalent prison conditions.[84] The study also estimated that optimizing cross-ventilation (allowing air to have a natural path in and out of the cells) would reduce transmission by 64.4 percent.[85] Moreover, improving ventilation would allow for a longer window for diagnosis of cases, thus

Detainees at the Penitenciária Agro-Industrial São João in Itamaracá, Pernambuco sleep in a dining room due to overcrowding. *Photo Credit: Human Rights Watch, 2015*

FIGURE 4: Racial make-up of Brazilian population (2015)

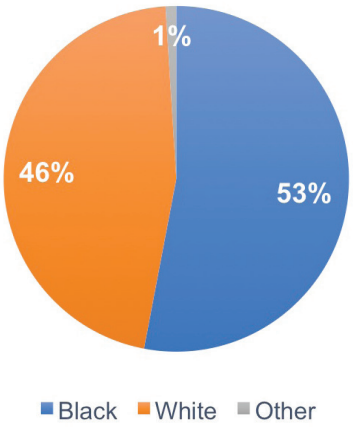
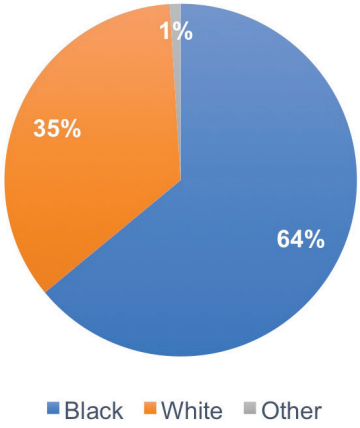


FIGURE 5: Racial make-up of prison population in Brazil (2015)



Race information was collected by self-report. The category "Black" includes individuals who identify as Black or Brown. "Other" includes individuals who identify as indigenous or being of Asian descent. Source: *Levantamento Nacional de informações penitenciárias, Ministério da Justiça e Segurança Pública, 2017*

averting further infections.[86] However, improving ventilation alone is insufficient to mitigate the effects of prison cell overcrowding on the increased transmission risk of TB.

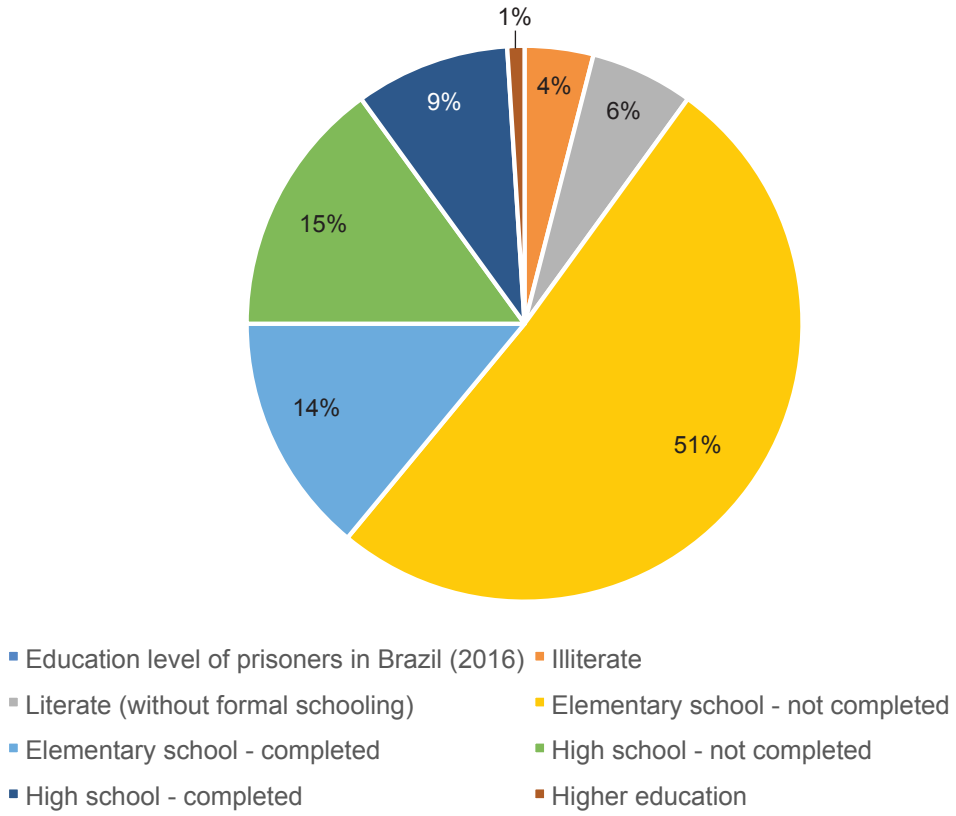
Overcrowding also inhibits efforts to treat the disease, as overburdened medical staff can seldom keep pace with prisoners' needs for treatment. One interview subject described how prisoners typically only received medical attention once they were on the brink of death.[87] Similarly harrowing stories are recounted in Drauzio Varella's popular memoir *Lockdown: Inside Brazil's Most Dangerous Prisons*.[88] Skin conditions such as scabies, an itchy rash caused by mites burrowing under the skin, are common. Lack of access to care and treatment, as well as inadequate screening measures and diagnoses, further encourage the spread of TB.[89]

DEMOGRAPHICS OF PRISONERS: MARGINALIZED GROUPS AT HIGH RISK OF TB ARE OVER-REPRESENTED

Brazil is seen by many as a "racial democracy," or essentially, a color-blind state because over half the population self-identifies as Black or Brown (mixed race). However, Brazil cannot escape its legacy of slavery and its enduring effects. Brazil imported over five million enslaved people from Africa, the largest number in the Americas, and was the last country to abolish slavery in the western hemisphere.[90] Repercussions of colonialism and slavery continue on to the present day: Black and Brown Brazilians on average earn 58 percent as much as white Brazilians, and in 2015, Afro-Brazilians made up the majority of the population living in extreme poverty in Brazil.[91,92]

In Brazil, race plays a large part in the burden of disease. The demographics of those entering the prison system in Brazil mirror those of the groups most affected by TB, which is a disease directly linked to social and economic factors. It primarily affects the most marginalized and vulnerable segments of society.[93] Similarly, the prison system also concentrates vulnerable members of society who are subject to discrimination and excluded from the formal economy.

FIGURE 6: Education level of prisoners in Brazil (2016)



Source: *Levantamento Nacional de informaçãos penitenciárias, Ministério da Justiça e Segurança Pública,* 2017

In 2016, the Black population–which constitutes 53 percent of the general population–comprised 64 percent of the prison population [see Figures 4 & 5].[94] Non-white people in the general population were also more likely to suffer from TB. In 2010, 53.6 percent of new TB cases were among Black or Brown populations, compared to 35.1 percent of new cases among White populations[95]

Both within prisons and outside, TB is a disease of the poor. Over half of the prison population in 2016 had not finished primary school, and 4 percent were illiterate [see Figure 6].[96] Those with lower educational attainment were also at higher risk of TB. Between 2008 and 2011, 37 percent of new TB cases in Brazil occurred among those with eight or fewer years of education [Table 1 below].[97] Education levels can be used as a proxy for socioeconomic status in Brazil: lower levels of education attained likely reflect a lower socioeconomic status.[98]

The concentration of marginalized groups within the prison system reinforces and perpetuates deep social inequities. Racial and ethnic minorities, as well as individuals with low educational attainment, are more likely to enter prison. Once incarcerated, they face higher risks of contracting TB. A history of imprisonment and TB cause significant disruptions to employment, isolation from social networks, and stigmatization, potentially exacerbating vulnerability and poverty.[99] Multiple interview subjects described how people who are formerly incarcerated face steep barriers to re-integrating into communities upon release.[100]

Young people were also extremely over-represented in prisons. In 2016, 55 percent of the incarcerated population and 18 percent of the general population were between the ages of 18 and 29. Young people are also at high risk for TB–the 15-34 age group had the highest percentage of new TB cases in the country from 2001–2010.[101]

Research on the different risks faced by female and male prisoners is lacking, but interview subjects highlighted factors that may heighten female prisoners' vulnerability. The vast majority of prisoners are men: out of the 726,712 total prisoners in the Brazilian prison system in 2016, 91.6 percent were males and 5.8 percent were females.[102] Women often visit and advocate for male relatives who are in prison, but female prisoners tend to receive much less support and fewer visits, according to several key informants who were interviewed. Visitors often provide prisoners with basic supplies they need to survive, including soap, toothpaste, and medications, which leaves prisoners without outside supporters in a more vulnerable positin.[103]

In addition, research has found that latent TB infections (LTBI) are more common among prisoners.[104] LTBI occur when the TB bacteria live inside the human body, but the people infected are asymptomatic and cannot infect others with TB. Many people with LTBI do not experience worsened health; however, when the immune system cannot stop TB bacteria from multiplying, LTBI can turn into an active TB infection, which is contagious.[105] Although LTBI are not transmissible, prison conditions lead to increased risk for LTBI reactivation through close contact with individuals experiencing active TB, HIV infection, and malnutrition.[106] The prevalence of active TB infections in Brazilian prisons ranges from 2 to 9 percent, and latent TB infections range from 40 to 73 percent.[107]

Prisoners are more likely to experience health conditions that increase their risk of developing active TB, including malnutrition, substance abuse, and, most notably, HIV.[108] As is the case for TB, the prevalence of HIV in prisons is much higher than in the general population. In Pernambuco, for example, HIV prevalence among prisoners is over 42 times higher than in the general population.[109] While the prevalence of HIV varies among Brazil's prisons, studies have reported a prevalence of 17 percent in some cases.[110] People living with HIV/AIDS are especially at risk for latent TB developing into active TB, as their immune systems are already weakened.[111] People infected with both latent TB and HIV are 21-34 times more likely to develop active TB as compared to the general population.[112]

Table 1: Distribution of Notified New Cases of Tuberculosis in Brazil, 2008 – 2011

	# Cases	Percent
Sex		
Male	183,202	65.7
Female	95,455	34.3
Unknown	17	0
Age group		
Over 45	101,565	36.4
20 to 44	150,325	53.9
10 to 19	20,782	7.5
0-9	6,002	2.2
Education level		
Illiterate	13,096	4.7
1 to 8 years	103,109	37
9 to 11 years	35,718	12.8
12+ years	13,610	4.9
Unknown or n/a	113,141	40.6
Residence area		
Urban	184,701	66.3
Rural	21,699	7.8
Urban/rural	1,675	0.6
Unknown	70,599	25.3

Source: Viana, P. V. de S., Gonçalves, M. J. F., & Basta, P. C. (2016). Ethnic and Racial Inequalities in Notified Cases of Tuberculosis in Brazil. PLOS ONE, 11(5), e0154658. https://doi.org/10.1371/journal.pone.0154658

Although the populations entering prisons are at higher risk of TB than the general population, research has demonstrated that TB often does not enter the prison system from the outside; rather, TB is frequently transmitted within prisons.[113] One molecular epidemiology investigation examined the circulation of TB in a highly endemic prison in Rio de Janeiro State. Researchers found that the majority of cases diagnosed in the prison were related to new infections by strains of TB that were already circulating within the prisons. In this setting, most newly diagnosed TB cases could be attributed to infection within prison, rather than infection prior to incarceration.[114] Accordingly, reducing the number of individuals who enter the prison system in the first place is a direct intervention that would reduce infection risk within prisons and spillover of TB to communities outside prisons.

Treating TB in Pernambuco's prisons

Rafael Sacramento is an infectologist who treats TB patients in Pernambuco's three main prison facilities. "When I go inside the cells, it's unbelievable. It's really hot. You can smell the smell of people. You know it's impossible to have good air and ventilation," he said. The crowded prisons, with nearly three times as many prisoners as spaces available are "perfect for TB to spread."

Despite the dangerous conditions inside these facilities, Sacramento says he feels safe because prisoners recognize the dire need for his services. As Sacramento explained, "The state doesn't rule inside – the prisoners create their own rules. We have no power inside the bars." Sometimes before going into a facility, Sacramento will receive a WhatsApp message warning him not to come because prisoners are expecting an outbreak of violence.

In these crowded, understaffed facilities, Sacramento relies on the help of prisoners to treat his patients. In some cases, prisoners in positions of power control access to medical care. Sacramento has heard of people needing to pay a *chaveiro* in order to see a doctor. Certain prisoners work with Sacramento as unofficial medical staff. He suspects that these people may use money or connections to organized criminal groups to secure these positions. "Some of the guys are really nice to work with," he said. "My work is impossible without their help." Some will send him Whatsapp messages with updates on patients' symptoms after he has left the facilities. However, close collaboration with prisoners has disadvantages. In order to find patients and bring them to Sacramento, prisoners see patients' files and learn who is infected with TB, HIV, and other diseases. Patients have complained to him that everyone in their cell knows their HIV status. He believes the fear that other prisoners will find out their medical histories stops some patients from coming forward for treatment for a range of diseases, including TB.

While everyone inside the prisons is at risk of TB due to poor ventilation and conditions, the poorest are the most likely to develop the disease, since they are more likely to also suffer from HIV, poor nutrition, and drug abuse, which increase their vulnerability to TB. "I always have the same type of patient: the poorest," he said. Sacramento notes that even within prisons, social hierarchies are present that influence prisoners' health risks. Prisoners with more resources can use their money to access better conditions. Those with no money to pay a *chaveiro* also have worse living conditions and stay in "unbelievably crowded" places. Some of Sacramento's patients sleep in hallways and makeshift tents outside the prison buildings. Some live inside the bathrooms and must move every time someone

needs to use the toilet and wake up early and remove all their belongings to make room for people to shower. He has one patient who has slept on a piece of cardboard on the floor every night for the past three years.

Sacramento also described the difficulties of ensuring that patients complete treatment for TB. Patients are often transferred to other facilities without the medical staff being informed. When new prisoners arrive, Sacramento sometimes does not find out someone needs TB treatment until two months later. "The legal files always come first, but sometimes the health files are delayed," he said. When people lapse treatment for one month, they need to start all over again. Some patients seek to use the opportunity of being in a new prison to cast off the label and stigma of being a TB patient. "They want a new life in this facility and don't want the stamp on their forehead that they're a patient," said Sacramento. "It's hard to believe, but it's possible to disappear behind bars." Sometimes they will search for a prisoner for one or two weeks in a crowded facility without finding him. Patients who are released from prison also stop treatment. "We'll lose a guy when he goes out to the streets, and after two or three years, he'll get locked up again and we'll find out he hasn't finished treatment. Some of these people have [multi-drug-resistant] TB," he said.

Sacramento views the lack of social support and the constant prioritization of security concerns over health concerns as major barriers to reducing TB. "We cannot help these people–we can only give them pills. That's the easy part, but it only addresses a small part of the problem," he said.

VI. Drivers of Overcrowding In Brazilian Prisons

Changes to Brazilian drug policy have played a significant role in Brazil's surging prison population. Between 2000 and 2014, the share of prisoners incarcerated for drug-related charges grew nearly five times faster than the overall prison population,[115] rising from 11.8 percent to almost 30 percent.[116] Similar to the overall demographics of the prison population, the impacts of the increase in drug-related incarcerations have been disproportionately borne by the non-white population in Brazil.[117] Moreover, nearly one in two women incarcerated in Brazil is in prison for a drug related offense.[118] Expert interviews also suggested that most of those arrested for drug-related offenses come from the most neglected parts of the cities, such as the "Cracolandia" district in São Paulo, or the favelas of Rio de Janeiro.[119]

The case of Rafael Braga provides the most high-profile example of such policing concerns. At the time of his 2015 arrest,[120] police officers claimed Braga possessed 0.6 grams of marijuana, 9.3 grams of cocaine, and a firework of the sort used by drug traffickers.[121] In 2017, Braga was given a sentence of 11 years and 3 months—a disproportionate sentence in the eyes of many, and a recent high-profile example of the relevance of drug related incarceration in the Brazilian criminal justice system.

Drug laws and drug-related incarceration have played a substantial role in increasing the total share of the population behind bars. Coupled with the absence of viable plans to increase prison capacity, overcrowding will remain a structural problem unless efforts are made to reduce the rate of incarceration. The turbulent current political and economic climate makes it likely that the rate of incarceration will increase. In December 2016, Brazil enacted Constitutional Amendment 95/2016 (also known as EC 95), which froze spending on social services for the next twenty years, except for increases in inflation.[122] Such is the severity and longevity of the program that some reports have referred to it as the "mother of all austerity plans."[123] Healthcare spending has been severely affected by the austerity program. For instance, human rights groups have noted a 15 percent reduction in funding for the Popular Pharmacy program (which provides Brazilians with access to essential medicines through public pharmacies), which has seen the closure of 314 Public Pharmacies in 2017, leaving only 53 in operation.[124] More broadly, the share of health spending in the 2017 federal budget dropped by 17 percent.[125] In 2017, for the first time in nearly 30 years, the government undershot the minimum health budget guaranteed by the Constitution by R $692 million (approximately US $210 million).[126]

In addition to the economic challenges associated with austerity, Brazil recently elected its new President, Jair Bolsonaro, who has supported a variety of "tough on crime" approaches, including increased sentences for criminals.[127] During his campaign, he used the slogan "*Prender e deixar preso,*" which roughly translates to "detain them and leave them in prison."[128] In public statements,

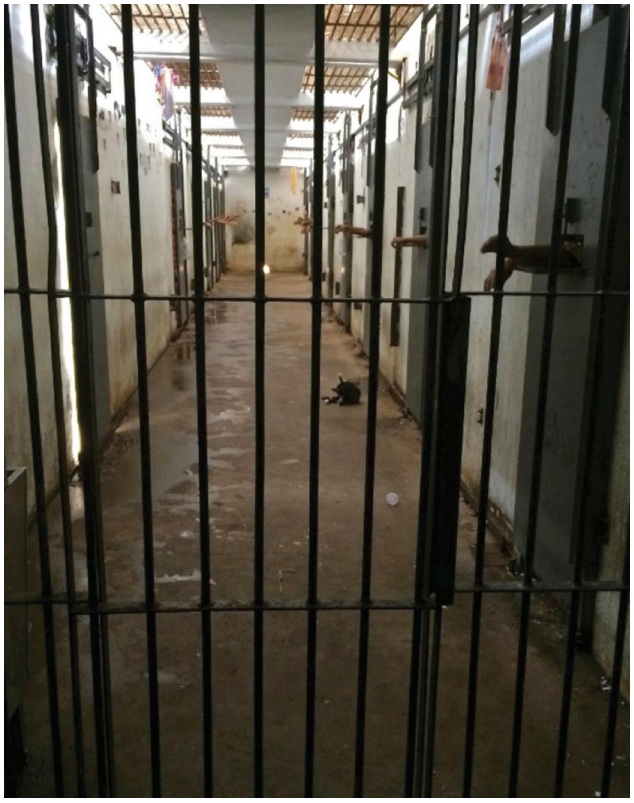
he has also supported the use of extrajudicial measures by the police against drug traffickers.[129] His running mate, Hamilton Mourao termed homes with children raised by single mothers or grandmothers as "misfit factories" that produce drug traffickers.[130] Under Bolsonaro's administration, policing and incarceration, especially for low-level drug offenses, will likely increase.

These developments are merely the latest in the increasingly punitive environment that affects the daily lives of those in Brazilian society charged with involvement in drug trafficking. Many of these developments built on the foundations of Brazil's 2006 Drug Law, which has played an important role in increasing levels of incarceration for drug-related offences.

THE 2006 DRUG LAW

Law 11,343/06 (2006 Drug Law) was the product of a compromise between competing interests that aimed to limit imprisonment for the possession and use of drugs, while strengthening available enforcement measures against traffickers. Article 28 of the Law lays out warnings, public health education, community service and fines (for those caught for multiple infractions) for those caught using drugs, but no imprisonment.[131] However, to offset the decriminalization of drug use, more punitive measures were adopted to deal with the activities of drug traffickers. Most notably, Article 33 increases the minimum penalty for drug trafficking from three years to five years.[132]

However, Law 11,343 provides no clear criteria to differentiate between individuals who are drug users and those who are drug traffickers. This ambiguity appears in two places in the law. First, under Article 28§ 20, in order to determine whether the drug was intended for personal consumption, judges are asked to consider the nature and quantity of the substance seized, the place and conditions under which the action was taken, the social and personal circumstances, and conduct of the agent.[133] This phrasing leaves the ultimate decision to the subjective determination of the judge, rather than any objective criteria that can be consistently applied. Second, the language of Article 33, which increased the penalties associated with drug trafficking, is overbroad in comparison to that used by Article 28. Trafficking in Article 33 is defined, *inter alia*, to comprise acts involving import, export, remitting, preparing, producing, manufacturing, acquiring, prescribing, administering, or delivering drugs to a distributor.[134] These acts need not be undertaken with the purpose of drug trafficking. Rather, merely committing the acts alone is viewed as sufficient evidence to prove drug trafficking. The absence of an intent requirement is a notable difference between Article 33 and Article 28. The combination of the above factors creates a significant lacuna in the law, where acts that are viewed as trafficking by one judge can be determined to be acts pursuant to drug use by another.



A cellblock in Pedrinhas, the state of Maranhão's largest prison complex. *Photo Credit: Human Rights Watch, 2015*

ENFORCEMENT OF THE 2006 DRUG LAW

The 2006 Drug Law was passed as part of an effort to reign in drug related incarcerations. Although it was designed as an attempt to create a system that differentiated between drug users and traffickers, it birthed a system where police officers and judges were given wide powers to determine who is a trafficker and who is not. The breadth of the law allows arresting officers to enjoy the discretion in determining whether to charge individuals for drug possession or drug trafficking. As the Braga case demonstrates, individuals from less privileged backgrounds have been charged with drug trafficking for acts as minor as carrying a few grams of marijuana, which arguably should be considered possession.

Individuals who are charged with drug trafficking are often denied pre-trial freedom, partly because drug trafficking is considered a "heinous crime," under Law 8,072/90.[135] This designation placed drug trafficking in the same bucket as crimes such as the commission of torture, and per the Law, makes it harder to receive bail and alternative punishments.[136] Experts interviewed explained that in many Brazilian prison facilities, the jail (i.e., where individuals are held for pre-trial detention) is co-located with the prison (i.e., where individuals who are convicted after a trial are sent for punishment). This practice contributes significantly to the overcrowding of prisons, with reports indicating that over 40 percent of those incarcerated in many facilities are in pre-trial detention.[137] Individuals accordingly spend significant time behind bars simply awaiting trial to determine if they will be found guilty. Some studies also suggest that the majority of these individuals are first time offenders caught with small amounts of drugs.[138] Moreover, many more have their charges dismissed, or are given sentences not involving incarceration.[139] For those individuals in particular, the apparatus of criminal justice has a uniquely destructive impact: it deprives them of their basic liberties while they await the opportunity to demonstrate their innocence in regard to a "crime" they did not commit.

The Brazilian justice system has attempted to remedy the overcrowding problem in part by instituting a system of custody hearings. This initiative—pioneered by the National Judicial Council in 2014—requires individuals to be brought before a judge within 24 hours of arrest to determine whether or not they should be detained prior to trial.[140] A few months after initiation, the Inter-American Commission of Human Rights—relying on data from the Brazilian Judicial Council—suggested that in 50 percent of cases where custody hearings were held, pre-trial detention was viewed as unnecessary.[141] As of June 2017, that number had declined to 44 percent,[142] but this rate of freedom from incarceration may be lower in certain parts of the country—experts from Pernambuco, for instance, suggested that the rate of those avoiding pre-trial detention in that state was lower than 40 percent. A recent report suggests that 23.5 percent of temporary releases or abatement of the arrests and release were ordered for cases of drug trafficking.[143] Interviews with experts confirm that a crucial element to the success of custody hearings is the interaction between the judges, prosecutors, and the arrested individual created by the custody hearing process. Seeing the individual about to be locked away humanizes alleged drug traffickers, often revealing poor, homeless individuals from the most vulnerable strata of society who do not appear to be serious narco-traffickers.[144]

While individuals who are first-time offenders, are not part of a criminal organization, and have a clean background are supposed to be subject to lighter sentences, this often does not occur in practice. In Habeas Corpus (HC) 118353, which dealt with the question of privileged trafficking,[145] Justice Lewandowski, the former chief justice of the Supreme Federal Court of Brazil, noted that some 80,000 people (or 45 percent of those charged with trafficking crimes) were sentenced

to prison for drug trafficking, despite sentences recognizing that they were privileged traffickers.

However, the custody hearings remain only partially successful at reducing the overall levels of incarceration in Brazil. First, challenges remain in implementing custody hearings nationwide, with experts indicating that adoption has not been universal particularly in areas in the countryside that are most likely to be unable to meet the requirements.[146] In part owing to the vastly increased workload from the custody hearings system, some judges remain resistant to adoption. Second, the structure of custody hearings remains deeply imbalanced. Since most drug trafficking crimes involve arrests with few witnesses, the arresting police officers are often providing the only testimony at the hearing itself, and judges are often deferential to the arresting officer's account of the incident and recommended charges. Moreover, the proclivities and personality of the judge hold significant sway over the ultimate outcome. For instance, Judge Patricia Cruz—who in January 2018 was appointed the head of the Department of Police Inquiries in São Paulo, the body responsible for custody hearings—suggested that every trafficker, however small, works directly or indirectly for criminal structures responsible for drug trafficking. Accordingly, she called for treating all instances of drug trafficking with rigor.[147]

A sleeping area, or "barraco" made from sheets in the Curado Prison Complex in Recife. *Photo Credit: Human Rights Watch, 2015*

Currently, a major case sits before the Supreme Court, which tends to be more progressive and left-leaning than other courts in the country. This case could play a crucial role in overcoming some of the challenges foisted on the criminal justice landscape by the 2006 drug law. RE635659 deals with the decriminalization of drugs in Brazil. In deciding this case, judges have a menu of policy options, and may go as far as decriminalizing all drugs, or may alternatively opt to direct the Ministry of Health to implement quantity thresholds to differentiate between drug possession and trafficking more clearly. Some civil society organizations are particularly opposed to the thresholds approach, however, as such an approach may place the burden of proof onto the defendant if they are caught with drugs in an amount greater than the threshold. Additionally, some civil society groups feared that the thresholds would be too low, further worsening the problem of over-incarceration.

The overcrowding of prisons will likely continue to worsen in the absence of systemic reform. In part, this is attributable to the unique characteristics of the Brazilian system's progressive sentencing discussed earlier, where individuals transition from one type of prison regime (closed, semi-open, and open) to another after defined amounts of time. The increase in drug-related incarcerations has

placed a strain on the ability of the judicial system to ensure the timely transition of individuals from one regime to another. Consequently, as expert interviews suggested, individuals end up spending longer than anticipated in the closed system due to delays in their transition, further exacerbating overcrowding.[148]

DEMOGRAPHICS OF THOSE INCARCERATED FOR DRUG OFFENSES

The War on Drugs globally has been criticized for targeting the most vulnerable members of society and exacerbating the oppression they face. An innovative study by Instituto Sou Da Paz, which studied the profiles of over 5,000 individuals arrested and charged with drug trafficking, reveals how the story in Brazil is no different. Among their surveyed population, almost 60 percent had no criminal background, and well over 90 percent denied ever belonging to cartels. The vast majority of those arrested were caught with less than 100 grams of marijuana or cocaine, and almost 97 percent were unarmed.[149]

It is also important to note that convictions and pre-trial detention for drug trafficking are gendered: 62 percent of women in the prison system were convicted (or awaiting trial) for drug trafficking crimes whereas 26 percent of men were in the prison system due to drug trafficking crimes [Figures 7 & 8].[150] That similar inequities are observed with respect to TB incidence in Brazil's prisons is no coincidence and highlights the intersectional plight of the country's overburdened system.

FIGURE 7: Percent of Men convicted or awaiting trial by type of crime

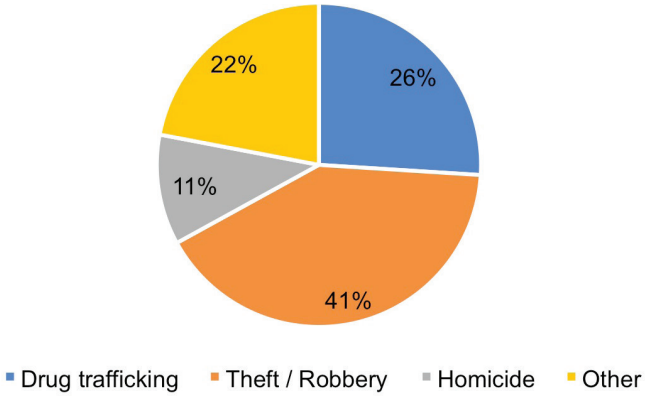
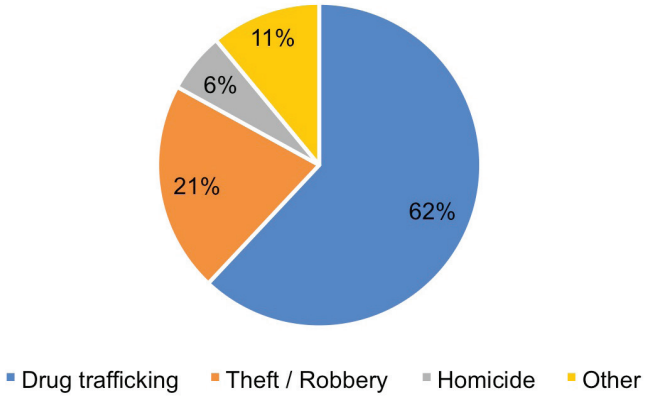


FIGURE 8: Percent of Women convicted or awaiting trial by type of crime



Source: *Levantamento Nacional de informaçãos penitenciárias, Ministério da Justiça e Segurança Pública,* 2017

VII. The Unchecked Spread of TB in Brazil's Prisons is a Public Health Issue

The health of Brazil's prisoners should concern the public. In 2003, the World Health Organization (WHO)—in conjunction with the Russian Federation International Meeting on Prison Health and Public Health—declared that "good prison health is essential to good public health."[151] Prison walls are merely temporary partitions between prisoners and society, especially in Brazil, where the constitution prohibits capital punishment and life sentences.[152] Furthermore, prisoners in the semi-open and open regimes regularly move between prisons and free society, as previously noted. Prison health encompasses not only the health of prisoners, but the wellbeing of prison staff and visitors who regularly move between the penitentiary system and the surrounding community.

As a consequence of the War on Drugs, Brazil has paid little attention to prison health in recent decades. The popular saying "human rights for right humans"[153] encompasses the sentiment that a person forfeits his claim to fundamental human rights when he commits a crime. Such a mindset justifies the abysmal state of the country's penitentiary healthcare system and has encouraged further restriction of prisoners' access to medical services. Incarcerated individuals are barred from public hospitals, except under extenuating circumstances, and a recent legislative movement in Rio de Janeiro proposed making prisoners in the state ineligible for Sistema Único de Saúde (SUS), Brazil's universal healthcare system.[154]

Ironically, the desire to reserve quality healthcare for law-abiding citizens threatens the health of the same citizens, especially with respect to TB. The unchecked spread of TB throughout Brazil's prison system has allowed the facilities that comprise it to become both reservoirs and amplifiers of disease. As a result, transmission within prisons is so severe that it is spilling over into the surrounding communities. A systematic review of the literature found that 6.3 percent of TB cases in the general population of middle and low-income countries could be attributed to exposure in prisons.[155] However, this figure likely underestimates the reality of the situation because it does not account for transmission events that occur after an individual living with TB is released from prison. Thus, the neglect of Brazil's penitentiary healthcare system has not only perpetuated abhorrent living conditions, inadequate screening methods, and inefficient surveillance strategies inside prisons, but also has created another barrier to effectively containing the spread of TB throughout the general population.

PRISONS ARE RESERVOIRS AND AMPLIFIERS OF TB

Poor conditions and neglected prison healthcare systems have caused prisons to become disease reservoirs. In epidemiologic terms, a disease reservoir is a population cluster in which a pathogen persists and can be transmitted to a target population through "spillover."[156] Brazil's prisons meet both criteria, where the target

population is the surrounding community. In fact, a recent mathematical modeling study found that transmission of TB in prisons may be driving disease incidence in Brazil's general population.[157] Unlike other disease reservoirs, however, prisons do not merely perpetuate infection. Rather, they amplify TB transmission, leading to incidence rates within prisons that are in some cases 40 times those observed in the general population.[158]

Overcrowding due to mass incarceration fuels transmission by increasing the number of individuals at risk of contracting TB. Transmission events can only occur when a susceptible individual encounters a person experiencing an active infection. Susceptibility is determined by one's history of disease and vaccination status. Unlike other communicable diseases such as chicken pox, TB does not confer perfect life-long immunity once an individual has contracted and cleared the bacteria. This means that an individual remains at risk of disease throughout their life regardless of previous TB infections.

There is also no completely protective vaccine against TB. The BCG vaccine, which is currently the only approved vaccine, is about 50 percent effective at protecting adults aged 20-29 against pulmonary TB.[159] The number of vaccinated prisoners is difficult to quantify, but is certainly low, with socioeconomic status and educational attainment representing the key social determinants of vaccine uptake in Brazil.[160] As noted in Section VI, Brazil's prison population is predominately comprised of poor, individuals with low levels of formal educational attainment. Thus, in the absence of a highly effective vaccine and sound vaccination campaigns, TB prevention efforts must come in other forms.

A cellblock littered with dirty dishes in the Pedrinhas prison complex in the state of Maranhão. *Photo Credit: Human Rights Watch, 2015*

An effective strategy for preventing TB transmission in prisons is limiting the number of prisoners entering the system. Given that decreasing the number of susceptible individuals in a population is a key step in infectious disease control, it is not surprising that mass incarceration has already been linked to population-level increases in TB in some countries in Europe and Central Asia.[161] One study found that the rate of incarceration, rather than the size of the prison population, was a strong determinant of TB incidence in the corresponding country. Even more troubling, these trends also corresponded to the spread of multi-drug resistant TB (MDR-TB) within these countries, implying that mass incarceration may also facilitate the transmission of dangerous, drug-resistant bacteria. In fact, when researchers modeled the transmission dynamics in prisons and other institutional amplifiers, they concluded that the most effective method to quell TB incidence, prevalence, and mortality in these situations would be to decrease the number of people entering the amplifier–the prison system.[162]

GENETIC DATA CORROBORATE EPIDEMIOLOGICAL EVIDENCE

Advances in molecular technology have allowed scientists to more conclusively connect TB infections in prisons to the surrounding community. It is now possible to generate probabilistic transmission trees for TB—the most likely explanation of who infected whom during an outbreak—using genetic sequencing and sophisticated statistical models. Pathogens evolve as they spread, undergoing small changes in the nucleotide sequences that make up their genetic material. Once *M. tuberculosis*, the bacteria that causes TB, is collected from an infected individual, its genetic material can be analyzed and compared to bacteria collected from other individuals. The degree to which these bacteria are genetically similar provides a major clue in understanding the path by which it spread through the community. This type of analysis is typically conducted across an entire population, and pathogens with similar sequences are clustered together and assumed to have originated from the same source.

More primitive versions of these techniques have been used for decades to establish that TB can be transmitted from prisons to the general public. In the late 1990's, an outbreak of TB in a jail in the United States was associated with an increase in new cases of TB in the surrounding community, and a genetic analysis of the *M. tuberculosis* strain found in the community revealed that it had originated in the jail.[163]

Similar relationships have been established in Brazil. A study conducted in Dourados, Brazil determined that more than half of the TB strains identified in the community were related to those isolated in prisoners.[164] More recently, another molecular epidemiology analysis in Santa Catarina, Brazil found that TB is also being transmitted between prisons.[165]

Future developments in these molecular epidemiology approaches will allow for the quantification of the burden of TB attributable to transmission within and spillover from prisons. For now, it is clear that TB is being transmitted from prisons into the community, and this process will remain a persistent public health threat until TB is controlled inside of prisons.

VISITORS AND PRISON STAFF ARE AT AN ELEVATED RISK OF CONTRACTING TB

Maintaining contact with the outside world through visitations by family members and significant others is a critical component of the rehabilitation process for prisons. Prisoners who receive visitors have lower recidivism rates and have a lower propensity for violent behavior, compared to those who do not receive visitors.[166,167]

A garbage pile in a yard at the Penitenciária Agro-Industrial São João in Itamaracá in Pernambuco. *Photo Credit: Human Rights Watch, 2015*

There is also evidence that visitations decrease depression in adolescent prisoners.[168] In Brazil, visitors also supply their incarcerated loved ones with hygiene and food products that prisons are unable to provide.[169]

Although visitors are rigorously screened for illicit drugs, the Brazilian penitentiary system does not have a mechanism for preventing infectious diseases from entering or leaving prisons. In Brazil, visitation hours are offered regularly and can involve as many as 2,000 to 3,000 visitors in a weekend.[170] There are typically no designated visitation areas and visitors are permitted to enter communal areas of the prison including courtyards,[171] creating an elevated risk of encounters with infected individuals. Although open air spaces have traditionally been considered lower risk areas for TB transmission events, genomic data suggest that transmission can and does occur outside of crowded spaces as well.[172] Individuals who enter prisons for intimate visits are allowed into cells, which further increases their risk of contracting TB. On account of their repeated interactions with prisoners, visitors not only face a higher risk of TB themselves, but also serve as conduits for transmission of the disease between prisons and outside communities.

In addition to visitors, the movement of prison staff between prisons and free society may connect infections in both communities. Prison staff are at an especially elevated risk for TB because they are exposed to many of the same risk factors as prisoners. One study conducted in a Malaysia, where prison overcrowding is also a serious issue, found that over 80 percent of the staff in the country's largest prison tested positive for TB.[173] Similarly, a cross-sectional study in Rio Grande do Sul, Brazil identified working in a prison environment as a specific risk factor for latent TB infection.[174]

PRISONERS CARRY TB BACK TO THEIR COMMUNITIES UPON RELEASE

Diagnosing individuals with TB continues to be a challenge worldwide, but the systemic obstacles pervading Brazil's prisons exacerbate the problem. Mathematical modeling has shown that active case finding, which involves screening at-risk, non-symptomatic individuals for TB, would lead to the greatest reduction in TB incidence both in prisons and in the community.[175] However, Brazil's overburdened system lacks diagnostic tools such as Gene Xpert and X-ray machines, which are sensitive to pulmonary TB infections, since they are expensive and require trained staff to operate them. Instead, facilities often rely on the prisoners themselves to notify medical officers if they experience symptoms that could be indicative of TB. These symptoms, such as coughing and fever, are typically non-specific, which can make obtaining an accurate diagnosis difficult.

Regressive policies may deter incarcerated individuals from reporting their symptoms as well. One public defender reported that prisoners who have been diagnosed with TB are not allowed to leave the prison even to attend a court date regardless of whether they are receiving medication.[176] Instead, a judge decides their fate without the individual present. In the event that a prisoner being treated for TB is transferred to a different prison, the system does not have a mechanism for ensuring they will finish their treatment.

As a result, few prisoners report their symptoms. They are either diagnosed with TB only at an advanced stage of the disease, at which point they have likely infected many others, or never. In the latter case, undiagnosed prisoners are released back into their communities and can spread the disease to their friends and family.

Even when a prisoner is correctly diagnosed with TB, access to effective treatment remains an issue. Although prisons are typically equipped with "TB hospitals," these facilities do little more than isolate sick prisoners from the general prison population.[177] Prisoners are denied access to public hospitals except in extenuating circumstances, and even in these cases concern for security may trump the individual's need for adequate medical attention. If an incarcerated individual begins a treatment regimen while he is incarcerated, the Brazilian penitentiary system lacks an effective mechanism to ensure patients are not lost to follow-up. Some efforts have been made to track these patients upon release; however, individuals are reluctant to share personal information such as their home address, making it difficult to establish continuity of care post-release.[178] Since most individuals who interact with the criminal justice system in Brazil are of a low socioeconomic status, they are less likely to have access to healthcare within their communities once they return home.

Many of the barriers prisoners face with respect to TB control and prevention are institutionalized. It is therefore the responsibility of policy makers to remove these obstacles if TB is to be eradicated not only from Brazil's prisons but from the general population as well.

VIII. Conclusions

The continued spread of TB within Brazil's prisons stymies public health efforts to eradicate this deadly infectious disease from the country. Legal and cultural attitudes towards drug use have directly contributed to the persistence of TB in prison populations by supporting the inhumane practice of overcrowding these institutions. Given Brazil's current financial situation, building more prisons to accommodate the growing prison population size is not sustainable, and public health campaigns to find and treat cases of TB in prisons require continuous funding to be carried out appropriately. Reducing the number of incarcerated individuals will directly reduce the number of people exposed to TB. Decriminalizing drug use and drug trafficking is one approach that will directly reduce the population at risk of TB infection.

The October 2018 presidential election of Jair Bolsonaro indicates that the situation in Brazil's prisons will not improve soon due to the tough-on-crime and racially-tinged rhetoric that shaped his campaign. The following recommendations are therefore not constrained by the current political structure in Brazil. Rather, they are meant to contribute to the growing body of work that is being used by public health and legal activists who are fighting for a healthy and just criminal justice system.

IX. Recommendations

Ultimately, reducing the size of the prison population is critical to combating the spread of TB in Brazil. Lowering the number of people who enter the prison system would reduce infection rates both within prisons and in outside communities across Brazil. Even if state-of-the-art diagnostic and screening strategies within prisons were not intractable because of resource limitations, prisoners with TB would still be lost to follow up upon release. Decreasing incarceration, therefore, emerges as the only feasible option, and one that cannot be achieved without the decriminalization of minor drug offenses, which have helped drive the prison population's dramatic growth. Such an approach would reduce the costs of maintaining prisons and providing health services to treat TB patients. While decarceration and decriminalization of drugs stands out as the most salient recommendation, more specific short-term and long-term recommendations have been outlined below, with attention to mitigating the harm of the current system.

SHORT-TERM RECOMMENDATIONS

Expand access to psychological and health support services at custody hearings

A feature of custody hearings in certain cities has been the increased presence of psychological, health support, and social support workers at the hearings themselves. The role played by these groups varies across different custody hearing judges. In some contexts, this support team plays a role in supporting the judge in the decision of whether to grant freedom or not. In other contexts, they serve to assure the judge that if a pre-trial arrestee is granted freedom, their urgent needs will be accounted for, making them less likely to recidivate in the interim period. Irrespective of the rationale preferred by a particular judge, the increased presence of social support services has a net positive impact on a detainee's outcomes, and one expert interviewee recounted that the presence of such social support networks at the custody hearing increases the likelihood that the detainee receives freedom.[179] This would play a role in limiting the exposure to in-prison TB by reducing the number of people who enter prisons in the first place.

Create guidance on prosecutorial and judicial discretion

Despite the institution of custody hearings, many individuals charged with drug trafficking do not receive freedom and spend extended time in pretrial detention. In part, this is driven by the legal status of drug trafficking as a heinous crime under Brazilian law, and in part by institutional asymmetries in the custody hearing process itself, where often the only witness is the charging officer, and the only inquiry conducted is about whether the procedure of the arrest was legal (i.e., that no torture or abuse was used). And in a rare but important set of cases, these hearings may occur *ex parte*, in the absence of the defendants. To counteract the institutional asymmetries associated with the custody hearing process, trainings and

guidance should be provided to prosecutors and judges on exercising their discretion in the charging and adjudication process.

LONG-TERM RECOMMENDATIONS

Expand the use of custody hearings

According to the Inter-American System of Human Rights, pre-trial detention should only occur in exceptional circumstances.[180] However, in Brazil, the use of pre-trial detention is the norm, rather than the exception. Despite a Resolution by the National Council of Justice requiring that all jurisdictions in the country use custody hearings by May 2016,[181] informants interviewed unanimously reported that implementation had not yet reached all areas of the country. This resolution requires that individuals be brought before a judge within 24 hours of their arrests. Enacting this resolution across all jurisdictions could significantly reduce prison overcrowding by limiting the number of people held in pre-trial detention. Evidence suggests that judges are less likely to order pre-trial detention when seeing a person during a custody hearing than when making a custody determination after reviewing paperwork only.[182]

Promote inter-disciplinary research

There are currently numerous efforts in the public health and legal fields to improve health outcomes of prisoners and decrease the spread of infectious diseases in Brazil's prisons. However, through the process of compiling this report, it has become clear that many of these initiatives are siloed within their respective fields. Due to the complex, inter-disciplinary nature of the issue at hand, it is critical that experts from each of these fields collaborate to develop solutions that are both legally feasible and biomedically sound.

Combat stigma associated with TB through targeted interventions

Stigma remains a barrier to diagnosing and treating TB patients on both sides of prison walls, and there is a dearth of research exploring effective interventions to eliminate misconceptions surrounding the disease.[183] Efforts to eradicate TB will be fruitless if individuals in need of care are unwilling to seek it out. Thus, public health experts who wish to improve health outcomes in prisons must engage in a systematic effort to evaluate methods for reducing stigma in settings where individuals also typically face marginalization and racial discrimination.

Improve mechanisms for tracking and treating TB patients after their release from prison

Currently, many TB patients are lost to follow up after leaving the prison system. Their treatment courses are interrupted, and they fail to receive the care they need to treat their TB. To combat this problem, more resources should be devoted to tracking patients once they leave prison and linking them to public health services to ensure continued access to treatment.

Implement active case finding strategies in Brazil's prisons

Once Brazil's prison population has been sufficiently reduced, prisons should implement active case finding strategies, or the identification of individuals with a specific disease through systematic testing or examination, to help eradicate TB from these facilities.[184] When coupled with increased access to treatment, active interventions have been shown to decrease the risk of poor disease-related health outcomes in TB patients, and individuals who are diagnosed with TB during the latent phase of the disease can be treated before

they become infectious.[185] Screenings could be conducted at regular intervals, including at the time an individual begins serving his sentence and prior to his release.

RECOMMENDATIONS FOR FURTHER RESEARCH

Further research is needed to understand:

- The prevalence of tuberculosis in juvenile detention facilities.
- The prevalence of tuberculosis in drug treatment facilities, which are reportedly overcrowded and fail to provide adequate medical care.
- How widely custody hearings are being carried out in the country and the barriers to more widespread implementation.
- The impact of the National Policy for Comprehensive Health Care for Persons in Prison.
- This inter-ministerial ordinance from 2014 brought prison health under the Unified Health System (SUS) with the aim of improving access to health services and continuity of care for prisoners. Interview subjects suggested that no comprehensive study had been undertaken to understand how widely this policy had been implemented and how it had impacted prison health.
- Gender-specific challenges women face in prisons and how this experience affects their TB status.

APPENDIX I: LIST OF EXPERTS INTERVIEWED

- Marcellus Ugiette, *Public Prosecutor in Recife*
- Wilma Melo, Edouardo de Alencar & Abreu Matos, *Ecumenical Service of Militancy in Prisons (SEMPRI)*
- Rafael Sacramento, *Infectologist for prison facilities in Pernambuco & PhD student at FIOCRUZ*
- Marianna Granja, Barbara Lopes Nunes & Eloisa Helena Rodrigues, *Public defenders in Recife*
- Pedro Rico, *Pernambuco State Secretary of Human Rights*
- Valeria Fernandez, *Superintendent of Pernambuco State Executive Secretariat for Resocialization (SERES)*
- Arturo Escobar & Rafael West, *academics focused on drug policy at the Federal University of Pernambuco*
- Mariana Boujikian, Carolina Yabase, Ana Navarrete & Mariana Varela, *Instituto Terro, Trabalho e Cidadania (ITTC)*
- Nathalie Fragoso & Vivian Calderoni, *Institute for Defense of the Right to Defense (IDDD)*
- Janaina Homerin, *Rede Justica*
- Leon de Souza, *Psychiatrist & Former director of policy coordination at the National Secretariat of Drug Policies*
- Isabela Reis & Joao Godoy, *Conectas, Institutional Violence Team*
- Mateus Moro, *Public Defender in São Paulo*
- Henrique Finotti, *Sociologist at the São Paulo Public Defenders' Office*
- Luiz Guillerme Paiva, *Former National Secretary for Policy on Drugs*
- Cesar Munoz, *Brazil Senior Researcher at Human Rights Watch*
- Luiz Ramos, *lawyer*
- Paulo Sotero, *Wilson Centre*
- Bruno Langeani & Leonardo Silva, *Instituto Sou da Paz*
- Jason Andrews, *public health researcher at Stanford*
- Katharine Walters, *public health researcher at Stanford*
- Sanjay Basu, *public health researcher at Stanford*
- Albert Ko, *public health researcher at Yale*
- Julio Croda, *public health researcher at FIOCRUZ*
- Gabriela de Luca, *program officer at the Open Society Foundation*
- Jose Veloso, *Paulista Network for Social Control of TB*
- Luciana Boiteaux, *professor at Universidade Federal do Rio de Janeiro*
- Catalina Perez Correa, *Colectivo de Estudios Drogas y Derecho (CEDD)*
- Ana Paula Pellegrino, *Igarapé*
- Marcelo Campo, *Federal University of Grande Dourados*
- Gabriel Santos Elias, *Brazilian Drug Policy Platform*
- Regina Zuim, *Rio State TB Program*
- Tiago Joffily, *Public Prosecutor, Rio de Janeiro*
- Murilo Bustamente, *Public Prosecutor, Rio de Janeiro*
- Afranio Kristski, *Center for TB Research, Federal University of Rio de Janeiro*
- Patricia Magno, *Public Defender, Rio de Janeiro*
- Raquel Willadino, *Aruan Braga, and translator Daniel, Observatorio de Favelas*
- Lucas Sada, *lawyer*
- Fafa Cordeiro, *sociologist in Rio de Janeiro*

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Cover Photo: A cellblock littered with dirty dishes in the Pedrinhas prison complex in the state of Maranhão. *Photo Credit: Human Rights Watch, 2015*