

# Tuberculosis and the climate crisis in Latin America: a predicament of poverty, migration and displacement

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Tuberculosis (TB) has long been associated with poverty and displacement, through food insecurity, overcrowding, poor living conditions and reduced access to healthcare, which significantly increase the risk of both disease and poor health outcomes.<sup>1</sup> Meanwhile, the climate crisis is likely to affect environmental conditions and increase extreme weather events and, consequently, migration and displacement, further exacerbating this important structural driver of TB.<sup>2</sup>

Of the 195 countries that in 2016 agreed to cut their greenhouse gas emissions as part of the Paris Agreement, only a small number are currently meeting their targets. The consequences will most likely disproportionately affect low- and middle-income countries and specifically poor individuals everywhere. Latin America has been heterogeneously affected by climate change, with some regions experiencing more pronounced increases in temperature than others. Heatwaves and droughts are surging, with catastrophic floods leading to hundreds of thousands internally displaced, many forced to live in shelters.<sup>3</sup>

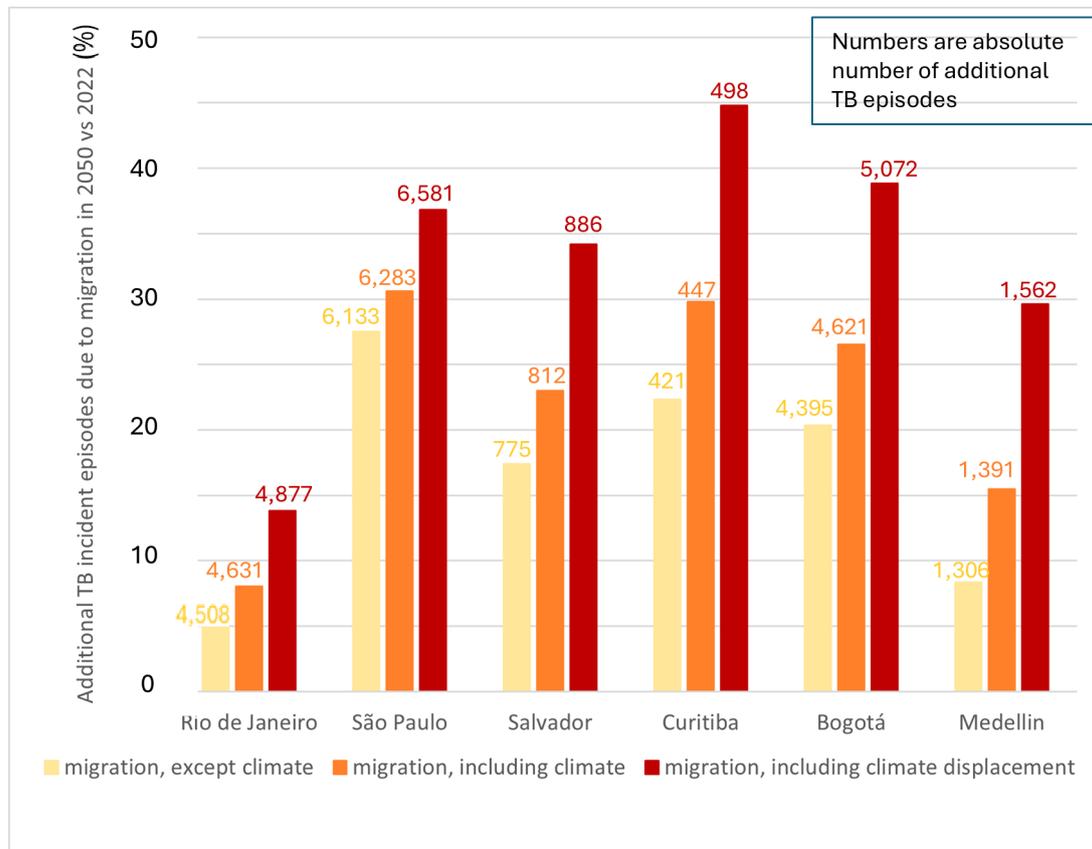
Climate migration, whether voluntary or forced, is mainly internal, with people moving within the boundaries of their own country.<sup>4</sup> Projections indicate that Latin America could see up to 17 million internal climate migrants by 2050<sup>4</sup> and, at the urban level, recent modelling results suggest that by 2050 climate migrants will constitute 10–43% of the total migrant population in large urban centres in Latin America.<sup>5</sup> Of these, more than half will be internally displaced persons (IDPs), that is, individuals forced to leave their homes in response to extreme environmental hazards and/or conflict resulting from the climate crisis. This population is often characterised by extreme poverty and vulnerability, and 80% of IDPs can

## SUMMARY BOX

- ⇒ Tuberculosis (TB) is a disease of poverty and social inequalities, and its burden has been increasing in Latin America in the past decade.
- ⇒ Latin America has been experiencing increases in temperature and extreme weather events, leading to migration and displacement, important structural drivers of TB.
- ⇒ Internally displaced people often concentrate in informal, overcrowded settlements on the outskirts of cities, such as slums, where the odds of developing TB are three times higher.
- ⇒ By combining recent estimates of climate migration in six large Latin American cities, we discuss how climate migration could lead to an increase of 14–45% in TB incident cases in 2050 in these settings.
- ⇒ It is vital for policy making to act now and address the social and health consequences of the climate crisis, by mitigating displacement and improving living conditions and TB surveillance.

currently be found in urban areas.<sup>5,6</sup> Urban poverty often concentrates in informal, overcrowded settlements on the outskirts of cities, such as slums,<sup>6</sup> where the odds of developing TB are three times higher compared with the general population (incidence rate ratio of 3.0 (95% CI, 2.8–3.1)).<sup>7</sup>

To demonstrate the potential scale of the effect on TB of climate-related migration and displacement to large urban centres, we estimated the possible increase in incident TB cases in 2050 compared with 2022 in six large Latin American cities considering a moderate climate scenario (ie, a future in which the Paris Agreement global temperature limit of a 1.5°C increase above pre-industrial levels is surpassed, but the worst-case outcome is avoided). By multiplying expected projections of the total resident population<sup>5</sup> and current estimates of TB burden<sup>1,8</sup> (see



**Figure 1** Increase in tuberculosis (TB) incident cases due to migration in six large Latin American cities expected between 2022 and 2050. Notes: Based on TB incidence data from Brazil Ministry of Health and WHO,<sup>1,8</sup> and resident population and migration estimates from the C40 Cities Climate Leadership Group and Baruch College.<sup>5</sup> The graph reports both percentages and absolute numbers of additional TB incident episodes in 2050 compared with 2022 in the six cities examined, as a consequence of either all types of migration except climate (yellow); or all types of migration including climate (orange); or all kinds of migration assuming all climate migrants are internally displaced persons (red).

online supplemental document for methods), we find that incident TB cases could increase by 8–31% across the six cities examined due to climate or all types of migration alone (see figure 1).

Such estimates assume a constant TB incidence rate from 2022 across the general population and solely consider the consequences for TB of increased population size due to migration. However, this likely underestimates the impact. If we add the additional risk from poor living conditions (eg, all climate migrants are IDPs), with a three times higher TB incidence,<sup>7</sup> the total number of incident TB cases would increase to 14–45% higher than in 2022 across the six cities examined.

These numbers, while alarming, most likely remain a strong underestimate of the total impact of climate migration on the TB epidemic in Latin America. Our simplified approach taken here does not, for example, consider the spillover of TB transmission in the general population due to contacts with migrants (as seen in data from São Paulo<sup>9</sup>) nor further increases in poverty. Crucially, we only consider the city proper and not the immediate outskirts, where IDPs are

expected to settle in increasingly larger numbers and poorer living conditions.<sup>5,6</sup>

It is thus vital to act now and tackle this predicament from two fronts. From the TB programme perspective, close attention should be paid to migrants and displaced individuals with improved access to welfare and health surveillance. From the climate crisis perspective, meeting climate targets and acting on the social drivers of TB by mitigating displacement and supporting safe migration, with improved housing and living conditions for migrants and non-migrants, is crucial to limiting the adverse effects of climate change on TB.

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