international policy centre for inclusive growth

The International Policy Centre for Inclusive Growth is jointly supported by the United Nations Development Programme and the Government of Brazil.

ONE PAGER 476

July 2021 ISSN 2318-9118

Mapping geographic access to COVID-19 health care in Brazil

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At the onset of the COVID-19 pandemic, a lack of preparedness of health systems in developing countries to cope with increased demand for hospitalisation was a cause for concern. Jensen and Molina (2020) estimated that the 20 most vulnerable countries in terms of availability of intensive care unit (ICU) beds would run out of beds if as little as 0.04 per cent of their population became actively infected. While it is important to consider aggregate figures at the country level, policy response occurs locally, at clinics, hospitals and vaccination sites. Thus, the distribution of health infrastructure within cities and ease of access, particularly for the most vulnerable groups, are crucial factors to develop informed and effective responses.

Pereira et al. (2021) examined the spatial, income and racial inequalities in geographic access to COVID-19 healthcare in Brazil's 20 largest cities, considering access to health care facilities with capacity for patient triage and referral of suspected cases to hospitals, as well as those equipped with ICU beds and mechanical ventilators.

First, authors analysed the support capacity of the public health system, looking at the number of ICU beds/ventilators per person in the catchment area of each hospital. They found that 13 out of the 20 cities analysed had fewer ICU beds/ventilators than the minimum level recommended by national authorities (one adult bed per 10,000 people). This could be considered insufficient to cope with the increased demand for hospital admissions and has proved to be inadequate in coping with the rapid spread of COVID-19 in many cities. The situation is worse when we consider the spatial concentration of health care services and the history of segregation and mobility barriers faced by vulnerable communities in Brazil.

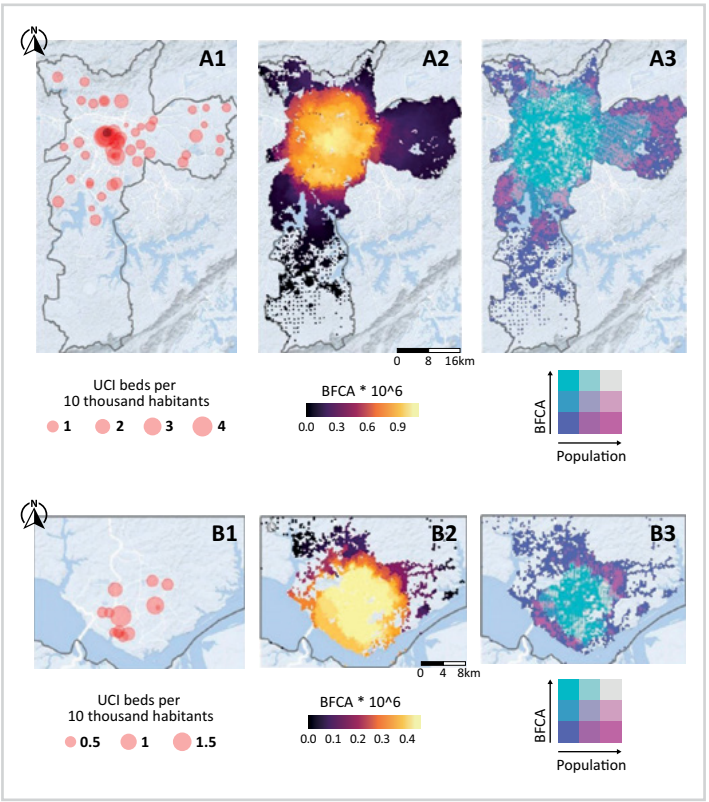
The study mapped approximately 228,000 vulnerable people (low-income and over 50 years old), who live farther than a 30 minute walk from primary and emergency care units. It also found around 1.6 million vulnerable people who live more than 5 km away from a hospital with ICU beds. Accessibility analysis using the balanced float catchment area (BFCA) methodology shows this scenario is particularly worrisome when accounting for the potential demand for ICU beds and ventilators. Estimates show large spatial inequalities, with substantially lower access to health services in low-income and black communities in urban peripheries as shown in Figure 1, which could easily be overwhelmed by hospitalisation demands in the near future. As patients suspected of COVID-19 might face mobility constraints, it is crucial to develop strategies to provide transport and health services to vulnerable communities.

Transport accessibility analyses can provide actionable information to help local governments improve access to health care during pandemic outbreaks. By placing disadvantaged communities with poor accessibility on the map, the study helps identify neighbourhoods where local authorities should prioritise building temporary hospitals and/or engaging mobile units. These analyses may also help identify which hospitals might face greater admission overload. The application of the novel BFCA methodology illustrates how competition effects in access to health care can have important but often overlooked implications for policy planning.

This type of research can be applied globally, particularly in larger cities—depending on data availability—to indicate areas where constructing makeshift hospitals would be more effective to improve health care accessibility, particularly for vulnerable groups. Future research should also consider the potential role of community health agents in improving accessibility in more remote areas.

Figure 1

Map of São Paulo (A) and Manaus (B) showing 1) The number of ICU beds per person in the catchment area of each hospital; 2) BFCA accessibility level; 3) the combined spatial distribution of population and accessibility. The bivariate choropleth map (3) helps draw attention to places that deserve more (or less) attention:



Note: Bright pink=large population areas underserved by health services.
Bright cyan=small population areas with high access to health services.
Dark purple=small population areas with the lowest access to health services.

Source: Authors' elaboration.

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