

The COVID-19 pandemic in Brazil: chronicle of a health crisis foretold

Guilherme Loureiro Werneck ^{1,2}
Marilia Sá Carvalho ³

doi: 10.1590/0102-311X00068820

The COVID-19 pandemic, caused by the novel coronavirus (SARS-CoV-2), has emerged as one of this century's major global health challenges. In the middle of April, just a few months after the epidemic erupted in China in late 2019, there had been more than a 2 million cases and 120,000 deaths from COVID-19 worldwide. Many more cases and deaths are predicted in the coming months. In Brazil, to date, there have been some 21,000 confirmed cases and 1,200 deaths from COVID-19.

Insufficient scientific knowledge on the novel coronavirus, the fast pace of its spread, and its capacity to cause deaths in vulnerable groups have generated uncertainties on the best strategies for confronting the epidemic in different parts of the world. The challenges are even greater in Brazil, since little is known about the characteristics of COVID-19 transmission in a context of huge social inequality, with communities exposed to precarious housing and sanitation conditions, without systematic access to running water, and with widespread crowding.

In a schematic, simplified approach, the response to the COVID-19 pandemic can be divided into four stages: containment, mitigation, suppression, and recovery. The first stage, containment, begins before cases are reported in a country or region. It mainly involves active tracing of inbound international passengers and their contacts, aimed at avoiding or postponing community transmission. In the current pandemic, an exemplary containment stage was essential for decreasing the pandemic's initial impact in Taiwan, Singapore, and Hong Kong, despite their proximity to China. Previous experience with the first major epidemic of severe acute respiratory syndrome (SARS) caused by coronavirus in this century (2003) may, at least partially, explain the successful containment of COVID-19 in these countries.

The second stage, mitigation, begins when there is already sustained transmission of the infection in the country. The goal is to decrease the levels of disease transmission in groups with the highest risk of clinical severity, besides, of course, isolation of positive cases. These measures, called "vertical isolation", are generally accompanied by some degree of reduction of social contact. The approach generally begins with the cancellation of large events, followed gradually by suspension of school activities, a ban on smaller events,

¹ Instituto de Medicina Social, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brasil.

² Instituto de Estudos em Saúde Coletiva, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brasil.

³ Programa de Computação Científica, Fundação Oswaldo Cruz, Rio de Janeiro, Brasil.



closing of theaters, cinemas, and shopping malls, and recommendations to reduce people's circulation. This is what has come to be called "flattening the curve" of the epidemic.

A suppression stage may be necessary when the previous measures have not proven effective, either because their implementation may not have been adequate and immediate (e.g., insufficient supply of diagnostic tests to identify infective individuals at the epidemic's onset) or because the achieved reduction in transmission is insufficient to prevent the healthcare system's collapse. In the suppression stage, more radical social distancing measures are implemented in the entire population. The goal is to postpone, as long as possible, an explosion in the number of cases until the situation stabilizes in the healthcare system, testing procedures can be expanded, and eventually some new therapeutic or preventive tool (e.g., a vaccine) becomes available. There are controversies ¹ concerning these "horizontal isolation" measures, particularly involving their economic, social, and psychological repercussions at the population level ².

Last but not least is the recovery stage, when there are consistent signs of a downturn in the epidemic and when the number of cases becomes residual. This last stage requires society's organization for the country's social and economic restructuring, and it definitely involves government intervention.

In Brazil, the question of the most adequate strategy for the epidemic's current context, whether "vertical isolation" or "horizontal isolation", has dominated the debate in different sectors of civil society, but also among researchers and professionals directly or indirectly involved in confronting the epidemic. The debate is analogous to the dilemma of the choice between interventions based on "high-risk strategies" or "population strategies" ³.

Geoffrey Rose's seminal work still influences the debate on public health interventions. Briefly, interventions based on "high-risk strategies" are targeted to reducing the disease's impact and complications in a population subset considered at highest risk. Meanwhile, the "population strategy" proposes a preventive approach for the entire population. In chronic diseases with high prevalence, there is a preference for population-based strategies, since the benefits of preventive measures are felt not only by the highest-risk groups, but by everyone. Assuming that the health risks are distributed evenly in a population, a population-based approach would reach a larger contingent of persons accounting for the largest burden of disease at the population level ⁴. Meanwhile, for communicable diseases, the high-risk focus has been proposed more frequently, since the approach targeted to the groups at greatest risk (of transmitting and/or acquiring the infection) would be more efficient for limiting transmission to the entire population ⁵. Sometimes a combination of the two approaches is used. This is the case with AIDS, with population strategies using promotion of condom use, alongside campaigns targeted to groups at increased risk such as sex workers ⁶.

The adoption of different strategies of social distancing, vertical or horizontal, must be guided by an analysis of the situation and progression of the epidemic in a given context. Thus, from the strictly theoretical point of view, an effective "vertical isolation" strategy might be the most efficient, because it also reduces the economic and social repercussions associated with "horizontal isolation". However, the conditions are limited for the implementation of "vertical isolation" in the current epidemic's situation in Brazil. This is partly due to the fast pace of the infection's spread and the difficulties in strict monitoring and surveillance of cases and contacts, since asymptomatic cases represent nearly 80% of infected individuals. The limitation is also due mainly to the lack of a broad testing system starting early in the epidemic, which would have allowed early identification of infected individuals. In fact, experience in China shows that at the beginning of the epidemic, 86%

of the infections were not detected, but they constituted the source of infection for 79% of the cases ⁷. Not by coincidence, progress with the epidemic's control in China only occurred after the enforcement of broad and drastic social distancing measures. In countries with serious limitations in both testing capacity in the initial moments of the epidemic and coverage of care for severe patients, such as in the United States and Italy, "vertical isolation" was tried initially, but the rapid rise in the number of cases required (albeit late) the introduction of the suppression strategy via "horizontal isolation". Similarly, in the United Kingdom, the vertical isolation strategy was initially recommended, but the evolution of the epidemic and the available projections led to a change of course, with the adoption of the suppression strategy based on horizontal isolation.

For years, the scientific community in the field of infectious diseases has warned that the emergence of new pandemics is not a question of "if", but of "when" they will occur ⁸. The 21st century has witnessed various epidemics that were able to be contained at some level in time or geographically, like the two previous coronavirus epidemics (SARS and the Middle East respiratory syndrome – MERS), the Ebola epidemics in Africa, and the H5N1 avian influenza epidemic. Together, they caused fewer deaths than COVID-19. The H1N1 influenza pandemic of 2009, for which there is a vaccine available, was devastating, with an estimating 150 to 575 thousand deaths from causes associated with the infection ⁹. The number of deaths that will be caused by COVID-19 is unknown, but current estimates indicate that the figure may exceed 2 million, even with the implementation of early suppression measures ¹⁰.

The scenario in Brazil is uncertain, and valid and reliable estimates of the number of cases and deaths from COVID-19 are hindered by the lack of reliable data on cases and on the actual implementation of suppression measures, given the contradictory recommendations issued by government authorities. Among the regions of Brazil, preliminary studies using data on interurban mobility point to the potential paths for the epidemic's spread as a potential tool for allocating the necessary resources (already scarce) for adequate care ¹¹. Little is known about how the epidemic will spread in (and impact) low-income communities, a completely new scenario when compared to the countries most affected by the pandemic thus far.

The COVID-19 pandemic has reached the Brazilian population in a scenario of extreme vulnerability, with high unemployment rates and severe budget cuts in social policies. In recent years, especially since Brazilian Congress passed *Constitutional Amendment n. 95*, which places a radical ceiling on public expenditures, and with the economic policies enforced by the current Administration, there is an increasingly intense stranglehold on funding for health and research in Brazil. Precisely in such times of crisis, society appreciates the importance of a country's strong science and technology system and a unified health system that guarantees the universal right to health.

The immediate decisions in the current scenario should seek to spare lives by guaranteeing quality of healthcare for severe cases. It is also crucial to minimize the economic, social, and psychological harms to the most vulnerable groups through the adoption of appropriate fiscal and social measures ¹². We Brazilians should raise our voices in defense of the Unified National Health System and demand that those currently governing the country participate in the defense of our people's lives; otherwise, those same administrators will be held accountable for promoting what is potentially one of the worst health tragedies in Brazil's history.

Contributors

The two authors contributed to the manuscript's conception, writing, and revision and approved the final version.

Additional informations

ORCID: Guilherme Loureiro Werneck (0000-0003-1169-1436); Marília Sá Carvalho (0000-0002-9566-0284).

1. Ioannidis JPA. Coronavirus disease 2019: the harms of exaggerated information and non-evidence-based measures. *Eur J Clin Invest* 2020; 50:e13222.
2. Kissler SM, Tedijanto C, Lipsitch M, Grad Y. Social distancing strategies for curbing the COVID-19 epidemic. *medRxiv* 2020; 24 mar. <https://www.medrxiv.org/content/10.1101/2020.03.22.20041079v1>.
3. Rose G. *The strategy of preventive medicine*. Oxford/New York: Oxford University Press; 1992.
4. Chor D, Faerstein E. Um enfoque epidemiológico da promoção da saúde: as idéias de Geoffrey Rose. *Cad Saúde Pública* 2000; 16:241-4.
5. Koopman JS, Simon CP, Riolo CP. When to control endemic infections by focusing on high-risk groups. *Epidemiology* 2005; 16:621-7.
6. Chang LW, Serwadda D, Quinn TC, Wawer MJ, Gray RH, Reynolds SJ. Combination implementation for HIV prevention: moving from clinical trial evidence to population-level effects. *Lancet Infect Dis* 2013; 13:65-76.
7. Li R, Pei S, Chen B, Song Y, Zhang T, Yang W, et al. Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2). *Science* 2020; [Epub ahead of print].
8. Wolfe N. *The viral storm: the dawn of a new pandemic age*. New York: Times Books; 2011.
9. Dawood FS, Iuliano AD, Reed C, Meltzer MI, Shay DK, Cheng P-Y, et al. Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: a modelling study. *Lancet Infect Dis* 2012; 12:687-95.
10. Walker P, Whittaker C, Watson O, Baguelin M, Ainslie K, Bhatia S, et al. Report 12: The global impact of COVID-19 and strategies for mitigation and suppression. <http://spiral.imperial.ac.uk/handle/10044/1/77735> (accessed on 03/Apr/2020).
11. Coelho FC, Lana RM, Cruz OG, Codeco CT, Villela D, Bastos LS, et al. Assessing the potential impact of COVID-19 in Brazil: mobility, morbidity and the burden on the health care system. *medRxiv* 2020; 26 mar. <https://www.medrxiv.org/content/10.1101/2020.03.19.20039131v2>.
12. Apuzzo M, Pronczuk M. COVID-19's economic pain is universal. But relief? Depends on where you live. *The New York Times* 2020; 23 mar. <https://www.nytimes.com/2020/03/23/world/europe/coronavirus-economic-relief-wages.html>.