

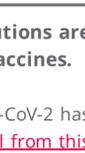


Brazil's Vaccine Community Responds to COVID-19

By **José Gomes Temporão, PhD**

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Former Minister of Health of Brazil



As COVID-19 hits Brazil hard, the country's public health institutions are well-positioned to develop, manufacture, and deploy eventual vaccines.

Over the past few weeks, the rate of infections and deaths due to SARS-CoV-2 has risen starkly in Brazil. The country now has the [fourth highest death toll from this new coronavirus, and the number of infections is still sharply rising](#). Only the US has more infected citizens. This situation is challenging our health institutions to react in full force.

Fortunately, Brazil has a long history of responding to unprecedented public health challenges. It was 120 years ago that Fiocruz, the Oswaldo Cruz Foundation, was established to address health threats of that time. Since then, Brazil has developed a strong track record of responding to viral epidemics. In the 1990s, the country developed its landmark HIV/AIDS program, which demonstrated that it was possible to provide state-of-the-art treatment to all AIDS patients within the public health system. This program continues today despite multiple political transitions.

More recently, the country confronted the Zika virus outbreak and its consequences. In 2015, Brazil was the first country to detect and characterize the emergence of the Zika congenital syndrome and quickly enlisted its research community to generate evidence and contribute to the search for new tools to address this disease.

In addition to these domestic efforts, Brazil has engaged consistently in global health initiatives. The country had a key role in the creation of the World Health Organization (WHO) with a Brazilian as its second Director-General. We've championed the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which promotes access to medicines, hosted the first Global Conference on Social Determinants of Health in 2011, and helped launch UNITAID in partnership with France, Chile, Norway, and the UK.

A Focus on Vaccination

Throughout all of this, vaccines are at the center of Brazil's public health tradition. The country has well-established domestic capacity for vaccine research and production, including two leading manufacturers: the Butantan Institute in São Paulo and Bio-Manguinhos, a unit within Fiocruz, in Rio de Janeiro.

Their production capacity has enabled the country to develop a robust immunization program with some of the highest routine immunization rates among middle-income countries. Vaccine expertise also gives Brazil the ability to quickly mobilize around outbreaks. Examples of this include the 2010 H1N1 vaccination campaign that reached 100 million people (50 percent of the population) with a vaccine manufactured at Butantan, and more recently, the response to yellow fever and measles outbreaks.

The combination of a Universal Health System – catering to 80 percent of the Brazilian population regardless of income – and multiple R&D institutes focused on vaccinology and local production has enabled the country to ensure a continuous supply of existing vaccines, adopt new vaccines, and expand coverage.

Brazil manufactures around 80 percent of all vaccines used in the country's widespread immunization program. In 2018 alone, this program provided over 300 million doses of vaccines at a cost of US \$1.2 billion – a fraction of what it would cost in high-income countries. This system was built on a strategic vision that included investment in infrastructure, expertise, and incentives for technology transfer agreements between Brazil's public sector manufacturers and multinational pharmaceutical companies.

These technology transfer agreements have allowed the country to adopt and deploy new products shortly after they are licensed globally. Butantan's agreement with Sanofi enabled the organization to fully incorporate seasonal influenza vaccine production, and a technology transfer of Merck's human papillomavirus (HPV) vaccine is underway. Bio-Manguinhos established partnerships for the production of vaccines against rotavirus, pneumococcal pneumonia, and the combination measles, mumps, rubella, and varicella viruses. Bio-Manguinhos is also one of the four global suppliers of yellow fever vaccines that are prequalified by WHO and made available through Gavi in at-risk countries.

Applying this Expertise to COVID-19

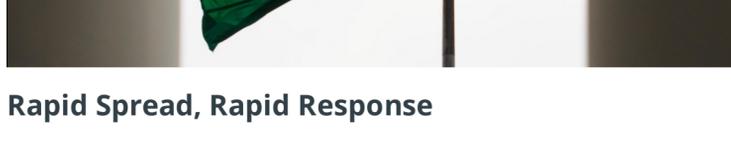
This established technology transfer record may prove a valuable resource once a vaccine for COVID-19 shows promise in clinical trials. Both Butantan and Bio-Manguinhos are well positioned to absorb a novel product and help scale-up manufacturing quickly for use in low- and middle-income countries. At Bio-Manguinhos, there are ongoing discussions with partners to explore technology transfer arrangements as well as the possibility of acting as a contract manufacturing organization to speed up the supply of vaccines.

The R&D capacity at Brazilian scientific organizations is also being leveraged to support the development of SARS-CoV-2 vaccines, and some interesting examples are starting to emerge. Scientists at Bio-Manguinhos are collaborating with external partners to explore six different candidates, building on existing vaccine platforms as well as new approaches under accelerated development. Meanwhile, Butantan has recently announced efforts to develop a novel vaccine approach based on outer membrane vesicles.

Scientists at Fiocruz, the immunology lab of the Institute of the Heart, the Medical School of São Paulo University, and the Center for Vaccine Technology at the Federal University of Minas Gerais are partnering to develop two SARS-CoV-2 vaccine candidates that are included in the WHO landscape document of COVID-19 candidates.

Grounded on its history of innovation and commitment to domestic and global public health, the Brazilian vaccine community is prepared to respond to this pandemic by contributing to the development, manufacturing, and eventual deployment of affordable vaccines for the communities and countries that need them most.

Spotlight



Rapid Spread, Rapid Response

An escalating number of SARS-COV-2 infections in Brazil is met with a swift response from the country's scientists.

By **Alex Menezes**

Senior Vice President at Global Health Strategies

The public health response to COVID-19 in Brazil has been far from perfect as the virus's rapid spread illustrates (see [COVID-19 in Numbers](#) below). But amidst limited viral testing and uncoordinated political leadership, one part of the Brazilian response has been swift and effective: the response from the country's scientific community.

Scientists began battling SARS-CoV-2 immediately. They sounded the alarm and encouraged preventive measures early on. And although this didn't contain the spread of the virus, it certainly impacted its trajectory.

The course of COVID-19 in Brazil is being closely tracked by epidemiologists working with the government and within academic institutions. Testing capacity is still falling short but epidemiological information is widely shared through nationwide government platforms and compiled in dashboards by independent research groups, including [CIDACS](#) and [Icici](#). These data science centers are setting the stage for in-depth investigations that will generate a more detailed picture of the Brazilian outbreak and its impact.

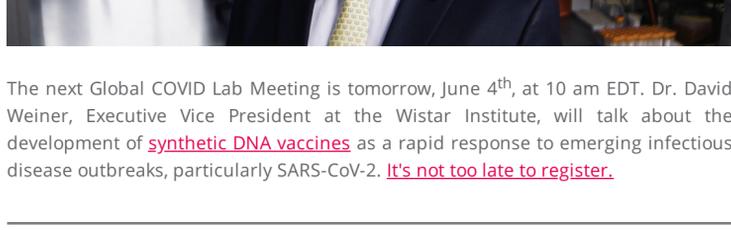
Official data on confirmed cases is also being complemented by regional and national surveys that were established in record time, as well as surveillance projects that were redirected to track the impact of SARS-CoV-2 in the country.

Most of these research efforts build on existing infrastructure and research teams, using both repurposed resources and new funding. A recent COVID-19-focused request for proposal by the Ministry of Health and the National Council of Research received over 2,200 responses. Other initiatives led by organizations such as Fiocruz and the São Paulo State Research Agency are pooling private and public funding to support investigators within public health and academic institutions.

The country's well-established clinical research capacity that has contributed to pivotal trials for HIV prevention, vaccines, and drug development over the years also quickly kicked into high gear in response to the pandemic. There are already many multicenter, national trials of COVID-19 underway.

Such robust research capacity in a high-incidence setting will surely contribute to the global understanding of this pandemic and help accelerate the development of new diagnostics, drugs, and vaccines that are sorely needed in Brazil, and around the world.

Global COVID Lab Meeting



The next Global COVID Lab Meeting is tomorrow, June 4th, at 10 am EDT. Dr. David Weiner, Executive Vice President at the Wistar Institute, will talk about the development of [synthetic DNA vaccines](#) as a rapid response to emerging infectious disease outbreaks, particularly SARS-CoV-2. [It's not too late to register.](#)

Must Read

Scientists continue to report on SARS-CoV-2 infection dynamics, collect preclinical data on vaccine candidates, and argue for increased collaboration in the efforts to develop vaccines against this novel human coronavirus.

- In this [preprint publication](#), researchers analyzed the duration of immune responses to four seasonal human coronaviruses in a small number of individuals and found that there is a short duration of protective immunity against reinfection.
- Another [preprint publication](#) analyzes infection data in the US and Europe to illustrate where and how the earliest sustained transmission networks were established.
- [A policy forum published in Science](#) outlines the plan for a public-private partnership to facilitate a collaborative approach to COVID-19 vaccine development.
- [A preclinical study published in Science](#) shows that DNA-based vaccine candidates could protect against SARS-CoV-2 infection in non-human primates.
- In a [commentary published in Vaccines](#), researchers argue that now is the time to start developing a universal coronavirus vaccine.

COVID-19 in Numbers

Brazilian Municipalities Reporting COVID-19 Cases



Credit: Compiled by [Rede CoVida](#) with data from [brasil.io](#)

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