Covid-19: Latin America defies nationalism and circumstance to develop its own vaccines

Latin American countries not only developed their own covid vaccine prototypes but also rolled them out. Martín De Ambrosio reports on a region taking its first steps towards vaccine security

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When the pandemic shook the world in 2020, Argentina, like many countries, went into full lockdown. Juliana Cassataro, a researcher at the National University of General San Martín, wondered what her team could do to help. The answer was obvious for a researcher specialising in oral vaccines: make one.

“From the beginning we planned to make it as a booster—we realised that we couldn’t compete with developers with millions and millions of dollars and the support of bigger nation states,” says Cassataro. Her team received a small grant of $100 000 from the Argentine ministry of science in May 2020 to design a prototype based on Cassataro’s specialism: recombinant protein vaccines.

Confidence was not high. Colleagues and politicians told them to give up—it was not feasible to produce a vaccine “with only a few thousand dollars.” By October 2020, however, Cassataro had produced two formulas with good results in mice, but ran short on materials. As the team approached pharma and biotech companies to help, they told Cassataro that her results were good but that “you will never make it, not in Argentina.”

Today, her team of nine—most of them women—are completing enrolment for a phase 3 clinical trial of their vaccine Arvac-Cecilia Grierson, named after the first female physician in Argentina. They did it with $15m, in association with Argentina’s ministry of science and the national laboratory Cassará (for comparison, one study found that the US National Institutes of Health were able to invest $31.9bn in covid vaccine development, production, and rollout, of which $337m was invested pre-pandemic).

One of the lasting narratives of the pandemic has been the unequal distribution of vaccines around the world. Even now, more than two years after the first immunisations in Europe and the US, only 29.2% of people in low income countries have received at least one dose.

Amid the furore over vaccine sharing, South America’s researchers did not sit around waiting for vaccines to trickle down.

Cuban independence

Cuba’s success is based on its well established, state backed biotech sector. Since the 1980s, when President Fidel Castro invested at least a billion dollars in the field, it has been a core principle of the socialist country, also creating a lucrative export trade. Cuba manufactures eight of the 11 vaccines used in its national immunisation programme, and exports hundreds of millions of vaccines to more than 40 countries every year.

“Our 30 years of experience has allowed us to get a covid-19 vaccine with 92% efficacy,” says Liz Alvarez-Lajonchere, manager of the Abdala vaccine project of the Center for Genetic Engineering and Biotechnology in Cuba. Coupled with ongoing state investment, she points to the maintenance of highly qualified personnel, capable of both producing and developing new products.

Abdala—as well as its less efficacious sister vaccine Soberana, which uses the same technology and is produced by Instituto Finlay, another Cuban biotech—has received praise. A headline in Nature in November 2021 read, “Cuba’s bet on home grown covid vaccines is paying off,” while Harvard’s TH Chan School of Public Health wrote that “Cuba’s ability to develop homegrown covid-19 vaccines and immunise most of its citizens should serve as a model for developing countries.”

Abdala has been approved for emergency use in countries including Mexico, Nicaragua, and Vietnam, while a World Health Organization assessment for wider use is ongoing.

Brazil

In Brazil, a public-private partnership between the Oswaldo Cruz Foundation (Fiocruz), the Butantan Institute, Sao Paolo’s state research centre, and private companies has been leading development efforts.

Butantan’s previous experience has been with vaccines cultured in eggs—common for many vaccines—with a manufacturer that was already working to produce a vaccine against influenza. This led it to partner in clinical trials of the Chinese vaccine Coronavac at the height of the pandemic. Its 2021 phase 3 study, involving 13 060 participants, was among the first to report positive results for a vaccine that was crucial to low and middle income nations because of its affordability and availability. The Fiocruz researchers, meanwhile, have experience testing the Oxford AstraZeneca vaccine in Brazil.
“We are currently in phase 2 of the clinical trial, which has been threatened several times by the rapid change in the epidemiological status of covid-19 and the advance of the national immunisation programme,” says Érrique Jose Farias Peixoto De Miranda, medical manager of clinical development at the clinical trials division at the Butantan Institute.

The vaccine will be sold at cost to the Brazilian Ministry of Health. De Miranda says a key advantage of the Butantan Institute is that, as a smaller biotech company, the costs of trials “are lower than that of big pharma,” with the biggest difference being the need for larger companies to outsource trials to local vendors like Butantan. As the company does the clinical trials themselves, and the number of study sites is lower than that of previous covid-19 vaccines such as for Pfizer and Johnson and Johnson, this helps to keep costs down.

Complex, difficult, and expensive

May 2023 saw yet another local covid vaccine announced—this time by Mexico, where the national government and private laboratory Avimex are working on Patria, which they hope to use locally as a booster shot by December.

Still, Elvira Zini, science director at the private Richmond Laboratories, in Argentina, says vaccine development in South America is “complex, difficult, and expensive.”

Zini was the principal investigator for Sputnik V, the Russian covid-19 vaccine, for use in Argentina. “You need to check a lot of processes, official paperwork, and authorisations. It’s difficult because you need talent and a good regulator. It is expensive because you also need millions for investments in infrastructure and capacity building.” This is why, globally, there are just a few companies working on vaccine development, she says.

Richmond was a local manufacturer for Sputnik V, completing the fill and finish of almost eight million shots for Argentines. Another laboratory close to Buenos Aires, Mabxience, helped fill and finish the Oxford AstraZeneca vaccine. Sadly, timing proved the enemy. A lack of suppliers for materials delayed the rollouts of either vaccine, leading to around 90 000 deaths in Argentina in its second covid wave in 2021. Zini says that “so-called globalisation turned into protectionism” as almost every country closed its borders, exacerbating the difficulty in obtaining supplies of any ingredient or material.

For her, it highlights perhaps the key learning beyond just developing one’s own vaccines: the region must reduce its reliance on medical imports. It’s a message said often by WHO. Latin America will soon have its own vaccines, but it also needs the materials to manufacture them.

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