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Cuba Libre to be COVID-Libre: Five Vaccines and Counting...



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On 23 March 2021, British Prime Minister Boris Johnson told a group of Conservative Party backbenchers: ‘The reason we have the vaccine success is because of capitalism, because of greed, my friends.’ Johnson was articulating the dogma that the pursuit of private profit through capitalist free markets leads to efficient outcomes. In reality, however, Britain’s accomplishments in developing the Oxford AstraZeneca vaccine and in the national vaccination rollout have more to do with state investments than the market mechanism. Government money subsidised the vaccine development at the University of Oxford, and it is the state-funded National Health Service that has carried out the

vaccination programme. Johnson did not admit that it is due to capitalism and greed that Britain now has the fifth worst Covid-19 mortality rate in the world with over 126,500 deaths (almost 1,857 per million people in the population) and counting.

The British government, like most neoliberal regimes, refused to take the measures necessary to slow and halt community transmission, it failed early on to provide health care and social care workers with adequate PPE and other resources which could have saved the lives of hundreds of frontline staff who died as a result. It contracted private businesses to carry out essential activities, most with little or no relevant experience, for example, instead of equipping the community-based GP system of the National Health Service to take charge of 'track and trace', the government dished out £37 billion to Serco to manage part of the system. In public health terms it has been disastrous; but measured by Boris Johnson's celebrated standards of capitalism and greed it is has indeed excelled. The greatest beneficiaries of Britain's response to the pandemic have been the private corporations making huge profits. Around 2,500 Accenture, Deloitte and McKinsey consultants are on an average daily rate of £1,000, with some paid £6,624 a day.

Johnson has now laid out a road map for reopening the economy. As a result, even the most optimistic scenario predicts a third wave between September 2021 and January 2022 resulting in at least 30,000 additional deaths in Britain. These deaths are preventable. But it precisely because the British government is driven by the capitalism and greed that it insists that we have to learn to 'live with the virus' so that the business of business can continue.

Contrary to Johnson's claims, this pandemic has affirmed that public healthcare needs cannot be adequately met under a profit-based system. Indeed, it is the absence of the capitalist profit motive which underlies the outstanding domestic and international response to Covid-19 by socialist Cuba, which now has five vaccines in clinical trials and is set to be among the first nations to vaccinate its entire population.

By reacting quickly and decisively, by mobilising its public healthcare system and world-leading biotech sector, Cuba has kept contagion and fatalities low. In 2020 Cuba confirmed a total of 12,225 coronavirus cases and 146 deaths in a population of 11.2 million, among the lowest rates in the Western Hemisphere. In November 2020, the airports were opened, leading to a surge with more infections in January 2021 than the whole of the previous year. By 24 March 2021, Cuba had registered fewer than 70,000 cases and 408 deaths. The death rate was 35 per million and the fatality rate was just 0.59% (2.2% worldwide; 2.9% in Britain). Within one year, 57 brigades of medical

specialists from Cuba's Henry Reeve International Contingent had treated 1.26 million Covid-19 patients in 40 countries; they joined 28,000 Cuban healthcare professionals already working in 66 countries. Cuba's accomplishments are more extraordinary given that from 2017 onwards, the Trump administration punitively unleashed 240 new sanctions, actions and measures to tighten the 60-year blockade of Cuba, including nearly 50 additional measures during the pandemic which cost the health sector alone over \$200 million.

Cuba has gone on the offensive against Covid-19, mobilising the prevention-focussed, community based public healthcare system to carry out daily house visits to actively detect and treat cases and channelling the medical science sector to adapt and produce new treatments for patients and Covid-19 specific vaccines. These advances bring hope not just for Cuba, but for the world.

What is special about Cuba's vaccines?

Some 200 Covid vaccines are being developed worldwide; by 25 March 2021, 23 candidates had advanced to phase III clinical trials. Two of those were Cuban (Soberana 2 and Abdala). No other Latin American country has developed its own vaccine at this stage. Cuba has three more vaccine candidates in earlier stage trials (Soberana 1, Soberana Plus and an intranasal, needle-free vaccine called Mambisa). How do we explain this accomplishment? Cuba's biotech sector is unique; entirely state-funded and owned, free from private interests, profits are not sought domestically, and innovation is channelled to meet public health needs. Dozens of research and development institutions collaborate, sharing resources and knowledge, instead of competing, which facilitates a fast track from research and innovation to trials and application. Cuba has the capacity to produce 60-70% of the medicines it consumes domestically, an imperative due to the US blockade and the cost of medicines in the international market. There is also fluidity between universities, research centres, and the public health system. These elements have proven vital in the development of Cuba's Covid-19 vaccines.

There are five types of Covid-19 vaccines being developed globally:

- + Viral vector vaccines, which inject an unrelated harmless virus modified to deliver SARS-CoV-2 genetic material (Oxford AstraZeneca, Gamaleya and SputnikV);
- + Genetic vaccines containing a segment of SARS-CoV-2 virus genetic material (Pfizer, Moderna);
- + Inactivated vaccines containing disactivated SARS-CoV-2 virus (Sinovac,/Butantan, SinoPharm, Bharat Biotech);

- + Attenuated vaccines containing weakened SARS-CoV-2 virus (Codagenix);
- + Protein vaccines containing proteins from the virus which trigger an immune response (Novavax, Sanofi/GSK).

The five Cuban vaccines under clinical trials are all protein vaccines; they carry the portion of the virus spike protein which binds to human cells; it generates neutralising antibodies to block the binding process. Dr Marlene Ramirez Gonzalez explains that they are, ‘subunit vaccines, one of the most economical approaches and the type for which Cuba has the greatest know-how and infrastructure. From protein S – the antigen or part of the SARS-CoV2 virus that all Covid vaccines target because it induces the strongest immune response in humans – Cuban candidates are based only on the part that is involved in contact with the cell’s receptor: the RBD (receptor-binding domain) which is also the one that induces the greatest amount of neutralizing antibodies. This strategy is not exclusive to Cuban vaccines. But Soberana 02 does distinguish itself from the rest of the world’s candidates as the only “conjugate vaccine”. Currently in phase III clinical trials, it combines RBD with tetanus toxoid, which enhances the immune response...Cuba had already developed another vaccine with this principle. It is Quimi-Hib, “the first of its kind to be approved in Latin America and the second in the world”, against *Haemophilus influenzae* type b, coccobacilli responsible for diseases such as meningitis, pneumonia and epiglottitis.’[1]

Idania Caballero, a pharmaceutical scientist at BioCubaFarma points out that the vaccines build on decades of medical science and work on infectious diseases. ‘The mortality rate in Cuba due to infectious diseases, even in times of Covid, is less than 1%. Cuba today vaccinates against 13 diseases with 11 vaccines, eight of which are produced in Cuba. Six diseases have been eliminated as a result of vaccination schedules. The vaccines produced with these technologies have been administered even to children in the first months of life.’[2]

The Soberana vaccines are produced by the Finlay Institute in partnership with the Centre for Molecular Immunology (CIM) and the Centre of Biopreparados. Soberana means ‘sovereign’, reflecting its economic and political importance; without a domestic product, Cuba would struggle to access foreign vaccines either due to the US blockade or to the cost. Soberana vaccines insert genetic information into superior mammalian cells. Soberana Plus is a the world’s first vaccine for Covid-19 convalescent patients to reach clinical trials.

The other vaccines, Abdala and Mambisa, names which also pay tribute to Cuba's struggle for independence, are produced by the Centre of Genetic Engineering and Biotechnology (CIGB). These vaccines insert genetic information in a less evolved organism, a unicellular microorganism (the yeast *Pichia Pastoris*). They build on the CIGB's extraordinary record, including its Hepatitis B vaccines, used in Cuba for 25 years.

By developing different vaccine platforms, those institutions avoid competing for resources. Caballero explains that: 'Cuba has the capacity to produce two independent vaccine chains, with over 90 million vaccines annually, while maintaining the required production of other products for the domestic market and for export.' The Cuban vaccines require three doses and, because they are stable at temperatures of between 2 and 8 degrees, do not require costly special refrigeration equipment.

Phase III trials and 'interventional studies'

By late March, phase III trials were underway for Soberana 2 and Abdala, each incorporating over 44,000 volunteers over 19 years old in regions with high incidence of Covid-19. Soberana 2 is being administered in Havana and Abdala in Santiago de Cuba and Guantanamo. Analysis and follow-up for phase III trial patients will continue until January 2022 to investigate whether they prevent transmission, how long immunity lasts, and other questions that no vaccine producers can yet answer. However, an additional 150,000 healthcare workers in Havana are receiving Soberana 2 shots, as part of an 'interventional study', a form of clinical trial that can be authorised after drug safety has been demonstrated in phase II. Intervention studies do not involve double blind testing or placebos. Another 120,000 healthcare workers in western Cuba will receive Abdala in the next few weeks. Other interventional studies in the capital will see 1.7 million people in Havana, most of the adult population, vaccinated by the end of May 2021, meaning that 2 million Cubans will have been fully vaccinated.

Assuming satisfactory results, in June the real national vaccination campaign will begin, prioritising groups according to risk factors and starting with over 60-year-olds. By the end of August 2021, six million Cubans, over half the population, will have been covered and by the end of the year, Cuba will be among the world's first countries to fully vaccinate its entire population.

Cuban medical scientists are confident that they have the capacity and experience to adapt their vaccine formulations, technologies and action protocols to tackle new variants. The next steps are for Soberana 1 and Soberana Plus to enter phase II trials and a new study involving 5 to 18 year olds will be launched.

Cuba and China team up on Pan-Corona

Cuba's CIGB have teamed up with colleagues in China to work on a new vaccine called Pan-Corona, designed to be effective on different strains of the coronavirus. It will use parts of the virus that are conserved, not exposed to variation, to generate antibodies, combined with parts directed at cellular responses. The Cubans contribute the experience and personnel, while the Chinese provide equipment and resources. The research will take place at the Yongzhou Joint Biotechnology Innovation Center, in China's Hunan Province, which was established last year with equipment and laboratories designed by Cuban specialists. Gerardo Guillen, director of biomedical science at CIGB said the approach: 'could protect against epidemiological emergencies of new strains of coronavirus that may exist in the future'. The project builds on nearly two decades of medical science collaboration between Cuba and China, including five joint ventures in the biotech sector.

A vaccine for the global south

Cuban professionals have received ten gold medals from the World Intellectual Property Organisation (WIPO) over 26 years; their biotech products were exported to 49 countries prior to the pandemic, including vaccines used in childhood immunisation programmes in Latin America. Cuba has stated that its Covid-19 vaccines will be exported to other countries. This brings hope to low- and middle-income nations that simply cannot afford to vaccinate their populations at high prices (between \$10 and \$30 per dose) demanded by big pharma. In February 2021, the Bureau of Investigative Journalism reported that US company Pfizer has been 'bullying' Latin American countries into putting up sovereign assets, such as embassy buildings and military bases, as guarantees against the cost of any future legal cases in relation to their Covid-19 vaccines.[3]

Through an agreement with Iran's Pasteur Institute, 100,000 Iranians will take part in the phase III clinical trials for Soberana 2 and another 60,000 people will participate in Venezuela. Other countries including Mexico, Jamaica, Vietnam, Pakistan, and India, have stated their interest in receiving the Cuban vaccines, as has the African Union, which represents all 55 nations in Africa. It is likely that Cuba will apply a sliding scale to its Covid-19 vaccine exports, as it does with the export of medical professionals, so what it charges reflects the countries' ability to pay.

What Cuba has achieved is remarkable, but as Caballero states: 'without the unjust US blockade, Cuba could have more and better results'. Cuba has become a world-leader in biotechnology because it has a socialist state with a centrally planned economy, that has

invested in science and technology and puts human welfare before profit; that is, with the absence of capitalism and greed that British Prime Minister Johnson celebrates.

Notes.

[1] ‘Rapid response’ letter in *The BMJ*, 1 March 2021,

[2] Email correspondence, 9 March 2021.

[3] “‘Held to ransom’”: Pfizer demands governments gamble with state assets to secure vaccine deal’, *Bureau of Investigative Journalism*, 23 February 2021.

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