# THE ALCIVAX

**Alcimed ponders whether COVID-19 immunity is humanity's great white whale and how to hunt it down.**

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## Creating the Vaccine Safety Net

"*All my means are sane, my motive and my object mad*," Captain Ahab, Moby Dick. There is little that the scientific community agrees on more than we need to achieve some form of collective COVID-19 immunity if we are ever going to get back to some semblance of a normal life. But so far immunity to COVID in the previously infected has remained an elusive open question, forcing us to rush perhaps madly into the desperate search for a vaccine.

### Needed for Collective Immunity

Making decisions about how to achieve some scale of collective immunity against COVID-19 is still lacking vital pieces of information. What does the immune response look like in asymptomatic spreaders of COVD-19 vs those who come down with severe disease? This immunological profiling will not only tell us which profiles protect from reinfection and how to speed clinical readouts for vaccine efficacy without having to resort to human challenge. Estimates suggest that 70% of the population would need a protective immune profile to create herd immunity against COVID-19, whether via natural infection or vaccination. At the current infection rate, vaccination may be faster than waiting for nature to take its course.

### The Race to Manufacture Vaccine

Vaccinating 70% of the world's would require 5.5 B single dose vaccines. Is this achievable? A 2016 study estimates the global manufacturing capacity for pandemic flu vaccines at 6.4 B doses in 2015, via a market of many competitors. The same will be true for COVID-19. Top players are already making strategic alliances to ensure manufacturing capabilities will meet demand once approved. Moderna and Lonza's collaboration has promised 1B doses per year with another 1 B promised through the J&J Emergent BioSolutions alliance. AstraZeneca will manufacture the University of Oxford vaccine, Sanofi and GSK will co-develop and manufacture, Pfizer and BioNTech are promising 100s of M of doses in 2021 and the Serum Institute of India looking for partnerships for its 1.5 B dose capacity.

The math helps us see that all of these major programs need to succeed for there to be hope of global herd immunity in 2021 with manufacturing running worldwide to increase distribution. An additional vital question: Are there enough raw materials, medical glass, etc. to make all these vaccines?

### Why we might fail

Nationalistic, my country first vaccine strategies only increase the likelihood of poorer under-vaccinated nations re-infected others once global travel resumes. A global $8 B fund raising effort led by the EU this week nabs about 33% of the necessary funds but with US, Russia, and India absent reaching this goal may be challenging.
Additionally, aggressive anti-vaccine campaigns have already begun around potential COVID vaccines with 23% of Americans polled in April saying they would refuse a vaccine if offered. But if vaccination willingness brings low flu-like coverage rates, we will still be chasing the COVID whale for years to come.

## Africa Fights Back

While Egypt was the first African nation to report a confirmed case of coronavirus, the virus has reached all but one country in Africa. It is possible that the fragile healthcare infrastructure could be easily overwhelmed by the spread of coronavirus.

Counting HIV/AIDs and the Spanish Flu, coronavirus will mark South Africa's third major pandemic in 100 years. With historical experience in mind, South Africa launched one of the most rigorous responses five weeks ago, deploying 28,000 healthcare workers to test communities across the country. South Africa imposed strict lockdown measures: banning jogging, cycling and dog walking, controversially banning cigarette and alcohol sales and imposing harsh stay at home orders. As a result, South Africa has seen a much slower spread than in other countries and has already started easing lockdown, along with Nigeria, Ghana, Rwanda, Zimbabwe and Namibia.

The Africa Centers for Disease Control and Prevention reports a large gap in testing rates between nations. Smaller nations like Mauritius and Djibouti have achieved high testing rates, joined by Ghana and South Africa that have implemented aggressive testing. However, "the collapse of global co-operation and a failure of international solidarity has shoved Africa out of the diagnostics market", making it hard for some countries to ramp up testing efforts.

Africa may also be economicaly and industrally alone as forecasts for Africa's tech ecosystems predict a sharp fall in funding inflow. AfricArena estimates total funding in African startups could drop by as much as $800 million or 40% with a visble severe slowdown expected in the next two quarters. Though Africa did not manufacture most of the essential medical supplies it needs, many countries were pushed into crisis. Countries across Africa, including Kenya, South Africa, Egypt, Ghana, Tunisia and Senegal had to act fast, encouraging existing factories to get approval to make masks, ventilators and other goods. Some companies are now making hundreds of thousands of face masks and PPE every day.

# COVID Ups & Downs

Hospital demand for hydroxychloroquine to treat Covid-19 patients is waning, signaling that uncertainty around effectiveness and safety will put an end to exploring the malaria drug during the pandemic. Approval of remdesivir will become available for U.S. hospitals in the coming week for treatment of patients with severe disease. Despite the 31% increase in recovery time, remdesivir is not the answer to all our COVID problems. Nearly 500 interventional trials for COVID-19 are ongoing to provide a wider array of options, most of which are therapeutic options.

Most prominant is among them being whether approved treatments will be just as effective across all strains of SARS-CoV-2. In a recent study from Los Almos National Labs, in collaboration with the Next strain project, suggests that the dominat circulating strain in Europe has mutated away from the original dominant strain in Asia. The D614G spike protein mutant appearing in Europe in February may respresent a more contagious strain but this theory remains to be tested. An additional question that arises is whether vaccine candidates pattered of Asian strains will provide protection against these mutated European strains of the virus.

## The Missing Link

Additionally, the race is still on to secure the real origins of the animal to human transfer point for SARS-CoV-2. Patient Zero for COVID-19 will likely never be found but understanding what species might be the intermediate host between humans and bats. Understanding the transmission route from animals to humans for coronaviruses, will help to establish the sorts of necessary surveillance programs to help us predict the next coronavirus strain with pandemic potential.

# The Testing Muddle

Every day we struggle to come up with effective testing strategies using validated supplies with clear results that contributes to the ever muddying waters of the real impact of COVID-19. For example, aggressive testing in Germany suggests that the number of people in Germany who've had the coronavirus may be 10 times the official figures. According to the study, about 1.8 million people living in Germany may have been infected — far higher than the confirmed count of more than 160,000. In Jakarta, a more accurate count of COVID-19 mortality may be through the number of burials, as many patients with suspected COVID-19 cases where never tested and left off of official counts. Additionally, testing supplies are going to be crucial for dealing with the thousands of Ethiopian migrants newly returned home from abroad stuck quarantined in university's while it can be determined if it is safe to send them home.

The newly approved Roche antibody test claims to be able to eliminate the large number of false positives seen with other tests and is increasing manufacturing capacity to 100 M tests per month by the end of the year. This will be sorely needed as many countries around the world exit lock down. Germany's confidence in the Roche test is clear and will be using it to re-examine the question of immunity passports.

The WHO continues to warn countries against immunity passports as the protective nature of primary infection for SARS-CoV-2 remains largely unknown. An extensive study of antibody response in patients in China demonstrates 100% seroconversion after infection, but provides no viral neutralizing data, failing to fill the knowledge gap. Such immunity passports if issued, especially based on potentially faulty tests may also introduce unnecessary discrimination. However, using certificates of vaccination in the future to guarantee international travel for example, similar to a strategy for Yellow Fever, could dramatically increase COVID-19 vaccine uptake among the previously skeptical and apathetic.

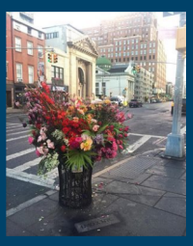
# LATAM's Growing Crisis

Coronavirus cases in Latin America are accelerating much faster than in other parts of the world. The growing crisis in South America also demonstrates why viral spread to remote areas is a cause for great concern. Recently, coronavirus has taken hold in the Amazon's biggest city—Manaus. Amazonas has one of Brazil's highest infection rates and one of the most underfunded health systems. Home to nearly two million people, Manaus is the seventh-biggest city in Brazil and its most isolated urban center. Amazonas also has the largest number of indigenous in the country, many of whom now live in the city.

Latin America is struggling with how and when to re-open the region's economies, while the worst of the outbreak has yet to hit countries including Brazil and Mexico. The global fall of oil prices is likely to send the oil-dependent economies of Venezuela, Colombia, and Ecuador into severe regional economic depression. The coronavirus crisis has presented much of Latin America with an impossible choice: continue enforcing lockdowns while risking economic collapse, or end the restrictions and risk overwhelming critically vulnerable health systems.

# All Joking Aside

In the US, there are two invasions, murder hornets and COVID-19. Hornets, unlike COVID-19, are edible! Check out these great recipes.



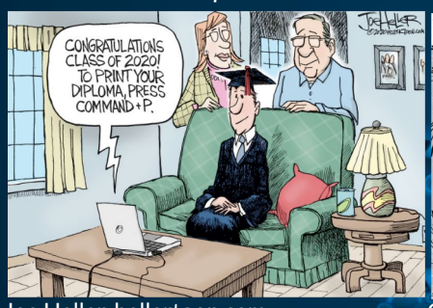
Also, floral design Lewis Miller has been turning NYC trashcans into flower vases. The flash flowers project, currently to thank healthcare workers, is an extension of a project Miller began in 2017.

Star Wars fans did not let lockdown dampen their May the 4th enthusiasm, with Baby Yoda


sporting a mask, which is the fashion industries newest offer, so you can choose your favorite designer when returning to work. Please do leave the pillow dress challenge in quarantine!

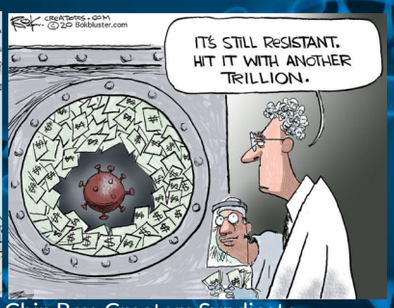
# Art imitates life, even life in the time of Corona!

*Zoom in on Pomp & Circumstance*




Joe Heller, hellertoon.com

*Pandemic Costs*




Chip Box, Creators Syndicate

*Old Questions, New Wrinkles*


Gary McCoy, Cagle Cartoons

*Invasive Contact Tracing*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