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How certain is the way out of COVID-19?

This quarter, the COVID-19 pandemic continued. Poor leadership and weak social discipline have squandered the gains from our initial quarantine. While there has been some progress on the therapeutic drug front, these drugs present only moderate gains in treating ill patients. As a result, it looks like our only ways out of this quagmire are herd immunity, a vaccine, or a chance mutation that renders this virus less infectious, less deadly, or both.

The first way out is herd immunity. To achieve herd immunity, roughly 70% of the population needs to be immune to COVID-19. Antibody tests indicate that roughly 7% of Americans have already had COVID-19, so we are not close to the 70% threshold. Additionally, given the current best estimates of COVID-19's fatality rate (0.5%-1.0%), achieving herd immunity without a vaccine means that 1.1-2.3 million Americans and 27-55 million people globally would die. The enormous human cost makes herd immunity a tragic way out of this quagmire. Hopefully, we do not go down this path.

The second way out is a vaccine. Right now, there are over 165 vaccines in various stages of trials. Most of these are preclinical, so they will not be of help anytime soon. Fortunately, five vaccines are in Phase III trials, the final trial before approval. (Besides these five, there is one vaccine that was rush-approved for use by the Chinese military.)

The leading candidates are:

- AstraZeneca / Oxford (UK/Sweden)
- Moderna (US)
- Murdoch Children's Research Institute (Australia)
- Sinopharm / Wuhan Institute of Biological Products (China)
- Sinovac (China)
- CanSinoBIO (China, rush-approved for the Chinese military)

In Phase III trials, the vaccines are given to tens of thousands of volunteers to determine how the vaccine's effectiveness and safety compare to placebos. As much hope as these vaccine trials generate, there is no guarantee that any of the leading candidates will be viable and approved.

Given current US-China relations, it is not obvious that any of the Chinese vaccines would be available here, and even if they are available here, the FDA may require them to undergo US trials. That leaves only three vaccines from ally nations.



Moderna hopes to have doses available in “early” 2021, and AstraZeneca/Oxford hopes to begin delivering emergency doses in October. Even in the most optimistic case of doses appearing in October, it will take some time to create 8 billion doses to cover the planet. Like most things recently, the cure will create dissension. Will the vaccine go to the most vulnerable? The old? The medical frontlines? The rich? Will everyone be forced to vaccinate?

Clearly COVID-19 and the related economic uncertainty are far from over. While we have more clarity than a few months ago, the future trajectory is still uncertain.

David R. “Chip” Kent IV, PhD
Portfolio Manager / General Partner
Cecropia Capital
Twitter: [@chip_kent](https://twitter.com/chip_kent)

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