

*COVID-19, and Pandemics on a Crowded Planet – A MAHB Dialogue with Infectious Disease Expert, Arthur Reingold*

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**Geoff Holland - COVID-19, also known as the coronavirus, appears poised to become a pandemic. What should every person know about it?**

Art Reingold - Let me begin by saying that whether it is a pandemic or not is, to me, somewhat of an artificial distinction. One can argue what the definition of a pandemic is. I think it's clear the virus is now pretty much spread around the planet, and is causing substantial infection and illness on every continent, certainly in Europe, the United States. I think it remains to be seen what will happen in Africa. So, I don't want to get hung up on whether it's a pandemic. It's a new virus. All of the evidence suggests the originating animal was most likely a bat. Now that it's in people, it's causing widespread infection, and some severe illnesses, and tragically some deaths. It appears to be closely related to corona viruses that have been found in bats based on molecular studies. The data suggests it may have started with a single introduction into a human that occurred back in early December 2019. In terms of the illness itself, it's very similar to influenza. It's a viral respiratory infection, and it's particularly dangerous in the frail elderly; the kind of people who might be in nursing homes, or people with underlying medical conditions like heart disease, and lung disease. It's quite clear it can be transmitted from one person to another. We have ongoing transmission now in a number of settings around the world.

**GH - We've watched this epidemic emerge and impact China. As it moves into every corner of the planet, what does history tell us about how this is going to play out?**

AR - I'm a little reluctant to extrapolate from prior episodes and illnesses. People do make comparisons to influenza. They make comparisons to SARS, and MERS. We don't know exactly where on the spectrum this virus falls, and what it's going to do. I think history is instructive for telling us that when we have a new

infectious disease threat associated with mortality or severe illness, that it creates enormous anxiety. If you look at epidemics of the past, you see stigma, you see fear, you see anxiety, sometimes you see overreaction. You see targeting of minority groups, or racial profiling, if you will. Prior epidemics show there may be a lot of reactions that are undesirable in addition to good reactions like improved hand washing. I don't know that we can extrapolate from other viruses to say exactly what's going to happen with this, now widespread, infection.

**GH - What are your best-case and worst-case scenarios for COVID-19?**

AR - I think the experience in Wuhan and in surrounding parts of China tells us that this virus can spread very quickly. It certainly has spread rapidly in Korea and in Iran. On the other hand, it would appear that the fairly draconian and probably unprecedented control measures taken in China have successfully reduced transmission. The best-case scenario is that through fairly standard public health measures like hand washing and social distancing, and the like, we can reduce transmission. That would be the best-case scenario. The worst-case scenario is that we don't manage to control it, and we have much more widespread transmission, with a lot more illness and death.

**GH – Is a vaccine the ultimate solution? And if so, what should we expect in that regard?**

AR - In the old days, when we weren't dealing with epidemics, and things proceed at their own pace, developing a new vaccine from beginning research through to licensure typically took 10 or 15 years and a substantial investment of dollars. Clearly, the technology has dramatically improved. Our ability to produce vaccines is much improved from what it was 10 or 15 years ago. That's good news. Of course, in a pandemic, we have an urgent situation. The general thinking is that we could pretty much go from where we are now to having a viable vaccine in reasonable numbers of doses in perhaps 18 months. There are a few caveats to that. The first one is we need to have good safety data, before we start giving a new vaccine to large numbers of people. That will be really important to ensure the safety of a new vaccine. We may or may not have good efficacy data, but mostly immunogenicity data at a point when people decide what should be done. There are also equity issues. A number of rich countries might have binding contracts to get most of the vaccine produced. That will impact the amount that would be available for WHO to provide to poor countries. So, there are some equity issues as well.

Once we do have a vaccine, who gets it? And I also think there are some policy questions about who we prioritize for vaccination; children, adults, elderly. Who should get a new vaccine like this is going to be really interesting policy discussion.

**GH - What types of messaging are most impactful in situations like this?**

AR - Of course, we would hope to prevent or reduce the stigma that falls on various groups or people of different national origins. This is a battle against the virus, not a battle against a particular group or nationality. I think that's a very important message. Clearly, the other important message is, in the absence of a vaccine, what can we do to reduce or prevent transmission in the community, to protect people. A lot of those messages are really well-known.... things like good hand washing, with soap for long enough. Covering your coughs and sneezes, staying home if you're sick, although we don't make that easy, since we don't have paid sick leave for many low wage workers. You know, professors if they stay home, nobody notices, and they still get paid, But, food handlers and a lot of other workers typically don't have paid sick leave. So, we don't make that easy, but we'd like sick people to stay home. If they do have to go out to cover their cough or sneeze, potentially wear a mask.

**GH - The human population on Earth has more than doubled over the past 50 years to nearly 8 billion. Has that encouraged planetary scale disease outbreak?**

AR – There are a couple of issues. One of them certainly is the extent to which people are moving into forested areas or areas where they're more in contact with animals or insect vectors, simply because they're looking for places to live. We have increased exposure to various animal species and insect vectors because of population growth, and people looking for affordable places to live. So we have an intrusion into areas where people might not have been trying to live before. Secondly, people have to feed themselves and their children. In Sub Saharan Africa a major source of protein is what's called bushmeat. In other words, hunting and killing wild animals for food. If you tell people don't eat that, or don't hunt and kill animal x, whatever it is, well, then you need to replace that with some other source of protein for them. How do you do that? So, pressures on the food chain, and the hunting of, and exposure to wild animals as food is part of the problem. Clearly,

environmental degradation and global warming are also impacting the distribution of disease vectors.

**GH - Are humans doing things to our environment that makes deadly disease outbreaks more and more likely?**

AR - The quick answer is yes. You know, more people are moving into previously unoccupied areas, and ecological zones. Global warming is having an impact on disease distribution. We are doing bad things to the environment. And of course, there are other issues, some of them highly specific. For example, our use of air conditioning in large buildings has caused Legionnaires Disease to be a problem. It's not transmitted person to person. It's acquired from exposure to contaminated aerosolized water but before we adopted large-scale air conditioning, we basically didn't have Legionnaires Disease. Also, the mass production of farm animals. So yes, humans are doing many things that can contribute to the risk of infectious diseases.

**GH - Is the spread of COVID-19 impacted by international relationships and cooperation? If so, how well are we doing with this right now?**

AR - Everyone recognizes that the spread has been greatly facilitated by international travel. Right? So, you know, at the time of the flu pandemic of 1918, if you wanted to get from one part of the world to the other, you'd have to go on a ship, taking a week or two to get from Europe to the United States, as an example. Now, a person can go from San Francisco to any other place in the world in 36 hours or less. Right now, looking at airplane traffic and the numbers of passengers, we have enormous amounts of travel going on. That has clearly facilitated and accelerated the spread of infectious agents like the coronavirus. International trade and commerce drive increased travel. On the other hand, widespread travel is also being greatly curtailed by the coronavirus. To the extent that people are canceling trips, airlines are losing money. If the question was more about countries working together, through international organizations, the World Health Organization, and other types of organizations to try and deal with this virus, are we cooperating internationally? Certainly, that's part of what is happening. And I think that's good news. But there are still plenty of political and other obstacles to good international collaboration between countries like the United States and Iran. So, there's plenty of work to do in that area.

**GH - What should people at the grassroots be doing to encourage a well-conceived adequately funded action approach to communicable disease?**

AR - I'm potentially going to verge into political territory here, but I think the first thing is that people should generally advocate for science-based interventions and public health. Science is a really important part of this. Some leaders are more interested in science than others, so you might want to think about who you want your political leaders to be. I also think we need to be more mature as taxpayers. And amenable to the notion that if we want a good public health infrastructure, if we want good scientific research, it has to be paid for. Typically, that means taxes, right? So people need to be willing to pay taxes, and politicians need to be willing to explain to them that if we want the benefits of an advanced society, we need to pay for them. Congress has appropriated extra money in the United States as an immediate urgent response to the coronavirus. That's important, but it does not eliminate the need for a steady, dependable source of funding for public health infrastructure. We tend to respond to an urgent situation, then a few years later, when there's nothing urgent going on, we make cuts, reduce funding. People generally need to understand, if they want good public health, they need to pay for it. Obviously, we also want people to think about their own behaviors, and how they can protect themselves and others. We have an enormous capacity to transmit information through the internet that didn't exist 30 years ago. But there's equally as much opportunity for abuse, misinformation, and deliberate hoax. For example, you have people saying that gargling bleach is a good way to protect yourself against this virus. That's absolutely not a good thing to do. There's the idea that silver in some way might be helpful. That's simply not so. It can be very hard for the average person to sort out what is scientifically validated information and what is not. We need to get the right messages to people, and people also need to think carefully about what they are hearing and reading.

**GH - What should I as an individual do to protect myself from the COVID-19 virus?**

AR - As I said, all this seems very boring stuff. We in public health have been telling people the same things for a long time. For the coronavirus, hand washing can be helpful. Good hand washing; regular hand washing. It's good to avoid putting your hands to your face, to your eyes, to your nose, any more than absolutely necessary. Touching one's face is a remarkably common human trait.

People touch their faces all the time subconsciously. We'd like people to try and reduce that as much as possible. We want people to get a flu shot, so there is less chance that our healthcare system and hospitals are simultaneously overwhelmed by both coronavirus and flu cases. We might rethink whether a particular trip is important or not, or whether you can hold a meeting using modern telecommunications, which also has the added benefit of reduced carbon footprint.

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