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**Beyond Coronaviruses:
Understanding the Spread of Infectious Diseases and Mobilizing Innovative Solutions**

Chairwoman Johnson, Ranking Member Lucas, and Distinguished Members of the Committee:

Thank you for the opportunity to make remarks before the committee. Over the years, I've testified numerous times to both House and Senate Committees, and it's still a special thrill for me to be here in Washington DC in order to discuss how science can help shape national policies. I'm a vaccine and pediatric-scientist, and for the last decade I've served as Professor of Pediatrics and Dean of the National School of Tropical Medicine, where I'm also Co-Director (together with my 20 year science partner, Dr. Maria Elena Bottazzi) of the Texas Children's Hospital Center for Vaccine Development. At Baylor College of Medicine and Texas Children's we develop vaccines for neglected tropical diseases and emerging infections.

I sometimes say we make the vaccines no one else will make because they're intended either for diseases of extreme poverty - such as schistosomiasis, Chagas disease, or leishmaniasis - or for pandemic threats and stockpiling. In addition, in 2015-16 I served as US Science Envoy for the State Department and White House focusing on vaccine development capacity building in the Middle East and North Africa. I also write books, and as a parent of an adult daughter with autism I'm both a vaccine and autism advocate, and the author of Vaccines Did Not Cause Rachel's Autism (Johns Hopkins Univ Press).

Relevant to today's hearing, I want to emphasize how investments in US research and development can contribute to global preparedness and our nation's response to infectious disease. One of our signature programs at Baylor College of Medicine and Texas Children's is a coronavirus vaccine program. Through support of NIAID, NIH and in collaboration with Walter

Reed Army Institute of Research and the Galveston National Laboratory, we developed, tested, and manufactured a very promising recombinant protein vaccine antigen to prevent SARS (severe acute respiratory syndrome), which emerged in Southern China and caused a pandemic in 2003. We also developed a recombinant protein vaccine antigen for MERS (Middle East respiratory syndrome). And now, we're developing a new recombinant protein vaccine for the new COVID-19 also known as SARS CoV2, or just SARS-2. In addition, we're conducting studies to see if our initial vaccine that we developed and manufactured for SARS could be repurposed for this new SARS-2 epidemic/pandemic.

Our experience developing coronavirus vaccines has provided some insights on where the gaps are in terms of our nation's emergency preparedness. I have 5 brief observations I would like to share:

1. We must recognize that pandemic threats such as SARS 2 go way beyond public health. As has been reported in multiple news outlets, the epidemic in Central China has severely damaged the Chinese economy, Asian markets overall, and has even promoted political unrest. The point is we're looking at tens of billions of dollars in losses to the Chinese economy because there was not adequate investment or interest in coronavirus vaccines. In the US, we have a similar vulnerability.

2. Let me provide an example. Through NIAID NIH support, we developed and manufactured a promising SARS vaccine. It used standard recombinant protein technology, similar to the technology used to license the current hepatitis B and HPV vaccines. The vaccine was protective against SARS challenge infections in lab animals, work done at the GNL, and appeared to maximize safety by minimizing what's known as immunopotential, a problem that sometimes plagues coronavirus and other respiratory virus vaccines.

The problem was this: By the time we completed manufacturing the SARS vaccine there was no longer interest in SARS as a public health threat. There was no transmission of SARS anywhere and we could not attract further public and private investments to carry this through clinical trials and licensure. In the end, industry is not interested in investing in a vaccine, which they would have to stockpile. No one wants to invest in a product designed NOT to be used. However, as the information in January 2020 showed that SARS and SARS 2 were about 80% similar and the two viruses bound to the same human receptor in the lungs, it became clear that there was a possibility that we could repurpose our SARS 1 vaccine to fight SARS 2. NIAID NIH is now helping us with some funds to advance this concept, and we are applying to other organizations such as CEPI and even the British Medical Research Council (MRC). But the point is that if that had investments been made previously, we potentially could have a vaccine ready to go now. Potentially it could have rescued the Chinese economy saving billions of dollars, or even the US economy should SARS 2 gain a foothold in the US as predicted by Dr. Redfield the CDC Director. An investment of a few million dollars for clinical trials and stockpiling of this vaccine, could have saved ten billion or even maybe one hundred billion dollars – a 10,000 to 100,000 to 1 rate of return, and in so doing stabilize our global economy.

3. We must recognize that vaccines for neglected and emerging infections fall through the cracks because they are not a priority for pharma and biotechs. We need investments in non-profit and academic based product development partnerships such as our center at our National School of Tropical Medicine at Baylor College of Medicine and Texas Children's or a handful of others such as PATH in Seattle, the University of Maryland CVD to name a few. Those funds would be used to support what we call a "warm base" of scientists at centers of excellence to produce vaccines needed for the health and global security of our nation.

4. I don't think all of the funds for this should come from the US Government. In my 2016 book entitled *Blue Marble Health: An Innovative Plan to Fight Diseases of Poverty amid Wealth* (Johns Hopkins Press) I made the observation that to the surprise of many, most of the global health threats from emerging and neglected diseases actually occurs within the G20 nations, especially the poor living in the G20 nations. However, overwhelmingly the public support for global health innovations, including vaccines, comes from just three sources, the US and UK Governments and to some extent the European Union. Currently these three entities provide 86% of public funding according to [Policy Cures G-FINDER Report](#).¹ Somehow, we need to get the other G20 nations involved, particularly the BRICS nations, such as China, Russia, Brazil, and India, as well as Japan and others. We need them to step up, and this needs to be prioritized at a future G20 Summit. This issue has not been on the radar screen of the G20 leaders and sherpas, but after what we've seen occur in China, I believe our President and the Department of State should make this a priority.

5. Finally, in regards to SARS 2 in America, I'm worried. Without a vaccine in-hand, it will be tough to fight this virus. It's a fight with one hand tied behind our back. We also have the problem that it looks increasingly likely that we may need to combat both flu and SARS-2 simultaneously. This has been a bad flu season in America, and according to the CDC it will likely continue to last for weeks or months. Tragically, more than 14,000 Americans, including 100 children, have died so far of flu this season, and while we don't yet have the final data, it appears that many if not most of those adults and children were not vaccinated despite recommendations by the CDC. We have a problem in this country with an aggressive, organized and well-funded antivaccine movement spreading misinformation about the flu vaccine. I'm also worried about measles. Because of the antivaccine movement last year measles returned to the US after it was eliminated in the year 2000. For instance, the epidemic in NY resulted in more than 50 hospitalizations, including 18 admissions to intensive care units (ICUs). Historically measles peaks in late winter and early spring, in other words around this time. As I wrote recently in a Fox News [op-ed](#)², if our local and state health agencies have to simultaneously fight SARS 2, flu, and measles, we'll simply lose, and this will have a terrible impact on our nation's economy.

¹ <https://s3-ap-southeast-2.amazonaws.com/policy-cures-website-assets/app/uploads/2020/02/07161934/GF-6pSummary2019.pdf>

² <https://www.foxnews.com/opinion/peter-hotez-infectious-epidemics-near-you>

Therefore, I would be happy to discuss at your convenience ways this Committee could take an even greater role in combating antiscience movements.

America faces a number of challenges in the coming weeks. We're now seeing the start of community spread in pockets across the country. It's tragic that we won't have a vaccine ready for this epidemic – and practically speaking, we'll be fighting these outbreaks with one hand tied behind our backs. The good news is that we have the best research universities and institutions the world has ever seen, and optimistic that we'll eventually regroup to solve important problems. Thank you for the opportunity to share some thoughts with you today.