**Commentary**

**Vaccinating cassandra**

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Receiving the first of two doses of the Pfizer-BioNTech COVID-19 vaccine was a more emotional experience than I anticipated. I’m a vaccinologist co-leading a team of scientists developing a potential recombinant protein COVID-19 vaccine for global health [1]. Vaccine production, manufacture, and distribution is led by Biological E (BioE) in India where it is being widely tested, with the aspirational goal that it might fill an urgently needed gap in low-cost COVID-19 vaccines for low- and middle-income countries [2]. So, as part of a community of scientists pursuing COVID-19 development I was naturally curious and eager to be counted among those receiving a new vaccine, especially one that employed cutting-edge mRNA technology.

For me, getting vaccinated also represented a sort of public service given the high rates of COVID-19 vaccine hesitancy in the United States [3]. As a US vaccine scientist who often appears on the cable news networks, as well as on podcasts and radio, I stated openly and repeatedly that I would gladly receive any COVID-19 vaccine authorized by the US Food and Drug Administration (FDA) [4]. My hope was that the American people might view my jab as an endorsement or vote of confidence in both the mRNA vaccine technology and the FDA itself as a regulatory authority. Regarding the former, the antivaccine lobby in the US now specifically targets the mRNA vaccine technology, questioning its safety, or even that it might modify our DNA despite a dearth of evidence for this or really much plausibility. Moreover, the US COVID-19 vaccine public private partnership known as Operation Warp Speed had been highly politicized and many Americans currently express a viewpoint that the emergency use authorization process is tainted. I have been a big proponent of the FDA and have become a major defender of their expertise, practices, and integrity.

Unanticipated was my emotional response to a COVID-19 immunization. Initially, I experienced some sense of relief. The high level of protective vaccine efficacy reported in the phase 3 clinical trials meant that once I received a second dose it was unlikely I would ever require hospitalization because of COVID-19 or require intensive care support.

Then there was gratitude. I understand the complexities of vaccine development and thankful to the scientists at Pfizer-BioNTech for their hard work and brilliance. Also for the many years of research and development in coronavirus vaccines led by the US National Institute of Allergy and Infectious Diseases-National Institutes of Health (NIAID-NIH) and British research organizations including the Wellcome Trust. Our group benefited from NIAID-NIH support allowing us to identify the receptor-binding domain of the spike protein as a key vaccine target, a common element of all of the COVID-19 vaccines now in development.

Ultimately, however, I grieved for the 300,000 Americans who lost their lives due to COVID-19 in 2020, with projections that 100,000 more would perish by a week or so after the US Presidential inauguration in January [5]. I could never have imagined we would reach such a staggering number of COVID-19 deaths. There was also anger and frustration. By the summer of 2020, it was clear that the Trump White House had no plans to launch a national control strategy for COVID-19. Instead, it coordinated a campaign of disinformation, which claimed that COVID-19 was a hoax or an illness no more serious than a case of the flu. It also attempted to attribute the deaths from COVID-19 to other causes or co-morbid conditions such as diabetes or obesity, while downplaying the importance of masks or social distancing, or even encouraging defiance of such measures in defense of “health freedom” [6].

Most of the 300,000 deaths might have been prevented if America had the proper leadership to mount a national response. We mostly failed to organize a program of non-pharmaceutical interventions (NPIs). Throughout the summer and fall of 2020 I devoted enormous energies to pushing the White House to launch what I called an “October 1 Plan” in order to implement NPI measures nationally and bring us to some level of COVID-19 containment [7]. In so doing, we might have slowed or delayed our current fall-winter surge long enough to get everyone vaccinated on the other side. Instead, the US emerged as the epicenter of the 2020 COVID-19 pandemic.

Night after night on the major US cable news networks, I explained how and why federal inaction and deflection would cause the number of deaths in America to skyrocket. When this had no obvious impact on the US federal government in terms of
generating action, one television anchor compared me to the mythical Cassandra – someone cursed by Apollo to accurately forecast the future but whose prophecies were disregarded or ignored.

I tolerated the first vaccine dose quite well, with some arm soreness and body aches later that evening, possibly a few chills or low-grade fever. By the next morning, I felt fine physically, although burdened mentally by our national failure to prevent COVID-19 and the thousands of Americans denied the opportunity to survive and receive their vaccine. As it stands now, our only option is to vaccinate our way through the epidemic. I never imagined we could have allowed things to get so profoundly out of hand.

Declaration of Competing Interest

Peter Hotez is a collaborator a low cost COVID19 vaccine for global health which was licensed by Baylor College of Medicine to a commercial third party for scale up and production

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