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## INVITED EDITORIAL

# Restoring Faith in Science

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“Science is a beautiful gift to humanity; we should not distort it.” – APJ Abdul Kalam

**A**s 2020 comes to a close, we need to keep this quote at the forefront of our minds. We see a new era dawning with the likely end of the coronavirus pandemic and the historic election of Joe Biden and Kamala Harris to the White House. Over the past 4 years, there has been an assault on science; “Alternative facts” have been used to deny the undeniable scientific evidence for climate change, its impact on our health, and the value of masks in mitigating SARS-CoV-2 transmission. We now need to embark on the work of repairing our nation’s embrace of scientific evidence so that science will once again be regarded for what it is—a beautiful gift to humanity.

Restoring faith in science is critical because our lives and that of our nation depend on it. First, and the most urgent, is ending this pandemic by vaccinating most of the US population. Researchers estimate that at least 60% to 70% of people will need to be vaccinated to confer “herd immunity.”<sup>1</sup> But we can only get there if people believe COVID-19 exists and is a major threat, and if they believe in the safety and efficacy of the vaccine. Science has answered these questions for the most part. We now know about COVID-19 and its threat, and about the encouraging efficacy of the vaccines based on data from Phase III trials by Moderna, Pfizer-BioNtech, and Aztra Zeneca.

The science behind the vaccines is both an opportunity and a risk. People need to have some scientific literacy to critically weigh the benefits that may come from the opportunity and the risk it confers. First, therapeutics are usually not as effective as they are found in clinical trials. In the real world, all sorts of things happen that are not controlled for in a strict protocol. For example, the Pfizer vaccine must be kept in ultra-low freezers. The company says that the vaccine can be kept at normal hospital refrigerator temperatures for up to 5

days, but this storage was not part of the trial protocol<sup>2</sup> and may be less efficacious under these conditions. Second, safety data are limited, and additional adverse effects often become apparent when



vaccines are distributed widely in a population in what is known as “postmarketing surveillance.”<sup>3</sup> Both these possibilities present additional challenges as we try to restore faith in science.

These challenges arise from a lack of scientific literacy in the US. Most people do not understand that science builds on trial and error, with a continued increase in certainty around what is known over time. Poor scientific literacy in the US has been exploited by people who want to undermine science that may reduce their power or influence. For example, some people continue to refer back to earlier in the pandemic when scientific leaders said the public did not need to wear masks. They do not educate people about how our knowledge and evidence has rapidly evolved. Nor do they correct misinformation and share that we now know with certainty that masks prevent the spread of SARS-CoV-2, both by protecting the wearer and reducing aerosolized droplets from those who are infected.

What can we do moving forward? We can do three things. First, we can express our faith in science to our patients, family, and friends. We can do this by sharing what we know and our confidence in it, including getting vaccinated against COVID-19 and sharing that news with people. Second, we can work with our patients to increase scientific literacy by explaining what is evidence-based, how that evidence is created, and why we believe in it. Third, we can engage in “misinformation inoculation.” This evidence-based strategy cues people to misinformation and how to spot it so that when they

see it on social media or another platform, they will be primed to question it and hopefully recognize it as misinformation.<sup>4</sup>

We have much to do to restore faith in science. And I am optimistic that we can if we set it as a goal and strategically demonstrate the value of science, our belief in it, and how it has and is helping humanity

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