

To Boost or Not to Boost?

To boost or not to boost, that is the question—or rather, one of many questions regarding COVID-19 vaccination in the United States. Do we mandate vaccination for everyone who is eligible? Should employers require that their employees be vaccinated? Should wealthy nations provide boosters for their own residents before other nations have been able to administer the primary series to theirs? Have we done all we can to produce vaccines as quickly as possible? Although this editorial cannot possibly answer all the questions related to vaccination, I will address one of particular interest right now—the use of booster shots.

The first consideration in this discussion is the durability of immunity to COVID-19. Although we have no historical data on COVID-19, we do have insights from studies of seasonal human coronaviruses, which are responsible for approximately 15% of cases of the common cold.¹ Looking at blood samples collected over 35 years as part of the Amsterdam Cohort Studies on HIV infection and AIDS, investigators examined the titers of antibodies to the 4 species of seasonal coronaviruses in 10 healthy individuals; they found a total of 101 episodes of infection ranging from 3 to 17 per individual, with time intervals to reinfection ranging from 6 to 105 months.² It therefore appears that coronavirus immunity is not long-lasting, and boosters are likely to be needed on an ongoing (dare I say perpetual?) basis.

More durability data come from Israel, where the rate of vaccine efficacy against infection was approximately 95% between January 24 and April 3, 2021,³ but it fell to 64% between June 6 and July 3 and to 39% between June 20 and July 17.⁴ There are several confounding factors to consider when interpreting these data, including: (1) the first people vaccinated were older, with less robust immune systems and more comorbidities; (2) the more-infectious Delta variant was present in later cohorts; and (3) restrictions were relaxed over time. Still, these data do suggest waning of immunity as a possible explanation for this increase in infections.

Data from UC San Diego Health (UCSDH) also demonstrated a dramatic increase in severe COVID-19 infections over time.⁵ Between mid-December 2020 and March 2021, 76% of the institution's health care workforce became fully vaccinated with either the Moderna or Pfizer-BioNTech vaccine. In a population of approximately 15,000 vaccinated health care workers, 3 to 5 cases (0.19-0.30 cases per 1000) of symptomatic COVID-19 were recorded each month from March to June vs 94 cases (5.7 cases per 1000) in July. These data suggest a decline in protection approximately 6 months after vaccination.

Confounders of the data include the arrival of the Delta variant in mid-April and the end of California's mask mandate on June 15. To help account for the confounders, the population of unvaccinated workers served as a control. The rate of symptomatic COVID-19 among this population was 3.4 to 6.8 per 1000 from March through June vs 16.4 per 1000 in July. A comparison of the populations led the researchers to conclude that the vaccine effectiveness exceeded 90% from March to June but dropped to 65.5% in July. Further supporting the waning of immunity, the rate of symptomatic infection in July was higher in workers who had completed vaccination in January or February (6.7 per 1000) than in those who had completed vaccination in March through April (3.7 per 1000). Finally, data from Israel demonstrated that the rate of confirmed infection in a booster group was lower than the rate in a nonbooster group by a factor of 11.3.⁶

What to do with all these data? One could argue that clearly we need boosters. But the July numbers from the UCSDH study suggest that boosters for health care workers would prevent at most just 5.7 cases per 1000 workers, which means we would be re-vaccinating 175 people to prevent a single symptomatic case. Isolation is a poor long-term solution, and reactions to mask mandates have been highly variable. Should we just continue doing what we have been doing thus far and allow COVID-19 to help with overpopulation?

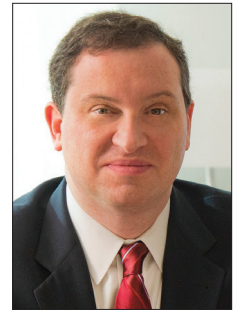
Whereas here in the United States we debate whether personal liberty and freedom allow us to ignore life-saving measures, most of the world is still left with no access to vaccinations. Can we justify booster shots in the United States before most people worldwide have had even one shot? Finally, I have to conclude with a comment on the FDA's requirement to act only upon data submitted. Did anyone think that people receiving the Johnson & Johnson vaccine would not need a booster would not need a booster after the Pfizer-BioNTech vaccine provided data that it required a booster?

Many of us in this wealthy nation feel an obligation toward poorer countries—if not from altruism, then from the knowledge that an ever-mutating virus halfway around the world will still affect us.

Sincerely,



Richard R. Furman, MD



(References on page 678)

Table of Contents

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711 Review Article

Total Neoadjuvant Therapy Approach in Rectal Adenocarcinoma

Sandra Kang, MD, and Christina Wu, MD

723 Clinical Update

New Data for Sacituzumab Govitecan-hziy in the Treatment of Metastatic Triple-Negative Breast Cancer

Aditya Bardia, MD, MPH

726 HCC in Focus

How to Choose Second-Line Treatment for Hepatocellular Carcinoma

Catherine Frenette, MD

Table of Contents continued from page 674.

In Memoriam: Dr Elihu "Eli" Estey

Clinical Advances in Hematology & Oncology was saddened to learn of the death of Elihu (Eli) Estey, MD, a professor of medicine at University of Washington and a longtime editorial advisory board member. Our deepest condolences to his family, friends, and colleagues.

(Continued from page 670)

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