

Utility of human judgment ensembles during times of pandemic uncertainty: A Case Study during the COVID-19 Omicron BA.1 Wave in Virginia

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Metaculus

 UNIVERSITY of VIRGINIA

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DEPARTMENT
OF HEALTH

Background

- Model-based approaches exist for providing short-term and seasonal epidemic forecasts
- Human judgment systems (crowdsourced forecasting) have emerged as a complementary approach to provide timely forecasts
 - *Recent efforts include those that have been applied to influenza forecasting¹, COVID-19 vaccine efficacy², mpox cases³*
 - *Need to evaluate their utility under rapidly varying conditions (e.g., COVID-19 Omicron BA.1 wave in USA during the winter of 2021-22)*
- In collaboration with Virginia Dept. of Health and Metaculus, we ran a forecasting tournament from November 2021 to March 2022

- *60 questions over 6 rounds*
- *8355 predictions from 129 unique users*
- *Questions about cases, hospitalizations, vaccine uptake, peak/trough activity, epidemiological parameters*



<https://www.metaculus.com/tournament/realtimepandemic>

<https://www.metaculus.com/questions/8759/forecasting-coronavirus-variant-omicron/>

1. Farrow, David C., et al. "A human judgment approach to epidemiological forecasting." *PLoS computational biology* 13.3 (2017): e1005248.
2. McAndrew, Thomas, Juan Cambeiro, and Tamay Besiroglu. "Aggregating human judgment probabilistic predictions of the safety, efficacy, and timing of a COVID-19 vaccine." *Vaccine* 40.15 (2022): 2331-2341.
3. McAndrew, Thomas, et al. "Early human judgment forecasts of human monkeypox, May 2022." *The Lancet Digital Health* 4.8 (2022): e569-e571.

Example question & interface

Question

QUESTION

What will be the percentage of the fully vaccinated population with booster/third dose of COVID-19 vaccine in Virginia on December 10th, 2021?

Resolution Criteria

Resolution Criteria

The question will be resolved using the % of the fully vaccinated population with a booster/third dose as of December 10th, 2021 from the [Summary](#) tab of COVID-19 Vaccine Dashboard maintained by the Virginia Department of Health. This will be computed by dividing the "People Vaccinated with Booster/Third Dose" by the count for "People Fully Vaccinated" and multiplying by 100

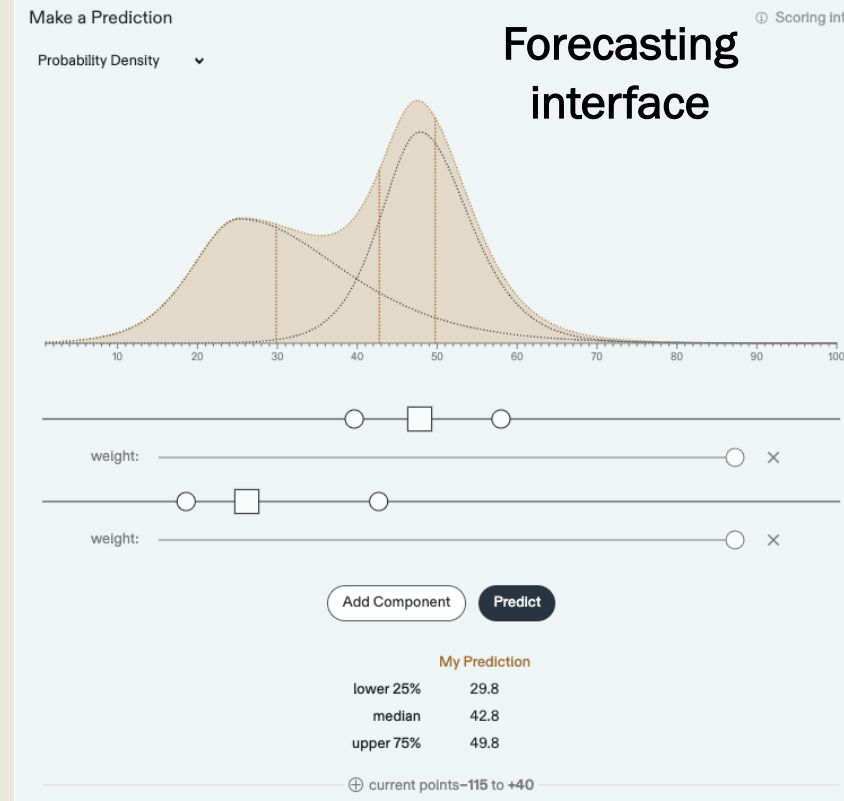
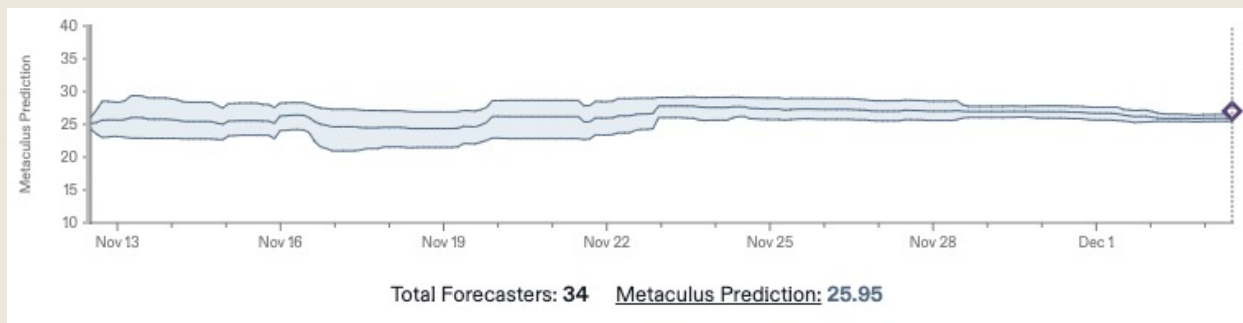
Background Info

Following the [recommendation](#) by the CDC Advisory Committee on Immunization Practices on September 24th, COVID-19 booster shots have begun rolling out for millions of Americans at higher risk for COVID-19, at least 6 months after their primary series. Recently, this emergency use authorization was amended to include Moderna and Janssen booster shots, as well as heterologous ("mix and match") booster shots.

As of November 9th, 2021, 13.95% of the fully vaccinated population in Virginia has received a booster/third dose.

Background Info

Ensemble predictions



Key findings

Case forecasts performed on par with national multi-model ensembles and were well-calibrated.

Vaccine uptake forecasts were more robust and accurate compared to baseline models.

System exhibited rapid qualitative shifts in prognosis of the Omicron BA.1 wave during the surge phase.

Community estimates of variant characteristics were in line with the scientific consensus.

*The observed **accuracy, timeliness, and scope** of such systems demonstrates the value of incorporating them into pandemic policymaking workflows.*

More details: Srinivasan Venkatramanan et al., “Utility of human judgment ensembles during times of pandemic uncertainty: A case study during the COVID-19 Omicron BA.1 wave in the USA”, medrxiv, doi: <https://doi.org/10.1101/2022.10.12.22280997>

