

A consensus of probabilistic predictions by experts and trained forecasters on SARS-CoV-2 vaccines

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Introduction

- To date, SARS-CoV-2 — the virus that causes COVID-19 — has infected over 14 million people and is responsible for more than 250,000 deaths in the U.S.
- Predictions of a potential SARS-CoV-2 vaccine's efficacy and arrival dates can inform and affect U.S. public health strategies to mitigate the spread of SARS-CoV-2 and reduce the burden of COVID-19.

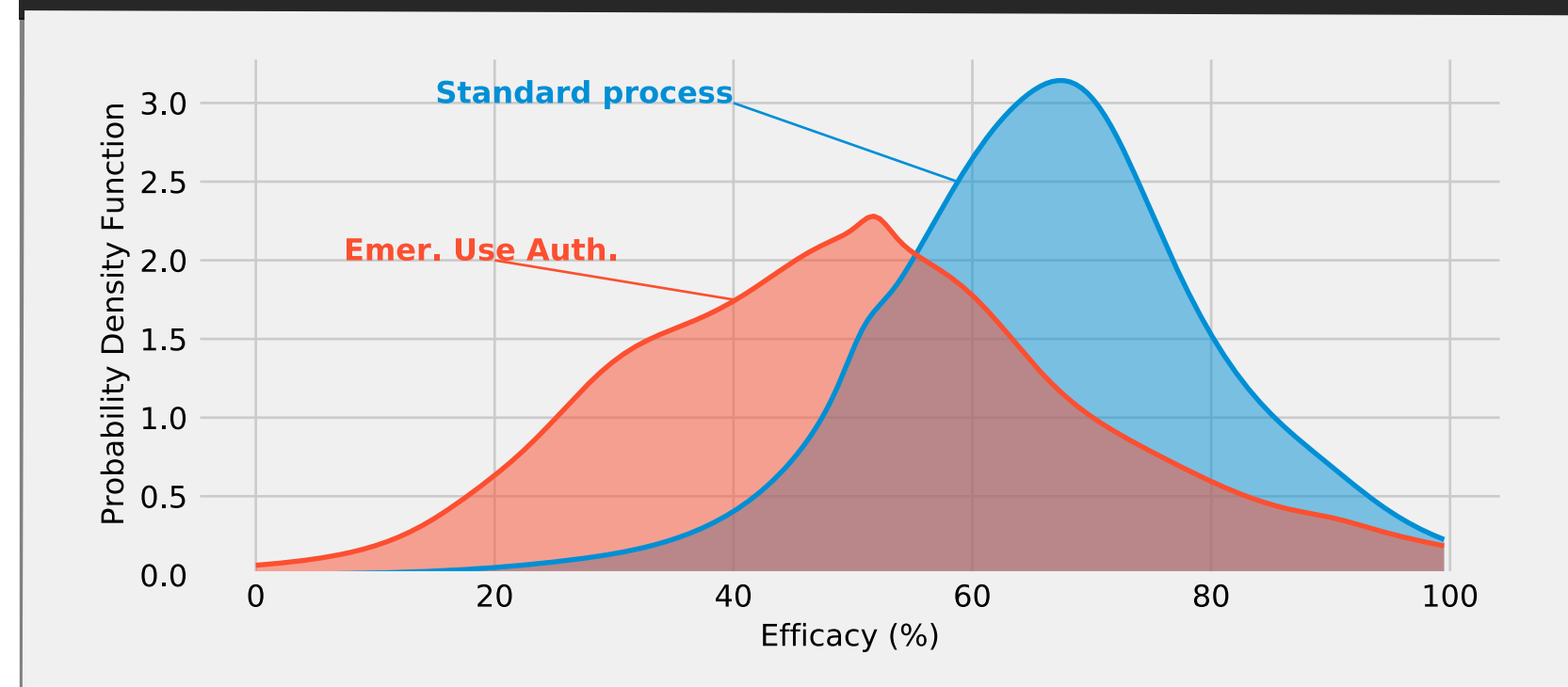
Aims

- To provide predictions from experts and trained forecasters on the timing, efficacy, and availability of SARS-CoV-2 vaccines
- To demonstrate a consensus of expert forecasts is a fast and versatile method that can provide actionable information to decision-makers

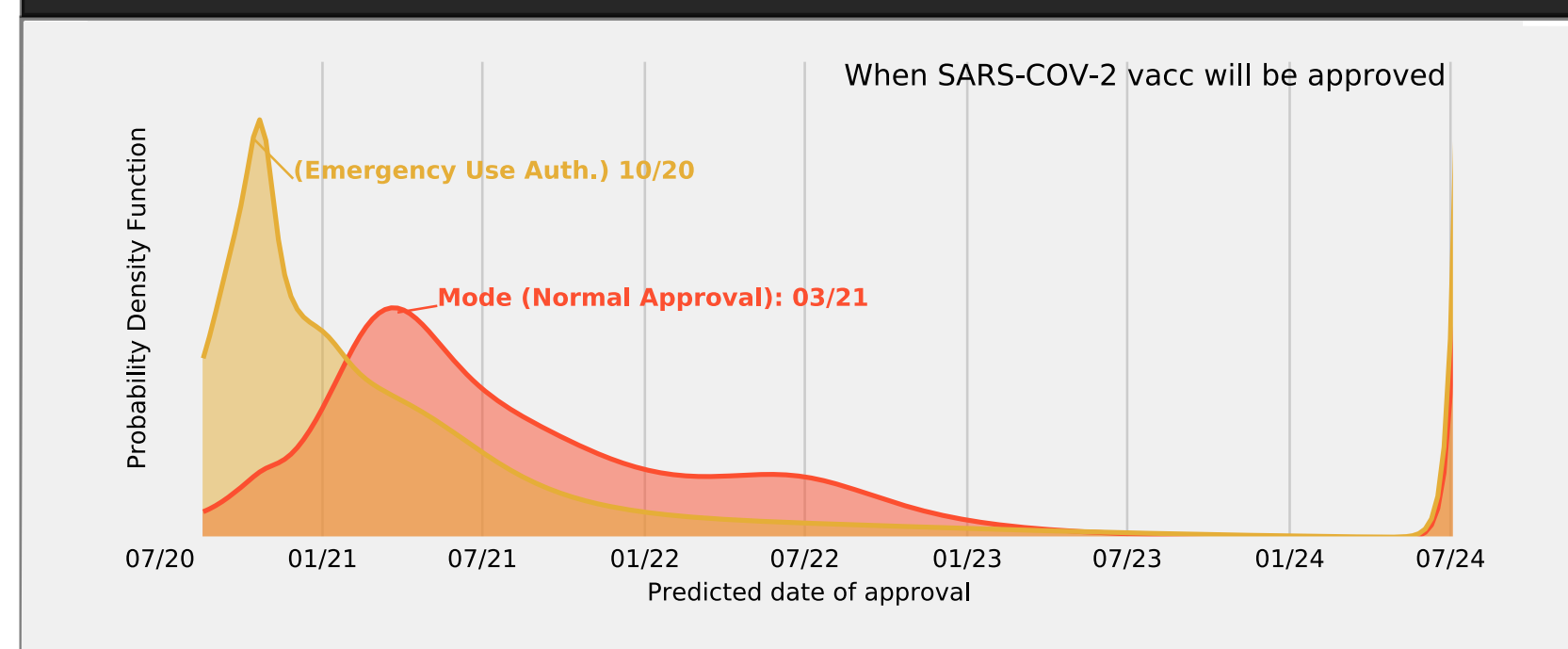
Methods

- We conducted 4 forecasting sessions from Jun./2020 to Sept./2020 that asked on average 6.5 questions and included up to 9 trained forecasters from Metaculus and 8 experts. Surveys and code can be found here = <https://github.com/computationalUncertaintyLab/vaccineAndTherapeuticsCrowd>
- Metaculus is a forecasting platform with a track record of predicting the timing and impact of scientific and technological breakthroughs
- Respondents made probabilistic, continuous predictions
- We defined a consensus as an equally weighted average of expert and trained forecaster predictions

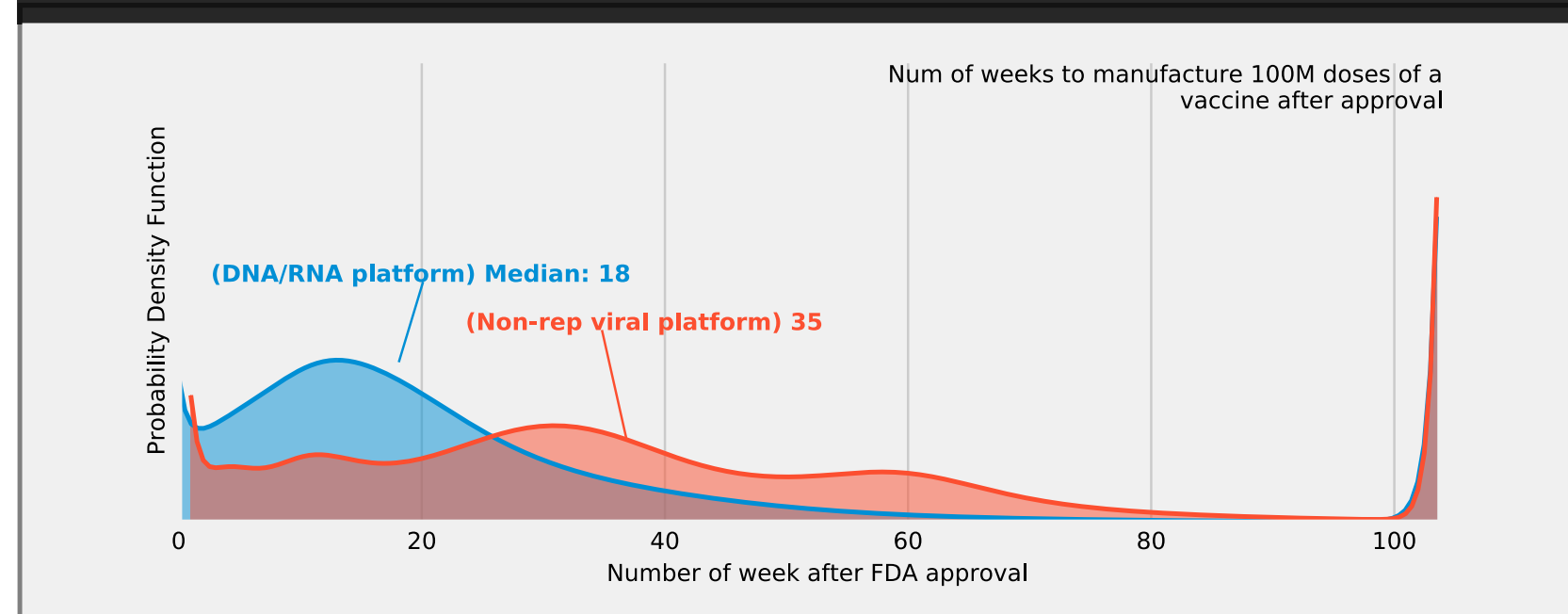
Efficacy of first approved vaccine



Timing of vaccine approval



Availability of 100M doses of approved vaccine



Results

- Efficacy of first approved vaccine:** In Sept./2020, experts assigned a median of 49.5% for the efficacy of the first US- or EU- SARS-CoV-2 vaccine approved on an emergency basis compared to a 66.0% efficacy of a vaccine approved through a standard process.
- Timing of vaccine approval:** Expert consensus predicted a mode of Oct./20 as the month the FDA would approve a vaccine under an emergency use authorization compared to a mode of Mar./21 for approval under a standard process.
- Availability of 100M doses of approved vaccine:** Experts and trained forecasters predicted a median of 18 weeks to produce 100M doses of a vaccine using a DNA/RNA platform versus a median of 35 weeks for a vaccine using a non-replicating viral platform.

Discussion

- Consensus predicted a lower efficacy for a vaccine approved on an emergency basis compared to the standard process, made reasonable predictions about the timing of a vaccine (in Sept. before Phase III results), and predict manufacturing 100M doses could take just 18 weeks.
- A consensus of subject matter experts and trained forecasters can provide fast information to public health decision makers on targets that computational models may not be able to forecast without plentiful data on vaccine efficacy, timing, and availability.

Acknowledgements

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