

Evaluating the added value of integrating wastewater data to forecast hospital admissions



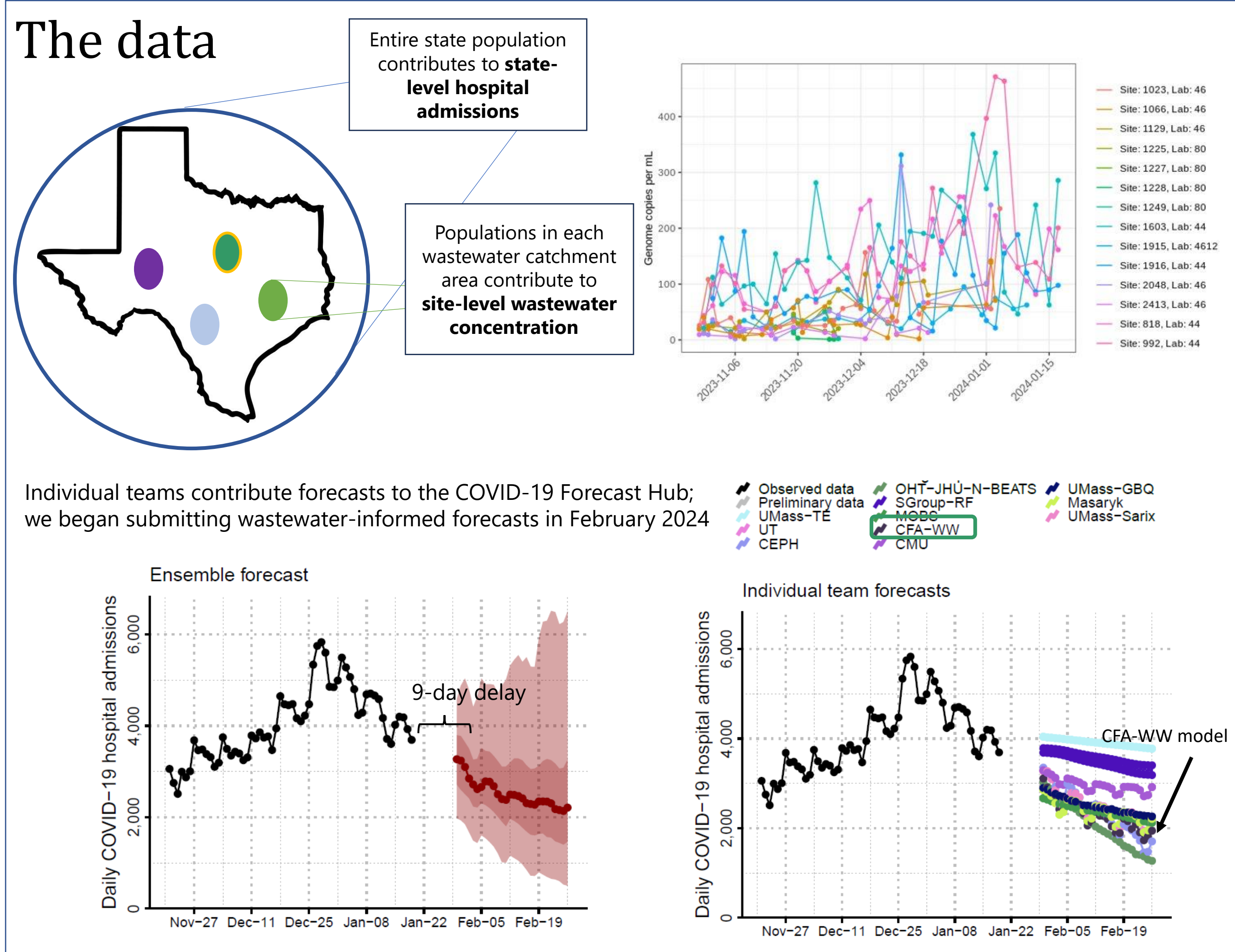
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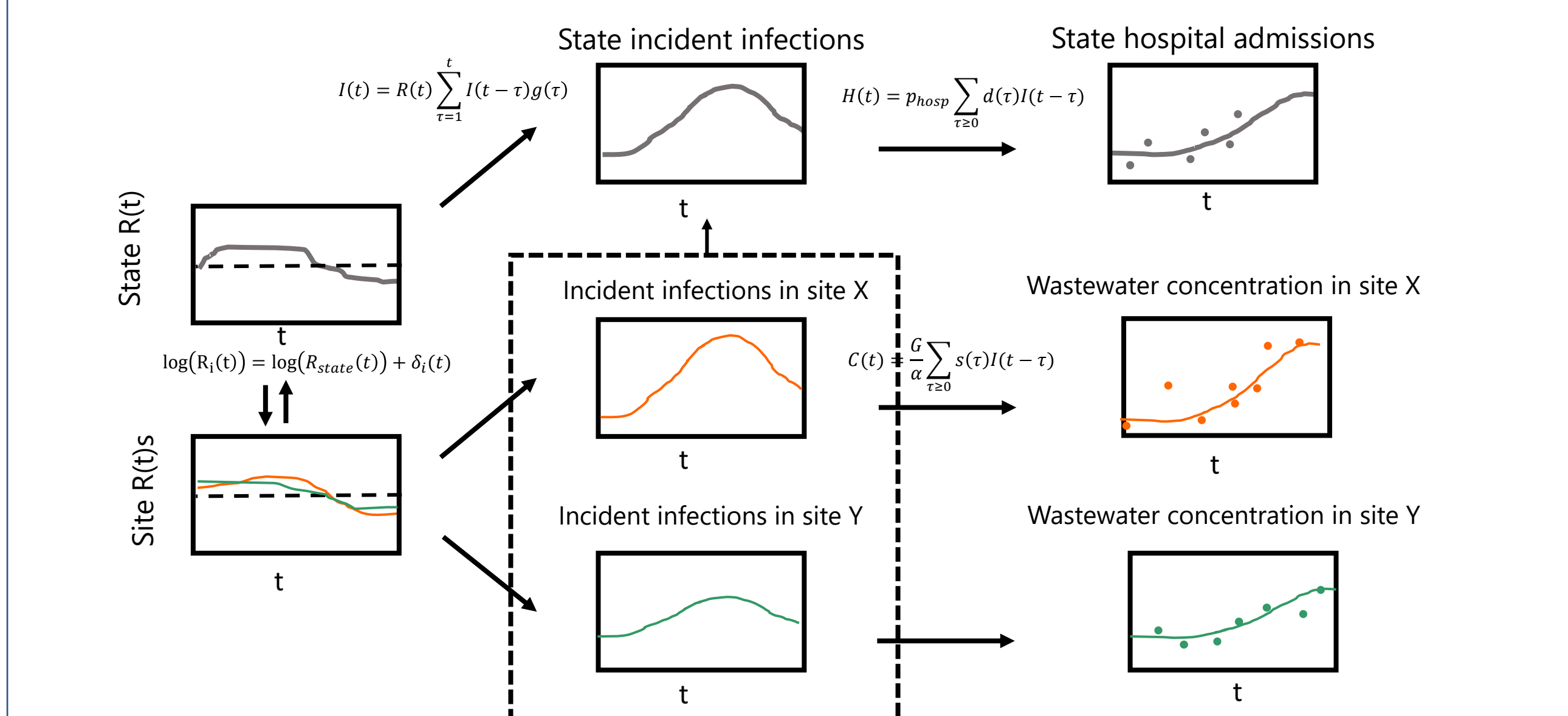
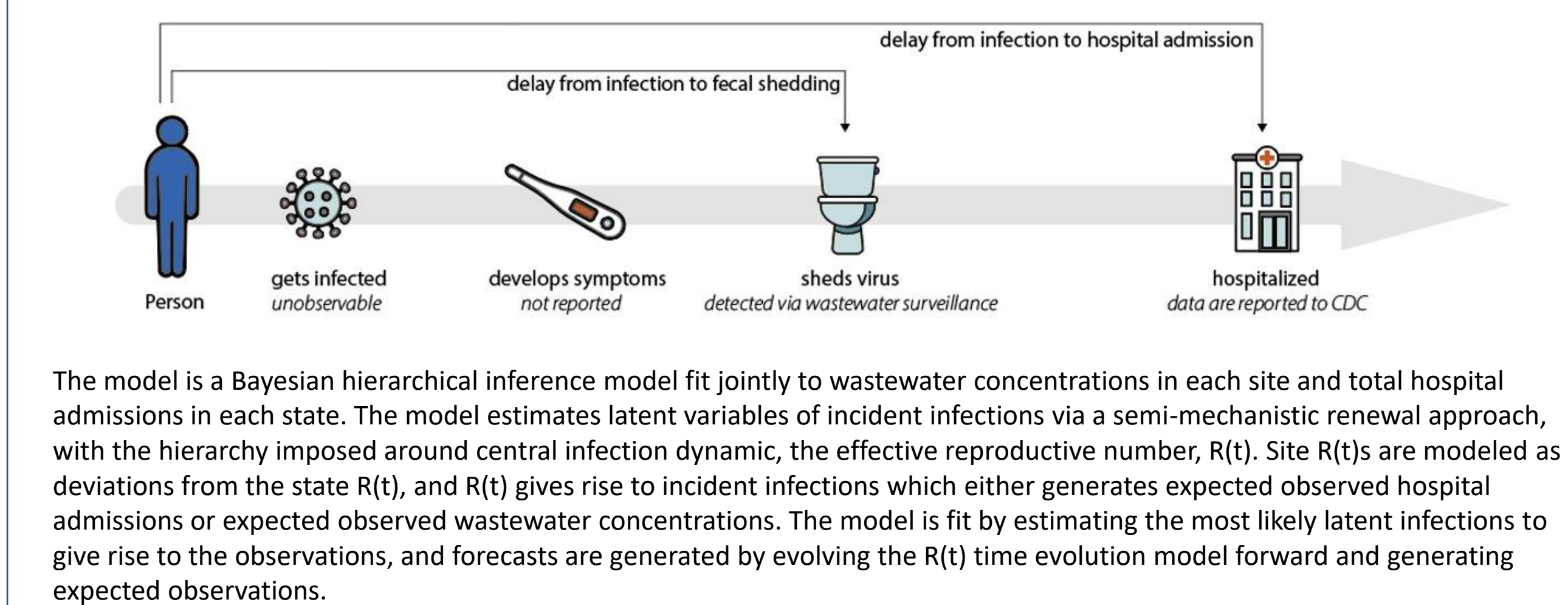
Introduction

- Developed a model that jointly fits hospital admissions data and wastewater concentration data at the site-level to produce **short-term (28-day) forecasts** of COVID-19 hospital admissions
- Published forecasts for 50 states, DC, PR, and the U.S. in the COVID-19 Forecast Hub
- Evaluating the performance of the wastewater-informed model** compared to the same semi-mechanistic renewal model fit only to hospital admissions
- Comparison to other forecast models submitting to the COVID-19 Forecast Hub

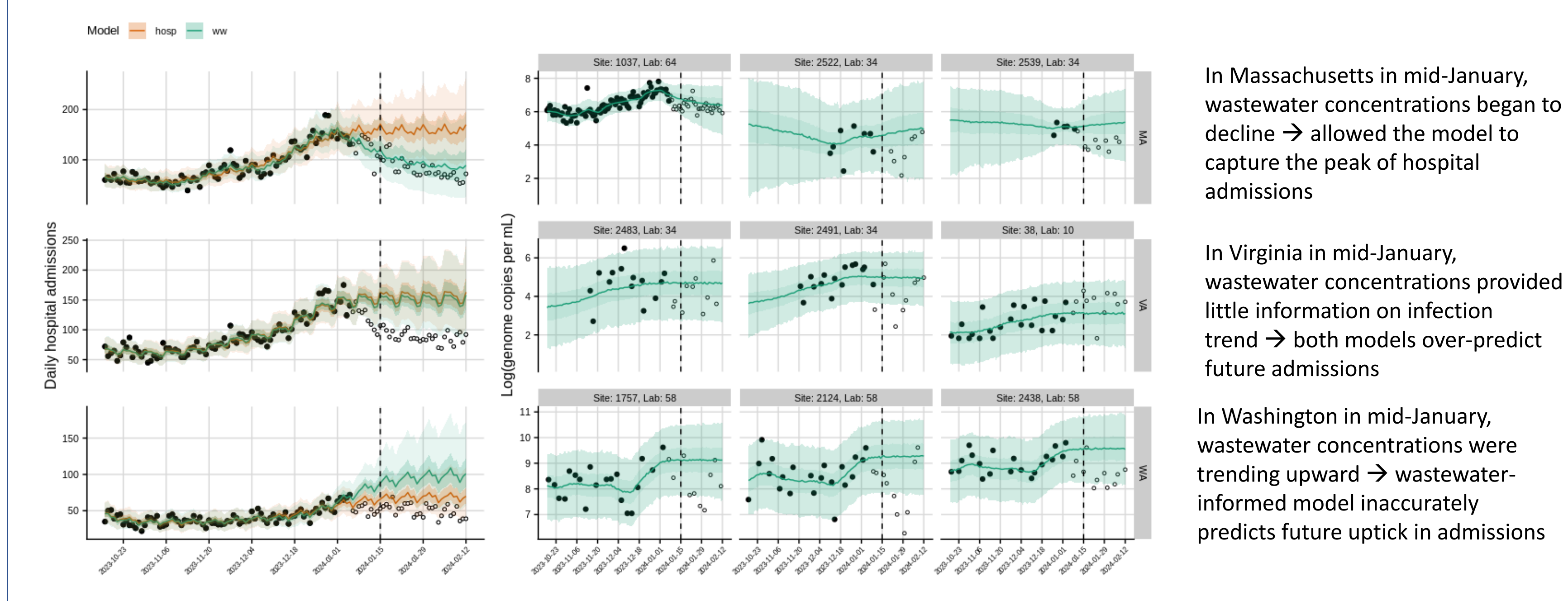
The data



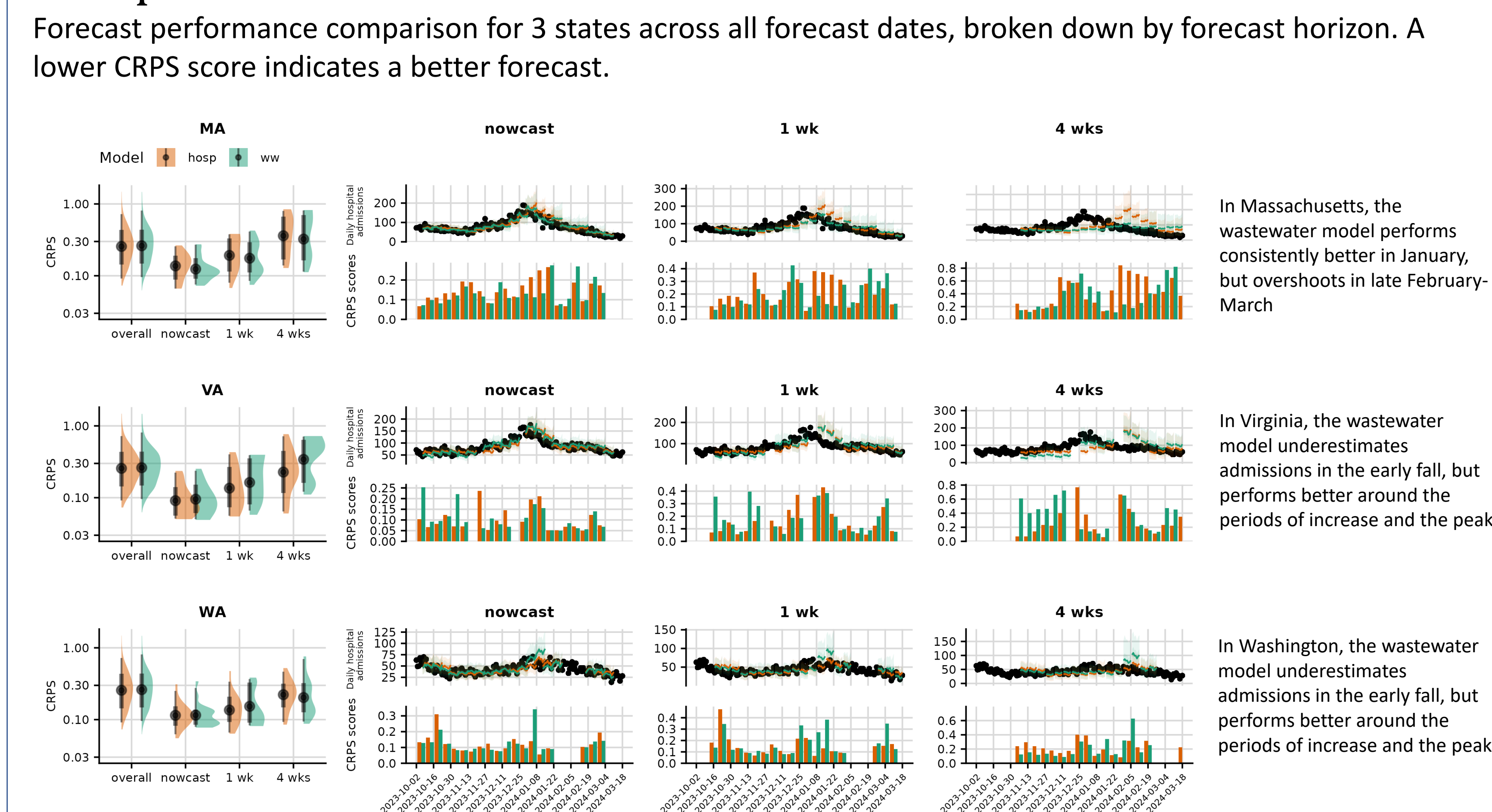
Model description



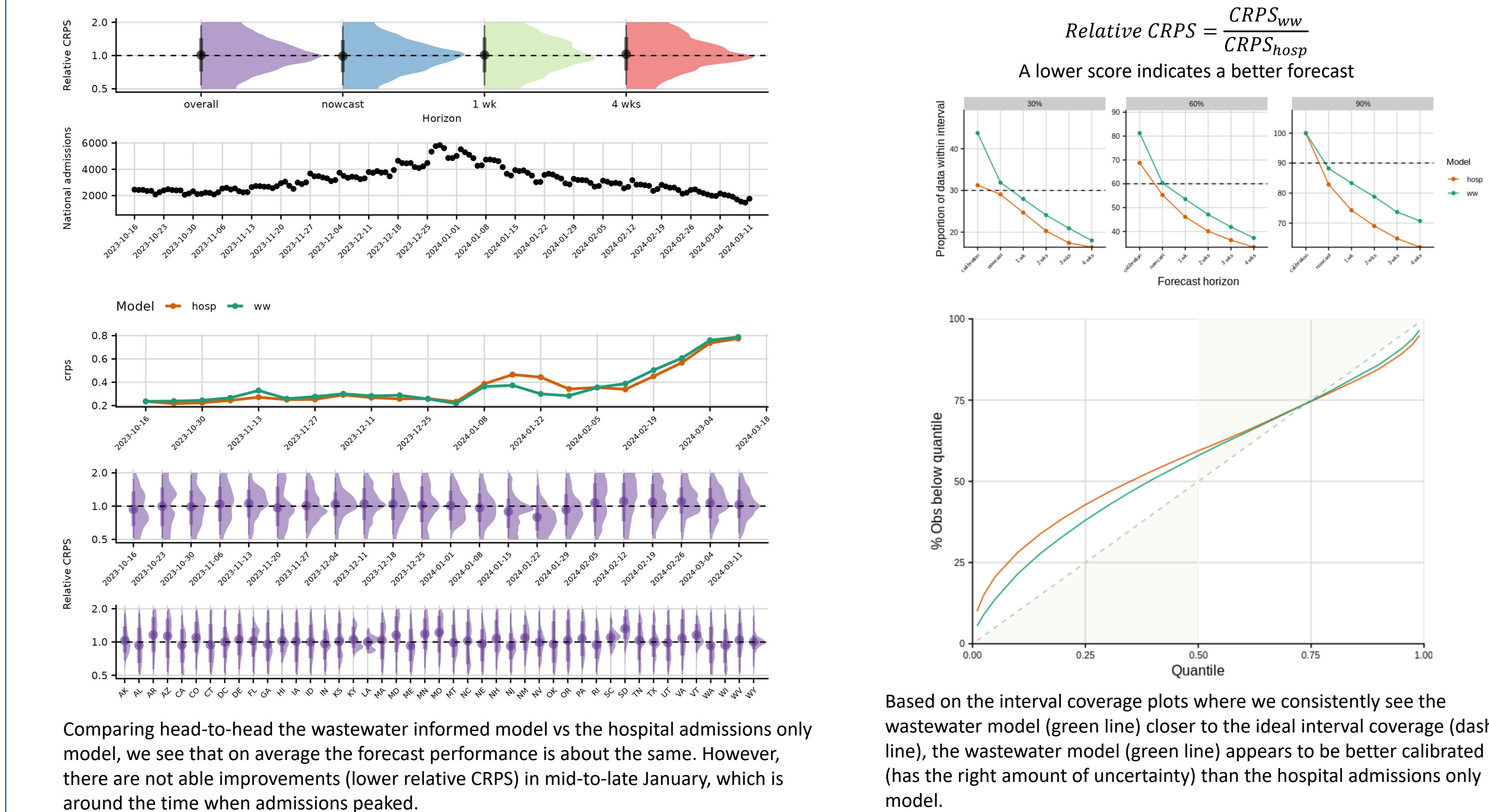
Example fit and forecast at a single forecast date



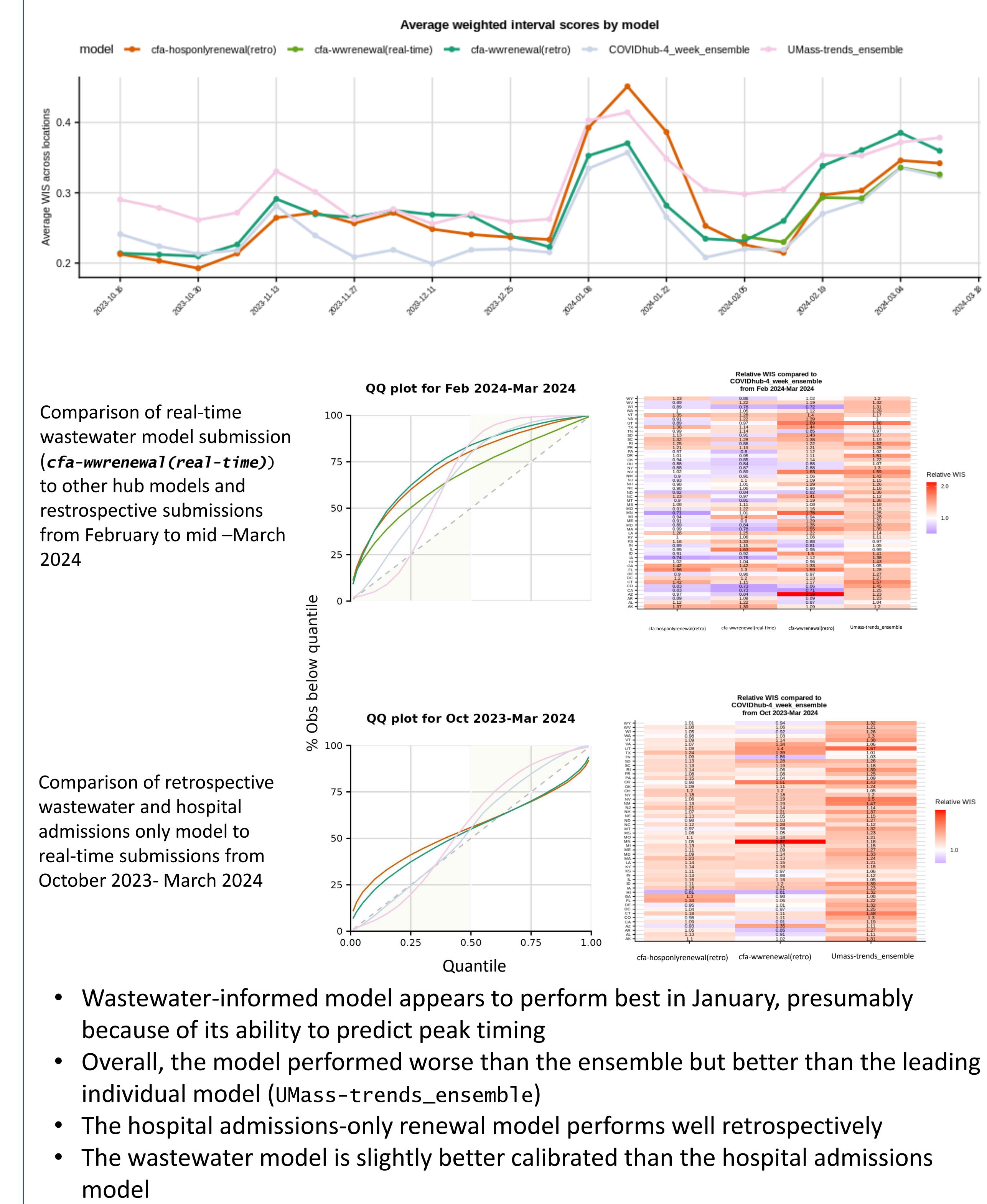
Example fit across all forecast dates



Evaluation across forecast dates, locations, and horizons



Retrospective and real-time Hub performance



Current & future work

- Investigate the relationship between the performance of the wastewater-informed forecast and characteristics of a state's wastewater data
 - For example, what is the impact of population coverage, collection frequency, and reporting latency on performance?
- Continued model development to improve handling of wastewater generative process—in particular, incorporating lab methods more explicitly into the model
- Developing an R package to allow state and local partners to run the model on their own data
- Incorporating geospatial information into model directly
- Applying the model to flu data

Code availability

All the code used to perform this analysis can be found at <https://github.com/cdcgov/wastewater-informed-covid-forecasting>. If you have feedback, please submit an issue or reach out directly: uox1@cdc.gov

We are in the process of developing an R package called *wwinference* to enable users to run the model on their own data and explore the outputs. If you'd like to request a feature or try it out, it can be found here: <https://github.com/cdcgov/ww-inference-model>

Acknowledgments

We thank the CDC National Wastewater Surveillance System (NWSS) and all contributing jurisdiction health departments and wastewater utilities. This work is in collaboration with our colleagues at CDC NWSS. All findings are preliminary.

The findings and conclusions of this report are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.