Eight-Week COVID19 Projections for New York City

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Note: Projections from 4/3/20 onwards included age-specific data and as such the model was likely better constrained and would better reflect the transmission dynamics, compared to our previous model projections. Additional model update from 5/8/20 onwards: the model was trained on both incidence and mortality data (combining covid-19 confirmed and probable deaths).

For more details on Methods, see README.pdf

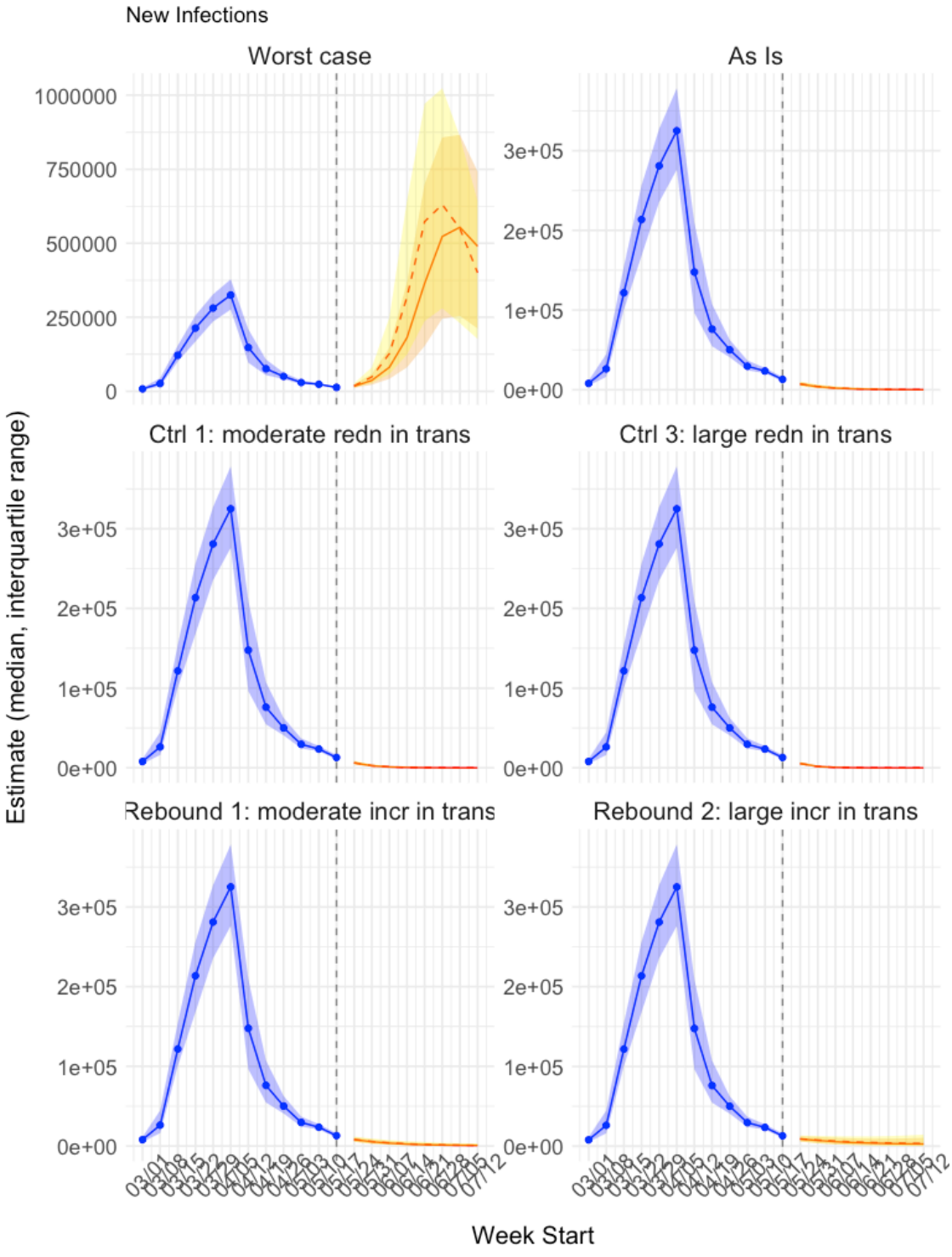
Results – see tables (Projected Epidemic Outcomes and Healthcare Demands etc.) in WeeklyProjections.xlsx and DailyProjections.xlsx; see figures below.

Some observations based on COVID19 data up to 5/22/20:

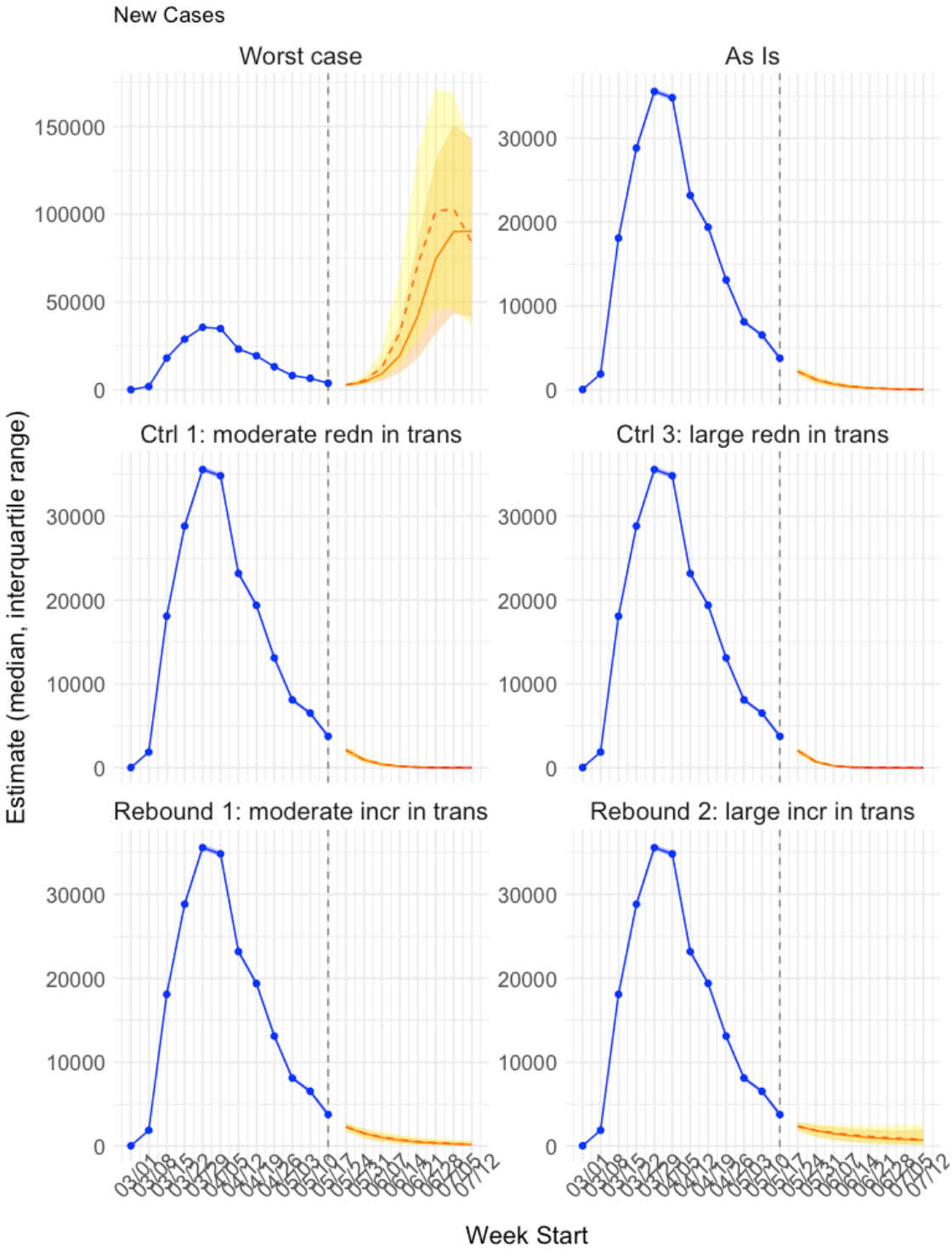
1) Estimated Rt, the real-time reproductive number, for the week of 5/17/20 was 0.58 (IQR: 0.43–0.72), which accounted for the depletion of susceptibles (i.e., seroprevalence—assuming people are immune after recovery). Estimated Rt for the week was 0.72 (IQR: 0.55– 0.84) if seroprevalence is ignored. Note both estimates indicate strong reductions in transmissibility over the last few weeks.
2) The model tended to underestimate demands for ventilators, compared to observations in the past weeks (relative error = -13% over the past ~12 weeks). Please adjust accordingly.

Acknowledgement: We thank the NYC Department of Health and Mental Hygiene (DOHMH) for sharing of data and allowing this public posting. And we thank Columbia Mailman School of Public Health for high performance computing.

Caution: Please note that there are large uncertainties in our model projections due to unknown disease transmission dynamics (model misspecification), changing behavior and policies, delay in reporting, and under-reporting. In particular, the data our projections are based on reflect situations ~2 weeks ago due to time lags from interventions implemented to transmission events (a couple days to weeks), from infection to symptom onset (~2-6 days), from symptom onset to seeking treatment (~2-7 days), from seeking treatment to getting tested and then reported in the surveillance system (~2-7 days). In addition, how the epidemic would unfold also depend largely on behavior changes over time.



Projected number for the next 8 weeks under different control scenarios. Blue lines and points show median estimates for the model training period; red lines show projected median numbers with seasonality (solid lines) or without seasonality (dashed lines); shaded regions shown the interquartile ranges (IQR) for model estimates with seasonality (in orange) or without seasonality (in yellow). Dates are the first day (i.e. Sunday) of the week.



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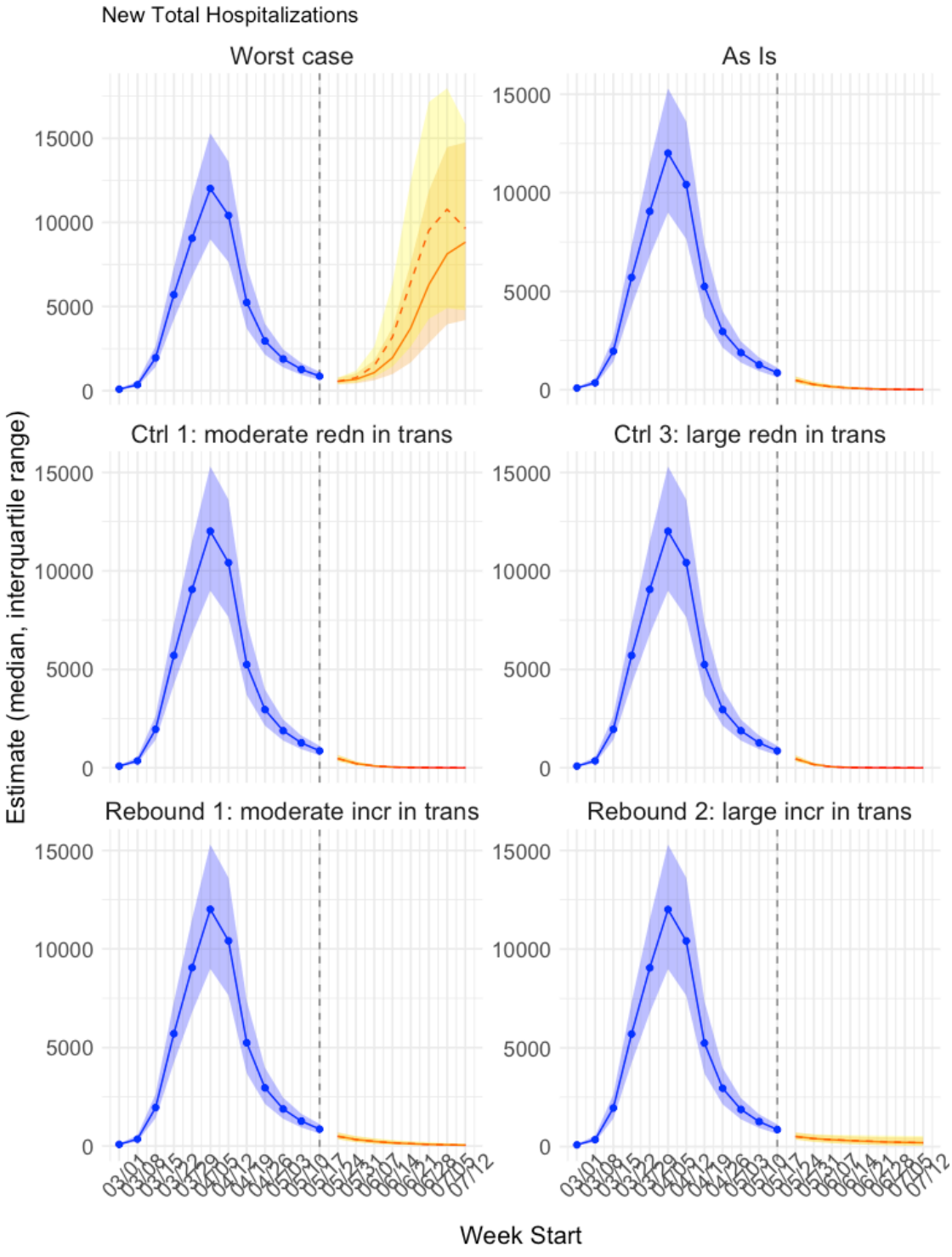

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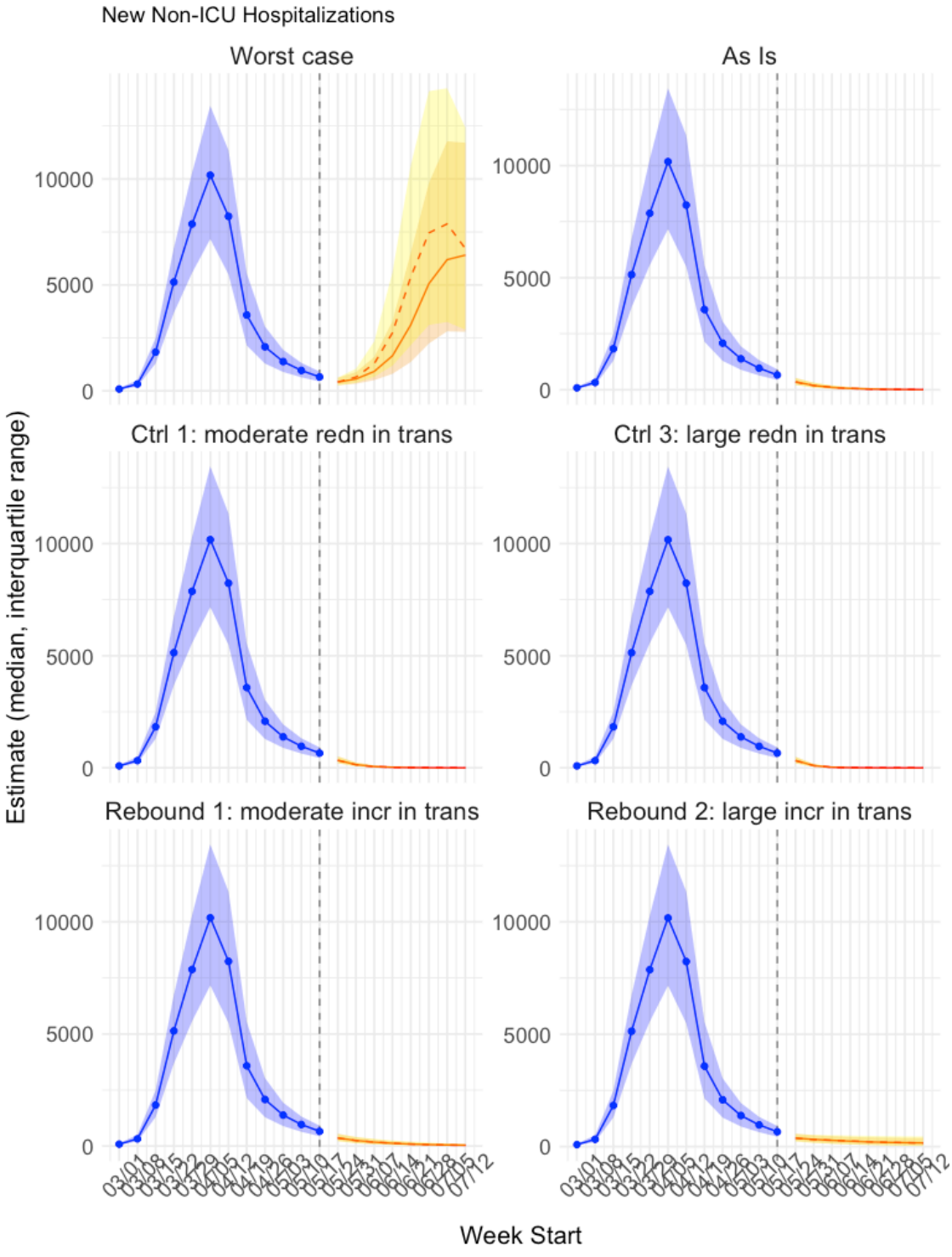

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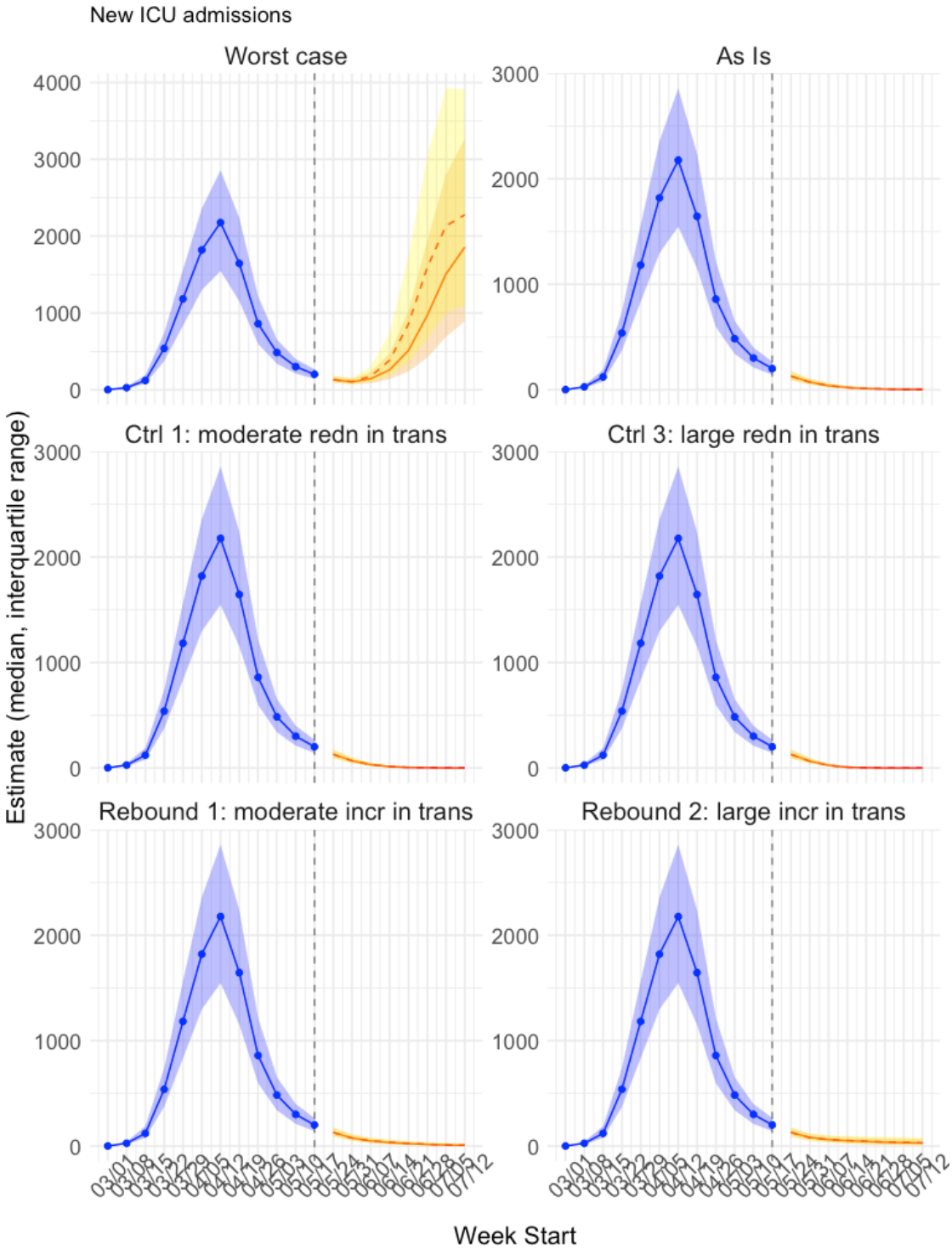

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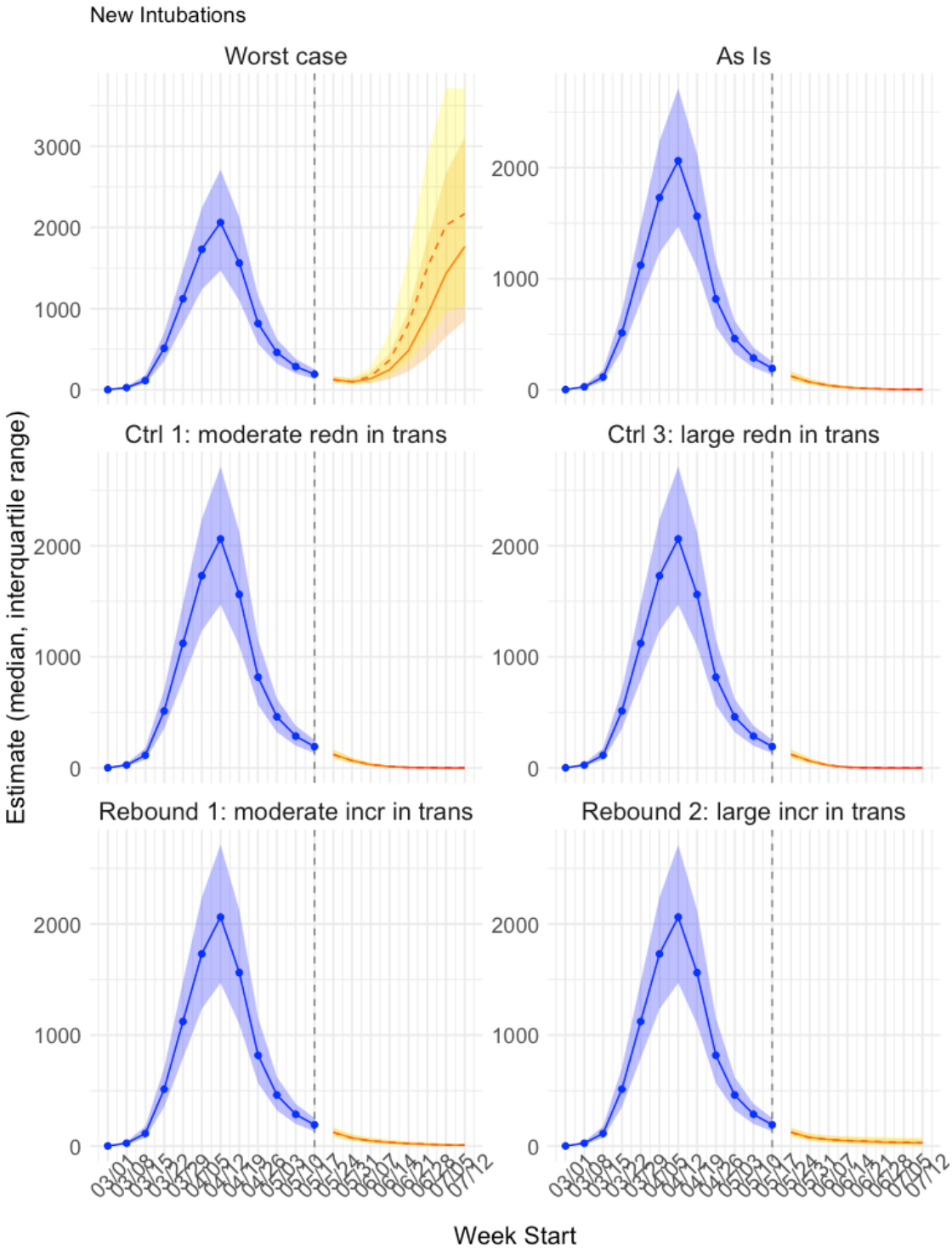

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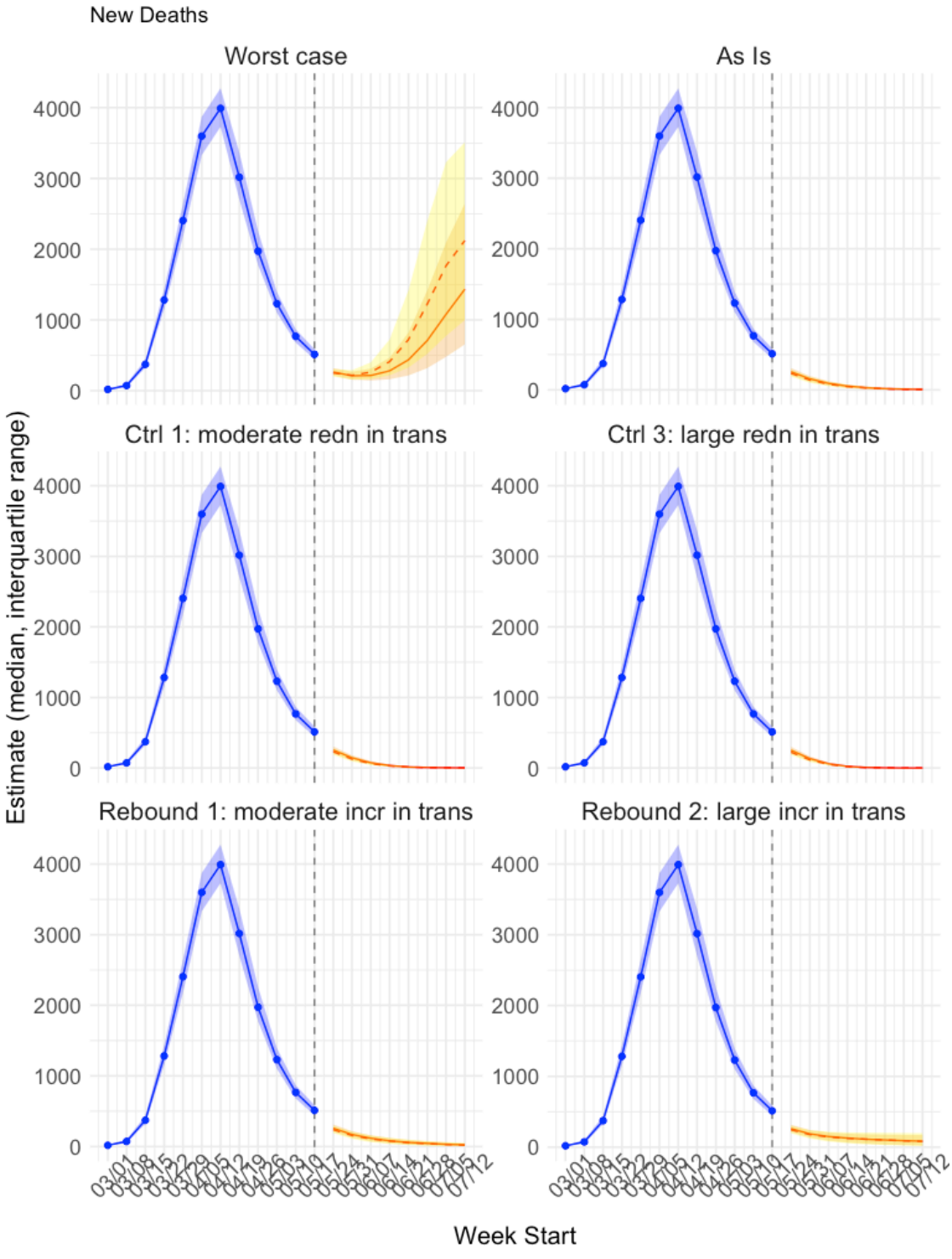

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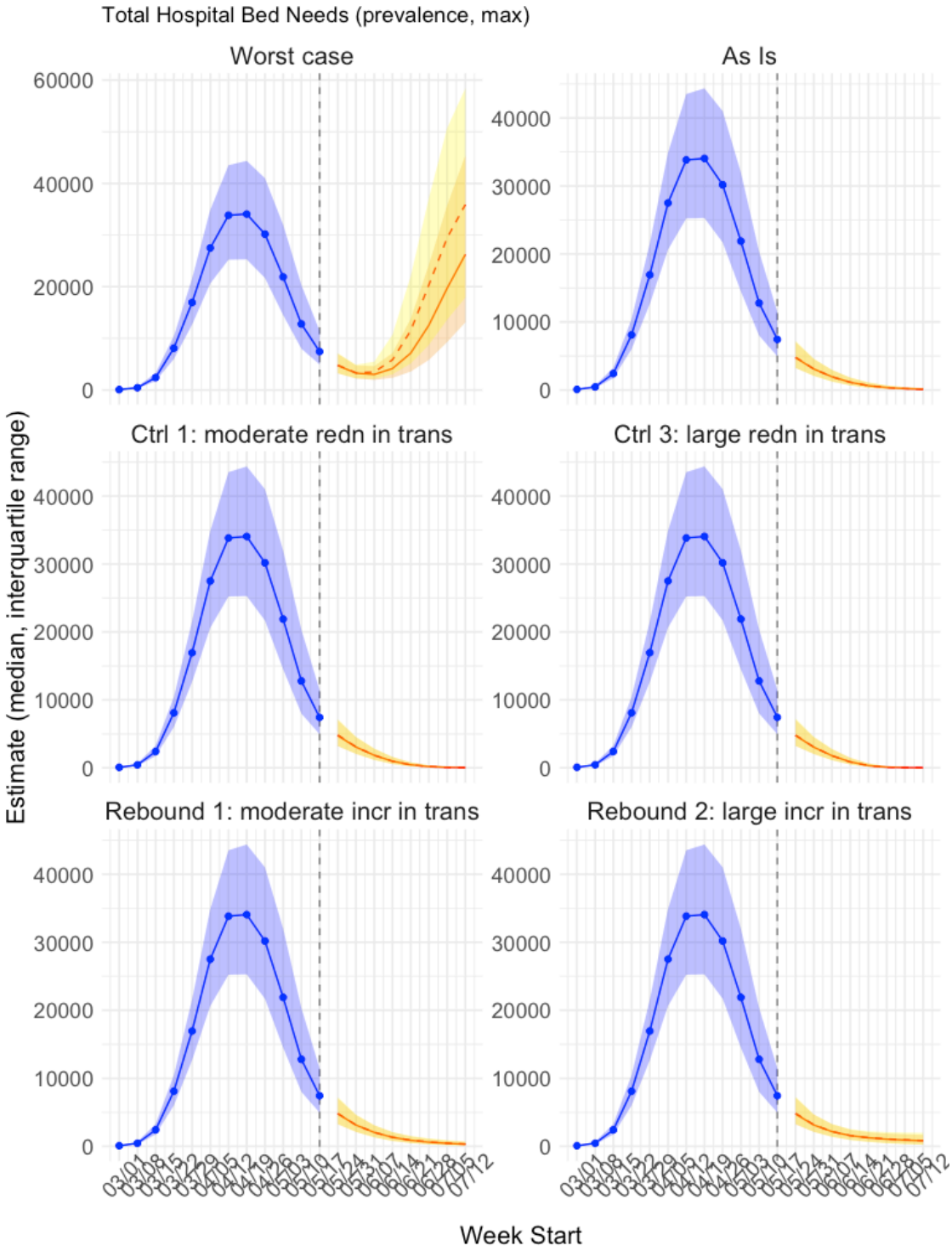

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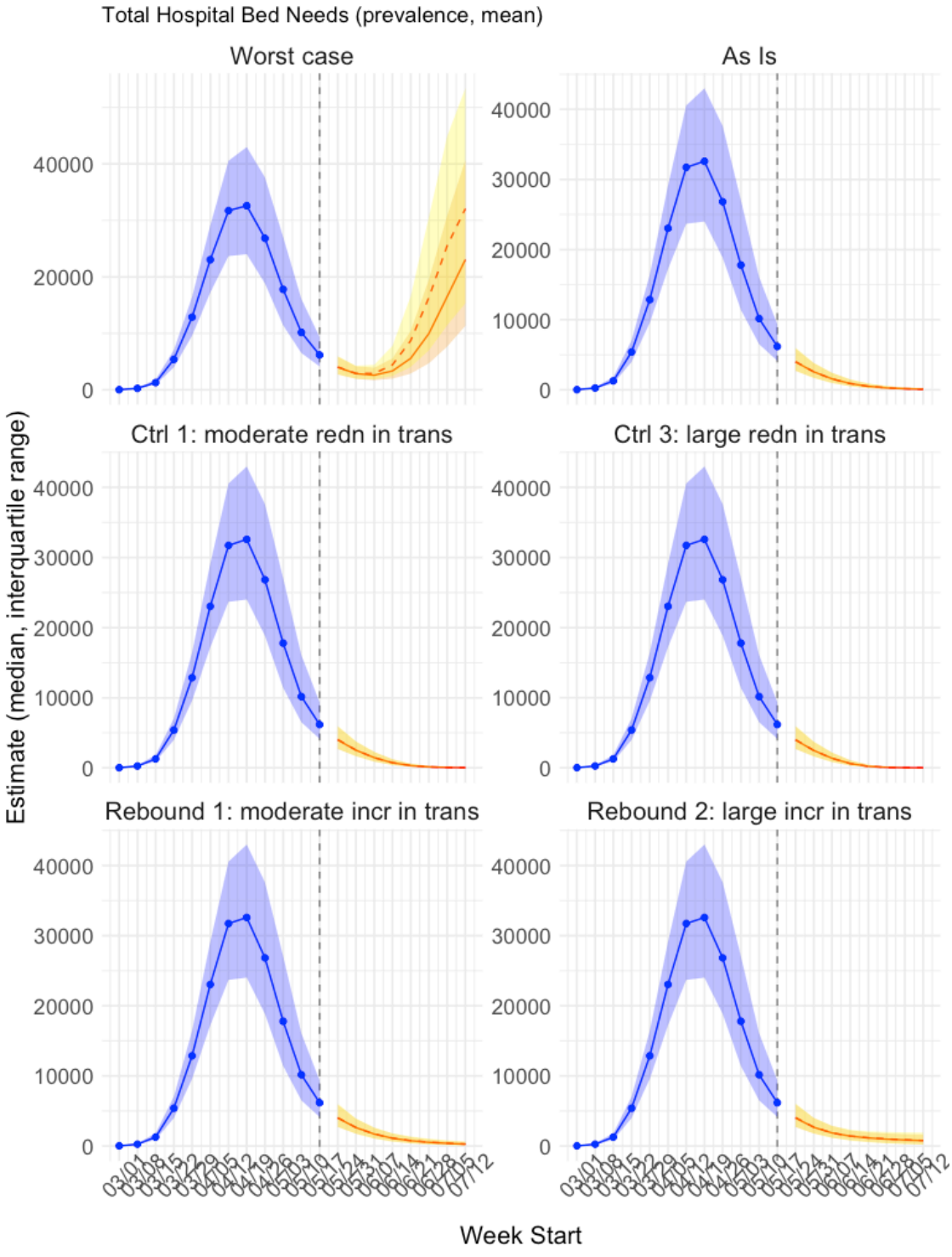

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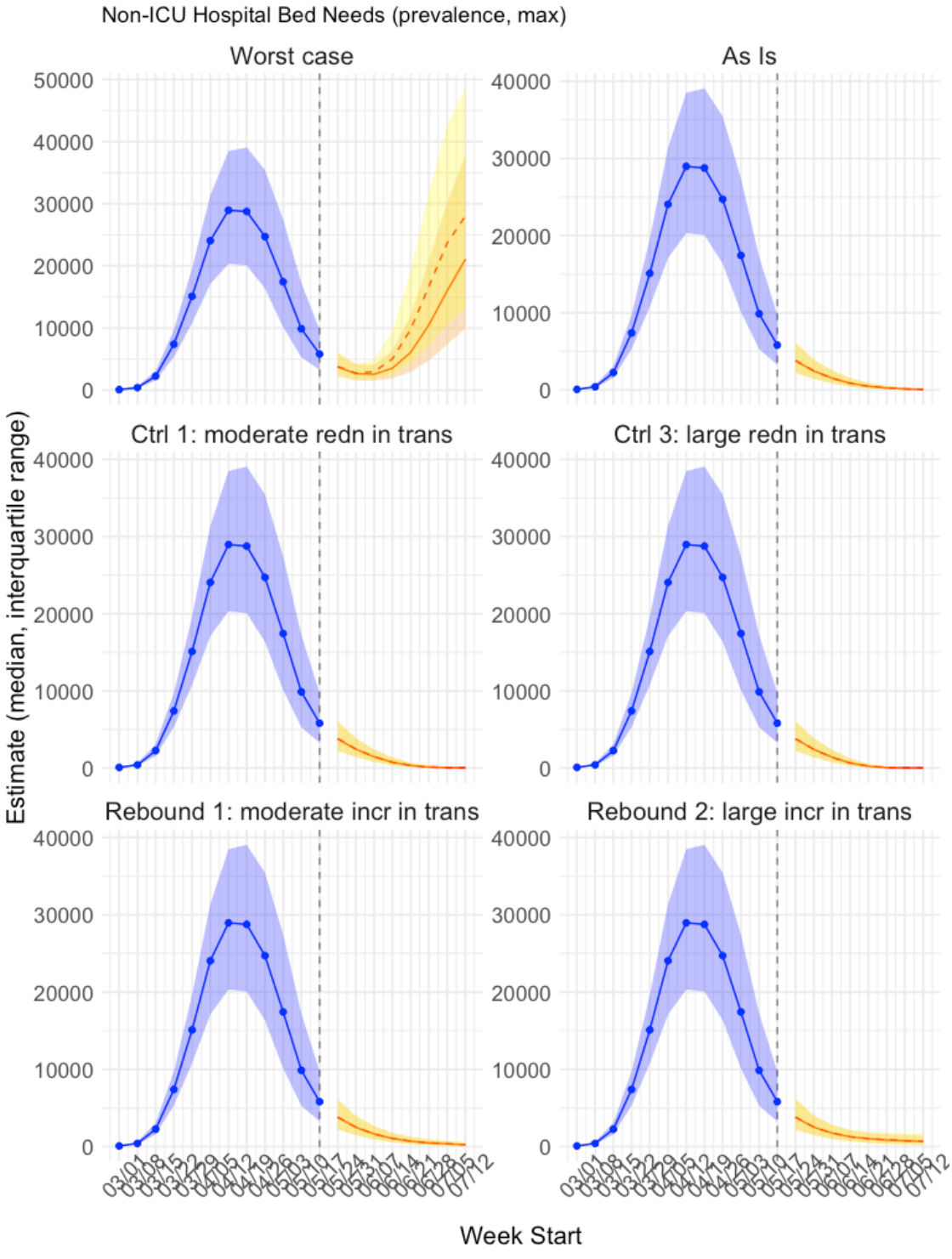

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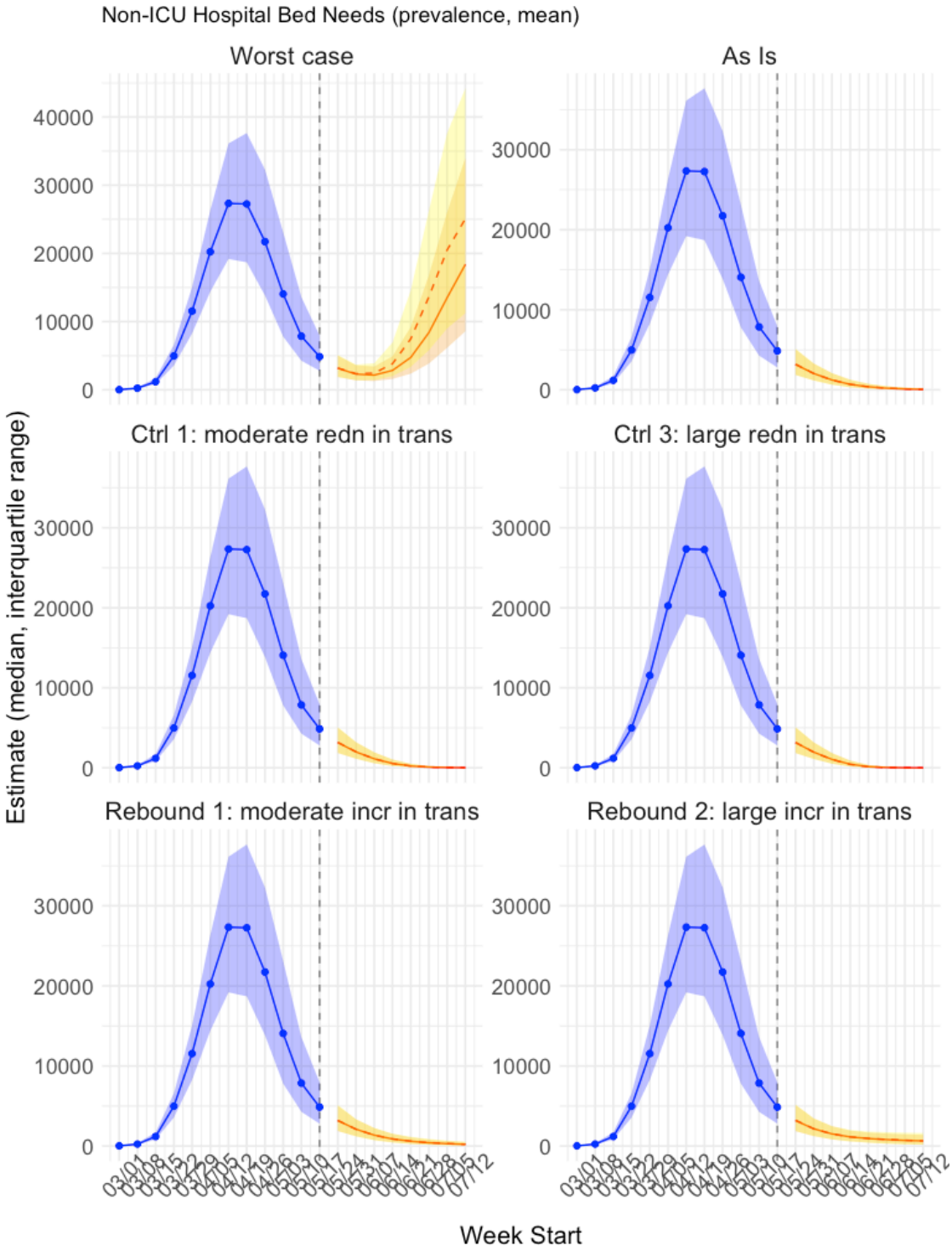

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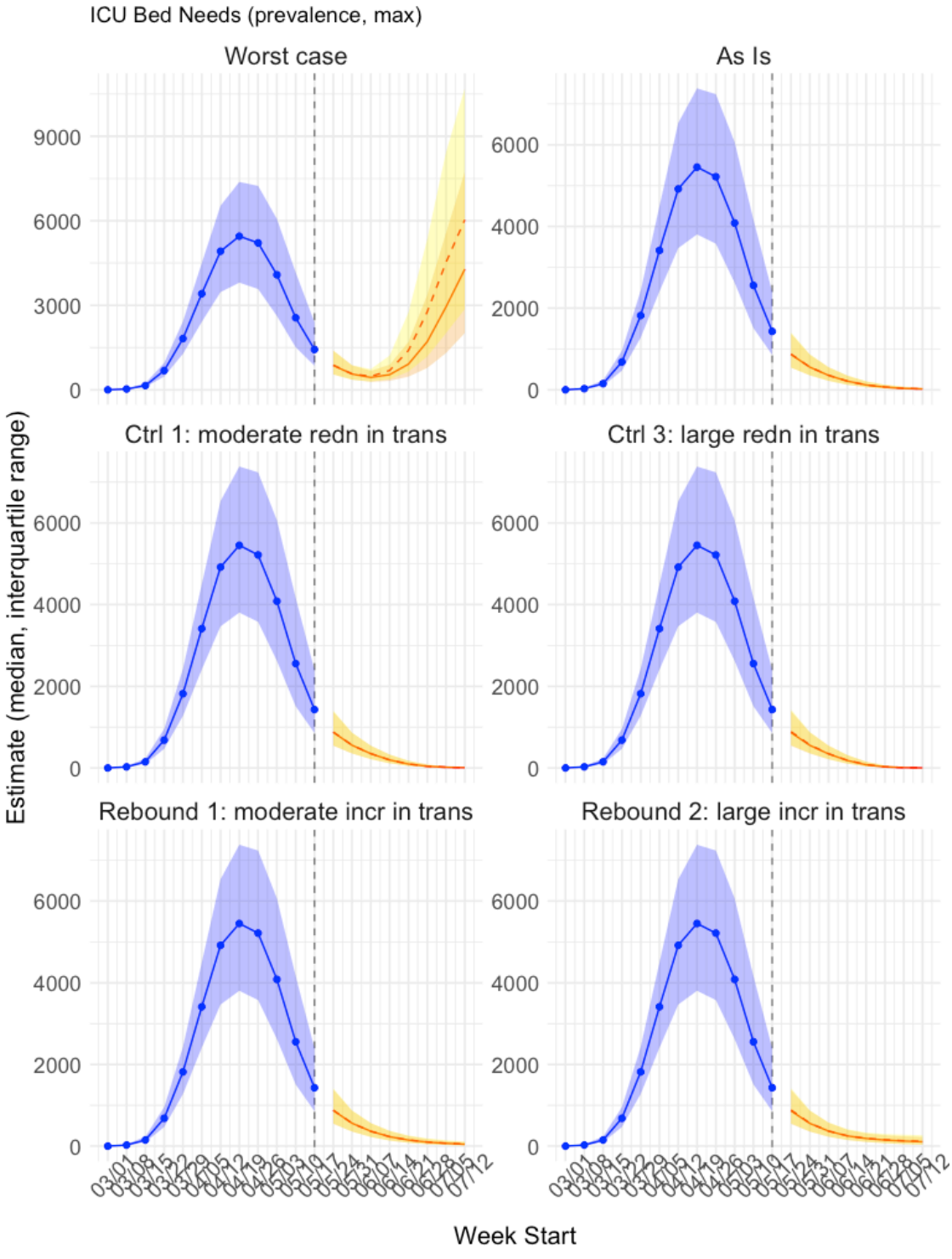

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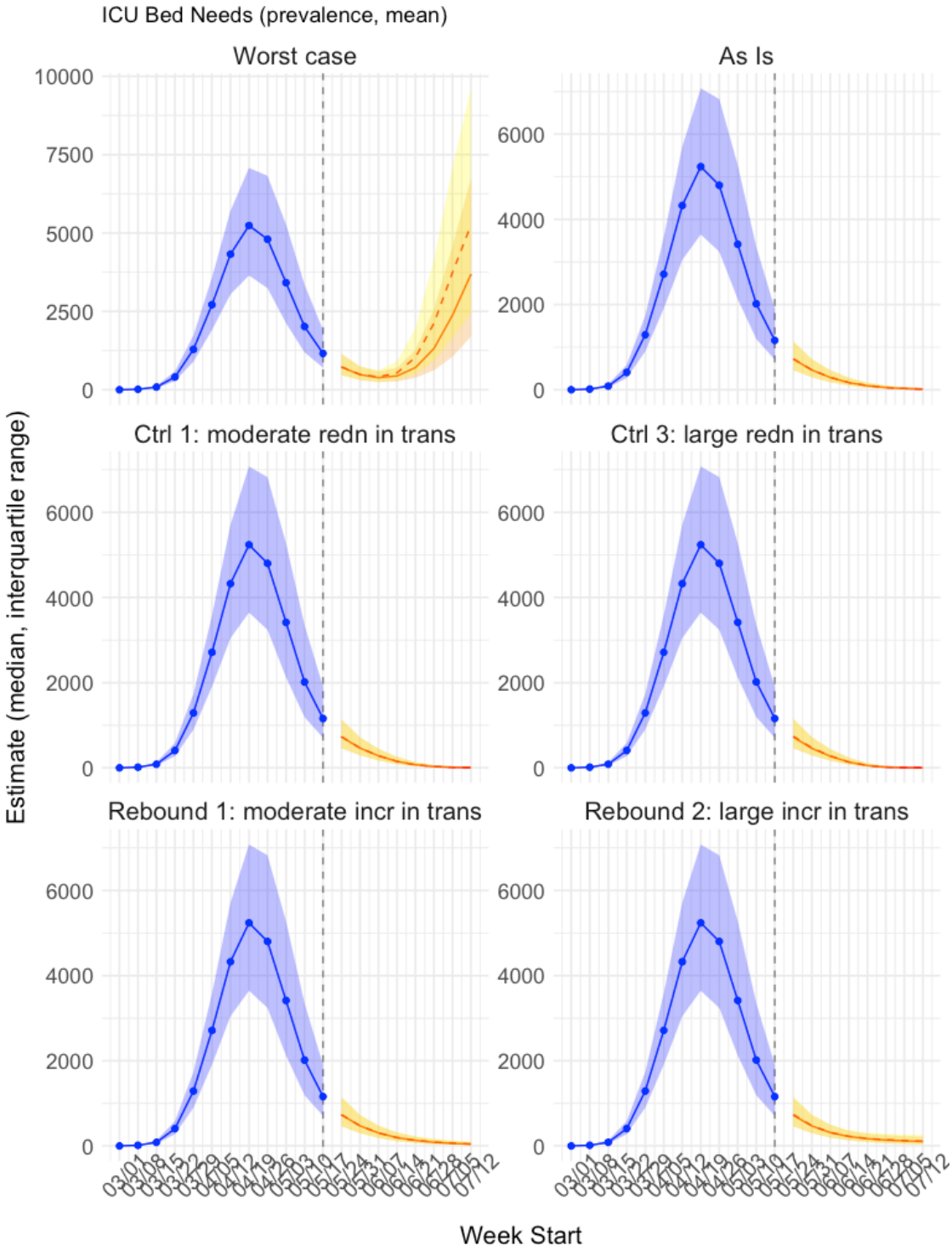

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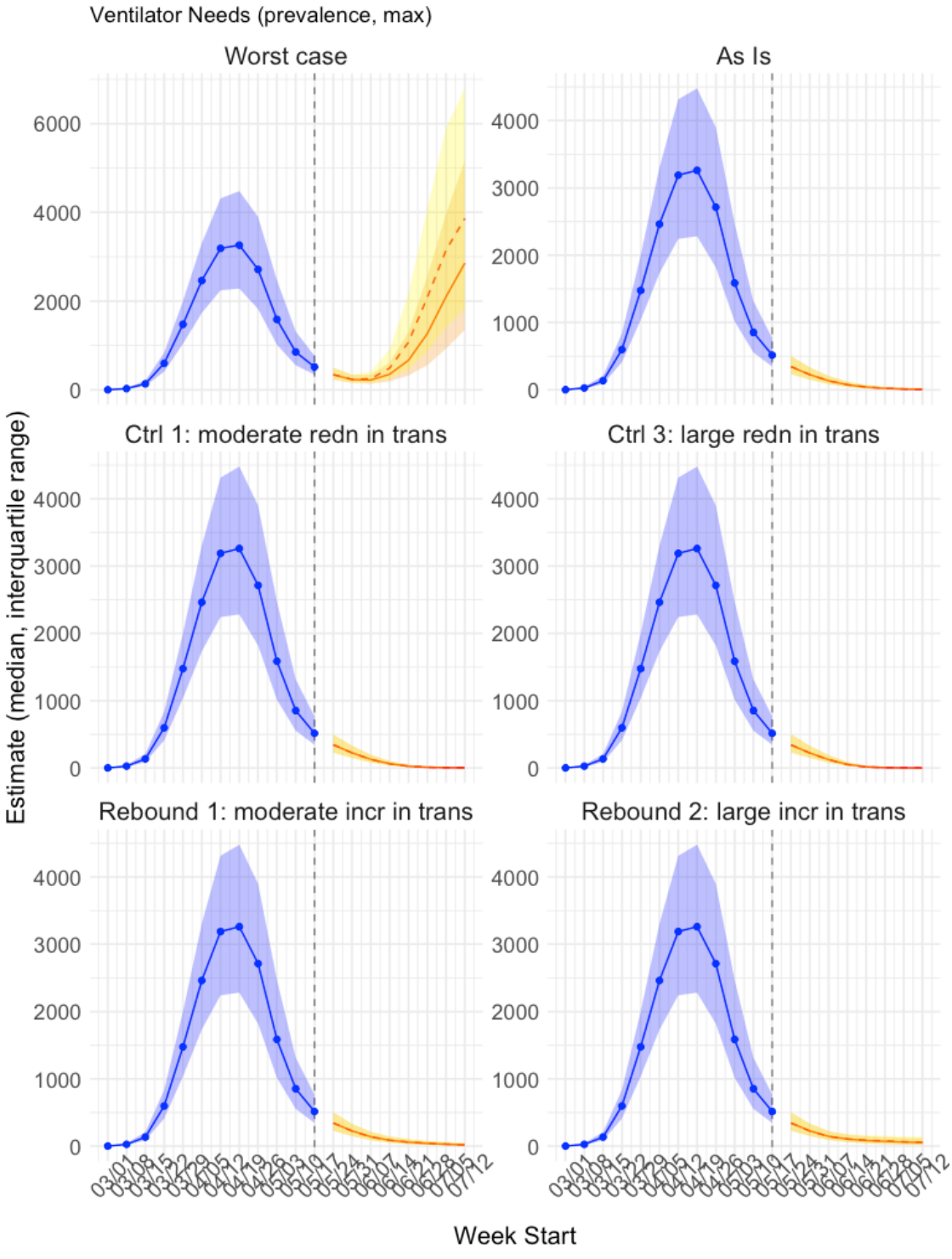

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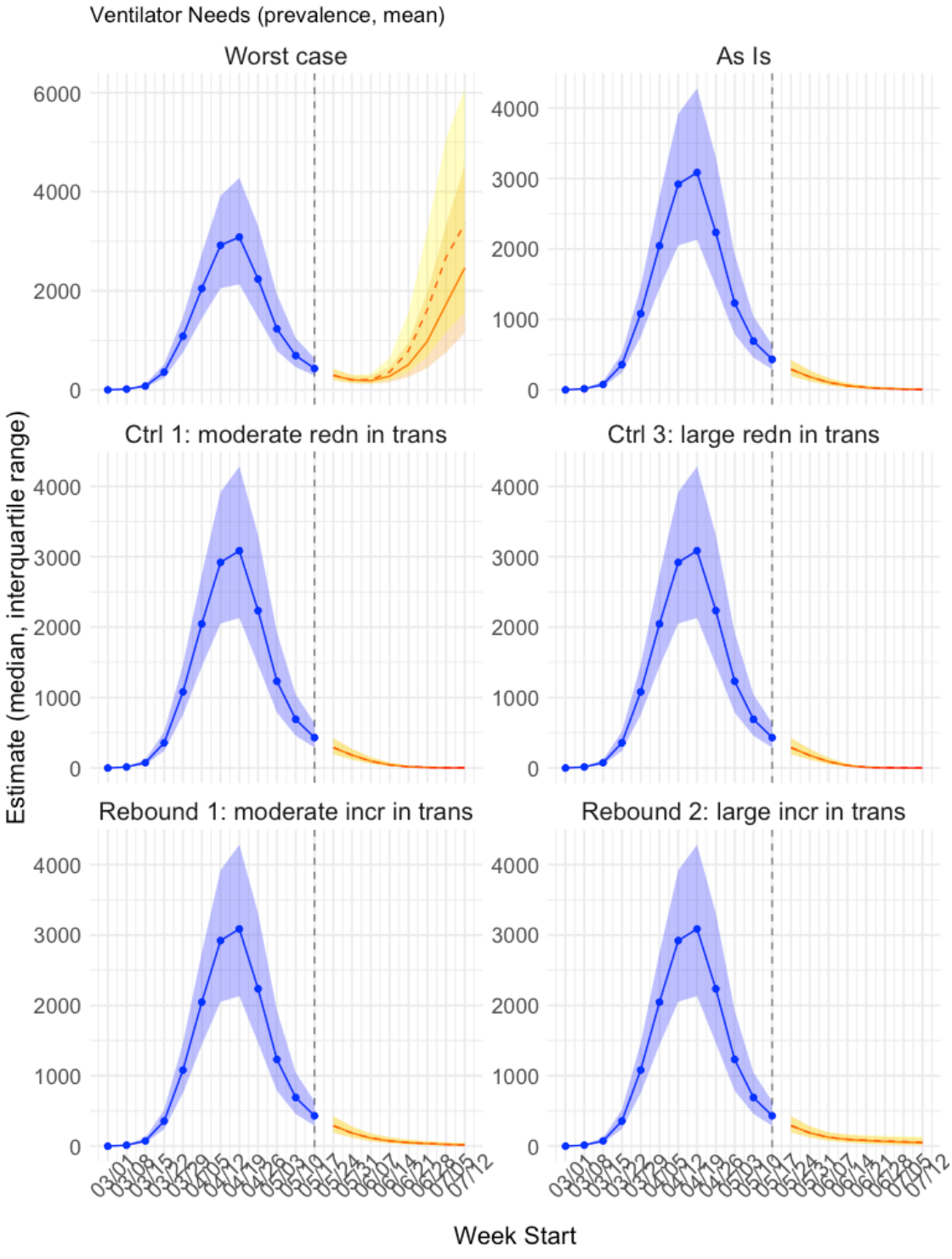

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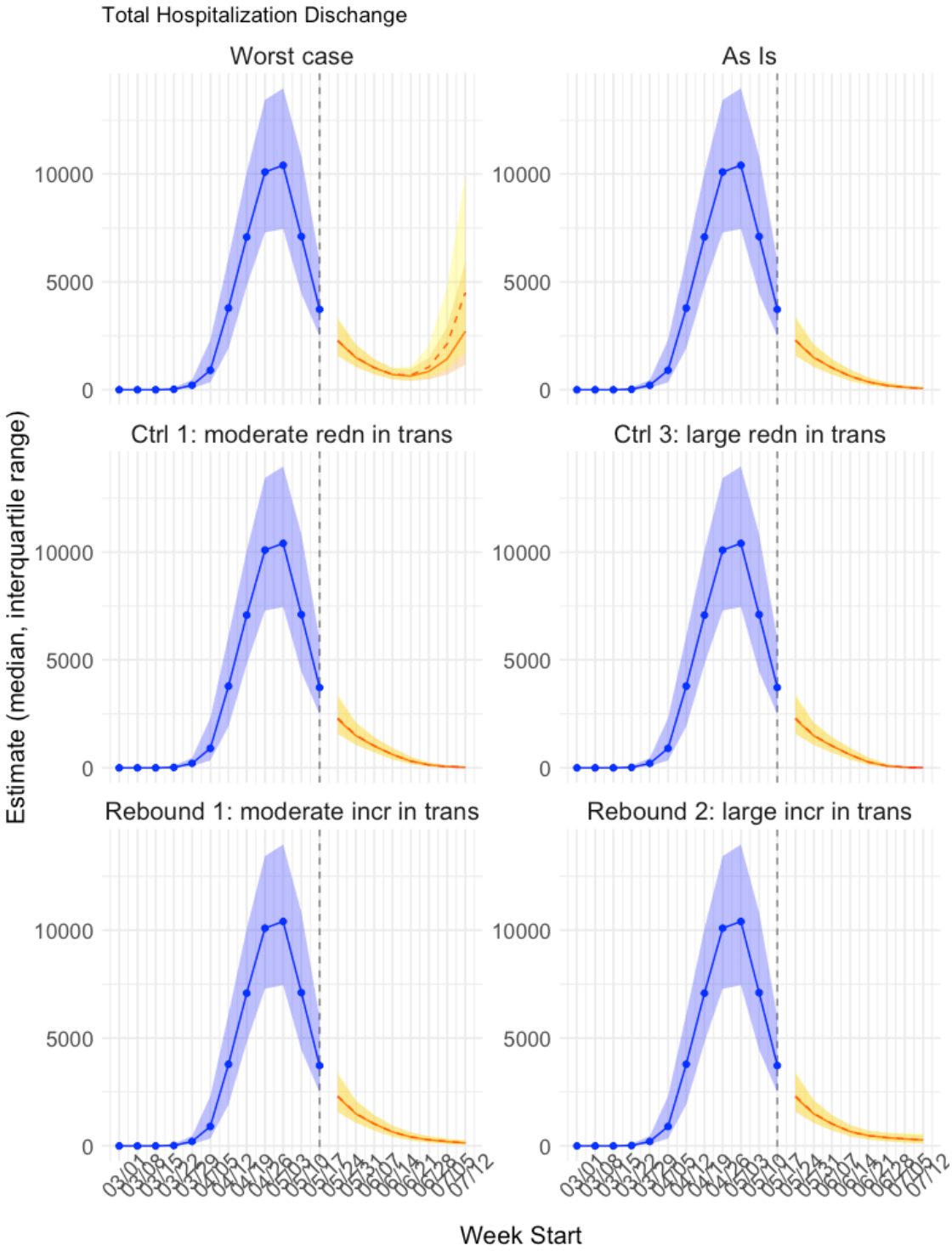

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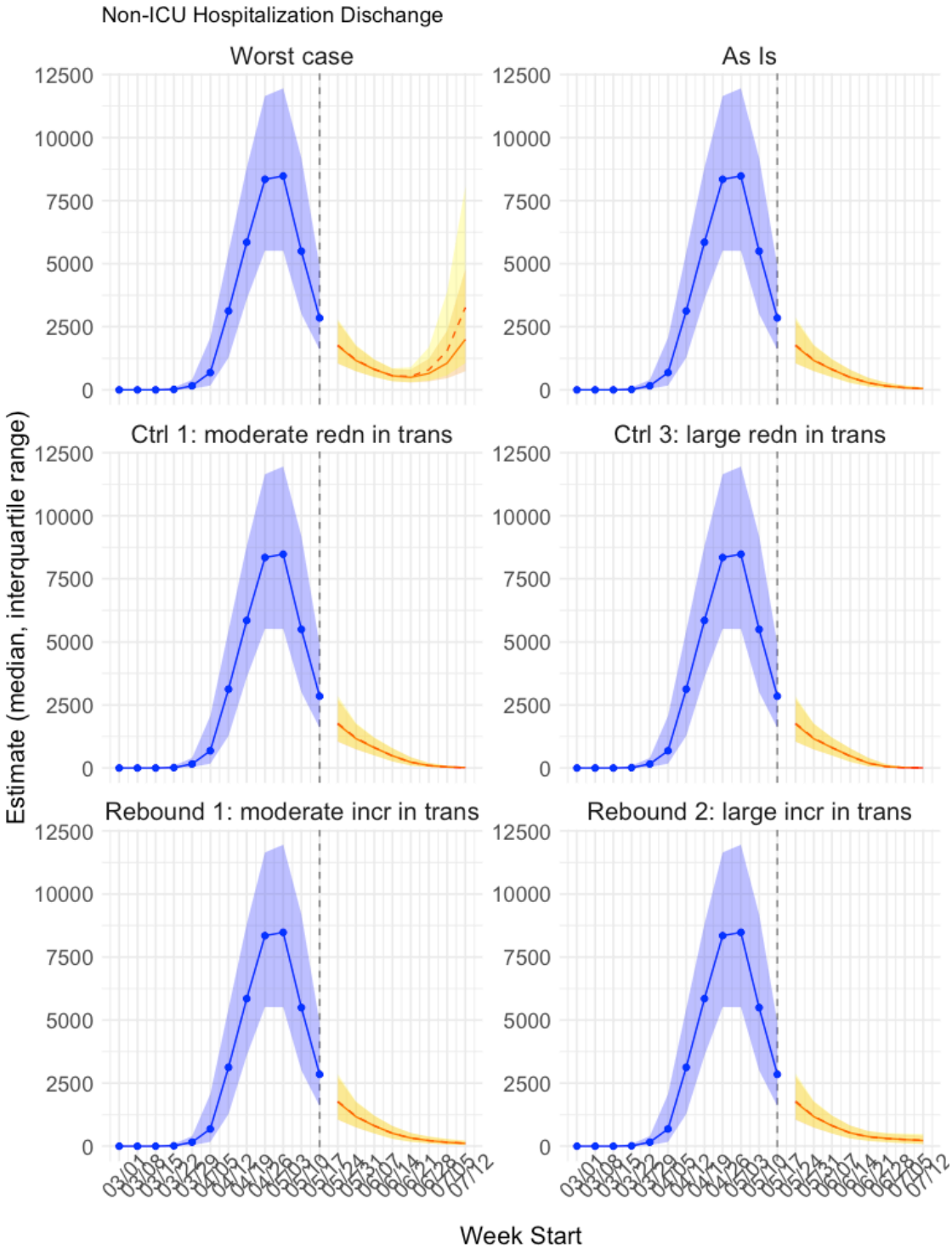

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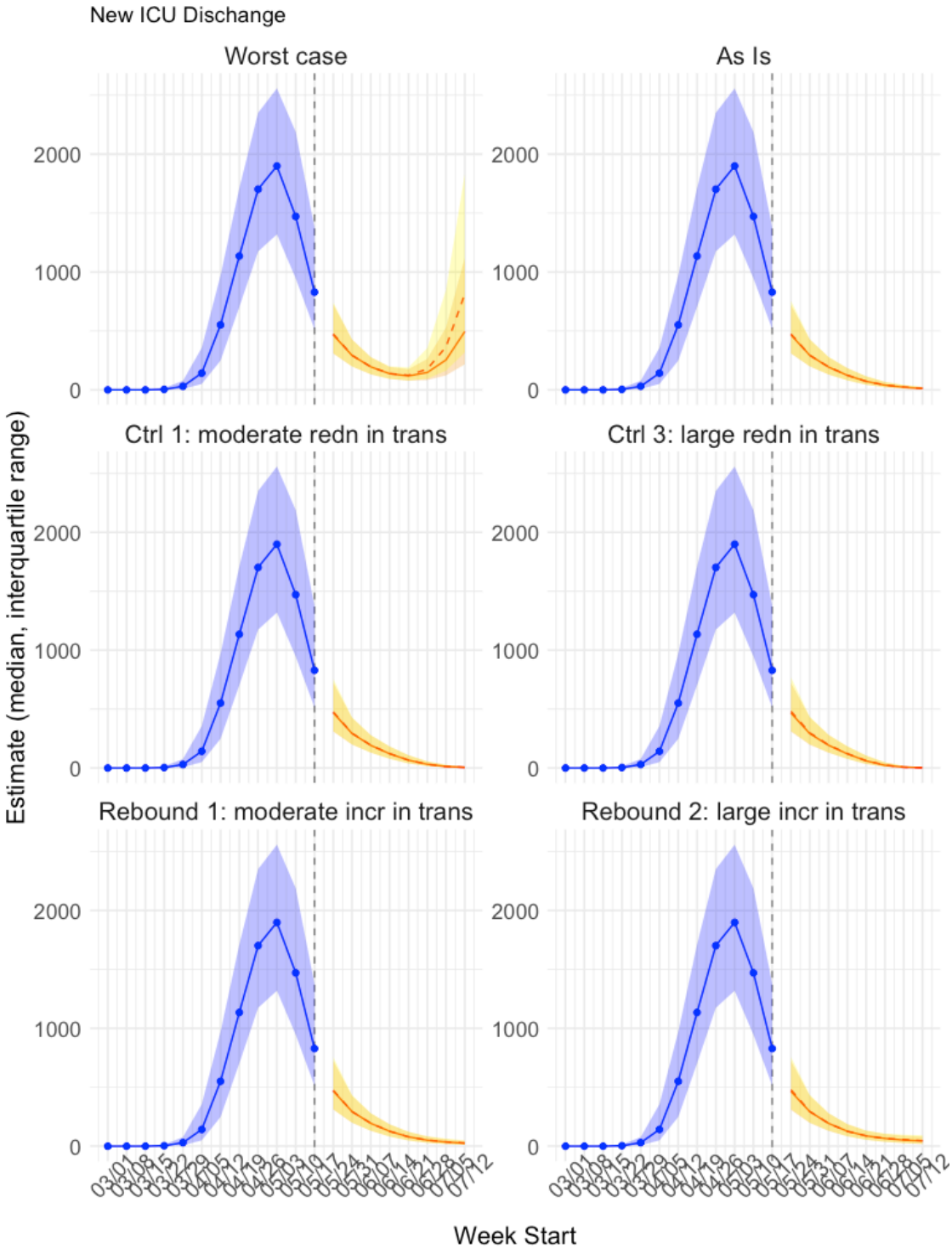

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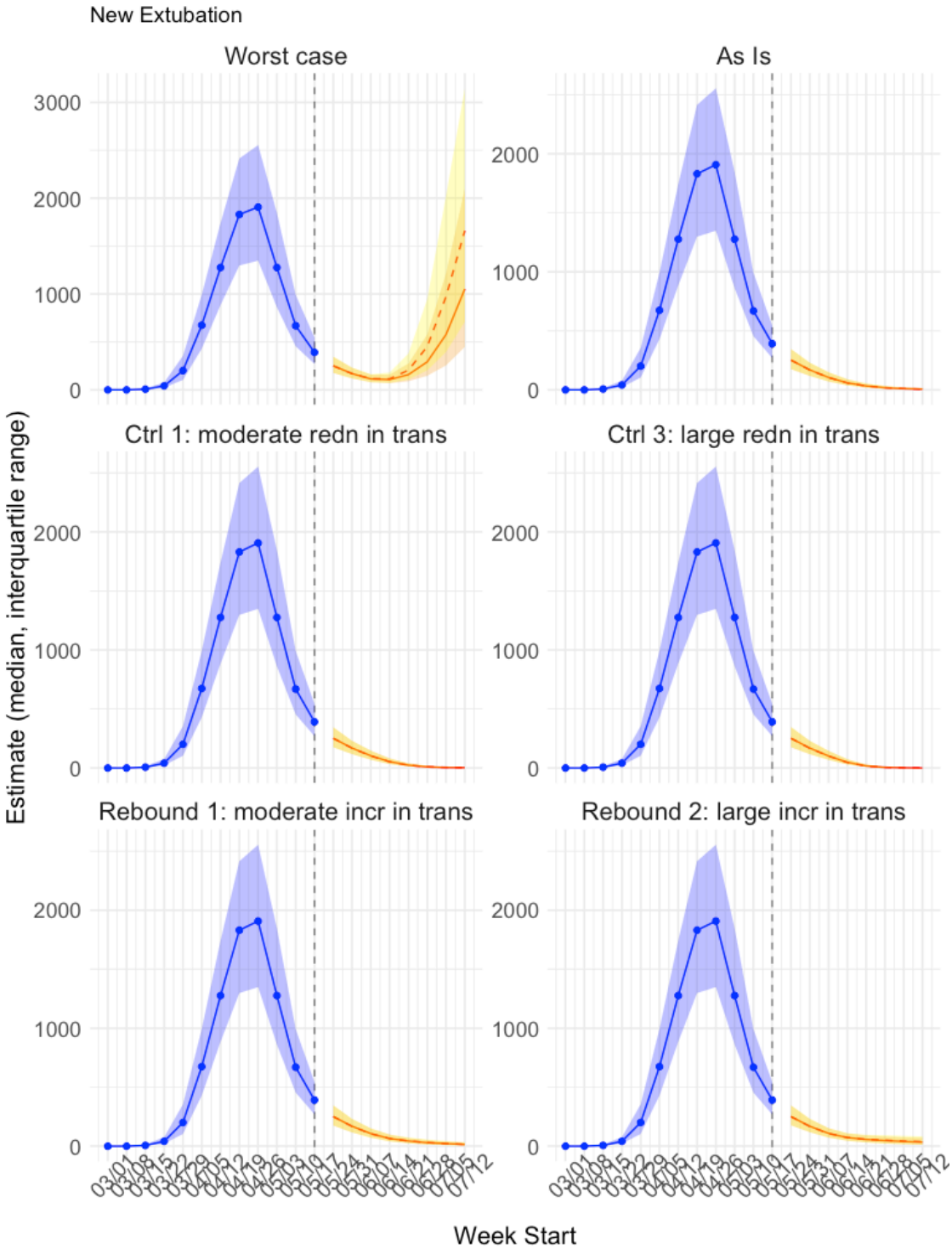

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