Eight-Week COVID19 Projections for New York City

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Note: This update 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.

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

Some observations based on confirmed COVID19 case data up to 4/3/20:

1) Based on age-specific data up to 4/3/20, transmission among most age groups (<65 years old) have been decreasing dramatically in the last couple weeks (see figures below). However, two elderly age groups (65-74 year-olds and 75+ year-olds) appeared to have continue increases in transmission.

2) The transmission rate and infectious period – two parameters indicative of speed of disease spread – have been estimated to reduce substantially since the week of 3/15/20, thanks to New Yorkers practicing social distancing and other infection and transmission control measures. At the end of last week (3/29/2020), the reproductive number – indicating on average how many people each infectious individual passes the covid19 to – has droped to around 1 (IQR: 0. 5 – 1.7). This indicates social distancing has been very effective in reducing transmission.

3) However, with current level of transmission (the As Is, or Status quo scenario below), the estimated health outcomes (ICU admissions etc.) and healthcare demands (ICU beds etc.) would continue to increase gradually, leveling off and remain at high levels (See figures below).

4) We are at a crital period to further reduce transmission. Continued and more stringent transmission controls such as those shown in the Ctrl 1-5 scenarios below may be needed in the coming weeks to further reduce spread and avoid overwhelming the healthcare systems.

5) Preliminary assessment indicated social distancing implemented since early-mid March has substantially reduced transmission. Comparing to the no-control scenario (i.e. lifting social distancing and other control measures), maintaining current level of social distancing would avert approximately 17,000 – 34,000 non-ICU hospitalizations, 13,000 – 17,000 ICU admissions, and 14,000 – 17,000 deaths in the next 8 weeks.

Acknowledgement: We thank the NYC Department of Health and Mental Hygiene (DOHMH) for sharing of data and allowing this public posting.

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 in behavior changes over time.
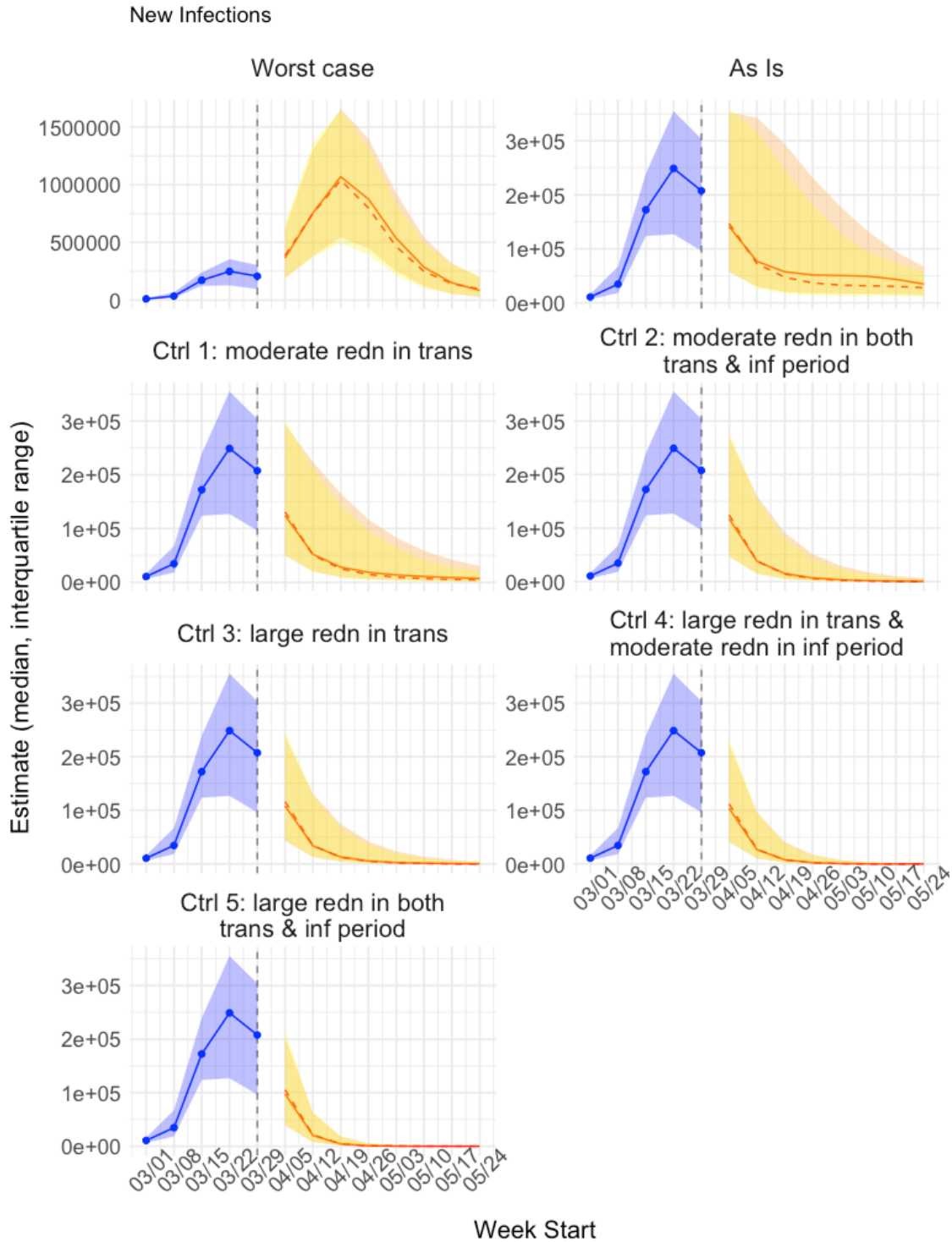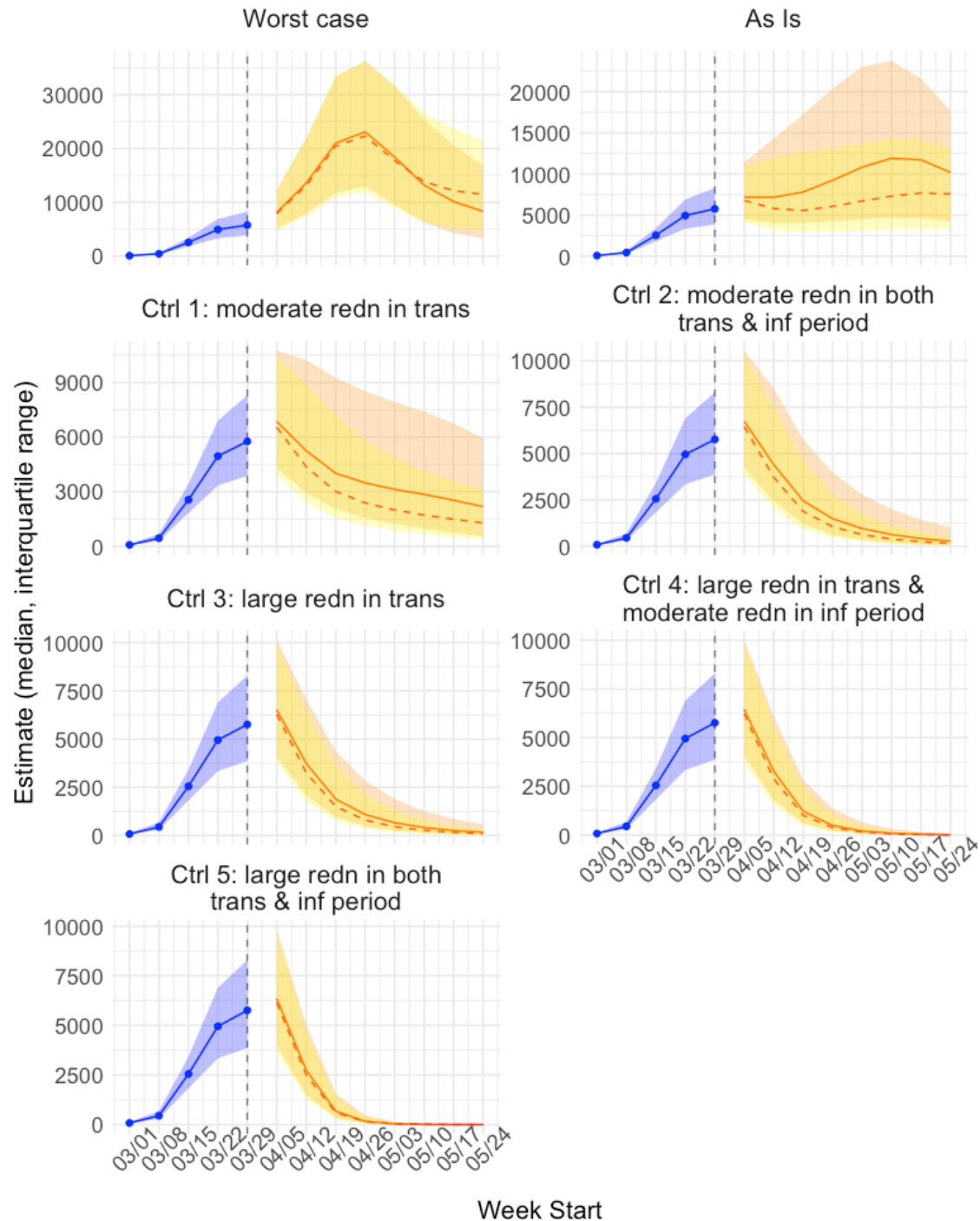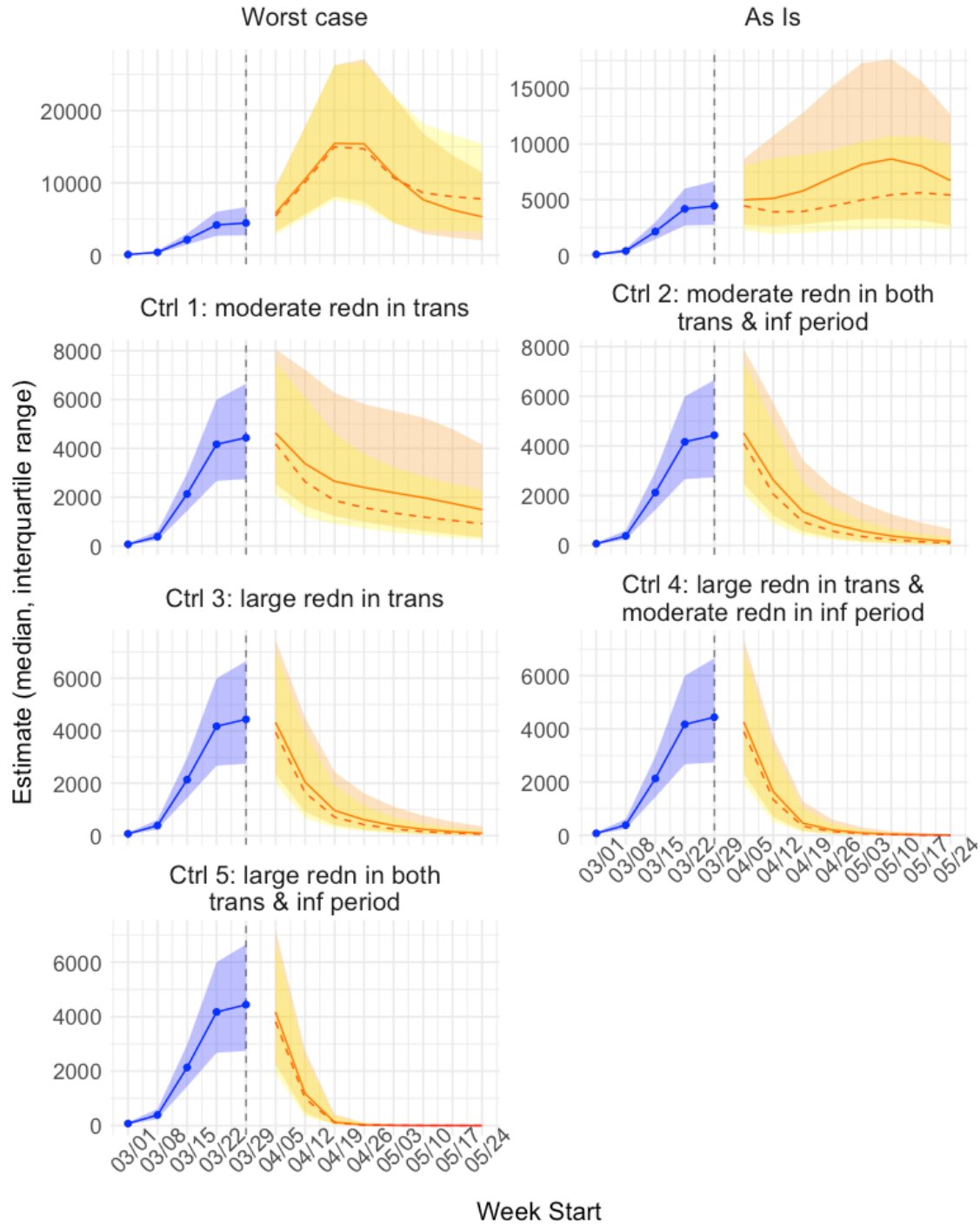
New Infections

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
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New Cases
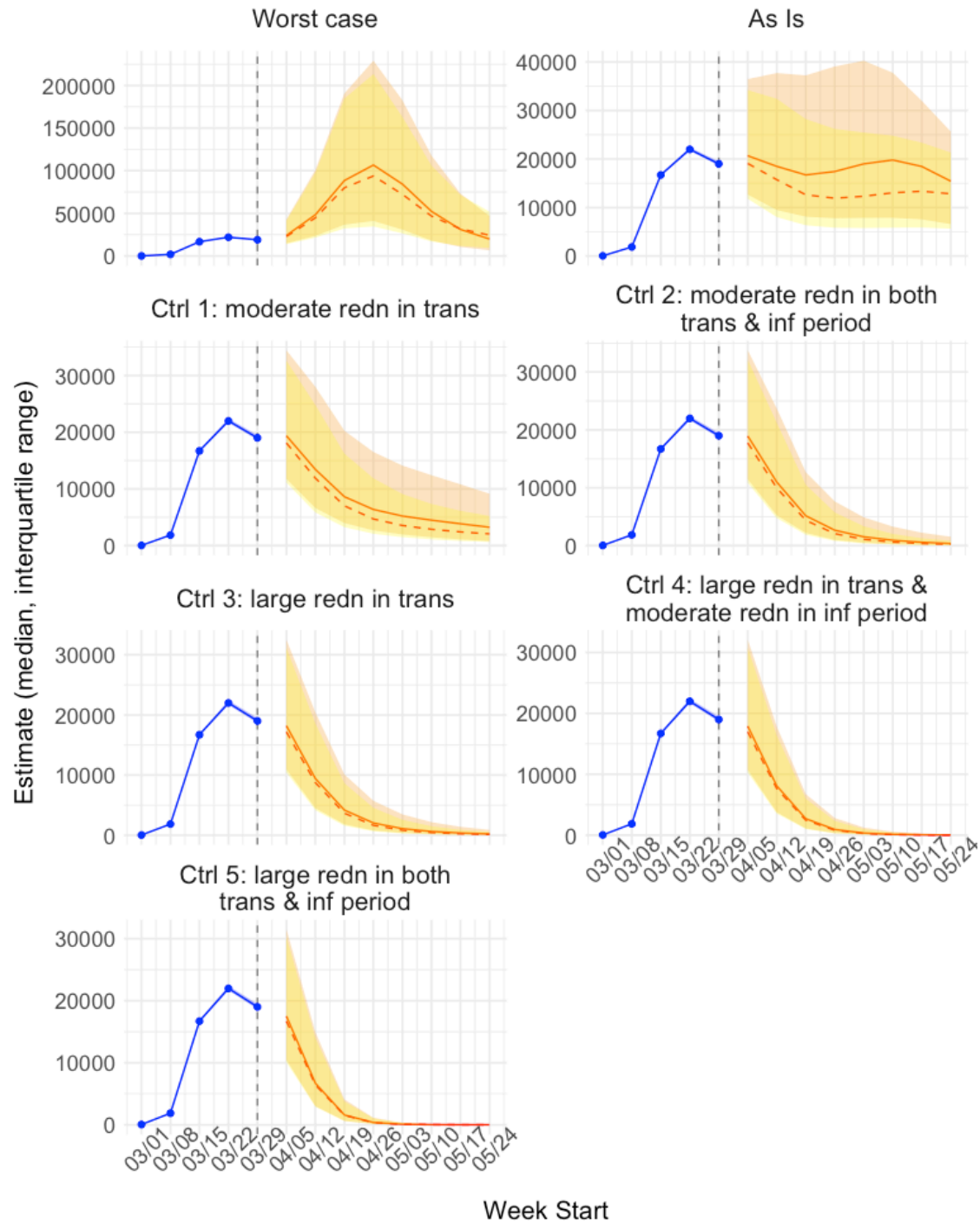
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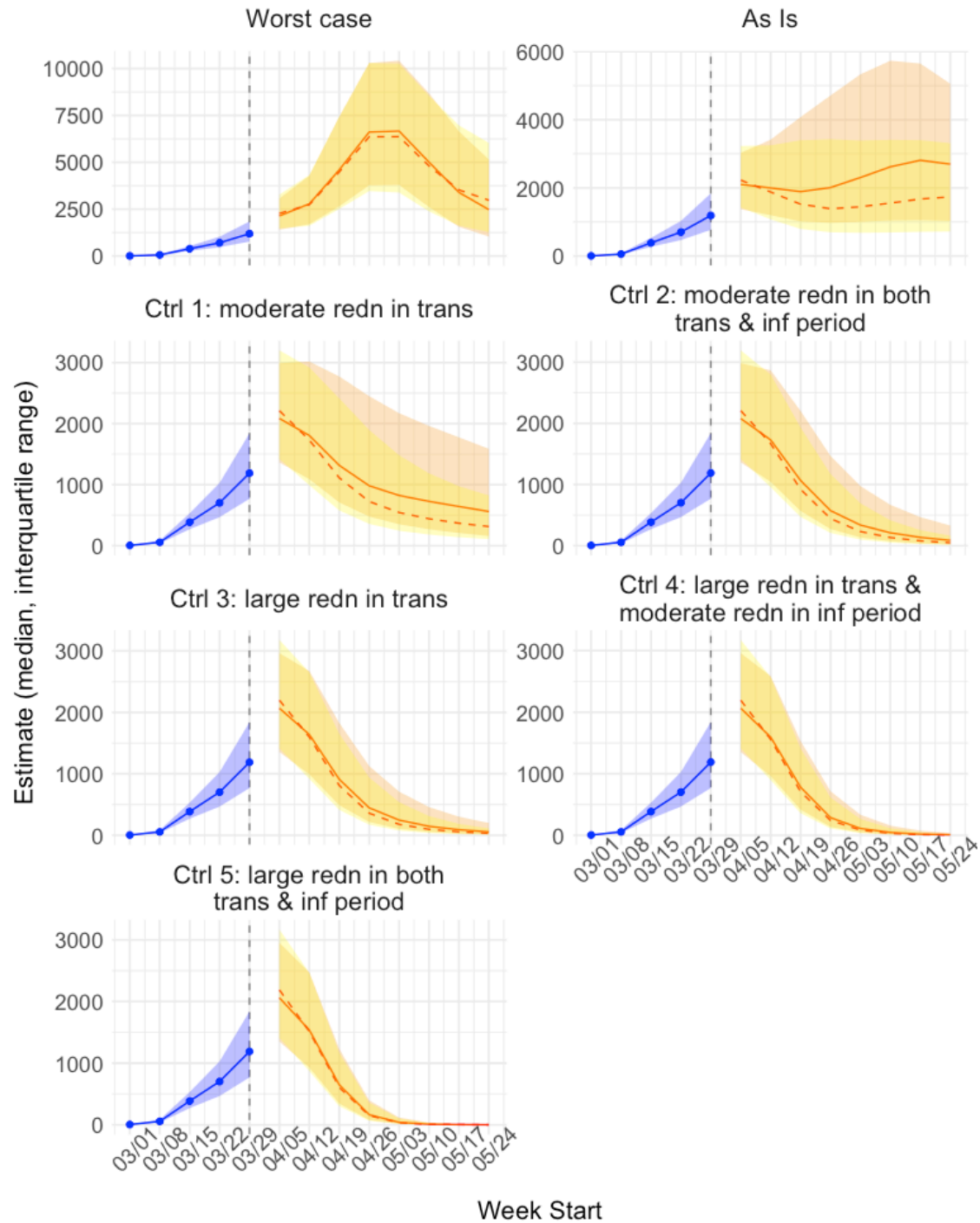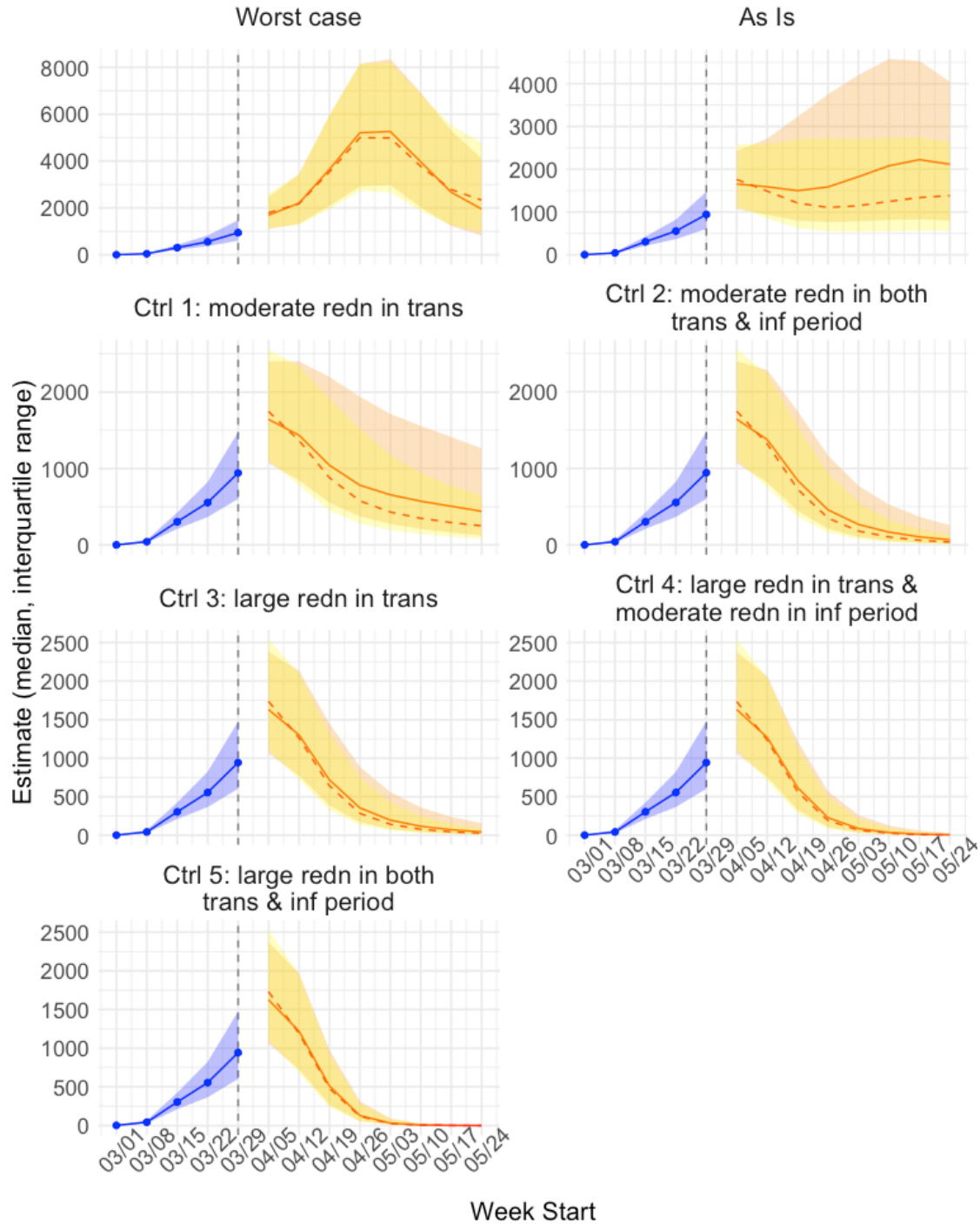
New Total Hospitalizations

Projected number for the next 8 weeks under different control scenarios.
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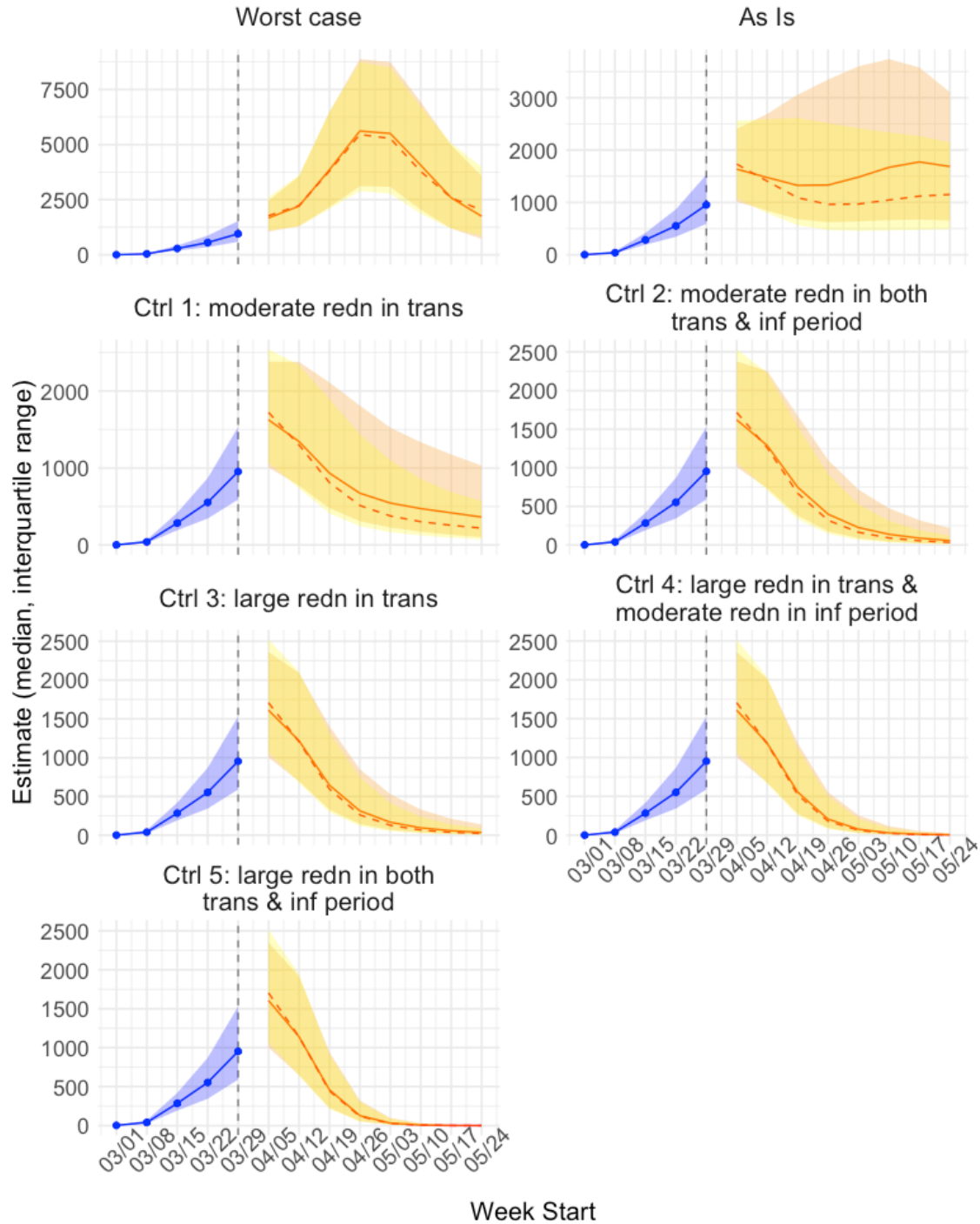
New Non-ICU Hospitalizations

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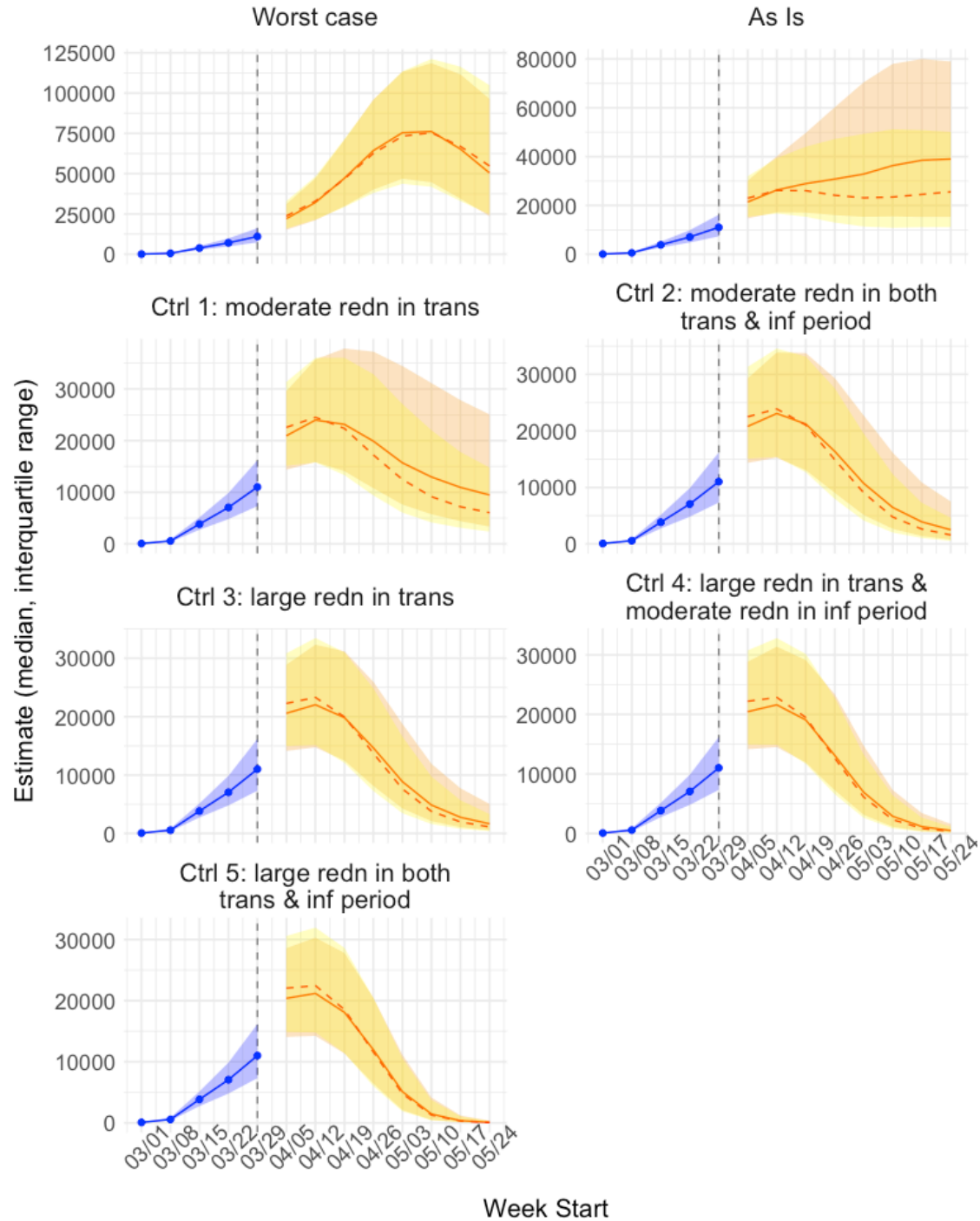
New ICU admissions

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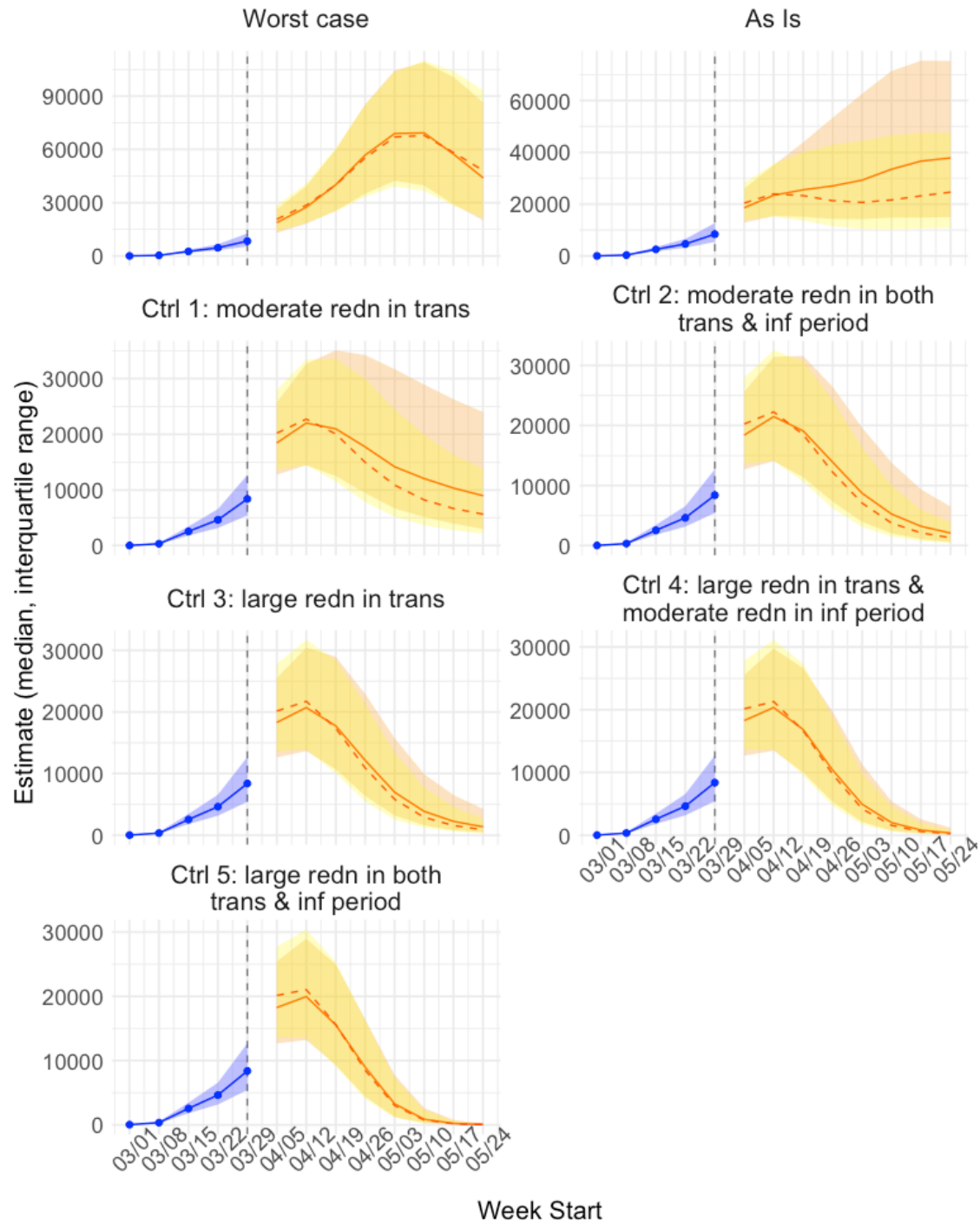
New Intubations

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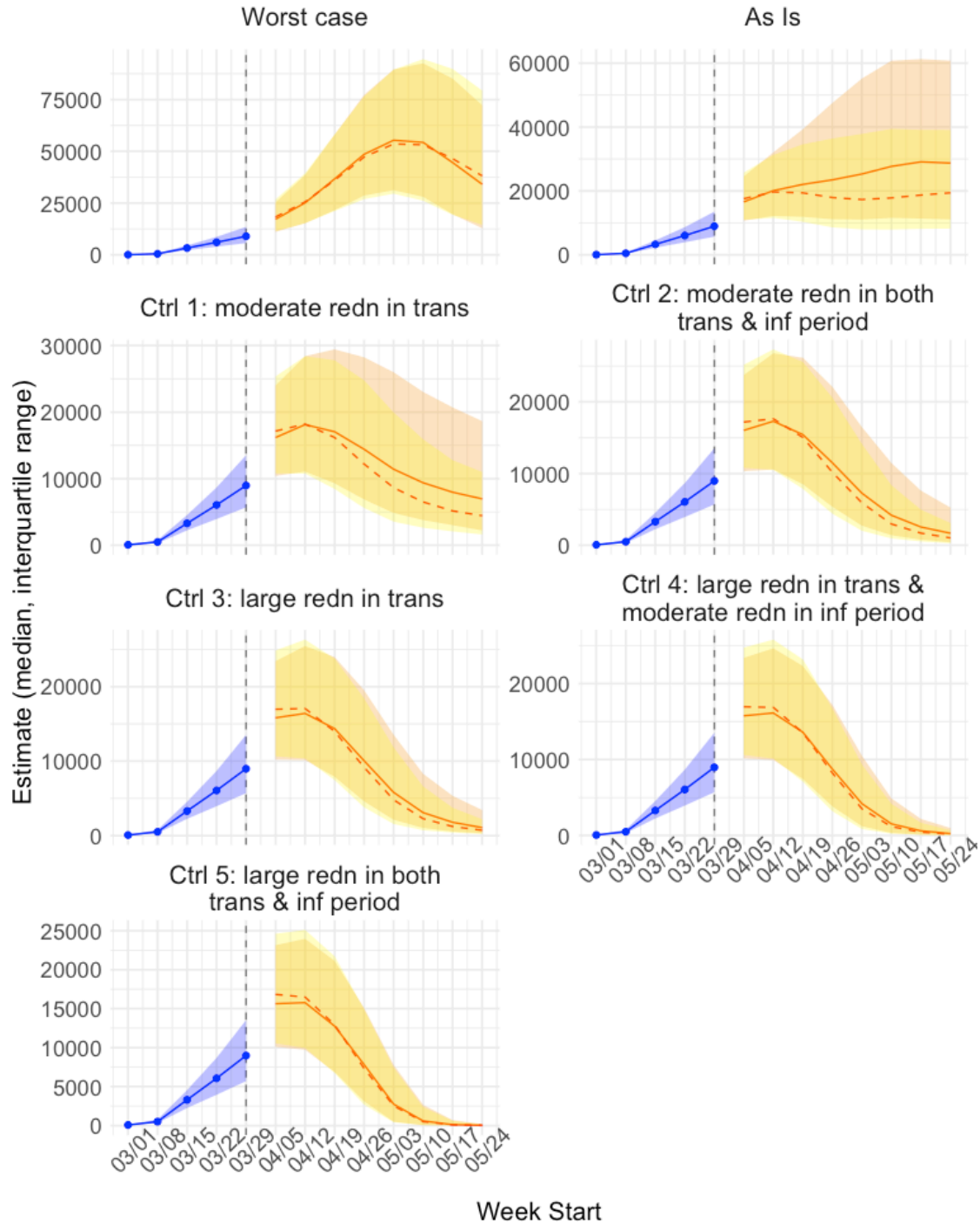
New Deaths

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Total Hospital Bed Needs (prevalence, max)

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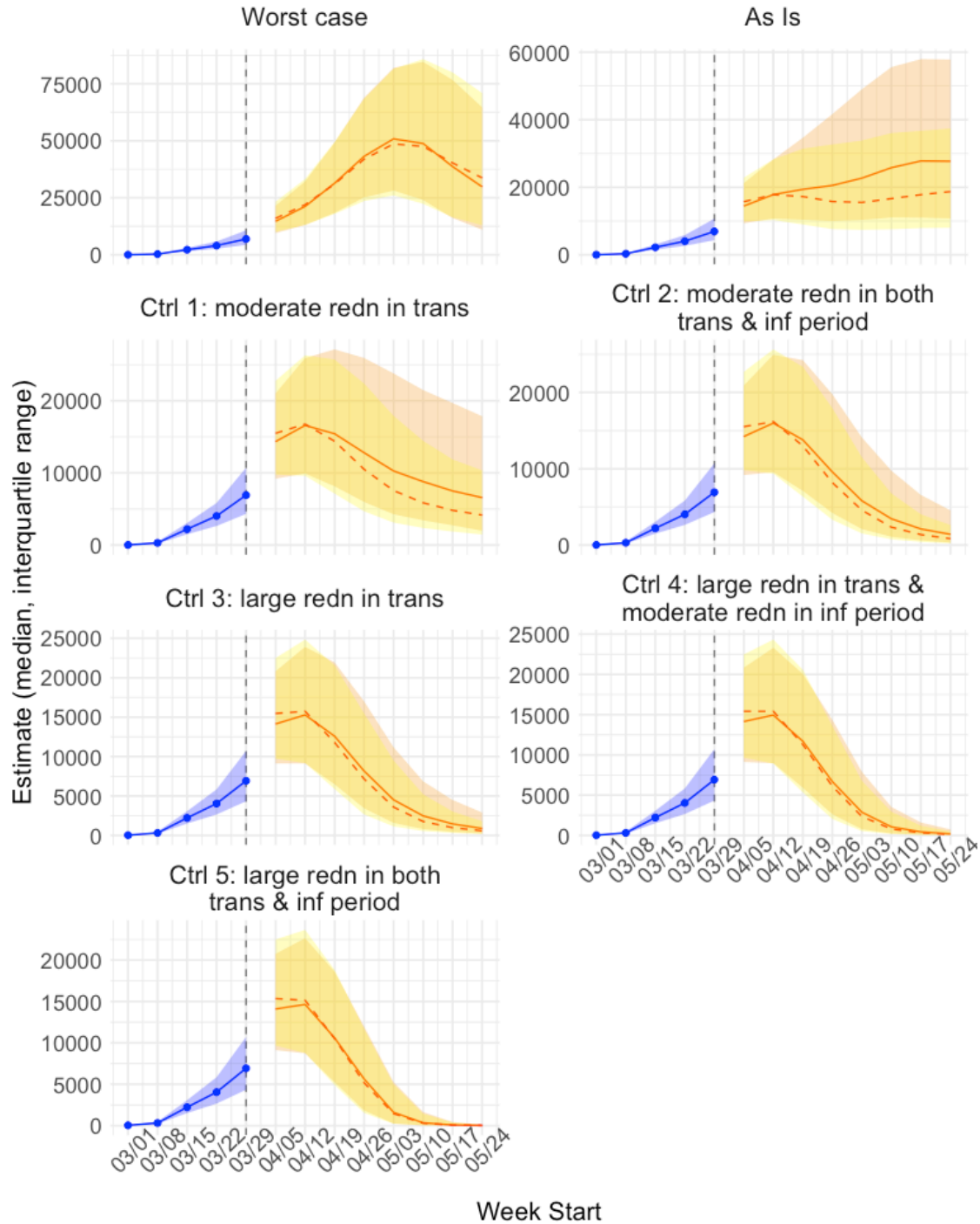## Total Hospital Bed Needs (prevalence, mean)

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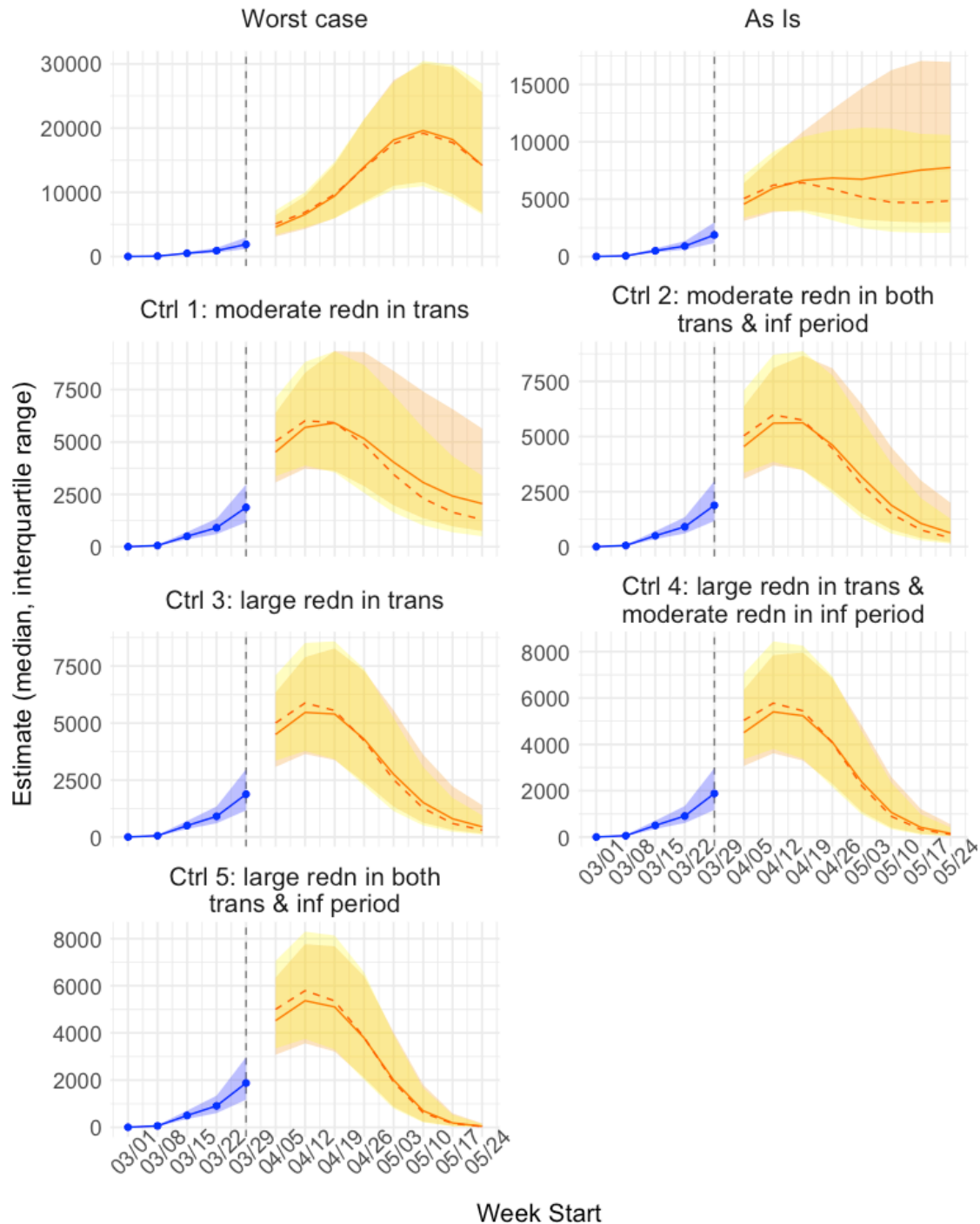Non-ICU Hospital Bed Needs (prevalence, max)

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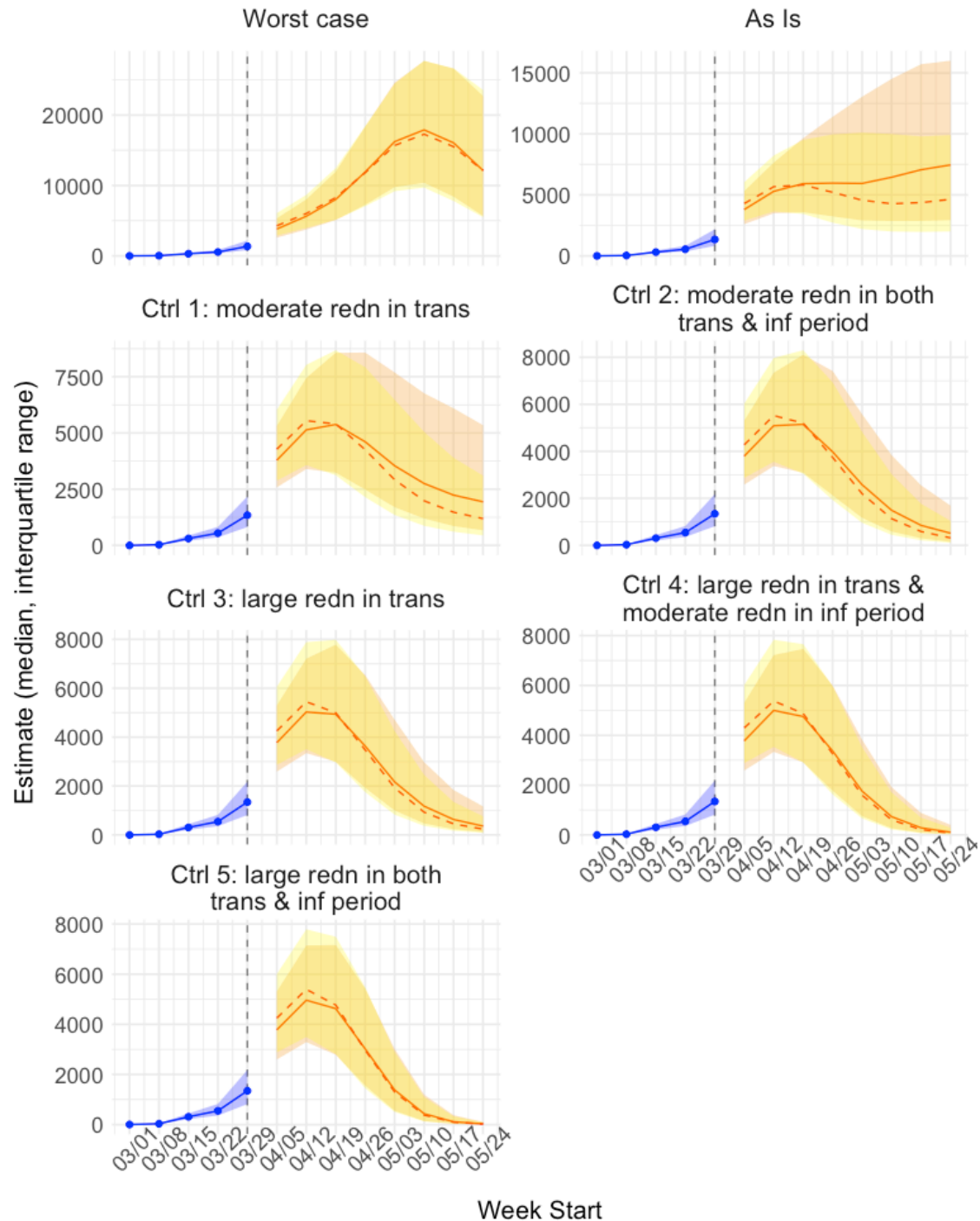Non-ICU Hospital Bed Needs (prevalence, mean)

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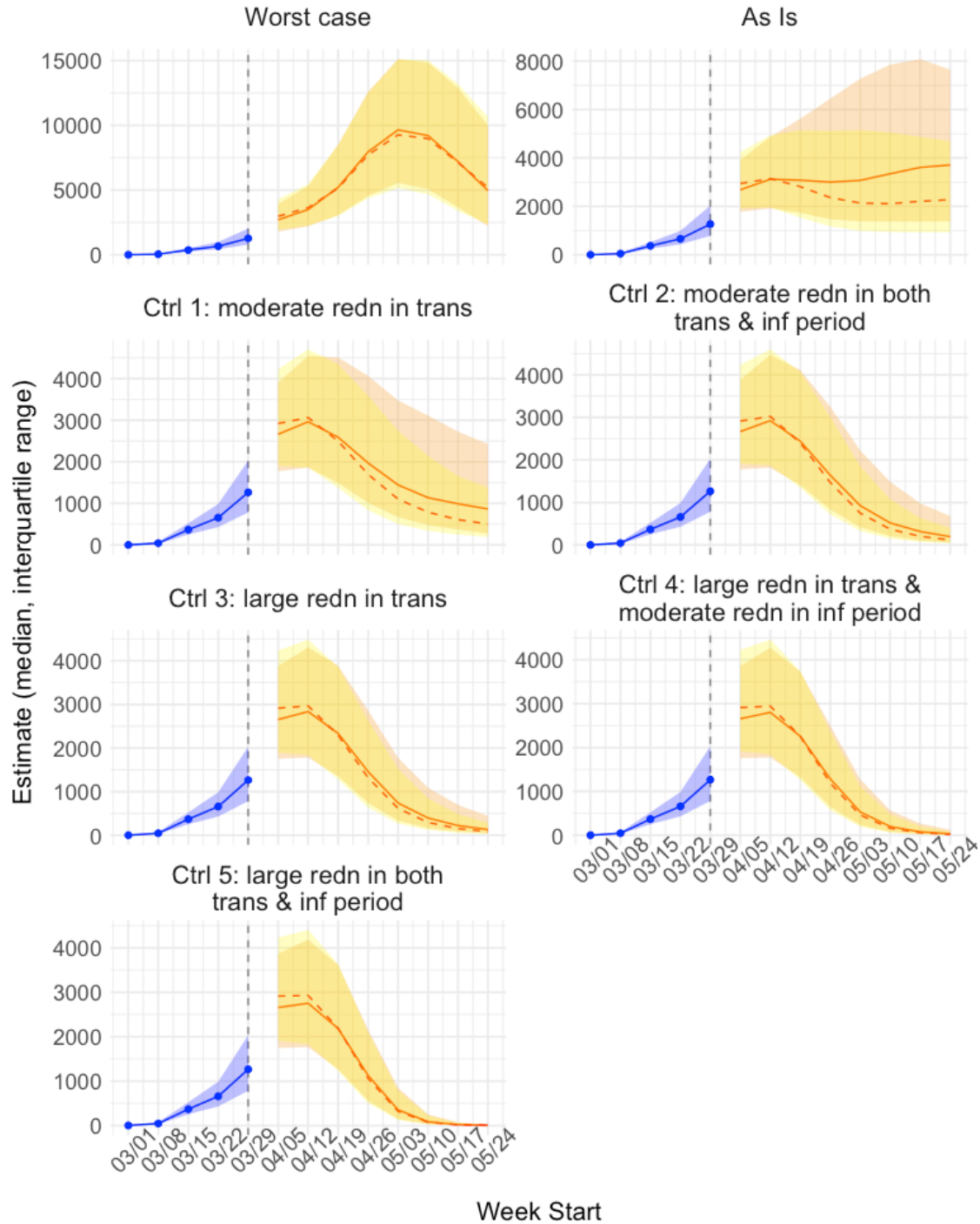ICU Bed Needs (prevalence, max)

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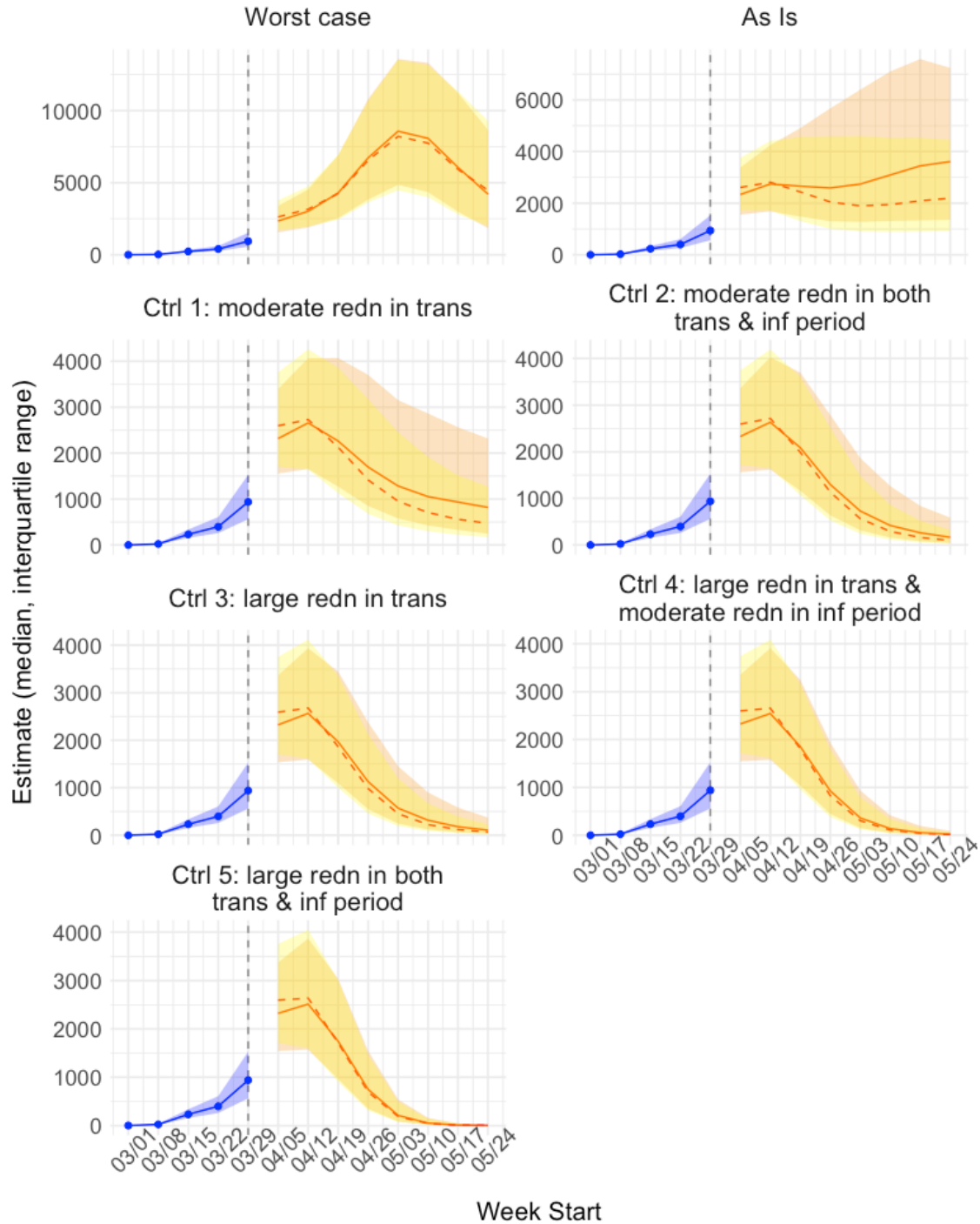
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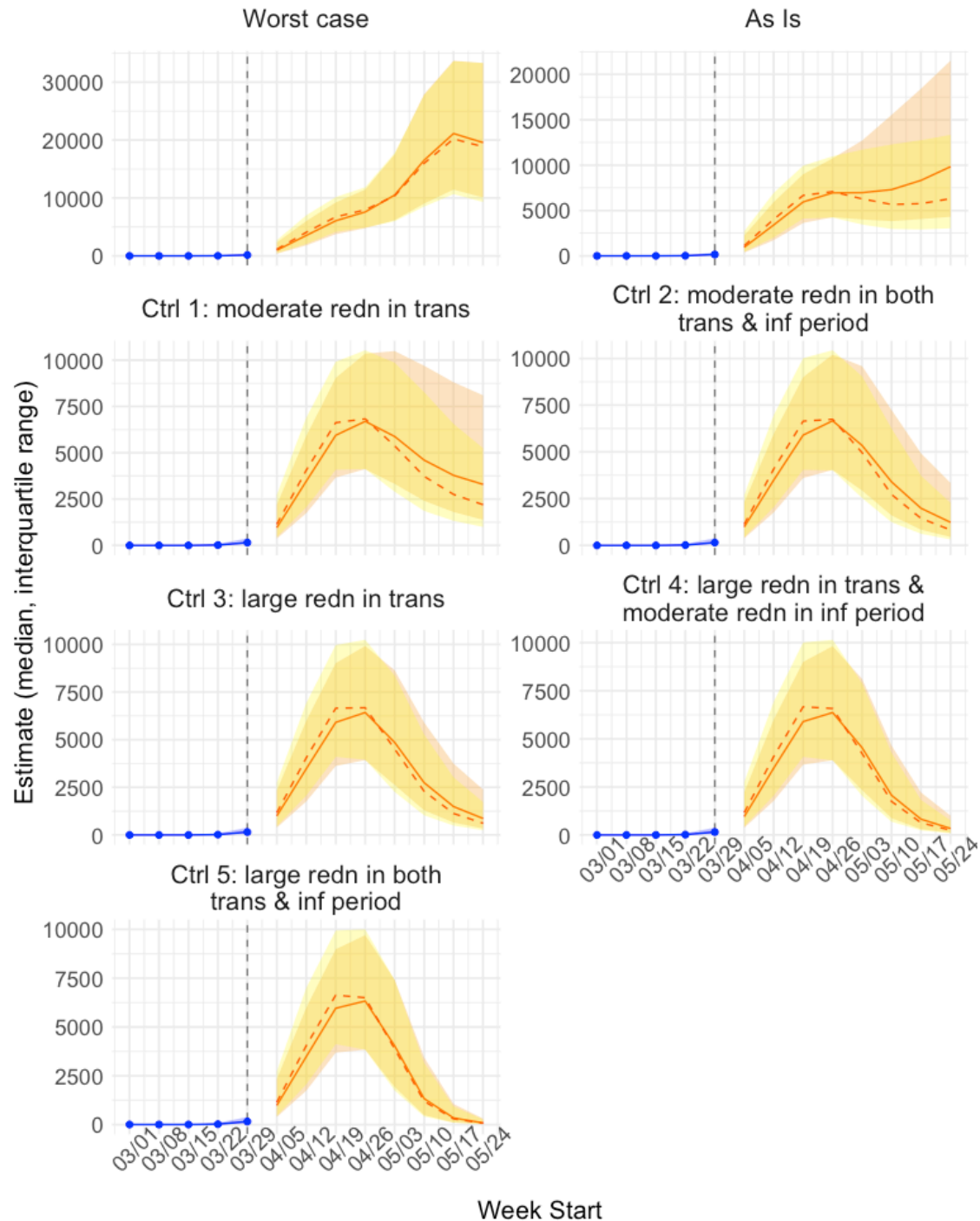
Ventilator Needs (prevalence, max)

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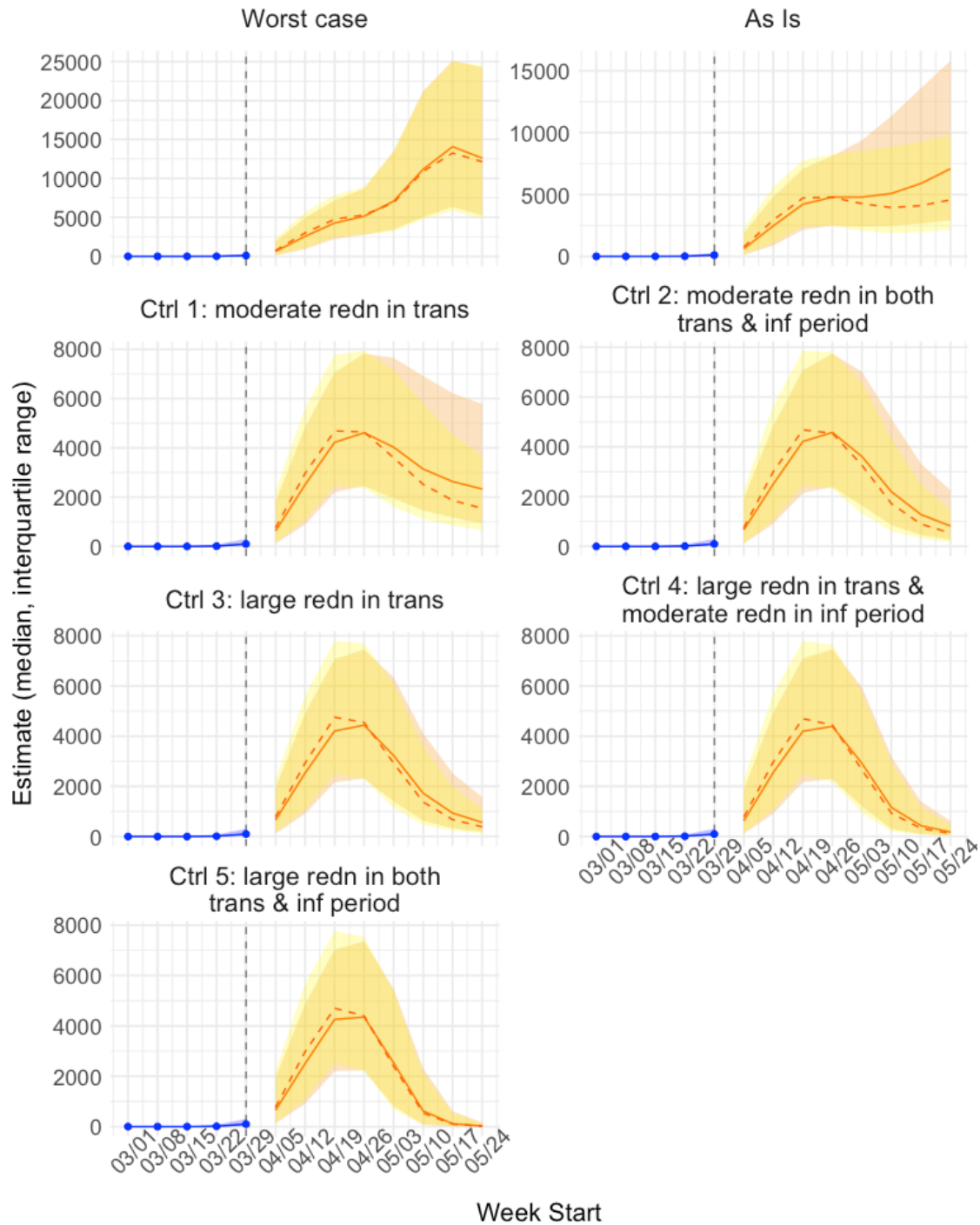
Ventilator Needs (prevalence, mean)

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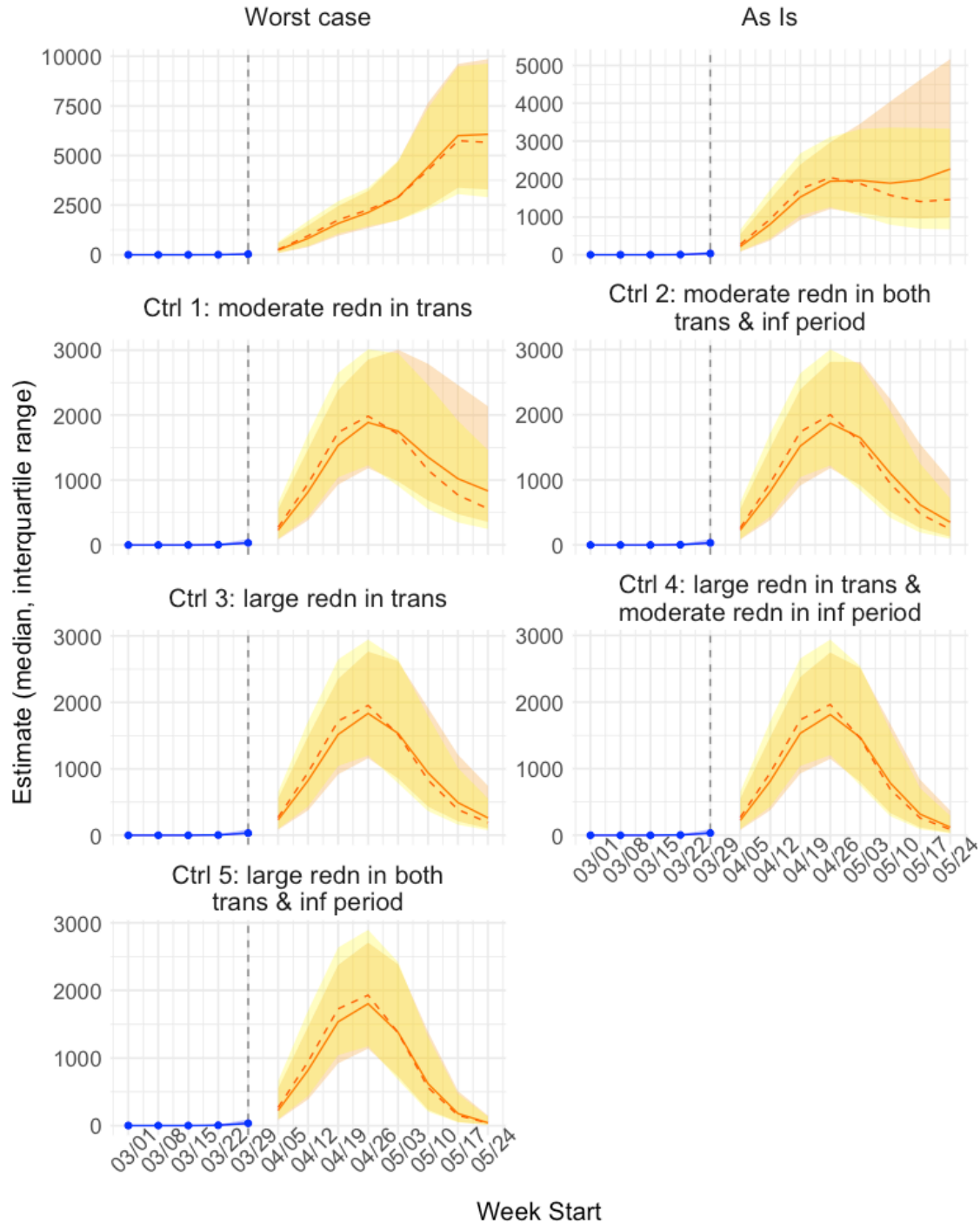
Total Hospitalization Dischange

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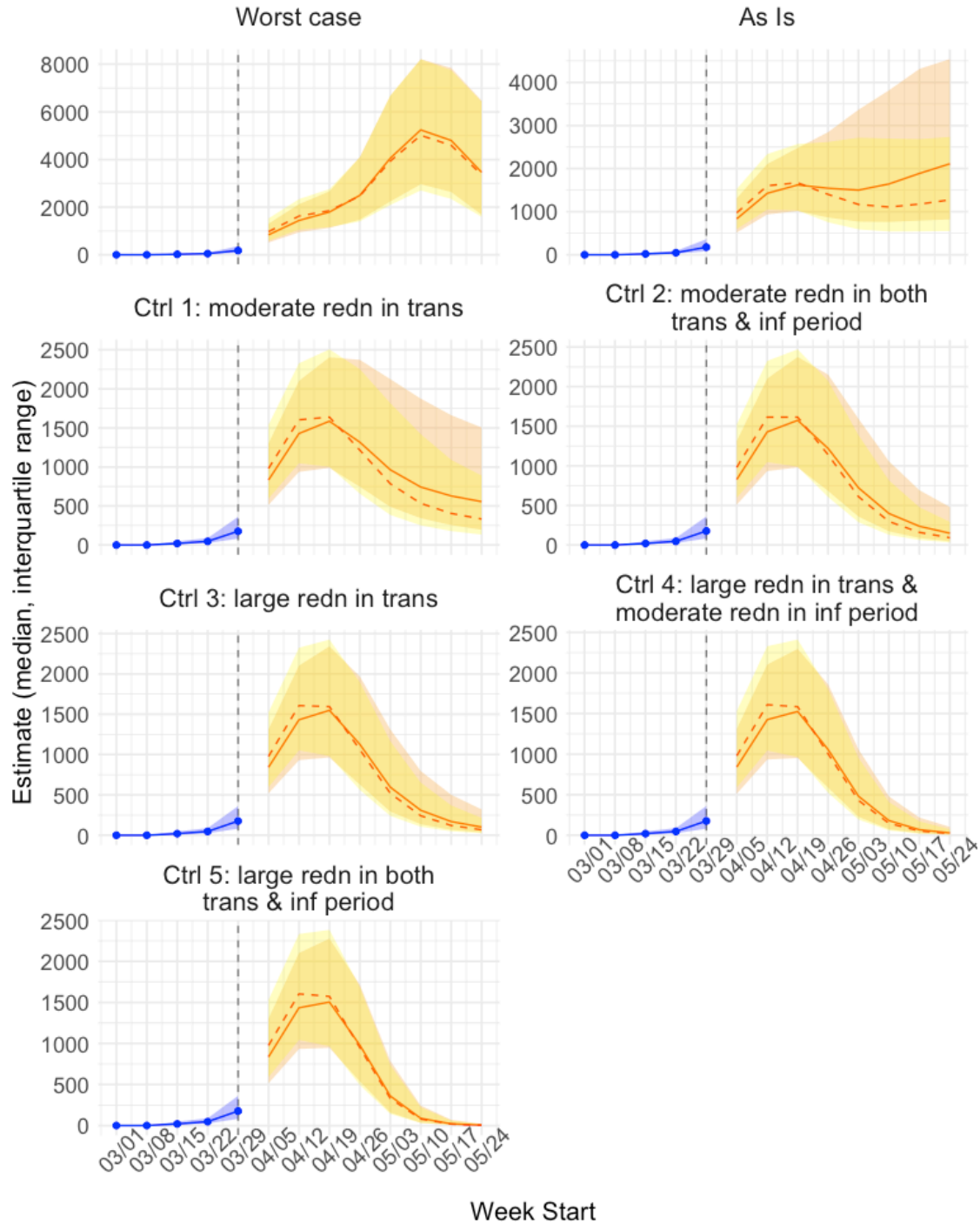
Non-ICU Hospitalization Dischange

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New ICU Dischange

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New Extubation

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