Global predictions of short to medium-term COVID-19 transmission trends - a retrospective assessment

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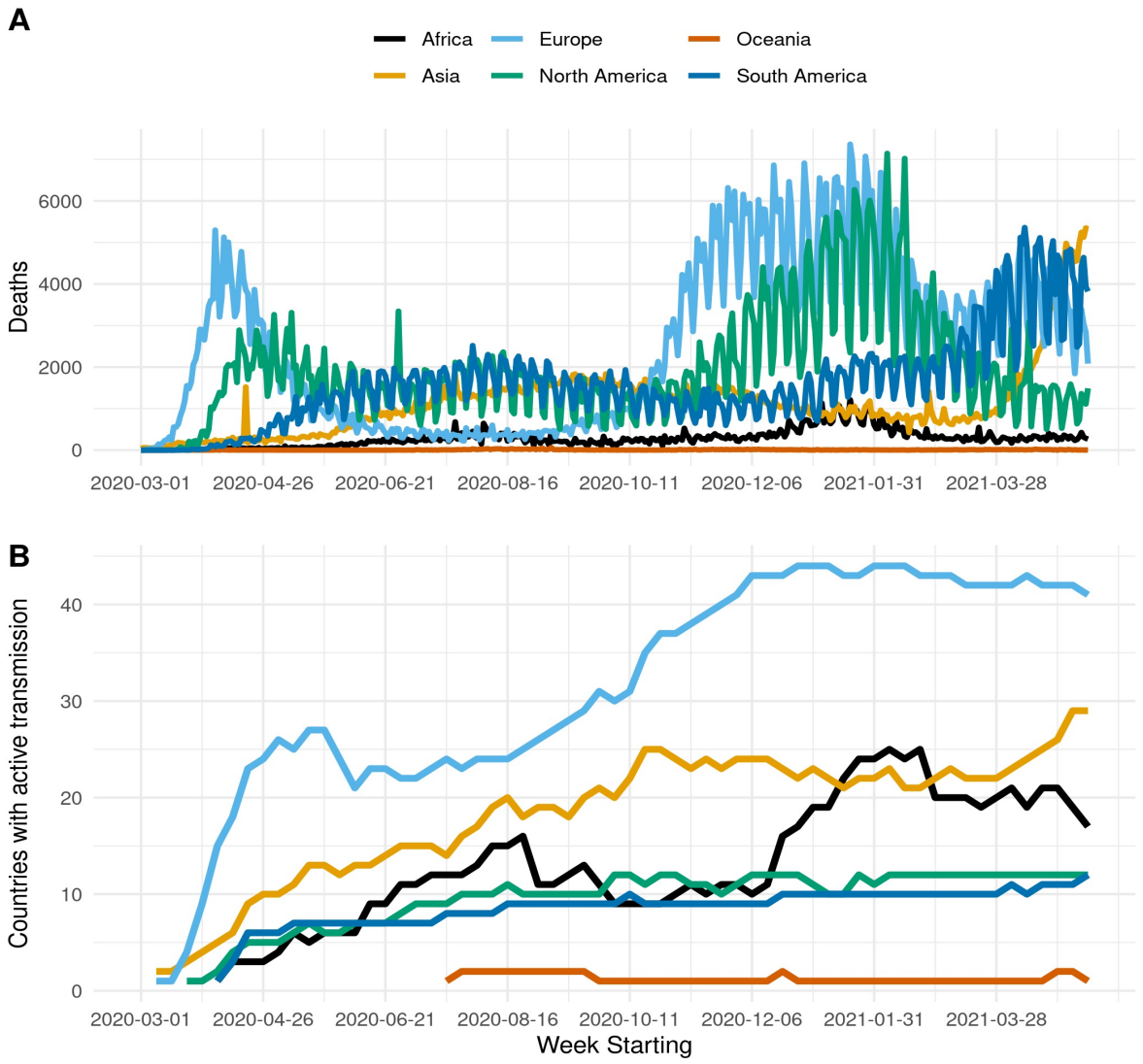
Background



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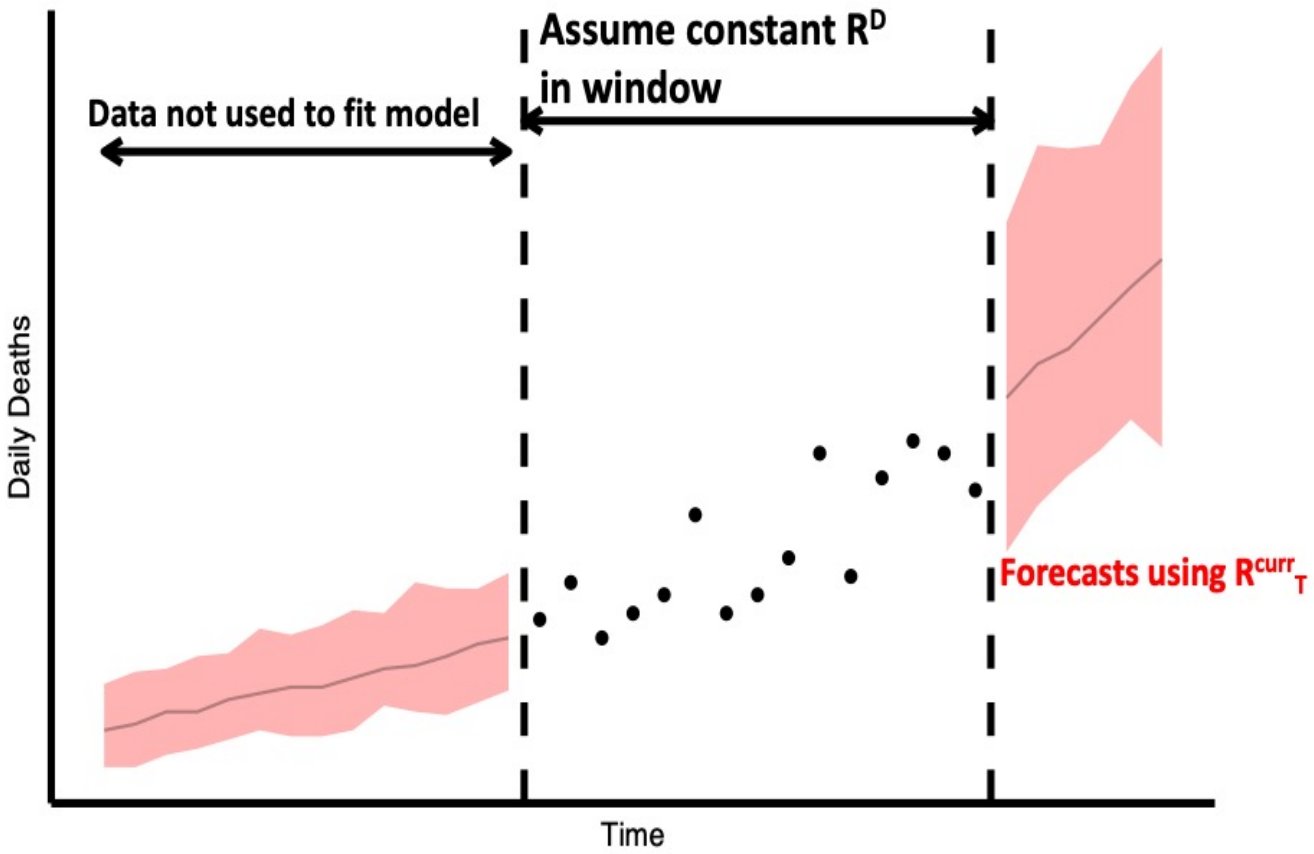
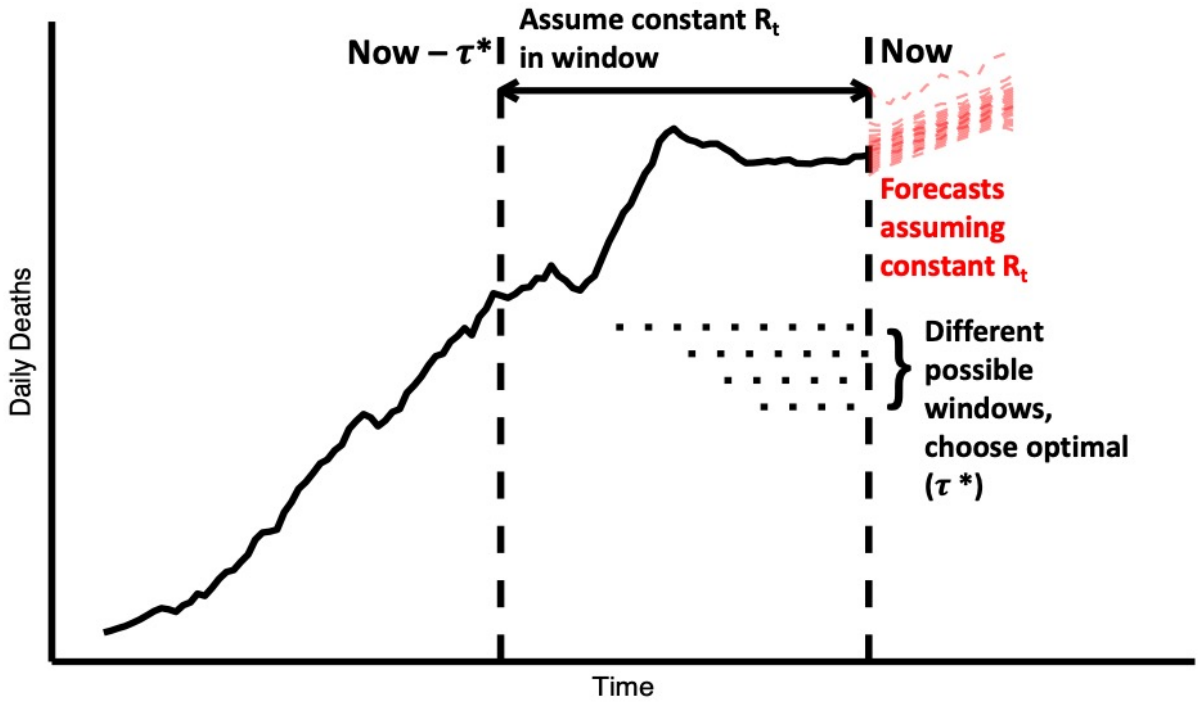
Methods – Model 1



Methods – Model 2



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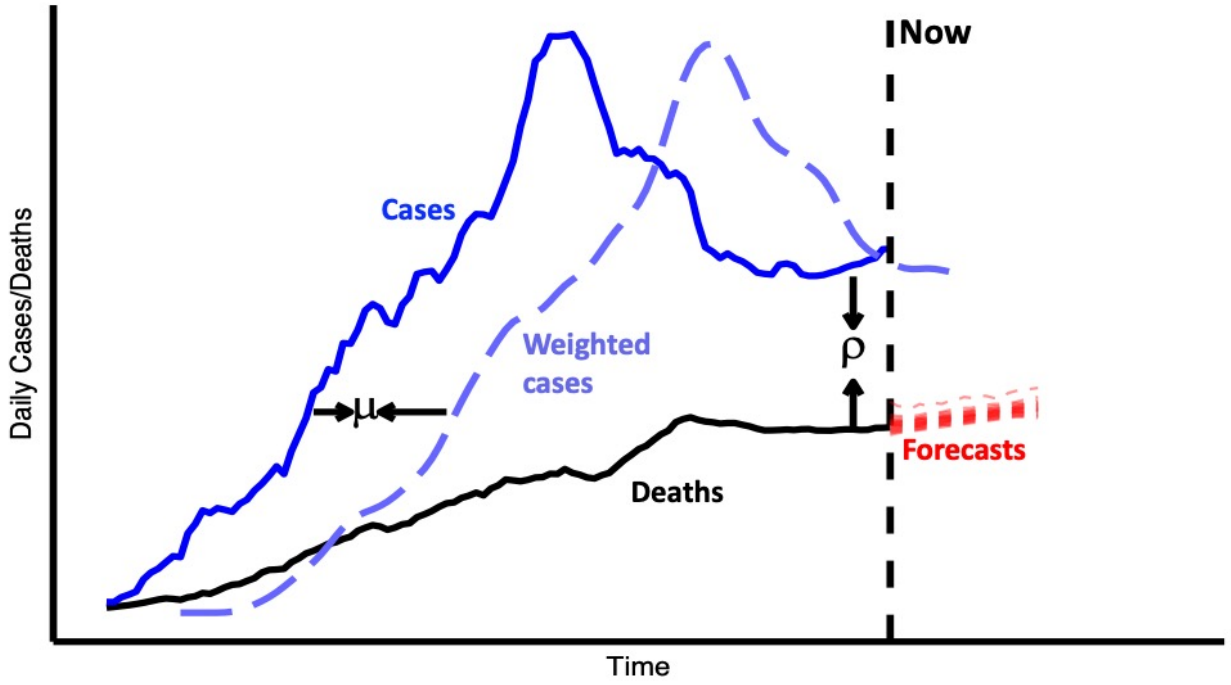
Methods: Model 3



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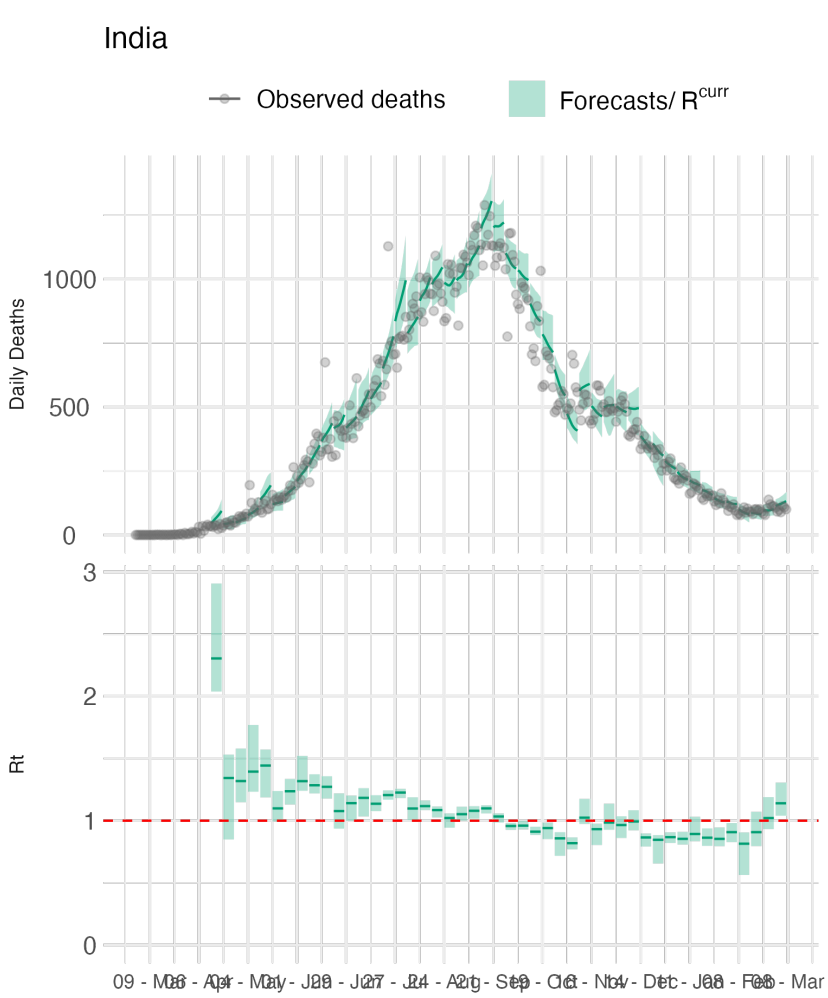
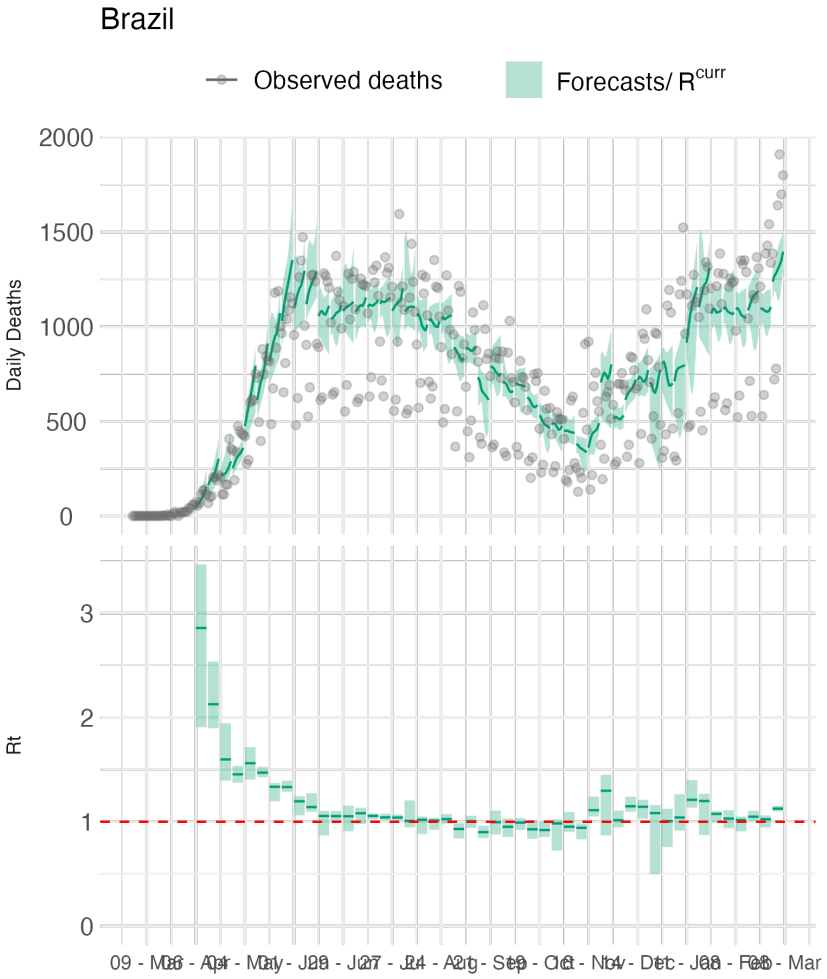
Results





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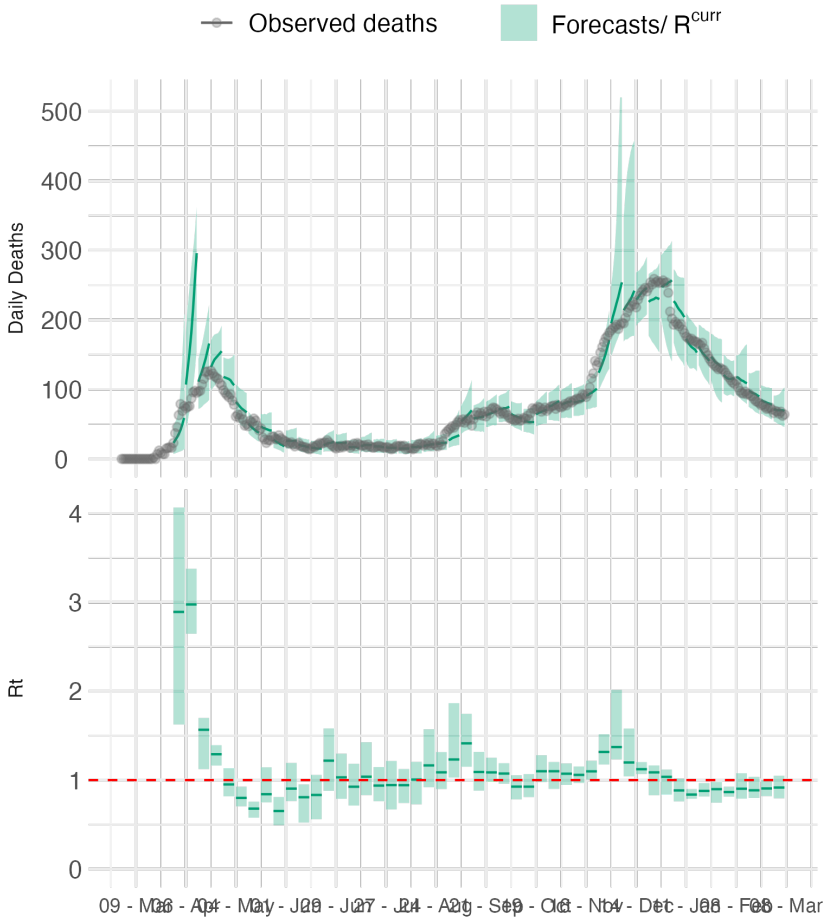
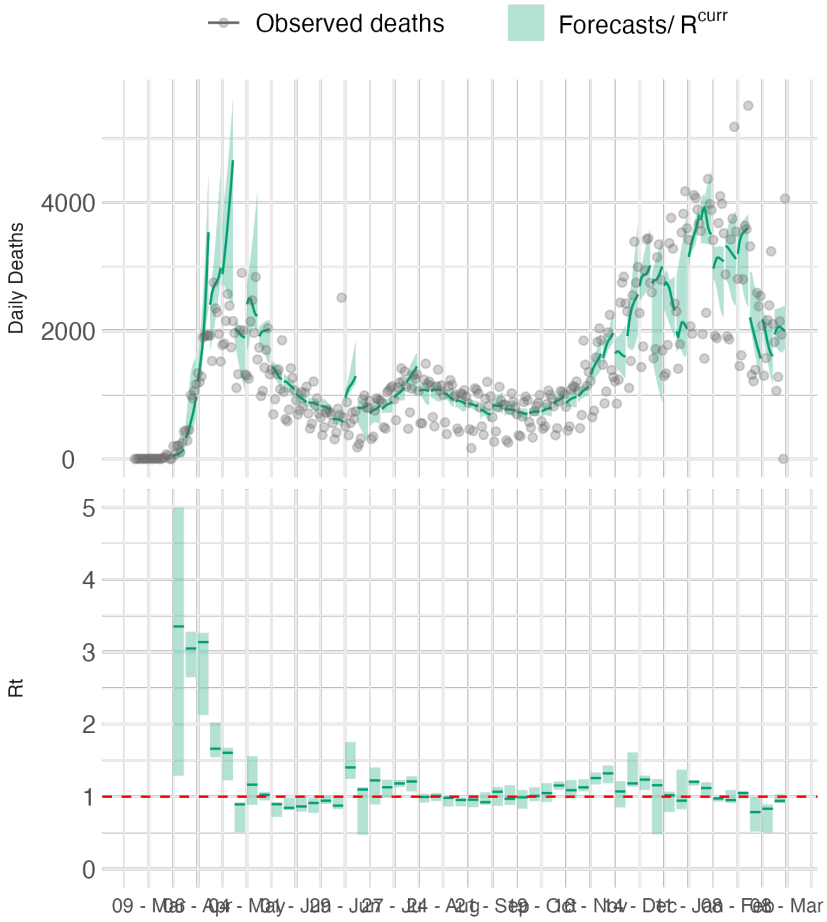
Turkey



USA



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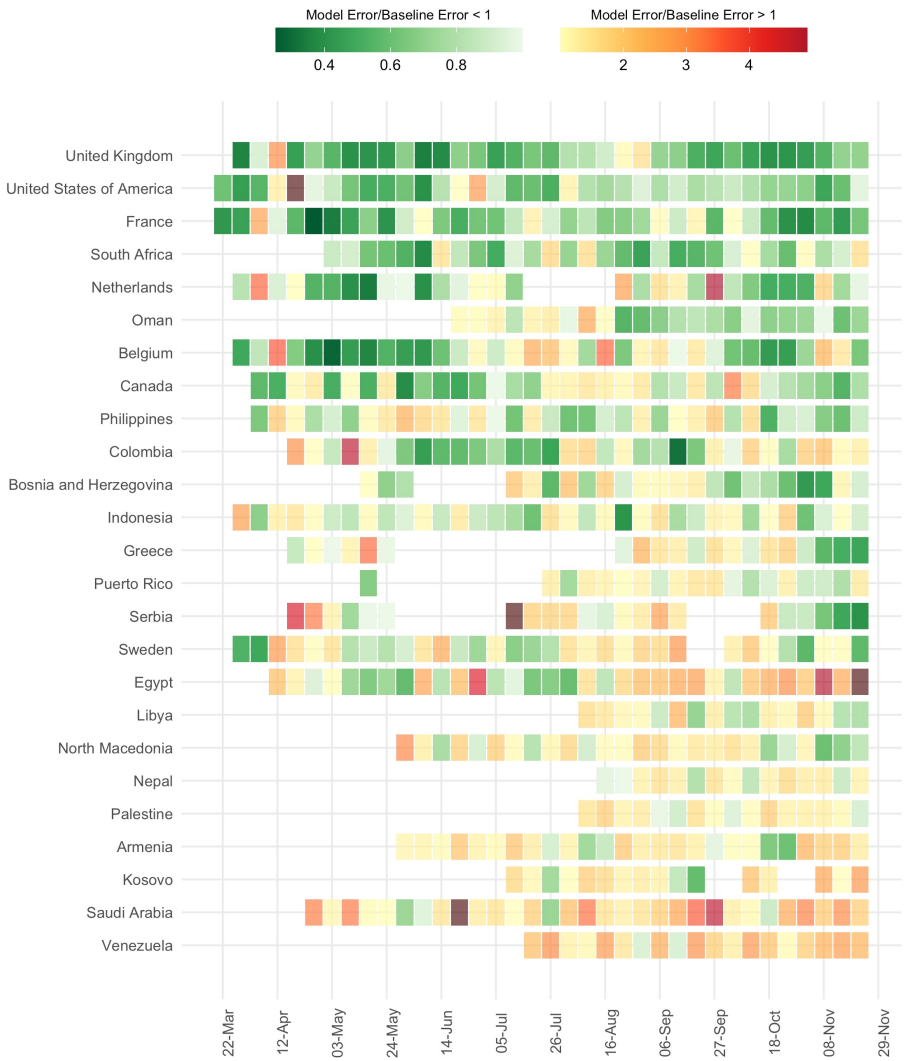
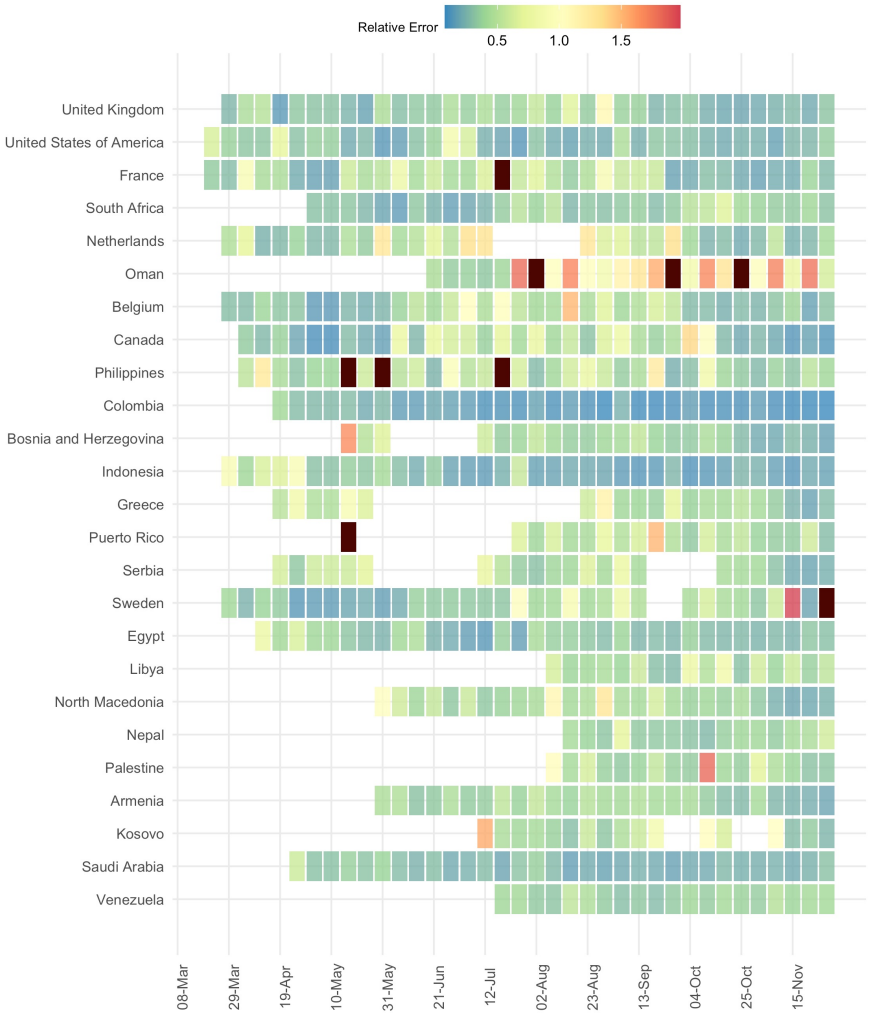
Retrospective Assessment

Compare ensemble and null model error



Model relative error



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Phase	Ensemble model error >Null model error	Ensemble model error <Null model error
Declining	16.5% (32)	83.5% (162)
Growing	30.5% (107)	69.5% (244)
Stable/growing slowly	55.4% (640)	44.6% (516)
Unclear	68.4% (322)	31.6% (149)

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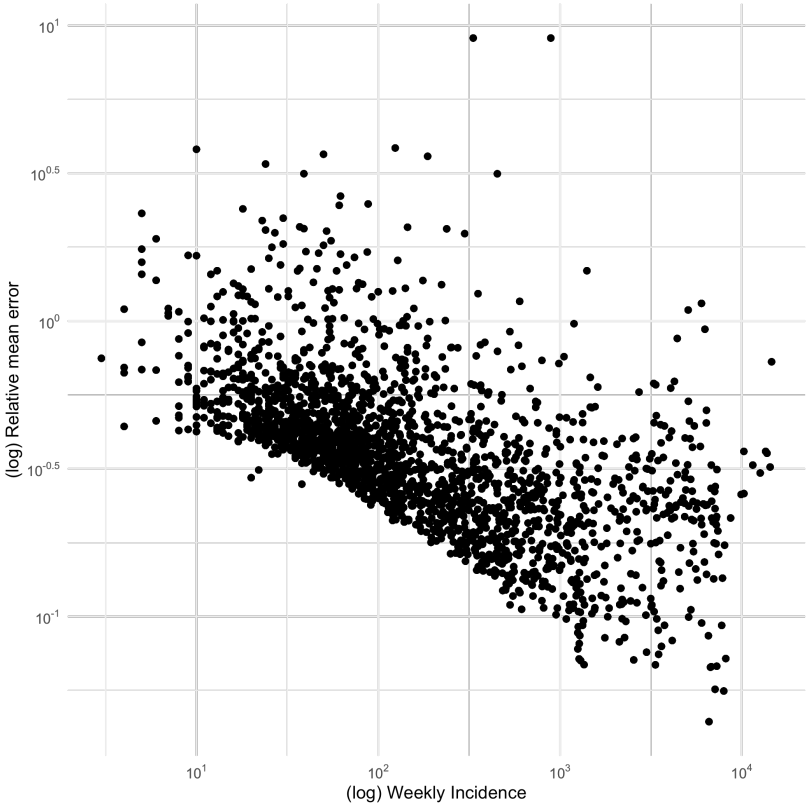
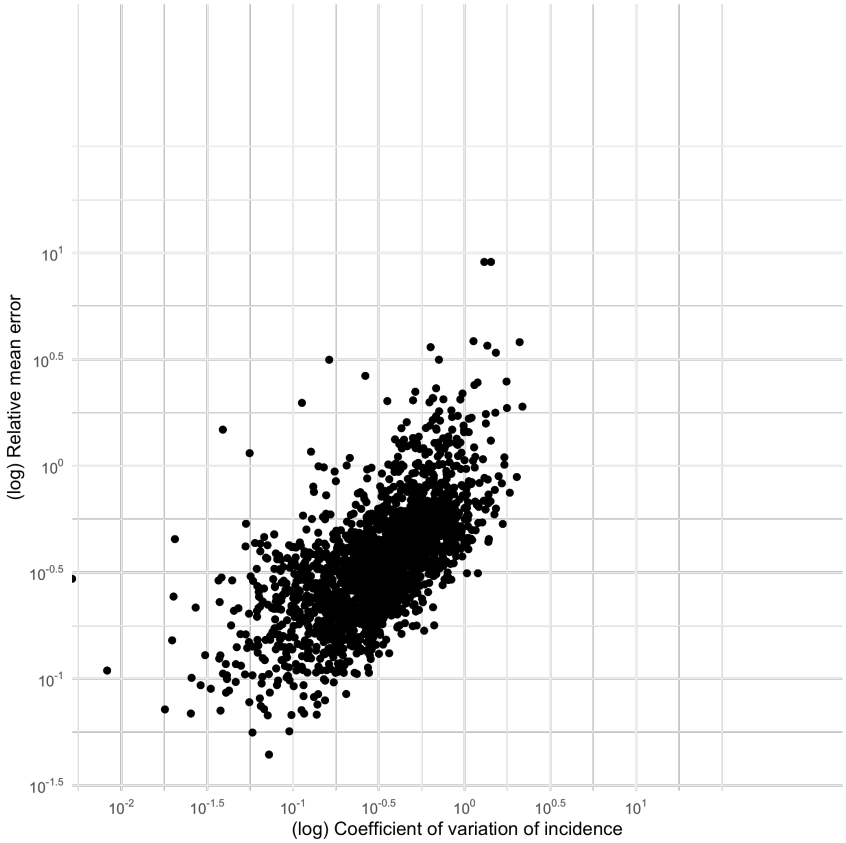
Model error varies inversely with the weekly incidence



Model error varies directly with the variability in weekly incidence



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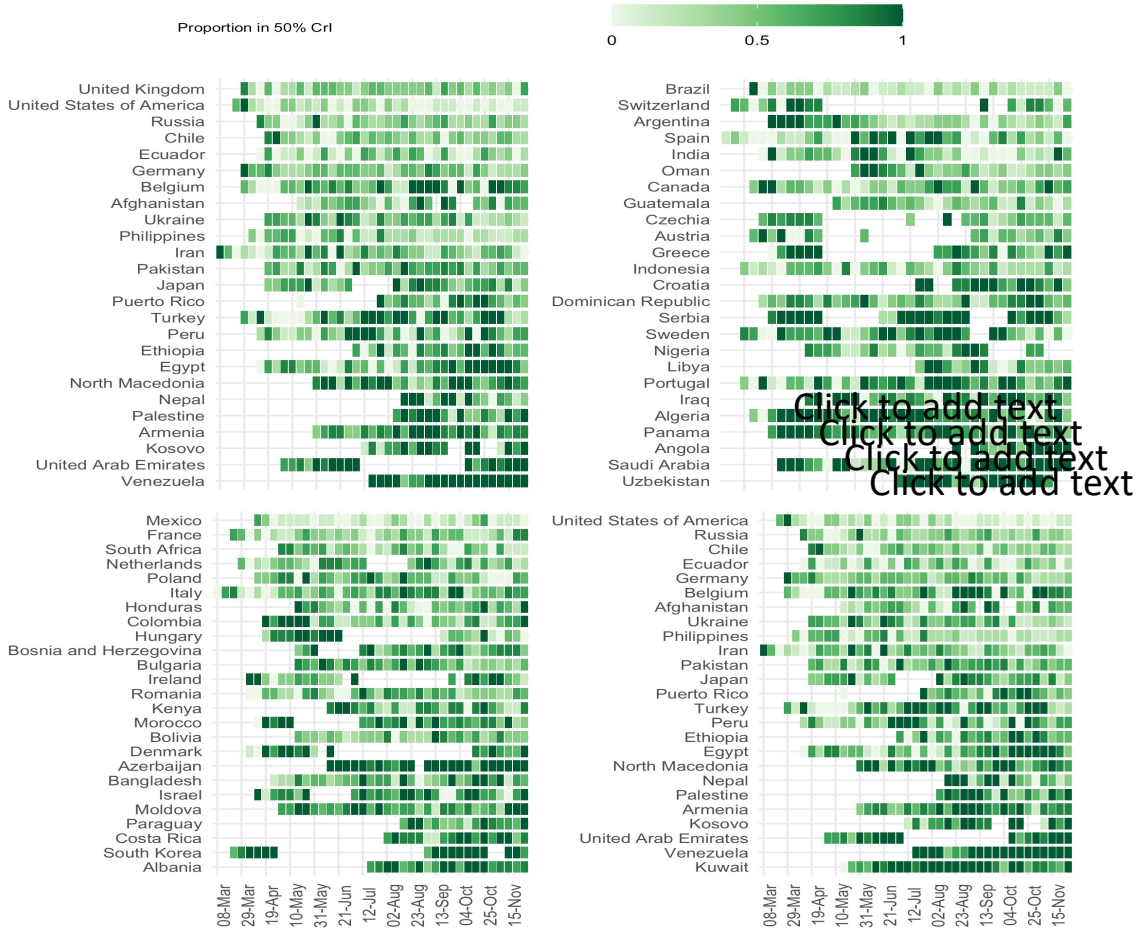

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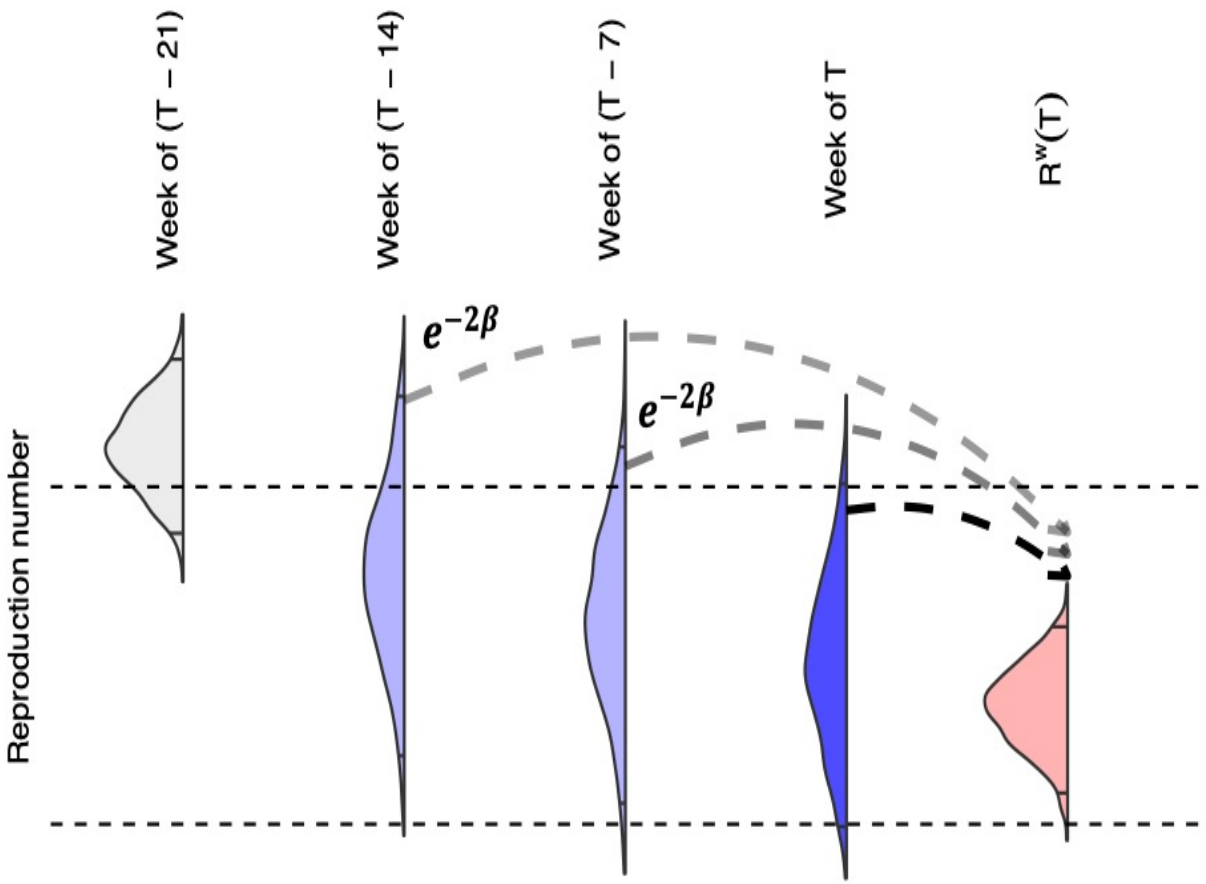
Medium-term forecasts



$$R_t^{eff} = \frac{R_t^w}{p_t^S}$$

$$R_{t+i}^S = R_t^{eff} p_{t+i}^S$$

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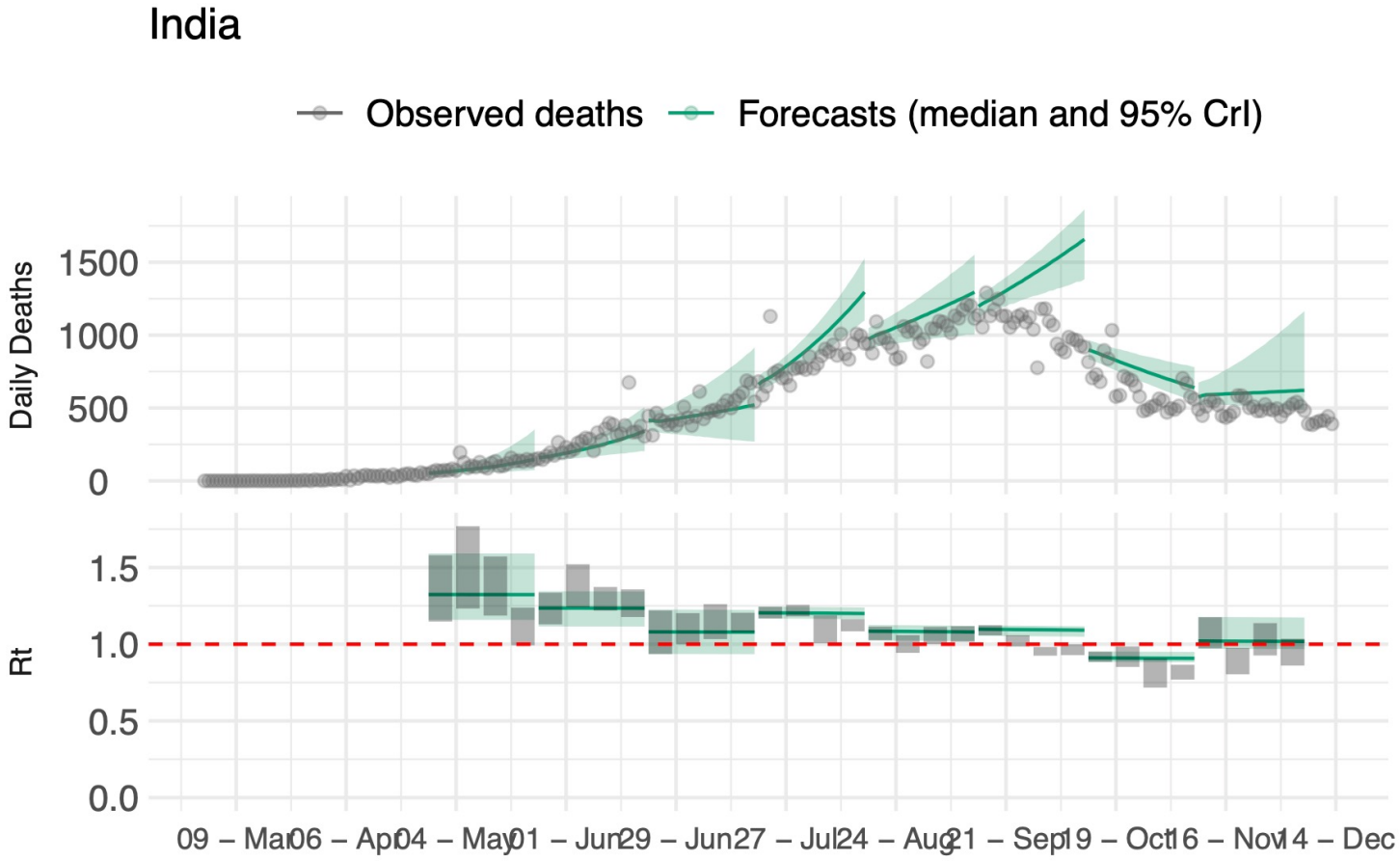

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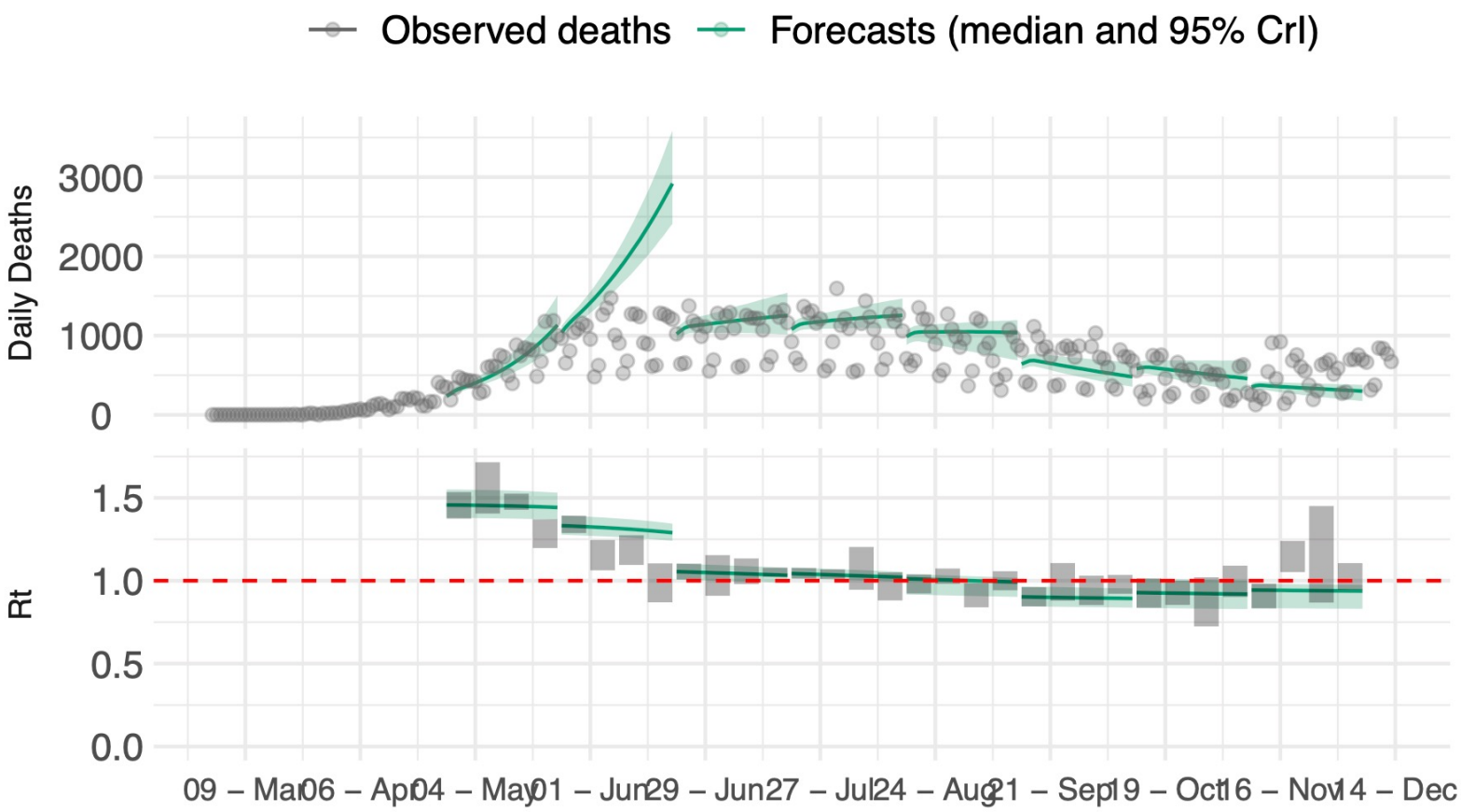
Brazil



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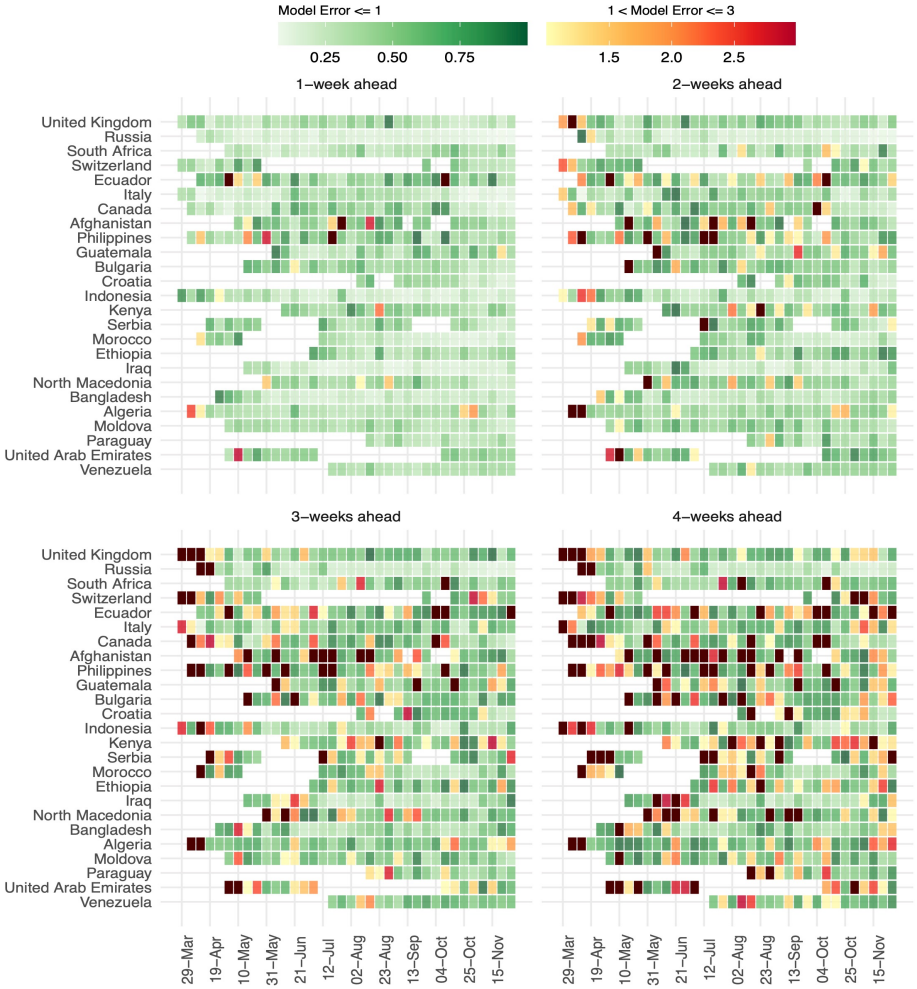
Medium-term forecasts relative error



- Model error grows over the projection horizon, with relatively small error up to 4 weeks.

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Conclusions

- Simple models, relying on the reported number of cases and deaths
- Ensemble model does well at capturing the transmission trends
- Medium-term forecasts perform well up to 4 weeks ahead.