

Corrections to predictions of the basic reproduction number

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The basic reproduction number, R_0 , derived from ordinary differential equation models is a powerful predictor of the severity of an infection and can help inform prevention and mitigation strategies. Many of the parameters used in ODE models are mean values of time-dependent distributions. Here, we show how we can incorporate properties of these distributions to refine estimates of R_0 for a series of ubiquitous models used in epidemiology. These corrections are applied to the R_0 estimate as opposed to the model itself, allowing simple models to be used, and better predictions to be made post-hoc as more data becomes available. Moreover, we address some difficulties in trying to extend these corrections to more complex models.

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