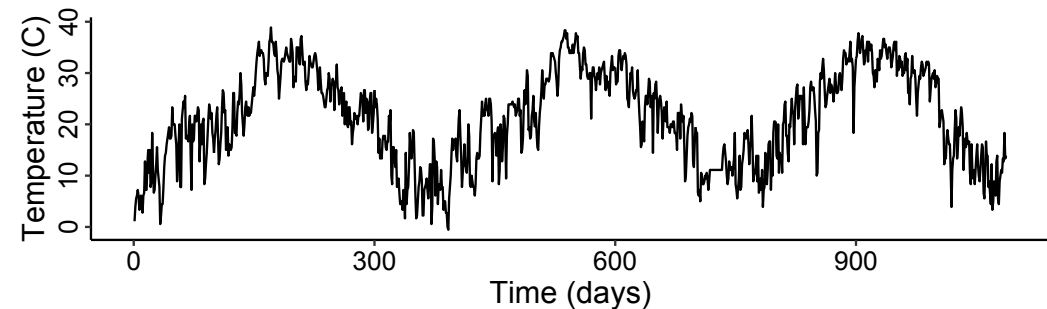


Environmental Driver

Mechanistic Model

Statistical Model



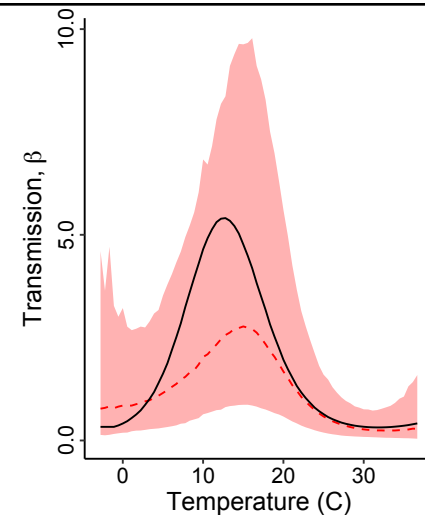
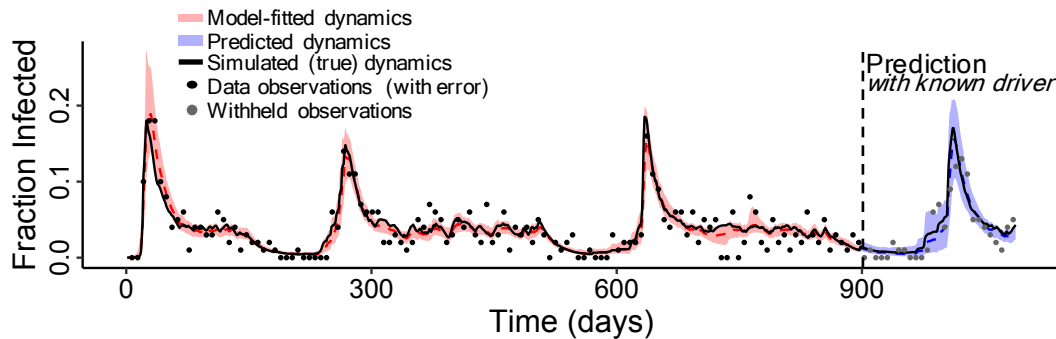
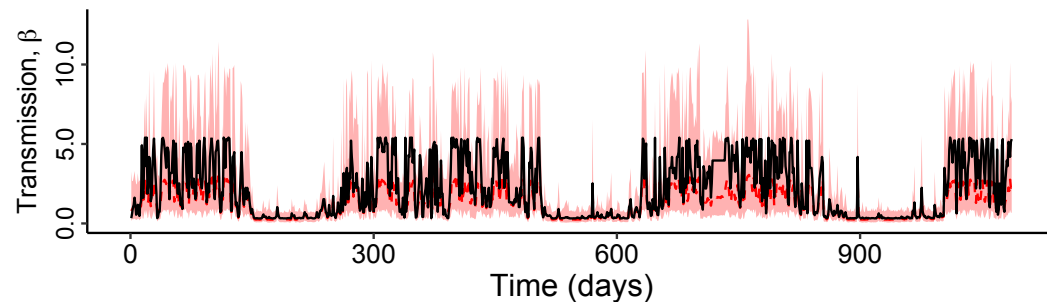
$$\frac{dS}{dt} = \mu N - \beta_{(t)} \frac{SI}{N} - \mu S$$

$$\frac{dI}{dt} = \beta_{(t)} \frac{SI}{N} - (\gamma + \mu) I$$

$$\frac{dR}{dt} = \gamma I - \mu R$$

The environmental driver (D) is linked to the mechanistic model with Gaussian process (GP) regression:

$$\beta_{(t)} = f(\mathbf{D}) \sim \mathcal{GP}(0, k(\mathbf{D}, \mathbf{D}'))$$



The full, hybrid model is fit to observed, longitudinal data.