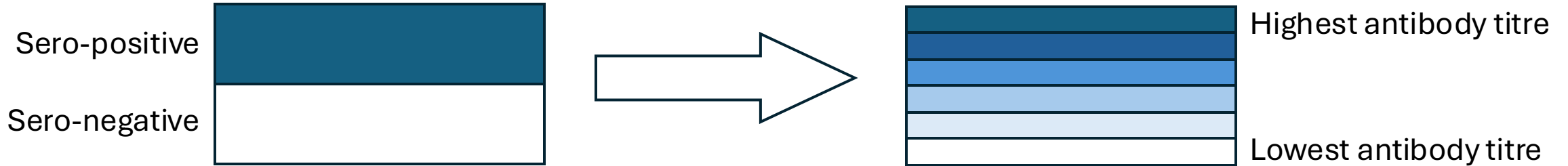


Incorporating stratified immunity in influenza transmission models

Jakob Jonnerby

Odin-monty workshop 24-25 March 2025



i: titre

a: age group

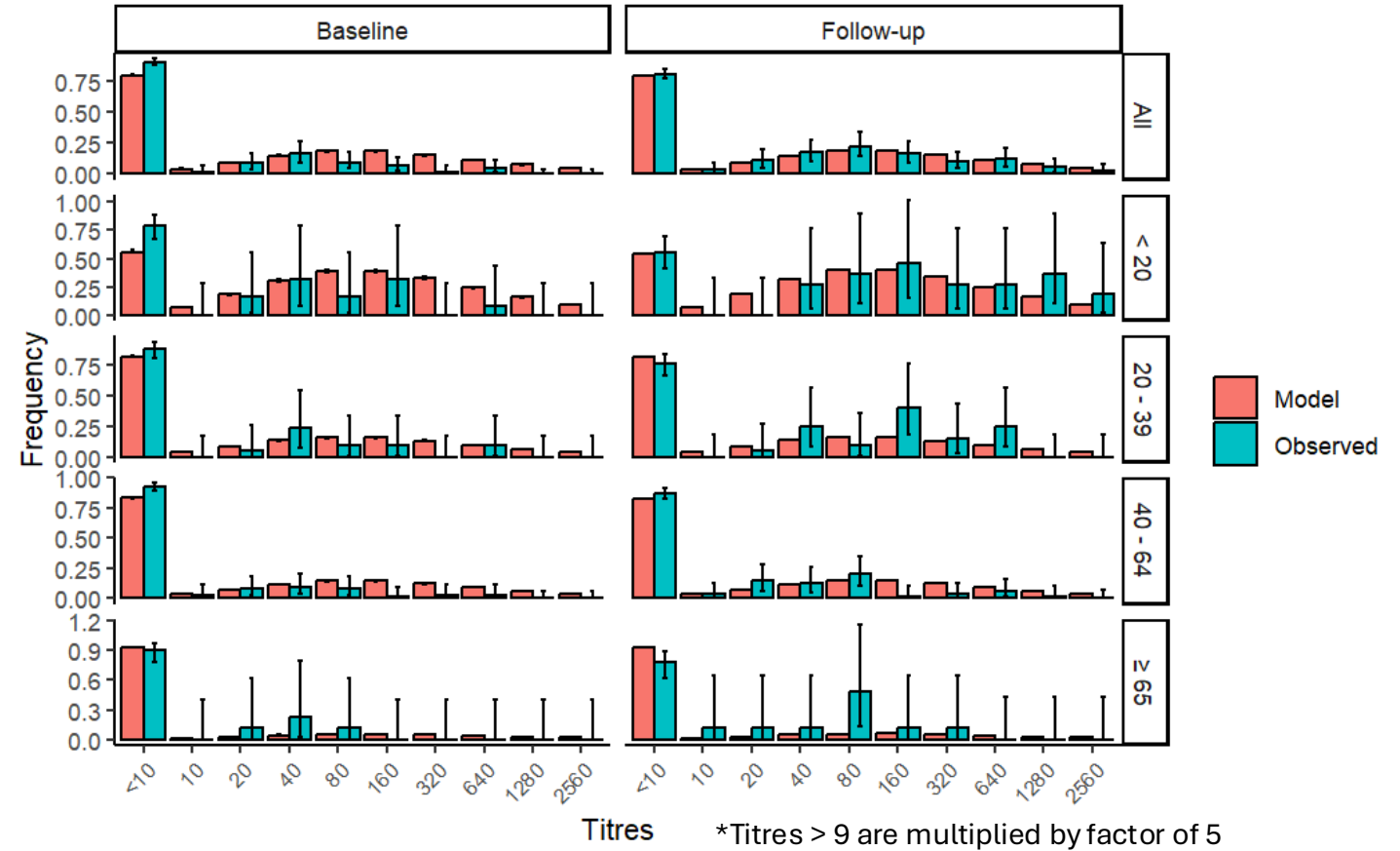
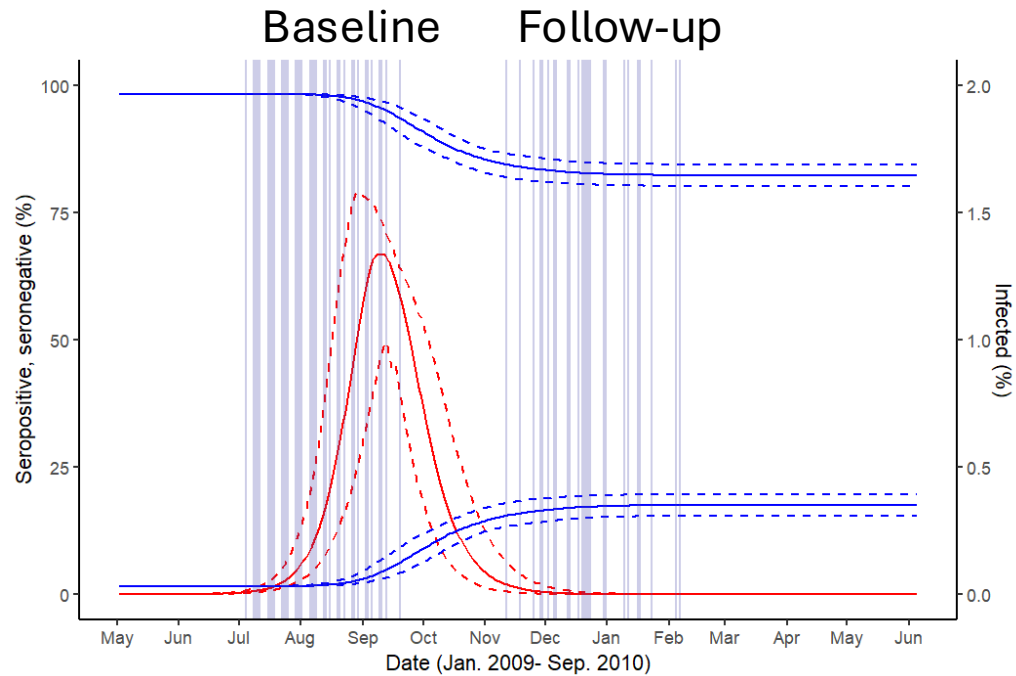
$$\frac{dS_i(a)}{dt} = -S_i \cdot \rho_a(i) \cdot \lambda(a) + \omega \cdot R_i(a)$$

$$\frac{dI_i(a)}{dt} = S_i \cdot \rho_a(i) \cdot \lambda(a) - \frac{1}{T_g} \sum_{j=i+1}^{i_{\max}} I_i(a) \cdot g_{ji}$$

Transition probability to higher titre

$$\frac{dR_i(a)}{dt} = \frac{1}{T_g} \sum_{j=0}^{i-1} I_j(a) \cdot g_{ij} - \omega \cdot R_i(a)$$

Results & conclusions



- Incorporating stratified titre levels could help improve model accuracy
- Compare with a threshold model (seronegative vs seropositive)
- Analyse UK data using the same model