Optimal immunisation strategies against RSV in children

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Background

- The Respiratory Syncytial Virus (RSV) is responsible for about 3.3 million lower-respiratory tract infections every year, many of them happening in children.
- The STIKO (German NITAG) recommends a seasonal administration of a mAB (nirsevimab), except for children born to vaccinated mothers.
- Immunity only lasts ~12 months and RSV is seasonal

→Children born to vaccinated mothers at the end of the RSV season will likely be susceptible to infection by the time they experience their first RSV season.

What is the added value of giving nirsevimab at the beginning of their first RSV season for infants born to vaccinated mothers?

Tools and struggles

- Age-structured compartmental catalytic model **X** values from the literature **=** Number of cases prevented by nirsevimab in addition to the vaccine

- Model written in odin (~ 1,000 times faster than using deSolve)
- Fitting initially done using BayesianTools → took ~ 20 hours → Switched to mcstate → Done in ~ 45 minutes

Struggles:

- Model fits the data, but it can be improved (ongoing work)
- odin is intuitive and easy to translate the model to, but only supports certain basic functions (loops are tricky)
- Fitting with mcstate is less straight-forward (case_compare function)