with pneumococci, several boundaries and weaknesses in modeling occur: only steady state analysis possible; no dynamic implementation of herd immunity and replacement effects; and no influence of changing demographic structure over time. Therefore a comparable ODE system was implemented and extended by population dynamics and split the pneumococcal serotypes in groups depending on their behavior depending on immunization.

RESULTS: For standard immunization program implementation as advocated by EPAR/EMEA it was possible to reproduce the behavior of the Markovian-Model with the ODE approach resulting in equivalent outcomes for validation. Using ODE approach extensions the influence of population dynamics effects and feedback-loops, the ODE model offers possibilities to implement additional dynamic methods, which is essential to gather the real world dynamics.

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The Markovian model can accurately describe the infection with pneumococcal bacteria if proper data exists and if there is no need to use dynamic effects or feedback-loops. The ODE model offers possibilities to implement additional dynamic methods, which is essential to gather the real world dynamics.

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