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# A human challenge model for respiratory syncytial virus kinetics, the pharmacological effect of a novel fusion inhibitor, and the modeling of symptoms scores

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## Abstract

Respiratory syncytial virus (RSV) causes acute lower respiratory tract infections, and is a major cause of hospital admissions and death in young children. Limited treatments currently exist that can prevent or minimise exacerbation of the disease. The aims of this work were: 1) to develop a population pharmacodynamic model to describe RSV kinetics (RSVK) in nasal lavage, 2) evaluate the impact of an investigational fusion inhibitor, JNJ-53718678, on RSVK, and 3) determine the relationship between RSVK and symptoms scores.

The best model to fit the RSVK data was a target-cell limited viral kinetics model previously developed for influenza A infections (Baccam P, Beauchemin C, Macken, CA, Hayden FG, Perelson AS, 2006), which included a series of compartments for infected, non-producing and infected, and producing cell populations. The model was adapted to account for longer incubation times seen in RSV, by including 4 additional transit compartments, with the virus elimination rate constant and initial number of target cells fixed to literature values to ensure model parameter identifiability. Between-subject

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