Séverine Urdy

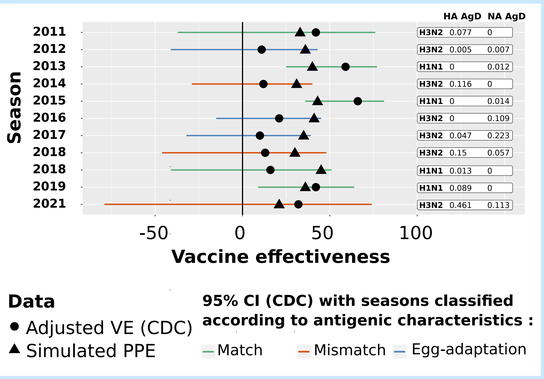
Background

Influenza vaccine effectiveness depends on:

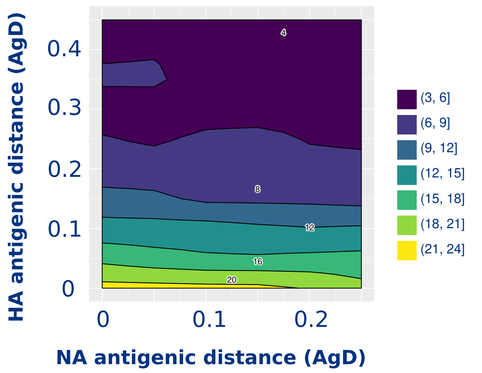
- **antigenic drift**
- **immunogenicity**
- **immunosenescence**
- **prior immunizations**
- **time elapsed** between vaccination and viral exposure
- ...

Knowledge-based modeling and ***in silico*** **clinical trials** help assess the **role** and **importance** of these different **factors.**

Seasonal simulations in 65+



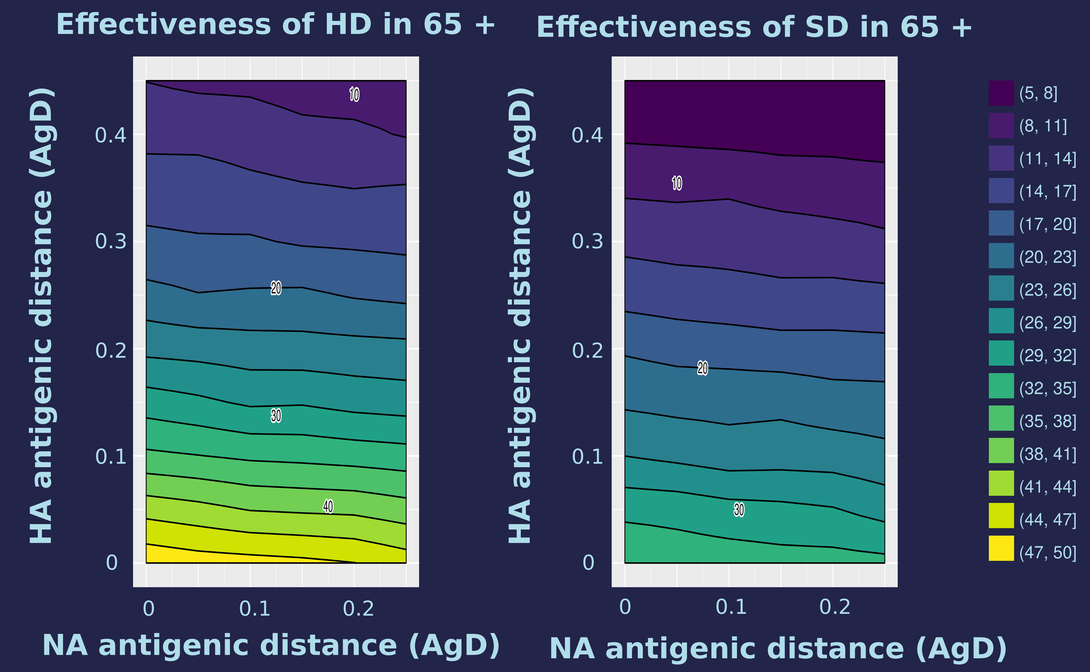
Effectiveness of High-Dose (HD) *versus* Standard Dose (SD) in 65+



Conclusions

The **HD vaccine consistently performs better than the SD vaccine**, in all simulated seasons, against both subtypes, supporting the use of the HD in the **older population**.

Predicting how **antigenic drift** affects influenza **vaccine effectiveness***



* quantified as the proportion of prevented symptomatic infections (PPE)

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Effectiveness of **High Dose** versus **Standard Dose Influenza vaccines** in **older adults :**

Insights from a **multi-strain modeling approach** taking **antigenic distance** into account

Authors: Urdy, S.; Ratto, N.; Hanke, M.; Toledo, A. I.; Peyronnet, E.; Jacob, E.; Thommes, E.; Chaves, S.; Coudeville, L.; Boissel, J. P.; Bruezière, L. and Courcelles, E.

Methods

1. Knowledge-based mechanistic model
2. Calibration of vaccine immunogenicity
3. Calibration of A/H1N1 & A/H3N2 dynamics
4. Calibration of clinical responses to infection
5. Calibration of virtual population
   a. Seroprotection rate
   b. Vaccine effectiveness
   c. Immunosenescence
6. *In silico* clinical trials for 10 seasons with exactly the same virtual population and perfectly matched control groups.

Multi-strain model of immunization by vaccination and infection