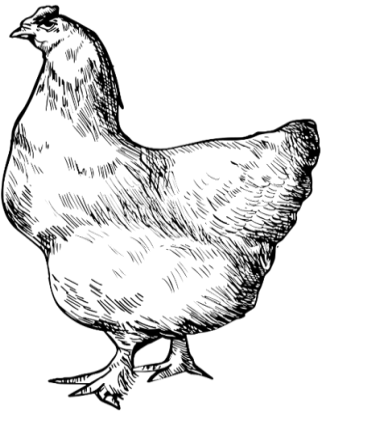


Modelling HPAI within-farm transmission using viral load distributions, to evaluate biosecurity effectiveness and to support management policies



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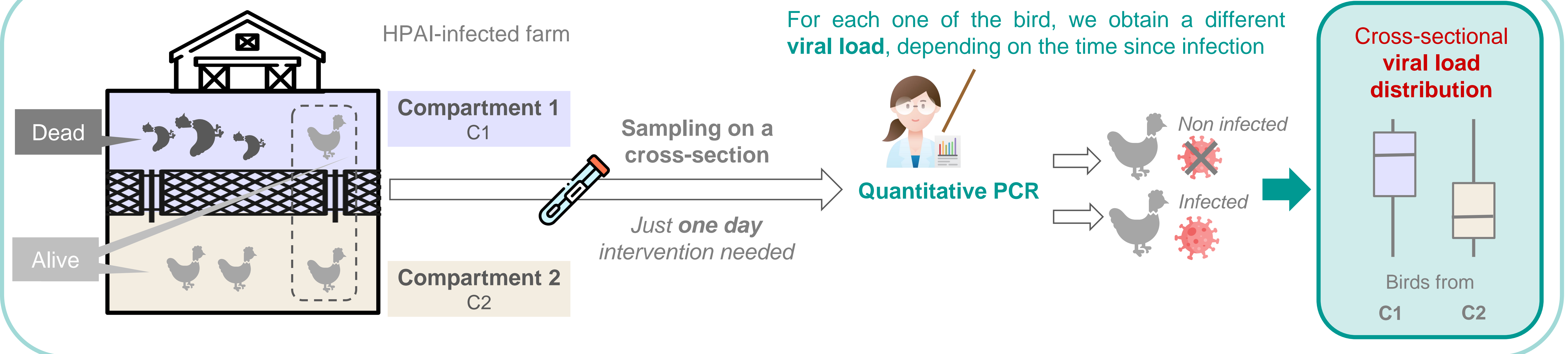
Background

- Managing a HPAI epidemics = **race against time: high and rapid lethality** (up to 90-100%, often within 48 hours)
- HPAI models: based on **daily mortality**, which is often a **missing value**
- Biosecurity**: a method of choice to slow down viral spread, but **effectiveness of within-farm measures** (e.g., compartmentalization) is **underdocumented**

Research questions

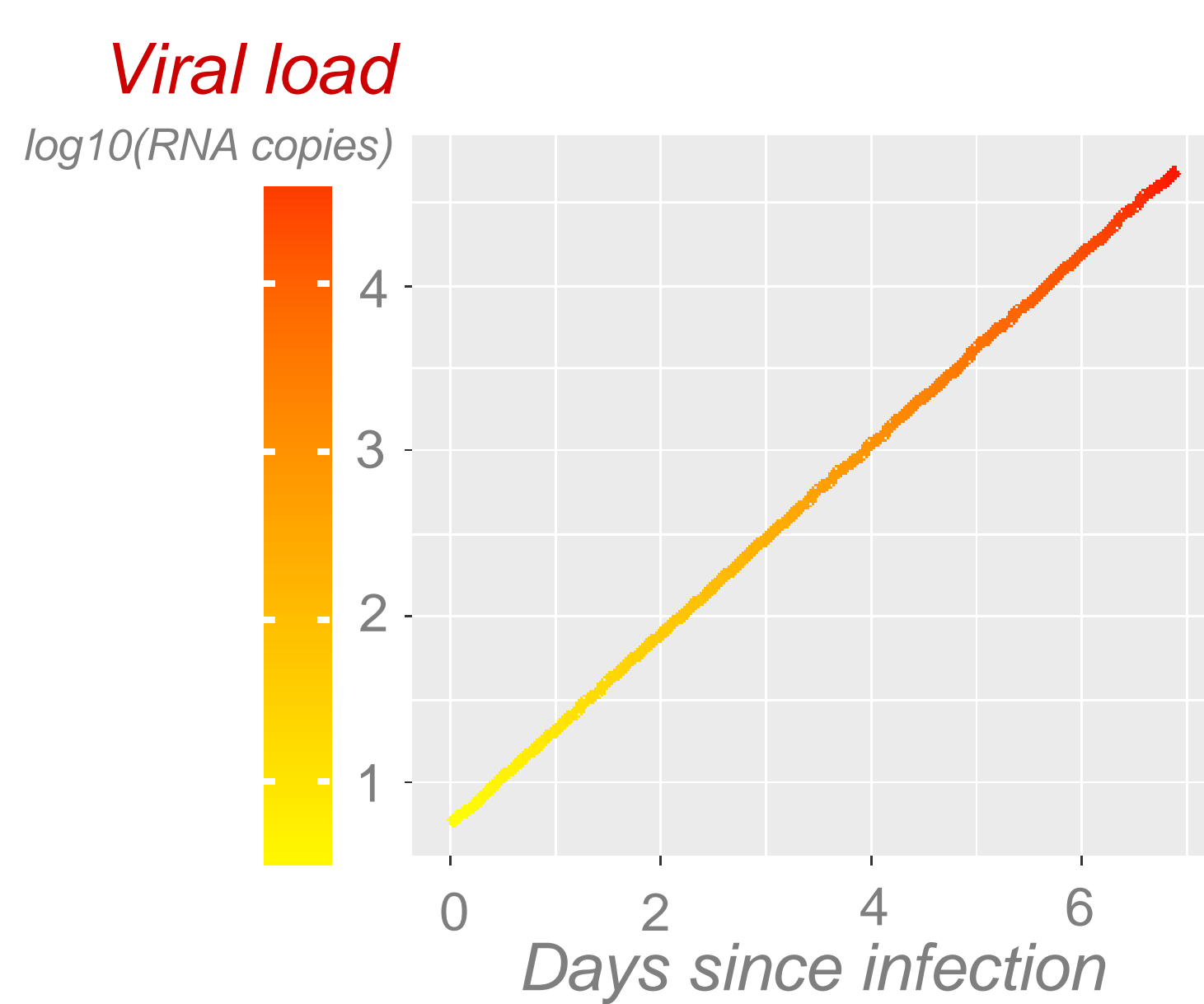
- How to develop a HPAI model, estimating the **day of introduction of the virus** and its within-farm dynamics, using an **innovative approach**: **cross-sectional viral load distribution**¹ ?
- Is within-houses **compartmentalization efficient** to limit viral spread ?

Data we need

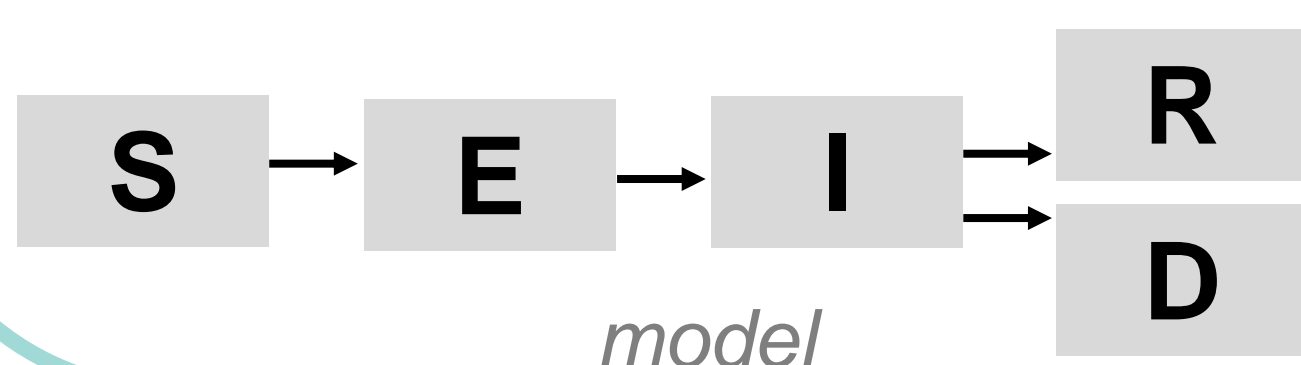


Models we need

The **individual** evolution of the viral load over the time since infection²

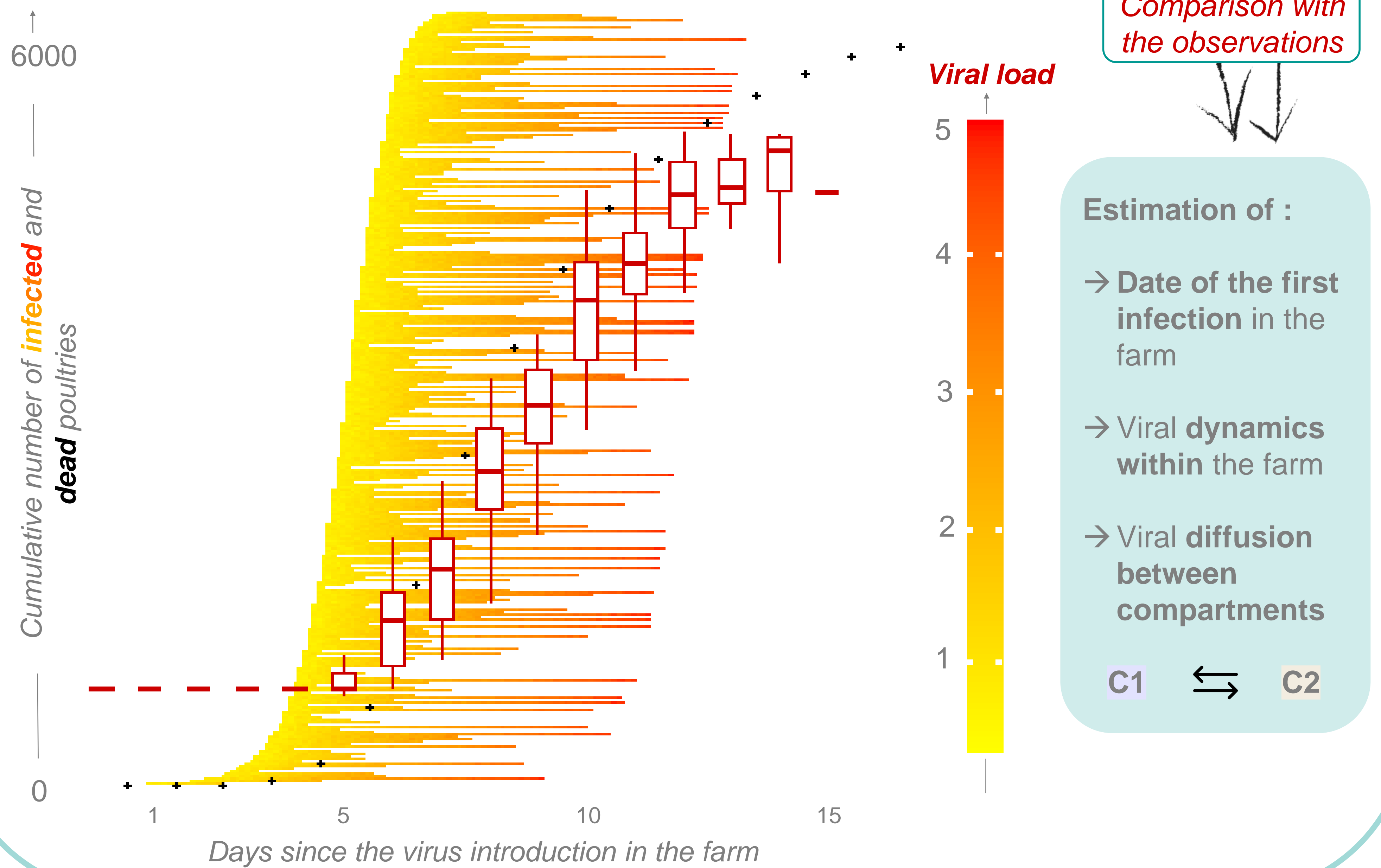


The number of infected poultres since the introduction of the virus in the farm



Expected results

Each boxplot: **simulated cross-sectional viral load distribution**



Expected impacts

- ✓ Identifying **risk factors**, and directing **epidemiologic investigations**
- ✓ Estimation of the within-houses **compartmentalization effectiveness**

Supporting management policies

Perspectives

Using this method to test the **effectiveness** of **different surveillance methods**, in a context of **avian influenza vaccination**



¹ Hay et al., 2021, Science

² Bessière et al., 2021, Journal of Virology