



# Rapid risk assessment tool (RRAT) to prioritize emerging and re-emerging diseases for risk management

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### **Objective**

- An automated tool to evaluate animal disease risks allowing for:
  - > Rapid analysis of incursion risk of a multitude of diseases

## Approach

• Relational database in R and SQLite to link data on disease outbreaks worldwide, international trade flows and infectivity (Fig. 1)

- > Prioritization of diseases for risk management and early warning
- > Insight in source countries and pathways to support preventive measures and risk-based surveillance
- > Updates for real-time analysis



• Semi-quantitative risk scores between 0 and 1 to rank diseases, source countries and pathways

# **Countries in RRAT** • Whole world

#### Pathways in RRAT

- Legal trade of live animals
- Legal trade of animal products
- Animal products carried by air travellers

#### Diseases in RRAT

- African horse sickness
- African swine fever
- Aujeszky's disease
- Bluetongue
- Bovine tuberculosis
- Classical swine fever
- Equine infectious anaemia
- Foot and mouth disease
- Lumpy skin disease
- Peste des petits ruminants

## Results

• Available for the Netherlands for 2016-2019



Figure 1. Outline of RRAT and databases used

## **Calculations**

• Binomial process considering (1) the number of animals/products, (2) the probability of entry into the country and (3) the probability of first infection of native animals (Fig. 2 and 3)



Figure 2. Scenario tree to calculate the probability of entry and first infection for live animals

**First infection** 

- Can be analysed in more detail for source countries, animal species, and animal products
- Open access via an online visualisation tool





![](_page_0_Figure_44.jpeg)

**Figure 3.** Scenario tree to calculate the probability of entry and first infection for animal products

# **Future perspectives**

**Entry** 

- Inclusion of additional introduction pathways (e.g. transport, feed, vectors)
- Transformation of RRAT into a nowcasting tool for daily use by policy makers • Development of app to disclose results to a wider audience

![](_page_0_Figure_49.jpeg)

**Figure 4.** The risk of having a new first infection in the Netherlands for each disease resulting from (a) trade in live animals, (b) trade in animal products, and (c) animal products carried by air travellers

![](_page_0_Picture_51.jpeg)

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**Funding:** The development of the RRAT was funded by the Ministry of Agriculture, Nature and Food Quality (KB-21-006-028, KB-37-003-033, WOT-01-003-078, WOT-01-003-094) and Wageningen University & Research (KB-33-001-008-WBVR)

**Publication:** De Vos et al., 2022. Front. Vet. Sci. 9:963758. doi:10.3389/fvets.2022.963758 **Online visualisation tool:** https://shiny.wur.nl/content/ca2f25a0-13d8-4285-8714-7fef1bfbcb83/