



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

Clazien de Vos, Ronald Petie, Ed van Klink, Manon Swanenburg

Objective

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

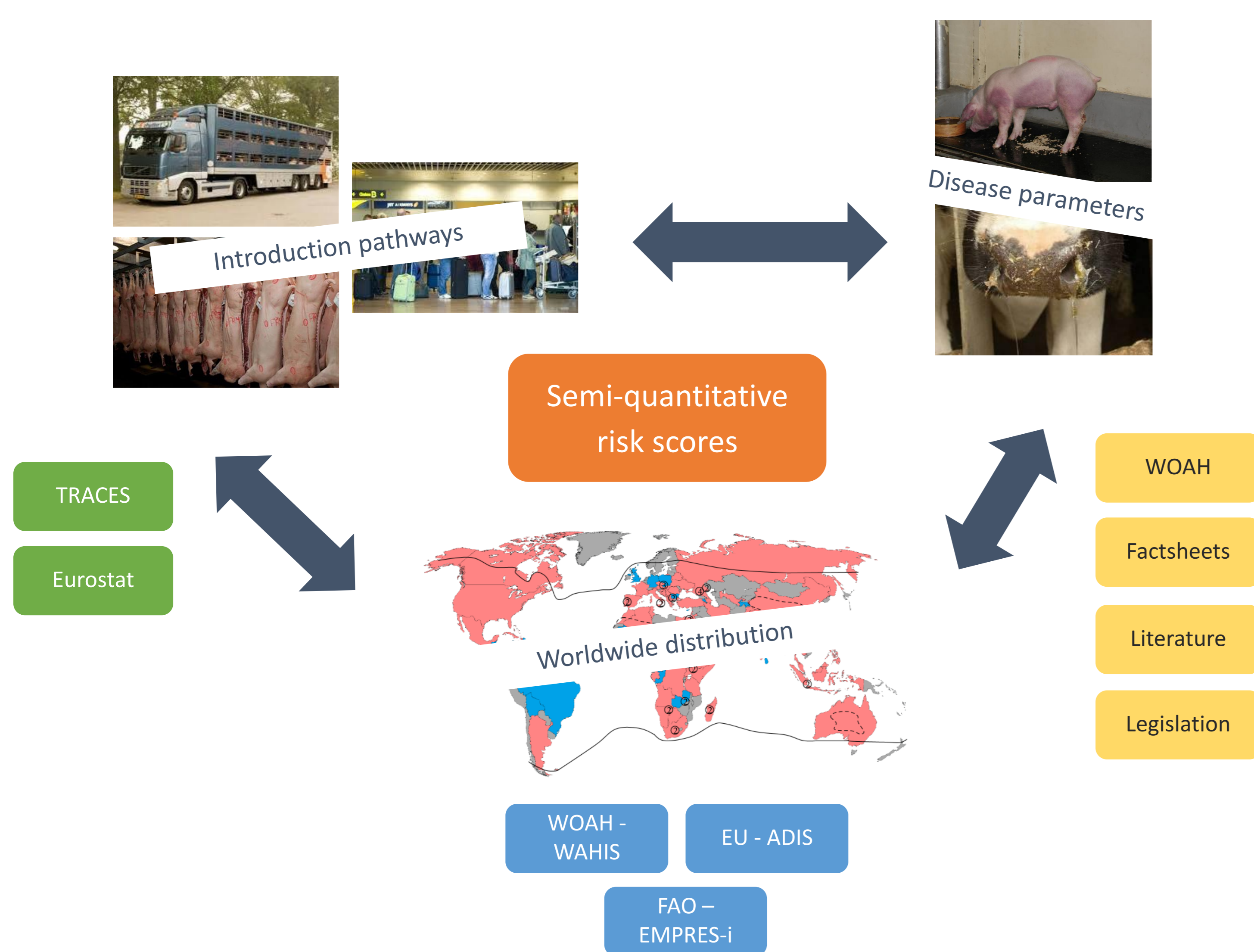


Figure 1. Outline of RRAT and databases used

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)

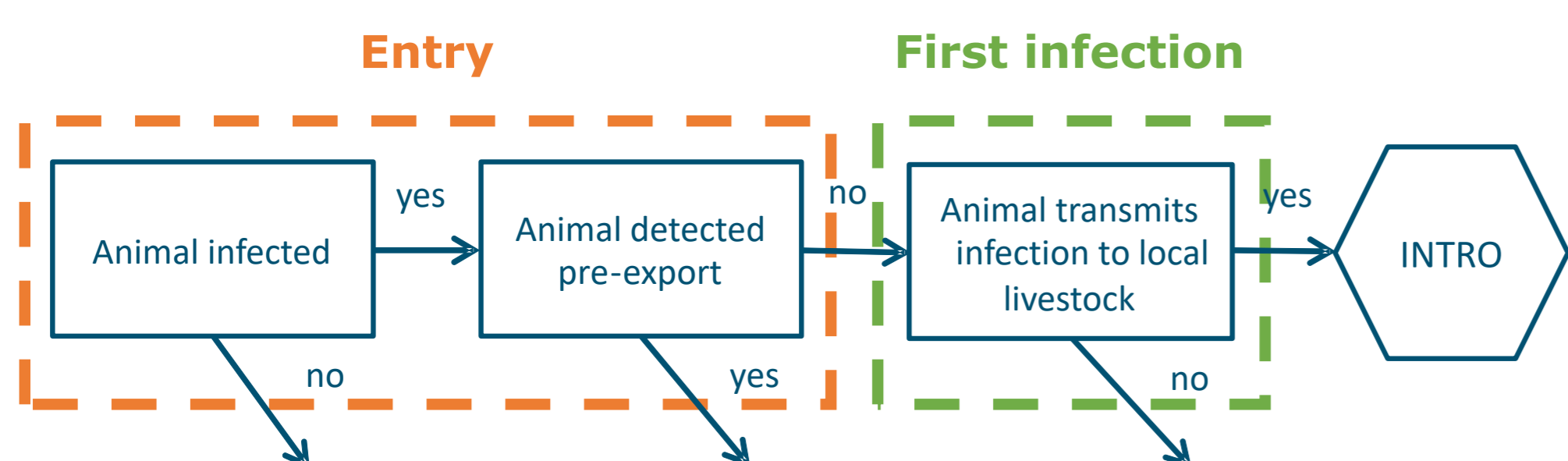


Figure 2. Scenario tree to calculate the probability of entry and first infection for live animals

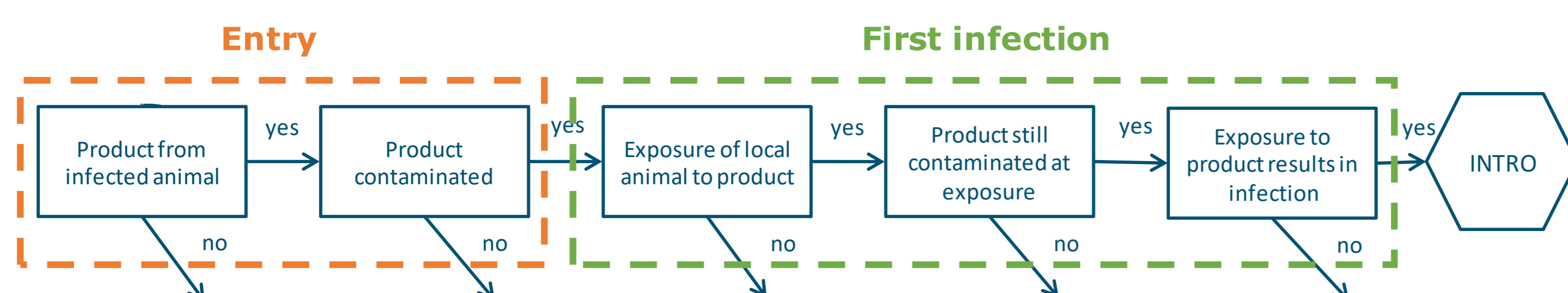


Figure 3. Scenario tree to calculate the probability of entry and first infection for animal products

Future perspectives

- 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

Approach

- Relational database in R and SQLite to link data on disease outbreaks worldwide, international trade flows and infectivity (Fig. 1)
- 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
- Can be analysed in more detail for source countries, animal species, and animal products
- Open access via an online visualisation tool

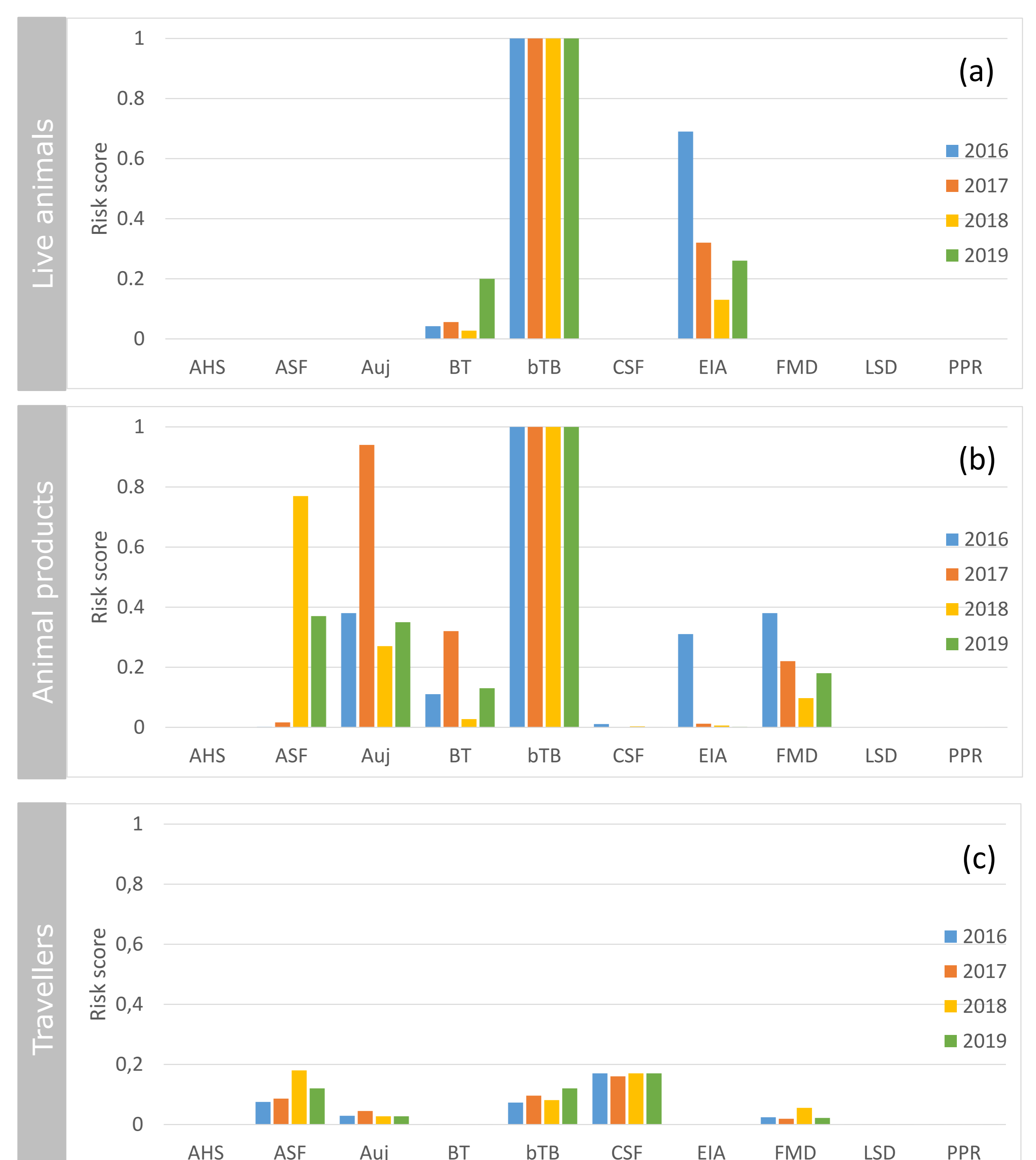


Figure 4. The risk of having a new first infection in the Netherlands for each disease resulting from (a) trade in live animals, (b) trade in animal products, and (c) animal products carried by air travellers