

**University
of Basel**

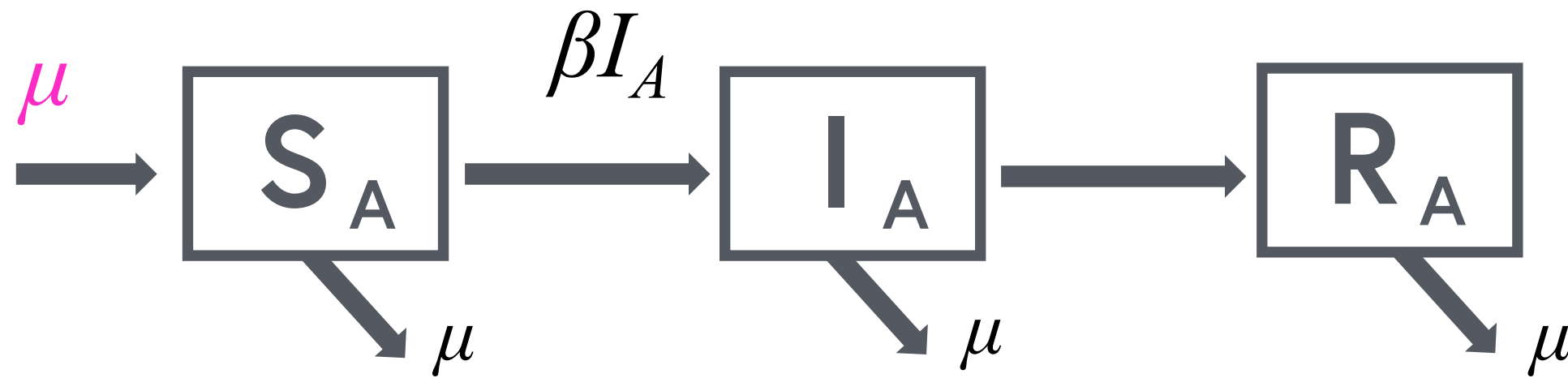
In association with:



Swiss Tropical and Public Health Institute
Schweizerisches Tropen- und Public Health-Institut
Institut Tropical et de Santé Publique Suisse

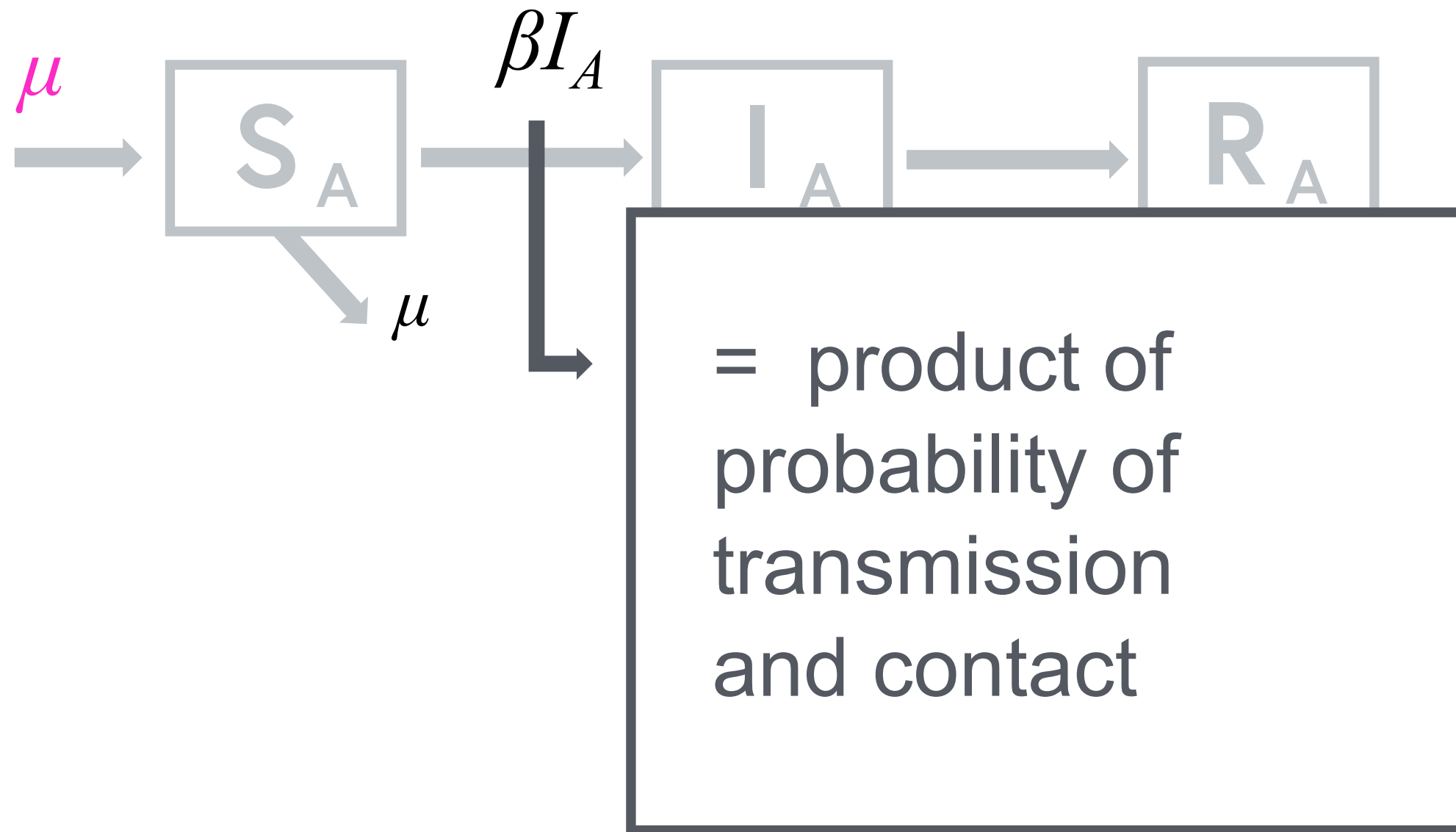
Modelling animal-human disease transmission

ANIMALS



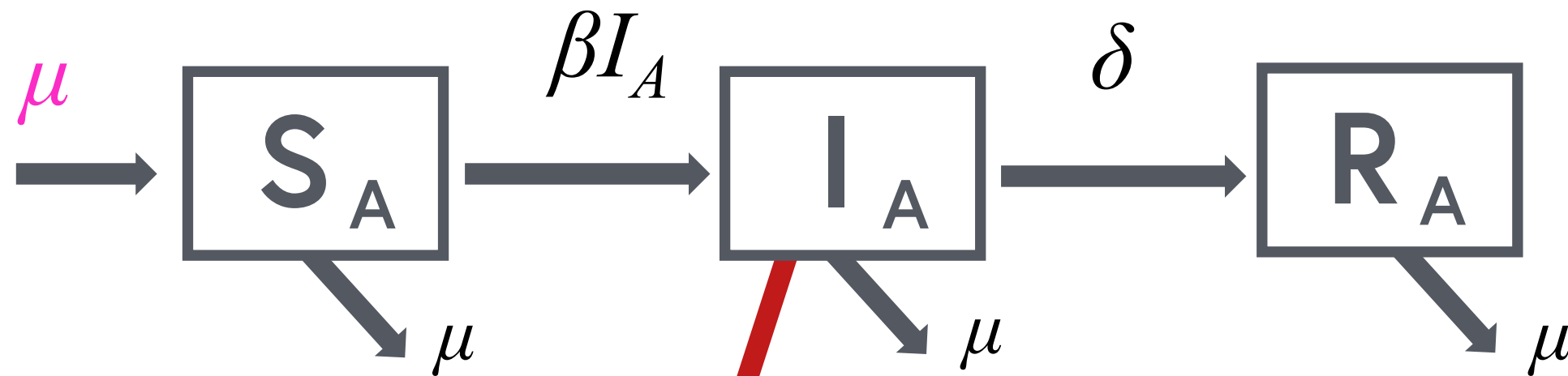
- A = animals
- S = susceptible
- I = infected
- R = recovered
- \rightarrow increase
- \searrow decrease
- μ (pink) = birth rate
- μ (grey) = mortality rate
- βI_A = contact rate

ANIMALS

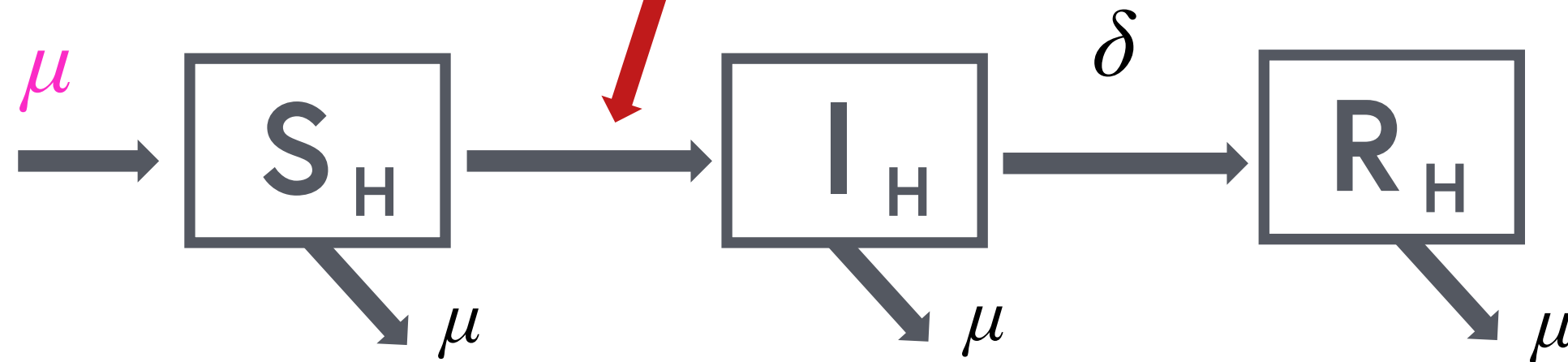


- A** = animals
- S** = susceptible
- I** = infected
- R** = recovered
- = increase
- ↘** = decrease
- μ = birth rate
- μ = mortality rate
- βI_A = contact rate

ANIMALS



HUMANS



$\alpha I_A S_H$

- A = animals
- S = susceptible
- I = infected
- R = recovered
- \rightarrow increase
- \searrow decrease
- μ = birth rate
- μ = mortality rate
- βI_A = contact rate
- δ = recover rate
- H = humans
- αI = infection

$$\frac{dS_A}{dt} = \mu(S_A + I_A + R_A) - \beta I_A S_A - \mu S_A$$

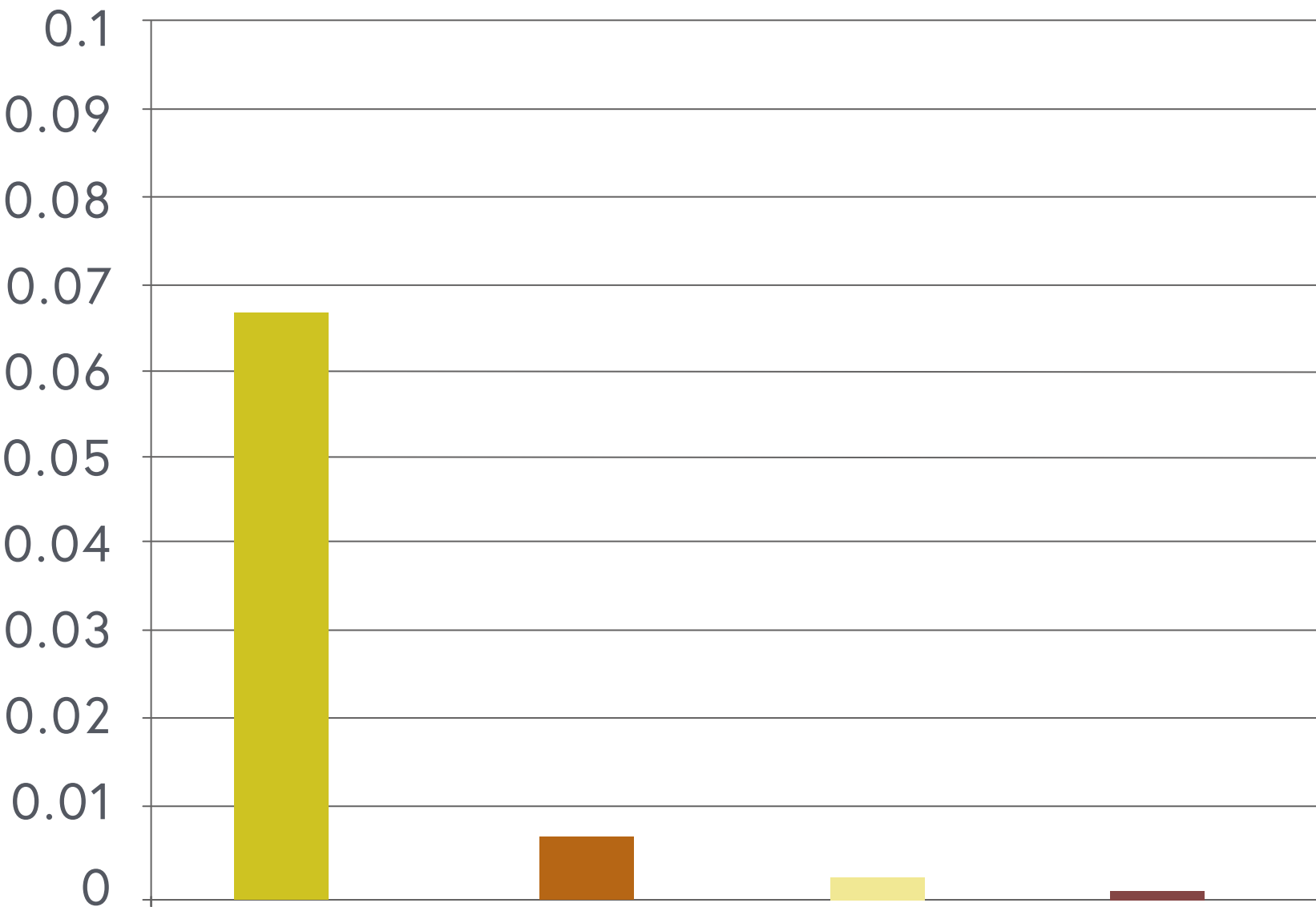
$$\frac{dI_A}{dt} = \beta I_A S_A - \mu I_A - \delta I_A$$

$$\frac{dR_A}{dt} = \delta I_A - \mu R_A$$

$$\frac{dI_H}{dt} = \alpha I_A S_H - \mu_h I_H - \delta_h I_H$$

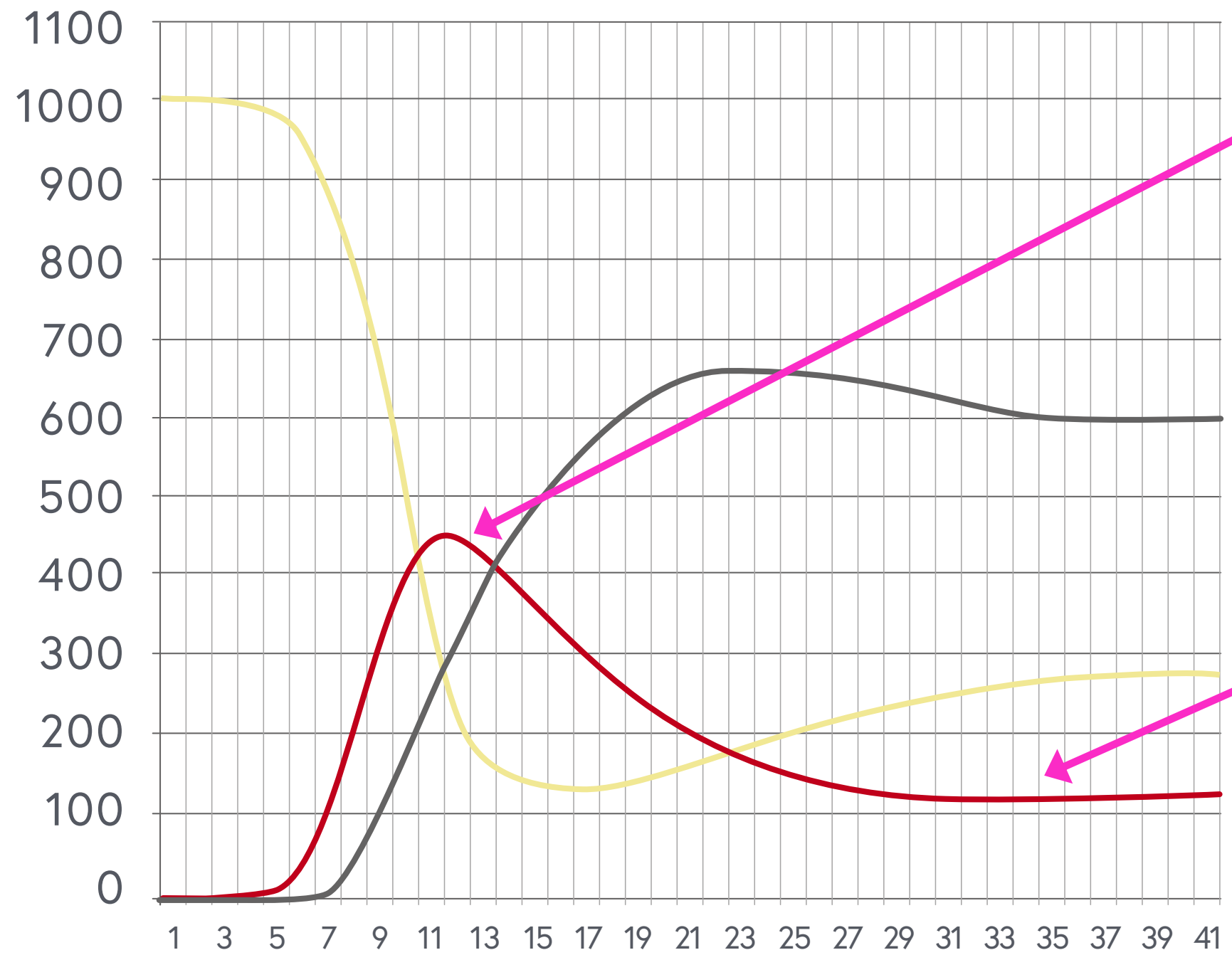
Comparative zoonotic potential of selected zoonotic pathogens

Ratio of transmission constants



- Brucella melitensis
- Brucella abortus
- Rabies
- Bovine Tuberculosis

Number of individuals



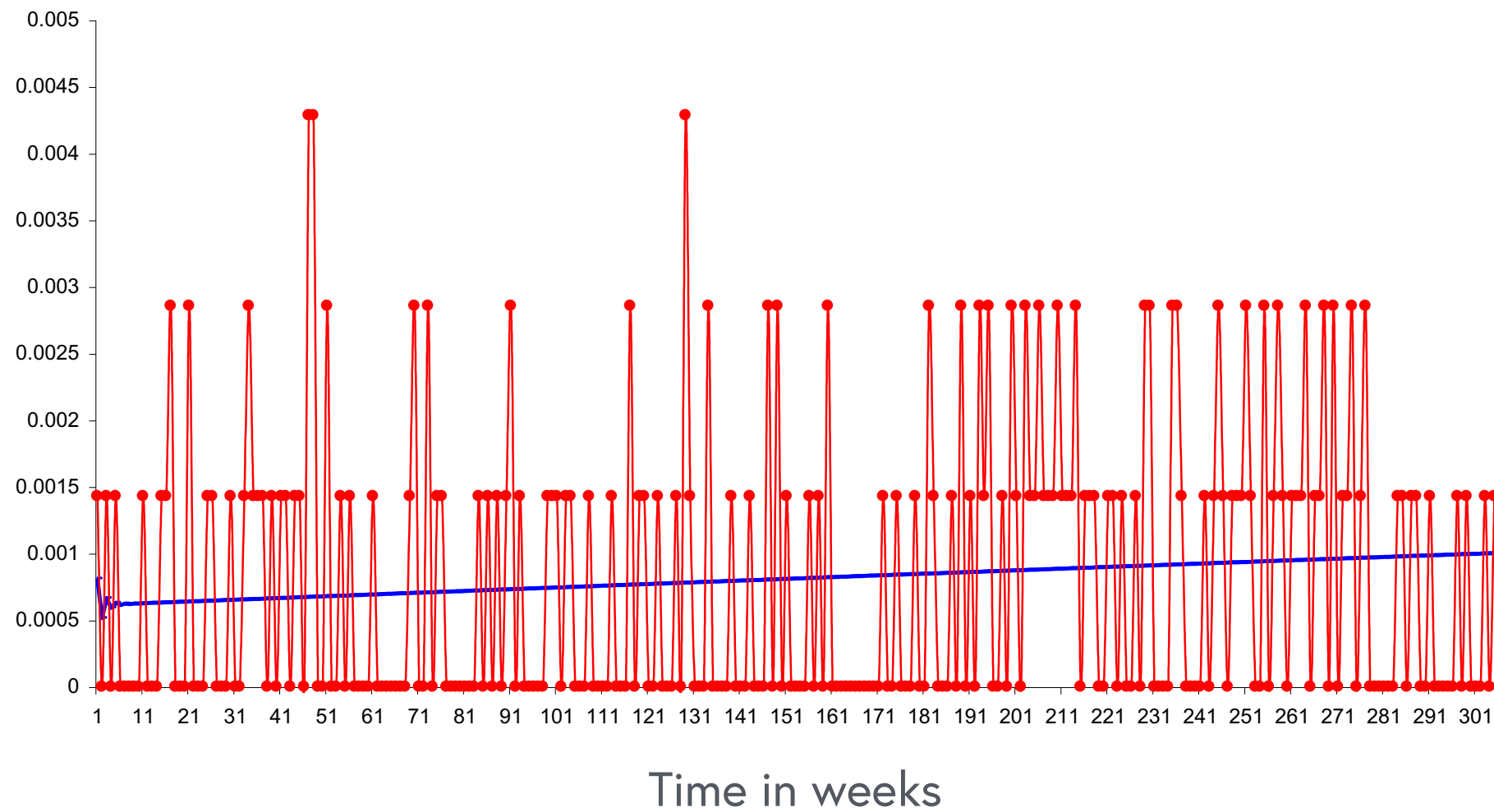
Epidemic peak
 $Re > 1$ before peak

— susceptible
— infectious
— recovered

Endemic stable
Transmission
 $Re \approx 1$

Transmission dynamics of rabies control in dogs and humans

Rabid dogs per km2



Exposed persons per km2

