



Within-herd transmission of *Mycoplasma bovis* infection in 20 Dutch dairy herds

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Background

- ***Mycoplasma bovis***: naturally resistant to antibiotics targeting cell wall synthesis
- **PREVALENT** worldwide in dairy and beef industry
- **CAUSES** mastitis or arthritis, but also pneumonia, keratoconjunctivitis, otitis media, abortion, subcutaneous abscesses
- **RISK FACTORS**: purchase of animals, increased stress levels, immunosuppression.
- **IMPACT**: High economic impact - hard to treat and often results in culling
- **TRANSMISSION**: During milking and nose-to-nose contact, or through environment

Objectives

1. Estimate the **within-herd transmission rate** between calves, youngstock and cows
2. Identify the **most likely** within-herd transmission pathways
3. Identify **farm management factors** explaining transmission rates and pathways.



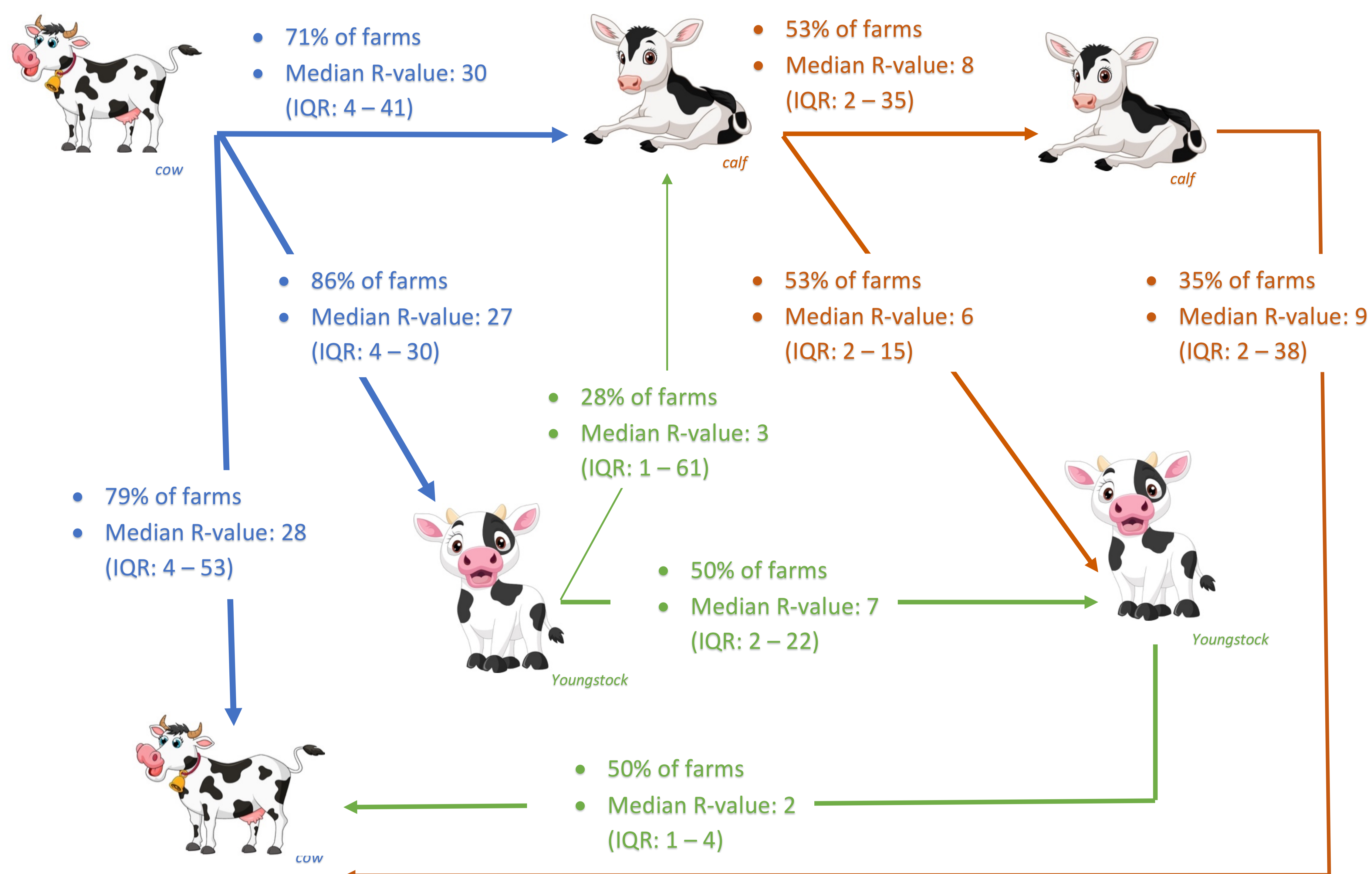
Materials and Methods

Longitudinal data were collected on **20 clinically infected dairy farms** in the Netherlands between 2016 – 2017.

- **SYMPTOMS**: mastitis or arthritis in cows
- **SAMPLING**: Each farm was sampled 5 times in 3 months
- **RISK ASSESSMENT**: Farm management factors were assessed for each farm
- **ANALYSIS**: An age-stratified SIR model on 3 aggregated individual test results to calculate disease transmission rates and pathways, and a Fisher's exact test to explore potential explanatory farm factors

Results

- **R-value** (transmission rate (β) / removal rate (γ)): 'The average number of secondary infections in age group i caused by 1 infectious animal in age group j over the entire course of its infectious period in an otherwise fully susceptible herd'.



Conclusions

- **Transmission** was **highly variable among herds** and **cattle age groups**, with **highest transmission rates** from **cows** to cows, youngstock and calves.
- Most important transmission pathways: **cow-to-cow, cow-to-calf, cow-to-youngstock**. But also, **calf-to-calf, calf-to-youngstock, youngstock-to-youngstock** and **youngstock-to-cows**.
- Associated farm factors: **internal biosecurity** (separate caretakers for different age groups, number of people involved), **external biosecurity** (contractors, external employees) or **indirect transmission routes** (number of feed and water stations).

Take away message

- **First study** to estimate transmission rates for *M. bovis* and results will help better understand the **on-farm intervention strategies** regarding *M. bovis* outbreaks.
- **Future steps**: design a **Bayesian individual-level model** to account for **low test sensitivity** and use the **3 diagnostic results separately** without manufacturer cut-off



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