



# FIRST EVIDENCE OF Q-FEVER IN RUMINANTS AND HUMANS IN ESTONIA

Neare K.<sup>1</sup>, Kooskora, M.<sup>1</sup>, Aleksejev A.<sup>1</sup>, Jeremejeva J.<sup>1</sup>, Hütt P.<sup>2</sup>, Lassen B.<sup>1</sup>, Orro T.<sup>1</sup>, Viltrop A.<sup>1</sup>

<sup>1</sup>Estonian University of Life Sciences, Institute of Veterinary Medicine and Animal Science, Tartu, Estonia

<sup>2</sup>Univeristy of Tartu, Faculty of Medicine, Institute of microbiology

Correspondence e-mail: [kadi.neare@emu.ee](mailto:kadi.neare@emu.ee)

## INTRODUCTION

Q-fever is a zoonosis, which causes mainly reproductive disorders in domestic ruminants and atypic respiratory disease in humans. Ruminants are considered as the main source of infection for humans, but the transmission pathways and relative importance of risk factors for maintenance of infection in domestic ruminants and transmission to humans are not fully understood. The prevalence of Q-fever in the Estonia has until present been unexplored. We report here the preliminary results of a larger study the aim of which is to clarify the prevalence of Q-fever in domestic ruminants as well as to provide evidence of the presence of the infection among human population and to identify risk factors for the spread of the infection among animals and humans and evaluate the possible risks for human health in Estonia.

## MATERIALS AND METHODS

### Study populations:

1. Sheep & Goat – breeding herds
2. Cattle – production herds (≥ 5 adult animals; N= 2535)
3. Humans:
  - A) Estonian Genome Center „gene donors“ (Biobank: N=51535 adult volunteers)
  - B) Estonian veterinarians and veterinary technicians (N ~1500)

### Samples:

**Cattle:** random sample of all Estonian herds tested for official EBL surveillance (2012), stratified by production type (dairy; beef)

- random sample of individual serum (beef herds) or pooled milk samples (dairy herds) from a study herd

**Sheep and goats:** all herds sampled for official control (2012)

- random sample of individual serum samples from every herd

### Humans

- Random sample of „gene donors“ stratified by district and sex
- Convenience sample of veterinarians and veterinary technicians (volunteers)

### ELISA tests

Ruminants: LSIVet™ Ruminant Q Fever – Serum/Milk ELISA

- 1 milk pool of max 50 animals per herd tested in dairy herds
- Pools of 5 serum, up to 6 pools per herd tested in beef herds

Humans: Coxiella burnetii Phase II IgG ELISA test - Virion/Serion GmbH; tested individually

### Statistical analysis (EpiTools)\*

- Apparent herd prevalence for cattle herds with exact binomial 95%CI
- Apparent individual prevalence for humans with exact binomial 95%CI
- Comparison of two proportions with 2-sample z-test

## RESULTS

**Table 1. Herd seroprevalence of Q-fever among Estonian cattle herds**

Animal Category	No of tested herds	No positive*	Herd prevalence (CI95%)	Comparison of two proportions
Dairy cattle	224	60	26,8 (21.0 .. 32.6)	p<0.0001
Beef cattle	112	10	8,2 (3.2 .. 13.3)	
Sheep	27	0	X	X
Goats	9	0	X	X

\* borderline results included

**Table 2. Seroprevalence of Q-fever in two groups of Estonian adult population**

Study group	No tested	No positive*	Prevalence* (CI95%)	No positive**	Prevalence** (CI95%)
General adult population	500	7	1.4 (0.6 .. 2.9)	21	4.2 (2.6 .. 6.3)
Veterinarians and technicians	158	2	1.3 (0.2 .. 4.5)	5 (3,2)	3.2 (1.0 .. 7.2)

\* borderline results not include

\*\* borderline results included

Comparison of proportions: p> 0.5

## CONCLUSIONS

- Q-fever antibodies were detected in cattle but not in sheep and goats, however the number of tested sheep and goat farms too small to conclude freedom
- Herd seroprevalence among dairy herds was significantly higher than among beef herds.
- Q-fever apparently present among humans in low prevalence
- Seroprevalence among veterinarians similar to general adult population of Estonia

\* **EpiTools:** Sergeant, ESG, 2013. EpiTools epidemiological calculators. AusVet Animal Health Services and Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease. Available at: <http://epitools.ausvet.com.au>.

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