

## 1.6. Q-fever

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### 1.6.1. *Coxiella burnetii*

Q-fever is a zoonotic disease caused by *Coxiella burnetii*. Q-fever (Q for query) is a systemic disease caused by an obligate intracellular bacterium *Coxiella burnetii* that is highly resistant to heat, drying and many common chemical and physical agents. This resistance enables the bacteria to survive for a long period in the environment. *Coxiella burnetii* occurs worldwide.

Natural reservoirs are more than 40 species of ticks and free-living vertebrates, primarily rodents. Ticks or their excreta may spread *Coxiella burnetii* to domestic animals, e.g. sheep, goats, cattle and dogs. These animals may display a cycle that does not involve ticks since *Coxiellae* can multiply in the trophoblast of the placenta. The placentas and amniotic fluids of these animals contain large numbers of bacteria which contaminate pastures and soil. Once animal secretions or excreta have dried, infectious dust is created.

### 1.6.2. Q-fever in animals

Cattle, sheep, and goats are the main reservoirs of *Coxiella burnetii* but a wide variety of other animals can be contaminated, including domestic pets. *Coxiella burnetii* usually does not cause clinical disease in these animals, although an increased abortion rate and fertility problems in cattle, sheep and goats are observed. The emergence of these common symptoms over a longer period of time leads finally to the suspicion of Q-fever.

Organisms are excreted in milk, urine and faeces by infected animals. Animals shed the organisms especially during parturition within the amniotic fluids and the placenta. Airborne transmission can occur on premises contaminated by placental material, birth fluids or excreta from infected animals. Airborne inhalation is the most important transmission route of infection.

Since 2010, the monitoring of *Coxiella burnetii* in ruminants was intensified. Tests on *Coxiella burnetii* were added to the abortion protocol of cattle, sheep and goats. Additionally, farms with milk producing goats were tested for the presence of *Coxiella burnetii* in bulk tankmilk. Both serology and RT-PCR were performed.

In the context of abortion, 2,191 ELISA's of cattle samples were performed of which 316 were positive; 55 ELISA's of sheep that

all were negative and 12 ELISA's of goat sera of which 2 were positive. For the same purpose, 5,254 RT-PCR's were performed of cattle samples of which 500 were positive, 76 RT-PCR's of sheep of which 2 were positive and 22 of goats of which 1 was positive.

In 2011, in the context of abortion, 337 ELISA's of cattle samples were performed of which 38 were positive, 12 ELISA's of sheep and 6 ELISA's of goats of which none were positive. Of the 7,120 RT-PCR that were performed of cattle samples, 108 were positive, 1 was positive of the 143 sheep samples and 2 were positive of the 39 samples from goats. A higher cut-off was used in 2011 for a sample to be declared positive.

The results of analyses of *Coxiella burnetii* in case of abortion are given in table 16 and the results of the analyses in the framework of the bulk tankmilk monitoring on farms with milk goats and/or milk sheep are given in table 17.

**Table 16.** results of analyses of *Coxiella burnetii* in the context of abortion, 2010 - 2011

	ELISA		RT-PCR	
	Number of tests	Number of positives	Number of tests	Number of positives
Cattle 2010	2,191	316	5,254	500
Cattle 2011	337	38	7,120	108
Sheep 2010	55	0	76	2
Sheep 2011	12	0	143	1
Goats 2010	12	2	22	1
Goats 2011	6	0	39	2

**Table 17.** results of tankmilk monitoring on farms with milkgoats/milk-sheep, 2010 - 2011

Test	Year	Number of farms tested	Number of farms positive
ELISA	2010	118	17
	2011	115	17
RT-PCR	2010	118	15
	2011	115	9

Of the 440 cattle farms where *Coxiella burnetii* was detected by PCR in 2010, 390 farms had one positive PCR result, 41 farms had 2 positive results, 8 farms had 3 and 1 farm had 4 positive PCR results.

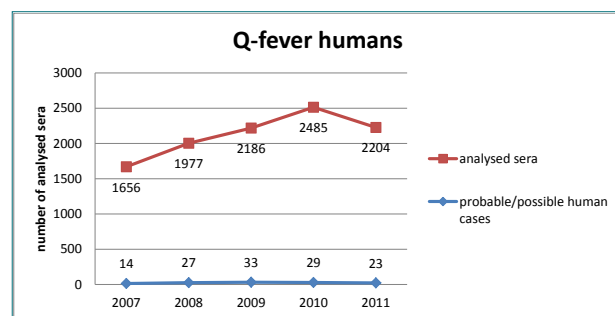
Following recommendations are given or measures are taken on farms with positive RT-PCR results:

- Information to the farmer and his family on Q-fever disease, sources of infection, transmission, symptoms of infected people, ...;
- Advice to persons 'at risk', especially persons with pre-existing cardiac valvular disease or individuals with vascular grafts and pregnant women;
- Restricted access to barns housing potentially infected animals;
- 'Good-practice' recommendations in particular for dealing with animal births/abortions:
  - Stimulation of the mandatory declaration of abortions;
  - Put aborted animals in quarantine;
  - Analyses of placenta and aborted fetuses in case of any abortion;
  - Appropriate disposal of placenta, birth products, fetal membranes and aborted fetuses;
- Regular cleaning and disinfection of residences of animals and materials
- Pasteurization of milk and milk products from infected farms
- 'Good-practice' recommendations in particular for manure:
  - Store manure a minimum distance from human dwellings;
  - Compost manure of infected animals for a period of time;
  - Implement measures to prevent dust and airflow to residential areas when spreading manure;
  - Plough manure in immediately after spreading;
- Respect of sanitary measures regarding animal movements, control of animal gathering, no participation in exhibitions of infected farms
- Preventive vaccination of non-infected animals on seropositive farms with a phase-I vaccine containing inactivated *C. burnetii*.

### 1.6.3. Q-fever in humans

In 2010, at the Institute of Tropical Medicine (NRL), a total of 2485 human sera have been examined for the presence of phase I and II IgM and IgG antibodies to *Coxiella burnetii*.

Twenty-nine probable/possible acute cases have been detected. An acute case is defined by a result of phase II IgM antibodies  $\geq 1/64$  as determined by IFA. The median age of the patients was 44.7 (range 25-78 years). Sixteen (55%) patients were male, 13 (45%) were female. Six patients stayed abroad before the start of their illness. The travel history of the other patients is not known.



**Figure 27.** Analyzed sera and probable/possible human cases of Q-fever between 2007-2011

In 2011, a total of 2204 human sera have been examined by the NRL.

Six confirmed/probable and 17 possible cases have been detected. The median age of the patients was 47.5 (range 17-76 years). Sixteen (69.6%) patients were male, 7 (30.4%) were female. Five patients stayed abroad before the start of their illness. The travel history of the other patients is not known.