

What is Q Fever?

Q Fever is the name of a disease caused by the infection by *Coxiella burnetii*, a bacterium that is able to infect most, if not all mammal species, but also birds, arthropods, etc. This name was given when the disease was first discovered, in humans (in Australia). By extension, it is now routinely used to name the classical clinical signs also observed in animals upon acute infection. However, most of the time, in humans and in animals, infection by *C. burnetii* (*coxiellosis*) is clinically silent. When it causes clinical signs, they extend beyond abortion – to other reproductive problems.

As a consequence, infection with *C. burnetii* is mostly underdiagnosed, and the impact of *coxiellosis* on reproduction performance, although well documented from a scientific point of view, is not widely known by farmers.

Ruminants are the main reservoirs of this bacterium, and cattle, sheep and goats are susceptible to the infection, while their clinical signs and main excretion routes may differ.

The bacterium is mostly shed in the farm's environment through biological fluids around parturition and abortion. It is extremely resistant in the environment, and may be dispersed by the airborne route, potentially leading to infection of other animals or humans, on the farm or in the vicinity, and can be carried by winds over several kilometers.

Experts of the European Q Fever Committee have therefore created a series of factsheets intended for farmers, to detail the suspicion, diagnostic and management



practices of *C. burnetii* infection. These practical tools are built on current scientific knowledge and may be further updated.

Here, six preliminary questions are addressed for farmers who are interested in the importance of *coxiellosis* on both the reproductive performance and the health of their herd/flock.

More factsheets are available from the European Q Fever Committee's website <https://euqfevercommittee.com/>.



ABOUT THE PATHOGEN

Coxiella burnetii is an intracellular bacterium, which means it is able to evade the immune system during infection. In the environment, it is able to resist durably desiccation (for several months), disinfection (such as 0.5% sodium hypochlorite) or UV radiation. It can survive several days in moisture (at least 7 days in water or milk at room temperature), but is inactivated by pasteurisation. All mammal species can be infected by *C. burnetii*, although ruminant species (including wildlife) are considered its main reservoir. People professionally exposed to cattle or small ruminants (veterinarians, farmers, slaughterhouse personnel...) are at risk of infection.



PURPOSE OF THIS FACTSHEET

To share essential knowledge and skills to protect your herd/flock and yourself from *Coxiella burnetii* infection.



ÁNGEL GÓMEZ MARTÍN

DVM, PhD, RAMON Y CAJAL RESEARCHER AT THE SPANISH MINISTRY OF SCIENCE AND INNOVATION AND FULL PROFESSOR AT THE CEU CARDENAL HERRERA UNIVERSITY IN VALENCIA, SPAIN; PROVAGINBIO RESEARCH GROUP.

“As the son of a dairy sheep and goat farmer and a veterinarian who has suffered a severe case of Q Fever, I am aware of the significance of this zoonosis. It is important for farmers to be aware of the risk for public health that an infected herd represents. It is necessary to consider that airborne transmission to humans from an active animal outbreak is a real possibility. We should not overlook the possibility of carrying infectious bacterial spores into our own homes: be careful with so called YOPis: Young (children), Old (the elderly), Pregnant women and Immunocompromised individuals. Scientifically, our research team has just discovered that coxiellosis negatively impacts the microbiota of herds [1], causing dysbiosis that affects the respiratory system, mammary glands, and vagina. The consequences of these effects, such as infertility, are often underestimated by farmers”



SŁAWOMIR KOŹMIŃSKI

DVM, CATTLE PRACTITIONER SPECIALIZED IN THERIOGENOLOGY, POLAND.

“In my 20+ years of experience as a cattle practitioner, I observed several aspects related to Q Fever. First, coxiellosis is mostly underdiagnosed at farm level. In the 50,000 cattle under my care, seroprevalence is around 80%, which justifies to advise for monitoring and control measures. Also, I observed that coxiellosis also prolongs the duration of uterine involution, delaying the calving interval and reducing the pregnancy rate below its cost-effective level (25%). Finally, farmers don't often think to include young stock in the vaccination, although it is most effective when started on heifers, before breeding.”

ABOUT Q FEVER

1. WHAT IS Q FEVER?

Q Fever is a bacterial disease affecting many animal species, including ruminants and humans, caused by *Coxiella burnetii* [2]. *Coxiellosis* is the infection caused by *C. burnetii*, that can have three presentations:

- An **asymptomatic form**, that is probably the most frequent case;
- A **symptomatic pattern**, mostly known through abortion (and usually named ‘Q Fever’);
- But clinical signs of *coxiellosis* extend beyond that, and may have a significant impact on the herd's performance, with **retained placentas, endometritis** and **infertility**.

Also, Q Fever is a zoonosis: the infection can be transmitted from one species to another (from animals to humans and between animal species).

2. HOW IS Q FEVER TRANSMITTED TO HUMANS AND BETWEEN ANIMALS?

Transmission occurs mainly via the airways: inhalation of aerosols contaminated mainly by genital secretions, afterbirths from infected animals, or manure (recent data seem to exonerate the latter, but further confirmation is needed).

Oral contamination (e.g. by ingestion of contaminated raw milk) is presently considered to be nil or quasi-nil to the general population, and minimal for at-risk people (pregnant women, persons with valve defect, immunocompromised persons) ^[3]. This consideration does not preclude other health risks associated with raw milk/dairy product consumption.

3. HOW DO I KNOW WHETHER COXIELLOSIS IS PRESENT ON MY FARM?

In ruminants, the infection is most often asymptomatic: in the majority of cases, infected ruminants do not show clinical signs, but can shed the bacteria by the vaginal route, and especially on the occasion of calving/abortion. Excretion in milk frequently occurs.

In case of symptomatic *Coxiella burnetii* infections, reproductive disorders: abortions, premature births, sickly newborns, and infertility (metritis, return to estrus, retained placenta leading to reduced reproduction performance) are the most important clinical signs. The latter aspect of infection is poorly known by farmers, but is increasingly recognized by veterinarians ^[4].

Identification of infection involves regular herd health monitoring, and the systematic investigation of abortions:

- **In cattle**, any abortion should be notified and subject to investigations;
- **In small ruminants**, most countries have published recommendations of a minimal number of events over a short timeframe to trigger fetus submission (in France, at least 3 abortions within 7 days or less; in the Netherlands, at least if 5% of pregnant females abort within a short period of time).

Also, a diagnostic investigation of reproductive underperformance is desirable. This does not preclude any additional/complementary measures in some European countries.

In any case, from an animal health standpoint, each abortion event should be investigated.

4. COXIELLA BURNETII HAS BEEN DETECTED ON MY FARM, WHAT SHOULD I DO?

In the EU27, Q Fever is covered by the Animal Health Law, where it is included in category E since 2021. No monitoring/surveillance/control programs are mandatory regarding abortions, but in case of a positive *C. burnetii* result, the case has to be notified to the competent veterinary services. Management of the infection is left to the decision of local (regional or national) authorities. The official decisions upon the detection of *coxiellosis* in a herd/flock may vary depending on its location. They may implement:

- Vaccination of the animals against Q Fever to limit abortions, improve fertility and decrease the shedding of bacteria into the environment. For instance, in the autonomous region of Valencia (Spain), upon the detection of *coxiellosis*, vaccination is compulsory and paid-for by the local authorities. This strategy is being implemented in other autonomous communities as it encourages the official reporting of outbreaks, thereby preventing their spread to the population. The Spanish national action plan against Q Fever ^[5] contemplates the vaccination of all animals in the herd over three months of age (it is a voluntary measure) when a clinical outbreak is officially reported. While this plan does not mention any duration for continued vaccination, it appears that at least 3 years are necessary to control *coxiellosis* at herd level by yearly vaccination ^[6]. The regional plan of the Valencia region is stricter than the national plan in this regard, imposing at least 4 years of continued vaccination, for replacement animals;
- In compliance with instructions of your veterinarian, it is important to combine vaccination with management, monitoring and biosecurity measures ^[7], with long-term programs due to the persistence of environmental contamination by *C. burnetii*. For instance, animals that are persistent shedders should be detected (if any) and removed;

- Appropriately manage effluents (manure in particular): storage conditions sheltered from the wind, consider covering with a net to prevent it from blowing away, only handle in windless and humid weather, compost the manure and plough into the soil immediately after spreading (or use a subsurface injection device);
- Implement reinforced biosecurity measures around parturition as long as *C. burnetii* shedders have not been removed. Because the bacterium can be spread by the airborne route, foam cleaning should be preferred to high pressure cleaning procedures;
- Although scientific evidence is not in support of that measure, some official veterinary services may impose milk pasteurization (for instance in some regions of Italy and Spain).

5. HOW CAN I PROTECT MY HERD AND ANIMALS FROM COXIELLOSIS?

1. Investigate your herd's status regarding *C. burnetii*. If it has a favorable status, implement tight external biosecurity measures.
2. Vaccinate your herd/flock according to your veterinarian's recommendation, as a preventive measure.
3. Preferably, prevent your animals from having contact with animals from other farms.
4. If it really is necessary to introduce animals into your herd/flock, check the health status of the herd of origin prior to animal movement. If this status is acceptable, place the animal in a quarantine location and vaccinate it before placing it within the herd.
5. Keep in mind that *C. burnetii* can be transmitted by the airborne route over long distances, and that no mechanical/chemical procedures will be fully protective.

6. HOW CAN I PROTECT MYSELF, MY FAMILY, FARM STAFF AND VISITORS?

1. Whatever your herd's status regarding *coxiellosis*, train and educate all staff on the risks associated with *coxiellosis*: hygiene, collection of afterbirth/fetuses, individual prevention measures (disposable masks, gloves/sleeves) and raise awareness on clinical signs of *coxiellosis* in humans.
2. It is not possible to fully protect people against an infection by *C. burnetii* on a farm with excreting animals.
3. You can only protect visitors by denying them access to the farming premises.
4. Training and education of all staff and family members helps all involved make better risk assessments.
5. The answers to questions 3 and 4 also apply to the protection of persons.
6. If an active outbreak of *coxiellosis* is suspected, wear respiratory protection such as a snugly fitting FFP3 mask (covering nose and mouth), especially for activities generating droplets and dust. This is delicate to comply with in practice, so limiting the risk of having *C. burnetii* circulating in the herd is all the more important.

Please contact your veterinarian for any further information.

REFERENCES

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EUROPEAN Q FEVER COMMITTEE

The Q FEVER COMMITTEE, co-chaired by Professors Raphaël Guatteo and George Valiakos, was created in July 2024 with the support of Ceva Santé Animale.

Discover who we are, our mission, and the latest expertise on Q Fever- Simply scan the QR code or visit the link below.

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