Chapter 8
A One Health Perspective on Q Fever:
Part 1

Rita Cruz
Polytechnic Institute of Viseu, Portugal

Carmen Vasconcelos-Nobrega
Polytechnic Institute of Viseu, Portugal & University of Trás-os-Montes and Alto Douro, Portugal

Fernando Esteves
Polytechnic Institute of Viseu, Portugal

Catarina Coelho
Polytechnic Institute of Viseu, Portugal & University of Trás-os-Montes and Alto Douro, Portugal

Ana Sofia Ferreira
University of Oporto, Portugal

Carla Santos
Polytechnic Institute of Viseu, Portugal

Cristina Mega
Polytechnic Institute of Viseu, Portugal

Ana C. Coelho
University of Trás-os-Montes and Alto Douro, Portugal

Helena Vala
Polytechnic Institute of Viseu, Portugal & University of Trás-os-Montes and Alto Douro, Portugal

João R. Mesquita
University of Oporto, Portugal

ABSTRACT

Q fever is a worldwide zoonotic infectious disease caused by Coxiella burnetii and ruminants, namely, cattle, sheep, and goats, are known to be the main reservoir for human infection. C. burnetii infection in animals can result in epizootic abortions which are often associated with vast bacteria shedding in birth fluids and placentas. Human infections mainly occur in persons handling infected animals and their products. Here the authors describe the history, bacteriology, biosafety, and epidemiology of Q fever, now known to be a serious threat to veterinary public health.

DOI: 10.4018/978-1-5225-6304-4.ch008

Copyright © 2019, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
A One Health Perspective on Q Fever

Q FEVER HISTORY

Q fever was first described in 1935 by Edward Holbrook Derrick, the director of the Laboratory of Microbiology and Pathology of the Queensland Health Department, in Brisbane, Australia after the regular occurrence of sporadic cases since 1933 (Maurin & Raoult, 1999; McDade, 1990). He was assigned to investigate an outbreak of an unknown disease that occurred among the local abattoir workers, with fever as the predominant symptom (Chmielewski & Tylewska-Wierzbanska, 2012; Derrick, 1937).

Derrick was first decided to determine the characteristics of the illness and carefully monitored the clinical features of the disease. The symptoms described included fever, lasting from seven to twenty-four days, headaches, depression, anorexia and pain in the limbs. The patient blood cultures performed, were negative and there was no detection of any antibodies for the known agents, at the time, in their sera. Because of this, it was concluded that the outbreak was the result of a new disease of unknown aetiology and called it Q fever. Q for query, English term that means doubt (McDade, 1990).

Several experiments and studies were performed, in order to determine the cause of the disease. Derrick inoculated guinea pigs with blood and urine from infected patients and observed that the animals developed fever. He also verified transmission of the disease, when the guinea pigs were inoculated with tissue suspensions prepared from infected animals. However, he failed to detect bacteria in infected tissues. As a consequence of this result, Derrick obtained the wrong conclusion that the etiologic agent of this disease was a virus (Burnet & Freeman, 1937; Chmielewski & Tylewska-Wierzbanska, 2012).

In an attempt to clarify the aetiology of the disease, Derrick sent the livers of infected guinea pigs to Frank Macfarlane Burnet, a virologist who worked at the Walter & Eliza Hall Institute in Melbourne. After further studies, where infected tissues were inoculated in other animal species, in 1937, Burnet and his assistant Mavis Freeman were finally able to isolate organisms, from guinea pigs, of bacterial origin with similar characteristics to the members of the genus *Rickettsia* (Burnet & Freeman, 1937; Chmielewski & Tylewska-Wierzbanska, 2012). The Q fever agent was then designated as *Rickettsia burnetii* (McDade, 1990).

In 1935, independently of Derrick’s work, Gordon Davis at the Rocky Mountain Laboratory in Montana, United States of America was investigating the ecology of Rocky Mountain spotted fever, when isolated an infectious agent from *Dermacentor andersoni* ticks, collected at the Nine Mile Creek (Maurin & Raoult, 1999). He verified that guinea pigs from where ticks were feed, developed an indeterminate fever syndrome and therefore suspected that had isolated *Rickettsia rickettsii*, the etiological agent of Rocky Mountain fever. However, the following *in vivo* inoculations shown
Related Content

Roles of Nutraceuticals and Functional Food in Prevention of Cardiovascular Disease: Sustaining Health

Wireless Heartrate Monitoring Along Prioritized Alert Notification Using Mobile Techniques
[www.igi-global.com/article/wireless-heartrate-monitoring-along-prioritized-alert-notification-using-mobile-techniques/218867?camid=4v1a](www.igi-global.com/article/wireless-heartrate-monitoring-along-prioritized-alert-notification-using-mobile-techniques/218867?camid=4v1a)
Awareness and Information Sources of Hypertensive Diseases Among Aged Civil Servants in Southwest, Nigeria

Nutraceutical Intervention of Phytosterols in Cardiovascular Aging
[www.igi-global.com/chapter/nutraceutical-intervention-of-phytosterols-in-cardiovascular-aging/207973?camid=4v1a](www.igi-global.com/chapter/nutraceutical-intervention-of-phytosterols-in-cardiovascular-aging/207973?camid=4v1a)