Q fever in the Arctic


Ammassalik hospital

Eskild Petersen

MD, DTM&H, DSc

Department of Infectious Diseases

Aarhus University HospitalSkejby,

Denmark

ProMED Moderator,

Parasitic Diseases

Coxiella burnetii	Spore building, intracellular, small gr. negative rod
Reservoir	Sheep, cows, goats, rodents and other mammals, birds
Transmission	Airborne (dust), placenta, amniotic fluid, urine, feces
	Can survive in the environment at least 1 year probbaly
	longer dependent on temperature and humidity
	Up to10^9 organisms per gram placenta tissue
Inkubation time	14 – 45 days
Symptomes	Fever, muscle pains, cough, headacke, rash
Course	Up to 95% clear the infection without treatment
Chronic Q fever	5% develops endocarditis, hepatitis, osteomyelitis meningoencephalitis

New Zealand remains probably the only country in the world where Q fever is absent

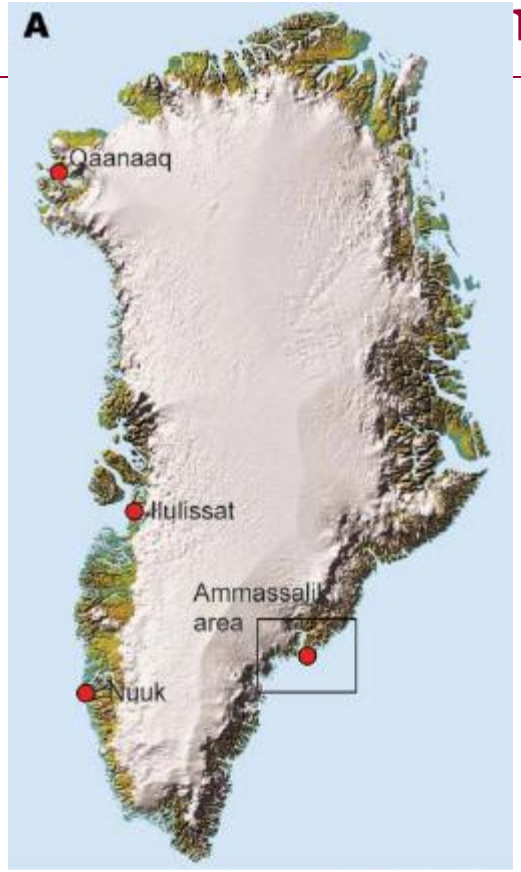
Hilbink F. et al. Int. J. Epidemiol. 1993;22 :945–949.

EID 2010;16:511-13

Q Fever in Greenland

Anders Koch, Claus Bo Svendsen, Jens Jørgen Christensen, Henning Bundgaard, Lars Vindfeld, Claus Bohn Christiansen, Michael Kemp, and Steen Villumsen

We report a patient with Q fever endocarditis in a settlement in eastern Greenland (Isortoq, Ammassalik area). Likely animal sources include sled dogs and seals. Q fever may be underdiagnosed in Arctic areas but may also represent an emerging infection.



The patient, a 40-year-old man, who resided in Greenland all his life, lived in Isortoq (population 100), a small settlement in the Ammassalik area (population 3,000) of eastern Greenland (Figure). He had worked as a hunter and a sanitation worker (garbage collector). The Ammassalik area includes the main town of Tasiilaq and 5 settlements.

The lack of domesticated ruminants may be the reason why Q fever has not been described in Arctic areas. Although *C. burnetii* has not been isolated from Arctic animals, some musk oxen in northern Quebec and reindeer in Arctic Russia (Nenet region) have been found to be positive for IgG against *C. burnetii* (*6,7*). Likewise, <0.6% of Inuits from Nunavik, 15% of trappers, and 18% of Cree hunters from interior regions of southern Quebec have been found to be positive for IgG against *C. burnetii* (*8–10*).

Centre Canadien Coopératif
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Wildlife Health Centre Newsletter

National Information Line 1-800-567-2033

Canadian Cooperative
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http://wildlife.usask.ca

2008;13:6-7

Muskoxen (*Ovibos moschatus*) of Nunavik: state of health and food safety

Coxiella burnetii, the agent responsible for Q fever (5/17)

Timofeeva SS. Data on the incidence of Q fever in the Arctic region (preliminary report) [in Russian]. Tr Leningr Inst Epidemiol Mikrobiol. 1963;25:70–4.

Current situation (27th July 2010, cited from ProMED):

The public health aspects So far this year (as of 21 Jun 2010), 421 reports of Q-fever cases in humans have been registered (compared to 1796 in 2009).

5 people died due to Q-fever during 2010.

Veterinary situation (27th July 2010, cited from ProMED):

91 farms have been reported as Q-fever contaminated (detected by the bulk milk test) from December 2009 till 15 Jul 2010.

Since all dairy goat and sheep farms in the Netherlands with more than 50 animals have been vaccinated, various veterinary requirements/measures could be discontinued.

Q fever in Russia I.

In the northwestern region of Russia (Leningrad province) cattle is proved to be the main source of *C. burnetii* infection in humans.

Liquidation of specialized cattle-breeding complexes (with their well-organized veterinary surveillance) and broadening of the circle of non-professionals that contact with agriculture or domestic animals infected with *C. burnetii* provide the prerequisites to Q fever spreading among various groups of population.

Tokarevich NK et al. **Anthropogenic effects on changing Q fever epidemiology in Russia.** Ann N Y Acad Sci. 2006;1078:120-3.

Q fever in Russia II.

Official Russian statistics indicate that between 1957 and 1995, 11,058 Q fever cases were reported in 37 administrative territories, including 39% in Povolzhje, 31% in West Siberia, and 14% in central Chernozemje, mostly in the regions of Astrakhan, Novosibirsk, and Voronezh.

However, Q fever is underreported in Russia because of diagnostic difficulties and insufficient laboratory equipment.

As in other countries, cattle, sheep and goats are the main reservoirs from which humans become contaminated, especially at the time of parturition.

Maurin & Raoult Clin Microbiol Rev 1999;12:518-53

Nova Scotia

Q fever was first reported in Nova Scotia in 1981.

Marrie recorded 174 Q fever cases between 1980 and 1987.

Exposure to infected dogs, wild hares, and deer has also been reported as a risk factor .

Q fever cases are not seasonal in Nova Scotia. Eleven Q fever endocarditis cases were diagnosed between 1979 and 1993 in Nova Scotia, which represents an incidence of 0.73 per million inhabitants per year.

C. burnetii is the etiological agent of approximately 3% of all endocarditis cases in this province of Canada.

Maurin & Raoult Clin Microbiol Rev 1999;12:518-53

Serosurveys have shown that Q fever is endemic in animals in Japan.

Q fever is probably common in Japan, as in most other countries, in individuals in contact with animals and animal products.

Maurin & Raoult Clin Microbiol Rev 1999;12:518-53

APMIS 115: 347–53, 2007
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Application of fluorescent *in situ* hybridisation for demonstration of *Coxiella burnetii* in placentas from ruminant abortions

TIM K. JENSEN,[1] DONALD L. MONTGOMERY,[2] PAULA T. JAEGER,[2] TINA LINDHARDT,[3] JØRGEN S. AGERHOLM,[3] VIVI BILLE-HANSEN[1] and METTE BOYE[1]

[1]Danish Institute for Food and Veterinary Research, Copenhagen, Denmark, [2]Department of Veterinary Sciences, University of Wyoming, Laramie, WY, USA, and [3]Department of Veterinary Pathobiology, Royal Veterinary and Agricultural University, Frederiksberg, Denmark

Jensen TK, Montgomery DL, Jaeger PT, Lindhardt T, Agerholm JS, Bille-Hansen V, Boye M. Application of fluorescent *in situ* hybridisation and immunohistochemistry for demonstration of *Coxiella burnetii* in placentas from ruminant abortions. APMIS 2007;115:347–53.

A fluorescent *in situ* hybridisation (FISH) assay targeting 16S ribosomal RNA was developed for detection of the zoonotic bacterium *Coxiella burnetii* in formalin-fixed, paraffin-embedded tissue, and applied on placentas from ruminant abortions. The applicability of the FISH assay was compared to immunohistochemistry (IHC) using human positive control serum in 12 cases of *C. burnetii*-associated placentitis as well as 7 negative control tissue samples. In all 12 cases the bacterium was detected within trophoblasts as well as free in the placental debris by both FISH and IHC. Extensive and

Scand J Infect Dis. 2000;32(6):605-7.

A case of Q fever acquired in Sweden and isolation of the probable ethiological agent, Coxiella burnetii from an indigenous source.

Rustscheff S, Norlander L, Macellaro A, Sjöstedt A, Vene S, Carlsson M.

Department of Internal Medicine, Värnamo General Hospital, Sweden.

Abstract

Serologically verified indigenous Q fever is described in a 52-y-old male, who presented with persistent fever, muscle and joint pain, headache and non-purulent cough. Institution of doxycycline resulted in prompt recovery. Coxiella burnetii was isolated from mouldy hay in a barn. The strain differs from previously isolated ones in Sweden.

Eur J Epidemiol. 1993 Mar;9(2):213-6.

A survey of Q-fever in Sweden.

Macellaro A, Akesson A, Norlander L.

Dept of Microbiology National Defence Research Establishment, UMEA, Sweden.

Abstract

Coxiella burnetii, the etiological agent of Q-fever has recently been isolated from sheep in southern Sweden. In this region 24-30% of sheep farmers have been exposed to the organism as shown by serological measurements. In veterinarians, another group with high risk of exposure to C. burnetii, about 12% have antibodies to the bacteria. The seropositive veterinarians are scattered all over the country. In two non-risk groups, draftees and hospital employees, 5-7% were found to be positive. This survey showed that Q-fever is a domestic disease which is spread throughout Sweden.

Scand J Infect Dis. 1981;13(1):17-21.

Q fever in Finland: clinical, immunological and epidemiological findings.

Lumio J, Penttinen K, Pettersson T.

Abstract

Clinical, immunological and epidemiological features of 14 human cases of Q fever diagnosed at Aurora Hospital are presented. All patients had an acute febrile disease and 9 (64%) had respiratory symptoms, 4 (29%) verified pneumonia, and 9 (64%) hepatitis, which in 4 biopsied cases proved to be granulomatous. Presence of circulating immune complexes was shown in 10/11 patients investigated by the platelet aggregation test (PAT) and the platelet iodinated protein A (PIPA) test. Q fever is not known to be endemic in the Nordic Countries. However, the causative agent, Coxiella burnetii, should tolerate our climate and there is a rich potential animal reservoir. All patients had visited some endemic area shortly before they were taken ill. In 3 cases the interval between arrival in Finland and the onset of symptoms was more than double the reported maximal incubation period, namely 69, 75 and 88 days. We suggest that these patients acquired the infection after their return to Finland from their clothing or from souvenirs. If so, Q fever could be acquired by this mechanism by persons who have never visited an area where the disease is endemic.

J Wildl Dis. 1983 Oct;19(4):324-9.

Serologic survey for selected microbial pathogens in Alaskan wildlife.

Zarnke RL.

Antibodies to Q fever rickettsia were found in sera of 12 of 15 (80%)

Dall sheep. I

Diagn Microbiol Infect Dis. 2007 Nov;59(3):283-6. Epub 2007 Sep 18.

Seroprevalence of zoonoses in a Cree community (Canada).

Lévesque B, Messier V, Bonnier-Viger Y, Couillard M, Côté S, Ward BJ, Libman MD, Gingras S, Dick D, Dewailly E.

Institut national de santé publique du Québec, Direction des risques biologiques, environnementaux et occupationnels, Quebec City, Quebec, Canada G1V 5B3. benoit.levesque@inspq.qc.ca

Abstract

Cree trappers and hunters are at risk for contracting infectious diseases conveyed by wildlife. We performed a study in a Cree community (Canada) to determine the seroprevalence of 8 zoonotic infections among hunters and trappers for evidence of exposure to Trichinella sp., Toxoplasma gondii, Toxocara canis, Echinococcus granulosus, Leptospira sp., Coxiella burnetii, Francisella tularensis, and Sin Nombre virus. A total of 50 participants (28 women and 22 men) were included in this study. Results indicate no or infrequent exposure to the Sin Nombre virus (0%) and 3 of the 4 parasites investigated (0-4%). Exposure to T. gondii (10%) and some bacteria appeared to be more prevalent (range, 4-18%). Overall, seropositivity was related to fishing, hunting, and trapping activities. Physicians should be aware of these infections in this population, particularly Q fever, tularemia, and leptospirosis.

Q fever and climate change

- ***Coxiella burnetii*** **are already present in the arctic and indeed in most of the rest of the world.**
- **Distribution seem to be ubiqitous in all climatic zoones.**
- **Spores are very resistant.**
- **More research are needed on the presence or absence of *C. bunetii***

Predictions:

Coxiella burnetii **will be found in the Arctic if looked for**

Climatic changes with influence on spore survival may cuase changes in the Epidemiology, but the infections is already widespread in wild mammals and birds

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