MONTANA ONE HEALTH

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ANIMAL AND HUMAN HEALTH PREVENTION OPPORTUNITIES

WELCOME TO *MONTANA ONE HEALTH*!!!

Montana One Health is a new quarterly bulletin published jointly by the Montana Departments of Public Health and Human Services (DPHHS) and Livestock (DOL) and meant to highlight zoonotic disease issues important to animal and human health authorities in Montana. The intended audience is veterinarians, animal health authorities, physicians and non-physician clinicians, and public health practitioners. We hope you enjoy this inaugural issue and future issues!

VETERINARIANS, HEALTHCARE PROVIDERS, AND PUBLIC HEALTH PRACTITIONERS — IMPORTANT TEAMMATES FOR PREVENTING, IDENTIFYING, AND TREATING HUMAN Q FEVER CASES

In 2011, the first recognized multi-state outbreak of human Q fever illness occurred in Montana and Washington. The outbreak involved goats sold to 20 farms in three states (MT, OR, WA). Twenty-one human cases of Q fever were identified, including nine cases in Montana. Another Q fever outbreak occurred in Montana during 2011 and was associated with an office building complex. The source of this outbreak is unknown. *Coxiella burnetii* is the causative agent of Q fever. Goats, sheep, and cattle are the most common animal reservoirs. Infected animals shed *C. burnetii* into the environment. The highest number of organisms are shed at parturition in fetal fluids and tissues. Animals normally do not develop clinical signs but can suffer abortions and stillbirths following acute infection. Humans typically become infected through inhalation of contaminated aerosols and dust. Lack of contact with livestock does not exclude the possibility of *C. burnetii* transmission. *C. burnetii* can become windborne and carried for long distances, acquired through laboratory contact or ingestion of raw milk products, and transmitted by tick bites.

Animal health response leads to identification of human Q fever cases and prevention of further cases

The introduction of *C. burnetii* into an immunologically naïve goat or sheep herd can result in abortion storms during the following one to two birthing seasons. Abortion storms can then lead to environmental contamination and human Q fever outbreaks. Additionally, asymptomatic animals can shed the organism for long periods following acute infection. In early 2011 and before a recognized human case of Q fever, an abortion storm occurred among a herd of goats on a Washington farm. *C. burnetii* was detected in the placenta of a goat in the herd. The results were then reported to the Washington State Department of Agriculture, then through the Washington State Department of Health to the local health department. The local health department then issued a health alert instructing local healthcare providers to question patients presenting with Q fever-compatible symptoms for prior exposure to goats. The diagnosis of the first recognized human Q fever case occurred in May 2011 by a physician who was aware of the health alert; the diagnosis of Q fever by the physician led to the identification of other human Q fever cases.

One of the Montana farms that received goats from the index farm in Washington was associated with six human Q fever cases. This farm had high density stocking; over 80% of environmental specimens collected were positive for *C. burnetii*. The testing of animal specimens showed over one-half of goats were shedding *C. burnetii*. In response, the animal health authorities at DOL worked with the farm's owner to implement a herd management plan. The Q fever herd management plan (http://liv.mt.gov/ah) is a voluntary agreement between DOL and the herd's owner and is intended to protect the public's health by reducing exposure of humans to *C. burnetii*, educating potentially exposed persons regarding Q fever transmission, limiting spread of *C. burnetii* in the herd owner's livestock, and detecting animals suspected of being infectious as soon as possible.

Table. Clinical characteristics of hospitalized adult patients with Q fever-compatible illnesses of unknown etiology during two Q fever outbreaks and following a health alert urging testing for Q fever, Montana, 2011

Characteristic	*Primary discharge diagnosis*			
	Pneumonia[a] (%)	Chest pain[b] (%)	Fever[c] (%)	Total (%)
No. patients	86	13	4	103
Risk factors assessed by healthcare provider				
Livestock exposure	0 (0)	0 (0)	1 (25)	1 (1)
Occupation (age 18–70)	17 (57)	4 (80)	2 (100)	23 (62)
Q fever testing				
Serum tested	0 (0)	0 (0)	1 (25)	1 (1)
Diagnosis excluded[d]	0 (0)	0 (0)	1 (25)	1 (1)
Doxycycline therapy[e]	2 (2)	0 (0)	1 (25)	3 (3)

[a]Pneumonia, organism unspecified (International Classification of Diseases, Ninth Revision, [ICD-9] code 486)
[b]Chest pain, unspecified (ICD-9 code 786.5)
[C]Fever, unspecified (ICD-9 code 780.6)
[d]Serum specimens collected 14 days after illness onset and with IgG-specific antibody titer to *Coxiella burnetii* phase II antigen ≤1:16 considered adequate to exclude *C. burnetii* infection
[e]Preferred antibiotic for Q fever treatment

Excerpt from: Nett RJ, Helgerson SD, Anderson AD. Clinician assessment for *Coxiella burnetii* infection in hospitalized patients with potentially compatible illnesses during Q fever outbreaks and following a health alert, Montana, 2011. *Vector Borne Zoonotic Dis* [in press]

Considering Q fever as potential diagnosis is critical to recognizing and treating human Q fever illness

Despite an estimated 3.1% seroprevalence rate in the US adult general population, during 2000–2010 only four cases of Q fever were reported in Montana. The incubation period of Q fever is usually 2–3 weeks. The most common clinical manifestation is a febrile and non-specific flu-like illness; thus, the diagnosis is challenging and few patients receive appropriate treatment. Indeed, hospitalized patients in Montana with Q fever-compatible illnesses were rarely evaluated for Q fever risk factors or the presence of *C. burnetii* infection (**Table**). Less than 5% of acutely ill patients will develop chronic Q fever, a life-threatening illness. Laboratory confirmation of acute Q fever is demonstrated by a four-fold rise in phase II Immunoglobulin G (IgG)-specific antibody titer between acute and convalescent specimens. Serum specimens collected 14 days after illness onset and with IgG-specific antibody titer to *C. burnetii* phase II antigen ≤1:16 is considered adequate to exclude *C. burnetii* infection. Acute Q fever is treated with doxycycline and is most successful at preventing severe illness when initiated within three days of symptom onset. Any patient suspected of having Q fever should be treated with doxycycline for 14 days and treatment should not be delayed based upon laboratory results of an acute serum specimen, which is often negative pending production of measurable antibodies. Considering the diagnosis of Q fever is especially important for immunocompromised patients, or those who are pregnant or have valvular heart disease as prompt antibiotic treatment can prevent life-threatening complications.

Q FEVER RECOMMENDATIONS

Animal Health

- Q fever is a reportable disease in Montana. Veterinarians who diagnose Q fever in livestock are required to report the diagnosis to DOL within 24 hours.
- Veterinarians and affected herd owners should work closely with DOL to develop a herd management plan that will outline control measures and reduce impact of the disease.

Human Health

- Clinicians should assess patients for Q fever risk factors (*e.g.*, livestock exposure) and consider the diagnosis in those hospitalized with clinical illness similar to Q fever and without a defined etiology.
- Patients suspected of having acute Q fever should be tested for the presence of phase II IgG-specific antibody to *C. burnetii.*
- Suspected Q fever patients should be treated promptly with doxycycline; treatment should not be delayed based upon lab results.
- Local health departments should alert clinicians to consider Q fever diagnosis upon learning of *C. burnetii* infection in livestock herd.
- Clinicians should immediately report any suspected case of Q fever to their local health department.

References

1. CDC. Notes from the field: Q fever outbreak associated with goat farms — Washington and Montana, 2011. MMWR. 2011;60:1393. http://cdc.gov/mmwr
2. CDC. Q fever. http://cdc.gov/qfever/

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