

Nature News March 3, 2010

## **Tough lessons from Dutch Q fever outbreak**

Mass cull of goats questioned as researchers race to find strain behind human cases.

The chief veterinary officer of the Netherlands has defended the country's decision to cull thousands of goats in an effort to control an unprecedented outbreak of Q fever.

The Netherlands "can't take a chance", Christianne Brusckke told Nature after a meeting in Breda -- a city near the heart of the outbreak.

At the meeting, scientists from other countries questioned the tactic. But Brusckke said that in other countries the authorities have been able to ignore the disease because there have been relatively few cases. In the Netherlands, however, epidemiological studies pinpointed goats as the source of the disease -- in an area increasingly densely populated by humans and dairy farms over the past decade, she added -- so the country had to act fast.

Q fever, caused by *Coxiella burnetii* bacteria, is harboured in mammals, birds and even insects. It can trigger abortions in goats and sheep and causes flu-like symptoms and sometimes pneumonia in humans.

After more than 2,200 confirmed human cases of the disease last year, the Dutch government slaughtered over 50,000 dairy goats on 55 of the country's nearly 400 farms in an effort to prevent the disease from spreading further.

But the Dutch government's approach to controlling the disease remains controversial. Some researchers argue that the mass cull was not necessary and less extreme measures -- such as vaccinating the animals -- may have been enough.

"I've never encountered anything like that before," says Paula Menzies of the University of Guelph in Ontario, Canada. "But I'm not the person in charge of trying to keep 2,000 people from getting sick this year."

Vaccination of dairy goats is now mandatory everywhere in the country. After the first round of vaccinations in the southern Netherlands in 2008, initial findings showed that the vaccine, produced by animal drug company CEVA of Libourne, France, cut down on the amount of bacteria in the goats' milk and afterbirth during lambing season the following year<sup>1</sup>.

But the first infected goats to be vaccinated were slaughtered in 2009. That put a crimp in possible findings from this year's lambing season, already under way, as to how much vaccination could help already infected farms, says Hendrik-Jan Roest, project leader on Q fever in goats for the Central Veterinary Institute (CVI) in Wageningen, the Netherlands. CVI researchers will attempt to analyze data from the dead goats, he says, but in the end, documenting the impact of the vaccinations may have to wait at least another year.

Researchers are also racing to work out whether one fast-spreading strain of the bacteria is causing human cases of the disease.

Previous analyses of 12 strains of *C. burnetii* found on infected Dutch dairy farms revealed one, CbNL01, that seems to be universally present in infected animals (see report). Roest and his colleagues are now trying to tease out if this bug is the one responsible for human infections. With the Dutch Institute for Public Health and the Environment, Roest's team is carrying out genome sequencing and comparisons of different strains. But CbNL01's omnipresence makes it difficult to be sure it's the source of the human disease, Roest adds.

Roest says that CVI researchers and veterinary pathologist Annie Rodolakis of INRA, the French agricultural research institute, will start by looking at how the bacteria spreads in mice. They then plan to analyze samples from infected humans and animals, comparing all Dutch *C. burnetii* strains to see if CbNL01 is the most virulent.

### **Groundbreaking**

For researchers from outside the Netherlands, the meeting presented "an incredibly wonderful opportunity" to learn from the Dutch, says Menzies.

"They've broken a lot of new ground so far" in the lab and on the farm, she says, from understanding how the bacteria are distributed at such a large scale to correlating measurements of bacterial DNA levels in bulk milk tank samples with infection rates.

"In Canada, we've been dealing with small outbreaks of disease in animals, but we've never done a prevalence survey," says Menzies. In part, that's because animals don't always exhibit symptoms of disease and detecting infected animals using blood tests -- something Dutch researchers have radically improved -- is difficult. She will take their methodology back to Canada, where testing will begin this summer on sheep and goats on both dairy and meat farms, as well as on the people that work with the animals.

The CVI said that starting this year they will also monitor the incidence of the disease in pets and horses. Cats, for example, have been identified as a vector in Canada and Japan.

"We need to know a lot more about the disease to understand why it's so different in the Netherlands than the rest of the world," Menzies adds.