

## LARGE ONGOING Q FEVER OUTBREAK IN THE SOUTH OF THE NETHERLANDS, 2008

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### Background

Q fever is a worldwide zoonosis caused by the bacterium *Coxiella burnetii* which is common in a wide range of wild and domestic animals. Cattle and small ruminants, in particular sheep and goats, have been associated with large human outbreaks. Humans become infected primarily by inhaling aerosols that are contaminated by *C. burnetii*. Most infections remain asymptomatic but in about 40% lead to a febrile disease, pneumonia and/or hepatitis. Chronic infections, mainly endocarditis, are observed in 3 to 5% of cases, with an increased risk for pregnant women and persons with heart valve disorders or impaired immunity. Q fever in pregnancy, whether symptomatic or asymptomatic, may also result in adverse pregnancy outcomes [1]. Q fever in humans is a notifiable disease in The Netherlands. The notification criteria for a confirmed case of acute Q fever are clinical symptoms consistent with Q fever and a positive serology defined by immunofluorescence assay (IFA) test or a *C. burnetii* complement fixation test [2]. Also clinical patients diagnosed by PCR are considered as confirmed cases. Between 1997 and 2006, Q fever was notified rarely with an average of

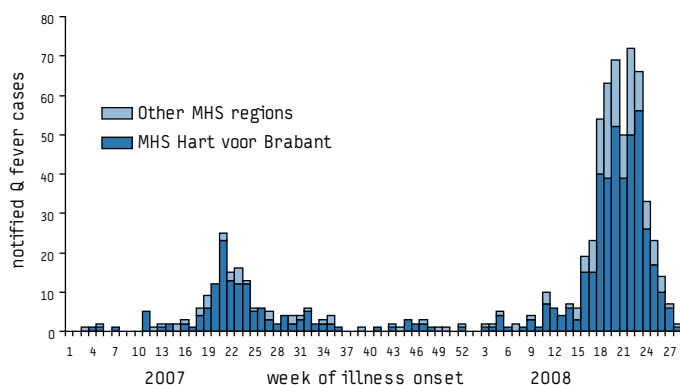
11 (range 5-16) cases annually [3]. In 2007, we reported in this journal the first community outbreak of Q fever in the south of The Netherlands [4].

### Current situation

We report a second large outbreak of Q fever that started in the first half of 2008. Since the spring of 2008, a marked increase in notified Q fever cases has been observed with a total of 677 cases notified up to 24 July 2008 in OSIRIS, an internet-based reporting system for notifiable infectious diseases in The Netherlands. Of these cases, 17 had illness onset in 2007, 546 in 2008, while for the remaining 114 recently notified cases the date of illness onset is still unknown. The majority of cases reported illness onset between week 18 and 24, similar to the outbreak in 2007 (Figure 1). The overall female to male ratio is 1:1.7. The age distribution in 2008 ranges between 7 to 87 years (IQR 41-60 years, median 51 years) and is similar to the age distribution in 2007 (Figure 2). The preliminary hospitalisation rate of cases in

FIGURE 1

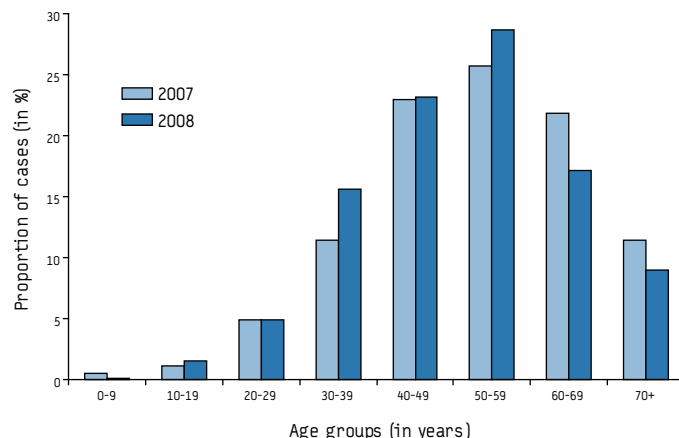
Notified cases of Q fever by week of illness onset, municipal health service (MHS) 'Hart voor Brabant' and all other MHS, 1 January 2007-24 July 2008, the Netherlands (n=182 in 2007 and n=546\* in 2008); Source: OSIRIS



\* for further 114 cases notified in 2008 the date of illness onset is still unknown

FIGURE 2

Age group distribution of Q fever cases in 2007 (1 January - 31 December, n=182 cases) and 2008 (1 January - 24 July, n=660 cases); source: OSIRIS



2008 was 22% compared to 43% during the same period (week 1-28) in 2007.

Of the cases with illness onset in 2008 for whom information on symptoms was available (n=300), 94% reported fever, followed by fatigue (89%), night sweating (78%), headache (71%) and general malaise (63%). Sixty-five percent of the cases with known symptoms had pneumonia. So far, no pregnancy has been reported among notified cases.

Although the 2008 epidemic is located in the same part of the country as the outbreak in 2007, it is more widespread in the province of Noord-Brabant and expanded to the adjacent province of Gelderland (Figure 3). This area is known for its large density of dairy goats. Seventy-five percent of the cases notified in 2008 reside in one municipal health service region 'Hart voor Brabant'. Within this region, several distinct clusters of Q fever have been observed in rural municipalities with cumulative incidences as high as 14 acute *C. burnetii* infections per 1,000 inhabitants (Figure 3). The outbreak is ongoing but the numbers seem to decrease in the entire Q fever affected area.

### Control measures and new legislation

Since 2007, Q fever has become an important public health problem in The Netherlands, warranting a continuous enhanced surveillance. Efficient data sharing between public health institutions and veterinary health partners on regional and national level is a prerequisite for timely and thorough source tracing and identification. Following the 2007 outbreak, an informal agreement was made that the veterinary and the public health sectors would

exchange information on farms with newly diagnosed animal cases of Q fever to allow for an adequate response and control. On 3 June 2008, an outbreak management team was convened and recommended a mandatory notification of Q fever in ruminants. In the same month this recommendation was implemented by the Dutch Ministry of Agriculture and the Ministry of Health; farmers and veterinarians have to report symptoms compatible with Q fever, usually abortion waves, in small ruminants held in deep litter houses. In addition, a ban to spread manure during the three months following the detection of Q fever at the farm and a restriction for visitors at the farm were imposed [5,6].

The current situation has also led to public health questions about the need for screening of pregnant women for Q fever and exclusion of blood donations from individuals in affected regions. On 22 July, an international expert meeting was organised by the National Institute for Public Health and the Environment (RIVM) and the Health Council of The Netherlands, with participation of the European Centre for Disease Prevention and Control (ECDC), to address these important issues. The outcome of this meeting will be reported separately.

### Discussion

This is by far the largest community outbreak of Q fever ever reported in the literature. Other European countries such as Denmark and Germany have also reported a changing epidemiology of Q fever and an increase in cases in 2008 but not to the same extent as in The Netherlands [7,8]. The sharp increase in cases in the spring and the widespread pattern of this community outbreak with more than 600 cases reported in 2008 is alarming. This high number of notified cases is partly explained by an increased awareness of Q fever among general practitioners (GP), specialists and medical microbiological laboratories, especially in the region where the 2007 outbreak occurred. We hypothesize that this has also led to a different diagnostic approach and earlier diagnosis of suspected cases, leading to less hospital admissions in the notified cases. Signals from rural GP practices indicate, however, that there is an unprecedented marked and striking increase in pneumonia and signs and symptoms associated with Q fever in their patient population [personal communication].

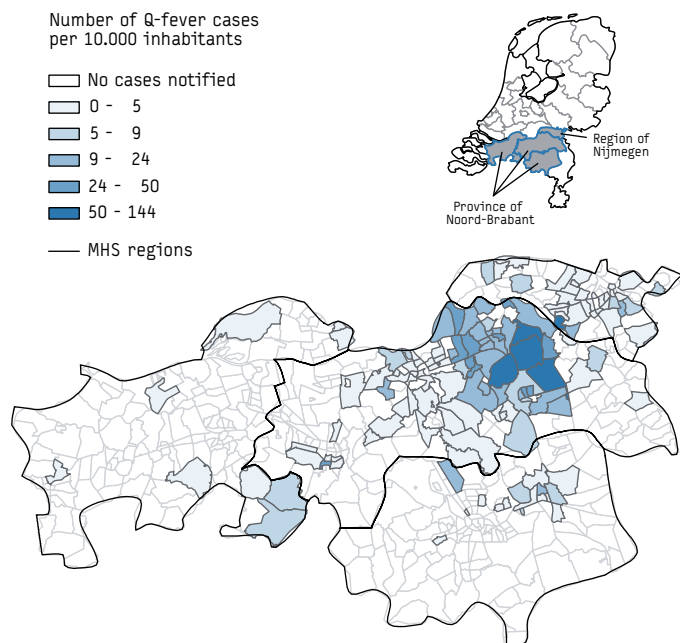
To date there has been no conclusive evidence as for the source(s) of the epidemic. Although a single animal source can cause many human Q fever cases [9], the larger geographic area in which cases occur in 2008, compared to 2007, points at multiple sources. Several studies to assess the risk factors for Q fever in the general population, high-risk groups, and in ruminants are ongoing or starting in the near future, including source investigations focusing mainly at small ruminant farms and pet farms.

We hope through this paper to raise awareness of this problem and inspire colleagues from other European countries to report whether they have observed similar increase in Q fever case numbers and share their experience.

### Acknowledgements

We would like to acknowledge all public health physicians and nurses from municipal health services and medical microbiologists from the regional laboratories in Noord-Brabant province and the region Nijmegen in Gelderland province. Figure 3 was compiled by Cindy Deuning (RIVM) based on four-digit post code data provided by the municipal health services.

**FIGURE 3**  
Q fever notifications per 10,000 inhabitants by four-position postal code areas\*, 1 January-23 July 2008, 3 MHS regions in Noord-Brabant province and MHS region Nijmegen in Gelderland province (n=628)



\* In The Netherlands six-digit postal codes (e.g. 4000 AB) indicate areas at street level. The Figure is based on larger districts defined by the first four digits of the postal code (e.g. 4000)

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This article was published on 31 July 2008.

Citation style for this article: Schimmer B, Morroy G, Dijkstra F, Schneeberger PM, Weers-Pothoff G, Timen A, Wijkmans C, van der Hoek W. Large ongoing Q fever outbreak in the south of The Netherlands, 2008. *Euro Surveill*. 2008;13(31);pii=18939. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=18939>