Author's response to reviews

Title: Q fever in the Netherlands: public perceptions and behavioral responses in three different epidemiological regions: a follow-up study

Authors:

Marloes Bults (m.bults@rotterdam.nl)
Desirée JMA Beaujean (desiree.beaujean@rivm.nl)
Clementine J Wijkmans (c.wijkmans@ggdhvb.nl)
Jan Hendrik Richardus (j.richardus@erasmusmc.nl)
Hélène Voeten (h.voeten@rotterdam.nl)

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Author's response to reviews: see over
Dear dr. Dalumpines,

We received reviewer reports on our submitted paper titled: “Q fever in the Netherlands: perceptions and behavioral responses in three different epidemiological regions: a follow-up study”. We are pleased with the compliment that this study is well planned, performed, analysed and finally, well presented. The reviewers also had some comments, which we are happy to address.

In this letter we give a point-by-point response to the comments of the reviewers. We also uploaded the revised version of our paper.

We hope that our paper is now suitable for publication in BMC Public Health.

Yours sincerely,

On behalf of all authors

Marloes Bults (corresponding author).
Comment reviewer #1:

Major Compulsory Revisions

1) In general, the paper lacks any in-depth analysis that would enable explaining and understanding of the observed trends and regional differences in the measured variables. The main results reported are that awareness and related health behaviors grow after the major outbreak of the disease and drop in the following years, with the high incidence region scoring higher than medium and low incidence regions in most variables. Given that (as the authors report in the introduction) the outbreak was followed by high media coverage (“the public were informed through targeted mailings, publications, and the news media”, Background section, pp. 3) that moreover differed between regions according to incidence levels (“patients (...) that lived in high-risk areas were offered Q fever vaccinations”, Background section, pp.3) the results and conclusions presented are rather trivial. The only result that the authors find surprising is that Q-fever related anxiety and perceived susceptibility remained low. However, they do not attempt any in-depth analysis of the data that would help explain this or the other results. With such a high sample (almost 1000 participants completing all 3 rounds of the survey) many research questions could be posed that would truly enhance our understanding of how the public reacts to zoonotic diseases, e.g.:

a. How does better knowledge (as measured) influence anxiety, perceived susceptibility, self-efficacy, etc.?

Reply:
As the reviewer suggest, we performed further in-depth analysis. To explain underlying correlations, we included a correlation matrix in the revised version of our paper (see Table 1). The correlation matrix presents the unadjusted means, standard deviations and bivariate correlations (using Pearson’s r) for demographic and cognitive variables regarding Q fever risk perception and preventive behavior. The results of 2010 were used, because the number of fatal cases and levels of knowledge, perceived severity, anxiety, efficacy beliefs, and preventive behavior were highest in that year. We found a strong positive correlation between knowledge and contact with the disease (.06; p=.03), perceived severity (.10; p<0.001), perceived susceptibility (.10; p<0.001), perceived anxiety (.21; p<0.001), perceived efficacy (.16; p<0.001), perceived self-efficacy (.10; p<0.001), intention (.11; p<0.001), and actual behavior (.13; p<0.001).

In the revised method section is described that:
‘We computed the means, standard deviations and Pearson’s r for the demographic and cognitive variables’.

In the result section we describe:
‘Table 1 provides the unadjusted bivariate correlations between the study variables. Except contact with the disease and perceived chance, all other cognitive variables were positively correlated, mostly with a correlation significant at the 0.01 level (2-tailed). For example, people with higher knowledge reported higher levels of contact with the disease, perceived
severity and perceived susceptibility, feelings of anxiety, perceived (self-)efficacy and intention, and took more often preventive measures against Q fever. Furthermore, contact with the disease was highly correlated with knowledge, perceived susceptibility, perceived chance, perceived anxiety, and preventive behavior, but was negatively correlated with intention on a marginal level (p=0.03). Perceived chance was highly correlated with contact with the disease, perceived severity, susceptibility, anxiety, intention, and preventive behavior.'

b. How does contact with the disease (as measured by question 7) affect knowledge, willingness to take counter-measures, etc.?

Reply:
Contact with the disease was measured with the item: ‘Did you or someone in your household ever had Q fever?’ Only a small number of respondents reported to have had Q fever themselves or someone in their household (2009 n=8; 2010 n=9; 2012 n=9). Contact with the disease is a possible ‘cue to action’ for taking preventive measures against Q fever. Cue to action is one of the variables included in the Health Belief Model and defined as events, either bodily (e.g. physical symptoms of a health condition) or environmental (e.g. media publicity) that motivate people to take action. In the correlation table as mentioned above at point 1a, we included this item and found that contact with the disease was positively correlated with knowledge (.06; p=0.03), perceived susceptibility (.11; p<0.001), perceived chance (.11; p<0.01), perceived anxiety (.06; p=0.02) and preventive behavior (.07; p=0.02). Furthermore, contact with the disease was negatively correlated with intention to take preventive measures on a marginal level (-.06; p=0.03).

As described above in the revised result section we included the following: ‘Table 1 provides the unadjusted bivariate correlations between the study variables’ and ‘Contact with the disease was highly correlated with knowledge, perceived susceptibility, perceived chance, perceived anxiety, and preventive behavior, but was negatively correlated with intention on a marginal level (p=0.03).’

c. What are the best predictors (in the first survey run) of higher propensity to take counter measures, higher self-efficacy, etc. as measured in the follow-ups?

Reply:
We performed logistic regression analyses to identify predictors of taking preventive measures. For the predictors, we used data of the first survey run in 2009. For the outcome variable, i.e. preventive behavior, data of the follow-up study in 2010 were used to identify a causal relationship between predictors and the outcome variable.

In the revised method section is described that: ‘Univariate and multivariate logistic regression analyses were performed to identify factors significantly associated with taking one or more preventive measures regarding Q fever. Prospective/follow-up studies are preferably used to identify a causal relationship between the predictors (measured at T1)
and actual behavior (measured at T2) [30]. Therefore, we used data from the first survey in 2009 for the predictors in the regression analyses, whereas data from the follow-up survey in 2010 were used for the outcome variable (i.e. preventive behavior). For the multivariate regression analyses, all factors with a p-value <0.1 in the univariate analyses were entered in the multivariate model, and removed one-by-one (starting with the most insignificant one etc.) until only statistically significant predictors (p<0.05) remained.

In the result section is described that: Univariate and multivariate logistic regression analyses were performed to identify predictors significantly associated with taking one or more preventive measure regarding Q fever (Table 4). From the multivariate logistic regression analysis, predictors of preventive behavior were being female (OR 1.4; 95% CI 1.1-1.8), older aged (>50 yrs: OR 2.0; 95% CI 1.3-3.1), having Q fever themselves/someone in their household (OR 5.4; 95% CI 1.0-28.1); more knowledge (OR 1.6; 95% CI 1.2-2.1), and higher levels of perceived severity (OR 1.6; 95% CI 1.2-2.1), feelings of anxiety (OR 2.3; 95% CI 1.7-3.1), efficacy (OR 1.7; 95% CI 1.3-2.2), and self-efficacy (OR 1.4; 95% CI 1.1-1.9).

In the discussion section is described that: ‘Predictors of preventive behavior regarding Q fever were being female, older aged, having Q fever themselves/someone in their household, and higher levels of knowledge, perceived severity, feelings of anxiety, and (self-)efficacy. So, besides rational arguments (such as perceived severity and efficacy of measures), emotional aspect like anxiety play a role in decision-making concerning preventive behavior.’

d. How the age/education/employment affect knowledge, anxiety, etc.? (results are not presented, although hinted at)

Reply:
As described at point 1a we included a correlation matrix in the revised version. This matrix provides information regarding the underlying correlations between the demographic and cognitive variables. As shown in table 1 being female was correlated with higher perceived chance, perceived self-efficacy, intention and preventive behavior. Being older was correlated with higher perceived severity, perceived chance, anxiety, (self-)efficacy, intention and preventive behavior. Higher educated was correlated with more knowledge, but with lower levels of contact with the disease, perceived severity, vulnerability (2 items), anxiety, self-efficacy and intention. Besides analysing correlations we also identified predictors of taking preventive measures regarding Q fever (as we described above at point 1c). We found that of the demographic determinants being female and older aged were predictors of preventive behavior.

In the revised result section we described that: ‘From the multivariate logistic regression analysis, predictors of preventive behavior were being female (OR 1.4; 95% CI 1.1-1.8), older aged (>50 yrs: OR 2.0; 95% CI 1.3-3.1), having Q fever themselves/someone in their household (OR 5.4; 95% CI 1.0-28.1); more knowledge (OR 1.6; 95% CI 1.2-
2.1), and higher levels of perceived severity (OR 1.6; 95% CI 1.2-2.1), feelings of anxiety (OR 2.3; 95% CI 1.7-3.1), efficacy (OR 1.7; 95% CI 1.3-2.2), and self-efficacy (OR 1.4; 95% CI 1.1-1.9).

e. Does anxiety predict the willingness to take counter-measures, etc.?

Reply:
As shown in the correlation table a strong positive correlation was observed between perceived anxiety and all other cognitive variables (i.e. knowledge, contact with the disease, perceived severity, vulnerability, anxiety, efficacy, self-efficacy, intention and behavior; revised version Table 1). Furthermore, as described above as a result of the multivariate logistic regression analyses perceived anxiety was found to be a predictor of taking preventive measures regarding Q fever (revised version Table 4).

In the revised result section we describe that:
'Table 1 provides the unadjusted bivariate correlation between the study variables. Except contact with the disease and perceived chance, all other cognitive variables were positively correlated, mostly with a correlation significant at the 0.01 level (2-tailed)’ and ‘From the multivariate logistic regression analysis, predictors of preventive behavior were being female (OR 1.4; 95% CI 1.1-1.8), older aged (>50 yrs: OR 2.0; 95% CI 1.3-3.1), having Q fever themselves/someone in their household (OR 5.4; 95% CI 1.0-28.1); more knowledge (OR 1.6; 95% CI 1.2-2.1), and higher levels of perceived severity (OR 1.6; 95% CI 1.2-2.1), feelings of anxiety (OR 2.3; 95% CI 1.7-3.1), efficacy (OR 1.7; 95% CI 1.3-2.2), and self-efficacy (OR 1.4; 95% CI 1.1-1.9) (Table 4).’

In the revised discussion we describe that:
‘Besides rational arguments (such as perceived severity and efficacy of measures), emotional aspect like anxiety play a role in decision-making concerning preventive behavior.’

f. Does the general pattern baseline – grow – drop observed for many variables mean that the variables drop to the baseline (2009) or remain higher? (this could be answered by a repeated measures AOV instead of pairwise comparisons).

Reply:
In the revised version, trends over time are clearly shown in the table (Table 2) and described in the result section. There are only 3 variables with a ‘baseline – grow – drop’ trend over time, including knowledge, perceived anxiety and preventive behavior.

In the revised method section we give more information about these ‘baseline-grow-drop’ trends and describe that:
‘Public knowledge regarding Q fever increased significantly between 2009 and 2010, but slightly decreased between 2010 and 2012 (Table 2); ‘Perceived anxiety increased from 2009 to 2010, but decreased between 2010 and 2012 to the level of the first survey in 2009’ and ‘The percentage of respondents that had actually taken one or more measures for preventing Q fever increased
significantly between 2009 and 2010 (from 22% to 30%), but decreased between 2010 and 2012 to the level of the first survey in 2009 (from 30% to 23%).

Minor Essential Revisions

2) The best part of the results section describes (almost line by line) what is already presented in the tables. In most part, this is redundant – it would be enough to underscore the most important general trends / results and instead present additional analyses here (see comment 1).

Reply:
We agree with the reviewer that the results could be more summarized and we now describe only the most important general trends/results. Furthermore, the most important results shown in figure 2 and 3 are included in respectively table 2 and 3 and the figures are deleted in the revised version of our manuscript. This increases readability and gives room for other results, like description of underlying correlations and predictors of Q fever preventive behavior.

3) In Figure 3 the regions are not labeled with regards to incidence (only “1”, “2”, “3”) and the reader has to guess which is the highest and which the lowest incidence region.

Reply:
In the revised version of the manuscript, the most important results shown in figure 2 and 3 are included in respectively table 2 and 3 and the figures are deleted in the revised version of our manuscript.

4) The results on confounding factors in the regional differences analysis are not presented while they could in fact be an interesting part of the analysis. Are the confounding factors correlated with each other? How do they influence the measured variables? Judging by the data in table 1, region 3 with the low incidence (as such serving as a baseline here) is markedly different from the others – it has the youngest, highly educated population, with lowest unemployment and highest “single” marital status. All this suggest that the region differs also on other dimensions (rural/industrial?) What was the motivation for choosing this region as a low incidence baseline if it is so much different from the others? More explanation should be given.

Reply:
In our study, we made use of an Internet panel that is representative for the Netherlands as a whole with regard to gender, age and education. However, the respondents in our study were not fully representative for each individual region regarding gender, age and education. The low incidence region (with the lowest number of human Q fever cases and therefore selected as ‘control’ region) includes 2 provinces. They are the most rural provinces of the country. However, apparently people in these provinces were more often female, young, higher educated, employed and single. However, we choose to include them as confounders in the analysis. As a result of this remark of the reviewer
we acknowledge that this is a weakness of our study which we now mention in the discussion section:

‘The Internet panel was representative for the Netherlands as a whole with regard to gender, age and education. Our study population comprised inhabitants of three regions. Therefore, the results may not be generalisable to the whole country. Furthermore, participants were not fully representative for their region. Although gender, age and education were included as confounders when analysing regional differences in risk perception and preventive behavior, other results can be slightly biased (for example the percentages in Table 2).’

5) When discussing the surprisingly low anxiety and perceived susceptibility levels the authors should include information on the population in the studied regions. The number of cases diagnosed in a particular region with respect to the total population of that region is what describes the actual probability of infection; NOT the number of cases in the region compared to the total number of cases in the country. The actual probabilities (as roughly assessed by the public) might influence anxiety levels and presenting them could help explain the results.

Reply:
In the revised version we now include information on the population in the studied region. The high incidence region (Noord-Brabant) includes 2464 000 inhabitants, the medium incidence region (Utrecht and Limburg) includes 2360 000 inhabitants, the low incidence region (Groningen and Friesland) includes 1229 000 inhabitants (http://www.cbs.nl/en-GB/menu/home/default.htm)

In the revised method section we describe that: The regions included Noord-Brabant (with around 2464 000 inhabitants), which had the highest incidence of human Q fever, and Utrecht and Limburg (with around 2360 000 inhabitants), where Q fever had been more recently introduced. Two other provinces with low incidences of human Q fever, Groningen and Friesland (with around 1229 000 inhabitants), served as control regions.

In the revised discussion section we describe that: This was remarkable, because there was a high risk of becoming infected in this region; around 75% of the total 2,357 cases in 2009 had occurred in this region (with around 2464 000 inhabitants).

Discretionary Revisions

6) When describing the limitations of the study it could be noted that samples drawn from panel participants are generally considered “heavy internet users”. In most cases this does not influence the results, but when analyzing the perceived amount of information received these participants might be biased due to their generally larger information seeking/information exposure behaviors.
Reply: We agree with the reviewer on this point and included in the revised discussion that:
‘Samples were drawn from an Internet panel which often include ‘heavy internet users’ who are more likely to perform information seeking behavior. This might have led to some bias in the perceived amount of information received.’

Comment reviewer #2:

Minor Essential Revisions

1) Please correct typo (i.e. behavior instead of behaviour)

Reply: The manuscript has been edited by a professional editorial office. Typo’s are corrected in the revised version of our manuscript.