

## BACKGROUND

Q fever results from bacterial infection with *Coxiella burnetii*, a zoonotic infection primarily transmitted to humans by large domestic mammals such as cattle and sheep, but also by other animals, including pets and wildlife, which shed *C. burnetii* in the form of aerosolised particles <sup>(1)</sup>. *C. burnetii* infection can also be acquired from contaminated animal products such as meat, milk, wool, placenta and other birth products <sup>(2)</sup>. Spores of *C. burnetii* also survive for long periods in the environment <sup>(3)</sup>. In Australia, Q Fever is a nationally notifiable disease. Cases have been observed in all states and territories but over 80% of all notified cases come from Queensland and New South Wales <sup>(4)</sup>. While Q Fever has mostly been observed in rural areas, cases have also been observed in urban areas <sup>(5)</sup>.

Q Fever may manifest as asymptomatic, mild or severe disease that results in hospitalisation and death <sup>(6)</sup>. Clinical symptoms of acute Q Fever from primary *C. burnetii* infection include: an influenza-like illness with fever, sweats, muscle aches and headaches, and less commonly pneumonia and hepatitis <sup>(5)</sup>. Approximately 5% of individuals with acute Q Fever will develop chronic Q Fever, which can present as endocarditis, bone and joint infections or chronic fatigue syndrome <sup>(7)</sup>. Treatment of acute and chronic Q fever is primarily with the antibiotic doxycycline <sup>(6)</sup>.

Q Fever is most often diagnosed in male adults aged between 20 and 60 years, especially those working in or exposed to the agricultural, livestock and veterinary industries <sup>(4)</sup>. Q Fever has been reported less often in children <sup>(8)</sup>. Also, the rates of seropositivity to *C. burnetii* in children are not clear <sup>(8)</sup>, and there is scarce data available in Australian children. The symptoms of Q Fever in children have also been reported as being less specific and so there is a concern that the disease may be under recognised in this population and thus the true burden of disease unknown <sup>(8)</sup>. Published reports to date of Q Fever in children, including in Australia, have either only presented epidemiological case numbers showing fewer cases in children than in adults <sup>(4, 9)</sup> or have reported children with chronic Q Fever, highlighting bone and joint infections <sup>(10,11)</sup>. There are no comprehensive data of Q Fever in children that have examined the symptoms, diagnosis, severity, clinical course, hospitalisation, treatment, risk factors infection and outcomes, which could help inform appropriate prevention, vaccination, and treatment strategies.

Although a Q Fever vaccine has been developed in Europe for use in livestock, the Australian government has not authorised importation for use in Australia due to biosecurity concerns <sup>(12)</sup>. Although hygiene measures to reduce transmission of *C. burnetii* from livestock can be implemented, the most effective means to prevent transmission to humans is via human vaccination <sup>(12)</sup>. A Q Fever vaccine, developed in Australia, has been available for human use since 1989, however it can only be administered to individuals aged ≥15 years with no previous exposure to *C. burnetii* <sup>(13)</sup>. A national program of Q Fever vaccination for at-risk adults was launched in 2001 but ceased in 2006 at the government's discretion <sup>(7)</sup>, and Q Fever incidence has since been rising since 2009 <sup>(4)</sup>. There have been no plans to reinstate the national Q Fever vaccination program <sup>(14)</sup>. The vaccine has not been trialled in children aged less than 15 years, and therefore not recommended for use in this age group <sup>(7)</sup>, however, a small number of Australian children under the age of 15 years have reportedly received the vaccine without adverse effects <sup>(15)</sup>. Plans to commence an Australian clinical trial of Q Fever vaccination in children aged 10-15 years were announced in 2020 <sup>(16)</sup>. However, there is no epidemiological and clinical data on the burden of Q fever among children in Australia. These information are essential to inform future public health and immunisation programs.

## STUDY OBJECTIVES

1. To identify cases of Q Fever in Australian children aged < 16 years, who are seen by paediatricians and to document the distribution of cases.
2. To describe Q Fever in children, including demographics, exposures/risk factors clinical features, severity, treatment and short- term outcomes in children with Q Fever, prior to vaccination of this population group.

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## CASE DEFINITION

Please report any child aged less than 16 years having either:

**1. Confirmed acute Q Fever** as determined by:

Laboratory detection of *Coxiella burnetii* by PCR testing of unclotted blood or serum

OR

Laboratory detection of a  $\geq$  four-fold increase in IgG antibody titres to phase II *C. burnetii* antigen by indirect immunofluorescence antibody (IFA) in a serum sample collected 2-3 weeks after onset (convalescent), when compared with a serum sample collected at onset, in the absence of recent vaccination

**2. Probable acute Q Fever** as determined by:

Laboratory detection of IgM antibody to phase II *C. burnetii* antigen in serum in the absence of recent vaccination

AND

Clinical presentation compatible with acute Q Fever disease (fatigue, cough, headache and fever)

**3. Chronic Q Fever** as determined by:

Clinical presentation consistent with chronic Q fever disease (e.g. endocarditis, osteomyelitis, hepatitis, encephalitis or other)

AND

Laboratory detection by IFA of elevated IgG antibody titres to phase I *C. burnetii* antigen, with or without detection of IgA in serum

OR

Laboratory detection of *C. burnetii* by PCR in blood or tissue at infection site (e.g. bone, joint)

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## PRINCIPAL INVESTIGATOR

## FURTHER INFORMATION

For further information related to this study or assistance completing the Case Report Form, please contact the APSU by either:

- email: [SCHN-APSU@health.nsw.gov.au](mailto:SCHN-APSU@health.nsw.gov.au) or
- phone: (02) 9845 3005

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