

## Short reports

# Q FEVER AND CONTACT WITH KANGAROOS IN NEW SOUTH WALES

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Q fever is a re-emerging pathogen of increasing public health importance.<sup>1</sup> This zoonosis, caused by *Coxiella burnetii*, can lead to acute and chronic illnesses in humans. While many infections are mild or asymptomatic, severe illness requiring hospitalisation and death can occur.

Domestic cattle, sheep and goats are important reservoirs for *C. burnetii* and exposure to aerosols and dust generated from infected animals is a well-established risk factor.<sup>2</sup> Of particular importance in transmission are the birth products of ruminants, which contain extremely high concentrations of *C. burnetii*. Typical high risk occupations associated with Q fever infection include farming, abattoir work and veterinary practice. Domestic pets, wild animals and ticks are also important reservoirs, although the role they play in the transmission of human disease is not well understood. In Australia, bandicoots, kangaroos, possums, dingoes, cats, foxes and wild pigs have all shown serological evidence of *C. burnetii* infection.<sup>3</sup>

In 2014, two cases of Q fever with non-typical risk exposures were investigated in northern New South Wales. The cases spent a significant amount of time (7–8 hours per day) working outdoors maintaining adjoining parkland properties (a hospital precinct and a golf club) inhabited by a large number of kangaroos. They were confirmed on the basis of clinically compatible symptoms and immunofluorescence serology performed by the Australian Rickettsial Reference Laboratory. The cases were aged 37 and 52 years, both were male and illness onsets were 19 April 2014 and 20 May 2014. Both cases were hospitalised, neither were vaccinated, neither had visited a recognised high risk setting (including farms or abattoirs) nor had contact with cows, goats, sheep, dogs or cats during their incubation period. Both spent considerable time each day (5–7 hours) mowing lawns contaminated with kangaroo faeces. All gardening activity, including lawn mowing, was performed without respiratory protection. The cases both directly handled joeys (juvenile kangaroos still using the mother's pouch) during their incubation period. One of the cases also handled dead kangaroos. As part of the investigation, other outdoor workers at the 2 sites were tested (CFT antibody and

intradermal hypersensitivity testing) to determine prior or current Q fever infection. Testing results from one of the sites was made available to public health investigators. A total of 19 outdoor workers were tested, including 10 permanent grounds staff. All were negative for both tests. Tick specimens (n = 49) and kangaroo tissue collected during an unrelated babesiosis outbreak at one of the locations earlier in 2014 were also tested for *C. burnetii* by polymerase chain reaction and all were negative.

Direct contact with infected joeys and/or kangaroos and exposure to infected kangaroo ticks are plausible risk factors for Q fever transmission. Although the kangaroo tissue and ticks did not test positive during this investigation, both kangaroos and the kangaroo tick *Amblyomma triguttatum* have been shown to carry *C. burnetii*.<sup>3,4</sup> Mowing lawns or blowing grass contaminated with faeces or birth products of kangaroos or other native animals are also possible risk factors. Q fever outbreaks have been associated with dust originating from infected ruminant farms<sup>2</sup> and lawn mowing and brush cutting activities have been associated with outbreaks of tularaemia and psittacosis.<sup>5–7</sup> The very high kangaroo population and the extensive contamination of lawns with kangaroo faeces were notable features. However, the absence of *C. burnetii* infection in any of the other grounds staff, including those who spent considerable time mowing the same grounds as one of the confirmed cases, suggests that the direct handling of joeys was the more likely risk factor in this instance. At both sites, the cases were the only outdoor workers who had direct contact with the joeys (including touching the bare skin of the joeys both in and out of the pouch as well as handling dead joeys).

While definitive conclusions cannot be drawn, this investigation adds to a very limited literature on Q fever transmission risks not associated with recognised high risk exposures. The importance of non-typical exposures for *C. burnetii* infection was recently highlighted in Queensland, where it was determined that 60% of acute cases treated at the Townsville hospital had no clear animal or occupational exposures.<sup>8</sup> These cases were more likely to live on the outskirts of the city in areas with denser wildlife populations, including marsupials. It was

hypothesised that the seasonal incidence of Q fever in Townsville was the result of increased wildlife numbers and the drier conditions that follow the wet season.

This investigation points to a possible role for kangaroos in the transmission of *C. burnetii* and the acquisition of Q fever in Australia. Both cases reported large numbers of kangaroos at their workplaces, both had direct contact with joeys and kangaroos during their incubation period, both spent considerable time mowing lawns contaminated with kangaroo faeces, with no other high risk exposures reported. Current occupational guidelines in New South Wales recommend wearing a mask while slashing or cutting grass in areas with livestock or native animals.<sup>9</sup> Additional investigations focusing on non-typical exposures will improve our understanding of the transmission risks and exposure routes from native Australian animals to humans.

### Ethics approval

Data collected during this outbreak investigation were covered by New South Wales public health legislation and as such ethics approval was not required.

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