

Salmonella: pits and pets

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What is salmonellosis?

Salmonellosis is primarily a foodborne disease in humans. It is responsible for the greatest number of enteric disease notifications in New South Wales (NSW). In 2007, a total of 4000 cases of salmonellosis were notified in NSW. This may, however, represent only one-eighth of salmonellosis cases in the community because few people present for treatment and testing.¹

Salmonella is a bacterial pathogen found in the intestinal tract of some animals. After ingestion of contaminated food or water, *Salmonella* colonises and invades the mucosal layer of the small and large intestine. This invasion causes the release of adenyl cyclase, creating an inflammatory response and production of the fluid that leads to diarrhoea. Sometimes the bacteria enters the bloodstream, leading to systemic illness.²

Clinical features

The incubation period for salmonellosis in humans ranges from 6 to 72 hours (although it is usually 12–36 hours). Symptoms include diarrhoea, abdominal pain, fever, headache and sometimes vomiting and bloody diarrhoea. The duration of illness is most often 4–7 days, although symptoms may persist for much longer. Treatment is usually supportive only; most people will recover with rest and fluids. Antibiotics are not usually recommended because they may increase the duration of illness.³

Diagnosis

Salmonella infections can only be confirmed by laboratory testing of a submitted specimen (usually a stool). The laboratory isolate *Salmonella enterica* is then separated into one of over 2000 serotypes (such as *S. Typhimurium* or *S. Infantis*).⁴ Further subtyping of some common *Salmonella* serotypes such as *S. Typhimurium* is performed to improve discrimination. Methods used for subtyping in NSW are phage typing and multi-locus tandem-repeat variant analysis.

Risk factors

The main risk factor for developing salmonellosis is eating raw or undercooked food such as poultry, beef, lamb, pork and eggs. It can also be spread from person-to-person or through contact with a contaminated animal or environment. Anyone is at risk of being infected with *Salmonella*; however, elderly people, children and immunocompromised individuals are at greater risk of developing more serious illness.⁵

Prevention

Salmonella contamination of food can be prevented by the following measures:

- minimising the potential for contamination during food production and transportation (e.g. ensuring animal feeds, irrigation water and storage areas do not become contaminated)
- keeping hot foods hot ($\geq 60^{\circ}\text{C}$) and cold foods cold ($\leq 5^{\circ}\text{C}$)
- handling and storing raw foods and ready-to-eat foods separately to prevent cross-contamination
- thoroughly cooking meals
- washing hands regularly with soap and water during food preparation and after activities like playing outdoors, touching animals and going to the toilet.

Public health response

Laboratories are required to notify local public health units whenever *Salmonella* has been isolated from a human clinical specimen. Public health units investigate clusters of people diagnosed with the same strain to identify common links. Where links are identified, the NSW Food Authority conducts an environmental investigation (including inspection of the food preparation area and source of ingredients) and applies control measures. Investigations help prevent further disease and inform public health policy to prevent further outbreaks.

Environmental *Salmonella* infection

While food is the most common source of *Salmonella* infection, contact with *Salmonella* bacteria in the environment is thought to be responsible for a small proportion of cases.⁶ Transmission may occur when people come into contact with a contaminated environment or an infected animal. Some *Salmonella* serotypes are more commonly found in the environment and in distinct geographical areas.

While rare in other Australian states, *Salmonella* Mississippi is thought to be endemic in Tasmanian

wildlife. Human infections are associated with drinking tank water and contact with birds and animals.⁷ Infections are also thought to be associated with child hand behaviours, such as lack of hand washing before eating and finger sucking.⁷

The Northern Territory (NT) has the highest rate of *Salmonella* infection in Australia. A recent case control study found various *Salmonella* strains in around 20% of all household environment samples in the state, with little difference between cases and controls. All turtle tanks and a large proportion of frog faeces, vacuum dust and backyard soil tested positive for *Salmonella* (S. Williams, OzFoodNet, 24 March 2009, pers. comm.). This high prevalence of *Salmonella* in households and animals in the NT may indicate that it is ubiquitous in tropical environments.

Data collected by OzFoodNet – the national foodborne disease surveillance network – reports that there were three *Salmonella* outbreaks linked to an environmental source between 2001 and 2007. Two of these outbreaks were associated with children at child-care centres following chick hatching programs. The other, a rare strain of antibiotic-resistant *Salmonella* Paratyphi B biovar Java associated with tropical fish tanks, occurred across Australia.⁸

In 2008, an outbreak of salmonellosis occurred in the northern Sydney area of NSW, mostly affecting children under the age of 5. Epidemiological investigation linked the outbreak to two public playgrounds in the area. Environmental investigation found the sand in the playgrounds positive for *Salmonella* Paratyphi B biovar Java. In collaboration with the local council, the playgrounds were closed and the sand was replaced. The source of the contamination is still under investigation.

While the source of *Salmonella* infection is usually contaminated food, it is important to consider contaminated environments or infected animals as potential sources when investigating outbreaks, particularly if the cases are mainly among young children.

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