



Salmonellosis in Hedgehogs

Agent

Salmonellosis is a disease caused by bacteria from the genus *Salmonella* and can affect mammals, birds and reptiles. Salmonellosis is a recognised zoonotic disease (*i.e.* it can be transmitted from animals to people).

Many species of *Salmonella* bacteria exist, some of which can be carried by, or cause ill health in, Western European hedgehogs (*Erinaceus europaeus*). *Salmonella* Enteritidis PT 11 is the most commonly isolated strain of the bacterium which has been recovered from hedgehogs in Great Britain (GB) for several decades, as well as from hedgehogs in mainland Europe. *Salmonella* Enteritidis PT 66, another strain of the bacterium, has recently been detected for the first time in hedgehogs. So far, it has only been detected in Scotland, where it is possible that this novel strain has recently emerged. Hedgehog infections with other types of *Salmonella* (e.g. *Salmonella* Typhimurium, *Salmonella* Agama) are rarely found.

Signs of disease

Hedgehogs infected with *Salmonella* may develop salmonellosis or become asymptomatic carriers of the bacterium.

Salmonellosis can range from causing mild gastro-enteritis to a severe condition affecting multiple organs leading to septicaemia and death. One manifestation of salmonellosis in hedgehogs is abscessation of the lymph nodes.

The signs of salmonellosis therefore vary, and are non-specific, but can include persistent weight loss, dehydration, loss of appetite, weakness, diarrhoea (often green, mucoid or blood-stained) and breathing difficulties.

Disease transmission

Transmission of *Salmonella* occurs through ingestion of the bacterium via water, food sources or surfaces contaminated with infected faeces. Infection can also follow contact of an open wound with contaminated material.

The risk of infection with *Salmonella* is increased by its ability to persist in the environment for extended periods of time. For example, it has been found to survive for up to four months in pond water and pasture soil and for more than two years in dried contaminated faeces.

Salmonella infection can occur in both juvenile and adult hedgehogs, although it may be more common in the former.

Distribution

Infection with *Salmonella* bacteria has been described in people and animals, including hedgehogs, from around the world. Salmonellosis occurs widely in hedgehogs in GB.

Risk to human health

Salmonellosis is an important cause of illness of people in GB, but here most human infections are contracted by eating contaminated food. The types of *Salmonella* obtained from food are different from those commonly found in hedgehogs.

However, the strains of *Salmonella* that affect hedgehogs also have the potential to cause ill health in people. Since hedgehogs can carry *Salmonella* bacteria, with or without signs of disease, sensible hygiene precautions are advised as a routine measure when handling these animals (see *Prevention* below).

People with salmonellosis most typically develop signs of gastroenteritis.

If you suspect you might have contracted *Salmonella* infection, you should seek medical advice.

Risk to domestic animal health

There are rare cases where pets (e.g. dogs and cats) or livestock have been infected with the strains of *Salmonella* Enteritidis found in hedgehogs. Although salmonellosis can affect pet dogs and cats, how often the disease is caught from hedgehogs is unknown. Dogs and cats with salmonellosis typically present with signs of gastro-enteritis. If you suspect your pet might have contracted *Salmonella* infection, you should seek veterinary advice.

It is advisable to avoid pets sharing feeding bowls with hedgehogs to minimise the chances of infection.

Diagnosis

The diagnosis of salmonellosis in hedgehogs relies on veterinary examination. In the live animal, faecal samples can be examined in a specialist laboratory for the presence of *Salmonella* bacteria. On post-mortem examination, the signs of salmonellosis are variable and additional laboratory tests are required to confirm the diagnosis.

If you wish to report finding a dead hedgehog, or signs of disease in hedgehogs, please visit www.gardenwildlifehealth.org. Alternatively, if you have further queries or have no internet access, please call the **Garden Wildlife Health** vets on **0207 449 6685**.

Control

Whilst medicines are available to treat salmonellosis in captive mammals, effective and targeted dosing of free-living hedgehogs is not possible.

Suitable commercial products, such as disinfectants, should be used to clean and disinfect equipment and contaminated surfaces following the manufacturer's recommendations.

If you find a sick hedgehog and suspect it may be infected with *Salmonella*, you should contact your nearest veterinary surgery or wildlife rehabilitation centre for further advice and use sensible hygiene precautions (see *Prevention* below).

Prevention

Although little can be done to prevent the spread of *Salmonella* in the environment and amongst hedgehogs in the wild, the disinfection of any bowls or plates used to feed wild hedgehogs should be routinely carried out as follows:

- Clean surfaces, bowls or plates using a suitable disinfectant (for example, a weak solution of domestic bleach (5% sodium hypochlorite) or other product following the manufacturer's instructions). Always rinse thoroughly and air-dry before re-use.
- Brushes and cleaning equipment should not be used for other purposes and should not be brought into the house, but be kept and used outside and away from food preparation areas.
- Wear rubber gloves and thoroughly wash hands and forearms afterwards with soap and water, especially before eating or drinking.

If you need to handle a hedgehog please use thick gardening or rubber gloves and wash your hands thoroughly with warm water and soap afterwards. This will reduce the chance of transmission of [*Salmonella*](#) or other diseases, such as [ringworm](#), that hedgehogs can carry.

Further information

Bexton, S. (2017) Hedgehogs. *In* BSAVA Manual of Wildlife Casualties Second Edition. Mullineaux, E., and Keeble, E. Eds.. BSAVA, pp. 117-136.

More information about the diseases affecting hedgehogs can be found on the Garden Wildlife Health website: www.gardenwildlifehealth.org.

More general information about hedgehogs and what you can do to make your garden hedgehog-friendly can be found on the Hedgehog Street website: www.hedgehogstreet.org.

Scientific publications

Lawson B, Franklins LHV, Rodriguez-Ramos Fernandez J, Wend-Hansen C, Nair S, Macgregor SK, John SK, Pizzi R, Núñez A, Ashton PM, Cunningham AA, de Pinna EM (2018) *Salmonella* Enteritidis ST183: emerging and endemic biotypes affecting western European hedgehogs (*Erinaceus europaeus*) and people in Great Britain. *Scientific Reports* [doi.10.1038/s41598-017-18667-2](https://doi.org/10.1038/s41598-017-18667-2)

Gaffuri A (2012) *Salmonella* infections in wild mammals. *In* Infectious Diseases of Wild Mammals and Birds in Europe. Gavier-Widén D, Duff JP, Meredith A. Eds. Wiley-Blackwell, pp. 390-397.

Handeland K, Refsum T, Johansen BB, Holstad G, Knutsen G, Solberg I, Schultze J, Kapperud G (2002) Prevalence of *Salmonella* Typhimurium infection in Norwegian hedgehog populations associated with two human disease outbreaks. *Epidemiology and Infection* **128**(3):523–527. doi.org/10.1017/s0950268802007021

Nauerby B, Pedersen K, Dietz HH, Madsen M (2000) Comparison of Danish Isolates of *Salmonella enterica* Serovar Enteritidis PT9a and PT11 from Hedgehogs (*Erinaceus europaeus*) and Humans by Plasmid Profiling and Pulsed-Field Gel Electrophoresis Comparison of Danish Isolates of *Salmonella enterica* Serovar. *Journal of Clinical Microbiology* **38**(10):3631-3635. doi.org/10.1128/JCM.38.10.3631-3635.2000

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