

# Naegleria fowleri: Qs and As

## What is Naegleria?

Naegleria is a free-living single-celled organism called an amoeba, commonly found in warm freshwater and soil. There are several species of Naegleria, but Naegleria fowleri is the only species that has been shown to cause disease in humans. It causes a very rare infection of the brain and brain coverings called primary amoebic meningoencephalitis (PAM). Even with treatment, most people with Naegleria fowleri infection die.

## How do you get infected with Naegleria fowleri?

Naegleria infects people by entering the body when water containing the amoeba goes up the nose. This may occur when people swim, dive or fall into warm freshwater containing Naegleria. Infections have occurred following domestic bathing, for example when young children fall or slip in a bath of water containing Naegleria. The amoebae travel up the nose to the brain where they infect and destroy brain tissue.

If water contaminated with Naegleria does go up the nose, the chance of contracting infection is extremely small. Children and young adults appear to be more susceptible to infection than adults.

Infections do not occur as a result of drinking water contaminated with Naegleria. Naegleria does not occur in sea water. You cannot get Naegleria from a properly cleaned, maintained and chlorinated swimming pool.

The organism was first identified in South Australia during the 1960s. A number of cases of infection occurred in towns served by unchlorinated water delivered through long above-ground pipelines. About half the cases had swum in warm freshwater, and the other half had sniffed or squirted water from the town supply into their noses. There have been no cases in South Australia since 1981, with chloramination of the water supply (a water treatment that ensures good residual levels of chlorine) and a public education campaign.

## How common is Naegleria fowleri in the environment?

Naegleria fowleri are found around the world. They grow best in warm water, especially between 25oC and 40oC. Any water body that seasonally exceeds 30oC or continually exceeds 25oC can support the growth of N.fowleri.

## Where in the environment can Naegleria occur?

Naegleria can potentially occur in any body of warm fresh water. This can include:

- lakes and rivers
- naturally hot water such as hot springs
- poorly maintained and under-chlorinated or unchlorinated swimming pools
- warm water discharge from industrial plants

Naegleria can also be found in soil, however water is the only known source of human infection.

## Is there a simple and quick test for Naegleria in water?

No. Recognition of N.fowleri in water requires specialised testing. It should be assumed that any warm freshwater body as described above could contain N.fowleri.

## How common are Naegleria infections?

Although N.fowleri can be commonly found in the environment, infection is rare. Cases of Naegleria meningoencephalitis have been recorded in South Australia, Western Australia, Queensland and New South Wales, and in many countries throughout the world.

There have been four confirmed cases and one probable case documented in Queensland since the year 2000. There have been no cases in South Australia since 1981. There have been three recorded cases in Western Australia, but none since 1985.

In the USA, in the ten years from 1998 to 2007, 33 infections were reported. Thirty-one had contact with recreational water and two had contact with water from a geothermal (naturally hot) water supply. It is estimated that the risk from recreational water activities (such as swimming/diving/waterskiing) in potentially contaminated freshwater in the USA, is five cases of N.fowleri infection for every billion episodes of recreational water activity.

## Does chlorine control Naegleria?

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*N.fowleri* cannot survive in water that is clean, cool and chlorinated. Free chlorine or chloramines at 0.5mg/L or higher will control *N.fowleri*, provided that the disinfectant persists through the water supply system.

## How can I reduce the risk of infection with Naegleria?

To prevent infection:

- avoid jumping or diving into bodies of warm fresh water or thermal pools
- keep your head above water in spas, thermal pools and warm fresh water bodies
- empty and clean small collapsible wading pools and let them dry in the sun after each use
- ensure swimming pools and spas are adequately chlorinated and well maintained
- flush stagnant water from hoses before allowing children to play with hoses or sprinklers
- if you are using unchlorinated water:
  - don't allow water to go up your nose when bathing, showering or washing your face
  - supervise children playing with hoses or sprinklers and teach them not to squirt water up their nose
- potentially contaminated water should not be used for any form of nasal irrigation or nasal lavage including Neti (an Ayurvedic practice of nasal cleansing)

## What about private bores?

*N.fowleri* has been identified where bore water is rested in above-ground dams then piped over distances in above-ground pipes to private homes. The presence of *N.fowleri* will vary with ambient temperature, the distance water is piped, and the length of time the water is at temperatures favourable to the amoeba while in storage and pipework. This length of time may be related to the rate of water use. In such circumstances, measures to prevent infection should be observed. Seek specialist advice regarding the pros and cons of water treatment processes (eg chlorination, chloramination filtration, UV treatment).

## References and Related Content

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