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Health Department

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Naegleria Fowleri

February 2014

What is Naegleria fowleri?

Naegleria is an ameba (single-celled living organism) commonly found in warm freshwater (lakes, rivers and hot springs) and soil. Only one species (type) of Naegleria infects people: Naegleria fowleri.

How does infection with Naegleria fowleri occur?

Naegleria fowleri infects people by entering the body through the nose. This typically occurs when people go swimming or diving in warm freshwater places such as lakes and rivers. The Naegleria fowleri ameba travels up the nose to the brain where it destroys the brain tissue.

You cannot be infected with Naegleria fowleri by drinking contaminated water. In very rare instances, Naegleria infections may also occur when contaminated water from other sources such as inadequately chlorinated swimming pool water or heated tap water lower than 116 degrees Fahrenheit enters the nose when people submerge their heads or cleanse during religious practices, and possibly when people irrigate their sinuses.

Where is Naegleria fowleri found?

In the United States, the majority of infections have been caused by Naegleria fowleri in freshwater located in southern states. The ameba can be found in:

- Bodies of warm freshwater such as lakes and rivers
- Geothermal (naturally hot) water such as hot springs
- Warm water discharge from industrial plants
- Geothermal (naturally hot) drinking water sources
- Soil
- Swimming pools that are poorly maintained, minimally-chlorinated, and/or un-chlorinated
- Water heaters with temperatures lower than 116 degrees Fahrenheit

Naegleria fowleri is not found in bodies of salt water such as the ocean.

When do Naegleria fowleri infections most commonly occur?

Although infections with Naegleria fowleri are very rare, they occur mainly during the summer months of July, August and September. Infections are more likely to occur in southern states, but can also occur in other locations. Infections usually occur when temperatures are high for prolonged periods of time, which causes higher water temperatures and lower water levels. Infections can increase during heat wave years.

What are the symptoms of Naegleria fowleri infection?

Naegleria fowleri causes the disease primary amebic meningoencephalitis (PAM), a brain infection that leads to the destruction of brain tissue. In its early stages, symptoms of PAM may be similar to symptoms of bacterial meningitis.

Initial symptoms of PAM start one to seven days after infection. The initial symptoms include headache, fever, nausea, vomiting and stiff neck. Later symptoms include confusion, lack of attention to people and surroundings, loss of balance, seizures and hallucinations. After the onset of symptoms, the disease progresses rapidly and usually causes death within one to 12 days.

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

Naegleria fowleri is found in many warm freshwater lakes and rivers in the United States, particularly in southern tier states. It is likely that a low risk of Naegleria fowleri infection will always exist with recreational use of warm freshwater lakes, rivers, and hot springs.



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The low number of infections makes it difficult to know why a few people have been infected compared to the millions of other people using the same or similar waters. The only certain way to prevent a *Naegleria fowleri* infection is to refrain from water-related activities in or with warm, untreated, or poorly-treated water.

If you do plan to take part in water-related activities, some measures that might reduce risk include:

- Avoid water-related activities in warm freshwater during periods of high water temperature and low water levels.
- Hold the nose shut or use nose clips when taking part in water-related activities in bodies of warm freshwater.
- Avoid digging in, or stirring up, the sediment while taking part in water-related activities in shallow, warm freshwater areas.
- If you are irrigating, flushing or rinsing your sinuses (for example, by using a neti pot), use distilled, sterile or previously boiled water to make up the irrigation solution. It's also important to rinse the irrigation device after each use and leave open to air dry.

For More Information:

Contact the Sedgwick County Health Department
Epidemiology Office at
316-660-7392 or visit the Sedgwick County website at
www.sedgwickcounty.org.