



Primary Amebic Meningoencephalitis (PAM)

What is Primary Amebic Meningoencephalitis (PAM)?

Primary Amebic Meningoencephalitis (PAM) is caused by an amoeba called *Naegleria fowleri*. It is an extremely rare and deadly disease which causes swelling of the lining of the brain and spinal cord.

What are the symptoms?

The first symptoms of the illness are high fever, headache, nausea, and vomiting. Later symptoms include stiff neck, seizures, hallucinations, altered mental status, and coma.

How soon do you develop symptoms?

Symptoms usually start 5 days after exposure, but can range from 1 to 7 days. Once symptoms start, the disease causes death within about 5 days, but can range from 1-12 days.

Where can *Naegleria fowleri* be found?

In bodies of warm freshwater, like lakes and rivers; natural hot bodies of water, such as hot springs; and warm water discharge from industrial plants.

What temperature does the water need to be for *Naegleria fowleri*?

Warm water temperatures (80°F to 115°F) caused by the hot summer months (June to September) allow the amoeba to multiply because their food source (bacteria) increases during hot weather. The risk is greater in very **warm** and **shallow waters**.

How do you become infected with *Naegleria fowleri*?

People can become infected when water containing the amoeba gets into the nose and travels to the brain. Once in the brain, the amoeba causes swelling of the lining of the brain and spinal cord, severe symptoms, and ultimately death for most people.

You cannot be sick with PAM by drinking water with *Naegleria fowleri*.

Who is at risk for contracting PAM?

In most cases, victims are described as young, healthy individuals who have been swimming or playing in water (lakes, rivers, ponds, etc.) three to seven days before they got sick.

What is the treatment for PAM?

The Centers for Disease Control and Prevention (CDC) have obtained an investigational drug that is available for treatment. A physician would contact CDC to get this drug for treatment.

What is the fatality rate for an infected person who begins to show symptoms?

Over 97% of individuals that are infected and show symptoms will die.

Can I get PAM from swimming in a chlorinated swimming pool?

No. Chlorine rapidly kills the amoeba, so people who swim in well-maintained swimming pools are not at risk of PAM.

How can you prevent PAM infection?

- 1) Hold your nose shut, use nose clips, or keep your head above water when swimming, jumping or diving into bodies of fresh warm water (lakes, rivers, ponds, hot springs).
- 2) Avoid swimming in areas with "No Swimming" signs posted.
- 3) Protect your kids by stopping them from swimming/playing in warm freshwater when the outside temperatures are high, and/or the water levels are low.
- 4) Do not dig, or stir up, the sediment while swimming/playing in shallow, warm freshwater areas.

REMEMBER: PAM is very rare. From 1962 through 2014, 132 cases of PAM have been reported in the United States. Every year many more deaths and injuries result from diving into shallow waters or natural waters that hide rocks and debris, from using alcohol and or drugs while boating or swimming, and from leaving children unattended in water even for short periods of time.

