



# 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 so 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?

*Naegleria fowleri* are 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 **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 become sick with PAM by drinking water with *Naegleria fowleri*.

## Who is at risk for contracting PAM?

Most cases of PAM are 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) has obtained an investigational drug that is available for treatment. Clinicians should report suspected cases to the Oklahoma State Department of Health, Acute Disease Service at (405) 271-4060 to initiate an investigation and coordinate specimen submission for laboratory testing. The clinician will work directly with CDC to determine if the suspected case is eligible to receive the investigational 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 develop illness 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) Never swim in stagnant or polluted water.
- 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.

