

Briefing Statement

Bureau: National Park Service
Issue: Potential risk for *Naegleria* infection
Park Sites: NPS units with water-based recreational areas
Date: May 21, 2008

Background: *Naegleria fowleri* (nigh-GLEER-ee-uh FOWL'-erh-eye) is a free-living amoeba found worldwide in warm freshwater bodies, including ponds, lakes, rivers, and hot springs. *Naegleria* is the cause of a very rare, but nearly always fatal, brain infection in humans. *Naegleria* infection occurs when amoebae-contaminated water enters the nose, followed by migration of the amoebae to the brain. Initial signs and symptoms occur within 1-14 days after exposure and are similar to those of bacterial meningitis (e.g. headache, fever, stiff neck, vomiting). Death typically occurs 3-7 days after symptom onset.

Since 1927, a total of 121 human cases (range, 0-8 cases per year) have been reported in the U.S.; most cases (85%) occurred during the summer or early fall (June–September). Because *Naegleria* is commonly found in warm freshwater bodies, the amoebae are likely present in recreational waters at many NPS units, particularly those located in the southern half of the U.S. NPS employees and visitors should be educated on general water safety issues, including the potential risk for *Naegleria* infection.

Current Status:

- Distribution and range of *Naegleria fowleri*
 - Found worldwide
 - Most commonly found in:
 - Warm bodies of freshwater, such as ponds, lakes, and rivers
 - Geothermal water, such as hot springs
 - Warm water discharge from industrial plants
 - Poorly maintained and minimally chlorinated swimming pools
 - Soil
 - Has been identified in many recreational waters throughout the U.S.
- Transmission of *Naegleria* infection
 - Generally occurs when people are participating in water-related activities, such as swimming underwater, diving, or other water sports that result in water going up the nose
 - Occurs when the amoeba enters the body through the nose and then travels to the brain and spinal cord where it destroys the brain tissue
 - Does not spread person-to-person
 - Infection does not occur by drinking contaminated water
- Epidemiology of *Naegleria* infection
 - Most common during summer months when air temperature is hot, water is warm, and water levels are low
 - More common in children (median age 12 years)
 - More common in males (78% of cases)
 - Known exposures for human cases occurred in 15 states in the southern half of the U.S. (Arizona, Arkansas, California, Florida, Georgia, Louisiana, Mississippi,

Missouri, Nevada, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, and Virginia)

- Signs/symptoms and treatment of *Naegleria* infection
 - Initial signs and symptoms start 1 to 14 days after infection
 - Signs and symptoms are similar to those of bacterial meningitis and include headache, fever, stiff neck, nausea/vomiting, seizures, altered mental status, and coma
 - Disease progresses rapidly and usually results in death within 3 to 7 days
 - Several drugs are effective against *Naegleria* in the laboratory, but effectiveness in treating infected persons is limited

 - Reducing the risk of *Naegleria* infection
 - Assume a low level of risk exists when entering bodies of warm freshwater
 - Measures that might reduce risk further include:
 - Avoid water-related activities in bodies of warm freshwater, hot springs, and thermally-polluted water, such as water around power plants
 - Avoid water-related activities in warm freshwater during periods of high water temperature and low water volume
 - 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
 - No current methods for decreasing or eliminating *Naegleria* from the environment

 - Implications for NPS
 - Given the wide distribution of the organism, a low risk for *Naegleria* infection likely exists for all persons who swim in NPS (or non-NPS) warm freshwater ponds, lakes, rivers, and hot springs
 - NPS staff and visitors should be informed about general water safety issues—including the risks associated with *Naegleria* infection—through pamphlets, rack cards, websites, and safety briefings
 - Because the location and number of amoebae in the water can vary over time, posting signs is unlikely to be an effective way to prevent infections
 - Posted signs might create a misconception that bodies of water without signs are *Naegleria*-free
 - Parks are encouraged to contact the NPS Public Health Program with any concerns regarding recreational water health and/or infectious diseases

 - Resources
 - Centers for Disease Control and Prevention, Division of Parasitic Diseases
 - *Naegleria* Infection Fact Sheet
(http://www.cdc.gov/ncidod/dpd/parasites/naegleria/factsht_naegleria.htm)
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