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Giardiasis--Don't Drink the Water

Hikers collect more than wilderness experience: On the longest day of 1991, 17 individuals embarked on an overnight hike in the Juneau Falls area of the Kenai Peninsula. On July 8, the Section of Epidemiology received a call from an alert emergency room physician in Soldotna who had treated two women with giardiasis--both had been on the hike. The women, 21- and 24-years old, experienced onset of diarrhea, abdominal cramps, bloating, fatigue, and loss of appetite on July 4. Both had laboratory confirmed giardiasis and were being treated with Atabrine® (quinacrine hydrochloride).

Investigation by the Section of Epidemiology led to the discovery of additional cases among the hikers. Thirteen individuals reported experiencing symptoms from 3 to 14 days following the hike: increased gas (89%), diarrhea (69%), abdominal cramps (69%), fatigue (62%), loss of appetite (38%), and bloating (15%). Stool specimens were collected from 16 hikers: *Giardia lamblia* was identified in nine of the specimens. All hikers with laboratory confirmed giardiasis had consumed untreated surface water during the hike.

Loggers felled by environment: On August 19, 1991 a public health nurse in Ketchikan called the Section of Epidemiology to report an outbreak of gastroenteritis among workers at a logging operation. An investigation was conducted with assistance from the Department of Environmental Conservation (DEC), Ketchikan. The workers, 31 men and 1 woman, lived on a barge anchored in a cove off Prince of Wales Island. Fourteen men became ill between July 31 and August 19. Illness was characterized primarily by loss of appetite (93%); loose stools, fever, cramps, and nausea (all 79%); headache (71%); increased gas (64%); and diarrhea (57%).

Consumption of barge tap water was a significant risk factor for illness (11 of 13 ill people and 7 of 18 well people drank tap water; relative risk = 4.0; 95% confidence limits 1.1, 15.0). In addition, the attack rate increased as the quantity of unpurified water consumed increased.

Stool specimens were collected from five symptomatic workers and examined for bacteria, ova and parasites, *Cryptosporidium* spp., and cyanobacterium-like bodies. All tests were negative.

The barge water supply came from a lake approximately 200 yards inland. Water was pumped from the lake to a holding tank on the barge where chlorine was added. The water was not filtered, and chlorine levels were not routinely measured. Water samples collected from a kitchen tap by DEC had no chlorine residual and grew bacteria too numerous to count.

A presumptive diagnosis of giardiasis was made based on the clinical course and epidemiologic information. Nine symptomatic workers were treated with metronidazole (quinacrine hydrochloride was not available in Ketchikan) with disease resolution over the next several days. DEC made recommendations--including installation of a filtration system adequate to remove *Giardia* cysts--to bring the barge water system up to safe drinking water standards.

The outbreak among the hikers was caused by consumption of untreated surface water. The outbreak in the loggers was probably caused by inadequate treatment of lake water, the source of drinking water for the barge. Although no causative organism was identified for the second outbreak, the symptomatology, epidemiology, and favorable response to treatment with metronidazole all suggested that it, like the first outbreak, was due to *Giardia lamblia*.

These outbreaks illustrate the hazards to Alaskans from drinking untreated or inadequately treated surface water. **There is a constant risk of ingesting *Giardia* cysts from consumption of water obtained from any untreated surface source in the state.** Filtration (using a filter with a pore size of <5 microns) is an effective method of removing cysts. Bringing water to a full boil will kill cysts. Chemical methods of disinfection (e.g., chlorine and iodine), though effective against bacterial pathogens, are **not** reliable for killing *Giardia* cysts.

Giardiasis generally presents as a gastrointestinal illness characterized by chronic diarrhea, abdominal cramps, bloating, steatorrhea, fatigue, and loss of appetite. Many infections, especially of young children, are asymptomatic. Giardiasis can be diagnosed by examination of stool specimens for ova and parasites. Testing is available free-of-charge through the State Public Health Laboratories. Quinacrine hydrochloride is the treatment of choice. Metronidazole, though somewhat less effective, can also be used. Since furozolidone is the only drug available as a liquid suspension, it is more acceptable to infants and young children. **All cases of giardiasis should be reported to the Section of Epidemiology.**

(Reported by Ned Magen, DO, Soldotna and Joan Nugent, PHN, Ketchikan. DEC inspections conducted by Bill Fagan, Ketchikan and Bob Pratt, Soldotna. Contributed by Mindy Schloss, RN, MPH, Brad Gessner, MD, and Michael Beller, MD, MPH, Section of Epidemiology.)