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A New Strategy for Understanding Giardiasis in Alaska

Background

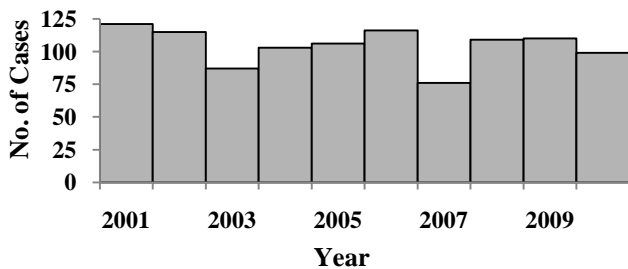
Giardiasis, colloquially referred to as “Beaver Fever,” is caused by infection with *Giardia* protozoa, and is typically characterized by self-limited diarrhea involving frequent, loose, pale, and greasy stools; abdominal cramps; and bloating. In some cases, illness can involve chronic diarrhea, fatigue, malabsorption, and/or weight loss.¹

Giardiasis is often assumed to be due to consumption of untreated surface water contaminated with animal feces. Recently characterized molecular variation between *Giardia* parasites has allowed genotypes to be divided into assemblages, which are grouped by degree of similarity. These data suggest that certain assemblages are more likely to be associated with specific animal species,² i.e., parasites found in humans are more likely to align with assemblages consisting of isolates from other humans, as opposed to parasites from non-human animal species. This might mean that person-to-person transmission, an acknowledged but not typically emphasized route, is more common than previously expected, as opposed to transmission being primarily zoonotic or environmental.

Giardiasis in Alaska

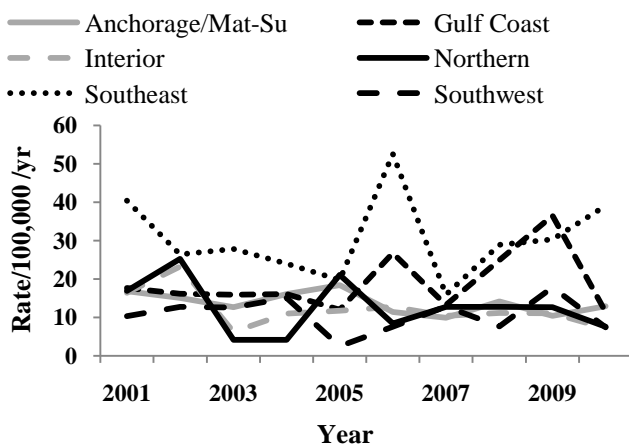
From 2001–2010, 1,042 cases of giardiasis were reported to the Section of Epidemiology (SOE; Figure 1), and annual rates of giardiasis in Alaska are routinely higher than in the rest of the United States.³ The number of reported giardiasis cases underestimates the true incidence of disease, as only laboratory-confirmed infections are usually reported to SOE and empiric treatment based on clinical presentation is believed to be common.

Figure 1. Number of Reported Giardiasis Cases, by Year — Alaska, 2001–2010



From 2001–2010, most giardiasis cases were reported during the fall (n=377; 36%), followed by summer (n=298; 29%), spring (n=203; 19%), and winter (n=164; 16%) months, and rates were typically highest in the Southeast and Gulf Coast regions (Figure 2).

Figure 2. Rate of Reported Giardiasis Cases, by Year and Region — Alaska, 2001–2010



Alaska has experienced occasional recognized outbreaks of giardiasis for which a common source has been identified.⁴ However, many cases are sporadic and not traced back to a specific source. Though patient interviews are routinely conducted by public health nurses or SOE staff upon receipt of a positive laboratory result, detailed information on all sources of drinking water and time recently spent with anyone suffering from a gastrointestinal (GI) illness is not routinely obtained unless an outbreak is suspected.

Molecular Data

In Alaska, pulsed-field gel electrophoresis molecular analysis is routinely performed at the Alaska State Public Health Laboratory (ASPHL) to help identify illness clusters and perform traceback investigations for many common reportable bacterial pathogens (e.g., *Campylobacter*, *E. coli*, *Salmonella*, and *Shigella*). Although giardiasis is the most frequently reported GI illness in Alaska, molecular characterization of *Giardia* isolates is not currently available at ASPHL. However, for a limited time, the US Centers for Disease Control and Prevention (CDC) will perform molecular characterization of all Alaska *Giardia* isolates to help us better understand the epidemiology of giardiasis in Alaska, identify potential outbreaks, and develop appropriate Alaska-specific public health control strategies.

Enhanced Surveillance Plan

For at least 12 months, SOE will interview all persons who are reported with giardiasis using a detailed questionnaire that will allow us to more completely ascertain potential risk factors for infection. Additionally, SOE will submit stool samples collected by health care providers caring for giardiasis patients for molecular analysis at CDC. The molecular data will allow for examination of the *Giardia* genotypes that occur in Alaska and facilitate the determination of a potential correlation between the likely route of transmission, identified through the questionnaire, and the genotype. Finally, a *Bulletin* will be published detailing the results of this effort.

Recommendations

1. In addition to the stool collected from suspected giardiasis patients for routine confirmatory testing (e.g., an ova and parasites exam), *health care providers should also collect a “raw” stool specimen in a sterile container* (e.g., a urine cup) *for molecular analysis*. Raw stool is required because common stool fixatives like formalin prevent the molecular methods from working. The raw stool should be frozen and shipped on cold packs to ASPHL. *Please contact ASPHL (907-334-2100) for supplies, labeling instructions, and shipping instructions.*
2. Raw stool should be collected and submitted to ASPHL each time a patient submits a new stool specimen for routine *Giardia* testing. Raw stool collected from persons with laboratory-confirmed giardiasis will subsequently be forwarded to CDC for molecular analysis.
3. Report all clinically-diagnosed and laboratory-confirmed cases of *Giardia* to SOE. To report, please call 907-269-8000, 561-4234, or 1-800-478-1700 if outside Anchorage; or fax information to 907-561-4239.

References

1. Heymann DL. *Control of Communicable Diseases Manual*. Washington, DC; 2008. American Public Health Association.
2. Xiao L, Fayer R. Molecular characterisation of species and genotypes of *Cryptosporidium* and *Giardia* and assessment of zoonotic transmission. *Int J Parasitol*. 2008;38:1239-55.
3. Yoder, JS *et al*. Giardiasis Surveillance — United States, 2006–2008. *MMWR Surveill Summ* 2010;59(6):15-25. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5906a2.htm>
4. State of Alaska Epidemiology *Bulletins* on Giardia are available at: <http://www.epi.alaska.gov/bulletins/catlist.jsp?cattyp=Giardia>