

June, 2008: A Drop of News from the Waterborne Disease Surveillance Team in the Division of Parasitic Diseases



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Greetings

A Drop of News is a forum for highlighting state and local waterborne disease surveillance activities, and giving informal updates from the Centers for Disease Control and Prevention (CDC) about waterborne disease and outbreak surveillance initiatives.

This issue brings you tools for preventing and investigating waterborne disease outbreaks, with a particular emphasis on recreational water venues, as well as recommendations and examples of effective health communication strategies for outbreaks. See Actions and Alerts for information

about recreational water illness (RWI) prevention materials, CDC's RWI outbreak response toolkit and upcoming NORS trainings. This issue will also introduce some of our laboratory staff and research initiatives in DPD; as well as provide guidance on how to collect pool water and stool specimens for testing at CDC laboratories.

Learn more about the Healthy Water web site project on page 5. CDC's *Legionella* team has partnered with South Carolina on an article about travel-related legionellosis investigations involving a hotel resort on page 6. Lastly, we have included information about the Council of State and Territorial Epidemiologist's (CSTE) workgroup on *Naegleria fowleri*, *Balamuthia* and *Acanthamoeba* spp, and a brief update about the MMWR Surveillance Summary for 2005-2006 waterborne disease and outbreak data.

Please share this newsletter with other waterborne disease investigators, provide feedback about content you would like to see and send in updates (e.g. bullet points, photographs, brief articles) about your recent waterborne disease activities and accomplishments to evl1@cdc.gov for inclusion in an upcoming newsletter.

Actions and Alerts

RWI Prevention Week (May 19-25, 2008) is over but you can still access prevention resources at http://www.cdc.gov/healthyswimming/prevention_materials.htm , including health communication aids, online. During an outbreak, use the RWI outbreak response toolkit at <http://www.cdc.gov/healthyswimming/outbreak.htm> .

OutbreakNet Conference:

Come early! Jonathan Yoder will discuss waterborne disease outbreak reporting in NORS during the first session. The Waterborne Disease Surveillance Team will also have a poster at OutbreakNet.

NORS Training: Ric Williams, the project manager for NORS, will explain NORS permissions models (e.g. options for how each state can structure the reporting process) and do a live demonstration of the system at lunch. State epidemiologists, waterborne disease outbreak coordinators and foodborne disease outbreak coordinators will be asked to participate in online training sessions this summer. The timeline for these trainings and launching NORS will be discussed at OutbreakNet.

Mark your Calendars!

OutbreakNet 4th Annual Conference: June 8

Council of State and Territorial Epidemiologists (CSTE) Annual Conference: June 9-12

Health Communications: Community and Public Health Partnerships to Limit Outbreaks

Although good pool operation and maintenance can reduce the incidence of waterborne disease in treated recreational settings, even the best maintained pools may be associated with outbreaks. Cryptosporidiosis outbreaks can occur at a well-maintained pool because the parasite is resistant to chlorine. A rapid response can be an effective measure for containing an outbreak, as highlighted in two examples below that were written by public health colleagues in Ohio and

Iowa. Communication among community partners and public health staff (e.g. epidemiologists and environmental health specialists) is vital to a rapid response. A new document that will be released by CDC's Healthy Swimming program (<http://www.cdc.gov/healthyswimming>) this June will provide recommendations for improving health communications with pool operators during an outbreak. This document will be accessible online at <http://www.cdc.gov/crypto/php.html> by the end of June.

IA: Quick identification of pool-related outbreaks and education of the public on keeping children with diarrhea out of wading pools seem to be key responses to cryptosporidiosis outbreaks. In July, 2005, an outbreak was detected through prompt disease reporting by local medical providers. The Iowa Department of Public Health (IDPH) was notified of at least 25 people with diarrheal illness in a central Iowa county. Cerro Gordo County Public Health (CGCPH) provides pool inspection service to this county. The IDPH and environmental staff from CGCPH have an excellent working relationship that facilitated a fast response to this event. Cryptosporidium infection was identified in 12 of the 25 reported ill. Upon investigation by CGCPH, and IDPH, it was suspected that the source of the outbreak was a local swimming pool. The pool was licensed with the State of Iowa and had a Certified Pool Operator (CPO) on staff. Control measures that limited this outbreak to the implicated pool included temporarily closing the pool to swimmers for hyperchlorination and quickly doing the same at several nearby municipal pools. In addition to visiting municipal pools to ensure prompt action, CGCPH staff checked for good signage concerning keeping children with diarrhea out of the pools. A case-control study that was later conducted to assess possible exposures to Cryptosporidium included exposures to pools, food and animals. The study concluded that only swimming in the suspected pool was significantly associated with illness. No additional Cryptosporidium infections were identified after control measures were implemented. Submitted by Matt Hobson, MA, Regional Epidemiologist, IDPH.

OH: In August 2004, the local hospital's Communicable Disease Nurse (CDN) spoke to the Auglaize County Health Department's (ACHD) CDN to report a confirmed case of cryptosporidiosis. This was followed by a call to ACHD by the Village Parks Superintendent after a private citizen contacted a municipal pool about multiple children with diarrhea, many of whom frequented the pool. On August 10, pool staff discovered that multiple lifeguards at the pool were experiencing gastrointestinal symptoms. The Parks Superintendent closed the pool for the day, and contacted the health department. ACHD Sanitarians recommended testing the water for Cryptosporidium oocysts. Testing was performed on August 11 and on August 16, the laboratory results were positive for oocysts. Before the laboratory results were returned, the pool was hyperchlorinated and re-opened; during this time, the number of laboratory-confirmed cases increased and eventually peaked at 43. All other public swimming pools in the county were advised to hyperchlorinate in an effort to prevent further illness. Pool operators were very responsive. Cryptosporidium fact sheets and handwashing signs were distributed to the pools. Handwashing signs were also posted throughout the community festival to limit secondary infections. All parties were in direct contact multiple times each day. These groups included: private citizens, pool staff, Village Parks Superintendent, Village Water Department, Village Administrator, Health Department Communicable Disease Staff, and Health Department Sanitarians, Ohio Department of Health staff, and CDC staff. Submitted by Aaron Longworth, RS, ACHD.

LAB NOTES

Water Samples—Pool Water and Pool Filter Backwash Collection

Figure 1 Dr. Vince Hill



Water samples can be tested for pathogens such as *Cryptosporidium*. These samples can then potentially be linked to clinical isolates (see page 4) from individuals who visited the associated recreational water venue(s). Collecting a sample of the backwash from a pool filter is ideal because it increases the chances of detecting the parasite if it was present during the previous filter run. Collect backwash samples before the pool is hyperchlorinated. To collect a backwash sample and submit it to CDC for testing, please follow the steps below:

1. Work with the pool operator to locate the port or site where backwash can be hand collected.
2. Have the pool operator begin the filter backwash cycle.
3. After the effluent becomes murky and turbid, collect 1L of filter backwash in a clean container.
4. Add 50 mg of sodium thiosulfate/L of backwash water to deactivate any chlorine in the water.
5. If sodium thiosulfate is unavailable, send the backwash to CDC as soon as possible instead of waiting to obtain and add thiosulfate.
6. Refrigerate the sample until it is shipped.

Collect pool water samples before the pool is hyperchlorinated. To collect a pool water sample and submit it to CDC for testing, please follow the steps below:

1. If possible, collect at least 20L of pool water in a clean container. Collapsible containers (i.e., “cubainers”) are useful for this.
2. Add 50 mg of sodium thiosulfate/L to deactivate any chlorine in the water.
3. If sodium thiosulfate is unavailable, send the water to CDC as soon as possible instead of waiting to obtain and add thiosulfate.
4. Refrigerate the sample until it is shipped.
5. Ship the sample with cold packs. DO NOT FREEZE the samples.

Figure 2 Dr. Hill's team



CDC Shipping—Water Samples and Clinical Specimens (see page 4 for more information about clinical specimen collection):

If you are planning to ship samples or specimens to DPD laboratories for testing, please call the Parasitic Diseases Branch (PDB) Public Inquiries line at 770.488.7775 first so that staff can ensure that it arrives safely. Please send samples Monday-Thursday. Please do not have samples arrive on Saturday, Sunday, or a holiday, because no laboratory staff will be available to accept and store them.

Outbreaks- Water Samples and Clinical Specimens:

Stephanie Johnston,
CDC, DPD, Building 109, Rm 1302,
4770 Buford Hwy, NE;MS F-36,
Atlanta, GA 30341-3724

Sporadic Cryptosporidiosis Cases Only– Clinical Specimens:

Lihua Xiao
CDC, DPD, Building 22, Room 14
4770 Buford Hwy, NE; MS F-12
Atlanta, GA 30341

***Stool Samples—Collection for Genotyping and Subtyping
Cryptosporidium spp.***

Figure 3 Dr. Lihua Xiao



Molecular biological methods can be applied to stool specimens to help determine if, and how, individual cases are related to each other. For example, in 2007, two swimming pool-associated outbreaks of cryptosporidiosis occurred in neighboring counties (County A and County B) of Oklahoma during the same period of time. Two different species were identified in the outbreaks: *Cryptosporidium hominis* subtype IdA15G1 in County A and *C. parvum* subtype IIaA17G2R2 in County B. Water samples collected from the suspected swimming pools were subtyped with the same results and provided further evidence that these were two distinct waterborne disease outbreaks.

Another benefit of genotyping and subtyping is the ability to determine the prevalence of specific subtypes. For example, *C. hominis* subtype IaA28R4 was recently identified from outbreak cases and in specimens collected from seemingly unrelated cases. Although this subtype was previously rare in the United States, IaA28R4 was identified in two swimming pool-associated outbreaks in two separate states during 2007. More importantly, it was also commonly seen in sporadic cases collected in late 2007 from four other states, indicating that there may have been a multi-state outbreak of cryptosporidiosis and/or common occurrence of secondary transmission after outbreaks; however, additional research is needed to understand the distribution of *Cryptosporidium* spp. and the relationship between species/subtype prevalence and the occurrence of outbreaks. Stool specimens from outbreak investigations, as well as sporadic cases of cryptosporidiosis, may be submitted to DPD for genotyping and subtyping. To collect and submit a stool specimen for testing, please follow the steps below:

Provide patients with stool specimen cups, or if unavailable, with sputum (blue top) cups, as well as sealable plastic bags in which they can place the cups.

1. Ask the patient to collect the stool in a dry, clean, leakproof container. No urine or other material should get in the container. Remember not to use formalin as this fixative precludes the use of PCR amplification.
2. Place the specimen cup in a sealed plastic bag before storing in the refrigerator.
3. Keep specimens refrigerated until they are shipped. It is okay to freeze the samples if long term storage is needed.
4. If possible, put stool in 50 ml centrifuge tubes before shipping.
5. Ship the refrigerated sample with cold packs and frozen sample with dry ice. Send fresh/frozen or other samples by overnight shipment.
 - Refer to page 3 for additional shipping and contact information.

NOTE: PVA-preserved or Carey-Blair specimens can potentially be used; however, PCR results are likely to be variable and will depend on age of the specimen, etc. Bacteria: The use of PVA or other preservatives is not acceptable if specimens need to be cultured. Stool samples should be refrigerated and transported to the lab for culture as soon as possible. If Cary-Blair and similar transport media for bacterial cultures are used to help preserve bacterial enteric pathogens, specimens should still be refrigerated during storage and transport. Additional guidance may be found at the following web site: http://www.cdc.gov/foodborneoutbreaks/guide_sc.htm

Figure 4 Dr. Xiao's team



***Giardia* Research—Opportunity for Collaboration**

Figure 5 Dr. Jeff Priest



DPD is working to develop new assays to detect and quantify the levels of human serum antibodies to *Giardia*-specific surface antigens, and we would like to know the sensitivity and specificity of the assays we are developing. The best way to address this question is by using samples from well-documented, point-source outbreaks (water, food, daycare, etc) that have occurred in the general population. If a giardiasis outbreak occurs in your state and the possibility of timely serum sample collection exists (less than 1 month post-symptom onset), please consider contacting the PDB Public Inquiries line (770.488.7775) to collaborate with Dr. Jeff Priest on this project.

Healthy Water Web Site Team Working in DPD

"Healthy water" is a topic that gets a great deal of attention at CDC but if you were looking for information on cdc.gov on the topic, you'd find yourself searching in many different directions. Michael Beach, NCZVED's Associate Director for Healthy Water, says, "The issue I see at the agency is that water-related research is done in 8 different centers and CIOs. We now have a Web site team with the goal of pulling together for the first time all of the work we do at CDC into one place, accessible for everyone.

"This effort gives us the true view of how much work is really going on here related to water. The dispersion of work across the agency is something that's very difficult for partners to understand. Partners don't need to understand how we're organized, they just want to find information. We want to give it to them in one place with one entry point, so that getting this information is seamless for the user - whether that user is the general public, an academic researcher or a public health professional. We want them to find what we have to offer. This is a great opportunity for cross-agency collaboration," he says.

Susan Butler, Liz Medlin and Hilda Whitmire form the Healthy Water Web Site Team, housed in DPD, but coordinating across CDC. Starting this past January, the team began work on Phase I of the project, focusing on water-related programs at CDC and organizing the information on the many water-related projects across centers into one easily searchable Web site with a single entry point. The plan is to complete this work in December, and in January 2009 to begin Phase II, connecting CDC's work with that going on among other agencies such as EPA, WHO and the U.S. Geological Survey. "This is our opportunity to connect with all the water-related public health information on the international and domestic side. We're not looking to reinvent the wheel, but there are a lot of niche sites and no place that ties it all back to a single entry point," says Michael.

Two months into the project, the team is meeting with CDC's many water work groups to make sure they're finding all the sources available. Liz, a waterborne disease researcher, notes, "We're finding that much of the information available today is great for technicians and professionals, but isn't really geared towards the general public. Our team goal is to create a public-friendly Web site."

Susan, a professor at Emory University's Rollins School of Public Health, and Hilda are health communication specialists who are making sure everything on the site works for the public. Hilda says, "Where we see a need, we're creating new pages that are clear and to the point. If we're in the middle of an outbreak, we don't want our visitors to spend a lot of time searching. They need information that's easy to access." Susan adds, " Our three goals for Phase I are to create a site that works for a wide range of audiences, is easy to search and understand, and that incorporates all the information that is now scattered across different centers of CDC."

Figure 6 The Healthy Water Team



Photo and article by Conne Ward-Cameron, published on NCZVED's intranet site on March 24, 2008.

A Travel-Associated Legionnaires' Disease Cluster Investigation

CDC frequently provides support to state coordinators for legionellosis case and disease clusters. This, the first in a series of articles by CDC's Legionella team, discusses a recent response to a travel-associated cluster that involved recreational water. This article was coauthored by Kira Christian at the South Carolina Department of Health.

Travel-associated Legionnaires' disease (LD) outbreaks can be difficult to recognize as a case may develop disease up to 14 days after exposure to a water aerosol containing *Legionella* bacteria. While resources are not always available to investigate each case of travel-associated LD, a single case may represent the "tip of the iceberg" of a larger outbreak. With proper identification and remediation of the water source, further LD cases are preventable. In 2005, CSTE adopted a position statement to encourage enhanced surveillance for travel-associated LD cases which included notifying CDC of cases within seven days of a case report (see Contacts section on page 8 for reporting instructions). For each LD case or cluster reported to CDC by public health colleagues, the Respiratory Diseases Branch (RDB) notifies the state health department(s) where the case(s) reported travel and provides recommendations for the investigation. Additionally, CDC's *Legionella* web site (<http://www.cdc.gov/legionella/>) contains outbreak investigation resources, including an environmental assessment tool.

Scenario: CDC and South Carolina identify an outbreak associated with a resort hotel

On February 22, 2008, CDC was notified of a confirmed LD case with travel to Myrtle Beach, South Carolina. The South Carolina Department of Health and Environmental Control (SC DHEC) interviewed the case, who reported spending several days at one hotel with frequent use of one of two hot tubs and the pool. A local epidemiologist then identified a second confirmed case through routine surveillance. The case, who had been hospitalized in a local SC facility, reported travel to the same hotel during her incubation period. In response, SC DHEC initiated an investigation and implemented the following CDC recommendations:

1. Conduct enhanced surveillance and potentially post an EpiX “Call for Cases.”

SC DHEC posted an Epi-X Call for Cases. Enhanced surveillance identified a potential third case with pneumonia; a urine antigen test was negative.

2. Perform an environmental assessment of the hotel and act based on findings.

SC DHEC Environmental Quality Control staff conducted an environmental investigation. Water samples revealed low pH values in both spas and a low chlorine level in the pool. Both spas were closed following discovery of additional deficiencies during a review of spa maintenance records. In total, 23 environmental samples that were taken, and 6 (26%) spa samples were positive for *Legionella pneumophila* serogroup 1.

3. Carry out remediation and continue environmental monitoring at the hotel.

SC DHEC recommended that the hotel close all recreational water facilities until all samples tested negative by culture and, once reopened, sample water every two weeks for three months and then once a month for the following three months. The hotel retains a private contractor to monitor the facilities. No additional cases have been reported at the hotel.

Figure 7. *Legionella* colonies. Source: *Public Health Image Library (PHIL)*: <http://phil.cdc.gov/phil/home.asp>



CSTE Workgroup—*Naegleria fowleri*

CSTE organized a national workgroup to respond to the need for public health guidance regarding risk factors and prevention of illness stemming from *Naegleria fowleri* in 2007, when six people died from *N. fowleri* infections. The workgroup's objectives include: building a national database of all U.S. primary amebic meningoencephalitis (PAM) cases; authoring a position statement to propose that *Naegleria fowleri*, *Balamuthia* and *Acanthamoeba* infections become nationally notifiable conditions; developing a risk communication plan for the general public, public health officials, healthcare providers, recreational water staff, and the media; producing recommendations for *Naegleria fowleri* testing; establishing a consensus approach to PAM investigations; and defining a critical research agenda.

MMWR—*Naegleria fowleri* Case Summaries

For information about six cases of PAM that were reported to CDC in 2007, as well as an ongoing review of PAM cases in the U.S (1937-2007), please see the recently published MMWR article.

CDC. Fatal Cases of Primary Amebic Meningoencephalitis Caused by *Naegleria fowleri*—Arizona, Florida and Texas, 2007. In: CDC Weekly Report, May 30, 2008. MMWR 2008; 57 (No.

21); 573-577.

Access the MMWR home page at <http://cdc.gov/MMWR>. Access the MMWR article listed above at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5721a1.htm?s_cid=mm5721a1_e.

Taking A Closer Look—*Naegleria fowleri*

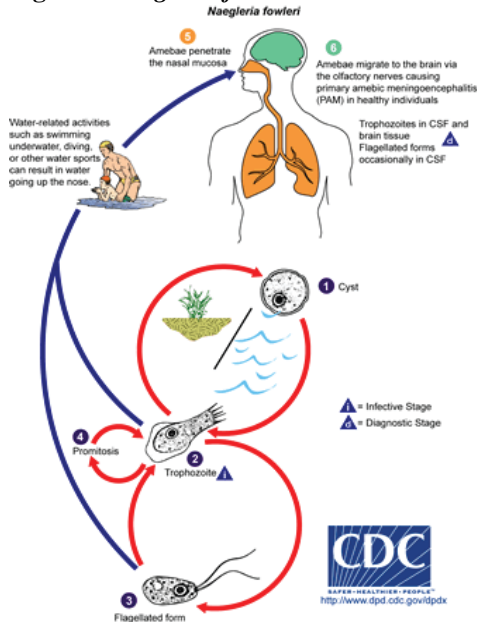
Figure 8 Dr. Michael Arrowood



DID YOU KNOW??

DPD surveillance of waterborne disease annually detects fatalities of *N. fowleri* infection. While it is well understood that the trophozoite stage of this amoeba can cause disease, little is known about the disease potential of the cyst stage. A new DPD research project will develop methods to produce and purify *N. fowleri* cysts for use in studies to evaluate the infectivity of cysts compared to trophozoites. This research will provide a better understanding of the susceptibility of cysts to disinfectants such as chlorine and support efforts to assess *N. fowleri*'s role as a potential public health threat.

Figure 9 *Naegleria fowleri*



Morbidity and Mortality Weekly Report (MMWR): 2005-2006 Surveillance Summary

The Waterborne Disease Surveillance Team would like to say thank you to everyone who was involved in investigating outbreaks, contributing data, writing and reviewing the MMWR Surveillance Summary reports for waterborne disease and outbreaks (2005-2006 data). We greatly appreciate the time and energy that you committed to these tasks.

The surveillance summaries for outbreaks associated with recreational water and drinking water (including non-recreational water that is not intended for drinking) is being reviewed for publication by MMWR staff. This was truly a collaborative effort and we look forward to sharing the published report with you later this summer.

Figure 10 Thank You



Request to Readers—your name here

Have you recently completed a waterborne disease investigation or surveillance project? Was it published in a peer-reviewed journal or did you present your work at a conference? If so, we would like to share your accomplishment by listing a citation for your work in the next newsletter under “Publications and Presentations.” Please send the information to Virginia Roberts at evl1@cdc.gov. We hope that this will become a regular section.

We also encourage you to send in other examples from waterborne disease outbreak and surveillance projects that we can highlight in this or in other sections of the newsletter (e.g. new and improved web sites, links to recently-developed educational materials).

Contacts

CDC is available to provide assistance regarding waterborne outbreaks and illnesses. Please contact us to report an outbreak or to request information about waterborne illnesses related to drinking water, recreational water and other water uses. State Health Departments can also contact CDC to obtain epidemic and laboratory assistance for waterborne outbreak investigations. Additional resources are available for recreational water inquiries and outbreaks involving *Legionella*.

Telephone

770.488.7775 (staffed Monday-Friday)

Fax

770.488.7761

Mail

Waterborne Disease and Outbreak Surveillance Coordinator,
Division of Parasitic Diseases, NCZVED, CDC, MS F-22
4770 Buford Highway, NE, Atlanta, GA, 30341-3724

CDC Reporting Form (CDC 52.12, rev 01/2003):

http://www.cdc.gov/healthyswimming/downloads/cdc_5212_waterborne.pdf

Recreational Water- Online Resources:

<http://www.cdc.gov/healthyswimming>

RWI Outbreak Response Toolkit:

http://www.cdc.gov/healthyswimming/rwi_outbreak.htm

Legionella:

[Editor's note: contact info edited, 06/2009]

All travel-associated Legionnaires' disease cases should be reported directly to the *Legionella* team by emailing travellegionella@cdc.gov or by sending a completed Legionellosis case report form within the seven days following state notification to CDC 1600 Clifton Road MS C-23 Atlanta, GA 30333, Attn: *Legionella* Team. **All Legionellosis cases and outbreaks that are not associated with travel** may be reported by sending completed case report forms to the above address within one month of state notification or as soon as possible thereafter. Case report forms and *Legionella* information can be found at <http://www.cdc.gov/legionella>. **Contact for additional questions, including assistance with outbreak investigations:** travellegionella@cdc.gov, 1-800-CDC-INFO (1-800-232-4636).

Please also submit the CDC 52.12 form and/or a summary report (see contact information at left) when the Legionellosis outbreak investigation has been completed.

Please contact Virginia Roberts at evl1@cdc.gov to submit content or suggestions for *A Drop of News*