

March, 2010: A Drop of News from CDC's Waterborne Disease Prevention Branch



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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.

After being on hiatus for several months, *A Drop of News* returns with information about waterborne disease-related research, outbreak response and investigation, surveillance and more! As we welcome in the new year, we would also like to introduce the new Waterborne Disease Prevention Branch (page 2), which is looking forward to working with you and other CDC water groups on water, hygiene and sanitation activities in 2010.

This issue includes an article from Arizona (page 3) about its responses to three Crypto outbreaks, as well as success stories from two EHSNet-Water participants (pages 6 and 7). See page 8 to read about the collaborative approach taken by South Carolina to save its Recreational Waters Program.

Don't forget to contact us at NORSWater@cdc.gov if you have an idea for a future article! Lastly, to catch up on all the news from previous issues, go online to: http://www.cdc.gov/healthywater/statistics/wbdoss/drop_of_news.

Actions and Alerts

Recreational Water Illness (RWI) Prevention week is fast approaching and will be the topic for the next Water, Hygiene and Sanitation (WASH) webinar on March 17, 2010 (see page 2). This year's theme is "Pool Inspections." Please contact HealthySwimming@cdc.gov with any questions. The Healthy Swimming brochure (shown below) and pool chemical safety poster are available for free online in English and Spanish at: <http://wwwn.cdc.gov/pubs/swim.aspx>

Figure 1 Image of the Healthy Swimming brochure



Mark your Calendars!

National Ground Water Awareness Week: March 7-10

World Water Day: March 22

WASH webinar: March 17

National Drinking Water Week: May 2-8

RWI Prevention Week: May 24-30

OutbreakNet Annual Conference: June 6

CSTE Annual Conference: June 6-10

The Waterborne Disease Prevention Branch

The Waterborne Disease Prevention Branch (WDPB) in the National Center for Emerging and Zoonotic Diseases (proposed) has been created to strengthen CDC's domestic and global efforts to support and develop water, sanitation, and hygiene (WASH)-related disease prevention programs and guidelines. The WDPB will use a multidisciplinary approach that includes surveillance, outbreak investigation and emergency response planning, applied epidemiologic and laboratory research, behavioral and communications research, environmental health research, and strategic partnership.

The WDPB is composed of the Division of Parasitic Diseases' former Water and Environment Team and the Division of Foodborne, Bacterial and Mycotic Diseases' former Diarrheal Diseases Epidemiology Team. The new WDPB is organized into four closely linked teams: a domestic WASH epidemiology team, a global WASH epidemiology team, a WASH laboratory team and a health promotion and communications team. In addition to the ongoing activities of the former Water and Environment Team, WDPB water and hygiene activities now include evaluating and supplying technical support to household water treatment programs in 32 countries; studying diarrhea etiology and conducting diarrheal outbreak investigations abroad; studying long- and short-term health impacts of handwashing promotion among infants and children; exploring models for scaling up handwashing behavior change; and assisting state and local health departments with control of daycare-associated shigellosis outbreaks and issues related to typhoid fever. An increased emphasis on sanitation and hygiene and global water issues in the WDPB reflects a natural association between traditional waterborne disease prevention efforts and sanitation and hygiene-related efforts.

Data and lessons learned from WDPB activities will serve as a foundation for developing prevention and control recommendations in the context of strong partnerships. The WDPB will continue to work closely with state, territorial, local, and global partners and will strive to enhance WASH support and resources available to these partners. The WDPB will also collaborate with internal and external federal partners, such as CDC's *Legionella* Team, the National Center for Environmental Health's (NCEH) water-related environmental health programs, and Environmental Protection Agency (EPA).

Figure 2 The organization of the Waterborne Disease Prevention Branch



WASH Webinars

The WBPB hosted the first WASH webinar on January 20, 2010. Participants included health departments in 39 states and territories, as well as CDC staff members who attended in-person. The webinar included presentations about the new branch and recent CDC discussions about waterborne disease prevention in the United States, as well as updates on RWI Prevention Week and outbreak surveillance activities. WASH webinars support dialogue and collaboration among waterborne disease epidemiologists, sanitarians and laboratorians across the nation. The WBPB actively solicits presentations and topics from local and state participants; coordinates presentations describing local, state and federal activities; and facilitates discussions on the topics.

Arizona—The Public Health Response to Three ‘Crypto’ Outbreaks in Maricopa County, 2008

Submitted by Joli Weiss (Arizona Department of Health Services) and Jennifer Stewart-Ricks (Maricopa County Department of Public Health)

In the summer of 2008, several outbreaks of cryptosporidiosis occurred in Maricopa County, Arizona. The Maricopa County Department of Public Health (MCDPH) identified three outbreaks from July 3 through August 5, 2008 occurring in two public swimming pools and one children’s splash-and-play area.

The first outbreak was initially reported by members of a swim team in a large municipal pool. Stool specimen analysis revealed the presence of *Cryptosporidium* oocysts. MCDPH conducted 89 interviews from swim team members, other pool users, and pool staff, and identified a total of five confirmed and 52 probable cases.

Information collected during the interviews revealed that almost all swim team members swam in multiple pools both before and immediately after illness. Team members denied swimming during the acute phase of infection; however, all admitted to resuming swimming immediately after symptoms resolved. Media became involved when the city of Phoenix closed all pools for hyperchlorination to prevent further spread.

The second outbreak also involved swim team members at a municipal pool. All 18 members were reported ill; of those, 12 were interviewed. Four confirmed cases were identified and seven cases were deemed probable. The municipality also immediately closed and hyperchlorinated all pools.

The third outbreak occurred in a children’s splash park run by a third municipality. A total of four confirmed and five probable cases were linked to the splash park. The water subsequently tested positive for *Cryptosporidium* oocysts. The water used for this feature was hyperchlorinated and a UV disinfection system was installed.

Cryptosporidiosis outbreaks are difficult to control due to the large number of people and swimming pools typically involved as well as the hardiness of the parasite. Yet, in Maricopa County, cryptosporidiosis cases decreased dramatically and no cases associated with the suspect pools were reported after the interventions. Two factors may have helped to stop the

outbreak. First, the jurisdictions involved closed all of the pools in the district for hyperchlorination (and in one case, UV disinfection) at the first sign of illness in order to prevent the spread of disease. Second, the media was involved from the outset, increasing awareness of cryptosporidiosis and providing education on prevention measures.

Editor's note: Additional information about cryptosporidiosis outbreak prevention and response is available in the Cryptosporidiosis Outbreak & Response Evaluation (CORE) Guidelines at: http://www.cdc.gov/crypto/resources/core_guidelines.pdf

Figure 3 A water feature at a waterpark



Dead-End Ultrafiltration in Waterborne Disease Outbreak Investigations

Submitted by Bonnie Mull (CDC/NCEZID)

CDC has been investigating ultrafiltration (UF) methods because of the need for a simple and effective technique for recovering diverse microbes from water. In the past, different filters had to be used for the different microbe classes (viruses, bacteria, and parasites). Ultrafiltration is a technique that has been used in various approaches since the 1970s for concentrating microbes, especially viruses, in water using dialysis ultrafilters. Because the ultrafilters have pore sizes small enough to remove large molecules, these filter membranes are also capable of simultaneously concentrating diverse waterborne microbes, including viruses, bacteria, and parasites.

For rapid response to suspected water contamination events, the dead-end UF (DEUF) method enables untrained field personnel to readily employ an UF technique to recover diverse target microbes or unidentified microbial agents from large-volume water samples. Instead of shipping tens of liters of water to an analytical laboratory, use of the DEUF technique decreases the costs and effort needed to analyze large-volume water samples (~ 100-L) by enabling filtration to be performed in the field and then shipping the ultrafilters (instead of bulk water samples) to the laboratory for final processing and analysis.

DEUF has been shown to be effective for waterborne disease outbreak investigations and is a valuable tool for bioterrorism preparedness and emergency response. This technique has been successfully used since 2008 to enable pathogen identification for waterborne outbreak investigations in Alamosa, CO (*Salmonella* in ground water), Oklahoma (norovirus in ground water), and Tennessee (hepatitis A virus in ground water). The technique enables sensitive detection of pathogens using culture, microscopy and molecular (e.g., PCR) assays.

Figure 4 Dead-end ultrafiltration technique being used in the field.



Figure 5 Dead-end ultrafiltration technique



Harmful Algal Bloom-related Illness Surveillance System (HABISS)

Submitted by Lorrie Backer (CDC/NCEH) and Andy Reich (Florida Department of Health)

The extent of human illness caused by environmental exposure to algal toxins in drinking and recreational waters is unknown. There are guidelines from the World Health Organization, Canada, Brazil, and Australia that public health agencies can follow to make decisions about allowing access to drinking water sources and recreational areas with ongoing HABs. However, there are no U.S. federal regulations, and no official guidance from the U.S. Environmental Protection Agency specifying allowable concentrations of HAB-related toxins in the water. In response to the need to support public health decision-making, the National Center for Environmental Health (NCEH) at CDC developed the Harmful Algal Bloom-related Illness Surveillance System (HABISS; website: <http://www.cdc.gov/hab/surveillance.htm>). HABISS is a unique surveillance system that includes the collection of not only human health data, but data from animals made ill by exposure to HABs and environmental data on the occurrence of HABs.

Data collection is organized in modular formats that can easily be adapted for state and local needs.

State health agencies are particularly interested in using this database to identify areas at risk for future blooms, thus allowing state public health prevention activities to be in place not only in response to reports of human or animal illnesses, but also in advance of anticipated public health impacts. For example, the Florida Department of Health's (FDOH) Aquatic Toxins Program, one of the original collaborators with CDC in the development of HABISS, uses the system to gain a better understanding of the water bodies contributing the greatest to HAB illness in Florida. This system is an important tool to FDOH as part of a comprehensive public health illness surveillance and reporting system. HABISS is a crucial element for FDOH public health managers in response decision making and collaborations within Florida and across state boundaries between local, state, and federal entities. These include developing health appropriate outreach material for the public, designing environmental public health monitoring for cyanobacteria and their toxins, and building partnerships with environmental managers in Florida. Currently, 13 states are contributing data to HABISS; staff are conducting active case-finding in collaboration with regional Poison Information Systems. Future plans include expanding HABISS internationally, enhancing reporting and modeling capabilities, and adding access to CDC's Event Anomaly Reporting System (EARS; website: <http://www.bt.cdc.gov/surveillance/ears/>).

Figure 6 Study site in California. August, 2007



Figure 7 Field sampling for human pathogens in California. August, 2007



Regionalization of the Environmental Legionellosis Response in New York State

Submitted by David M Dziewulski (New York State Department of Health)

In New York State, legionellosis events (one person) and outbreaks (two or more people) not only occur in communities but also occur in New York State-regulated healthcare facilities (e.g., nursing homes, long-term residences, hospitals). Investigation of legionellosis events and outbreaks need to be addressed promptly and efficiently with properly trained staff, in order to prevent the occurrence of additional illness. Until recently, much of the equipment and expertise for a proper environmental investigation resided in the Department of Health's Central Office, making a rapid response difficult.

In order to improve legionellosis response, staff of the Bureau of Water Supply Protection located in the Department of Health's Center for Environmental Health developed and implemented a training initiative on legionellosis outbreak/event investigation and prevention. The training was aimed at public health professionals (engineers, sanitarians and scientists) working in State Health Department Regional Offices and the State's County and City departments of health. Elements of the training included background information on legionellae; clinical aspects of the disease; introductory epidemiology; use of an Environmental Assessment Form (EAF) to evaluate water systems and cooling towers where the bacteria may be present; use of equipment for monitoring water quality parameters; and an introduction to both industry guidance and relevant government regulations and guidance topics. New York State case studies of previous legionellosis outbreaks were also included in the course presentation. On-going implementation of the course was assisted by funds from the CDC Environmental Health Specialist - Network (EHS-Net) Water agreement. Between 2007 and 2009, each of the four New York State Regional Offices hosted training sessions for regional and county health department staff. Additional presentations on the environmental aspects of legionellosis investigations were made to health-care facility engineers, epidemiologists and hospital/long-term care program staff.

In another step to improve legionellosis investigations in regulated healthcare facilities, an EHS-Net-funded 'crash-cart' containing equipment, supplies and reagents was designed, assembled and distributed to the Regional Offices. Equipment included a luminometer to rapidly estimate the presence of microorganisms through the measurement of adenosine triphosphate (ATP); meters to measure pH, temperature and conductivity; infra-red temperature sensors to help measure facility components up to 5 feet away that are not readily or safely accessible by staff; and colorimeters for copper, chlorine, chlorine dioxide analyses in order to assess current disinfection conditions. Sampling equipment and replacement reagents and standards were also part of the cart inventory. Initially the cart concept was viewed as a rapid-response kit to be used in legionellosis investigations as well as a means to decentralize and expedite the environmental component of these investigations. Apart from these investigations, the use of the crash-cart has been extended to include water quality monitoring at facilities with known risks and for routine drinking water monitoring tasks.

The impact of the training and local availability of the crash-carts has been demonstrated by the increased involvement of the Department's Regional Office staff and local departments of health in addressing legionellosis events that have occurred in their geographical areas of concern. Mr. Dave Rowley of the Western Region's Rochester Field Office stated that "The crash cart has greatly enhanced . . . [our] region's ability to respond to cases of Legionnaires' Disease in various settings. The equipment included in the cart, coupled with the Department's Environmental Assessment Form, allows regional staff to characterize water and HVAC systems . . .". John Strepelis in the Central Regional Office felt that the equipment was a time-saving device

because “The crash cart has enabled us to conduct preliminary surveys to gain information for focusing *Legionella* sampling efforts”. The end-result of these efforts has been that regional and local environmental health staff have the training and tools to become directly involved in the response to legionellosis events in the regulated healthcare facilities as well as sporadic community occurrence of the disease. This has resulted in a rapid and efficient response to legionellosis events statewide.

Figure 8 New York State showing the New York State’s Department of Health’s Regional and Field Structure

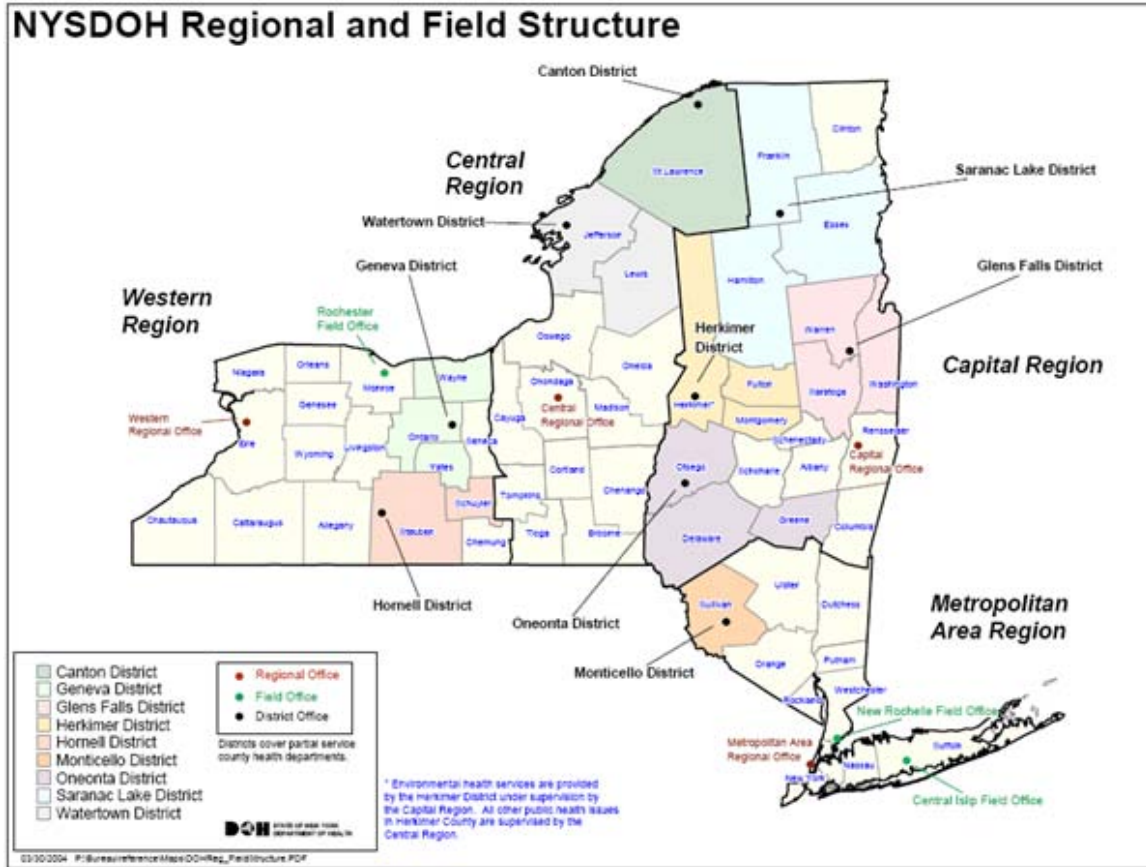


Figure 9 A legionellosis investigation ‘crash-cart’



EHSNet-Water Receives Environmental Recognition Award

In June 2009, the Sacramento Environmental Commission presented EHSNet-Water in California with an Environmental Recognition Award for voluntarily exceeding drinking water regulatory requirements during 2008. This award was given to Joyce Tuttle, REHS, PHM for work at 15 migrant farm camps in the Sacramento Delta of California. The camps, which are regulated under Housing and Community Development housing standards and inspected by the Sacramento County Environmental Management Department, are required to meet bacteriological water quality standards once per year. The EHSNet-Water project included bimonthly drinking water quality tests to measure bacteria levels and other constituents (pH, conductivity, salinity, TDS, nitrate, sulfate, phosphate, sulfide, arsenic, iron, manganese and turbidity). The increased frequency of testing identified problems with drinking water quality that had not been detected in the most recent annual tests. Migrant farm camp operators were provided with reports that summarized the test results. Working closely with migrant farm camp operators, Joyce was able to improve drinking water quality in several of the camps, and was contacted by farm operators to provide technical assistance following complaints about water quality from camp workers. For more information about EHSNet-Water, go to: <http://www.cdc.gov/nceh/ehs/ehsnet/>

Figure 10 Environmental Recognition Award



Figure 11 : (Left-Right) Joyce Tuttle (CA DPH), Glenn Takeoka (CA DPH), and Anne Frey (Sacramento County EMD)



South Carolina—A Successful Effort to Save a Recreational Waters Program

Submitted by Shawn Clarke and Jim Ridge (South Carolina Department of Health and Environmental Control)

The South Carolina Department of Health and Environmental Control (SCDHEC) manages the public pool Recreational Waters Program as two separate organizational units within the Bureau of Water (i.e., Permitting and Compliance). Prior to 2002, the Recreational Waters Program was funded in part by state general funds and in part by recreational water user fees such as application fees and annual operating fees. Following a budget reduction in 2002, all state general funds were cut from the program, and the program was slated for closure.

In response to the challenges facing the Recreational Waters Program, SCDHEC staff initiated stakeholder meetings to present the situation to stakeholders and discuss options for the future of the program. Stakeholders included builders—concerned about the potential influx of unlicensed and unregulated builders from other states; the hospitality association—concerned about increases in insurance rates and lost tourism revenue if accidents and RWIs occurred in unregulated pools; apartment owners associations/property management associations—concerned about an increase in insurance rates and loss prevention/risk management; and suppliers.

SCDHEC presented three options: end the program entirely; maintain the program with fewer inspections and no permitting activities; or increase the fees that supported the program and keep the existing level of services. As a result of the meetings, the third option was determined to be the most acceptable one for SCDHEC to pursue. SCDHEC followed up by presenting a proposed fee structure to stakeholders and seeking their support.

As of 2002, the Recreational Waters Program is completely self-supported through recreational water user fees. Annual operating fees have increased from \$75 to \$125 for the first pool and from \$50 to \$75 for each additional pool. Permit application fees have increased from a \$200 base fee plus a \$0.20 charge per square foot of pool surface area to a \$400 base fee plus a cost of \$0.50 per square foot of pool surface area or a flat charge of \$1000 per slide/flume. Re-inspection fees were also increased from \$100 to \$250 per pool per re-inspection. Staffing levels for the program, which encompasses 7,025 public pools, remain at 13 regional staff, 33 part-time summer inspectors, two full time compliance staff and two full-time permitting staff. As of October, 2009, the number of completed pool inspections exceeded 24,000.

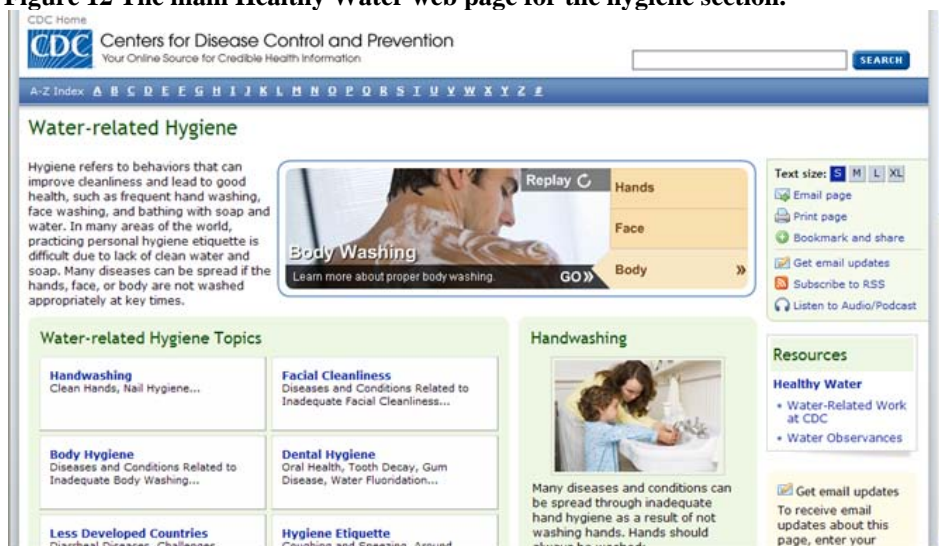
SCDHEC 's efforts to engage stakeholders and identify potential solutions provided a unique opportunity to find a mutually-agreeable solution to the funding challenges faced by the Recreational Waters Program. The revised fee structure in effect today has enabled the SCDHEC's Bureau of Water to maintain standards of public pool safety and cleanliness and continue to support the Department's efforts to enhance public health in South Carolina.

Healthy Water Website—New Hygiene Section

CDC's Healthy Water (HW) website announces the launch of its new Hygiene section (online at <http://www.cdc.gov/healthywater/hygiene/>). The HW site now offers eight separate topical sections, including Drinking Water, Healthy Swimming/Recreational Water, and Diseases, Contaminants and Injuries.

The new hygiene section provides users with information about water-related hygiene habits, behaviors, and etiquette. This section also outlines proper hand washing techniques, prevention and control of hygiene-related diseases, and hygiene challenges in less developed countries. Interactive human models allow the user to learn about diseases and conditions related to specific body parts.

Figure 12 The main Healthy Water web page for the hygiene section.



Ground Water Awareness Week and World Water Day, 2010

Did you know that the majority of public water systems in the United States use ground water as their primary source? Were you aware that, worldwide, 1.5 million children die each year from diarrheal diseases caused by unsafe water, poor sanitation, and lack of hygiene?

To highlight the role water plays in the health of the public and the importance of maintaining the integrity of our water sources, the WDPB joins with its partners to celebrate Ground Water Awareness Week and World Water Day in March.

Ground Water Awareness Week, observed this year on March 7-13, is sponsored annually by the National Ground Water Association (NGWA). In addition to increasing general awareness around

the topic of ground water, NGWA uses this week to stress the importance of yearly water testing and well maintenance.

World Water Day, observed on March 22 of each year and sponsored by the United Nations Environmental Programme (UNEP), was created to focus attention on the importance of freshwater resources. The 2010 World Water Day theme "Clean Water for a Healthy World," is designed to raise awareness of water quality challenges and the importance of water quality in sustaining healthy ecosystems and people.

2007-2008 MMWR Surveillance Summaries

The WDPB would like to say thank you to everyone involved in waterborne disease outbreak investigations and outbreak reporting for the 2007-2008 reporting period. Ongoing efforts in waterborne disease prevention and detection provide valuable data for state, local and federal public health, including the national Waterborne Disease and Outbreak Surveillance System (WBD OSS). The surveillance summaries for 2007-2008 data will be published in 2010 and will discuss outbreaks associated with recreational water and drinking water (including non-recreational water that is not intended for drinking). If you are interested in reading historic WBD OSS surveillance reports, please go to <http://www.cdc.gov/healthywater/statistics/wbdoss/surveillance.html>. You may also be interested in taking a look at the archived outbreak reporting forms now online at http://www.cdc.gov/healthywater/statistics/wbdoss/nors/forms_archive.html.

Publications and Presentations

Remember that if you have recently completed a waterborne disease investigation or surveillance project that was published in a peer-reviewed journal or presented at a conference, you can share your accomplishment by listing a citation for your work under "Publications and Presentations." We also encourage you to send in other examples of waterborne disease outbreak and surveillance projects that we can highlight, such as updated web sites, links to new educational materials or informal summaries of other activities.

Contact Us

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 epidemiologic and laboratory assistance for waterborne outbreak investigations. Additional resources are available for recreational water inquiries and outbreaks involving *Legionella*.

Phone: 770.488.7775 (staffed Monday-Friday)
Fax: 770.488.7761

Waterborne Disease & Outbreak Surveillance Coordinator
Centers for Disease Control and Prevention National Center for Emerging and Zoonotic Diseases (proposed) , MS F-22,
4770 Buford Highway, NE, Atlanta, GA, 30341-3724

Training and resources for reporting waterborne disease outbreaks to CDC via the electronic National Outbreak Reporting System (NORS):
<http://www.cdc.gov/healthywater/statistics/wbdoss/nors/index.html>

Healthy Water website: <http://www.cdc.gov/healthywater/>

Outbreak Response Toolkits: <http://www.cdc.gov/healthywater/emergency/toolkit/index.html>

Legionella:

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 report outbreaks of legionellosis in NORS when the outbreak investigation has been completed (see links to training and other resources for NORS at left).

Please contact NORSWater@cdc.gov to submit content or suggestions for *A Drop of News*