

***Waterborne Disease and Acts of Water Terrorism:
The New Role of the Physician as Front-line Responder***
June 4, 2003
American College of Preventive Medicine

CONFERENCE SUMMARY

The American College of Preventive Medicine (ACPM) convened a one-day conference on June 4, 2003, in Washington, DC, to increase the recognition of waterborne disease and the health effects of water pollution, including the threat of intentional biological and chemical contamination of water. Titled, *Waterborne Disease and Acts of Water Terrorism: The New Role of Physician as Front-line Responder*, the conference was also sponsored by the American Medical Association, Centers for Disease Control and Prevention, and American Water Works Association (AWWA).

The conference targeted national, state, and local medical societies, public health agencies, and other organizations that can reach practicing physicians and other providers at the community level. The aims of the conference were to:

- Increase awareness among national, state, and local medical societies and public health organizations regarding the ongoing and emerging threats posed by chemical and microbial contamination of water reserves and the importance of physicians and other health providers being able to recognize, diagnose, and manage cases of waterborne illness.
- Introduce these organizations to a comprehensive, educational, on-line resource available to practicing physicians to assist them in recognizing and managing waterborne disease and the health effects of water pollution.
- Develop and carry out strategies to ensure these organizations reach out to their respective members, through information dissemination and training initiatives, to increase physicians' and other front-line providers' awareness and skills regarding identification and management of waterborne disease.

Funding through the Centers for Disease Control and Prevention's Public Health Conference Support Grant Program (Grant Award No R13/CCR322001-01) and through the AWWA supported the conference.

Participant Demographics

ACPM culled the following information regarding conference participant demographics from registration information provided prior to the conference. Overall, there were 93 registrants for the conference. Approximately half of the registrants were physicians (MDs and DOs). Approximately 72 percent of the non-physicians had graduate degrees, including about one-fourth who had clinical (e.g., nursing or veterinary) degrees. Of the remaining three-fourths with graduate degrees, most had MPHs, PhDs, or JDs. The breakout of registrants by primary professional setting is as follows:

- State/local health agency – 29%
- Specialty association – 20%
- University – 14%
- Non-profit – 12%
- Federal health agency – 10%
- Industry/business – 7%
- Hospital – 2%

- Military – 1%
- Other – 5%

Pre-Conference Outreach Strategies

ACPM conducted extensive outreach to the primary target audiences of the conference to attract potential participants and create awareness of the on-line waterborne disease physician reference guide (www.waterhealthconnection.org). The main targets were presidents and executive leaders of national, state, and select local medical societies and health departments who could reach larger audiences of physicians and public health practitioners. ACPM reached out to many secondary audiences as well. Below are some of the key strategies ACPM employed to market the conference:

- Obtained current mailing lists for presidents and CEOs of approximately 25 national medical associations, all state medical societies, and state health officials and sent them a personalized invitation letter from the ACPM and AWWA presidents. Also invited health departments and medical societies from six large metropolitan areas.
- Created, printed, and widely distributed a follow-up marketing post card. The post card highlighted a recent CDC-issued terrorist threat to water facilities and how the conference would address related critical information needs for providers. In addition to state health departments and medical societies, ACPM distributed the card to the full ACPM and ACOEM memberships as well as at a variety of national environmental health meetings and forums.
- Sent multiple e-mail announcements to a variety of national organizations and coalitions announcing the conference and asking them to distribute the announcement to their members. Also worked with a variety of terrorism and public health training clearinghouses to ensure the conference was listed.
- Conducted extensive phone follow-up with the primary target audiences to prompt each organization to send an appropriate member. Also called the executive directors or other key contacts of a variety of public health associations, including those representing schools of public health, microbiologists, public health laboratories, physician assistants, drinking water administrators, nurse practitioners, and others.
- Distributed two press releases, the first about four weeks in advance of the conference to generate media interest, and the second the day of the conference to highlight the key messages emanating from the conference.

Conference Presentations

Dr. Arthur Frank, ACPM's Secretary-Treasurer and an environmental/occupational medicine expert, moderated the conference. ACPM President Dr. Robert Harmon and AWWA President Lynn Stovall provided the welcome. Other introductory remarks were delivered by Dr. Patricia Meinhardt, chair of the planning committee for the conference and author of the on-line physician reference guide that would serve as the key educational vehicle for the conference; Michael Sage, Deputy Director of CDC's Office of Terrorism Preparedness and Emergency Response; and Janet Pawlukiewicz, Director of the EPA's Water Protection Task Force. These remarks provided an important context for the conference, highlighting the threat of water terrorism and the general lack of awareness by health providers and water utilities of how to identify and manage potential incidents.

Keynote Presentation: “All Preparedness is Terrorism Preparedness”

Richard Jackson, MD, MPH

Director

National Center for Environmental Health

Centers for Disease Control and Prevention

Dr. Jackson noted how the potential for acts of domestic terrorism has been steadily increasing over the past few decades, and he cited numerous mass casualty events over the past 20 years as evidence of this trend. Despite the escalating occurrence of acts of terrorism, eighty percent of our nation’s cities and counties still have no bioterrorism response plan.

In light of this recent trend, the development of an effective bioterrorism response plan is crucial. This plan should address the subject of water terrorism, as it has been growing in the spotlight with recent threats by the al Qaeda to our nation’s water supply. Water terrorism is defined as an act that deliberately interrupts a supply of water through physical destruction, water pressure in a system, or computer/data systems. Water terrorism also includes the disturbance of the quality of water through direct injection of contaminants/poisons.

In response to an event or threat of water terrorism, several questions should be asked by the health department or water utility, such as: Is the agent stable in water? What is the toxic dose? Will existing water treatment processes eliminate it? Can I modify water treatment to handle it? Will home water treatment methods work? Are rapid detection tests available?

The “multiple barriers” approach to drinking water safety includes the following steps: Prevent source contamination; control discharge of underground contaminants; treat water to meet standards; assure water system operators are qualified; ensure quality distribution systems; and inform the public about drinking water safety.

Those responsible for unregulated drinking water systems have expressed a need to regional CDC offices for rapid access to drinking water expertise and for CDC to streamline internal information systems.

In order to tackle the issue of water terrorism preparedness effectively, there are several challenges within the infrastructure of environmental public health (EHP) that must be dealt with first. Many states and localities lack environmental public health leadership. The role of environmental public health services is not well understood and is often invisible. Stakeholders need to be more involved with environmental public health services. There has also been a decrease in the number of EPH professionals, as there are currently only 25 universities with accredited EPH undergraduate programs.

“Waterborne Disease in Healthy and Susceptible Populations: The Impact of Natural and Intentional Contamination”

Jeffrey Griffiths, MD, MPH&TM

Director of Graduate Programs in Public Health

Tufts University School of Medicine

Natural and intentional contamination of water often results in new emerging pathogens and endemic diseases. The resistance to chlorination/disinfection and medical treatment characterizes an emerging pathogen. Such pathogens can be spread by zoonotic (animal) or by human means. A tiny inoculum of the “emerging pathogen” can infect anyone. Although contamination of water can impact an entire population, the more vulnerable sub-populations, such as children and elderly, feel the most prominent effects. Due to advances in medical technology, population shifts have resulted in a growing

elderly population afflicted with chronic diseases. Consequently, the prevalence of morbidity and mortality caused by new emerging waterborne pathogens and endemic disease also increases.

Dr. Griffiths provided some practical yet crucial guidelines for preventing the contamination of water. The water supply should be kept clean of any fecal matter through methods such as filtration and chlorination. If the existence of fecal matter in the water is impossible to prevent, the bacteria in the water should be killed. The killing of the bacteria in the water should be a continuous process, as consumption of human or animal waste greatly facilitates the transmission of pathogens. No traces of the bacteria should linger in the water. While taking these steps, the water should also be rid of naturally occurring and non-made minerals and synthetic chemicals.

“Physician Preparedness for Waterborne Acts of Terrorism”

Patricia L. Meinhardt, MD, MPH, MA

Executive Medical Director

Center for Occupational and Environmental Medicine

According to Dr. Meinhardt, it is critical that an effective bioterrorism response plan includes “early detection and rapid response to biological, chemical or radiological terrorist assaults on the nation's infrastructure.” Although methods of detecting intentional water contamination have been improving, the initial indication that contamination has taken place is often when disease trends or illness patterns have changed within a community. This occurrence could develop into a community-wide waterborne disease outbreak or a cluster of water-related cases of chemical or radiological toxicity in the general population.

Emergency preparedness and response to acts of water terrorism must include the medical community as critical key players. Local community physicians are likely to provide the first warning to health authorities of waterborne acts of terrorism. As healthcare providers are among the most trusted sources of information for the general public regarding drinking water quality and safety in the US, community residents will immediately turn to them for advice regarding the safety of their drinking water following a water terrorism event.

Unfortunately, most physicians have received no formalized training in the detection or management of waterborne disease and the health effects of water pollution. Formal training in this area is necessary as accurately diagnosing disease or illness from water contamination can be challenging. Many of the signs and symptoms of water-related disease are non-specific and mimic more common medical disorders.

A new medical website has been created to assist healthcare providers in recognizing and managing waterborne disease and the health effects of water pollution. The website, *Recognizing Waterborne Disease and the Health Effects of Water Pollution: A Physician On-line Reference Guide*, can be found at www.WaterHealthConnection.org. Unique features of this website include:

- “24/7” availability with free access to 427 web pages of comprehensive information
- Clinically relevant information detailing the diagnosis and management of waterborne disease from pathogens and/or chemical contamination
- Repository of physician anti-terrorism preparedness and readiness resources
- New Section – *Physician Preparedness for Acts of Water Terrorism*
- Special risk communication and patient risk evaluation guidelines for both healthy and susceptible populations regarding waterborne disease
- “Ease of use” technology tools and website support for busy physician users

- Targeted search engines providing quick and easy access to 200 websites covering a diverse array of waterborne disease and water contamination issues
- Peer-reviewed content by leading medical and public health experts from medical academia and public health agencies including CDC, ASTDR, and EPA
- CME credit toward the AMA Physician's Recognition Award (maximum of 22 CME credits) sponsored by ACPM

Dissemination Strategies and Recommendations

Conference attendees participated in an open discussion of educational outreach strategies at the national, state, and local levels, identifying potential distribution channels for the conference program, on-line medical web site, and for other physician readiness materials addressing water terrorism. At the beginning of the conference, participants were asked to complete an outreach survey to express their organizations' educational needs and preferences and to identify appropriate delivery methods for outreach efforts. The results of the survey helped steer the open discussion.

Participants offered the following suggestions for disseminating the educational resources:

- Make it easy for physicians to use (e.g., "on the shelf" reference guide, internet-based, canned lectures) and promote its applicability toward recertification and CME
- Specialty society meeting venues
 - Great place to catch physicians away from patients to give them information
 - Physicians will be more inclined to learn the information when they are at a meeting with other physicians
- Provide the information to other providers of health services (nurses, vets, etc.)
- Include the content in medical licensing, in-service, and board certification exams
- Create links to the website from existing websites
- Conduct Train-the-Trainer courses
- Incorporate educational material into terrorism workshops and organizations' annual meetings
- Promote content to state health officials, epidemiologists, bioterrorism coordinators, and environmental quality engineers
- Build on the results of the CSTE assessment of state epidemiologic capacity to advocate for dedicated funding for water terrorism
- Use existing state and local bioterrorism funding for training
- Disseminate electronic news articles with links to the web site
- Tie to CDC lab response network
- Provide promotional materials to partner organizations
- Secure the AMA's endorsement of the web site
- Convene a brown-bag luncheon with staff at national partner organizations (NACCHO, ASPH, etc.)
- Package the information and send it out on CD-ROM
- Place information in terrorism training announcements
- Be explicit in promotional announcements about what we want the users to do (i.e., bookmark the site)
- Develop distilled journal articles for adaptation across medical specialties

Conference Evaluation

Forty-four participants completed the conference evaluation form that was distributed at the meeting. Overall, participants expressed that the conference was beneficial and well organized. The evaluation used a scale of 1 to 6, with 1 being “strongly disagree” and 6 being “strongly agree.” The following shows the average score for each corresponding question. The number “in agreement” refers to those who responded as either “Agree” (5) or “Strongly Agree” (6).

- Was the conference well planned and organized? **5.3** (37 of 42 respondents in agreement)
- Were audiovisuals sufficient? **5.3** (35 of 40 respondents in agreement)
- Will the information learned be useful in your work? **5.3** (35 of 43 respondents in agreement)
- Was the event of value to you? **5.4** (39 of 43 respondents in agreement)
- Were the presentations free of commercial bias? **5.7** (40 of 41 respondents in agreement)
- Were the educational objectives meant? **5.3** (31 of 33 respondents in agreement)

Conference Follow-up

Follow-up Survey

In follow-up to the conference, ACPM developed a survey to evaluate the value and effectiveness of the on-line resource introduced during the conference, as well as to gain feedback on efforts made to promote and disseminate the online resource throughout the participants’ respective organizations and others. The electronic survey was distributed to all conference participants. ACPM also viewed the survey as an opportunity remind participants about the web-based resource and to take action to help promote it to colleagues and constituents.

The survey drew 15 responses. Since the conference, 12 of the 15 (80 percent) respondents indicated they had visited the on-line waterborne disease/water terrorism resource, www.waterhealthconnection.org. Fourteen respondents (93 percent) reported that they had initiated or planned to promote or disseminate this resource within their respective organizations and/or to others. Word of mouth or referral to a colleague was the outreach method most often cited (9 of 15, or 64% of respondents). Creating web links to the site (5 of 14, or 35%) and disseminating through newsletter articles, membership mailings, mass e-mails, blast fax, etc. (5 of 14, or 35%) were other methods frequently cited.

Brochure

ACPM is developing a four-color brochure to highlight the waterborne disease/water terrorism resources presented at the conference as well as to convey some key messages from the conference. ACPM is printing 7,500 brochures. ACPM has put together a distribution plan that will include most institutions accredited by the Accreditation Council on Continuing Medical Education, the state and local medical societies and health departments targeted for the conference, several categories of physicians from the AMA Master File database, administrators and medical directors at hospitals, health plans, and medical centers, medical directors at family practice clinics, emergency room directors, and others.