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Water Source Outbreaks, Policy, and the South Bass Island Investigation

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2. Walsh TJ, Hiemenz JW, Seibel NL, et al. Amphotericin B lipid complex for invasive fungal infections: analysis of safety and efficacy in 556 cases. Clin Infect Dis **1998**; 26:1383–96.
3. Denning DW, Lee JY, Hostetler JS, et al. NIAID Mycoses Study Group multicenter trial of oral itraconazole therapy for invasive aspergillosis. Am J Med **1994**; 97:135–44.
4. Walsh TJ, Lutsar I, Driscoll T, et al. Voriconazole in the treatment of aspergillosis, scedosporiosis, and other invasive fungal infections in children. Pediatr Infect Dis J **2002**; 21:240–8.
5. Baden LR, Katz JT, Fishman JA, et al. Salvage therapy with voriconazole for invasive fungal infections in patients failing or intolerant to standard antifungal therapy. Transplantation **2003**; 76:1632–7.
6. Ascioglu S, Rex JH, de Pauw B, et al. Defining opportunistic invasive fungal infections in immunocompromised patients with cancer and hematopoietic stem cell transplants: an international consensus. Clin Infect Dis **2002**; 34: 7–14.
7. Baden LR, Marty FM. Posaconazole for invasive aspergillosis [letter]? Clin Infect Dis **2007**; 45:664 (in this issue).
8. Oakley KL, Moore CB, Denning DW. In vitro activity of SCH-56592 and comparison with activities of amphotericin B and itraconazole against *Aspergillus* spp. Antimicrob Agents Chemother **1997**; 41:1124–6.
9. Imai JK, Singh G, Clemons KV, Stevens DA. Efficacy of posaconazole in a murine model of central nervous system aspergillosis. Antimicrob Agents Chemother **2004**; 48:4063–6.
10. Petraitiene R, Petraitis V, Groll AH, et al. Antifungal activity and plasma pharmacokinetics of posaconazole (SCH 56592) in treatment and prevention of experimental invasive pulmonary aspergillosis: correlation with galactomannan antigenemia. Antimicrob Agents Chemother **2001**; 45:857–69.
11. Najvar LK, Cacciapuoti A, Hernandez S, et al. Activity of posaconazole combined with amphotericin B against *Aspergillus flavus* infection in mice: comparative studies in two laboratories. Antimicrob Agents Chemother **2004**; 48:758–64.
12. Kirkpatrick WR, McAtee RK, Fothergill AW, Loebenberg D, Rinaldi MG, Patterson TF. Efficacy of SCH56592 in a rabbit model of invasive aspergillosis. Antimicrob Agents Chemother **2000**; 44:780–2.
13. Walsh TJ, Petraitis V, Petraitiene R, et al. Experimental pulmonary aspergillosis due to *Aspergillus terreus*: pathogenesis and treatment of an emerging fungal pathogen resistant to amphotericin B. J Infect Dis **2003**; 188:305–19.

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Water Source Outbreaks, Policy, and the South Bass Island Investigation

To the Editor—We applaud O'Reilly et al. [1] on their hard work emphasizing the key point that public hygiene matters. Obviously, they undertook exhaustive water sampling and an extensive survey of patient exposures to characterize the outbreak of gastroenteritis on South Bass Island, Lake Erie, Ohio. Liang et al. [2] provided a broad view of the importance of quality assurance and diligence in maintaining the domestic water supply from the perspective of outbreaks. In their recent survey of outbreaks in the United States, Liang and colleagues found that >50% of incidents occurred in areas outside the jurisdiction of a water utility. The Environmental Protection Agency recently published a Ground Water Rule [3] that targets the quality assurance responsibilities of water utilities but does not necessarily fill the gap between regulations that protect designated watershed areas and the need for supported community approaches to respond to concerns once they are realized. O'Reilly et al. [1] suggest that the answer for South Bass Island is a municipal water treatment facility. Capitalization and maintenance costs of such an intervention are high. A subsidized well-water outlet purification approach, which would be encouraged for households and mandatory for commercial establishments, may be a better option in some of these settings. World Health Organization guidelines on water quality provide an excellent summary of pathogens and appropriate targets for purification (including toxins) based on background water contamination levels, and they cite accepted efficacies for a wide range of purification methods appropriate at the municipal, well, and household levels [4]. Open-minded cost and efficacy analyses for each community are needed, because rapid, affordable, and efficacious interventions may be available and less daunting than large infrastructure projects or—though important—sewage control and abatement in the Great Lakes.

The mere presence of pathogens in sampled well water is not surprising. We are curious to know the concentrations of and intersource variance in pathogens identified in this outbreak. Also, although we are familiar with karst systems, we were confused by figure 2 in the article [1]. The depicted well appears to draw from a ground water source but is contaminated by surface water. Proper well placement avoids surface water. As represented, the well appears to draw from the bottom of the aquifer. If so, this is problematic, because settleable solids, such as organisms and contaminants heavier than water, may then be drawn into the well. The goal is not to disturb this layer for precisely the reasons highlighted in this article.

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References

1. O'Reilly CE, Bowen AB, Perez NE, et al. A waterborne outbreak of gastroenteritis with multiple etiologies among resort island visitors and residents: Ohio, 2004. Clin Infect Dis **2007**; 44:506–12.
2. Liang JL, Dziuban EJ, Craun GF, et al. Surveillance for waterborne disease and outbreaks associated with drinking water and water not intended for drinking—United States, 2003–2004. MMWR Surveill Summ **2006**; 55: 31–65.
3. US Environmental Protection Agency. EPA Ground Water Rule. US Environmental Protection Agency, **2006**. Available at: http://www.epa.gov/safewater/disinfection/gwr/regulation.html. Accessed 8 April 2007.
4. World Heath Organization. World Heath Organization Guidelines for drinking-water quality, third edition. Geneva: World Health Organization, **2004**. Available at: http://www.who.int/water_sanitation_health/dwq/gdwq3/en/. Accessed 8 April 2007.

The views expressed are those of the authors and do not represent those of the US Navy, the Department of Defense, the US Government, or the Catholic University of America.

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Reply to Brett-Major and Brett-Major

To the Editor—We thank Brett-Major and Brett-Major [1] for their correspondence and appreciate their interest in and concerns regarding access to safe drinking water after a large, waterborne outbreak of gastroenteritis on South Bass Island, Lake Erie, Ohio [2]. There is no doubt that access to safe drinking water is an essential component of health protection in communities. We agree that point-of-use water treatment is the most appropriate strategy in the provision of safe drinking water for certain communities, particularly in the developing world [3, 4], and well-water outlet purification may be an option for areas outside water utility jurisdiction. However, on South Bass Island, a highly developed island that receives >500,000 tourists every year, we maintain that expansion of the existing municipal water treatment infrastructure is the most appropriate solution for safe drinking water on this island. We do not imply that municipal water treatment is the solution for all islands or for all areas that have an underlying karst hydrogeology. In fact, we think that, in the context of an outbreak, it is prudent to perform an extensive environmental assessment, so that the most appropriate solution for the environmental scenario can be identified.

Multiple sources of contamination were evident from the exposure information collected in the epidemiological and environmental studies. Multiple fecal microbes were identified in ground water wells throughout the island. Of the subset of water samples for which quantification was performed, many contained relatively high concentrations of fecal contaminants. The results of all environmental sampling on the island during the outbreak are publicly available in a series of reports prepared by the multiple agencies involved in the investigation (http://www.odh.ohio.gov/news/lcmv1.aspx).

In our article [2], figure 2 is a representation of the basic concepts of ground water and surface water flow in karst terrain [5]. An unfortunate characteristic of karst geology is, indeed, the fact that ground water can come under the influence of surface water. The investigation found that contamination at shallow well depths was greatest, and many wells were unprotected from shallow contamination as a result of the short lengths of casing (6–8 m [20–27 feet]) installed in the well. Furthermore, a review of the island well logs found that more than one-half of the wells had openings, crevices, or caves below the protective casing depth. These factors may have allowed surface water and contaminants to quickly reach and enter the wells [6, 7]. Island wells may draw from a range of points in the aquifer. We agree that, as noted, wells should not draw from the bottom of the aquifer. For these reasons, the safety of water from wells placed in a karst geology can not be guaranteed.

We appreciate the opportunity to expand on some of the specifics of this outbreak. We hope lessons learned from this outbreak may help communities determine the appropriate approach to ensure safe water for their residents and visitors.

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References

1. Brett-Major DM, Brett-Major SM. Water and public hygiene [letter]. Clin Infect Dis **2007**; 45:666–7 (in this issue).
2. O'Reilly CE, Bowen AB, Perez NE, et al. A waterborne outbreak of gastroenteritis with multiple etiologies among resort island visitors and residents: Ohio, 2004. Clin Infect Dis **2007**; 44:506–12.
3. Centers for Disease Control and Prevention. Safe water systems for the developing world: a handbook for implementing household-based water treatment and safe storage projects. Atlanta: Centers for Disease Control and Prevention, **2000**. Available at: http://www.cdc.gov/safewater/manual/sws_manual.pdf. Accessed April 2007.
4. Mintz E, Bartram J, Lochery P, Wegelin M. Not just a drop in the bucket: expanding access to point-of-use water treatment systems. Am J Public Health **2001**; 91:1565–70.
5. Grannemann NG, Hunt RJ, Nicholas JR, et al. The importance of ground water in the Great Lakes region. Water Resources Investigation report 00–4008. Lansing, MI: US Geological Survey, Office of Ground Water, **2000**.
6. Keswick BH. Sources of groundwater pollution. In: Britton G, Gerba CP, eds. Groundwater pollution microbiology. New York: John Wiley & Sons, **1984**:39–64.
7. US Department of the Interior. Groundwater manual—a water resource technical publication. Denver, Bureau of Reclamation, US Government Printing Office, **1985**.

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Liposomal Amphotericin B Trial Marred by Conclusions

To the Editor—We commend Cornely et al. [1] for their excellent study comparing 2 different doses of liposomal amphotericin B (LAmB) as initial therapy for invasive mold infection. The study was designed to answer the important question of whether a dosage of 10 mg/kg per day of LAmB is more effective than a dosage of 3 mg/kg per day during the first 2 weeks of treatment.

Unfortunately, some of the authors' assertions are not supported by the data presented. We disagree with the authors'