

Hot Tub Folliculitis Outbreak Resulting from a Resort Rental Unit Stay in March 2008

Education, Proper Maintenance, and Regulation Are Keys to Prevention

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Background

Pseudomonas aeruginosa folliculitis (hot tub rash or hot tub folliculitis) is a community-acquired skin infection that results from the bacterial colonization of hair follicles after exposure to contained, contaminated water (e.g. whirlpools, spas, swimming pools, water parks, bathtubs).¹ Hot tub folliculitis first appears as itchy bumps and develops into dark red tender nodules and/or small pus-filled pimples. The eruptions typically involve the trunk and upper parts of the arms and legs. The rash can be extensive and may affect all areas of the body but is usually most severe under areas covered by a swimsuit. It may be accompanied by headache, nausea, vomiting, abdominal cramps, sore throat, rhinitis, sore eyes, and fever.

Diagnosis of hot tub folliculitis is usually made by visual examination and exposure history. However, a physician may obtain samples from the pus-filled bumps for bacterial culture to confirm the diagnosis. In a one year period throughout the United States, eight confirmed and two suspected *Pseudomonas aeruginosa* waterborne disease outbreaks were documented; five of these outbreaks involved spas, one involved a pool, and four involved both spas and pools.² This report describes an outbreak investigation conducted at a resort near Lake Cumberland through a coordinated effort between environmentalists and epidemiologists.

On March 25, 2008, the environmentalist at the McCreary County Health Department received a phone call from a concerned parent whose daughter had spent the previous weekend in a cabin at a resort near Lake Cumberland. The daughter had subsequently developed a painful rash and swollen hands and feet, and reported that several others were exhibiting similar symptoms. The complainant, a healthcare professional, was concerned that his daughter had a *Staphylococcus aureus* infection (staph infection). The complainant stated that approximately 30 people could have been exposed to the hot tub and potentially had symptoms. The regional epidemiologist based at the Lake Cumberland District Health Department (LCDHD) was contacted by another concerned parent stating that her daughter, a Marine, was sick. She reportedly had a rash, swollen hands and feet, and had been quarantined by the Marine Corps at a base in North Carolina.

An investigation was initiated by the LCDHD. Initial information gathering revealed that the resort on Lake Cumberland rents and manages cabins that are privately-owned homes. This rental program is not inspected or permitted by the health department because the cabins are considered individually-owned homes. The hot tubs in these cabins are "home-grade" hot tubs and do not fall under health department regulation.

Investigation Methods

The LCDHD epidemiologist contacted the Kentucky Department for Public Health (KDPH) Division of Epidemiology and Health Planning to advise and consult with state health officials about the investigation. LCDHD environmentalists also contacted the KDPH Division of Public

Health Protection and Safety on March 25, 2008, and were instructed to collect a 300 mL water sample from the suspect hot tub to be sent to a private laboratory for analysis.

The LCDHD epidemiologist began case identification on March 25, 2008. A total of 11 people were identified as having been at the suspect cabin during the weekend of March 21 – 23, 2008. A case was defined as any individual who had visited the Lake Cumberland resort over the weekend and subsequently developed a rash within 24 hours of last exposure to the hot tub. Phone interviews were conducted using a standardized pool exposure outbreak investigation questionnaire by the LCDHD epidemiologist. The questionnaire contained questions about: symptoms; medical treatment and diagnosis; lab testing; others with similar illness, including names and contact information; close contact with others; sharing of personal items; and exposure to pool, hot tub or sauna. Individuals were asked if they had shared any personal items or if they had other common exposures such as sleeping in the same bed.

Results

Case 1

A 20-year-old female had visited the resort over the weekend of March 21-23, 2008, and developed symptoms on March 23. She experienced painful swelling of lower extremities, making it difficult to walk, and a rash on her legs, stomach, thighs, back, and arms; she vomited frequently after symptom onset. She sought medical attention on March 25 and was given the preliminary diagnosis of staph infection from two physicians and one physician's assistant. Scrapings of the rash were sent for laboratory testing.

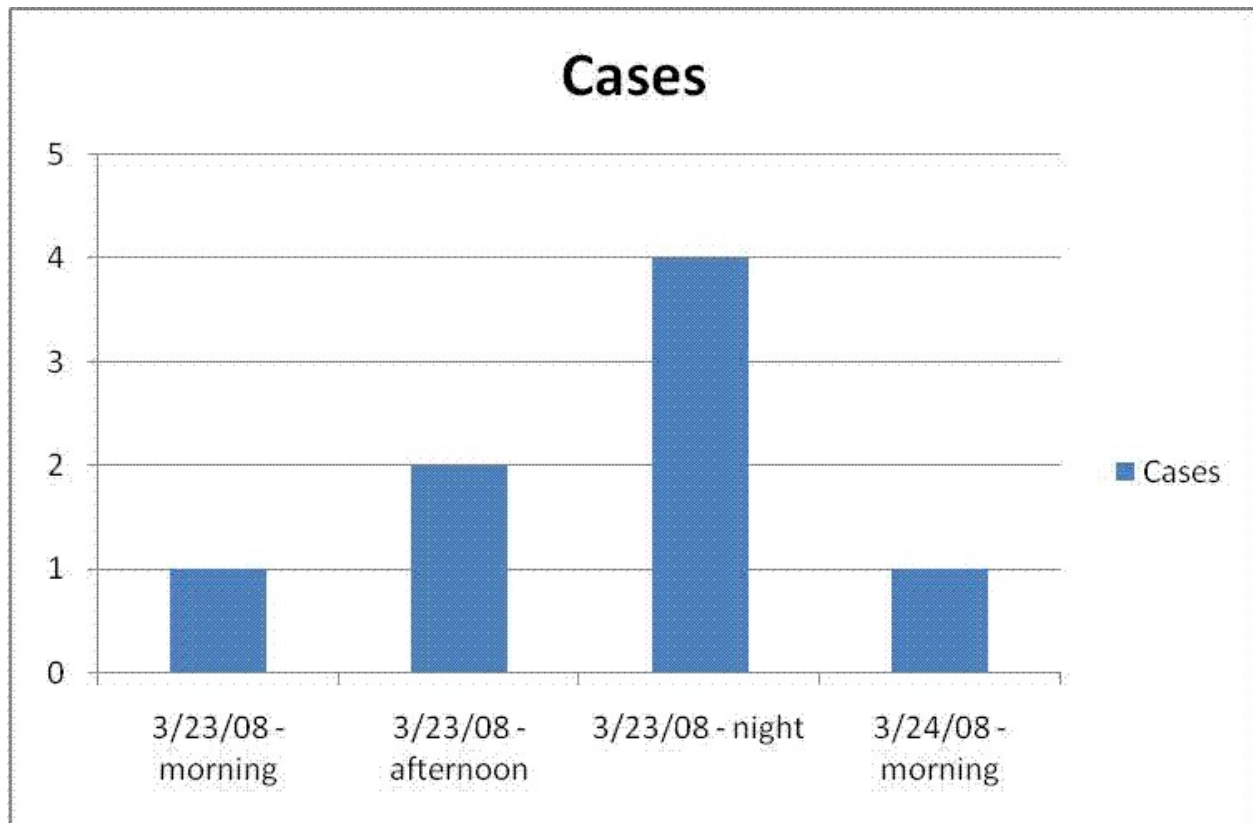
Case 2

A 19-year-old female Marine stationed in North Carolina, who had visited the resort over the weekend of March 21-23, 2008, began exhibiting symptoms on March 24 during her drive back to North Carolina. She stated that she had a rash on her legs, felt "funny," and her toes and hands were aching. She sought medical attention at the base infirmary and was immediately quarantined to her room with a preliminary diagnosis of staph infection. Blood work was done, but the LCDHD was unable to make contact with anyone in the infirmary to obtain the results. Both individuals had spent time in a hot tub at the cabin.

Through further telephone interviews, eight total cases of hot tub folliculitis were identified that met the case definition, with affected individuals ranging in age from 3-years-old to 54-years-old. All individuals involved sought medical treatment, and four patients had samples collected for laboratory confirmation. Of the four laboratory samples, three were positive for *Pseudomonas aeruginosa* and the fourth was identified as "mixed skin flora."

The mean age of cases was 20-years-old and seven (88%) of cases were female. Of the eleven individuals who were present at the cabin over the weekend of March 21-23, 2008, eight (73%) spent time in the hot tub. The epidemiologic curve identifying the number of cases and timeline in which they reported illness is shown in Figure 1.

Figure 1: Epi curve displaying time of onset (by 8-hour intervals) of hot tub rash illnesses in patrons at a Lake Cumberland Resort Park cabin during March 21-23, 2008.



The water sample collected from the hot tub was identified as positive for *Pseudomonas aeruginosa* by Lab Corp. On March 27, the resort was asked to drain, thoroughly clean, and sanitize all hot tubs. A follow-up inspection was made on April 1, 2008, to sample the hot tub after cleaning. Results from the follow-up water sampling were negative for *Pseudomonas aeruginosa* and *E. coli*, indicating that the hot tub was adequately cleaned and sanitized.

Hot tub folliculitis has an incubation period of up to 48 hours after exposure to contaminated water. The rash usually clears on its own within 2-10 days, as it is a self-limiting infection. Usually no treatment is necessary for the infection, with the exception of the use of “anti-itch” medications. Severe infections may be treated with antibiotics. Laboratory testing is usually not pursued by clinicians; however, to rule out staph infections and confirm a hot tub folliculitis outbreak from exposure to contaminated water, cultures must be taken and tested.

This environmental investigation posed some unique challenges for both the environmentalists and the KDPH Division of Public Health Protection and Safety. Since this type of resort is not regulated by the health department as a hotel or recreational water facility, new issues arose with regard to the handling of inspection and recommendations given to the facility. This is an area that the state has yet to address, because the type of resort property in question is considered a private residence that has been “rented.”

An educational pamphlet for hot tub folliculitis that describes the signs and symptoms, causes, and preventive methods, as well as recommendations for hot tub care and maintenance, was created and made available to the resort. The resort's staff was also educated on proper hot tub care and maintenance, and all infected individuals were educated on hot tub rash causes, symptoms, and prevention. The Centers for Disease Control and Prevention recommends maintaining a free chlorine or bromine concentration of 2 to 5 parts per million, pH of 7.2-7.8 and lists other important health and safety guidelines for public spas or hot tubs.³ Individuals are recommended to take precautions such as heeding hot tub safety rules, observing the hot tub and its surroundings, and talking with staff and other hot tub users when choosing to use a hot tub.⁴

In Kentucky, both the Kentucky Division of Laboratory Services (State Public Health Lab) and Morehead State Laboratory have the ability to test water for *Pseudomonas aeruginosa*, the most common cause of hot tub folliculitis.

The state lab tests recreational water from public sources such as hotel pools or hot tubs for *Pseudomonas aeruginosa* upon request. They require two (2) 100 mL samples which must arrive at the lab within 30 hours from the time of collection. For more information about testing available through the state lab, contact Lucinda Mitchell at Lucinda.Mitchell@ky.gov.

Morehead State Laboratory has the ability to perform specialized water testing for *Pseudomonas aeruginosa*, as well as other organisms. In order to submit specimens to the Morehead State Laboratory, two (2) 120mL water samples should be taken and must arrive at the lab within 30 hours of collection. It is important to note that the Morehead State Laboratory will charge \$50 per organism tested. For more information, visit their Web site at <http://www.morehead-st.edu/wtl/>.

Closing Notes

The outbreak investigation at the resort near Lake Cumberland demonstrated the need for a coordinated effort between LHD environmentalists and epidemiologists during outbreak investigations. In addition, further guidelines may need to be developed for facilities available for public use that are privately owned and rented. Because use of these types of properties is legally considered a private agreement between parties rather than public use that should fall under health department regulation, the potential for serious illness remains. This question must be addressed at the state level, with the resulting policies and procedures passed down to the local level for implementation.

¹Krivda, Stephen J. *Pseudomonas* Folliculitis. eMedicine from WebMD online. Available: <http://www.emedicine.com/DERM/topic356.htm>

²Centers for Disease Control and Prevention. Surveillance for Waterborne Disease and Outbreaks Associated with Recreational Water --- United States, 2003—2004. MMWR 2006; 55(SS12);1-24
<http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5512a1.htm>

³http://www.cdc.gov/healthyswimming/pdf/spa_operation.pdf

⁴http://www.cdc.gov/healthyswimming/pdf/spa_user_tips.pdf

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