The small town of Williamson, West Virginia, the "Heart of the Billion Dollar Coal Field" according to the road sign that welcomes incoming visitors was in disarray on a warm, 30°C day in July, 1987. Why? Because a known "AIDS" victim had been swimming in the town pool. The pool manager, a high school teacher, immediately alerted the mayor of Williamson, whom also serves as the town pharmacist. Hearsay that "the AIDS victim" had open sores and was bleeding rectally prompted the mayor to order immediate closing. In the following days, the Williamson pool was drained and meticulously scrubbed. The reactionary response also prompted cleaning of the diving board, walkways, lounge chairs, and the locker room.

Was this emotional response necessary? Can AIDS be spread via recreational aquatic environments such as swimming pools, spas, and hot tubs? According to West Virginia state health officials, the mayor and townspeople of Williamson "overreacted." Media reports and newscasts portrayed the entire town as "dimwitted hillbillies" and state health officials echoed what we've so frequently heard: AIDS cannot be spread through casual contact.

Contrary to an alarming report in the British Medical Journal citing heavily-used, public bathing facilities (i.e., pools, spas or hot tubs) with insufficient disinfectant levels as a possible mode of AIDS transmission, Martin Favero of the Centres for Disease Control reported, "The only way sexually transmitted diseases (STDs) can be communicated in swimming pools or whirlpool bath is by sexual activity." Favero also pointed out that the absence of epidemiological evidence and reports supports the fact that sexually transmitted bacteria or viruses (i.e. Hepatitis B virus, HTLV-III/LAV or Herpes Simplex virus Type II) cannot be transferred through contact with pool or spa water. According to Favero, "Persons infected with STD's may introduce these previously mentioned pathogenic agents into pool or spa water, but 'simple dilution', even in the absence of a chemical germicide, would not allow the pathogenic agent to invade a susceptible individual." He concluded by saying, "The risk of transmission of disease under these circumstances is so low as to be unmeasurable and in my opinion is zero."

What about the transmission of Hepatitis via pool or spa water? Is it a viable route of transmission? Hepatitis, commonly called "viral hepatitis," represents several clinically similar diseases that are etiologically and epidemiologically distinct. Hepatitis A (formerly called infectious hepatitis) and Hepatitis B (formerly called serum hepatitis) can be diagnosed with specific serologic tests. The third primary type of hepatitis that lacks a specific diagnostic test, and thus must be diagnosed by exclusion, is known as Non-A, Non-B Hepatitis. In 1985, there were approximately 21,500 cases of Hepatitis A; 24,300 cases of hepatitis B; 3,500 cases of Non-A, Non-B hepatitis; and 7,100 cases of unspecified hepatitis reported in the United States.

According to the most previous referenced report, person-to-person contact, generally through faecal contamination, is the principle route of transmission of Hepatitis A. Transmission is accommodated by poor personal hygiene, poor sanitation, and intimate contact. Casual contact or the sharing of utensils, cigarettes, or even kissing are not believed to transmit the infection. The surveyed literature shows no reports of Hepatitis A transmission via recreational waters such as swimming pools or whirlpool baths.

Hepatitis B virus (HBV) infection is the major cause of acute and chronic hepatitis, cirrhosis, and primary hepatocellular carcinoma worldwide. Transmission occurs via percutaneous or permucosal routes. HBV infected blood or body fluids can be transmitted by contaminated needles or through sexual contact. Close personal contact, such as in households or among children in institutions for the mentally retarded, can be a route of infectious transmission due to unnoticed contact with infectious secretions with skin lesions or mucosal surfaces. Hepatitis B virus is not transmitted via the faecal-oral route or by contaminated food or water. Of the information surveyed, transmission via pool or spa water was never identified as a mode of transmission which supports Favero's conclusion that sexual activity is the only mode of transmission of sexually transmitted diseases in swimming pools or whirlpool baths.

The previous discussion of the virulent and oftentimes lethal AIDS virus and less malicious Hepatitis virus permits us to focus our attention at those pathogenic organisms that are known to be transmitted via recreational aquatic environments. The most common microorganism associated with pool and spa water infections is Pseudomonas aeruginosa. P. aeruginosa is considered an opportunistic, ubiquitous bacterial species frequently isolated from surface waters and soil. Pathogenic pseudomonas can infect a variety of plants, and P. aeruginosa laden plants have been cited as modes of transmission to man. P. aeruginosa has been isolated from swimming pools water and from the infected outer ears of swimmers using the identified infected pool. Serotype identification verified common strains of P. aeruginosa. Commercial and residential pools and spas have recently been identified as transmission vehicles of P. aeruginosa. However, most case studies by health organizations and Centres for Disease Control have identified improper operation and maintenance as the primary cause of Pseudomonas aeruginosa outbreaks.

For example, the largest reported outbreak of whirlpool-associated dermatitis cause by P. aeruginosa occurred between March 11-15, 1981. Seventy-five (75) persons were affected. The aquatic recreational facilities were identified as the transmission source. The sand filter and chlorinators were functioning properly. The pool water had a pH of 7.4 and a free available chlorine level (FAC) of 1.5 mg/l, while the whirlpool bath had a pH of 7.2 and a 0.6 mg/l FAC level. P. aeruginosa was isolated from the spa, but the pool failed to culture any organisms. As identified in the editorial note of this referenced case, improper operation and maintenance resulted in the outbreak. At the time of the CDC update, there were no known reports of outbreaks occurring at facilities maintaining proper water balance conditions and minimum chlorine level of 1.0 mg/L.

Another similar P. aeruginosa outbreak occurred to 14 snowmobile enthusiasts vacationing in West Yellowstone, Montana. Investigation of the motel's pool and sauna identified the pool and area surrounding the pool as the transmission source. The pH of the pool water was 7.2 and the temperature was 32.2°C. Total chlorine was 3.0 ppm and no free chlorine was present. The carpet surrounding the pool was extremely wet and the wood parts under the carpet were soggy and rotting. The motel operator indicated that chlorine residuals were seldom measured. Both pool and surrounding carpet tested positive for P. aeruginosa (serotype 0:11). The carpet was teeming with P. aeruginosa to the count of 2.8 x 10 organisms per gram of carpet. The pool was drained, cleaned, and refilled. The carpet was thoroughly cleaned and washed with chlorine

bleach. An automatic chlorinator was installed. This corrective action followed by improved operation and maintenance has resulted in no additional outbreaks of P. aeruginosa at this facility.

Conclusion

Sexually transmitted diseases (STDs) are transmitted via intimate sexual contact or the transference of infected blood or blood products. Infection via casual contact or pool or spa water is not a viable mode of transmission of STDs. Moreover, the occurrence of P. aeruginosa and subsequent rash outbreaks is frequently coincidental with improper operation and maintenance of pools or spas. In light of this and the supporting references, pool and spa owners/operators should maintain optimum and continuous conditions to ensure a safe and comfortable swimming or soaking environment. This process can be realized through educational programs and adherence to recommended use directions associated with EPA registered pool and spa sanitizers.

Reference

1. "Issues and Alternative Disinfective Techniques in Sanitation: The Transmission Issue", presented by P. Kirk Mitchell, Manager, Application Research and Chief Chemist, Hydrotech Chemical Corporation, Marietta, Georgia 30065 at NSPI's 31st Annual Convention, November 18-20, 1987 (Phoenix, Arizona).

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