

# CONTAGIOUS COMMENTS

## Department of Epidemiology

### Interactive Water Fountains- A Modern Day Broadstreet Pump

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Most epidemiologists in Public Health start their education with the case study of John Snow and how he discovered that an outbreak of cholera was tied to the village (aka. Broadstreet) pump. He used common epidemiological practices of mapping disease clusters and once he removed the handle from the pump the cholera outbreak ceased. This happened back in the 1850's. Flash forward 160 years and the town centers are becoming the hot spot for "interactive fountains", "splash parks", "spray parks", etc. . These are the terms that are commonly used to describe an interactive zero-depth, youth-oriented recreational water attraction with features that spray or pour water on visitors. Whatever the terminology you would like to use, these water features have also become synonymous with the term, "recreational water illness" or RWI.



Interactive fountains are popular in the hot summer months because they are typically found in areas that are easily accessible and are free of charge. Installing these types of water features is less expensive than installing a pool and they are more becoming more attractive to build in town centers. But due to lack of regulations and un-hygienic practices by their users, these fountains are doing much more than providing good 'ole summer time fun.



Photo of Teacher's Fountain  
Downtown Portland, OR

In the past decade there have been numerous outbreaks of *Cryptosporidium* and other GI illnesses associated with "splash parks" both nationally and internationally. One of the most notable outbreaks occurred in New York in 2005. According to the Centers for Disease Control and Prevention (CDC), "In July-August 2005, New York state experienced a cryptosporidiosis outbreak that sickened >3,000 persons, including at least 425 persons with confirmed cases, primarily children. The outbreak was associated with use of a recreational water interactive

fountain."<sup>(1)</sup> "Although the interactive fountain was filtered and chlorinated, the treatment was not sufficient to inactivate *Cryptosporidium*."<sup>(1)</sup> In 1999, an outbreak of diarrheal illness occurred at an interactive fountain in a beachside park in Florida. In this outbreak, illness affected 44 percent of the estimated 4,800 people who used the fountain. Of note, this fountain was used frequently with diaper-aged children who often stood over the nozzles<sup>(2)</sup>. In September 2006, giardiasis and cryptosporidiosis were the culprits in an outbreak that was linked to a neighborhood interactive water fountain in a large upscale neighborhood, also in Florida. This outbreak was characterized by 49 cases (38 giardiasis, 9 cryptosporidiosis, and 2 co-infection) and the outbreak was noted to begin in early July and continued through late September, and concluded when the splash park was closed. The median age of those affected was four years old.<sup>(3)</sup> Additionally, in 1997 at least 369 cases of cryptosporidiosis occurred from contact with an interactive fountain at a Minnesota zoo.<sup>(4)</sup> Additional outbreaks of *Cryptosporidium* have been reported in the literature from Idaho, Louisiana, and the United Kingdom, all associated with interactive water features.

#### ***Cryptosporidium* and *Giardia* – not your best swimming buddies:**

*Cryptosporidium* (aka. crypto) is a chlorine-resistant parasite that can cause illness after ingestion of as few as 10 oocysts, and can remain infectious for up to 6 months in moist environments. Crypto lives in the intestine of infected humans or animals. An infected person or animal sheds *Cryptosporidium* parasites in the stool. Millions of crypto parasites can be released in a bowel movement from an infected human or animal.

Giardiasis is caused by the protozoan, *Giardia lamblia* and is an infection principally of the upper small intestine. A person infected with *Giardia* can remain asymptomatic, have acute self-limited diarrhea, or have intestinal symptoms such as chronic diarrhea, steatorrhea, abdominal cramps, bloating, frequent loose and pale greasy stools, fatigue malabsorption, and weight loss. Now if that does not sound like summer fun! Children are infected more frequently than adults and prevalence is higher in areas of poor sanitation and in institutions with children not toilet trained. Just like with crypto, concentrations of chlorine used in routine water treatment do not kill *Giardia* cysts.

#### **Myth: Interactive water fountains are inspected**

Almost all interactive water fountains incorporate some form of disinfection but nevertheless they can remain unmaintained and poorly designed. In Colorado, these types of water features

currently do not fall under the Colorado Department of Public Health and Environment's (CDPHE) Regulations Pertaining to Swimming Pools and Mineral Baths policy issued by the State Board of Health. In researching this topic, I had the pleasure of speaking with Mr. Robert Cribbs who works with the Water Quality Control Division at CDPHE and he stated that there are no routine inspections that are done on these facilities but some counties may inspect these types of water features if they are a part of swimming parks.

By not having regulations on interactive fountains, this means that some of the basic public health safety regulations do not have to be followed. For example, one of the best ways to stop the spread of fecal organisms is to not allow patrons with diarrhea to enter the water feature. Interactive fountains do not need to have signage of any kind indicating this. Also, pools have showers and diaper changing stations at the facility to help with hygienic practices. Again, with interactive water fountains these types of facilities are not a requirement. Mr. Cribbs noted that in response to the outbreak of *Cryptosporidium* in 1995 in New York, the New York State Health department developed strict guidance around the design and maintenance around interactive fountains. Mr. Cribbs uses this document as a reference for many communities when they are considering developing these types of parks but unfortunately it is rarely followed.

#### **How can we prevent Recreational Water Illnesses (RWIs)?**

The CDC has published many materials for healthy swimming tips. Below are the tips that CDC offers to swimmers and parents of young kids for protection from RWIs.

**Three Steps for All Swimmers:** Keep germs from causing recreational water illnesses (RWIs).

- Don't swim when you have diarrhea. You can spread germs in the water and make other people sick.
- Don't swallow the pool water. Avoid getting water in your mouth.
- Practice good hygiene. Shower with soap before swimming and wash your hands after using the toilet or changing diapers. Germs on your body end up in the water.

**Three Steps for Parents of Young Kids:** Keep germs out of the pool.

- Take your kids on bathroom breaks or check diapers often. Waiting to hear "I have to go" may mean that it's too late.
- Change diapers in a bathroom or a diaper-changing area and not at poolside. Germs can spread in and around the pool.
- Wash your child thoroughly (especially the rear end) with soap and water before swimming. Invisible amounts of fecal matter can end up in the pool.

#### **Can't I just put a swim diaper on my child?**

The use of swim diapers and swim pants may give many parents and pool staff a false sense of security regarding fecal contamination.

According to the CDC, little scientific information exists on how well swim diapers and swim pants are able to keep feces or infection-causing germs from leaking into the pool. Even though swim diapers and swim pants may hold in some feces, they are not leak proof and can still contaminate the pool water. It is unlikely that swim diapers are able to keep diarrheal stools, the most serious water contaminant, from leaking into the pool. No manufacturers claim these products prevent leakage of diarrhea into pools.

Parents should not allow their children enter the water when they are ill with diarrhea, even if they are wearing swim diapers or swim pants. They risk contaminating the pool and making other children sick. Swim diapers and swim pants are not a substitute for frequent diaper changing. It is recommended that parents change their children often and make frequent trips to the toilet while swimming.

#### **Who is most likely to become infected with a RWI?**

According to the CDC Children, pregnant women, and people with weakened immune systems (for example, people living with AIDS, individuals who have received an organ transplant, or people receiving certain types of chemotherapy) can suffer from more severe illness if infected. People with weakened immune systems should be aware that recreational water might be contaminated with human or animal feces containing Crypto. Crypto can cause a life-threatening infection in persons with weakened immune systems.

People with a weakened immune system should consult their health care provider before participating in activities that place them at risk for illness.

This article explored outbreaks specific to interactive fountains but there have been additional outbreaks in other recreational water use arenas such as spas, swimming pools, lakes, rivers, and streams. Regardless where you choose to cool off this summer just remember the basics of public health and you will have a more enjoyable summer.

Additional Resources:

<http://www.cdc.gov/healthywater/swimming/pools/water-play-areas-interactive-fountains.html>

#### **References:**

1. (CDC), Centers for Disease Control and Prevention. *Surveillance Summaries: Cryptosporidiosis Surveillance- United States 2003-2005*. s.l. : MMWR, 2007.
2. *Outbreak of Gastroenteritis Associated with an Interactive Water Fountain at a Beachside Park-- Florida, 1999*. (CDC), Centers For Disease Control and Prevention. 25, s.l. : MMWR, 2000, Vol. 49, pp. 565-8.

3. *Outbreak of Giardiasis and Cryptosporidiosis Associated with a Neighborhood Interactive Water Fountain- Florida, 2006.* Eisenstein, L, Bodager, D and Ginzl, D. 3, s.l. : Journal of Environmental Health, 2008, Vol. 71.
4. *Outbreak of Cryptosporidiosis Associated with a Water Sprinkler Fountain- Minnesota, 1997.* CDC, Centers for Disease Control and Prevention (. 40, s.l. : MMWR, 1998, Vol. 47, pp. 856-860.

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