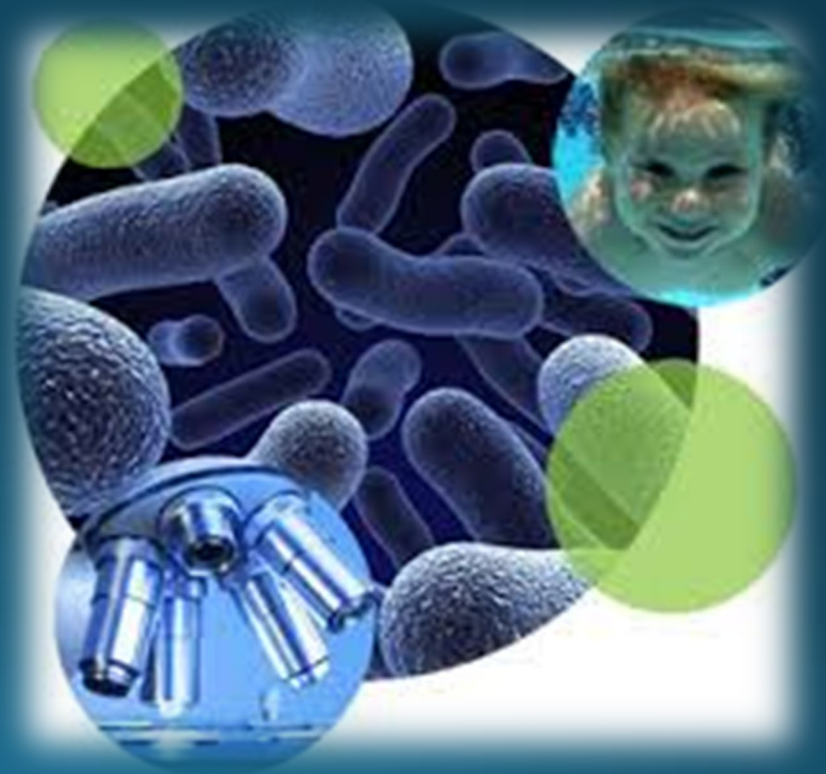


Recreational Water Illnesses (RWIs)



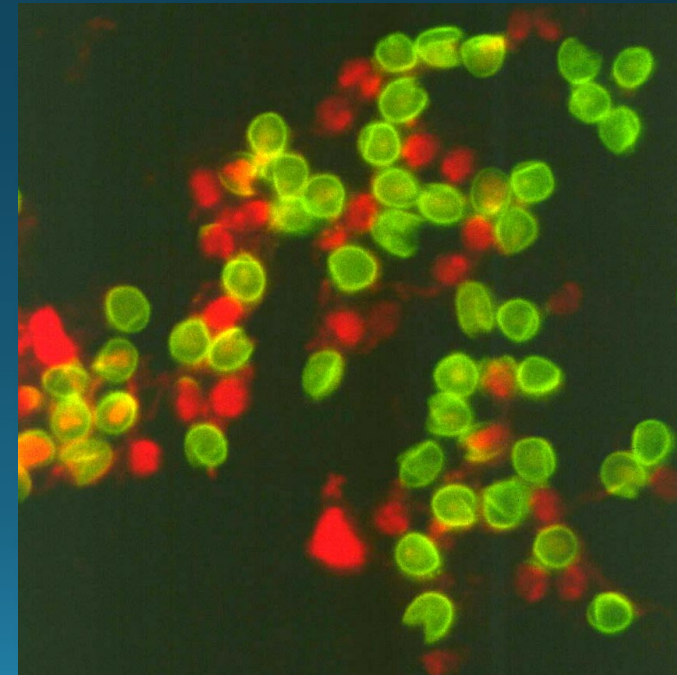
Recreational Water Illnesses (RWIs)

- Definitions
- Basics
- Symptoms
- Sources
- Types
- Locations
- Treatment
- Prevention



Definitions

- Recreational Water: Any water which is used by a significant number of persons for recreation or play
 - Examples:
 - Swimming pools
 - Splash parks
 - Hot tubs
 - Etc
- Recreational Water Illness (RWI): Illness caused by germs and chemicals found in the water we swim in



Basics

- Result from swallowing, breathing, or having contact with contaminated recreational water
- Caused by:
 - Microorganisms,
 - Bacteria
 - Protozoa
 - Algae
 - Viruses
 - Other parasites, or
 - Chemicals



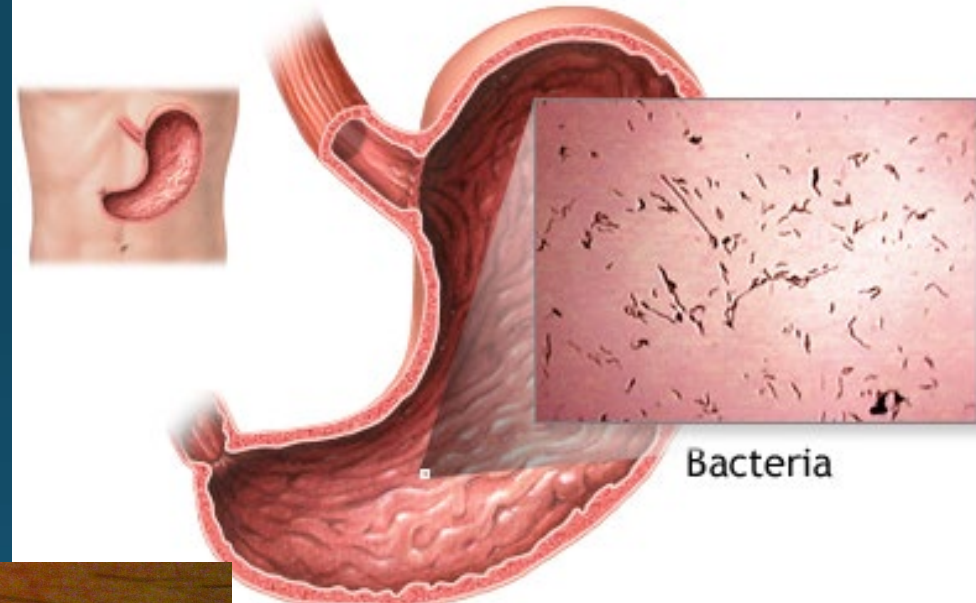
Most Common Symptom of an RWI



Symptoms

- RWIs can cause:
 - Upset stomach
 - Vomiting
 - Diarrhea
 - Skin rash
 - Difficulty breathing
 - Infections
 - Eye (Pink eye)
 - Ear (Swimmer's ear)
 - Skin
 - Wound (Staph infection)
 - Lungs (Legionnaire's Disease)
 - Brain
 - Other organs

Diarrhea may be caused by bacteria or parasites found in food and water



Sources

- Germs
 - Swimmers
 - Rain
 - Wind
 - Animals
- Chemicals
 - In water
 - Evaporates from water

Main Source of Contamination



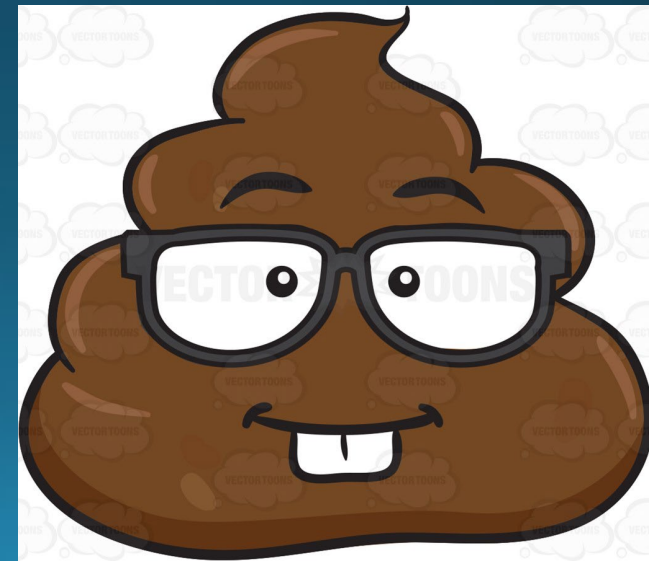
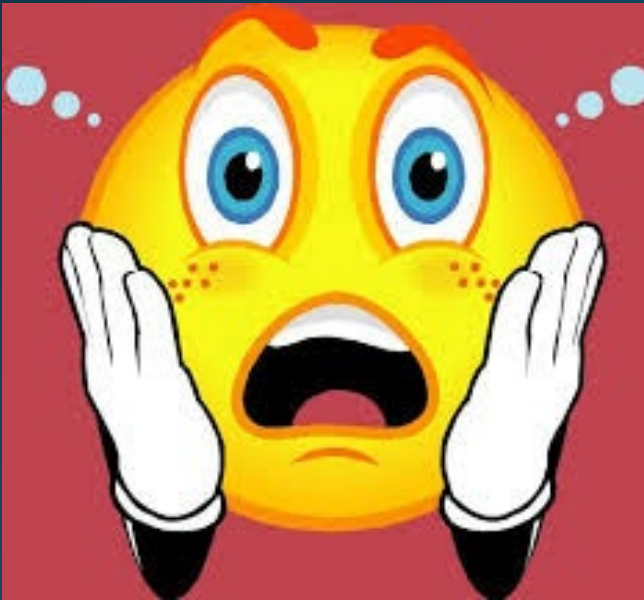
SWIMMERS!!!



How?

- Body Fluids
 - Spit, mucous, blood, urine, sweat
- Skin
- Hair
- Fecal Material

Average humans carry
~0.14 grams of feces
on their body.



Types of Germs that cause RWIs

- Coliform bacteria
 - E. coli O157:H7
- Cryptosporidium
- Giardia
- Norovirus
- Hepatitis A
- Shigella
- Campylobacter



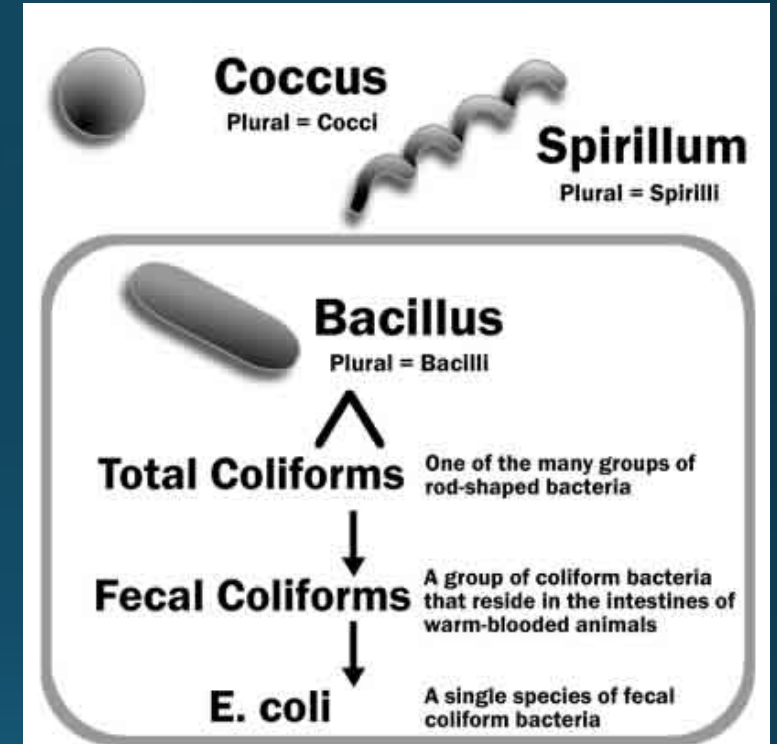
- Salmonella
- Pseudomonas aeruginosa
- Staphylococci
- Streptococci
- Legionella
- Athlete's foot fungus
- Naegleria

Types of Germs that cause RWIs

- **Coliform bacteria**

- **E. coli O157:H7**

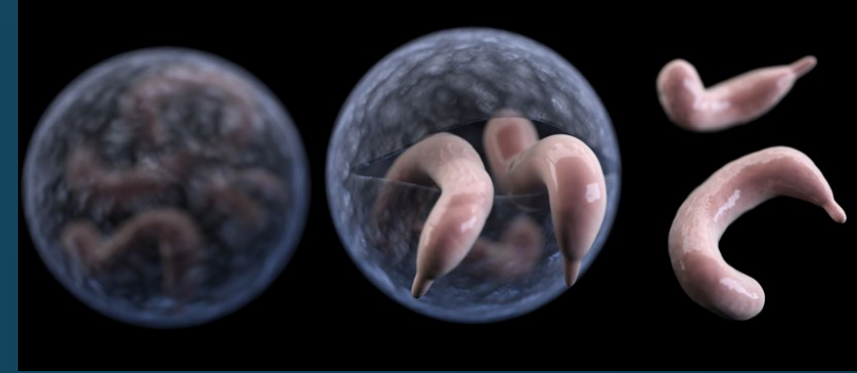
- Introduced in fecal material
 - Ingested
 - Can cause: bloody diarrhea
vomiting
nausea
abdominal cramping
 - Can be fatal
 - Killed by 1.0 ppm chlorine in less than **1** minute



Types of Germs that cause RWIs

- **Cryptosporidium**

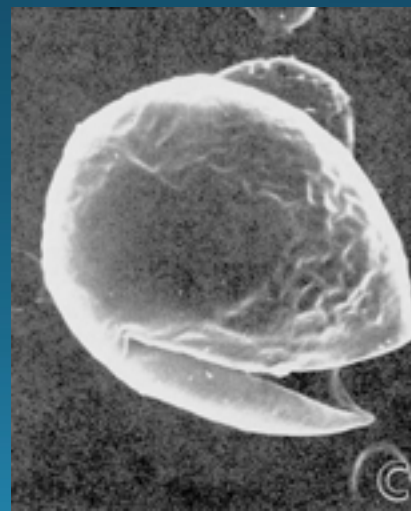
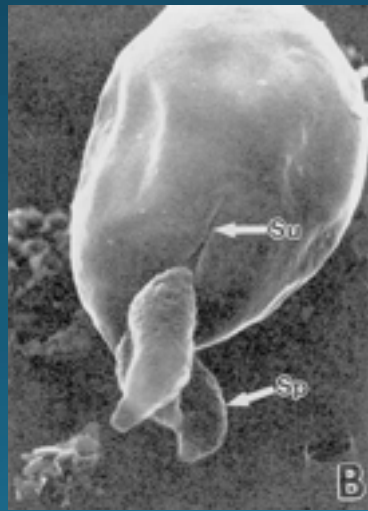
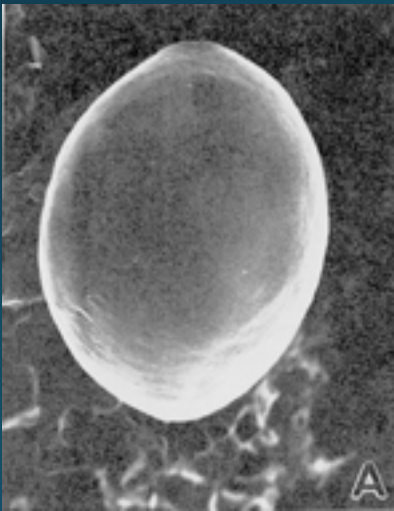
- Introduced in fecal material
- Ingested
- Causes fever with watery diarrhea, stomach cramps
- Can cause life-threatening infection in persons with weakened immune systems
- Extremely chlorine tolerant!
- Can survive in 1.0 ppm Chlorine for 8.7 days
- In order to inactivate, need to maintain at least 20 ppm chlorine for 12 hours



Types of Germs that cause RWIs

- **Giardia**

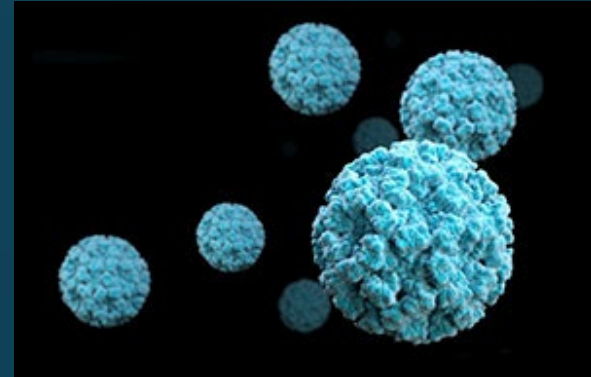
- Introduced in fecal material
- Ingested
- Causes diarrhea
- Moderately chlorine resistant
 - According to the University of Missouri a chlorine level of 10 ppm will kill Giardia in 10 minutes



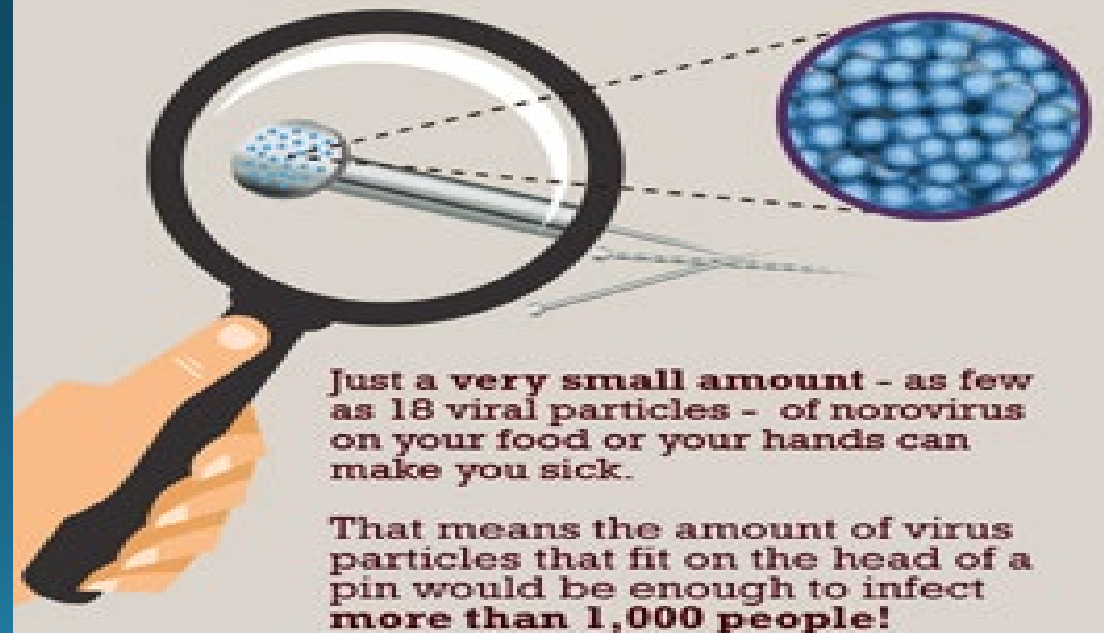
Types of Germs that cause RWIs

- **Norovirus**

- Introduced with fecal material or vomit
- Ingested
- Can cause: Projectile vomiting
Nausea
Abdominal cramps
Watery diarrhea
- Persistent
- Can survive Chlorine levels of up to 10 ppm



How contagious is norovirus?



Just a very small amount - as few as 18 viral particles - of norovirus on your food or your hands can make you sick.

That means the amount of virus particles that fit on the head of a pin would be enough to infect more than 1,000 people!

Types of Germs that cause RWIs

- **Hepatitis A**

- Introduced with fecal material
- Ingested

- Causes: nausea
 diarrhea
 fever
 abdominal pain
 jaundice
- Killed easily at 3-5 ppm Chlorine

Yellowing of the eyes, skin,
and mucous membranes



Types of Germs that cause RWIs

- **Shigella**

- Introduced with fecal material
- Ingested
- Causes: bloody diarrhea
 fever
 stomach cramps
 may be fatal
- Killed easily by proper Chlorine levels



Shigella sonnei

Types of Germs that cause RWIs

- **Campylobacter**

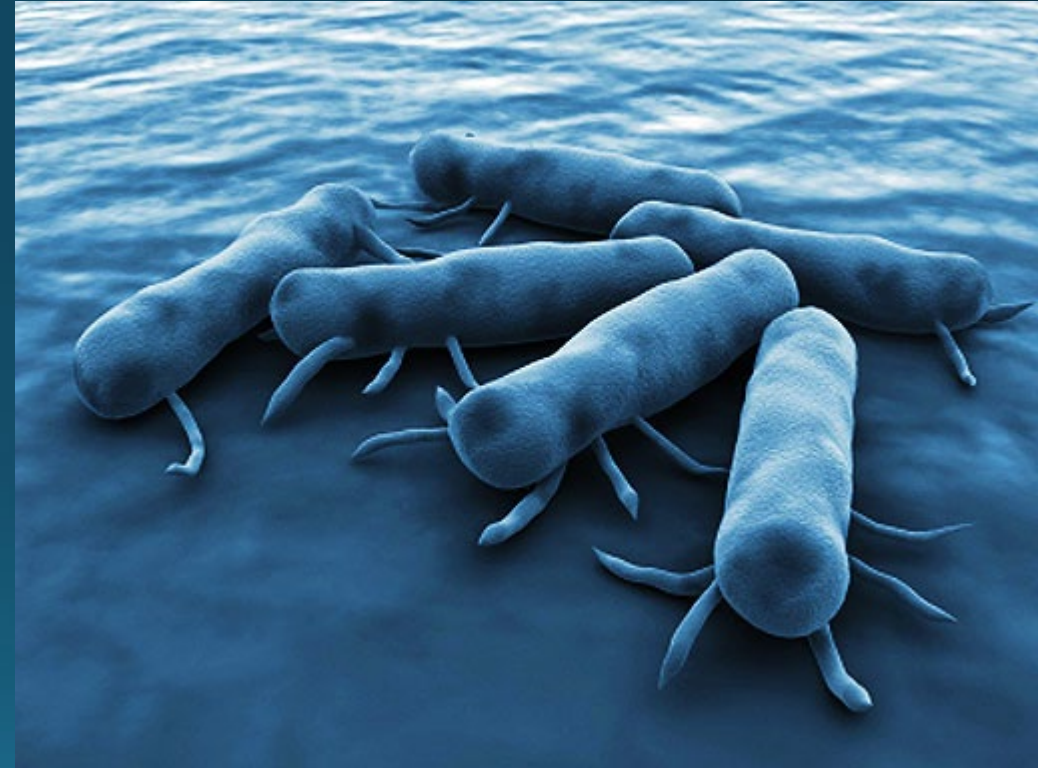
- Introduced with fecal material
- Ingested
- Causes: diarrhea
 cramping
 abdominal pain
 fever
 may be fatal
- Killed easily by proper Chlorine levels



Types of Germs that cause RWIs

- **Salmonella**

- Introduced with fecal material
- Ingested
- Causes: fever
abdominal cramps
diarrhea
possibly death
- Killed by proper chlorine levels



Types of Germs that cause RWIs

- **Pseudomonas aeruginosa**

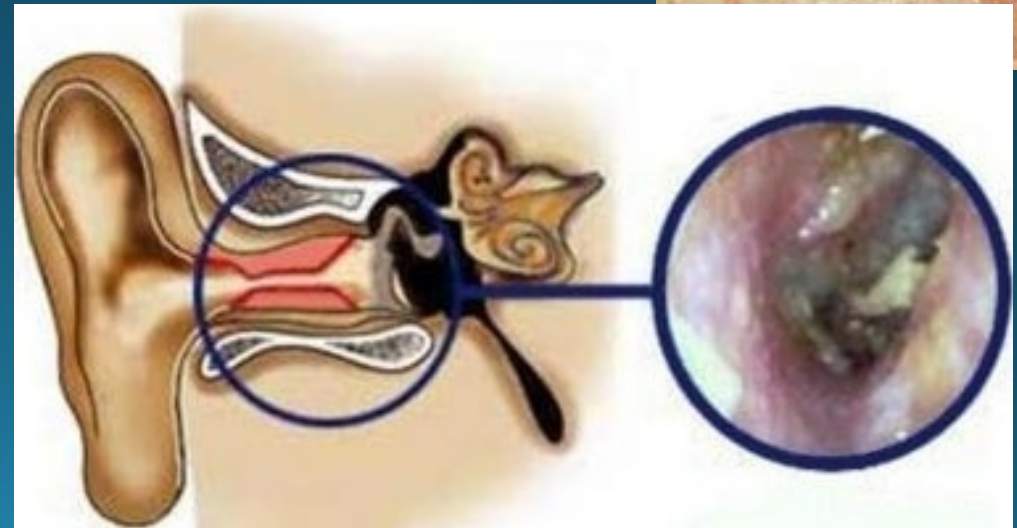
- Introduced by skin, nose, throat and feces
- Likely the most common bacteria in pool water
- Can cause: “swimmer’s ear” and “hot tub rash”
 - itchy skin (dermatitis/folliculitis)
 - sore throat
 - flu-like illness
 - pink eye
- Easily killed by 1.0 ppm Chlorine
 - Multiplies quickly when water disinfectant levels drop



Types of Germs that cause RWIs

- **Swimmer's Ear (*Otitis externa*)**

- More common in children and young adults
- Symptoms
 - Pain when gently tugged
 - Itchiness inside the ear
 - Pus draining from ear
- Treatment
 - Contact a health care provider
- Prevention
 - Dry ears after swimming



Types of Germs that cause RWIs

- **Hot Tub Rash (*Pseudomonas dermatitis*)**

- Symptoms

- Itchy spots on the skin that become bumpy red rash
- Rash in areas previously covered by swimsuit
- Pus-filled blisters around hair follicles

- Treatment

- Most clear up without medical treatment

- Prevention

- Remove swimsuits and shower with soap after getting out of water
- Clean swimsuits after getting out of water



Types of Germs that cause RWIs

- **Staphylococci & Streptococci**

- Introduced with nasal and/or oral discharges
- Causes bacterial infection through skin or nasal/oral membranes
- Staph can infect wounds
- Strep are spread through droplets
- Killed by 1.0 ppm Chlorine



Types of Germs that cause RWIs

- **Legionella**

- Bacterial growth in water, especially warm water
- Harmless if ingested
- When inhaled can cause Legionnaire's disease or Pontiac fever
- Easily killed by 2.0 ppm Chlorine



Types of Germs that cause RWIs

- **Athlete's Foot (tinea pedis)**

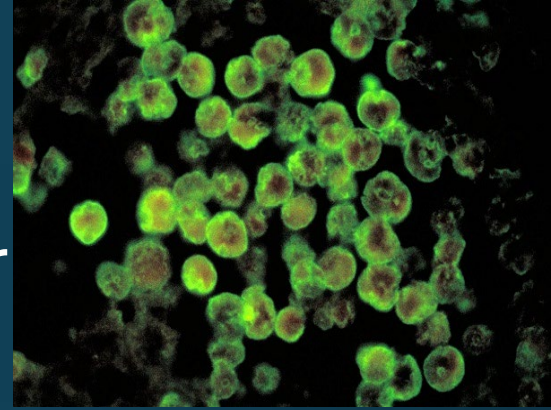
- Caused by a fungal infection
- Causes scaling, flaking, and/or itching
- Transmitted in moist areas where people walk barefoot (bathhouses)
- Can also infect:
 - toenails,
 - groin area,
 - etc.



Types of Germs that cause RWIs

- **Naegleria fowleri**

- Microscopic amoeba found in soil and warm water
 - Unchlorinated swimming pools
- Enters through nose, travels to brain & spinal cord
- Causes: headache, fever, nausea, vomiting, stiff neck, confusion, seizures, hallucinations, death
- Not found in properly chlorinated pools
- 23 people have died from Naegleria between 1995-2004 in the US
 - Fatality rate is >97%



Cases of Concern

- In 1998 in Georgia, 26 people were sickened after swimming in a pool with a child who had *E. coli*.
 - 7 people were hospitalized & 1 killed by the outbreak.
 - The pool's chlorine level had not been adequately maintained.
- In New Mexico in 2008, a competitive swimmer who ignored symptoms of diarrhea caused 92 swimmers, including other competitive swimmers, coaches and lifeguards, to contract the illness.
- In 2001 in an Illinois water park, 358 people contracted diarrhea, despite adequate chlorine and pH levels.

Potential Locations for Pathogens

- Water
- Decking
- Bathhouse
 - Floors
 - Benches
- Showers
- Restrooms
- Towels



- Filters, Piping, Skimmers
- Swimsuits





Prevention

- Pool disinfectants can kill most germs in less than an hour, but for others it can take longer.
- Test water routinely at FDHU or another water lab
 - Coliform and Heterotrophic Plate Count
- Maintain proper disinfection levels
- Check chlorine or other disinfectant levels and pH regularly
 - Every 2 hours (per FDHU code) or more often if busy
- Close pool, as necessary, to disinfect and clean up after fecal occurrences and establish a fecal incident log.
- If you have questions, call Jayme!



Tips for the Public

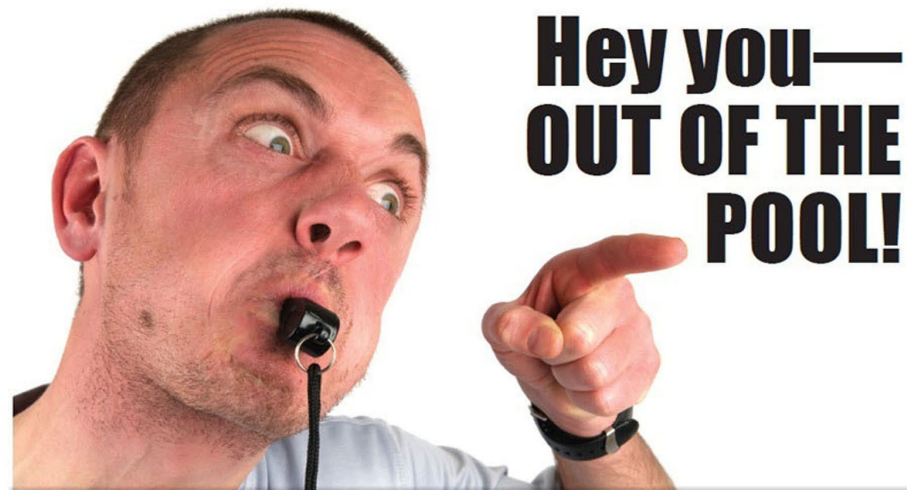
- The unfortunate truth is that chlorinated swimming pools can and do transmit disease.
- Swimmers should not rely solely on the pool's chemical treatments, and should heed the following precautions:
 - Avoid the pool if they have diarrhea (germs can be transmitted in pool water weeks after symptoms cease)
 - Shower using soap (especially the rear end) before and after swimming
 - Take frequent bathroom breaks (small children need reminders) and check diapers often (every hour, if possible)
 - Change diapers in bathroom – NOT poolside
 - Wash hands with soap after using bathroom and after changing diapers
 - Don't swallow pool water
 - Children sometimes jokingly spit pool water back into pool or at friends, but this can cause illness



Diarrhea and Swimming DON'T MIX

If you or recently had, diarrhea, stay out of the water.
Don't share your germs with other swimmers.

Public Health and Emergency Services
www.oxfordcounty.ca/health
519-539-9800 or 1-800-755-0394



Hey you— OUT OF THE POOL!

GOT DIARRHEA?

Don't swim for 2 weeks.

This is one thing you don't want to share.

Funded by Center for Disease Control and Prevention
Epidemiology and Laboratory Capacity Grant to Prevent Water Borne Diseases



Pee mixes with chlorine to make chemicals that cause red, stinging eyes and coughing. Poop can contain germs that get in the water and cause diarrhea if swallowed.

Chlorine doesn't kill germs instantly!

For more information, visit www.cdcgov/healthyswimming

Funded by Center for Disease Control and Prevention
Epidemiology and Laboratory Capacity Grant to Prevent Water Borne Diseases



Questions



References

- www.cdc.gov/
- www.nachi.org
- www.aquaticcouncil.com