

## Main Topics Covered

1. What is Recreational Water Illness?
2. Where do germs come from?
3. Introduction to common/serious RWI
4. How to prevent RWI

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## What is Recreational Water Illness?

Illness that people can get from being in or around water recreation facilities

Exposure routes:

- Ingestion
- Skin contact
- Inhalation

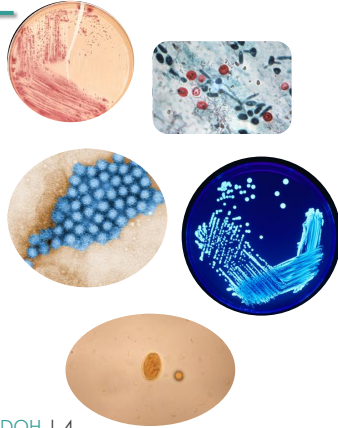


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## Where Do Germs Come From?

- Disease causing agents

- Bacteria
- Viruses
- Parasites
- Chemicals



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- **Bacteria:**

- They grow in the environment and in people
- Source water

- **Viruses:**

- They grow in people
- They can persist in the environment
- Source water

- **Parasites:**

- They grow in people
- They can persist in the environment
- Source water

- **Chemicals:**

Disinfection By-Products: Combination of disinfectant and chemicals from people

## Where Do Germs Come From?

- Some come from people
- Some come from the environment



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## Disease Causing Agents That Come From People

- Bacteria, viruses, and parasites that live in or on people
  - From the intestinal tract
  - From the skin
- Urine, sweat, body oil, lotion, cosmetics, sunscreen, deodorant, etc. react with chlorine
  - From the urinary tract, sweat glands, and the skin



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## Disease Causing Agents That Come From The Environment

- Bacteria, viruses, and parasites that grow or persist in the environment
  - The pool water and surfaces
  - Pipes and filter
  - The pool deck
  - The hose

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## Pseudomonas Infection

- What causes it?
  - Caused by *Pseudomonas aeruginosa* (bacteria)
  - This bacteria is everywhere
  - It grows well in wet warm environment
  - Somewhat resistant to chlorine/bromine



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## Pseudomonas Infection

- How do we get it?
  - Warm temperature opens up hair follicles
  - It enters hair follicles and grows there
  - Bathing suit/Duration of being wet
  - Shower afterwards no help

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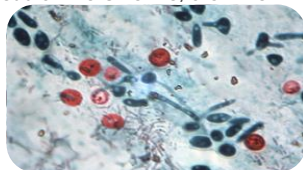
## Pseudomonas Infection

- How serious is it?
  - Rash with red bumps
  - Infection in the outer ear canal
  - Typical incubation period: 2-14 days
  - Typical duration: 8 days
  - Usually it goes away without medical treatment

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## Cryptosporidiosis

- What causes it?
  - Caused by *Cryptosporidium* (parasite)
  - Commonly found in cattle
  - It persists in water for a long time
  - Very resistant to chlorine/bromine



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## Cryptosporidiosis

- How do we get it?
  - Someone infected with Cryptosporidium brings it to the pool
  - Fecal-oral route
  - Diarrhea vs formed stool
  - Children/swim diapers

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## Cryptosporidiosis

- How serious is it?
  - Diarrhea
  - Vomiting
  - Fever
  - Stomach cramps
  - Typical incubation: 2-10 days
  - Typical duration: 10-14 days
  - Can be serious for susceptible population

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## Legionellosis

- What causes it?
  - Caused by *Legionella* (bacteria)
  - *This bacteria is everywhere*
  - *It likes wet warm to hot environment*
  - *It needs other germs already growing*
  - *Somewhat persistent to chlorine/bromine*



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## Legionellosis

- How do we get it?
  - Inhalation of droplets
  - Sprays and jets
  - Bacteria grow in the lungs
  - Not from human to human

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## Legionellosis

- How serious is it?
  - Pontiac fever: mild flu-like symptoms
  - Legionnaire's disease: severe pneumonia (10-15% fatality)
  - Typical incubation: 2-14 days
  - Typical duration: 2-14 days

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## Disinfection By-Products

- What causes it?
  - Chlorine reacts with other chemicals to form Combined chlorine
  - Those other chemicals are:
    - Urine
    - Sweat
    - Lotion
    - Sunscreen, etc.
  - Combined chlorine smell like chlorine, are corrosive, and irritating

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## Disinfection By-Products

- How do we get it?
  - Many bathers = lots of combined chlorine
  - Agitated water = lots of off-gassing
  - Eyes come in contact with water
  - Inhalation of volatile combined chlorine

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## Disinfection By-Products

- How serious is it?
  - Irritated eyes
  - Irritated nose and throat
  - Chest tightness
  - Coughing
  - May cause and trigger asthma

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## How To Prevent RWI

- To your advantage, use the understanding of
  - Where do germs come from?
  - How do we get it?
- Prevent them from entering the pool
- Block the route of exposure

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## What Can We Do To Prevent Them From Entering The Pool?

- Disease causing agents that come from people (from the intestinal tract and the skin)
  - Shower with soap
  - Do not use pool when sick or having infection
- Urine, sweat, body oil, lotion, cosmetics, sunscreen, deodorant (from the urinary tract, sweat glands, and the skin)
  - Enforce no pee in the pool
  - Shower with soap

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## What Can We Do To Prevent Them From Entering The Pool?

- Disease causing agents that come from the environment
  - The pool water and surfaces
  - Pipes and filter
  - The pool deck
  - The hose
- Maintenance of Water Quality
- Proper cleaning

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## How Can We Block The Route Of Exposure?

- Pseudomonas example
  - Warm temperature opens up hair follicles
  - It enters hair follicles and grows there
  - Bathing suit/Duration of being wet
  - Shower afterwards no help
- Limit the time in spa to 15 minutes
- Maintain water quality

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## How Can We Block The Route Of Exposure?

- Cryptosporidium example
  - Someone infected with Cryptosporidium brings it to the pool
  - Fecal-oral route
  - Diarrhea vs formed stool
  - Children/swim diapers
- Discourage swallowing of water?
- Provide diaper changing tables
- Respond properly to fecal contamination (See CDC handout)

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## How Can We Block The Route Of Exposure?

- Legionella example
  - Inhalation of droplets
  - Sprays and jets
  - Bacteria grow in the lungs
  - Not from human to human
- Maintain water quality

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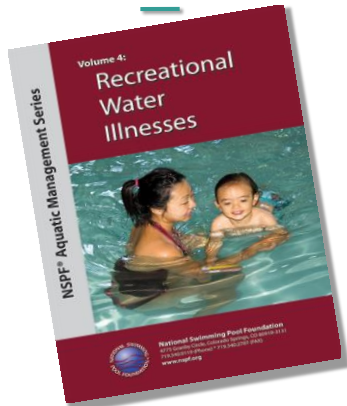
## What Strategy Was Mentioned More Than Once?

Maintain water quality!

Shower properly!

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Questions?



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