

# Recreational Water Illness



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**OutbreakNet Conference**  
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Healthy Swimming Program

National Center for Emerging and Zoonotic Infectious Diseases



# Acknowledgments

## □ Waterborne Disease Coordinators

- States
- District of Columbia
- Territories
- Freely Associated States

## □ CDC

### ■ NCEZID/WDPB

- Michael Beach
- Virginia Roberts
- Jonathan Yoder
- Sharon Roy

### ■ NCEH/EHSB

- Jasen Kunz
- Charles Otto

# Outline

- ❑ **What do national data on outbreaks of recreational water illness tell us?**
- ❑ **How do we respond to the outbreak data?**

**Problem: Swimming is fun and a great form of physical activity, but it can lead to illness and injury**



**Solution: Work together to minimize risk of illness and injury**

# Recreational Water Illness (RWI)

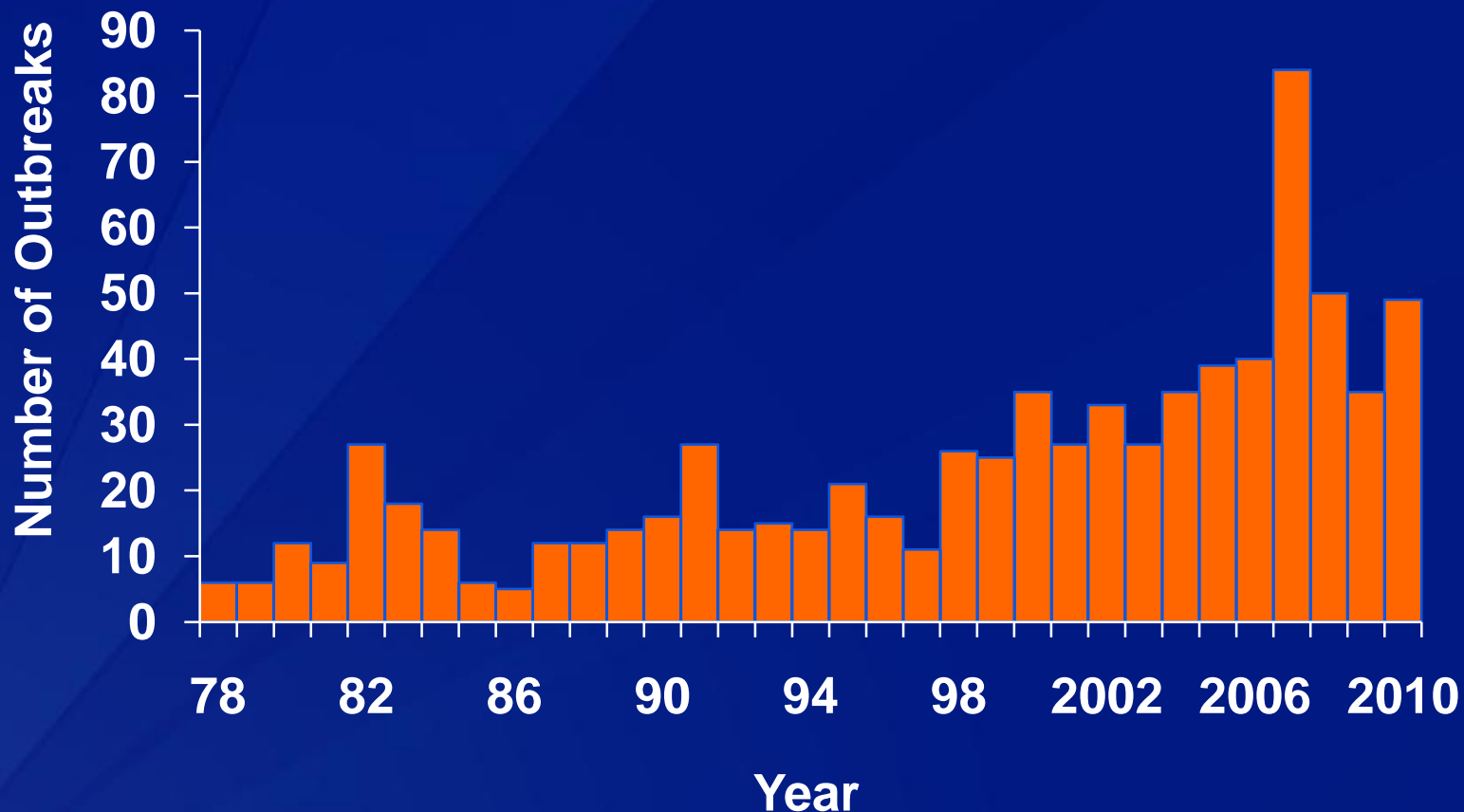
## □ Caused by

- Pathogens transmitted by ingesting, inhaling aerosols of, or having contact with contaminated water in pools, spas/hot tubs, interactive fountains, lakes, rivers, or oceans
- Chemicals in water or chemicals that volatilize from water and cause indoor air-quality problems

# RWI Outbreak

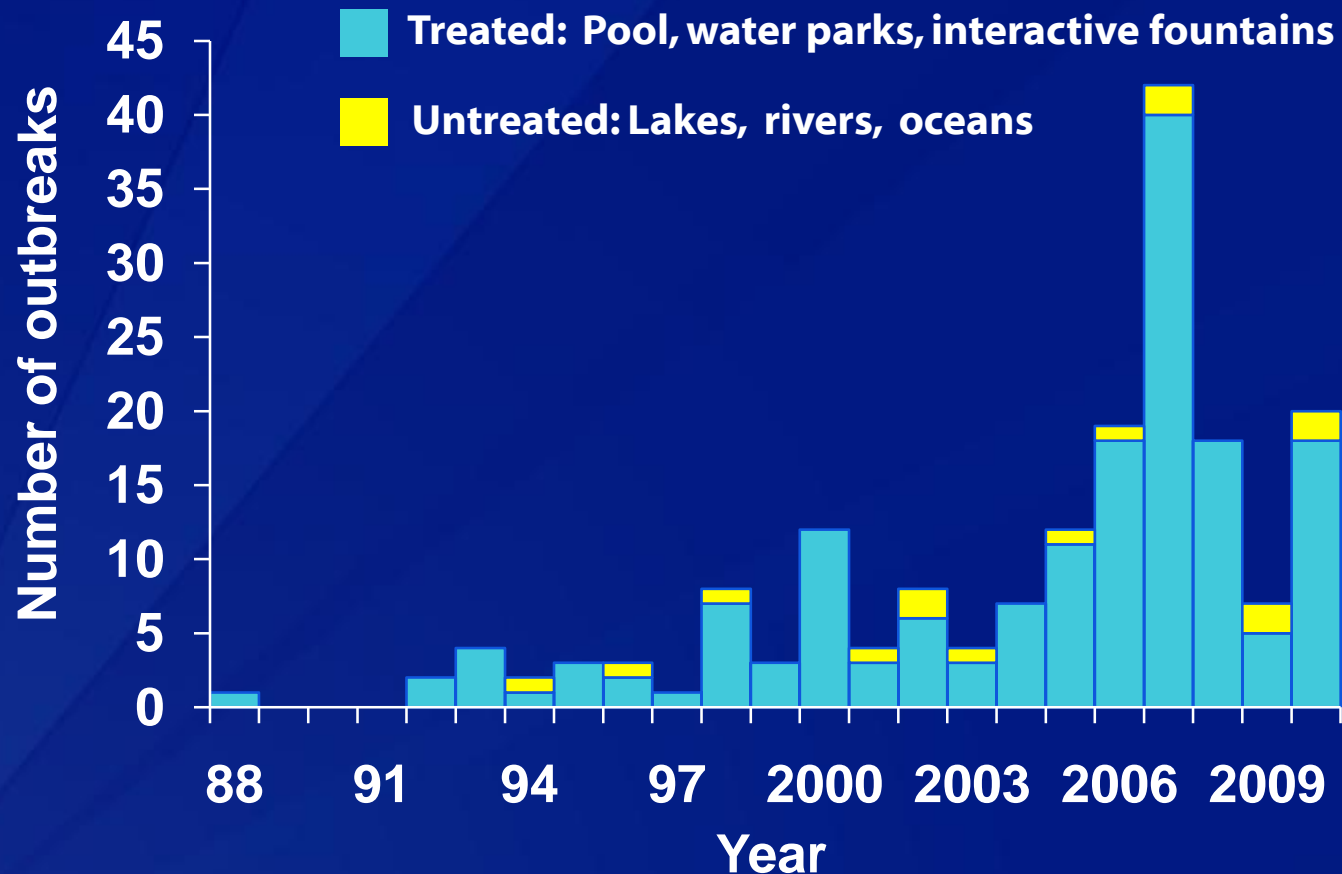
- ❑  **$\geq 2$  persons linked by time, exposure to recreational water, and characteristics of illness**
- ❑ **Evidence implicates recreational water or volatilization of water-associated compounds into air surrounding water**

# RWI Outbreaks, by Year United States, 1978–2010\*



\* N=780, Hlavsa MC *et al.* 2011. MMWR 60(SS-12):1–39.  
2009 and 2010 data are preliminary (updated 08/16/2012).

# RWI Outbreaks of Cryptosporidiosis, by Water Treatment and Year United States, 1988–2010\*



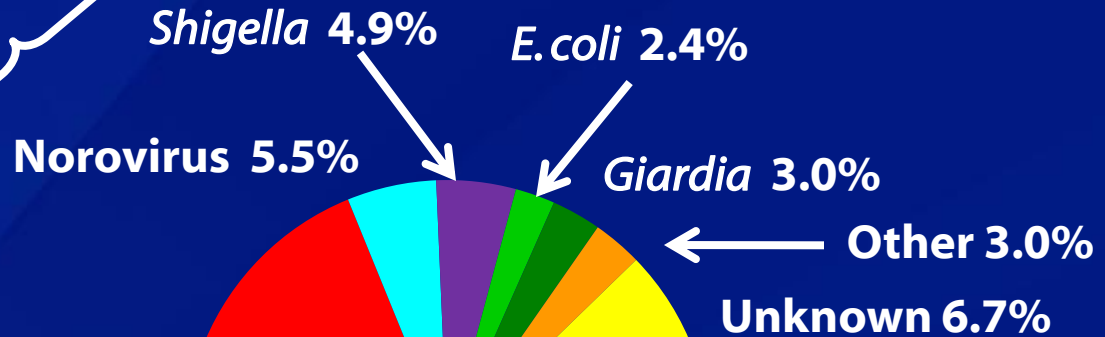
\* N=153, Hlavsa MC *et al.* 2011. MMWR 60(SS-12):1–39.

2009 and 2010 data are preliminary (updated 06/26/2012).



# RWI Outbreaks of Gastroenteritis Associated with Treated Recreational Water United States, 1999–2008 (n=164)

Chlorine sensitive:  
Poor pool operation  
& maintenance



Other includes  
*Campylobacter*, *Salmonella*,  
*Plesiomonas*, and  
multiple pathogens

Cryptosporidium  
("Crypto")  
74.4%

Chlorine  
tolerant

Source: Hlavsa MC et al. 2011. MMWR 60(SS-12):1–39.

# **THREE E'S OF HEALTHY SWIMMING**

# EDUCATING the Swimming Public

**POOL CHEMICAL SAFETY: USE**  
PROTECT YOURSELF AND SWIMMERS FROM THE THOUSANDS OF PREVENTABLE INJURIES THAT OCCUR EACH YEAR

**BEFORE YOU USE POOL CHEMICALS**

- Get trained in pool chemical safety (for example, during operator training course)
- Ask for help if you are NOT trained for specific tasks
- Read entire product label or Material Safety Data Sheet (MSDS) before using
- Learn your pool's Emergency Chemical Spill Response Plan and practice steps (for example, evacuation)

**USING POOL CHEMICALS SAFELY**

- Dress for safety by wearing appropriate safety equipment (for example, safety goggles, gloves, and mask)
- Read chemical product label before each use
- Handle in a well-ventilated area
- Open one product container at a time and close it before opening another
- Minimize dust, fumes, and splashes
- Measure carefully
- Never mix
  - Chlorine products with acid; this could create toxic gases
  - Different pool chemicals (for example, different types of chlorine products) with each other or with any other substance
- Only pre-dissolve pool chemicals when directed by product label
  - If product label directs pre-dissolving, add pool chemical to water. NEVER add water to pool chemical because violent (potentially explosive) reaction can occur.

Always respond to pool chemical spills immediately. Follow your pool's Emergency Chemical Spill Response Plan, and be sure to contact the proper authorities and management.

Pool Address and Phone Number:  
Emergency Response Phone Number:  
Local Health Department Phone Number:

For more information about the safe use of pool chemicals, check your pool safety plan or visit [www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)

**Recreational Water Illness and Injury Prevention Week 2012**

button

## Think Healthy. Be Healthy. Swim Healthy!

Remember, you share the pool water with everyone.

If someone with diarrhea contaminates the water, swallowing that water can make you sick.

*It's not drinking water.*

So, you think chlorine kills germs. Yes, it does. But it doesn't work right away. It takes time to kill germs.

Without your help, even the best-maintained pools can spread illness.



**Three Steps for Water Safety**

**PLEASE** keep an eye on your child at all times. Remember, kids can drown in seconds and in silence.

**PLEASE** use appropriately fitted life jackets\* instead of air-filled or foam toys (such as "water-wings" or "noodles"), which are not designed to keep children afloat.

**PLEASE** use sunscreen with at least SPF 15 and both UVA and UVB protection, and be sure to reapply it after swimming. Just a few serious sunburns can increase the risk of getting skin cancer.

FOR MORE INFORMATION VISIT [www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention

**Healthy Swimming**

Protect Yourself and Your Family Against Recreational Water Illnesses

brochures

## Don't Swallow Pool Water

You wouldn't drink the water someone else bathes in. Why would you drink the water someone else swims in?



You share the water—and the germs, pee, sweat, and dirt in it—with everyone in the pool.  
**Use pool water for swimming, not drinking.**

For more information, visit [www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)

**Facts About Crypto and Swimming Pools**

**What is Crypto and how can it affect me?**  
Cryptosporidium (Crypto) is a germ that causes diarrhea. This germ is found in the stool (poop) of humans and farm animals (such as cows, pigs, and chickens). It can survive for a long time in the environment. It can survive for days even in properly chlorinated pools.

**Why is Crypto a problem?**  
Crypto is one of the most common causes of recreational water illness (RWI) caused by germs spread through pool water in the United States and can cause prolonged diarrhea (up to 2 weeks).

**How can I reduce my risk of getting sick from Crypto?**

- Don't drink, swallow, or get water from pools and most likely to become seriously ill when finished with Crypto.
- Young children
- Pregnant women
- Individuals with weakened immune systems

**How is Crypto spread in pools?**  
Crypto is spread by swallowing water that has been contaminated with fecal matter containing Crypto.

**What can I do to reduce my risk of getting sick from Crypto?**  
You share the water—and the germs, pee, sweat, and dirt in it—with everyone in the pool. This means that you and everyone with diarrhea can easily contaminate the water. Swallowing water is a small amount of pool water that has been contaminated with the Crypto germ can make you sick.

**SWIMMERS AND PARENTS:**  
For more information about Crypto, visit [www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)

**POOL OPERATORS:**  
For guidelines and resources to help you prevent Crypto and other germs from contaminating the water, visit [www.cdc.gov/healthyswimming/healthyswimmingoperator.html](http://www.cdc.gov/healthyswimming/healthyswimmingoperator.html)

fact sheets

Winner - Recreational Water Illness Prevention

YouTube

**RWITP**

RECREATIONAL WATER ILLNESS POLICE

THAT'S WHAT WE'RE HERE FOR.

[www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)

0:57 / 1:01

videos

posters

## Knowledge of Healthy Swimming, by State of Residence — HealthStyles Survey, 2009

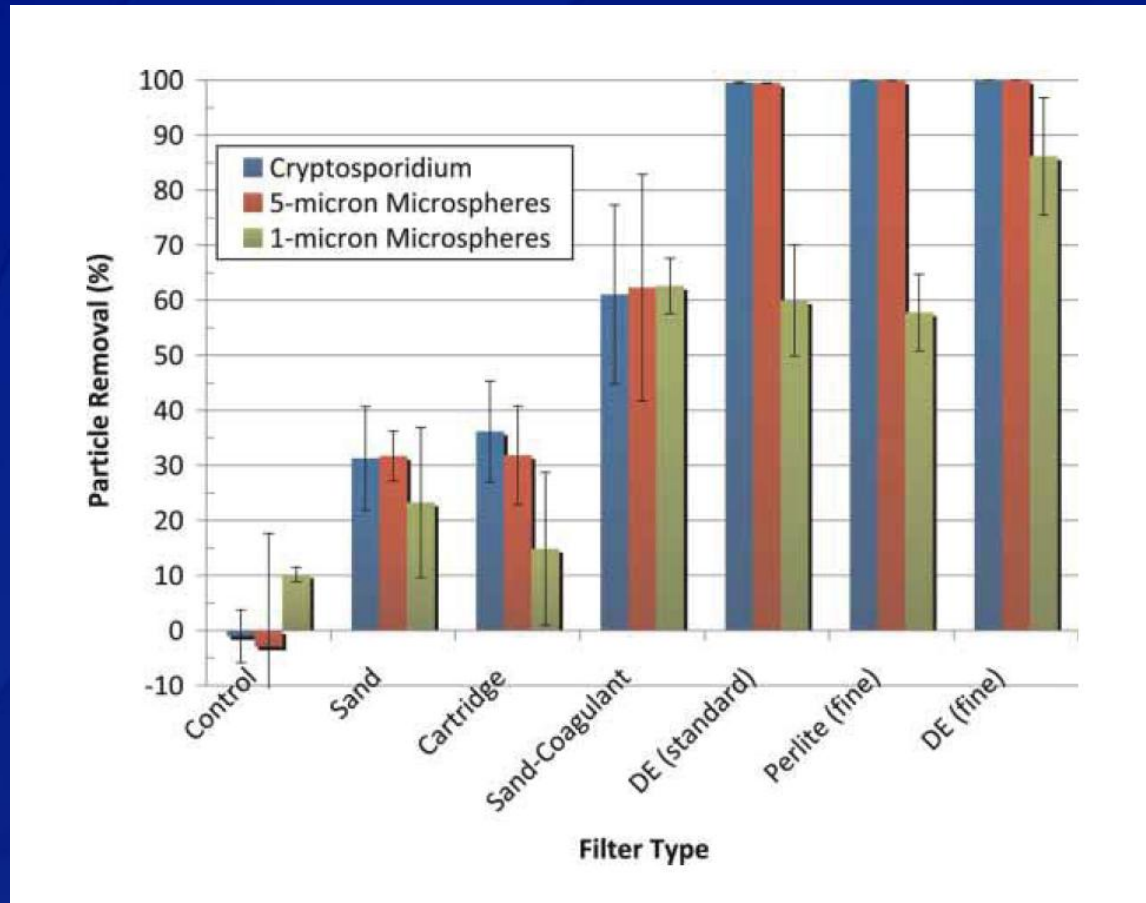
Behavior or concept	Utah % correct (95% Confidence Interval [CI])	Rest of Continental U.S. % correct (95%CI)	Rao-Scott Adjusted Chi- Square P-Value
Not swimming when you have diarrhea	100.0 (100.0–100.0)	78.4 (76.5–80.2)	—
Not swallowing water while swimming	96.4 (90.8–100.0)	85.7 (84.4–87.1)	0.0464
Making sure that pools are treated	49.3 (8.8–89.8)	86.0 (84.7–87.4)	0.0096
Chlorine does not kill germs instantly	85.8 (71.3–100.0)	65.9 (63.8–68.1)	0.0483

# ENGINEERING 99.9% *Cryptosporidium* Inactivation\*: Chlorine Dioxide

Experiment	5 mg/L ClO <sub>2</sub>	5 mg/L ClO <sub>2</sub>
		+ 2 mg/L free chlorine
1	564	422
2	473	453
3	666	428
4	784	654
Mean <u>±</u> SD	622 <u>±</u> 134	489 <u>±</u> 111

\* PRELIMINARY CDC data; Authors: Jennifer Murphy, Michael Arrowood, and Vince Hill.

# ENGINEERING Removal of *Cryptosporidium*



Source: Amburgey JE *et al.* J Water Hlth 2012;10(1):31–42.

# ENFORCEMENT

## Current U.S. Pool Code Situation



- ❑ Lack minimum national standards for design, construction, operation, and maintenance of treated recreational water venues
  - No federal agency regulates all
- ❑ Regulate at state or local level
- ❑ Reflect differences ———> variability
  - Outbreaks or events
  - Ability to keep up with latest scientific data

# Impetus for the Model Aquatic Health Code (MAHC)



- ❑ **CDC—sponsored workshop in 2005**
- ❑ **Problem: Variability in state and local pool codes identified as barrier to prevention of RWIs**
- ❑ **Solution: Develop model code as resource for state and local partners to voluntarily adopt**
  - **Base on scientific data, best practices**
  - **Provide free, open access**
  - **Update regularly, using latest data**



# MAHC Progress

- ❑ **14 MAHC modules**
  - **12 (86%) 14 posted to date for 1st 60-day public comment period**
- ❑ **Goals for all 14 modules**
  - **Post all 14 modules individually for first 60-day public comment period by October 2012**
  - **Re-post complete MAHC for second 60-day public comment period 1<sup>st</sup> quarter of 2013**
  - **Post 1<sup>st</sup> edition of MAHC for 2013 summer swim season**

# Evaluation of Recreational Water Illness & Injury Prevention Week

Healthy Water - Windows Internet Explorer

ming/

CDC Home  
Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People.™

A-Z Index A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

## Healthy Swimming/Recreational Water

Swimming and other water-related activities are excellent ways to get the physical activity needed for a healthy life, and millions of people enjoy oceans, lakes, rivers, pools, and spas each year. However, it is important to be aware of ways to prevent water-related adverse health events, such as sunburn and other injuries, drowning, and recreational water illnesses (RWIs). CDC's Healthy Swimming program provides information for the public and health professionals (for example, outbreak response toolkits and Model Aquatic Health Code) on a variety of subjects.

Swimming Report  
Healthy Swimming  
MAHC

Model Aquatic Health Code  
For Swimming Pools and Spas  
GO

Replay  
GO

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What's this? Submit

### Healthy Swimming & Recreational Water Topics

<b>Pools &amp; Hot Tubs</b> Model Aquatic Health Code, Design, Operation, Disinfection...	<b>Resources</b> Promotion & Prevention Materials, FAQs, Training and Education...
<b>Oceans, Lakes, &amp; Rivers</b> Beach Monitoring, Water Quality Indicators...	<b>Publications, Data, &amp; Statistics</b> MMWR & EID Reports, References, Surveillance, Outbreaks...
<b>Recreational Water Illness</b> RWI Basics, Education & Prevention Materials, State Resources...	<b>Training &amp; Education</b> Educational resources and training...
<b>Injury &amp; Skin Cancer</b> Drowning, Boating, Sun Protection...	<b>CDC at Work</b> Programs, Projects, and Activities...
<b>Outbreak Response Toolkits</b> RWI, Legionellosis, Cryptosporidiosis, etc....	<b>Policy</b> Healthy Swimming Policy...

Recreational Water Illness and Injury Prevention Week 2012  
Learn More

For Specific Groups  
MAHC Module Reviewers (NEW)  
General Public  
Aquatics Staff  
Health Professionals  
Travelers  
En Español

Health Benefits of Water-Based Exercise

Contact Us:  
Centers for Disease Control and Prevention  
1600 Clifton Rd  
Atlanta, GA 30333  
800-CDC-INFO (800-232-4636)  
TTY: (888) 232-6348  
New Hours of Operation  
8am-8pm ET/Monday-Friday  
Closed Holidays  
cdcinfo@cdc.gov

Popular Links  
• Swimmer's Ear  
• What are Recreational Water Illnesses?  
• Hot Tub Rash  
• Giardia  
• Pool & Hot Tub Disinfection and

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[www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)