

# **Cryptosporidiosis in a NC Swim Team**

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Communicable Disease Branch

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# Presentation Outline

## ➤ Background

- Characteristics
- Laboratory Methods
- Case Definition
- Surveillance Data

## ➤ Outbreak

- Swim Team

# Crypto Characteristics

# What is Crypto?

- Oocyst-forming parasite
  - Tolerant to chlorine
    - Can live for days in chlorine treated water
- Most prevalent species in humans
  - *C. parvum* (humans, cattle, other mammals)
  - *C. hominis* (humans)
- Long survival outside the human body, especially in moist environments
- Up to 75% of US population may have had exposure in their lifetime
- Largest outbreak in Milwaukee, 1993
  - Contamination of public water system
  - Estimated >400,000 illnesses



# What are the symptoms of Crypto?

- Frequent, watery diarrhea
- Other symptoms can include:
  - Abdominal pain
  - Less often: nausea, vomiting, fever
  - Severe and chronic symptoms in immunocompromised patients
- Symptoms persist 2 to 20 days and can be intermittent
- Asymptomatic infections common
- Incubation period: 7 days (range: 2 -14 days)



# Cryptosporidiosis

(*Cryptosporidium*)



- 1 Thick-walled oocyst (sporulated) exits host



# Laboratory Methods



# How will I know if I have Crypto?

- Laboratory testing
- Microscopy (acid-fast)
- Not included in routine ova and parasite (O&P) testing
- Direct Fluorescent Antibody (DFA) - detection of oocysts
- Has to be requested
- Enzyme Immunoassay (EIA) - detection of antigen
- PCR - sequencing and genotyping



# Laboratory Methods

## Hospital/ Commercial Labs

- Meridian Immunocard (EIA)
- Ova and Parasite (O&P)
- PCR?

## State Lab

- Meridian Immunocard (EIA)



## CDC

- Modified Acid Fast
- DFA
- Standard PCR
  - Genotyping/Sub-typing

# Case Definition

# Cryptosporidiosis (*Cryptosporidium* spp.)

## 2012 Case Definition

CSTE Position Statement Number: 11-ID-14

### Clinical Description

A gastrointestinal illness characterized by diarrhea and one or more of the following: diarrhea duration of 72 hours or more, abdominal cramping, vomiting, or anorexia.

### Laboratory Criteria for Diagnosis

#### Confirmed

- Evidence of *Cryptosporidium* organisms or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (PPV), e.g.,
- Direct fluorescent antibody [DFA] test,
- Polymerase chain reaction [PCR],
- Enzyme immunoassay [EIA], or
- Light microscopy of stained specimen.

#### Probable

The detection of *Cryptosporidium* antigen by a screening test method, such as immunochromatographic card/rapid card test; or a laboratory test of unknown method.

### Case Classification

#### Probable

- A case with supportive laboratory test results for *Cryptosporidia* spp. infection using a method listed in the probable laboratory criteria. When the diagnostic test method on a laboratory test result for cryptosporidiosis cannot be determined, the case can only be classified as probable, OR
- A case that meets the clinical criteria and is epidemiologically linked to a confirmed case.

#### Confirmed

A case that is diagnosed with *Cryptosporidium* spp. infection based on laboratory testing using a method listed in the confirmed criteria.

#### Comment

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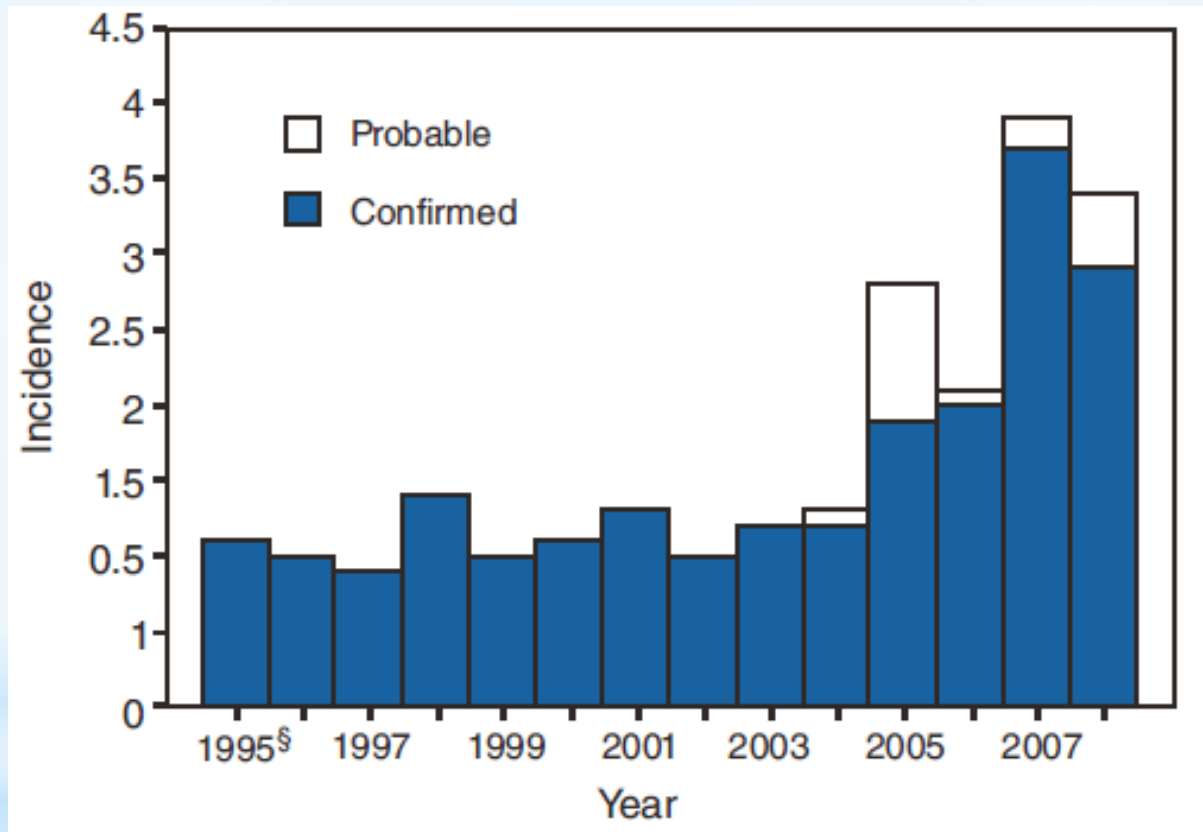
#### Comment

NC State Lab  
uses rapid  
card test

# Surveillance

National and North Carolina

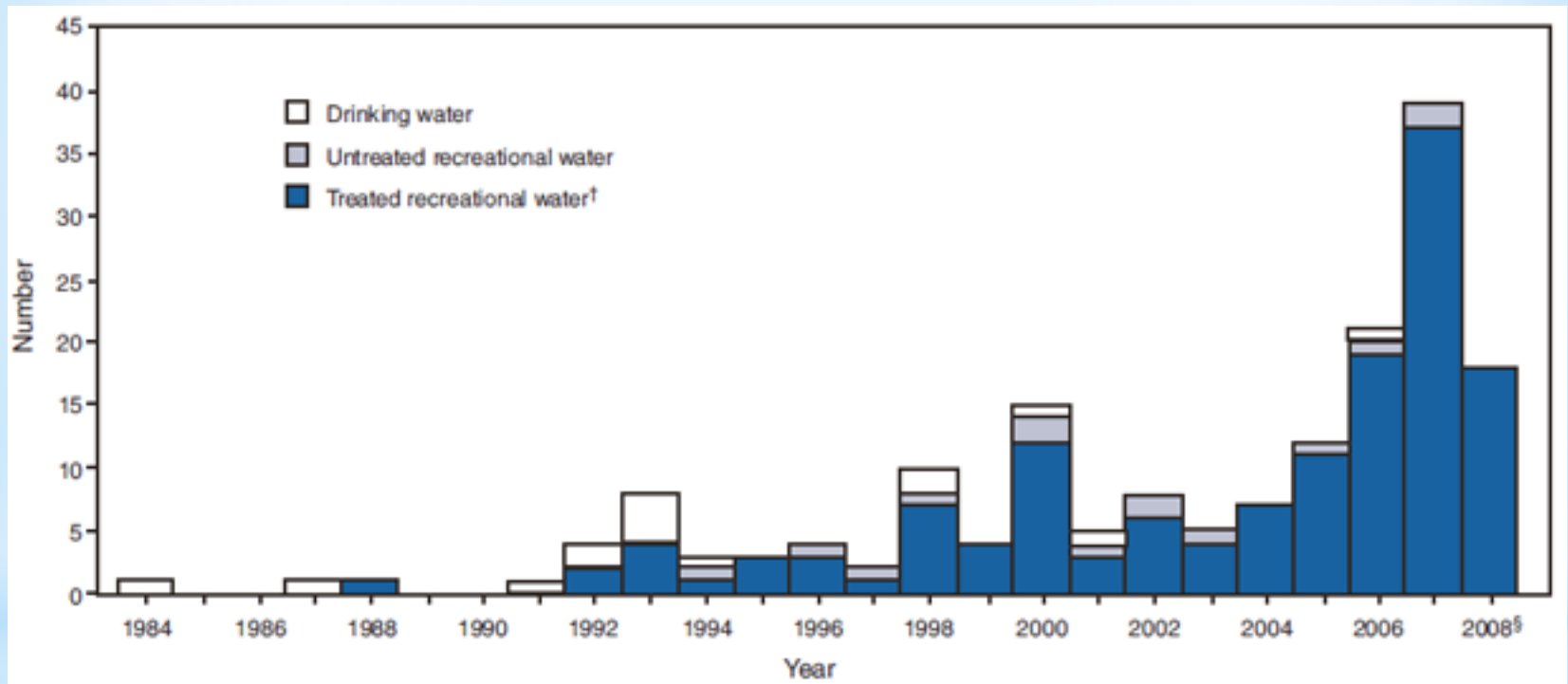
# National Surveillance



MMWR Cryptosporidiosis Surveillance US 06-08; June 11, 2010 / 59(SS06);1-14



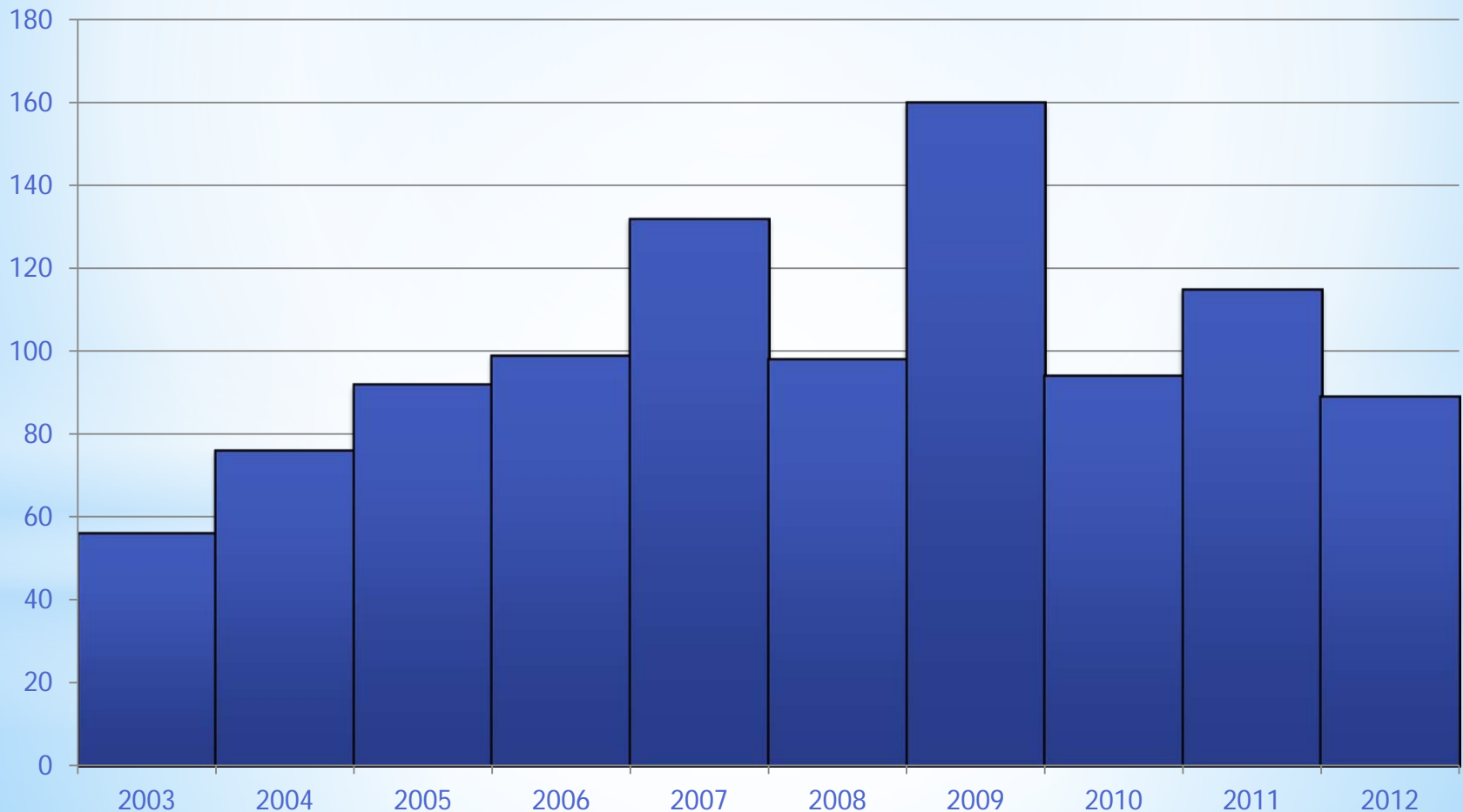
# Number of Crypto Outbreaks Associated with Water



MMWR Cryptosporidiosis Surveillance US 06-08; June 11, 2010 / 59(SS06);1-14

# North Carolina Surveillance

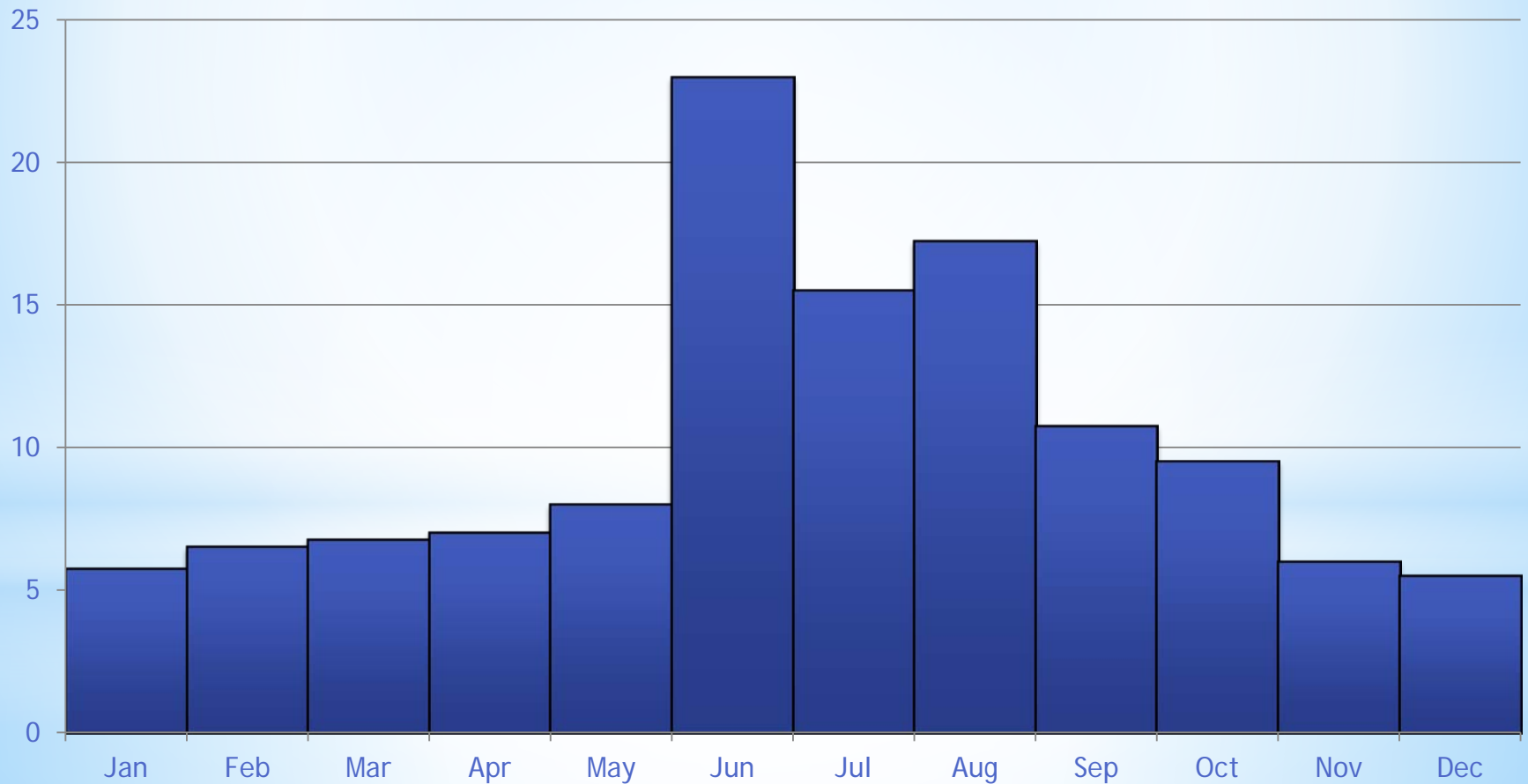
## Cryptosporidium Cases by Year of Onset, North Carolina





# North Carolina Surveillance

Average Number of Cryptosporidiosis Cases by Month of Disease Onset, NC, 2008-12



# The Outbreak



# Thursday, December 5<sup>th</sup>- 4:30pm

- 1 lab confirmed + 4 symptomatic crypto cases among a club swim team
- A pool was shut down the day before for cleaning after reports of these ill individuals swimming in the pool
- Ill individuals presently at a pool preparing for a meet taking place in a few hours



# Why do we care?

## ➤ Cryptosporidium

- Chlorine tolerant parasite
  - Transmitted even when chlorine levels are correct
- Easily excreted from ill swimmers into the pool
- High risk groups
  - Children / Pregnant women - dehydration
  - Immunocompromised - severe prolonged symptoms
- Historical evidence of large ongoing outbreaks
  - New Mexico - per report during CDC consultation
  - Utah - 1,902 lab confirmed cases from Jun - Dec 2007



# What are the control measures?

- Stay home until asymptomatic
- Do not use recreational water for 2 weeks after symptoms resolve
- Hyperchlorination of affected pools

# Hyperchlorination

## Hyperchlorination to Kill *Cryptosporidium*\*

### Recommendations for Aquatics Operators of Treated Venues

*Cryptosporidium* (or “Crypto”) is an extremely chlorine-tolerant parasite, so even well-maintained pools and interactive fountains can spread Crypto among swimmers. If an outbreak of Crypto infections occurs in your community, the health department might ask you to hyperchlorinate. Additionally, to help keep Crypto levels low, you might choose to hyperchlorinate periodically (for example, weekly). If necessary, consult an aquatics professional to determine or identify the feasibility, practical methods, and safety considerations before attempting to hyperchlorinate at your facility.

**Step 1:** Close the pool to swimmers. If you have multiple pools that use the same filtration system — all of the pools will have to be closed to swimmers and hyperchlorinated. Do not allow anyone to enter the pool(s) until hyperchlorination is completed.

**Step 2:** Raise the water’s free chlorine concentration (see Table) and maintain pH 7.5 or less and the temperature at 77°F (25°C) or higher.

**Step 3:** Achieve a concentration time inactivation value (Ct) of 15,300<sup>†</sup> to kill Crypto. The Ct refers to the concentration of free chlorine in parts per million (ppm) multiplied by time in minutes at a specific pH and temperature (see footnote <sup>§</sup> for guidance if chlorine stabilizer is used).

# Now, back to the swim team...

➤ 4:30pm - NC DPH notified

- County environmental health specialist notified
- CDC consulted

➤ 5:30pm

- Pool manager voluntarily canceled meet to hyperchlorinate

# Friday, December 6<sup>th</sup> - 5pm

## ➤ Epi

- 7 cases
  - All on same club swim team

## ➤ Environmental Health

- Identify pools used by the team for practice and meets

# Monday, December 9<sup>th</sup>

- 13 pools in 3 counties reopened after hyperchlorination for precautionary reasons

# Intel from School Nurses (December 11<sup>th</sup>)

## ➤ Parents report:

- Scholarship money at stake
- Height of competitive swim season
- Active noncompliance from other parents/swimmers
- Efforts to avoid testing; therefore, avoiding exclusion



# Challenges

## Competitive Swimmers

- Swim year round
- Travel (within NC and to other states)
- Compete for scholarships
- Use Christmas break to practice
- Internal / external pressure to swim

## Swimming Pools

- Shared by high risk groups
- No visual indication of contamination
- Hyperchlorination recommended after one suspected exposure



# Getting the Message Out

➤ Swim coaches

➤ Swim team members

➤ Parents

- NC Swimming
- NC High School Athletic Assn
- NC Independent Schools Athletic Assn

• State Environmental Health Section

• YMCA

➤ Pool operators

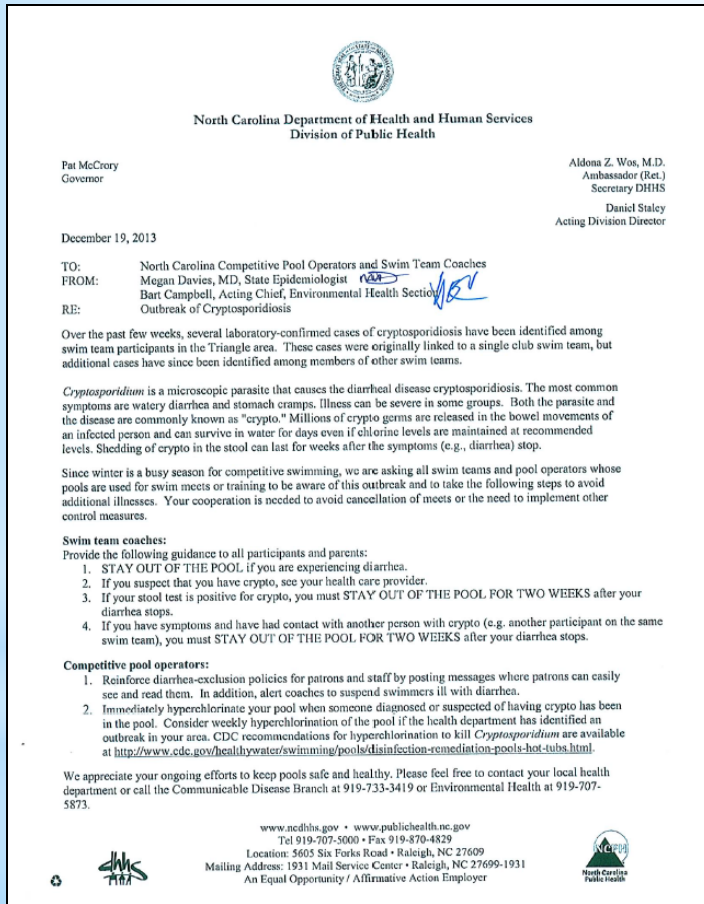
➤ Environmental health staff

➤ Local health directors

➤ Communicable disease nurses

- State Division of Public Health

# The Message



## Swimmers

- Stay out of the pool, if ill
- See your provider, if suspicious
  - If diagnosed, remain out of pool for 2 weeks after symptoms resolve
- If ill + contact with crypto case, remain out of pool for 2 weeks after symptoms resolve

## Pool operators

- Post exclusion signage
- Immediately hyperchlorinate if confirmed or suspected crypto exposure exists; consider weekly hyperchlorination during outbreak

# Statewide Associations



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NORTH CAROLINA SWIMMING REPRESENTS OVER 8,900 SWIMMERS, PROFESSIONAL COACHES AND DEDICATED VOLUNTEERS IN THE SPORT OF SWIMMING.



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[Updates to the Website](#) November 23, 2013

[2014 NCS Select Camp/Zone Team Assistant Coach Application](#) November 14, 2013

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# North Carolina Swimming

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## PROTECT OUR SWIMMERS FROM CRYPTOSPORIDIUM THIS SEASON

 DECEMBER 19, 2013 BY [BILL MARTIN](#)

### CRYPTOSPORIDIUM ADVISORY

The NC Public Health Department has issued an advisory to all swimmers, coaches, and pool operators regarding increased risk of cryptosporidium (crypto) infections following confirmed infections of competitive swimmers in the Triangle area. Crypto is an intestinal parasite that causes stomach cramps and diarrhea. The most important way to prevent spread of the infection is for swimmers who display any symptoms to stay out of the water. Crypto is able to survive in pools even with normal chlorination levels. Here is the link to a [Memo from the State of North Carolina Department of Health](#) which gives more details on keeping our swimmers safe and preventing and responding to outbreaks. With holiday training ready to begin, please be aware of the situation, share the State's memo with your pool managers, and encourage any swimmer who displays symptoms of intestinal distress to stay out of the pool and seek medical attention.

If coaches or parents have specific questions about crypto or the advisory, please feel free to contact Nicole Lee at the NC Department of Health and Human Services:

Nicole Lee, MPH  
Epidemiologist  
Communicable Disease Branch  
225 N. McDowell Street, Raleigh, NC  
Phone: 919-715-1162

[nicole.lee@dhhs.nc.gov](mailto:nicole.lee@dhhs.nc.gov)

Thank you,




Trish Martin  
North Carolina Swimming Safety Chair  
336-327-4697

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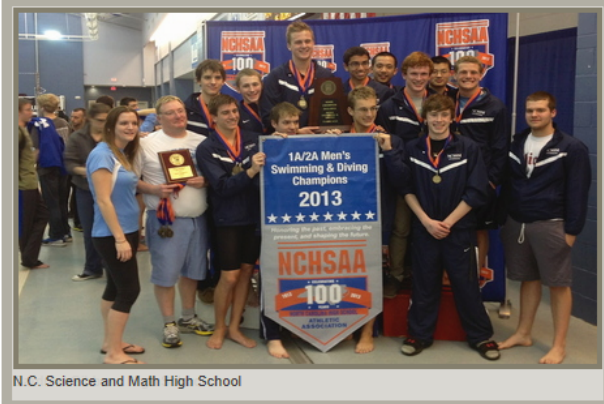
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Information Not Specific to a Sport  
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### Swimming & Diving



N.C. Science and Math High School

2013-14 SEASON FAST FACTS

First Day of Practice: Oct. 30, 2013

First Contest Date: Nov 18, 2013

\*Reporting Deadline: Jan. 25, 2014

Regional Round of Playoffs: Jan. 31-Feb. 1, 2014

State Championships: Feb. 6-8, 2014


\*See schedule details under 2014 State Championship Information\*

Championships Information


List of Hotel Accommodations

Outbreak of Cryptosporidium Among Swim Teams

2013-14 Swimming and Diving information from Handbook



Presenting Partners



Wilson  
MORE WIN.


Playoff Brackets

Playoff Brackets

Upcoming Events & Deadlines

- 1/3 [Deadline for NCHSAA Spirit of Sport Award nominations](#)
- 1/11 [100th Gala Night to Remember](#)
- 1/15 [Official Registration Deadline for baseball, lacrosse, softball, women's soccer and track and field](#)
- 1/24 [Deadline for Toby Webb Coach of the Year Award](#)
- 1/24 [Deadline for Toby Webb Coach of the Year Award](#)

Calendar



# NC Independent Schools Athletic Assn

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- [HEALTH AND SAFETY](#)
- [PLAYOFF BRACKETS INFO AND RESULTS](#)
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## OUR MISSION

The NCISAA exists to encourage interscholastic competition among North Carolina independent schools that are committed to integrity, sportsmanship, and fair play.



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# YMCA

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## FOCUSING ON HEALTHY LIVING

The Guzmans consider the Y their second home. In addition to enrolling Abila in preschool and swimming lessons, Alex coaches soccer. The family is a regular at most of the Y's family nights and in the gym. Family time at the Y allows them to connect with each other and other families.

[READ MORE](#)

### FROM THE GROUND UP



#### The Y is More Than You Know

You may think you know the Y, but from A-to-Z, we're nurturing the potential of youth, improving the country's health and well-being, and giving back to support our neighbors.

To find out how the Y is so much more, [watch our story](#) featuring the shadow dance troupe, Catapult, from NBC's "America's Got Talent".

### NEWS FROM THE Y

#### Beyond Camp: Keeping Kids' Interest Piqued Once Summer Ends

Summertime is an ideal time for children to learn a new skill or hobby. But those skills often fall by the wayside when the new school year comes around. The Y's camp expert offers some advice to parents. [OrlandoSentinel.com](#)



Courtesy of OrlandoSentinel.com

March 4, 2014

#### YMCA Takes Rehab Out of the Hospital

In one community, the Y provides rehabilitation programs where individuals can heal, be active and find camaraderie. [TheSpec.com](#)

February 28, 2014

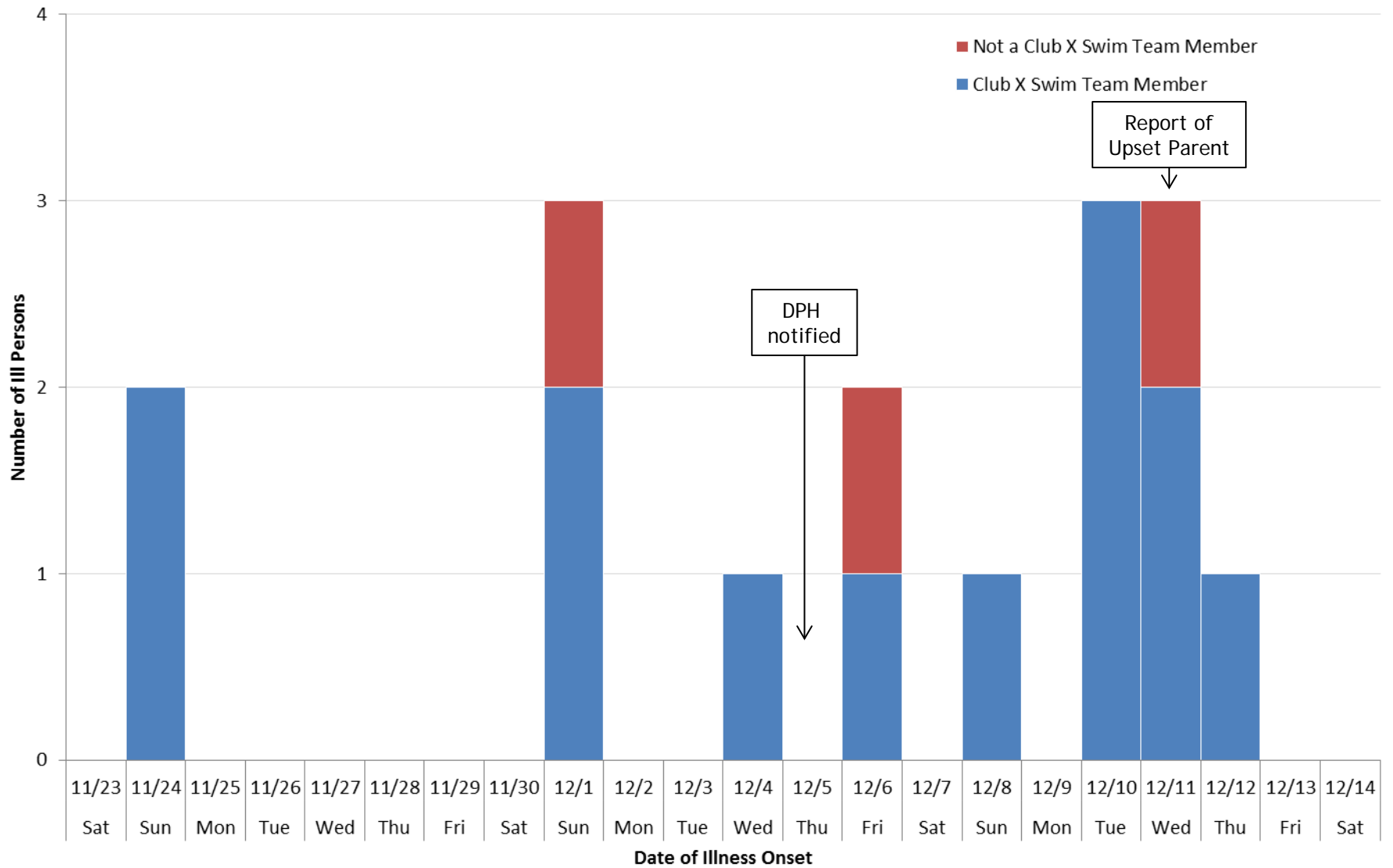
#### YMCA of the USA Board of Directors Elects New Chair

YMCA of the USA announces the election of

[GIVE](#)[FIND YOUR Y](#)[GO](#)[SHARE YOUR STORY](#)[READ MORE](#)[HEALTHY FAMILY HOME](#)[READ MORE](#)[WORLD SERVICE](#)

# Cryptosporidiosis: Illness by Date of Onset and Swim Team, North Carolina, December 2013 (n=16)

as of 12/30/13



# Lessons Learned



# Local Health Department

## ➤ Orange

- Bluntness was needed from the beginning rather than soft recommendations

## ➤ Durham

- Have one point of contact for vertical and horizontal communication
- Key interviewees revealed pertinent information

## ➤ Wake



# State Health Department

- Partnerships with public health and non-public health entities are important
- CDC's waterborne group is very helpful and responsive
- Summarize aggregate information during conference calls
- Need for better communication
  - Communicate onsets for various counties during conference calls

# Acknowledgements

## ➤ Orange County

- Sue Ellen Morrison
- Ann Zellmer
- Tom Konsler

## ➤ Durham County

- Susan Thompson
- Cathi Ostrander
- John Williams, REHS

## ➤ Wake County

- Dianne Brewer
- Andre Pierce

## ➤ NC State Lab

- Cami Hartley

## ➤ LabCorp

- Regina Simpson

## ➤ Duke Micro Lab

- Peggy Althaus

## ➤ NC High School Athletic Association

- Carolyn Shannonhouse

## ➤ NC Independent Schools

## ➤ Division of Public Health

- Larry Michael
- Jim Hayes
- Jean-Marie Maillard
- Carl Williams
- Sandy Pace

## ➤ CDC

- Michael Beach
- Michele Hlavsa
- Dawn Roellig

## ➤ NC Swim

- Bill and Trish Martin

## ➤ Duke Aquatics

- Bill Martin

## ➤ YMCA of the USA

- Kimberly Cousineau



The background of the slide features a series of concentric, light blue ripples on a white surface, resembling water droplets. The ripples are centered in the middle of the slide and fade out towards the edges.

**Thank You!**

Any additional questions?