• Emerging Issues
• MAHC and Rule Update
• 2013 Crypto Review
Operational Issues

• ORP/pH Controllers
  – Once installed they can’t be removed
  – They must be maintained in proper working order

• Submission of Records
  – Helps inspector provide guidance and clarification if operator is not understanding the requirements
  – Helps build case if enforcement action is necessary
• Increased Inspection Frequency
  – Up to 4 routine inspections per year
  – Special inspections as needed

• CPO Revocation
  – Only in well documented cases where a lack of knowledge or care is endangering the health and safety of the patrons.
  – Submitted after final action enforcement action related to the deficiencies.
Operational Issues

Drain Cover Installed Life

• CPSC recommendation to owners/operators has been to contact the drain cover manufacturer regarding cover life.
• Under state rules require closure for missing or broken drain covers, state rules do not address installed life.

Fill & Drain Wading Pool

• Must be completing daily logs and remain within the same water chemistry ranges.
• OTHER ???
• Admission Requirements
• Pool Rules
• Policies and Procedures
• Emergency Response
• Design features not addressed in current rules
Many workplaces contain spaces that are considered to be “confined” because their configurations hinder the activities of employees who must enter into, work in or exit from them.

By definition, a confined space:

• Is large enough for an employee to enter fully and perform assigned work;
• Is not designed for continuous occupancy by the employee; and
• Has a limited or restricted means of entry or exit.
A permit-required confined space has one or more of these characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material with the potential to engulf someone who enters the space;
- Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or
- Contains any other recognized serious safety or health hazards.
Confined Space
OSHA’s standard for confined spaces (29 CFR 1910.146) contains the requirements for practices and procedures to protect employees in general industry from the hazards of entering permit spaces.

Before the initial work assignment begins, the employer must provide proper training for all workers who are required to work in permit spaces. After the training, employers must ensure that the employees have acquired the understanding, knowledge and skills necessary to safely perform their duties.
• Understand definitions
• Get trained
• Stay out or follow training
Model Aquatic Health Code (MAHC)

- MAHC was developed in modules on the following:
  - Facility Design and Construction
  - Recirculation Systems and Filtration
  - Disinfection and Water Quality
  - Risk Management and Safety
  - Facility Maintenance and Operation
  - Monitoring and Testing
  - Contamination Burden
  - Hygiene Facilities
  - Fecal/Vomit/Blood Contamination Response
  - Operator Training
  - Lifeguarding and Bather Supervision
  - Regulatory
  - Ventilation and Air Quality
  - Preference/User Guide/Definitions
The first completed version of the MAHC is expected to be published in late 2014.

The Swimming Pool and Spa Program will begin the process of updating 641 IAC Chapter 15 - Swimming Pools and Spas once the first completed version of the MAHC is released.

The Swimming Pool and Spa Program does not anticipate adoption of the MAHC in its entirety. The revised Iowa Swimming Pool and Spa Rules will likely contain a combination of current rules and the MAHC.
Cryptosporidium is a microscopic parasite that causes the diarrheal disease cryptosporidiosis. There are many species of Cryptosporidium that infect humans and animals. Both the parasite and the disease are commonly known as "Crypto."

- The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very tolerant to chlorine disinfection.
- *Cryptosporidium parvum* and *Cryptosporidium hominis* are the most prevalent species causing disease in humans.
- Transmission of *Cryptosporidium parvum* and *C. hominis* occurs mainly through contact with oocysts that become ingested. Following ingestion by a suitable host the parasites undergo asexual multiplication and then sexual multiplication to develop oocysts that sporulate in the infected host. Oocysts are infective upon excretion, thus permitting direct and immediate fecal-oral transmission.
Who's at Risk?

• Anyone can get cryptosporidiosis.
• High-risk persons include:
  – Child care workers and diaper-aged children who attend child care centers;
  – Parents & family of infected children;
  – International travelers;
  – Swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams;
  – Animal workers – particularly cattle
  – Persons who consume raw milk, other unpasteurized dairy products, or unpasteurized juices
FIGURE 1. Incidence* of cryptosporidiosis, by year — National Notifiable Diseases Surveillance System, United States, 1995–2010†

* Per 100,000 population.
† N = 85,514.
§ First full year of national reporting.
And Iowa Rates Higher than National Rates
What's this got to do with pools?

Outbreaks of Acute Gastrointestinal Illness Associated with Treated Recreational Water Use, United States, 2001–2010

- Chlorine sensitive: Poor pool operation & maintenance
  - Giardia 3.5%
  - Shigella spp. 4.1%
  - Norovirus 4.7%
  - Unidentified 7.0%

- Other* 2.3%
  - E. coli 2.3%

- Cryptosporidium spp. 76.2%

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

Extremely chlorine tolerant

**Inactivation Time Chlorinated Water**

<table>
<thead>
<tr>
<th>Microbe</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. coli</em> O157:H7</td>
<td>&lt;1 min</td>
</tr>
<tr>
<td>Hepatitis A virus</td>
<td>~16 min</td>
</tr>
<tr>
<td><em>Giardia</em> parasite</td>
<td>~45 min</td>
</tr>
<tr>
<td><em>Cryptosporidium</em> parasite</td>
<td>~15,300 min (10.6 days)</td>
</tr>
</tbody>
</table>

*1 ppm (1 mg/L) chlorine at pH 7.5 and 77 degrees*

**Fecal Accident Response Recommendations:**
[www.cdc.gov/healthyswimming/fecal_response.htm](http://www.cdc.gov/healthyswimming/fecal_response.htm)
Crypto occurs all year but peaks in summer


* N = 16,607; date of onset for 4,381 patients was unknown.
Crypto has a high incidence among children.


* Per 100,000 population.
# 2013 Iowa Crypto (thru Oct)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cases YTD 2013</th>
<th>Incidence YTD*</th>
<th>Cases YTD 2012†</th>
<th>5-year avg cases**</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botulism, infant</td>
<td>3</td>
<td>0.10</td>
<td>0</td>
<td>0.20</td>
<td>0.00%</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>2</td>
<td>0.07</td>
<td>0</td>
<td>1.00</td>
<td>100.00%</td>
</tr>
<tr>
<td>Campy</td>
<td>594</td>
<td>19.50</td>
<td>534</td>
<td>633.60</td>
<td>-6.25%</td>
</tr>
<tr>
<td>Crypto</td>
<td>1474</td>
<td>48.39</td>
<td>329</td>
<td>323.40</td>
<td>355.78%</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>118</td>
<td>4.86</td>
<td>0</td>
<td>0.40</td>
<td>36900.00%</td>
</tr>
</tbody>
</table>
Cryptosporidium Summary
Confirmed and Probable Cases

YTD Cryptosporidiosis Cases by Age

YTD Number of Cryptosporidiosis Reports by Month

YTD Cryptosporidiosis Cases by Gender
Iowa Summary

1474 Probable and Confirmed cases with patients located across 86 counties

• Approx. 1/3 identified registered pool exposure within incubation period or during infectious period at pools located in 40 counties.

• Approx. 140 unique registered aquatic facilities were identified by patients through interviews as either a source of possible exposure or possibly contaminated by the patient. More than half of those facilities were identified by a single patient/case.
Confirmed Case, Now what?

IDPH - Center for Acute Disease Epidemiology

Local Public Health

IDPH - Bureau of Environmental Health Services

Local Environmental Health/Swimming Pool Contract Holder

Patient

Pool Facility
C. Local Public Health Agency Follow-up Responsibilities

Case Investigation

a. It is the LPHA’s responsibility to complete a Cryptosporidiosis Case Investigation Form by interviewing the case and others who may be able to provide pertinent information. Much of the information on the form can be obtained from the case’s health care provider or the medical record.

b. Use the following guidelines in completing the form:

1. Accurately record the demographic information, event information, laboratory findings, date of symptom onset, symptoms, treatment, and other clinical information.

2. When asking about exposure history (food, travel, activities, etc.), use the incubation-period for cryptosporidiosis (1-12 days).

3. Ask questions about travel history and group gatherings to help identify where the case became infected.

4. If possible, record any restaurants at which the case ate, including food items(s) and date consumed.

5. **Ask questions about water exposures. If exposure is thought to be related to a swimming pool, wading pool, spray/splash pad, or spa exposure, the responsible environmental health agency should be notified (refer to the Pool Inspection Contractor Contact List) so that an exposure risk assessment can be conducted and action can be taken to prevent further exposure at that site.**

6. Ask questions about water supply because cryptosporidiosis may be acquired through water consumption.

7. Household/close contact, pet or other animal contact, child care, and food handler questions are designed to examine the case’s risk of having acquired the illness from, or potential for transmitting it to, these contacts. Determine whether the case attends or works at a child care and/or is a food handler or has recently shown calves at a county fair.

8. Ask if the patient knows others who have similar illness about the same time.

9. If several attempts have been made to obtain case information, but have been unsuccessful (e.g., the case or health care provider does not return calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as has been gathered. Please note on the form the reason why it could not be filled out completely. If using IDSS, select the appropriate reason under the Event tab in the Event Exception field.
Why does it take so long to get crypto notifications?

• **Time Frames**
  – Incubation 1-12 days, Average 7 days
  – 2-3 days before seeing a doctor
  – A week for lab confirmation
  – Time for report to reach CADE or PHN
  – Time to get exposure information
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 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 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 for guidance if chlorine stabilizer is used).

<table>
<thead>
<tr>
<th>Concentration time inactivation value (CT)</th>
<th>Free chlorine concentration (C) (parts per million)</th>
<th>Time (t) (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15,300*</td>
<td>20</td>
<td>765</td>
</tr>
<tr>
<td>15,300</td>
<td>10</td>
<td>1,530</td>
</tr>
</tbody>
</table>

Step 4: Confirm that the filtration system is operating while the water reaches and is maintained at the proper free chlorine level for disinfection.

Step 5: Backwash the filter thoroughly after reaching the CT. Be sure the effluent is discharged directly to waste and in accordance with state or local regulations. Do not return the backwash through the filter. Where appropriate, replace the filter media.

Step 6**: Allow swimmers back into the water only after the required CT has been achieved and the free chlorine and pH levels have been returned to the normal operating range allowed by the state or local regulatory authority.

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* Check for existing guidelines from your local or state regulatory agency before use. CDC recommendations do not replace existing state or local regulations or guidelines.


§ Crypto CT is based on killing 99.9% of Crypto. This level of Crypto inactivation cannot be reached in the presence of 20 ppm chlorine stabilizer, even after 24 hours at 80 ppm free chlorine, pH 6.5, and a temperature of 77°F (25°C). Extrapolation of these data suggest it would take approximately 24 hours to kill 99.9% of Crypto in the presence of 50 ppm unless some acid, 20 ppm free chlorine, pH 6.5, and a temperature of 77°F (25°C) or higher. Shields JM, Arrowood MJ, Hill VR, Beach MJ. The effect of cyanuric acid on the chlorine inactivation of Cryptosporidium parvum in 20 ppm free chlorine. J Water Health. 2006;4(A4):193-201.

¶ Many conventional test kits cannot measure free chlorine levels this high. Use chlorine test strips that can measure free chlorine in a range that includes 20-40 ppm (such as those used in the food industry) or make dilutions for use in a standard DPD test kit using chlorine-free water.

** CDC does not recommend testing the water for Crypto after hyperchlorination is completed. Although hyperchlorination destroys Crypto's infectivity, it does not necessarily destroy the structure of the parasite.
The facility should log the steps taken to remediate any crypto that may be present.

The log should include the person responsible, date and time remediation began, water temperature, and cyanuric acid concentration.

- At regular intervals the time, free chlorine, and pH level should be logged to demonstrate total CT was achieved.
- After required CT has been achieved, the water chemistry must be returned to appropriate levels and logged before reopening the facility.
In POOL water that contains cyanuric acid or a stabilized CHLORINE product, water shall be treated by:

1) Lowering the pH to 6.5, raising the free CHLORINE residual to 40 mg/L using a non-stabilized CHLORINE product, and maintaining at 40mg/L for at least 30 hours or an equivalent time and concentration needed to reach the CT VALUE. Measurement of the inactivation time required shall start when the AQUATIC VENUE reaches the intended free CHLORINE level or,

2) Circulating the water through a SECONDARY DISINFECTION SYSTEM to reduce the number of Cryptosporidium OOCYSTS in the AQUATIC VENUE below 1 OOCYST/100ml as outlined in MAHC Section 4.7.3.3.2.4 or,

3) Draining the AQUATIC VENUE completely
Properly designed secondary disinfection systems such as UV and Ozone can be effective countermeasures against cryptosporidium.

- The Swimming Pool Rules provide no requirements regarding secondary disinfectants or their design criteria, and there is no current requirements regarding the maintenance and logging of the specific output levels of these systems the department cannot readily determine the effectiveness of a particular facility’s secondary disinfection systems where installed.

- A facility could consult with their engineer and pool equipment suppliers to determine as part of their risk assessment if their systems could supplement or eliminate the need to hyperchlorinate to inactivate cryptosporidium and what output levels should be maintained and with what frequency they should be logged.
Why facilities may want to consult with a professional company

To determine the most optimal and practical methods and needed safety considerations.

- Some facilities lack knowledgeable staff to perform hyperchlorination (i.e. Draining and refilling without hyperchlorinating).
- Most outdoor facilities use cyanuric acid and may operate outside of the pH or temperatures limits in the CDC hyperchlorination guidance requiring CT adjustments.
- Hyperchlorination requires chlorine levels that may exceed the typical range of standard test kits.
- Manual feeding of large quantities of chemicals may require additional personal protective equipment or safety considerations.
If a pool is implicated with crypto (2 or more cases) our first priority is to prevent further spread of disease

- Pools should hyperchlorinated as soon as reasonably possible
- Complicated testing- need a minimum of 10 liters of water for sample and requires many days to complete
- Cannot differentiate between live and dead oocysts
- Test recovery in even the best laboratories is 50%
- Does not add value- testing is expensive with no added benefit
When testing may be appropriate

- During a large outbreak in a concentrated area the department (CADE and EHS) in conjunction with the State Hygienic Laboratory and CDC may request a water sample be collected prior to hyperchlorination/remediation.
- Remediation would begin immediately after samples collected prior to laboratory results to prevent further spread of illness.
Reducing the Risk of Crypto Transmission

Educate
Advise
Empower
To Reduce Contamination and to Reduce Exposure

Who: Public/parents/patrons, pool operators, pool inspectors..... childcare workers, farm workers, fairs, doctors, nurses, etc.
12 Steps for RWI Prevention for Pool Staff

Step 1: Lead your staff.
Step 2: Develop partnerships.
Step 3: Educate pool staff.
Step 4: Educate swimmers and parents.
Step 5: Maintain water quality and equipment.
Step 6: Evaluate aquatic facility design.
Step 7: Institute disinfection guidelines.
Step 8: Evaluate hygiene facilities.
Step 9: Develop a bathroom break policy.
Step 10: Create a special policy for large groups of young children.
Step 11: Post and distribute health information.
Step 12: Develop an outbreak/emergency response plan.
Educate the Facilities

- Filtration
- Ozone
- UV
- Coagulants
- Increase turn-over rates
- Planning for Hyperchlorination
- Minimizing cyanuric acid
- Elevating disinfection levels
- Diaper changing stations made available
- Proper fecal contamination response
- Require swim diapers
- Clear pool for regular restroom breaks
- Signage
Educate the Public/Patron

- Shower before swimming
- No pool water in the mouth
- Do not go to pools when ill
- Do not return to pool for two weeks after symptoms subside
- Diaper aged children have swim diapers
- Do not change diapers poolside
- Take children for regular bathroom breaks
Keep it Clean
Facility Messaging

Healthy Swimming
Six “PLEAs” for Protection Against Recreational Water Illnesses (RWIs)

PLEASE do not swim when you have diarrhea. This is especially important for kids in diapers.

PLEASE do not swallow the pool water.

PLEASE practice good hygiene. Take a shower before swimming and wash your hands after using the toilet or changing diapers.

PLEASE take your kids on bathroom breaks or check diapers often.

PLEASE change diapers in a bathroom and not at the poolside.

PLEASE wash your child (especially the rear end) thoroughly with soap and water before swimming.

For more information go to: www.healthywatering.org

WANTED: DIRTY DIAPERS

Wash With Soap
Especially the rear end,
Before You Swim

GUIDE A CLEAN AND HEALTHY POOL
Flush diapers every 2-4 hours and change them in the bathroom, NOT in pool area.

GOT 1
DIARRHEA?
DON'T SWIM!

If you have diarrhea, stay out of the water. Don’t share your germs with other swimmers.

For more information visit: www.cdc.gov/healthywatering

SIX Steps for Healthy Swimming
Protection Against Recreational Water Illnesses (RWIs)

PLEASE don’t swim when you have diarrhea. Diarrhea can contain pathogenic bacteria that may make other people sick.

PLEASE don’t swallow pool water. Avoid getting water in your mouth.

PLEASE practice good hygiene. Shower with soap before swimming and wash your hands after using the toilet or changing diapers.

PLEASE leave the pool if you or anyone around you has an open wound, rash, or any other communicable disease.

PLEASE don’t swim if you feel sick. Avoid getting water in your mouth.

PLEASE wash your child thoroughly before leaving the pool. Health officials recommend children be washed before being diapered.

For more information visit: www.cdc.gov/healthywatering

Take Frequent Bathroom Breaks:
Keep Pee and Poop Out of the Pool!

Pee mixers with chlorine to make chemicals that cause red stains on the pool surface. Keeping pee and poop out of the pool is also an important way to reduce the spread of illness.

Chlorine doesn’t kill germs instantly!

Don’t Swallow Pool Water

Swallowing water is dangerous. Children and adults may choke or drown. Pool water may contain germs that can cause illness. If you or another swimmer gets water in your mouth, don’t swallow.

DON’T MIX

If you have diarrhea, stay out of the water. Don’t share your germs with other swimmers.

Can You Read This?

Swimming lenses get scratches and can cause eye irritation. If you wear glasses or contact lenses, make sure they are not scratched and are in good conditions.

For more information visit: www.cdc.gov/healthywatering
Olga
• Iowa Department of Public Health Swimming Pool and Spa Program
  https://www.idph.state.ia.us/SwimmingPoolsAndSpas/

• Centers for Disease Control and Prevention Healthy (CDC) Swimming/Recreational Water
  http://www.cdc.gov/healthywater/swimming/resources/posters.html

• CDC Twelve (12) Steps for Prevention of Recreational Water Illnesses (RWIs) for Pool and Aquatics Staff
  http://www.cdc.gov/healthywater/swimming/pools/twelve-steps-for-prevention-rwi.html

• RWI Videos:
  – RWI Police: http://www.youtube.com/watch?v=KTBowy5I8dg
  – Olga: http://www.youtube.com/watch?v=H1I1K2VWVw
Contact Information

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http://www.idph.state.ia.us/SwimmingPoolsAndSpas/