CRYPTO HERE, CRYPTO THERE, CRYPTO, CRYPTO EVERYWHERE

WORLD AQUATIC HEALTH CONFERENCE
WILLIAMSBURG, VA
THURSDAY, OCTOBER 17TH, 2019

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IOWA DEPARTMENT OF PUBLIC HEALTH
DISCLAIMER

THIS PRESENTATION:
  • IS INTENDED FOR EDUCATIONAL PURPOSES ONLY.
  • IS NOT MEANT TO OFFER MEDICAL, LEGAL, OR REGULATORY COMPLIANCE ADVICE.
  • DOES NOT REPLACE INDEPENDENT PROFESSIONAL JUDGEMENT.

THE OBSERVATIONS, OPINIONS, AND RECOMMENDATIONS EXPRESSED IN THIS PRESENTATION AND ON THE FOLLOWING SLIDES ARE SOLELY THOSE OF THE PRESENTER BASED ON THE INFORMATION AVAILABLE TO AND REVIEWED BY THE PRESENTER AT THE TIME THE PRESENTATION WAS PREPARED.
OBJECTIVES

• WHY DO WE WORRY ABOUT CRYPTO

• CRYPTO SPECIES AND HOSTS

• HOW COMMON, WHERE DOES IT OCCUR, & RATES

• HOW IT IS TRANSMITTED

• WHAT FACTORS CAN INFLUENCE TRANSMISSION AND CRYPTO RATES

• HOW CAN THESE FACTORS HELP SHAPE RESPONSE
Cryptosporidium is a microscopic parasite that causes the diarrheal disease cryptosporidiosis. Both the parasite and the disease are commonly known as "Crypto."

https://www.cdc.gov/parasites/crypto/index.html
WHY DO WE CARE ABOUT CRYPTO?

• CRYPTOSPORIDIUM IS RESISTANT TO COMMON DISINFECTANTS.

• LOW DOSES CAN CAUSE DISEASE.

• LIMITED TREATMENT OPTIONS FOR CRYPTOSPORIDIOSIS, RECOVERY TYPICALLY DEPENDS ON THE HEALTH OF YOUR IMMUNE SYSTEM.

• IT CAN CAUSE SEVERE, LIFE THREATENING ILLNESS PARTICULARLY IN IMMUNOCOMPROMISED HOSTS.
  (YOUNG CHILDREN, ELDERLY, AIDS, CHEMOTHERAPY, ORGAN TRANSPLANT, INHERITED DISEASES AND AUTOIMMUNE CONDITIONS TREATED WITH IMMUNOSUPPRESSANT DRUGS)
MANY SPECIES AND HOSTS

• IN 2014 THERE WERE OVER 26 VALIDATED SPECIES OF CRYPTO THAT INFECT A WIDE VARIETY OF HOSTS.

• THE MAJORITY (>90%) OF THE INFECTIONS IDENTIFIED IN HUMANS TO DATE HAVE BEEN FROM C. HOMINIS AND C. PARVUM.

• UP TO 17 SPECIES HAVE BEEN IDENTIFIED IN HUMANS INCLUDING BUT NOT LIMITED TO: C. MELEAGRIDIS, C. UBIQUITUM, C. FELIS, C. CANIS, C. SUIS, C. ANDERSONI, C. VIATORUM AND C. MURIS

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Species of Cryptosporidium</th>
<th>Major hosts</th>
<th>Zoonotic status</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>C. andersoni</td>
<td>Cattle</td>
<td>Yes</td>
<td>[24]</td>
</tr>
<tr>
<td>2.</td>
<td>C. baileyi</td>
<td>Birds</td>
<td>No</td>
<td>[25, 26]</td>
</tr>
<tr>
<td>3.</td>
<td>C. bovis</td>
<td>Cattle</td>
<td>Yes</td>
<td>[27]</td>
</tr>
<tr>
<td>4.</td>
<td>C. canis</td>
<td>Dogs</td>
<td>Yes</td>
<td>[28]</td>
</tr>
<tr>
<td>5.</td>
<td>C. cuniculus</td>
<td>Rabbits</td>
<td>Yes</td>
<td>[29, 30]</td>
</tr>
<tr>
<td>6.</td>
<td>C. erinacei</td>
<td>Hedgehogs and horses</td>
<td>Yes</td>
<td>[31]</td>
</tr>
<tr>
<td>7.</td>
<td>C. fayeri</td>
<td>Marsupials</td>
<td>Yes</td>
<td>[32]</td>
</tr>
<tr>
<td>8.</td>
<td>C. felis</td>
<td>Cats</td>
<td>Yes</td>
<td>[33]</td>
</tr>
<tr>
<td>9.</td>
<td>C. fragile</td>
<td>Toads</td>
<td>No</td>
<td>[34]</td>
</tr>
<tr>
<td>10.</td>
<td>C. galli</td>
<td>Birds</td>
<td>No</td>
<td>[35]</td>
</tr>
<tr>
<td>11.</td>
<td>C. hominis</td>
<td>Humans</td>
<td>Most common species in humans</td>
<td>[36]</td>
</tr>
<tr>
<td>12.</td>
<td>C. macropodum</td>
<td>Marsupials</td>
<td>No</td>
<td>[37]</td>
</tr>
<tr>
<td>13.</td>
<td>C. meleagridis</td>
<td>Humans and birds</td>
<td>Yes</td>
<td>[4, 38]</td>
</tr>
<tr>
<td>14.</td>
<td>C. molnari</td>
<td>Fish</td>
<td>No</td>
<td>[39, 40]</td>
</tr>
<tr>
<td>15.</td>
<td>C. muris</td>
<td>Rodents</td>
<td>Yes</td>
<td>[41]</td>
</tr>
<tr>
<td>16.</td>
<td>C. parvum</td>
<td>Ruminants</td>
<td>Yes</td>
<td>[42]</td>
</tr>
<tr>
<td>17.</td>
<td>C. ryanae</td>
<td>Cattle</td>
<td>No</td>
<td>[43]</td>
</tr>
<tr>
<td>18.</td>
<td>C. scrofarum</td>
<td>Pigs</td>
<td>Yes</td>
<td>[44]</td>
</tr>
<tr>
<td>19.</td>
<td>C. serpentis</td>
<td>Snakes and lizards</td>
<td>No</td>
<td>[45, 46]</td>
</tr>
<tr>
<td>20.</td>
<td>C. suis</td>
<td>Pigs</td>
<td>No</td>
<td>[47]</td>
</tr>
<tr>
<td>21.</td>
<td>C. tyzzeri</td>
<td>Rodents</td>
<td>Yes</td>
<td>[48]</td>
</tr>
<tr>
<td>22.</td>
<td>C. ubiquitum</td>
<td>Primates, ruminants, and rodents</td>
<td>Yes</td>
<td>[49]</td>
</tr>
<tr>
<td>23.</td>
<td>C. varani</td>
<td>Lizards</td>
<td>No</td>
<td>[50]</td>
</tr>
<tr>
<td>24.</td>
<td>C. viatorum</td>
<td>Humans</td>
<td>Less common species in humans</td>
<td>[51]</td>
</tr>
<tr>
<td>25.</td>
<td>C. wrairi</td>
<td>Guineas pigs</td>
<td>No</td>
<td>[52]</td>
</tr>
<tr>
<td>26.</td>
<td>C. xiaoii</td>
<td>Sheep and goats</td>
<td>Yes</td>
<td>[53]</td>
</tr>
</tbody>
</table>

HOW COMMON IS CRYPTO

- THE CDC NOTES THAT IN THE UNITED STATES, AN ESTIMATED 748,000 CASES OF CRYPTOSPORIDIOSIS OCCUR EACH YEAR.
- SURVEILLANCE IDENTIFIES APPROXIMATELY 8,000 CONFIRMED AND PROBABLE CASES PER YEAR
- AN AVERAGE OF 830 CASES PER YEAR ARE LINKED TO OUTBREAKS (2009-2017)
- DIFFICULT TO IDENTIFY OUTBREAKS FROM SOURCES WITH UNIVERSAL EXPOSURE

https://www.cdc.gov/parasites/crypto/infection-sources.html
https://www.cdc.gov/mmwr/pdf/ss/ss6403.pdf
https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6825a3-H.pdf
2009-2017 IDENTIFIED OUTBREAKS

• 444 CRYPTO OUTBREAKS WERE IDENTIFIED WITH A TOTAL OF 7,465 CASES OVER 9 YEARS FOR AN AVERAGE OF APPROXIMATELY 830 CASES PER YEAR

• 156 CRYPTO OUTBREAKS (APPROXIMATELY 35%) WERE EPI LINKED TO POOLS.

• APPROXIMATELY 5% OF THE TOTAL REPORTED CASES OF CRYPTO WERE EPI LINKED TO AN OUTBREAK ASSOCIATED WITH A SWIMMING POOL

• ONLY TWO OUTBREAKS WERE DETERMINED TO BE THE RESULT OF TRANSMISSION BY ENVIRONMENTAL CONTAMINATION; THIS MIGHT BE BECAUSE OF DIFFICULTIES INHERENT TO IMPLICATING FOMITES AS AN OUTBREAK SOURCE

https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6825a3-H.pdf
SPORADIC VS OUTBREAKS

SPORADIC

• APPROXIMATELY 90% OF IDENTIFIED CASES
• MAY INCLUDE CASES ASSOCIATED WITH OUTBREAKS WHERE LINK WASN’T IDENTIFIED
• MAY INCLUDE UNDETECTED OUTBREAKS FROM LESS OBVIOUS EXPOSURES
• MAY INCLUDE UNDETECTED OUTBREAKS FROM UNIVERSAL EXPOSURES THAT ARE MORE DIFFICULT TO IDENTIFY

OUTBREAKS

• APPROXIMATELY 10% OF IDENTIFIED CASES ARE LINKED TO AN OUTBREAK
• 444 IDENTIFIED OUTBREAKS (2009-2017*):
  • 156 TREATED REC. WATER - 35%
  • 88 PERSON-TO-PERSON - 20%
  • 86 ANIMAL CONTACT - 19%
  • 63 UNKNOWN - 14%
  • 22 FOODBORNE- 5%
  • 14 UNTREATED REC WATER (14)- 3%

*https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6825a3-H.pdf
SURVEILLANCE CHALLENGES

ONLY ABOUT 1% OF ESTIMATED CRYPTO CASES ARE DIAGNOSED AND REPORTED.

SOME KEY FACTORS

• VARIABLE SYMPTOMS
• SELF LIMITING COURSE
• INADEQUATE DIAGNOSIS
• INADEQUATE LAB TESTING
• AGE
• GENDER
• IMMUNOLOGICAL STATUS
• EXPOSURES
• BIAS

WHERE IS CRYPTO OCCURRING

[Map showing cases per 100,000 population by state in 2010, with different colors indicating different case ranges.

Cases/100,000:
- No cases reported
- <1 case
- 1-<2 cases
- 2-<4 cases
- 4-<7 cases
- 7-<10 cases
- 10-<20 cases
- 20-<40 cases
- 40-<100 cases
- 100+ cases

Figure 2. Mean annual rate of cryptosporidiosis-related (CR) hospitalization among persons aged ≥65 years (from the Centers for Medicare and Medicaid Services databases) versus the mean annual rate of reported cases of cryptosporidiosis in the total population (national surveillance from the Centers for Disease Control and Prevention) for the period 1997–2004. Annual rates have been adjusted for each state to reflect only those years for which surveillance data was available. A, States in which cryptosporidiosis was not a reportable illness for the entire time period are shown in red.

SOME STATES CONSISTENTLY HIGHER

CDC notes that incidence appears consistently higher in certain states, and that differences in incidence among states might reflect differences in risk factors.
FACTORS MAY VARY BY LOCATION

ONE STUDY REVIEWED RISK FACTORS FOR SPORADIC CASES FROM SEVEN STATES INCLUDING ONE MIDWESTERN STATE, MINNESOTA, AND SIX STATES FROM THE EAST OR WEST COASTS (CALIFORNIA, CONNECTICUT, GEORGIA, MARYLAND, OREGON, AND NEW YORK).

THE SIGNIFICANT RISK FACTORS FOR SPORADIC CASES OF CRYPTOSPORIDIOUM IDENTIFIED BY THE STUDY FOR MINNESOTA DID NOT INCLUDE SWIMMING, WHEREAS SWIMMING WAS INCLUDED AS A SIGNIFICANT RISK FACTOR FOR THE COASTAL STATES AS A WHOLE.

Since half of the study participants came from Minnesota, we also examined every variable according to residence in Minnesota or residence in the other six states. Well water consumption (OR = 2.1; 95% CI = 1.2 to 3.7), contact with ill children ≤2 years of age (OR = 3.9; 95% CI = 1.4 to 11.3), and contact with ill children > 2 to 11 years of age (OR = 5.2; 95% CI = 2.1 to 12.9) were significant risk factors in Minnesota but not outside Minnesota. Swimming in general (OR = 2.9; 95% CI = 1.5 to 5.5), swimming in freshwater (OR = 2.9; 95% CI = 1.2 to 6.9), and any travel (OR = 1.8; 95% CI = 1.1 to 2.9) were significant risk factors outside Minnesota but not in Minnesota.

2014-2018 CRYPTO 5 YR AVG RATE/100,000

2014-2018 Cryptosporidiosis 5 yr Avg Rates/100,000 Population
2596 TOTAL CASES

- 521 CASES (20%) REPORTED RECREATIONAL WATER EXPOSURE AT RESIDENTIAL/BACKYARD POOLS OR PUBLIC POOLS
- 446 CASES (17%) REPORTED CHILDCARE EXPOSURE
- 384 CASES (15%) REPORTED PRIVATE WELL EXPOSURE
- 339 CASES (13%) REPORTED CATTLE EXPOSURE
- 267 CASES (10%) REPORTED UNTREATED REC. WATER EXPOSURE (I.E. LAKES, RIVERS)

INDIVIDUAL CASES COULD HAVE REPORTED MULTIPLE RISK FACTORS
2018: 651 TOTAL CASES
OF 48 (7.3%) REPORTED PUBLIC POOL EXPOSURES
14 ALSO REPORTED ANIMAL CONTACT ON FARMS OR AT FAIRS
12 ALSO REPORTED ILL HOUSEHOLD CONTACT
5 ALSO REPORTED DRINKING WELL WATER
5 ALSO REPORTED SWIMMING NATURAL WATER
4 ALSO REPORTED DAYCARE/DIAPERS
(17 (2.6%) ONLY REPORTED PUBLIC POOL EXPOSURE)
2013 CRYPTO CASE COUNTS AND RATES/100,000 Population

The map illustrates the 2013 Cryptosporidiosis case counts and rates per 100,000 population for various counties in Iowa. The rates are color-coded to indicate the number of cases and rates per 100,000 population. Counties with higher rates are shaded in darker colors, while counties with lower rates are shaded in lighter colors. The map provides a visual representation of the geographical distribution of Cryptosporidiosis cases across the state, with specific counties such as Lyon, Ossela, Dickinson, Emmet, Kossuth, Winnebago, Worth, Mitchell, Howard, Winneshiek, and Allamakee showing notable case counts and rates.

© 2019 Mapbox © OpenStreetMap
IOWA 2013

1506 TOTAL CASES

• 576 CASES (38%) REPORTED RECREATIONAL WATER EXPOSURE AT RESIDENTIAL/BACKYARD POOLS OR PUBLIC POOLS
• 222 CASES (15%) REPORTED CHILDCARE EXPOSURE
• 167 CASES (11%) REPORTED UNTREATED REC. WATER EXPOSURE (I.E. LAKES, RIVERS)
• 101 CASES (7%) REPORTED CATTLE EXPOSURE
• 102 CASES (7%) REPORTED PRIVATE WELL EXPOSURE

INDIVIDUAL CASES COULD HAVE REPORTED MULTIPLE RISK FACTORS
Table 10. Non-Norovirus, Non-Foodborne or Unknown Cause Outbreaks, 2013

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Outbreak</th>
<th>Cause</th>
<th>Location</th>
<th>Date</th>
<th>Description</th>
<th>Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.</td>
<td>Water-to-Person</td>
<td>Vomiting, Diarrhea, Fever</td>
<td>Public Pool</td>
<td>July</td>
<td>7 + 1 epi-link</td>
<td>Water-to-Person</td>
</tr>
<tr>
<td>47.</td>
<td>Water-to-Person</td>
<td>Vomiting, Diarrhea, Fever</td>
<td>Public Pool</td>
<td>Polk</td>
<td>July</td>
<td>2 + 3 epi-link</td>
</tr>
<tr>
<td>48.</td>
<td>Water-to-Person</td>
<td>Vomiting, Diarrhea, Fever</td>
<td>Splash Pad</td>
<td>Polk</td>
<td>June</td>
<td>5 + 5 epi-link</td>
</tr>
<tr>
<td>49.</td>
<td>Animal-to-Person</td>
<td>Vomiting, Diarrhea, Fever</td>
<td>Child Care</td>
<td>Marion</td>
<td>September</td>
<td>4/15</td>
</tr>
<tr>
<td>50.</td>
<td>Person-to-Person</td>
<td>Diarrhea, Abd Cramping</td>
<td>Religious Retreat</td>
<td>Dallas</td>
<td>October</td>
<td>3/16</td>
</tr>
</tbody>
</table>

Table 11. Foodborne Outbreaks, 2013

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Outbreak</th>
<th>Cause</th>
<th>Residence</th>
<th>Date</th>
<th>Description</th>
<th>Etiology</th>
</tr>
</thead>
</table>
• IN 2013 HYPERCHLORINATION RECOMMENDATION WAS BASED ON A DECISION TREE

• AS CASES WERE REPORTED TO THE POOL PROGRAM THEY WERE LOGGED AND STAFF CONTACTED THE LOCAL POOL INSPECTOR WITH CASE INFO FOR RECOMMENDATION.

• OVER 400 CASES IDENTIFIED OVER 130 DIFFERENT PUBLIC POOL FACILITIES
HYPERCHLORINATION CHALLENGES

• GENERALLY TOO LATE (EXCEPT FECAL INCIDENT RESPONSE)
• ONLY PROTECTIVE UNTIL PATRONS ENTER THE WATER
• EXPENSIVE/TIME CONSUMING
• POTENTIAL HAZARDOUS
• COMPLICATED
• POTENTIALLY CAN DAMAGE EQUIPMENT AND VOID WARRANTIES
• REGULAR PATRONS ALREADY EXPOSED, DISPLACED PATRONS CAN INFEK OTHER POOLS SPREADING OUTBREAK
Fecal-Oral F Diagram

Adapted from “Exposure to Animal Feces and Human Health: A Systematic Review and Proposed Research Priorities”
Gauthami Penakalapati, Jenna Swarthout, Miranda J. Delahoy, Lydia McAliley, Breanna Wodnik, Karen Levy, and Matthew C. Freeman
Environmental Science & Technology 2017 51 (20), 11537-11552
2014-2018 CRYPTO 5 YEAR AVG RATE/100,000
2014-2018 RATES VS CATTLE INVENTORY

https://www.legis.iowa.gov/docs/publications/MOW/attachments/1045970_1647964.jpg
OTHER POSSIBLE CONTRIBUTING FACTORS

SURFACE WATER CONTAMINATION

• STRAIGHT PIPE SEPTIC
• WWTP DISCHARGE/TREATMENT PROCESS
• COMBINED SEWER SYSTEMS, SANITARY SEWER OVERFLOWS, BYPASSES
• RUNOFF/WATERSHED
• EXTREME WEATHER/SPILLS
• SUBSURFACE DRAINAGE (TILING)

GROUND WATER CONTAMINATION

• ABANDONED WELLS
• EXTREME WEATHER/FLOODED WELLS
• AGRICULTURAL DRAINAGE WELLS
• SEPTIC SYSTEMS
OTHER POSSIBLE CONTRIBUTING FACTORS

CONTAMINATION BY MECHANICAL VECTORS?

STUDIES INDICATE POSSIBILITY FOR TRANSMISSION BY FLIES

• Adult flies with access to a substrate containing C. parvum oocysts can transport these oocysts in their digestive tracts and on their external surfaces. A 3-day-exposure of flies to feces with oocysts resulted in deposition for next 8 days of an average of more than 100 oocysts/cm² of the surface visited by flies, and a single fly can carry on its external surface more than 200 oocysts.

• In temperate climates, there can be 10–12 fly generations in the summer. Winter usually ends the breeding cycle of the house fly. Individual flies can travel as far as 20 miles; however, the vast majority of flies do not travel more than 2 miles.

COMMUNICATION PATHS

- IDPH - Center for Acute Disease Epidemiology
- IDPH - Bureau of Environmental Health Services
- Local Public Health
- Local Environmental Health/Swimming Pool Contract Holder
- Patient
- Pool Facility
IOWA RULES

• IOWA SWIMMING POOL AND SPA RULES DO NOT DIRECTLY ADDRESS REQUIREMENTS FOR FECAL INCIDENT RESPONSE OR RESPONSE TO OUTBREAKS LINKED TO POOLS.

• ANY DIRECTION GIVEN TO SWIMMING POOLS WOULD BE IN THE FORM OF RECOMMENDATIONS BASED ON A REVIEW OF THE AVAILABLE INFORMATION.
ALL POOLS ARE VULNERABLE TO CONTAMINATION BY PATRONS

Recommendation: Permanently post important health information warning of the risks.

**Important Health Information**

Some people are more vulnerable to contaminants found in swimming pools and spas than the general population. Germs such as cryptosporidium can survive for days even in a properly disinfected pool and can cause serious illness. Immunocompromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, people with conditions treated with immunosuppressant drugs, pregnant women as well as some elderly, and infants may be particularly at risk from infections. These people should seek advice about swimming in public pools from their health care providers. The U.S. CDC (Centers for Disease Control and Prevention) has additional information on Healthy Swimming and Recreational Water Illnesses on their website at:

[https://www.cdc.gov/healthywater/swimming/index.html](https://www.cdc.gov/healthywater/swimming/index.html)

[https://www.cdc.gov/healthywater/swimming/swimmers/rwi.html](https://www.cdc.gov/healthywater/swimming/swimmers/rwi.html)
Recommendation: Post different swimming hygiene posters throughout the operation/season to encourage good swimmer hygiene.

https://www.cdc.gov/healthywater/swimming/materials/posters.html
RESPONDING TO FECAL INCIDENTS REDUCE RISKS

Recommendation: Follow CDC Fecal Incident Response Recommendations at the time of a fecal incident

SECONDARY DISINFECTION REDUCES RISKS

Recommendation: Use secondary disinfection systems (i.e. Ozone, UV) on recirculating spray pads and wading pools.

Increased Risk Aquatic Venues

However, there are some AQUATIC VENUES where the risk of acquiring a RWI is elevated (INCREASED RISK AQUATIC VENUES) due to either the use of the AQUATIC VENUE, or the users. THERAPY POOLS, for example, are often utilized by individuals with compromised immune systems and/or open wounds. The risk of acquiring an RWI is substantially increased under such circumstances. WADING POOLS are utilized by small children who may be in diapers. Incontinent infants and small children are likely to increase the contamination burden (e.g.: urine and feces) in the water, thereby creating an increased risk of disease to other users. In addition, cryptosporidiosis is more prevalent in younger children. INTERACTIVE WATER PLAY VENUES such as spray pads, fountains, and similar features are most often used by smaller children who are likely to increase the risk of water contamination occurring. They also may be more likely to suffer from more severe illness when they become infected.
Sunlight-driven photolysis of chlorine can produce extremely reactive oxygen species hydroxyl radicals (HO•) and O₃ dramatically enhancing the effectiveness of chlorine-based disinfection processes towards chlorine-resistant microorganisms.

CRYPTO OUTBREAK

- TWO OR MORE CASES MUST BE LINKED BY TIME, LOCATION, AND ILLNESS

- EPI EVIDENCE IMPLICATES THE WATER EXPOSURE AS PROBABLY SOURCE OF ILLNESS
TYPICAL TIMELINE

• INCUBATION PERIOD (TYP. 2-10 DAYS) AVG 7 DAYS AFTER EXPOSURE BEFORE SYMPTOMS DEVELOP

• GENERALLY LAB TESTS ARE NOT ORDERED TO IDENTIFY PATHOGEN UNTIL SYMPTOMATIC FOR 7 DAYS

• AFTER REPORT OF CASE IS ENTERED INTO REPORTING SYSTEM CASE INVESTIGATION IS ASSIGNED AND LPHA COLLECTING INFORMATION SUCH AS DATE OF ONSET AND RISK FACTORS/EXPOSURES

• CAN BE 3 WEEKS OR MORE AFTER EXPOSURE BEFORE A POSSIBLE OUTBREAK IS IDENTIFIED
RESPONSE

• EACH CASE IS REVIEWED INDIVIDUALLY

• ROUTINE HYPERCHLORINATION OR HYPERCHLORINATION IN RESPONSE TO A SINGLE CASE IS NOT TYPICALLY RECOMMENDED DUE TO CHALLENGES ASSOCIATED WITH HYPERCHLORINATION AND DELAYS ASSOCIATED WITH RECEIVING THE CASE REPORTS

• HYPERCHLORINATION MAY BE RECOMMENDED ON A CASE BY CASE BASIS IF EVIDENCE OF OUTBREAK IMPLICATING POOL AS PROBABLE SOURCE OF ILLNESS. (I.E. OUTBREAK IS ONGOING)
QUESTIONS, COMMENTS, OR SUGGESTIONS

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