Welcome to the

Model Aquatic Health Code Network Webinar

Response to a Spa-Related Outbreak of Legionnaire’s Disease
Featured Presenter: Tori Burket, Colorado State Department of Health

Tuesday, November 27, 2018

Join the MAHC Network! Email MAHCnet@naccho.org and request to be added to the mailing list.

Please use your computer speakers to listen to today’s presentation.

Questions may be submitted via the chat box.

We will begin at 1:00 PM Eastern.

Thank you for your interest and attendance!
CMAHC UPDATES:

- CMAHC Certification Program
- Chlorine Safety Video
- Change Request Submission and Comment Process
- Membership
CMAHC Certification Program

- Certifies that services or products comply with the relevant or applicable standards and procedures outlined in the MAHC (www.cmahc.org/cmahc-certification-program.php)
  - Includes a thorough product evaluation based on the MAHC content related to the specific product or service. Aquatic services and products must meet or exceed all applicable MAHC standards

- **Certified first product in September 2018**
  - Counsilman-Hunsaker “Facility Manager” web-based app.
    - C-H partnered with NSPF on app

- **Several other groups want CMAHC certification**
  - Operator Training, Lifeguard Training, other web-based apps.
CMAHC participated in an American Chemistry Council (ACC) effort to develop a training video to address prevention of unintended releases of chlorine gas

- Video-
  - “Preventing Unintended Chemical Injection”
    - [www.poolinterlocksafety.com](http://www.poolinterlocksafety.com)

Video is free and we encourage you to view it and distribute the link
CMAHC UPDATES

- Change Request Submission and Comment Process Now Open
  - https://cmahc.org/enter-change-request.php

- Renew your membership for the 2018-2020 Conference Cycle or join for the 1st time! (memberships expired Nov. 2017)
  - https://cmahc.org/membership-signup-form.php
First Mini-MAHC Available!

Reducing the Spread of Cryptosporidium

Online – CDC website
Downloadable PDFs
What Is a Mini MAHC?

- Partial Adoption
  - Addresses one particular issue
  - Supports á la carte adoption

- Specific Topic Areas
  - Focuses on how to fix or prevent

- Precision
  - zeroes in on the matter at hand

- Code Language and Annex
  - Reduces time spent examining the entire Code and Annex
Mini MAHC Intended Uses

- **Reactive**
  - Respond to an existing problem
  - Solutions to outbreak/injury/drowning investigations
  - Adjust current code

- **Proactive**
  - Prevent potential problems
  - Avoid future illness and/or injury
  - Address needs/gaps in current code
CDC Website/MAHC Site/The MAHC/Current Edition/Mini-MAHCs

- Code Language
  

- Annex
  
Outbreak of Legionnaires’ Disease Associated with a Colorado Hotel Hot Tub
Contact Info

Tori Burket, MS, CPO
Waterborne Disease Epidemiologist & Legionella Coordinator
Colorado Department of Public Health & Environment
Tori.Burket@state.co.us
Agenda

1. Pool inspections in Colorado
2. Hotel hot tub outbreak
3. Questions
THANK YOU

Jefferson County Public Health

Mitch Brown, Michael Lucero, and Jessa Woodward

Colorado Department of Public Health and Environment (Communicable Disease Branch)

Nisha Alden, Alicen Nelson, Alexis Burakoff, Emily Spence-Davizion, Karen Edge, Logan Stec, Melissa Lindt, Samie Stephens, and Ben White

Colorado Department of Public Health and Environment (Lab)

Skip Gossak, Shannon Matzinger, Joel Sevinsky, Emily Travanty, Hugh Maguire

Tri-County Health Department

Jillian Jaskunas

State Partners

Ellen Elaine (MDH) and Sandra Pena (NMDH)

Centers for Disease Control and Prevention

Chris Edens, Candis Hunter, Jasen Kunz, Jessica Smith, Claressa Lucas, Sooji Lee, and Natalia Kozak-Muiznieks
Recreational water inspections in Colorado

5 CCR 1003-5, Swimming Pool and Mineral Bath Regulations

1. Not all public health agencies in Colorado have environmental health programs or perform routine pool inspections.

2. Facilities are characterized as either private (not inspected), semi-public, or public.

3. Semi-public and public facilities are required to adhere to state regulations at all times, even if they are not routinely inspected.
Few critical violations that require immediate closure of a facility

- Elevated bacterial or fecal coliform levels
- Out of range chlorine or pH
- Turbidity issues related to main drain visibility
The Outbreak!
First Investigation

- May 10, 2016- notified of the first case; MN resident.
- November 29, 2016- Notified of the second case; CO resident.
- December 1, 2016- First environmental investigation conducted at the facility. Pool/hot tub closed.
### Environmental Sampling Round 1

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Culture Result</th>
<th>Sample Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>Pool water</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>Pool water line swab</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>Pool filter basket swab</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>Pool pump swab</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>Hot tub water</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Culture Result</th>
<th>Sample Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>-</td>
<td>Hot tub water line swab</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>Hot tub jet swab</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>Hot tub pump swab</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>Guest room jacuzzi swab</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>Pool shower swab</td>
</tr>
</tbody>
</table>
Round 1 Pictures
Second Investigation

• April 3, 2017- at 6:00 am the pool and hot tub are routinely inspected and both are closed due to multiple critical violations of state code. At 12:00 pm, CDPHE is notified of a third case associated with this facility; NM resident.

• April 4, 2017- Second environmental investigation conducted.
# Environmental Sampling Round 2

<table>
<thead>
<tr>
<th>Sample #</th>
<th>PCR Result</th>
<th>Culture Result</th>
<th>Sample Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>+</td>
<td>Hot tub water</td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>-</td>
<td>Pool water</td>
</tr>
<tr>
<td>3</td>
<td>+</td>
<td>+</td>
<td>Hot tub jet swab #1</td>
</tr>
<tr>
<td>4</td>
<td>+</td>
<td>+</td>
<td>Hot tub jet swab #2</td>
</tr>
<tr>
<td>5</td>
<td>+</td>
<td>-</td>
<td>Hot tub water line swab #1</td>
</tr>
<tr>
<td>6</td>
<td>+</td>
<td>-</td>
<td>Hot tub water line swab #2</td>
</tr>
<tr>
<td>7</td>
<td>+</td>
<td>-</td>
<td>Pool water line swab #1</td>
</tr>
<tr>
<td>8</td>
<td>+</td>
<td>-</td>
<td>Pool water line swab #2</td>
</tr>
<tr>
<td>9</td>
<td>+</td>
<td>-</td>
<td>Rear air vent swab</td>
</tr>
<tr>
<td>10</td>
<td>+</td>
<td>+</td>
<td>Hot tub filter basket swab</td>
</tr>
<tr>
<td>11</td>
<td>+</td>
<td>-</td>
<td>Pool filter basket swab</td>
</tr>
<tr>
<td>12</td>
<td>+</td>
<td>-</td>
<td>Front air vent swab</td>
</tr>
<tr>
<td>13</td>
<td>+</td>
<td>+</td>
<td>Hot tub pump swab</td>
</tr>
<tr>
<td>14</td>
<td>+</td>
<td>-</td>
<td>Pool pump swab</td>
</tr>
</tbody>
</table>

*All 19 potable water samples were negative through both PCR and culture*
Round 2 Pictures
Hotel Pool Inspection History

Consistent closures due to critical violations of the Colorado Swimming Pool and Mineral Bath Regulation

• 4/4 (100%) failed inspections between February 2016 and April 2017
Inspection Violation History

February 2016
- Spa ph too high and visible debris
- No CPO on staff
- Maintenance records not maintained
- Flow meter not functioning
- Pool disinfectant greater than allowable limit

October 2016
- No CPO on staff
- Maintenance records not maintained
- Flow meter not functioning

June 2016
- Flow meter not functioning
- Maintenance records not maintained
- No CPO on staff

April 2017
- Spa ph too low
- Pool had no detectable disinfectant (Cl)
- Alkalinity too low in pool and spa
- No CPO on staff
- Maintenance records not maintained
- Flow meter not functioning
Epidemiologic Investigation

Epi-X Report
1. Report released on April 10, 2017 through the Epidemic Information Exchange (Epi-X) facilitated by the CDC
2. Notified other counties and states about this exposure

Guest Notification
1. Received contact information for 177 guests that had recently stayed at the hotel (March 3-April 3, 2017)
2. 152/177 guests were able to be contacted
3. No additional confirmed cases were found
   • 3 suspect cases identified that developed pneumonia within 14 days of exposure to the pool or hot tub
# Case Information

<table>
<thead>
<tr>
<th>Patients</th>
<th>Sex</th>
<th>Age</th>
<th>Symptom Onset</th>
<th>Case Definition</th>
<th>Used Hot Tub</th>
<th>Used Shower</th>
<th>Hospitalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Male</td>
<td>63</td>
<td>4/27/2016</td>
<td>Confirmed</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Case 2</td>
<td>Female</td>
<td>63</td>
<td>10/23/2016</td>
<td>Confirmed</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Case 3</td>
<td>Female</td>
<td>45</td>
<td>03/12/2017</td>
<td>Confirmed</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Environmental Remediation

- Mitigation
  - Complete disinfection of the system

- Follow-up testing
  - 6 month re-testing schedule
Mitigation Requirements

1. Drain hot tub (voluntarily drained the pool)

2. Scrub all hot tub and pool surfaces, skimming devices, jets, and circulation components with disinfectant

3. Replace sand filter media and service sand filter unit

4. Inspect for and fix broken or poorly functioning components

5. Refill and superhalogenate water in hot tub and pool

6. Disinfect and/or replace both air filters
Post-Mitigation Pictures
Follow-Up Testing

6 month re-testing schedule

- Sampling every 2 weeks for 3 months and then
- Sampling once a month for 3 months

Conditions for re-opening

- Negative *Legionella* culture test results
- Pass inspection by JCPH

Conditions for closure

- Any positive *Legionella* culture test results
- Fail inspection by JCPH

- Failed initial inspection after mitigation resulting in delayed opening
- Positive samples found at the end of September
- Failed another inspection at the end of July
Challenges

Communication & Protocol

• Informing about why we were conducting an investigation
  ▪ Response to confirmed illness, not complaints
• Reiterating the overall process and requirements
  ▪ Ensuring proper procedures were followed
• Disagreement over investigation methods
  ▪ Difficulty obtaining guest information
  ▪ Messaging to guests

Knowledge

• Education about *Legionella* and the public health impact
  ▪ All 3 cases were hospitalized
• CPO rarely, if ever, on site
  ▪ No one on staff who understood recreational water risks and operational standards
• Inspection history considerations and improvements
Conclusions

Strong evidence of association
• All 3 cases reported exposure to the hot tub
• Environmental sampling indicated presence of *Legionella pneumophila* SG1
• Past inspection reports showed consistent occurrence of critical violations to the state code, especially related to disinfection levels

Collaboration is key
• All 3 cases lived in different states, so this investigation hinged upon thorough case interviews and multi-state collaboration
• Collaboration within our own state between JCPH, TCHD, and CDPHE
• CDC consultation and whole genome sequencing lab analyses

Motivation to improve Colorado pool regulations
• Current regulations have no incentive for adherence
Questions?
How can NACCHO facilitate a professional network around MAHC implementation?

Idea:

• Create an online community for professionals working in aquatic health and safety—specifically, those who are interested in **locally** implementing the Model Aquatic Health Code in part or in whole.
Virtual Communities

Capabilities:

• Discussion boards
  – Asking questions
  – Requesting resources

• Announcements, discussions, etc.
  – Email notification – sent at end of day

• Post files and media
  – Potential for Network leadership to have access
What features would you use most?
What kind of discussion topics would you like to participate in?
Thank you!

Contact Information

ENVIRONMENTAL HEALTH PROGRAM

Grace McClain
PROGRAM ANALYST

202-507-4267 /
gmcclain@naccho.org

Archived Model Aquatic Health Code Network Webinars

Model Aquatic Health Code Resources

Colorado Swimming Pool & Mineral Bath Regulations Revision Work Group