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!

NACCHO
National Association of County & City Health Officials

MAHC NETWORK
CMAHC UPDATES

November 27, 2018

Douglas Sackett,
Executive Director
Council for the Model Aquatic Health Code

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

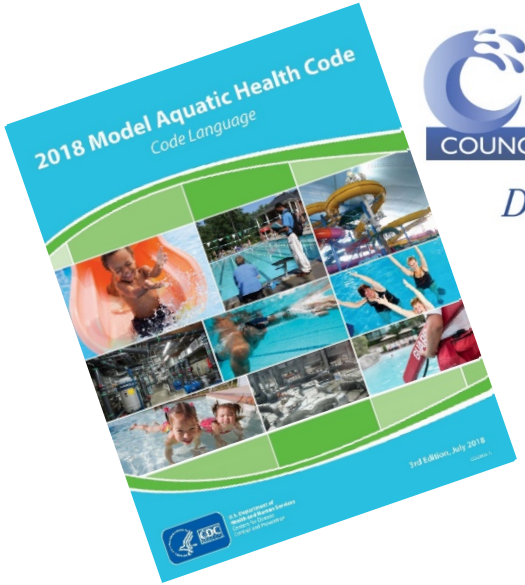
- **Video-**
  - **“Preventing Unintended Chemical Injection”**
    - www.poolinterlocksafety.com

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

CMAHC UPDATES

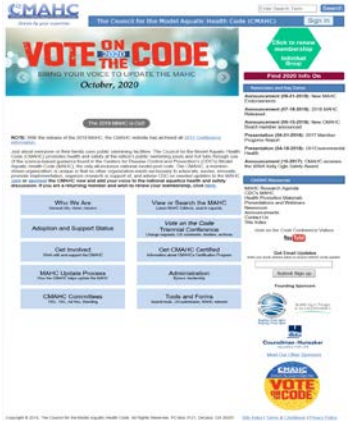
- Change Request Submission and Comment Process Now Open
  - https://cmahc.org/enter-change-request.php

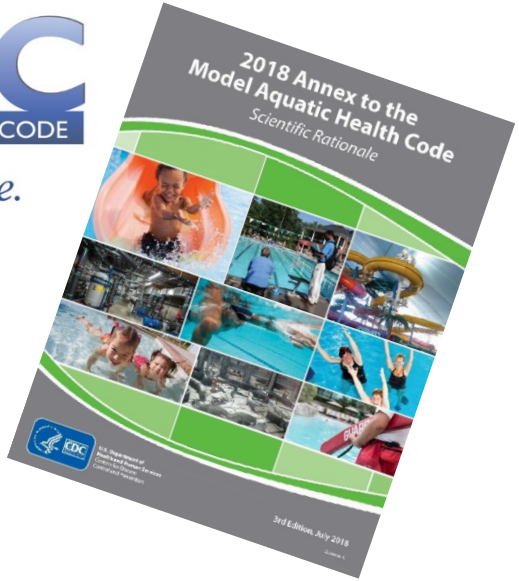
- Renew your membership for the 2018-2020 Conference Cycle or join for the 1st time! (memberships expired Nov. 2017)
  - https://cmahc.org/membership-signup-form.php



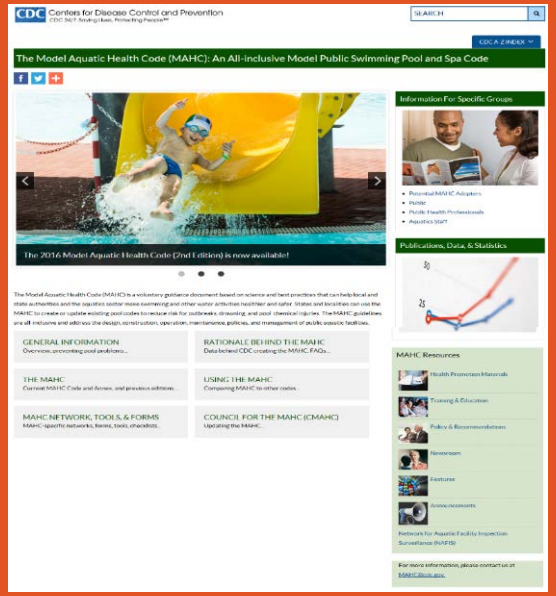
CMAHC
COUNCIL for the MODEL AQUATIC HEALTH CODE

Driven by your expertise.





MAHC
More Information: Search on "CDC MAHC" or visit the Healthy Swimming MAHC Website: www.cdc.gov/mahc
Email: mahc@cdc.gov



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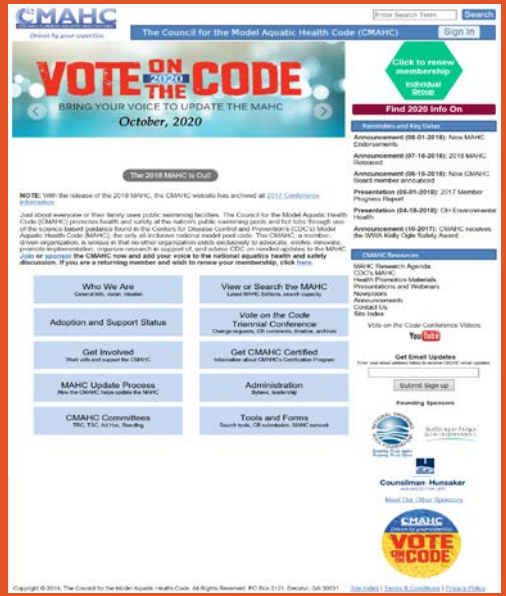
More Information: Search on "CMAHC" or visit the CMAHC Website: www.cmahc.org
Email: info@cmahc.org



Contact Information

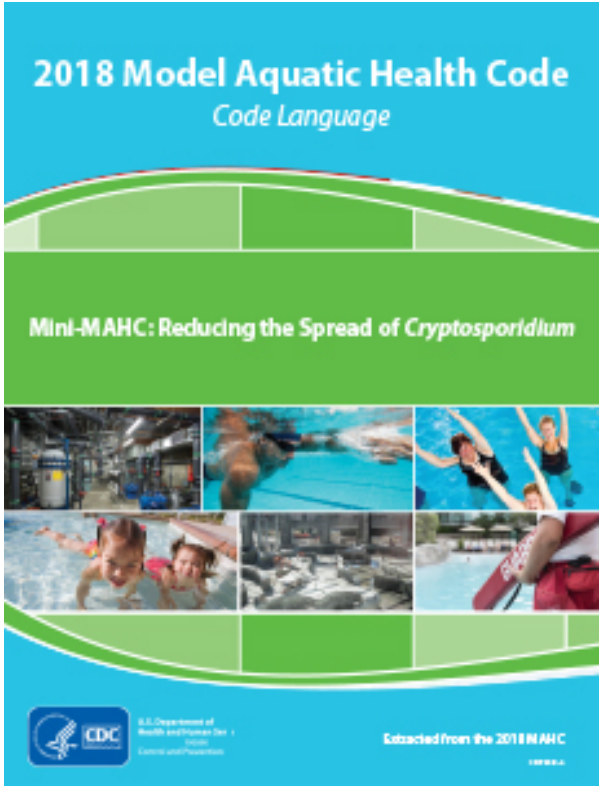
Doug Sackett
Executive Director, CMAHC
E-mail: DouglasSackett@cmahc.org
Phone: 678-221-7218

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**

https://www.cdc.gov/mahc/pdf/Mini-MAHC-Code-Crypto-Prevention-508.pdf

- **Annex**

https://www.cdc.gov/mahc/pdf/Mini-MAHC-Annex-Crypto-Prevention-508.pdf

Outbreak of Legionnaires' Disease Associated with a Colorado Hotel Hot Tub

CDPHE
COLORADO
Department of Public Health & Environment

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-Davizon, 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

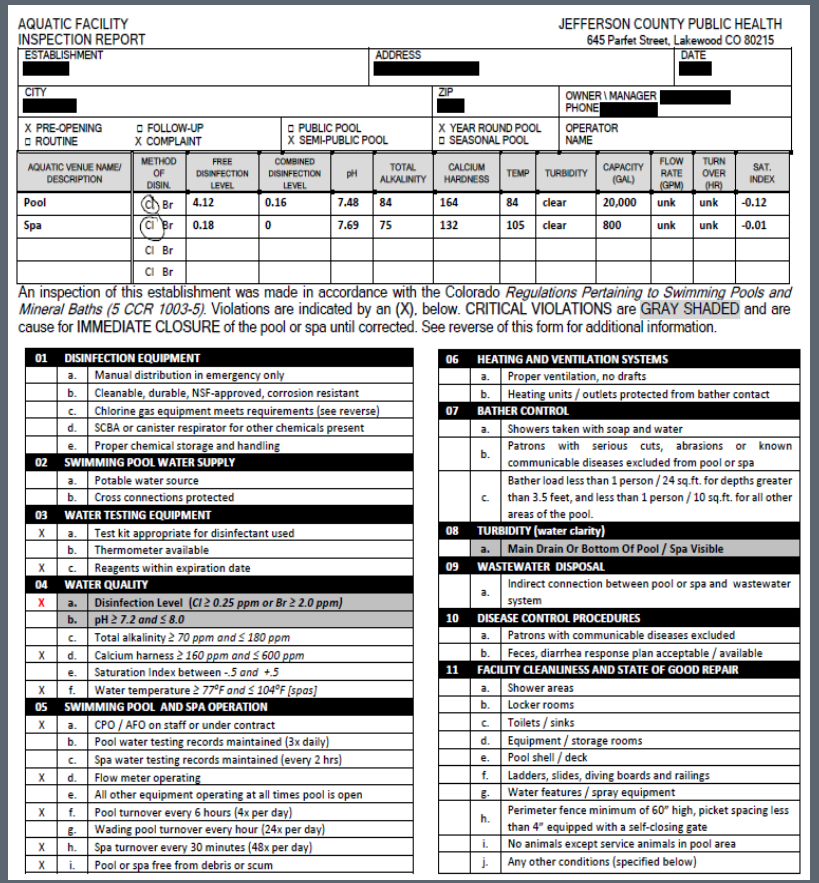
Recreational water inspections in Colorado

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.



AQUATIC FACILITY
INSPECTION REPORT

JEFFERSON COUNTY PUBLIC HEALTH
645 Parfet Street, Lakewood CO 80215

ESTABLISHMENT [redacted]	ADDRESS [redacted]	DATE [redacted]
CITY [redacted]	ZIP [redacted]	OWNER \ MANAGER [redacted] PHONE [redacted]
X PRE-OPENING □ ROUTINE	□ FOLLOW-UP X COMPLAINT	□ PUBLIC POOL X SEMI-PUBLIC POOL	X YEAR ROUND POOL □ SEASONAL POOL	OPERATOR NAME

AQUATIC VENUE NAME/ DESCRIPTION	METHOD OF DISIN.	FREE DISINFECTION LEVEL	COMBINED DISINFECTION LEVEL	pH	TOTAL ALKALINITY	CALCIUM HARDNESS	TEMP	TURBIDITY	CAPACITY (GAL)	FLOW RATE (GPM)	TURN OVER (HR)	SAT. INDEX
Pool	(Cl) Br	4.12	0.16	7.48	84	164	84	clear	20,000	unk	unk	-0.12
Spa	(Cl) Br	0.18	0	7.69	75	132	105	clear	800	unk	unk	-0.01
	Cl Br											
	Cl Br											

An inspection of this establishment was made in accordance with the Colorado *Regulations Pertaining to Swimming Pools and Mineral Baths (5 CCR 1003-5)*. Violations are indicated by an (X), below. CRITICAL VIOLATIONS are GRAY SHADED and are cause for IMMEDIATE CLOSURE of the pool or spa until corrected. See reverse of this form for additional information.

01	**DISINFECTION EQUIPMENT**	
	a.	Manual distribution in emergency only
	b.	Cleanable, durable, NSF-approved, corrosion resistant
	c.	Chlorine gas equipment meets requirements (see reverse)
	d.	SCBA or canister respirator for other chemicals present
	e.	Proper chemical storage and handling
02	**SWIMMING POOL WATER SUPPLY**	
	a.	Potable water source
	b.	Cross connections protected
03	**WATER TESTING EQUIPMENT**	
X	a.	Test kit appropriate for disinfectant used
	b.	Thermometer available
X	c.	Reagents within expiration date
04	**WATER QUALITY**	
X	a.	Disinfection Level *(Cl ≥ 0.25 ppm or Br ≥ 2.0 ppm)*
	b.	*pH ≥ 7.2 and ≤ 8.0*
	c.	Total alkalinity *≥ 70 ppm and ≤ 180 ppm*
X	d.	Calcium harness *≥ 160 ppm and ≤ 600 ppm*
	e.	Saturation Index between *-.5 and +.5*
X	f.	Water temperature *≥ 77°F and ≤ 104°F [spas]*
05	**SWIMMING POOL AND SPA OPERATION**	
X	a.	CPO / AFO on staff or under contract
	b.	Pool water testing records maintained (3x daily)
	c.	Spa water testing records maintained (every 2 hrs)
X	d.	Flow meter operating
	e.	All other equipment operating at all times pool is open
X	f.	Pool turnover every 6 hours (4x per day)
	g.	Wading pool turnover every hour (24x per day)
X	h.	Spa turnover every 30 minutes (48x per day)
X	i.	Pool or spa free from debris or scum

06	**HEATING AND VENTILATION SYSTEMS**	
	a.	Proper ventilation, no drafts
	b.	Heating units / outlets protected from bather contact
07	**BATHER CONTROL**	
	a.	Showers taken with soap and water
	b.	Patrons with serious cuts, abrasions or known communicable diseases excluded from pool or spa
	c.	Bather load less than 1 person / 24 sq.ft. for depths greater than 3.5 feet, and less than 1 person / 10 sq.ft. for all other areas of the pool.
08	**TURBIDITY (water clarity)**	
	a.	Main Drain Or Bottom Of Pool / Spa Visible
09	**WASTEWATER DISPOSAL**	
	a.	Indirect connection between pool or spa and wastewater system
10	**DISEASE CONTROL PROCEDURES**	
	a.	Patrons with communicable diseases excluded
	b.	Feces, diarrhea response plan acceptable / available
11	**FACILITY CLEANLINESS AND STATE OF GOOD REPAIR**	
	a.	Shower areas
	b.	Locker rooms
	c.	Toilets / sinks
	d.	Equipment / storage rooms
	e.	Pool shell / deck
	f.	Ladders, slides, diving boards and railings
	g.	Water features / spray equipment
	h.	Perimeter fence minimum of 60" high, picket spacing less than 4" equipped with a self-closing gate
	i.	No animals except service animals in pool area
	j.	Any other conditions (specified below)

Inspection Report

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

COLORADO

The Outbreak!

CDPHE
COLORADO
Department of Public Health & Environment

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.

Epidemiologists play the new CDC edition of Clue®

Environmental Sampling Round 1

Sample #	Culture Result	Sample Location
1	-	Pool water
2	-	Pool water line swab
3	-	Pool filter basket swab
4	-	Pool pump swab
5	-	Hot tub water

Sample #	Culture Result	Sample Location
6	-	Hot tub water line swab
7	-	Hot tub jet swab
8	-	Hot tub pump swab
9	-	Guest room jacuzzi swab
10	-	Pool shower swab

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

Sample #	PCR Result	Culture Result	Sample Location
1	+	+	**Hot tub water**
2	+	-	Pool water
3	+	+	**Hot tub jet swab #1**
4	+	+	**Hot tub jet swab #2**
5	+	-	Hot tub water line swab #1
6	+	-	Hot tub water line swab #2
7	+	-	Pool water line swab #1

Sample #	PCR Result	Culture Result	Sample Location
8	+	-	Pool water line swab #2
9	+	-	Rear air vent swab
10	+	+	**Hot tub filter basket swab**
11	+	-	Pool filter basket swab
12	+	-	Front air vent swab
13	+	+	**Hot tub pump swab**
14	+	-	Pool pump swab

*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

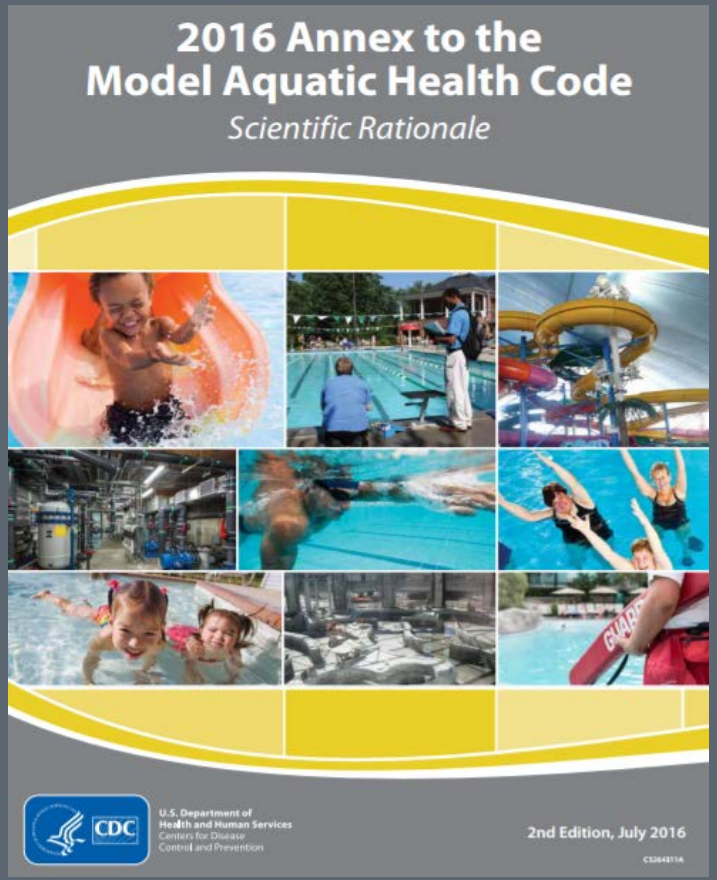
1. Report released on April 10, 2017 through the Epidemic Information Exchange (Epi-X) facilitated by the CDC
2. Notified other counties and states about this exposure

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

Patients	Sex	Age	Symptom onset	Case definition	Used hot tub	Used shower	Hospitalized
Case 1	Male	63	4/27/2016	Confirmed	Yes	Yes	Yes
Case 2	Female	63	10/23/2016	Confirmed	Yes	Yes	Yes
Case 3	Female	45	03/12/2017	Confirmed	Yes	Yes	Yes



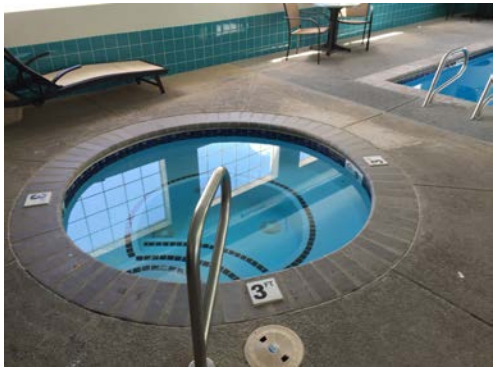
Environmental Remediation

- **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

Failed initial inspection after mitigation resulting in delayed opening

Positive samples found at the end of September

Conditions for closure

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

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

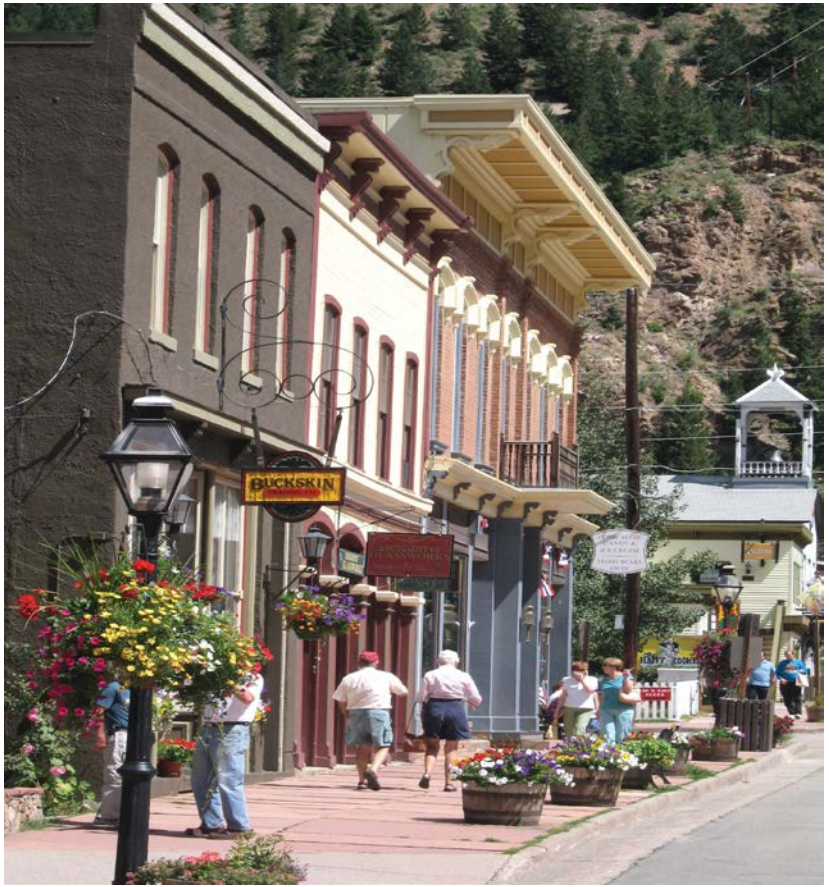
- All 3 cases reported exposure to the hot tub
- Environmental sampling indicated presence of *Legionella pneumophila* SG1
- Past inspection reports showed consistent occurrence of critical violations to the state code, especially related to disinfection levels

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


BUCKSKIN

Questions?

How can NACCHO facilitate a professional network around MAHC implementation?

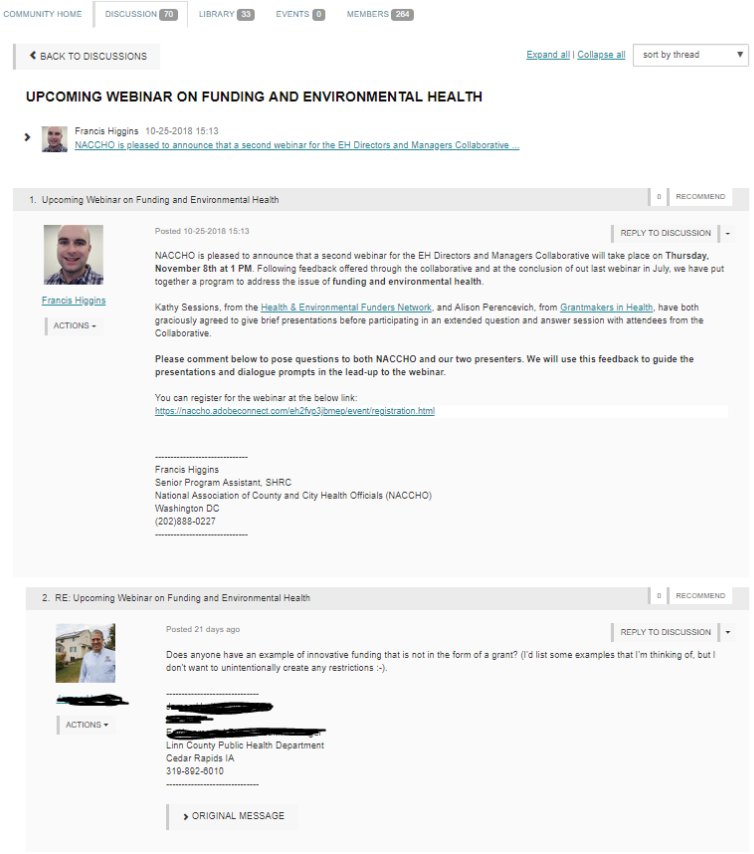
Idea:

- 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



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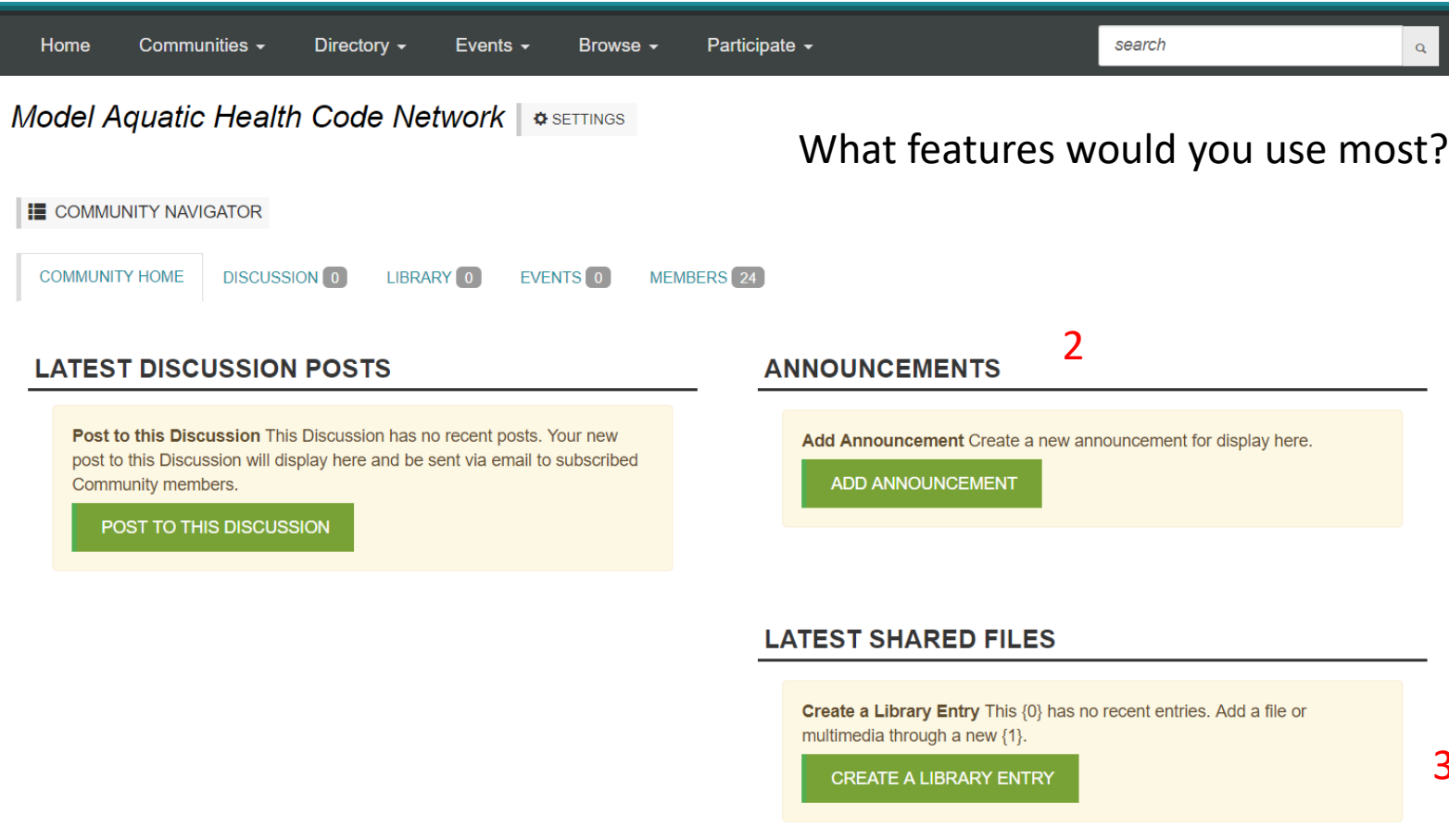
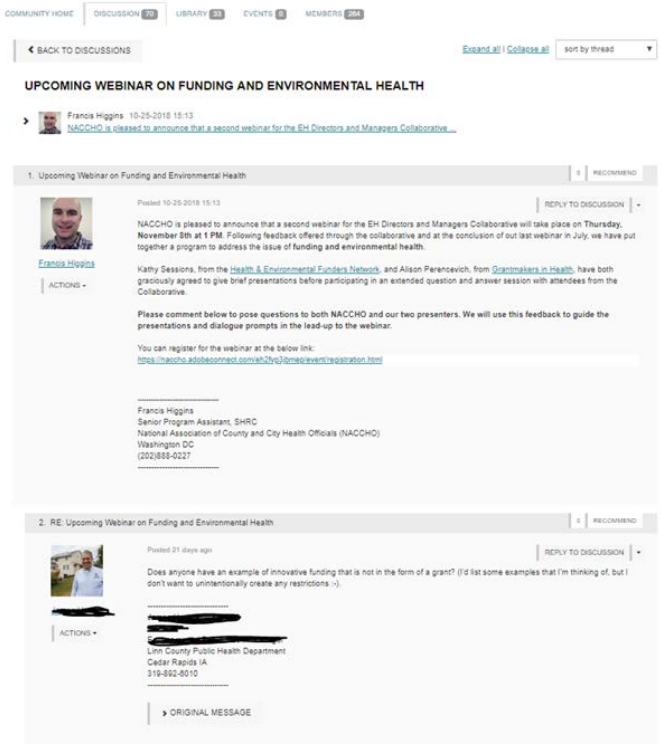
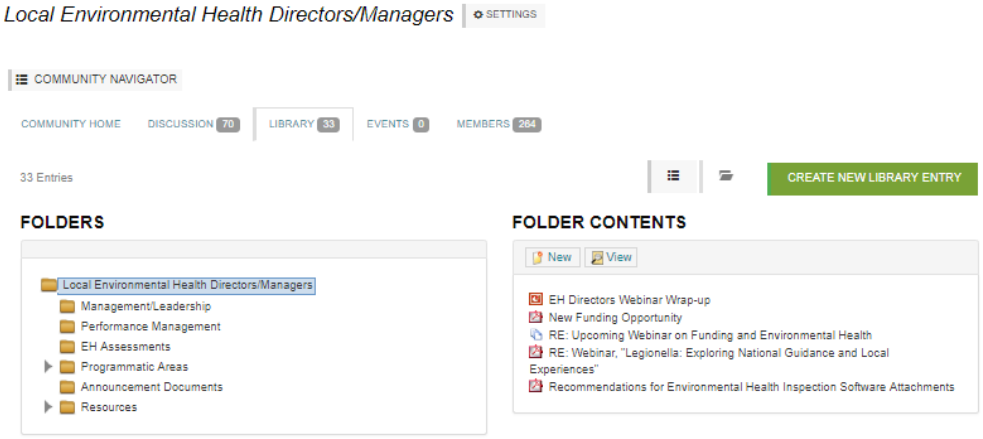

Home
Communities
Directory
Events
Browse
Participate
search
Model Aquatic Health Code Network
SETTINGS
What features would you use most?
COMMUNITY NAVIGATOR
COMMUNITY HOME
DISCUSSION 0
LIBRARY 0
EVENTS 0
MEMBERS 24
1
LATEST DISCUSSION POSTS
Post to this Discussion This Discussion has no recent posts. Your new post to this Discussion will display here and be sent via email to subscribed Community members.
POST TO THIS DISCUSSION
2
ANNOUNCEMENTS
Add Announcement Create a new announcement for display here.
ADD ANNOUNCEMENT
LATEST SHARED FILES
Create a Library Entry This {0} has no recent entries. Add a file or multimedia through a new {1}.
CREATE A LIBRARY ENTRY
3

What kind of discussion topics would you like to participate in?





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Thank you!

REGISTER TODAY

MAHC Network May 2018 Webinar

"New CDC Resources for Healthy & Safe Swimming Week"

WATCH NOW

Watch the MAHC's January Webinar

Webinar Title, "Cyanuric Acid: It's Not Just About Crypto"

BECOME A MEMBER

Join the MAHC Network today!

To join, please send your name and affiliation to mahcnet@naccho.org.

Archived Model Aquatic Health Code Network Webinars ⊕

Model Aquatic Health Code Resources ⊕

Colorado Swimming Pool & Mineral Bath Regulations Revision Work Group ⊕

Contact Information

ENVIRONMENTAL HEALTH PROGRAM

Grace McClain

PROGRAM ANALYST

202-507-4267 /
gmcclain@naccho.org

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