



**Lorain County  
Public Health**

For the Health of Us All

# *Legionella* Outbreak Associated with a Hotel Spa

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ODH Midwest Workshop: March 26, 2019

# Initial Notification from Ohio Department of Health (ODH)

- December 11, 2018
  - Lorain County Public Health (LCPH) was contacted by ODH
    - Informed of a Case of *Legionella* with possible connection to a spa at “HOTEL A”
    - Also informed that this was the 3<sup>rd</sup> Case of *Legionella* possibly connected to the spa since March 2017

# Assembled Investigative Team

- Internal meeting held the same day
  - Team:
    - Jami Krugman, Epi/Communicable Disease Nurse
    - Kathleen Grella, RN, Epi (in-training)
    - John Sabo, R.S., M.P.H., Epi/Informatics
    - John Harbeck, R.S., Sanitarian
    - Dave Oakes, R.S., M.P.H., Supervisor
    - Jill Lis, R.S., Director
    - Dave Covell, R.S., M.P.H., Health Commissioner

# Initial Tasks – File Review

- “Hotel A” opened in July 2013
- History of Critical Violations
- History of lack of oversight and proper operation and maintenance

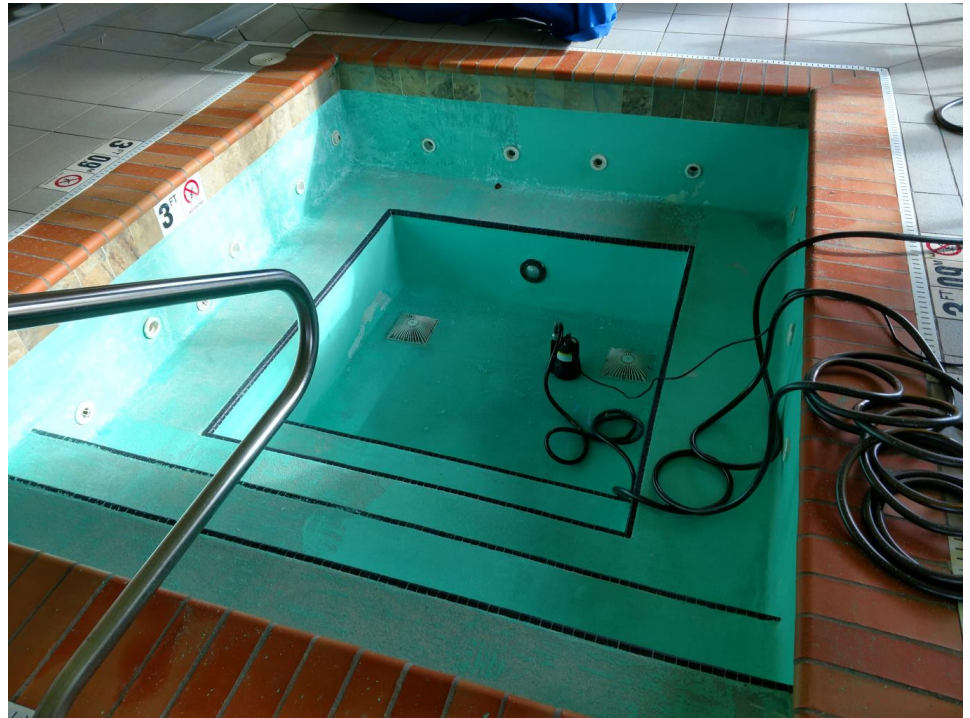


# Critical Violations - Spa

- 40 overall inspections conducted since “HOTEL A” opened in 2013
  - 8 inspections found the spa to be already closed for repairs, etc.
  - 9 inspections conducted resulted in the spa being closed by management
    - No residual chlorine
    - pH out of range
    - UV disinfection not working
  - Common themes of lack of record keeping and low flow rate

# Spa Characteristics

- Sand filter
- Chlorine disinfection via salt generator
- UV disinfection, secondary
- Internal surface had significant paint pitting and chipping – signs of poor water chemistry



# Most Recent Inspections – Leading up to Outbreak Notification

- 11-2-18
  - Routine inspection
  - Spa found closed at the time of inspection for repairs
- 12-4-18
  - No Chlorine, UV inoperable
  - Low alkalinity, low flow
  - Spa closed by management – not to open until re-inspection conducted by LCPH

# Initial Tasks – Review Info from ODH

Legionella - Environmental

https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/Legionella-Environmental/legionella-environmental-welcome

Apps iGoogle Lenovo Recommen... Lorain County Gene... LCGHD Timesystem LCGHD - Daily Syst... Google Sign in - Google Ac... Ohio Department o... USGS Sharepoint


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Department of Health

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A-Z INDEX ? Q

ODH / Know Our Programs / Legionella-Environmental / Legionella - Environmental

  
Legionella-Environmental

WELCOME

RESOURCES



**Legionella - Environmental**

*Managing a large building water system for Legionella management and prevention. Reports of Legionnaires' disease in Ohio are increasing*

Windows taskbar: Chrome, File Explorer, VLC, OneDrive, PowerPoint, Access, System tray (100% battery, 2:44 PM 3/17/2019)



# Initial Tasks – Review Info from CDC

The screenshot shows a web browser window with the URL <https://www.cdc.gov/legionella/health-depts/environmental-inv-resources.html>. The page features the CDC logo and the text "Centers for Disease Control and Prevention CDC 24/7: Saving Lives, Protecting People™". A search bar is located in the top right corner. The main heading is "Legionella (Legionnaires' Disease and Pontiac Fever)". Below this, a breadcrumb trail reads "CDC > Legionella Home > For Health Departments". The left sidebar contains a "Legionella Home" section with links to "About the Disease", "Fast Facts", "For Clinicians", "For Health Departments" (selected), "Surveillance & Reporting Resources", and "Epidemiology Resources". The main content area is titled "Environmental Investigation Resources" and "Assessment and Sampling". It states: "The following environmental assessment and sampling tools are available to assist in the environmental component of Legionnaires' disease outbreak investigations." Two links are listed: [Legionella Environmental Assessment Form](#) [13 pages] (UPDATED June 2015) and [CDC Sampling Procedure and Potential Sampling Sites](#) [6 pages]. A sidebar on the right titled "Environmental Investigation Videos" shows a video thumbnail of two people in a laboratory setting. The Windows taskbar at the bottom displays various application icons and system status information, including the date and time (6:51 PM 3/13/2019).

CDC Legionella Environmental Investigation Resources

Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™

Search

[A-Z Index](#)

**Legionella (Legionnaires' Disease and Pontiac Fever)**

CDC > Legionella Home > For Health Departments

[Legionella Home](#)

- About the Disease +
- Fast Facts
- For Clinicians +
- For Health Departments -**
  - Surveillance & Reporting Resources +
  - Epidemiology Resources +

## Environmental Investigation Resources

### Assessment and Sampling

The following environmental assessment and sampling tools are available to assist in the environmental component of Legionnaires' disease outbreak investigations.

- [Legionella Environmental Assessment Form](#) [13 pages] (UPDATED June 2015)  
Use this form to document a facility's water systems, help determine whether to conduct *Legionella* environmental sampling, and, if so, develop a sampling plan.
- [CDC Sampling Procedure and Potential Sampling Sites](#) [6 pages]

### Environmental Investigation Videos

# Initial Site Visit: 12-12-18

- LCPH staff went to “HOTEL A” to notify management of the outbreak and to begin the site investigation
- Got the run-around
  - Hotel desk staffed by a random staff member
    - Called the hotel manager
      - It was her day off and she did not want to speak with us or come in to meet with us
    - Called Sales Rep – she was off as well, but did come in to meet with us.
      - Not very knowledgeable about overall facility
      - No one else available to assist with a full site visit

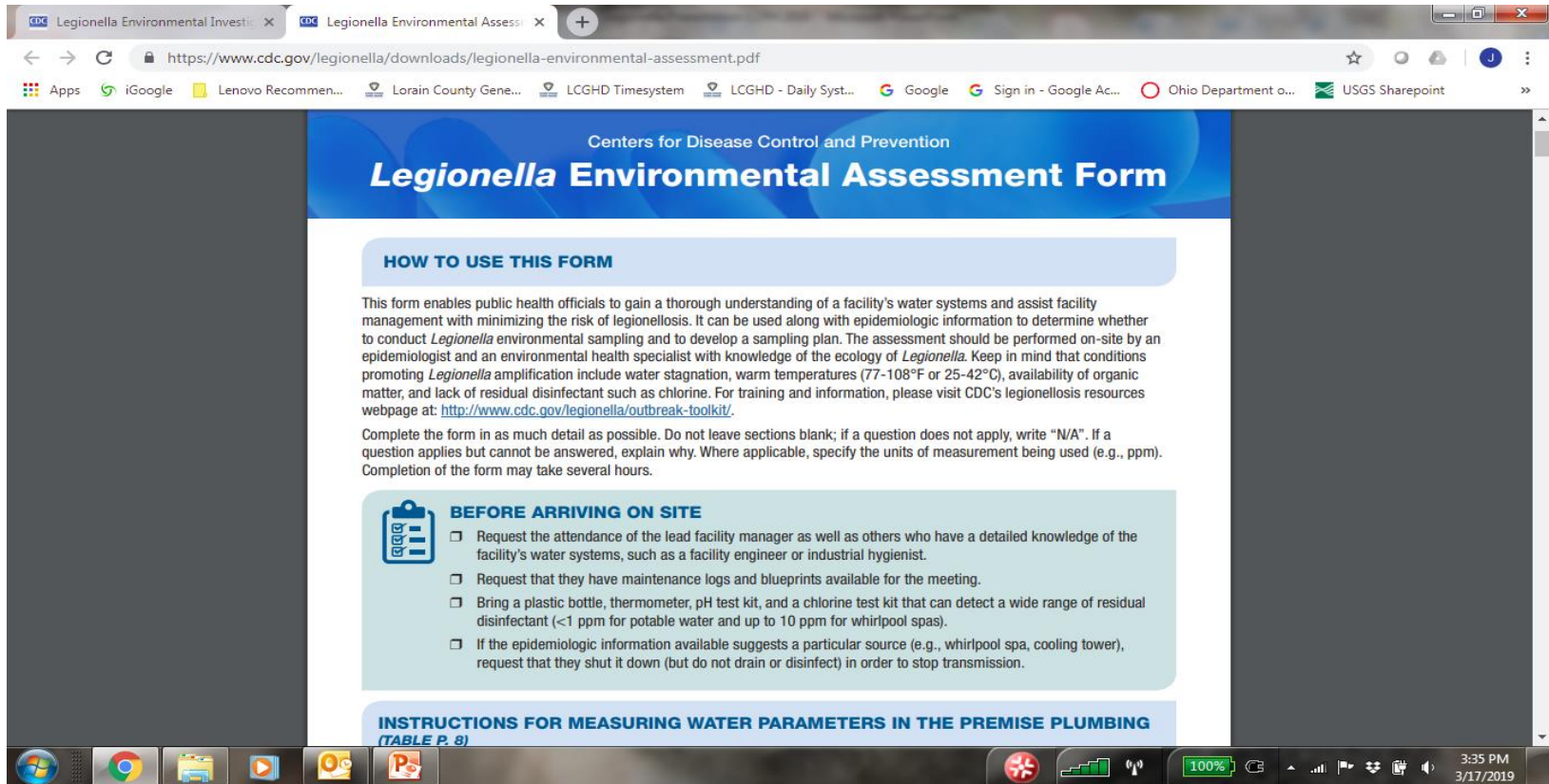
# Initial Site Visit Cont...

- Remember:
  - 12-4-18 inspection resulted in the spa being closed
  - We had received no contact from “HOTEL A” that they were ready for a re-inspection
    - But we also did not know with confirmation that any guests had used the spa. It was supposed to be closed.
    - Checked disinfection levels in both the spa and pool - none
    - Immediately had hotel staff close the pool and spa “again” and post signage.

# Need Arose to Contact Hotel Owner

- Team informed Health Commissioner (HC) about the lack of cooperation at the Hotel from the General Mgr.
  - HC made contact with the owner
    - Out of the country
    - Had been made aware of our visit by hotel staff, but was not made aware of how serious it was
    - Provided contact information for his daughter that would be able to assist us
  - HC contacted owner's daughter
    - *"If the building is burning down, who do you call? It's that serious."*

# Site Visit “Take 2”: 12-13-18



- Team went back to “HOTEL A”
- Conducted CDC *Legionella* Environmental Assessment

# Environmental Assessment Team

- Consisted of:
  - LCPH investigation team
  - Hotel staff (Group Sales Manager)
  - Maintenance staff
    - Was on-site, but was not familiar with the building specifics, or water distribution systems, and was also not interested in learning about them

# Facility Characteristics

- Hotel, 97 rooms, 4 floors
- Occupancy varies – winter lowest
- Emergency water systems
  - Fire sprinklers, safety shower, eye wash station
    - Eye wash station inaccessible – chemicals stored in it
- No centralized humidification
  - Individual room HVAC systems, discharge humidity to the outside
- No water safety plan or *Legionella* prevention plan

# Water Supply Source

- Municipal Water
- Chlorine disinfection
- No history of pressure drops, boil advisories, or disruption in service
- Hotel does not monitor incoming water parameters



# Premise Plumbing System

- No recirculation system to ensure there is a constant hot water supply flowing through the piping
- 4 hot water tanks/boilers
  - Used on demand
  - Temperature settings: 155, 152, 155, and 160 °F
  - Not cleaned/drained on a regular basis
- Water temperatures NOT monitored by facility
  - Comment made by hotel staff about guest complaints about not enough hot water available

# Water Temperatures & Disinfection

- Team measured maximum hot water temperatures in various locations

- Lobby bathroom: 124.2 °F
- Pool room bathroom: 105.2 °F
- Room 113: 123 °F
- Room 215: 122.3 °F
- Room 327: 131 °F
- Room 414: 127 °F

**Temperatures observed were much lower than temperature settings on boilers**

- Measured residual chlorine with test kit : OK

# Spa Information (CDC Assessment)

- Spa maintenance performed by hotel manager or other staff
  - Staff turnover has been a problem
- Sand filter
- Salt generator
- Unknown dates of last backwash or filter change
- Not operating as designed or in good repair

# Other Features: Ice Makers & Dispensers

- 1 ice machine on each of the 4 floors
- Last filter change in 2016
  - Hotel opened in 2013
  - All 4 ice machines had visible mold growth and scum
- All ice machines were immediately taken out of service and signage was put on them

# Inspection of Pool and Spa

- An abbreviated inspection was done day prior
  - Closed – no disinfection
- Conducted full inspection in conjunction with the CDC Environmental Assessment and so it was an active part of the investigation

# Review of Assessment Findings and Next Steps

- LCPH team returned to the office and reviewed the facility assessment
  - Concerned about spa
  - Somewhat concerned about water temperature in boiler/water distribution system, but disinfection ok
- Then, ODH informed LCPH of 2 additional cases with an association to “HOTEL A” and potential spa usage

# ODH Alerts: OPHCS, Epi-X

"This is an ALERT"

- Lorain County Public Health is investigating two cases of Legionnaires' disease who had both been to a hotel in Elyria, OH. Both are confirmed cases. The first one, an Ohio resident, stayed there November 17-18, 2018 and had onset of illness November 22, 2018. The second one, a KY resident, stayed there November 21-24, 2018 and had onset of illness November 25, 2018.
- Please review your Legionnaires' disease cases, especially those with onset October 2018 to the present, for any cases with travel to the Elyria or Lorain, OH area in the ten days prior to onset. Please report these cases to Kathy Grella, by email at [kgrella@loraincountyhealth.com](mailto:kgrella@loraincountyhealth.com) or by telephone at 440-322-6367.

## Remember: Most Recent Inspections – Leading up to Outbreak Notification

- 11-2-18
  - Routine inspection
  - Spa found closed at the time of inspection for repairs
- 12-4-18
  - No Chlorine, UV inoperable
  - Low alkalinity, low flow
  - Spa closed by management – not to open until re-inspection conducted by LCPH
- **Water quality conditions were unknown prior to onsets**

### **Case Onset dates of:**

**\*11-22-18**

**\*11-25-18**

**\*11-27-18**



# Is *Legionella* Sampling Necessary?

- Sampling is a recommended component of a *Legionella* investigation
  - If cases all had an association with spa usage, couldn't we have the hotel staff focus on spa maintenance, super-chlorination, etc.? Would that fix the problem if it was in fact the spa that was the source of *Legionella*?
- Sampling is expensive – who would pay?

# Sampling Cont....

- The 2 additional cases provided LCPH with more uncertainty about the spa as the source of the outbreak
  - One new case stayed at “HOTEL A”, but supposedly did not use the spa
  - Now concerned about potentially a much larger problem – was the water distribution system contaminated?
- Decision made to collect samples
- Additionally, we recalled a recent issue that added to our concerns and the potential for more cases

# Local Issue of Significance, 11-29-18

The screenshot shows a web browser displaying a news article from Fox 8 Cleveland. The article title is "Shelter available for 2,500 Columbia gas customers impacted by outage lasting 24 to 48 hours". The byline indicates it was posted at 4:18 PM on November 29, 2018, by Natasha Anderson and Kristy Griffith-Bergen, and updated at 01:57 AM on November 30, 2018. Below the article title are social media sharing buttons for Facebook (987 shares), Twitter, Pinterest, LinkedIn, and Email. A video player is embedded in the article, showing a map of Elyria with a red line indicating the gas shutoff location on Concord Avenue. The video player has a play button and a progress bar. To the right of the video player is an advertisement for Vitafusion Women's Gummy Vitamins, featuring a bottle of the product and text: "vitafusion CLINICALLY PROVEN ABSORPTION ONLY AMERICA'S #1 GUMMY VITAMIN BRAND. LEARN MORE \*FOR VITAMIN C & D". The browser's address bar shows the URL: https://fox8.com/2018/11/29/columbia-gas-shutting-off-gas-to-25000-customers-in-elyria-area/. The browser's taskbar at the bottom shows various application icons and the system clock indicating 7:16 PM on 3/19/2019.

Shelter available for 2,500 Columbia gas customers impacted by outage lasting 24 to 48 hours

POSTED 4:18 PM, NOVEMBER 29, 2018, BY NATASHA ANDERSON AND KRISTY GRIFFITH-BERGEN, UPDATED AT 01:57 AM, NOVEMBER 30, 2018

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Columbia Gas outage in Elyria  
COLUMBIA GAS SHUTTING OFF GAS  
GAS SHUTOFF: CONCORD AVENUE  
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DOWNTOWN ELYRIA  
E BROAD ST.

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\*FOR VITAMIN C & D

7:16 PM 3/19/2019

Columbia Gas put people up in “HOTEL A” until gas service was restored.

# Sampling Arrangements

- Needed to locate lab
  - Only 3 CDC certified labs in Ohio for *Legionella* testing
    - Q Laboratories, Cincinnati
    - Wexner Medical Center at OSU, Columbus
    - Northeast Ohio Regional Sewer District (NEORS), Cuyahoga Heights
- Needed to obtain sampling supplies
- Holidays were fast approaching – needed to figure this out and sample asap

# NEORSD Lab

- Current relationship with lab
- Explained severity of situation and need to collect samples asap
- Lab uncertain if they could assist with current workload
  - They might need to charge a surcharge due to expediting the work
  - They would get back to us asap

# In the meantime, dealing with hotel General Manager Disbelief

- GM sent email to LCPH on 12-13-18
  - *“Good afternoon, sorry I missed you today. If you don't mind I would like a copy of the "complaints" being presented against us to make sure they are legitimate. We haven't heard anything like this from past or present guests and are wondering if it may be a past employee that was recently terminated from that department. Please let me know when you can. Thanks! “*

# LCPH Response to GM

*“Hello ....We have been in communication with the owner of the hotel and his daughter and they are both aware of the situation.*

*This is not complaint-driven. Several individuals have been ill with a waterborne illness and have a common link of having used the spa. When certain illnesses occur, as in this case, legionella, they get reported to health agencies to try to determine what may have caused it. Questions that are asked include whether or not they had any recreational water contact, such as a pool, spa, beach, etc. Health agencies then follow-up with this information, which is why we visited the hotel and are working with the owner on corrective actions.*

*Again, this is a confirmed illness investigation linked to use of the spa.*

*If you have any general questions, please let me know. ”*

# GM Response

*“Good afternoon and thank you for reaching out. That information actually helped a lot. It was just hard to believe that all these complaints would come in at once conveniently after we terminated the gentleman that was responsible for the pool. I just wanted to make sure it wasn't some form of retaliation since we hadn't heard from any guests directly. We are working on balancing the chemicals now and will touch base with Mr. Harbeck as soon as we believe it is ready. The spa will take a little longer since we are going to take this opportunity to drain and clean and refinish completely. I appreciate your help and attention to this matter. “*



# NEORSD Confirmation of Services

- Lab confirmed they can perform sample analysis
- Lab would assemble all supplies for pick-up and provide sampling instructions
- Each sample costs \$350.00
  - Plus additional \$100/sample for confirmation
- Time is of the essence
  - 10 day test
- Sample supplies picked up 12-17-18
- Samples to be collected 12-18-18

# Prep for *Legionella* Sampling

The screenshot shows a web browser window with the URL <https://www.cdc.gov/legionella/videos.html>. The page features a sidebar with links to 'CDC Healthy Swimming', 'CDC Vessel Sanitation Program', 'Unexplained Respiratory Disease Outbreaks (URDO)', and 'European Legionnaires' Disease Surveillance Network (ELDSNet)'. The main content area highlights a video titled 'How to Sample Spas and Fountains', which teaches CDC's procedure for collecting environmental samples from spas and fountains for *Legionella* culture. The video has a running time of 7:32 minutes and was released on 10/7/2015. The page also includes a footer with contact information for CDC-INFO, CDC information links, and social media connections.

**CDC Healthy Swimming**

**CDC Vessel Sanitation Program**

**Unexplained Respiratory Disease Outbreaks (URDO)**

**European Legionnaires' Disease Surveillance Network (ELDSNet)**

**How to Sample Spas and Fountains**

Learn CDC's procedure for collecting environmental samples from spas (hot tubs) and fountains for *Legionella* culture during a cluster or outbreak investigation, or when cases of disease may be associated with a facility.

Running Time: 7:32 minutes  
Date Released: 10/7/2015

Page last reviewed: April 30, 2018  
Content source: National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases

**CONTACT CDC-INFO**

Have questions? We have answers.  
1-800-CDC-INFO (800-232-4636)  
TTY: 888-232-6348

Email CDC-INFO

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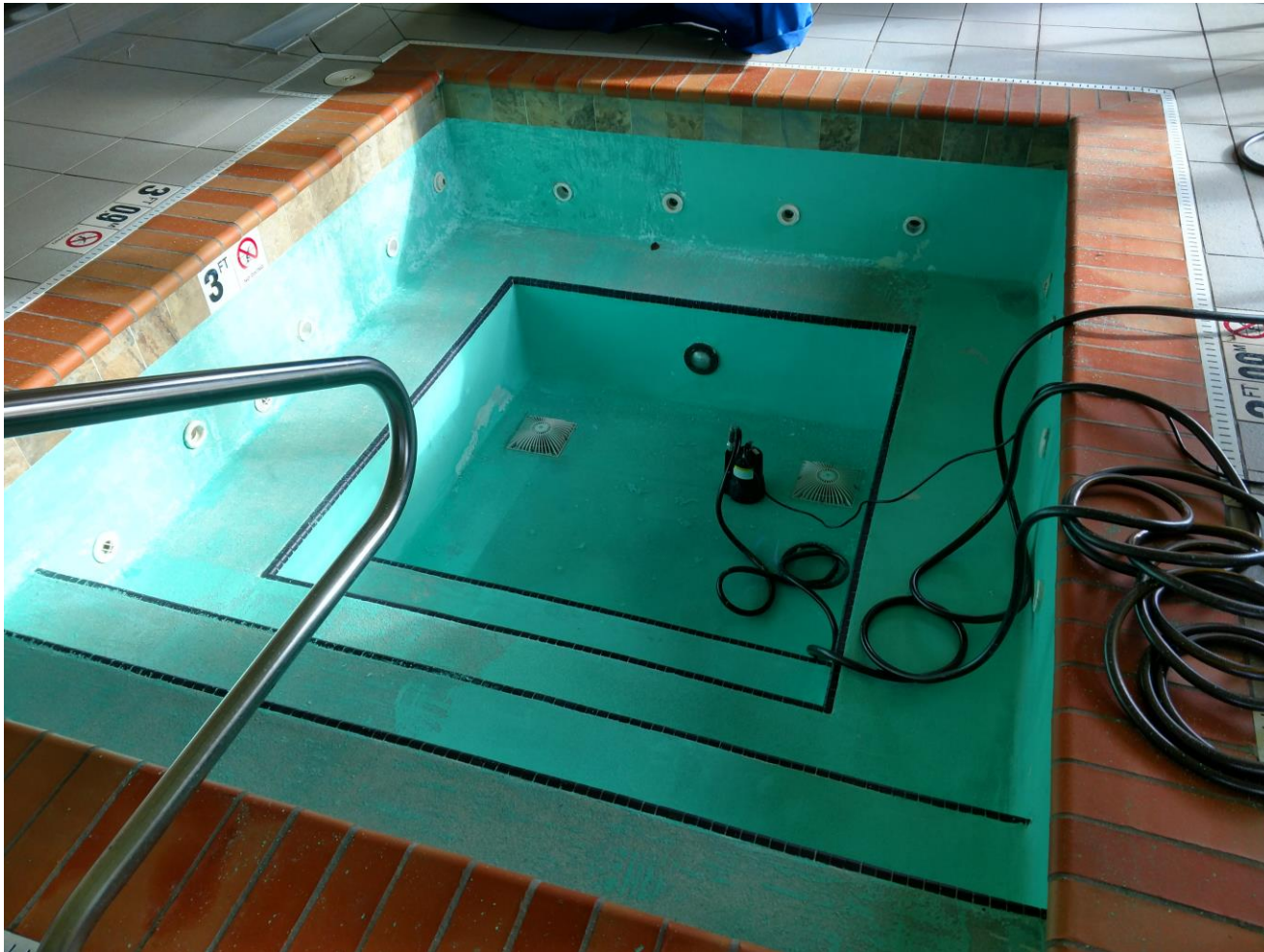
Facebook, Twitter, YouTube, Instagram, RSS, Email

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CDC Website Exit Disclaimer

# Sampling Locations

- 9 samples
  - Spa floor (Bulk water sample)
  - Inlet to Spa, SE corner (Swab sample)
  - Spa jet, NE corner (Swab)
  - Sand filter (Sand sample)
  - Shower head, spa area (Bulk water sample)
  - Shower, spa area (Swab sample)
  - Hot water tank (Bulk water sample)
  - Tub faucet, room 322 (Bulk water sample)
  - Tub faucet, room 322 (Swab sample)

# Sampling Photos





















# Sample Results

- Preliminary, after 48 hours
  - *Legionella pneumophila* growth in sample for sand filter
- Day 7
  - All samples associated with the spa were showing *Legionella pneumophila* growth
- Day 10 – FINAL
  - All samples associated with the spa were confirmed with *Legionella pneumophila* growth

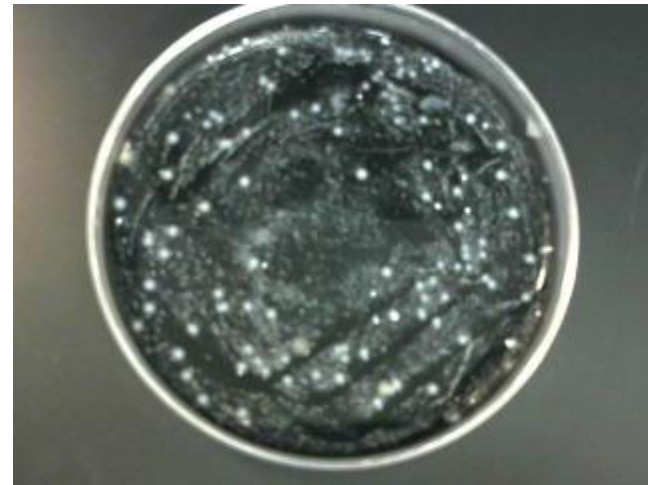
# Sampling Locations and Results

- 9 samples
  - Spa floor (Bulk water sample): **Result: TNTC**
  - Inlet to Spa, SE corner (Swab sample): **Result: 1,316 CFU/mL**
  - Sand filter (sand sample): **Result: 2,200,000 CFU/mL**
  - Spa jet, NE corner (Swab): Result: <1 CFU/mL
  - Shower head, spa area (Bulk water sample): Result: <1 CFU/mL
  - Shower, spa area (Swab sample): Result: <1 CFU/mL
  - Hot water tank (Bulk water sample): Result: <1 CFU/mL
  - Tub faucet, room 322 (Bulk water sample): Result: <1 CFU/mL
  - Tub faucet, room 322 (Swab sample): Result: <1 CFU/mL

# *Legionella* Cultures



**Sample ID# LCH1812180003, Day 7**  
SAND FILTER  
2,200,000 CFU/mL



**Sample ID# LCH1812180001, Day 7**  
SPA FLOOR  
TNTC



# Review Sampling Results with Hotel Staff

- Contacted GM on 1-2-19
  - Needed to discuss sampling results
    - Did indicate that *Legionella* was found in the spa
- Requested to set up meeting with all pertinent hotel staff to review the results of the site investigation and sampling results
- Meeting tentatively scheduled for 1-8-19 due to schedule of owner's daughter

# More Concerns...

- Also, we had repeatedly inquired with GM about what pool company would be providing the work on the spa
  - Stressed the importance of LCPH discussing the issues directly with the company
    - PPE
    - Prevent inhalation exposure

# Reply from GM

*“Our on site maintenance guy has been working to remove the old paint and prep for new paint. He is also removing the old sand to clean the filter as well. He has been using gloves and painting masks to prevent inhaling anything that may have been present. He seems to be ok health wise. I hope this is ok. “*



# LCPH Response

*“Hello... this is not ok and I can’t stress enough the seriousness of using a professional pool company to properly decontaminate the spa. This has been mentioned several times and I do not understand why you would have one of your employees try to deal with this and expose them to legionella bacteria and the risk of becoming seriously ill, not to mention not doing it properly and having more guests become ill. People that are exposed to legionella may not develop symptoms for up to 10 days.*

*The maintenance guy needs to stop working on this. Please do not try to deal with this yourselves.*

*Below is a list of pool companies:*

# Another Hotel Visit

- GM's response was concerning and we knew we needed to have an in-person conversation with her
  - LCPH staff met with the GM and was informed that:
    - Personal Touch Landscaping is the pool company that would be working on the spa
    - GM stated that the maintenance person that was doing work was her dad
    - Stated over and over again the importance of a pool company doing the work and to call us ahead of work beginning
    - Think we finally got through to the GM, or she realized her dad had potential exposure – she broke down crying

# Meeting with Hotel Staff

- 1-8-19
  - LCPH staff, hotel staff, owner's daughter, maintenance staff, pool company, insurance company
  - Provided “protected” overview of cases, only sharing pertinent information
  - Reviewed findings of CDC Environmental Assessment, including recommendations
  - Reviewed sampling results
  - Discussed next steps

# Meeting with Hotel Staff....

- Next steps included:
  - Remediation versus equipment replacement
    - Hotel staff and pool company had concerns about the success of remediation
      - Would cleaning/scrubbing and super-chlorination work to remove the *Legionella* bacteria?
    - Leaning towards equipment replacement for both the spa and the pool
      - Would abandon the current disinfection method of using a salt generator to using chlorine with an automatic feeder

# Current Status

- “HOTEL A” decided to “fill-in” the spa and replace the equipment for the pool
- As of this date, the pool still remains closed and the spa has yet to be filled in
- We have been contacted by a law firm for one of the cases for our records related to this investigation

# Lessons Learned

- Looking at the history of “HOTEL A”, it is easy to see how an outbreak of *Legionella* occurred
- The facility was under the jurisdiction of another LHD prior to 2017 when a merger occurred
  - Multiple sanitarians conducted inspections
  - Inspections get filed and knowledge of problem facilities isn't always passed along
- In discussions to conduct a CQI project to be able to track types of violations and to help identify patterns

# Lessons Learned Cont...

- Opportunities for education and outreach with facilities
  - Inspections tend to focus on what we typically do during an inspection
    - Water chemistry, safety, records, etc.
  - Need to start talking about waterborne illnesses and how they can easily happen with lack of oversight
- Better training for Sanitarians and pool/spa operators
- Need improved surveillance & information sharing
  - Especially for Out-of-State cases

# Case Information

Case #	Residence	Dates at "HOTEL A"	Onset Date	Spa use
1	Out of state	3-23-17 to 3-24-17	3-24-17	Yes
2	Out of state	8-14-17 to 8-15-17	8-18-17	Yes
*****				
3	Out of state	11-21-18 to 11-24-18	11-25-18	Yes
4	Ohio	11-17-18 to 11-18-18	11-22-18	Yes
5	Out of state	11-23-18 to 11-24-18	11-27-18	No



# Case Characteristics

**Table 1. Characteristics and Exposures of Confirmed Legionnaires' Disease Cases Among Hotel A Guests, November 2017 to December 2018**

Characteristic or Exposure	Number With Characteristic (0%)
Age >45 y	5 (100)
Male Sex	3(60)
Female Sex	1((20)
Unknown Sex	1(20)
Used Whirlpool Spa	4(80)

Other: Some cases had underlying chronic health conditions, had visited healthcare facilities, used a CPAP machine, etc.....

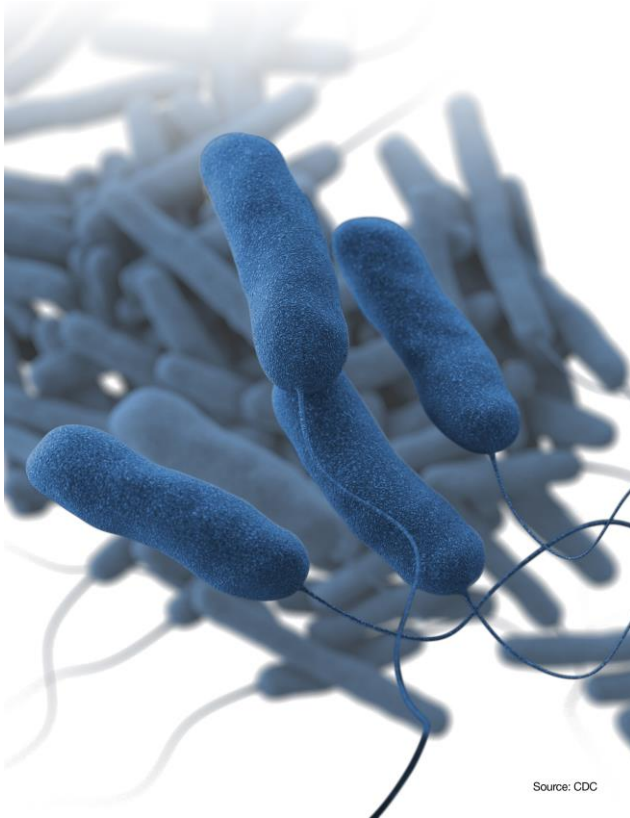
# Challenges and Purpose

- This investigation had its challenges:
  - Primary Epi was in the process of retiring and training the new Epi
  - “HOTEL A” staff took awhile to gain an understanding of the severity of the problem

***The purpose of the investigation was to find the source of the illness and to take the necessary steps and actions to prevent additional illnesses from occurring.***

**We found the source and to date there have been no new cases.**

# Thank you for your time. Q&A



Source: CDC

- Contact us:
  - Jill Lis
    - 440-284-3224
    - [jlis@loraincountyhealth.com](mailto:jlis@loraincountyhealth.com)
  - Kathleen Grella
    - 440-284-3213
    - [kgrella@loraincountyhealth.com](mailto:kgrella@loraincountyhealth.com)