

Legionellosis in a Hotel: A Local Health District's Epidemiological and Environmental Response

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WILLIAMSON COUNTY AND CITIES HEALTH DISTRICT

Objectives

- To learn about legionellosis and what constitutes a legionellosis outbreak
- To learn how epidemiology, environmental health, and the Local Health Authority work together in a legionellosis outbreak
- To learn the roles and responsibilities of the management of the affected building/location
- To learn proper remediation plans designated by control orders issued by the Local Health Authority



Initial Notification



First Cases Reported

- Monday, September 25, 2017
- Texas Department of State Health Services (DSHS) notified the Williamson County and Cities Health District (WCCHD) of two confirmed legionellosis cases with exposure to the same Williamson County hotel prior to illness onset
- WCCHD began discussing appropriate interventions, such as written notification of the cases and education on proper water systems maintenance



We have an outbreak!

Per DSHS guidance, two or more cases of legionellosis associated with the same facility within one year is considered an outbreak and requires public health intervention.



Third Case Reported

- Friday, September 29, 2017
 - WCCHD was notified of a third confirmed case with the same hotel exposure



What is Legionellosis?



Legionella pneumophila

- Bacterial respiratory illness transmitted by inhaling contaminated aerosolized water droplets
- Not contagious person-to-person (must inhale the droplets)
- *L. pneumophila*, has approximately 70 serogroups
 - Serogroup 1 causes the majority of infections
- *L. pneumophila* can manifest as two different clinical illnesses
 - Legionnaire's disease – usually requires hospitalization with pneumonia
 - Pontiac Fever – people may not realize they're sick



Pontiac Fever

- Symptoms may include fever, cough, muscle aches, and headache
- Self-limiting that resolves within one week without antibiotics
- Incubation period is typically 24-72 hours after exposure
- Often under-reported
- Rarely requires hospitalization

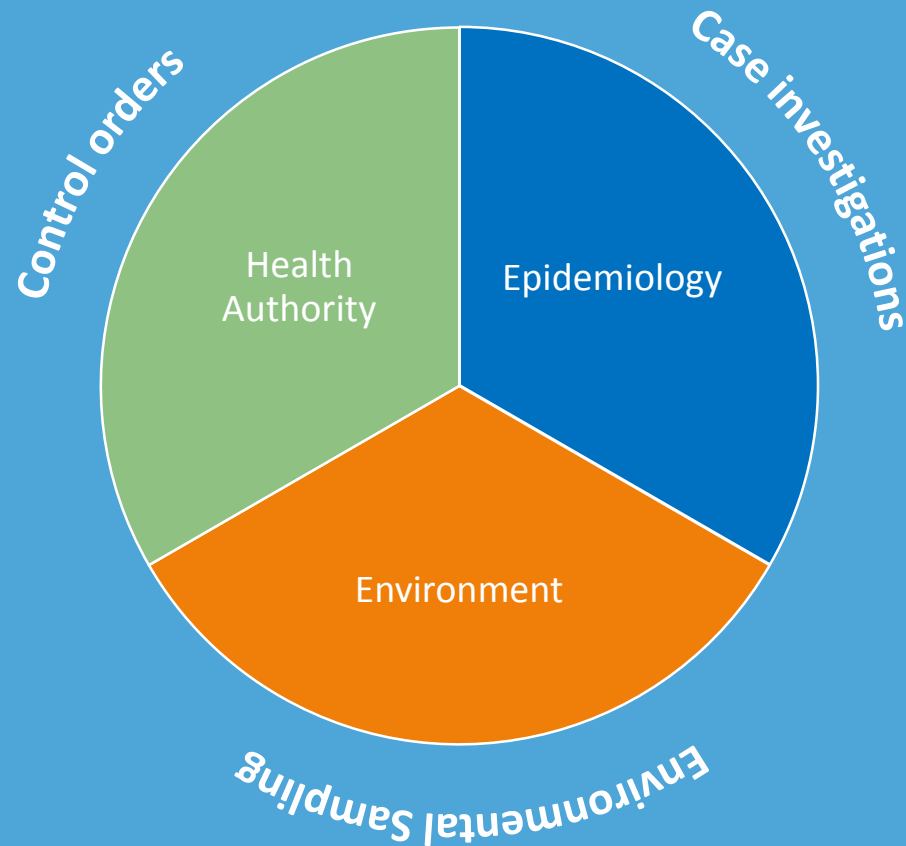


Legionnaire's disease

- Symptoms may include pneumonia with fever, shortness of breath, chills, non-productive cough, muscle aches, and headache
- Incubation period is typically 2-10 days
- Usually requires hospitalization
- Case fatality rate is 5-30 percent



Appropriate Response is Three-Fold



Phase One: Source of Exposure



Where is it coming from?

- Tuesday, October 3, 2017
 - Epidemiology and environmental staff visited the hotel
 - *conducted an environmental assessment to determine possible sources of exposure*
 - *verified proper maintenance procedures*
 - *obtained diagrams of the hotel and water systems*

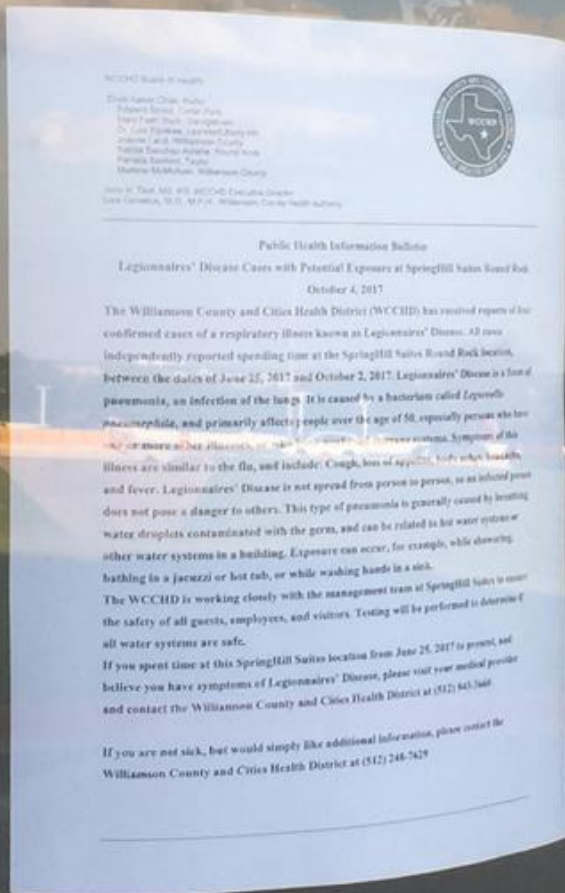


Control Order #1 Issued

- Wednesday, October 4, 2017
- Hotel management must:
 - Cease all new admissions to the hotel and to evacuate hotel guests and non-essential staff
 - Inform all current guests, employees, and known visitors and all former guests, employees, and known visitors on the property June 25, 2017 – present of their exposure and notify WCCHD of their contact information
 - Hire a third-party environmental consultant for environmental testing and remediation (with WCCHD present)



Public Health Information Bulletin Posted at Entrances



Case investigations

- WCCHD epidemiologists:
 - Gathered contact information for symptomatic employees and recent guests from the hotel management (across TX and Mississippi)
 - Interviewed each exposed person to collect detailed information about symptom onset, symptoms, duration, laboratory testing, and where in the hotel each person spent time
 - Coordinated with CDC to mail sputum specimens from two confirmed cases to the CDC for additional testing



Third-Party Sampling

- Wednesday, October 5, 2017
- Collected pre-remediation bulk water and biofilm samples per CDC guidance from 86 locations throughout the hotel
- Sent samples to ELITE testing laboratory for testing by PCR and culture



Third-Party Sampling Results

- Pre-remediation water sampling confirmed the presence of *Legionella spp.* through PCR, though culture results were all negative



Phase Two: Environmental Remediation



Control Order #2

- October 16, 2017
- Hotel management can serve guests again once the building water system is fully flushed
- Pool area must remain closed to all guests/staff (except those assisting in remediation)
- Third-party consultant to collect samples post-remediation with WCCHD staff and provide results to WCCHD within 24 hours
 - If any samples are positive for *Legionella*, submit an additional post-remediation plan to WCCHD
- Inform WCCHD of any known ill guests/staff



Environmental Remediations

- Conducted by the third-party environmental consultant
- Remediation of the entire water system from point of entry was conducted using hyper-chlorination of ALL potable water systems, followed by super heating
- All water heaters were drained and cleaned, and several replaced



More Environmental Remediations

- The pool and spa, and associated filtration systems, were drained and scrubbed with XY-12 sanitizing solution for several hours
- Sand filters were emptied and replaced
- Post-remediation water tests were conducted from the same 86 locations, and were tested by PCR and culture



Hotel Pool Area



Post-remediation lab results

- All post-remediation water and biofilm samples were negative for *Legionella* bacteria



Control Order #3

- November 14, 2017
- Hotel management must abide by the six-month Water Testing Plan to detect the presence of *Legionella pneumophila* on all water systems
- Hotel management must abide by the long-term Water Management Program for Building Water Systems to reduce risk associated with legionellae and other opportunistic pathogens that may be present in building water systems
- Inform WCCHD of any known ill guests/staff



Control Order #4

- December 5, 2017
- Hotel management must notify WCCHD \geq 1 week prior to reopening the pool area
- Six-month Water Testing Plan
- Long-term Water Management Program for Building Water Systems
- Inform WCCHD of any known ill guests/staff



By the way -

- December 2017
- This hotel decided to remove the spa completely and renovate the pool



Results & Progress



Epidemiology

- Collected information (from hotel, email, phone, hotline) about 53 employees and former guests, with exposure periods ranging from March 2015 to October 2017
- 6 contacts were confirmed cases of Legionnaire's disease, all with exposure to the indoor pool/hot tub area in the hotel
- Corresponded with the environmental sampling results and required the hotel to remediate further in the pool/hot tub area, as it was likely the source of exposure



Confirmed Cases (n=6)

- 5 guests, 1 employee
- Average age: 60YO
- 4 females, 2 males
- Exposure period: 6/25/17-10/4/17
- All hospitalized
- No deaths



CDC Test Results

- CDC confirmed the presence of *L. pneumophila* in both sputum specimens by PCR
- The testing also included an supplementary analysis called nested sequence-based typing
- Both specimens had an uncommon, but previously found in North America, specific sequence type and a common exposure (hotel)



Lifting Control Orders

- After water system remediation and negative post-remediation culture results, the hotel was authorized to reopen to guests, with the exception of the pool/spa room (Control Order #2)
- After confirmation of a second round of post-remediation tests, authorization to open the pool/spa room was granted (Control Order #4)

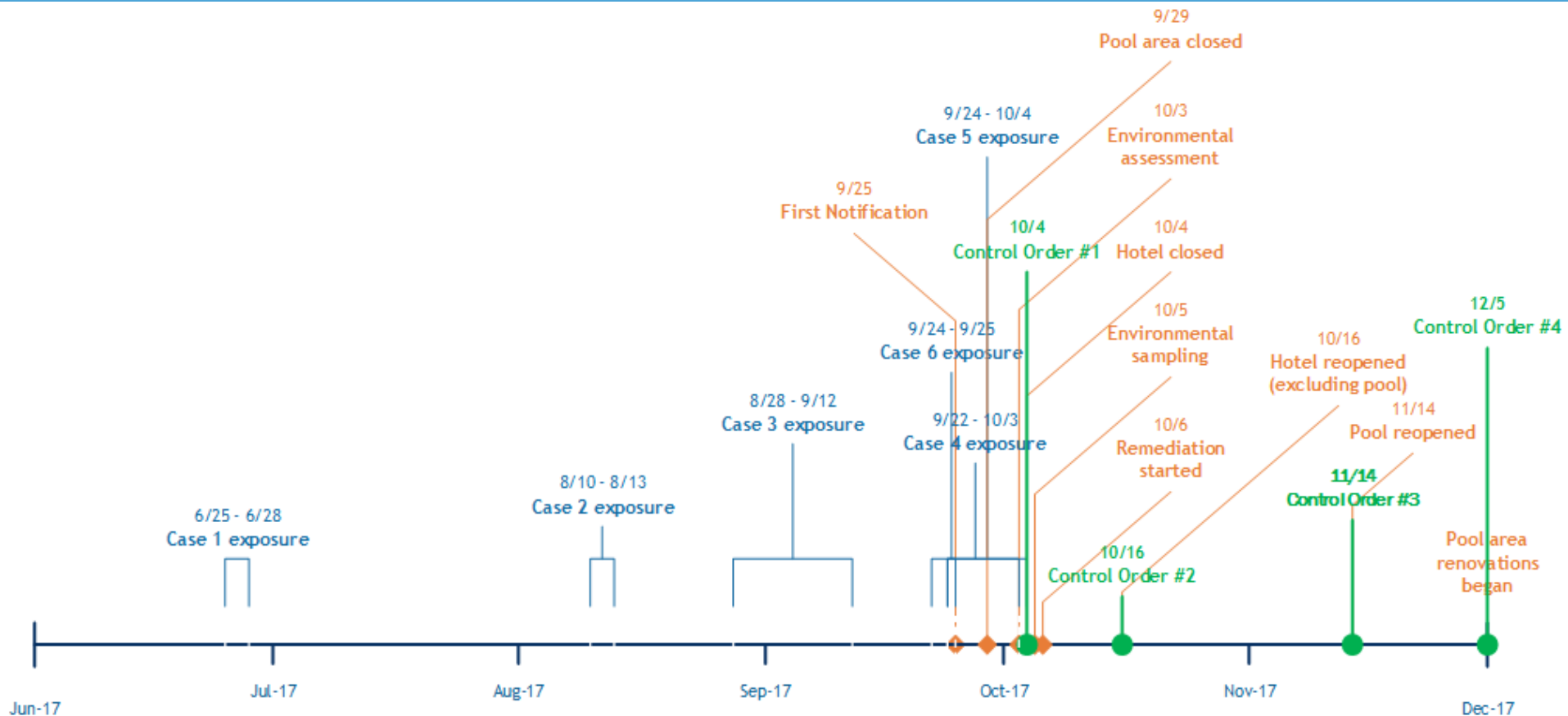


Dissolution of Control Order #4

- June 12, 2018
- After remodeling the pool area, the hotel notified WCCHD of the potential reopening date
- WCCHD inspected the pool area and reviewed final water tests (all samples showed *Legionella* not detected)
- Pool area reopened on June 8, 2018



Timeline of Events



Strengths & Future Improvement



What we did well

- Previous legionellosis outbreak experience
- Clear plan of action from the beginning
- Communication among all parties
- Hotel management cooperation



What we can improve

- Better customer service to exposed persons
 - More information about the situation currently, next steps, and phone numbers to contact for additional questions
- Clear expectations about testing needed for specimens
 - Environmental sampling isolates were not saved to run additional DNA sequencing on them potentially to match to the sputum cultures



Limitations

- Many of those likely with *Legionella* (more likely with Pontiac Fever) said their symptoms went on and on for days (well beyond typical Pontiac Fever)
 - Considered NAC ultimately
- Testing for *Legionella* was not consistent
 - Wrong testing, incomplete testing, etc. performed that could not be used in the case definition
 - Emailed IPs about outbreak but not all doctors were in local hospitals



Conclusions



The Big Picture

- 6 confirmed legionellosis cases with hotel pool area exposure
- Identified an association between the confirmed cases and exposure to the pool area at the hotel (and no new cases after pool area closure)
- Hotel performed remediation on all water systems and all *Legionella* testing post-remediation was negative
- Hotel completed six months of a water management program and re-opened the pool area in June 2018



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- WCCHD Environmental Health staff
- WCCHD Local Health Authority
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Questions?

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