

**OUTBREAK OF LEGIONELLOSIS  
HAMPTON, NEW HAMPSHIRE, 2018  
FINAL INVESTIGATION REPORT**

April 1, 2019

*New Hampshire Department of Health and Human Services  
Division of Public Health Services*

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## ABBREVIATIONS USED IN THIS DOCUMENT

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
CDC	United States Centers for Disease Control and Prevention
DES	New Hampshire Department of Environmental Services
DFA	Direct Florescent Antibody
DHHS	New Hampshire Department of Health and Human Services
HSEM	New Hampshire Department of Safety, Division of Homeland Security and Emergency Management
Lp	<i>Legionella pneumophila</i>
Lp1	<i>Legionella pneumophila</i> serogroup 1
Lp3	<i>Legionella pneumophila</i> serogroup 3
NAT	Nucleic Acid Test
NH	New Hampshire
PCR	Polymerase Chain Reaction
PHL	New Hampshire Public Health Laboratories
SBT	Sequence-based Typing
ST94	Sequence Type 94
UAT	Urinary Antigen Test
WGS	Whole genome sequencing
wgMLST	Whole genome multi-locus sequence typing

Note: The use of trade names and names of commercial sources in this report is for identification purposes only and does not imply endorsement by the New Hampshire Department of Health and Human Services.

## **CONTRIBUTORS AND ACKNOWLEDGEMENTS**

This outbreak was investigated by the following agencies:

New Hampshire Department of Health and Human Services

New Hampshire Department of Environmental Services

U.S. Centers for Disease Control and Prevention

Town of Hampton, New Hampshire

Additional support was provided by Governor Christopher T. Sununu's Office, the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management, and the City of Dover, New Hampshire. The New Hampshire Department of Health and Human Services appreciates the significant assistance provided by all of the agencies that contributed to this investigation.

The majority of people who became ill as a result of this outbreak were visitors to New Hampshire. The New Hampshire Department of Health and Human Services appreciates the assistance provided by health departments in other jurisdictions to gather medical records, conduct patient interviews, and facilitate laboratory testing. The New Hampshire Department of Health and Human Services also appreciates the assistance provided by healthcare providers and institutions that cared for those who became ill, and the cooperation of the people affected by this outbreak, in particular, those who were ill that provided important information about their time in Hampton, sometimes agreeing to multiple lengthy interviews with the investigation team.

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## EXECUTIVE SUMMARY

In August 2018, the New Hampshire (NH) Department of Health and Human Services (DHHS) became aware of a possible outbreak of legionellosis in Hampton, NH, a popular regional tourist destination. Legionellosis is an infectious disease caused by *Legionella* bacteria, most commonly *Legionella pneumophila* serogroup 1. Legionellosis is divided into two major clinical syndromes, Legionnaires' disease and Pontiac fever; the former being a potentially severe pneumonia illness that often results in hospitalization and can result in death in as many as 10% of people infected. *Legionella* bacteria are naturally found in water and soil, and infection is acquired through inhalation of aerosolized droplets of water containing the bacteria. Most *Legionella* infections are sporadic; however, outbreaks can occur and are often associated with exposure to aerosolized water in large buildings such as hospitals, hotels and apartment buildings, as well as hot tubs, decorative fountains, and cooling towers. DHHS, along with several partners, conducted epidemiologic, environmental, and laboratory investigations into the source of the outbreak. These investigations resulted in identification of at least 34 individuals with illness consistent with Legionnaires' disease who likely acquired their infection from the hot tub or the potable water system at The Sands Resort in Hampton, NH between May and August of 2018. The inadequate maintenance of The Sands Resort hot tub as well as other conditions within the facility, such as low hot water temperatures, may have favored the growth of *Legionella* bacteria. *Legionella* bacteria were detected in nearly half of the environmental samples collected at the hotel, with six samples from the hot tub having the same strain of *Legionella pneumophila* serogroup 1 as was found in respiratory specimens from two people with confirmed Legionnaires' disease who stayed at The Sands Resort. While other potential sources of *Legionella* bacteria were investigated in this community, no other sources of this outbreak were identified based on information collected during the course of the investigation. Closure of the hot tub at The Sands Resort and remediation of the hotel water system led to cessation of the outbreak. Adherence to public bathing regulations and implementation of an appropriate facility water management plan to reduce the risk of legionellosis are essential and may have prevented this outbreak.

## I. INTRODUCTION

This report provides a comprehensive summary of the investigation into *Legionella* infections that occurred in Hampton, New Hampshire (NH), from May through August, 2018.

### A. Outbreak Detection and Response

On August 10, 2018, an individual called the NH Department of Health and Human Services (DHHS) to report that a family member and a travel companion, both Massachusetts residents, were diagnosed with Legionnaires' disease following a visit to Hampton, NH in early August 2018. *Legionella* infections are required by law to be reported to the health department by healthcare providers and laboratories in NH, as well as in all other states; reported infections are investigated by the respective health department based on residency of the patient. DHHS contacted the Massachusetts Department of Public Health to confirm that the individuals were diagnosed with Legionnaires' disease and that they had travelled to Hampton, NH during their incubation period prior to onset of illness. Upon initial inquiry, the Massachusetts Department of Public Health did not yet have information about the individuals. On August 22, 2018, the Massachusetts Department of Public Health reported to DHHS that they were able to confirm diagnoses of Legionnaires' disease in the two travelers to Hampton, NH and an outbreak investigation was initiated. DHHS searched the NH legionellosis case report database to identify other cases of legionellosis potentially-associated with Hampton, NH and two additional cases were identified with overnight stays in the area of Ashworth Avenue. In addition to initiating investigation into the source of the outbreak, DHHS initiated extensive public, healthcare provider, and partner communications.

This outbreak response was coordinated by the DHHS, Division of Public Health Services, Bureau of Infectious Disease Control with support from many individuals across DHHS as well as from the NH Department of Environmental Services (DES), the NH Department of Safety's Division of Homeland Security and Emergency Management (HSEM), the Town of Hampton, NH, and the State of NH Governor's Office. A number of multi-agency coordination meetings were held involving these entities to ensure a coordinated and timely response to the outbreak. Additionally, assistance from the United States (U.S.) Centers for Disease Control and Prevention (CDC) was requested on August 26, 2018 to support the outbreak investigation. A CDC team was deployed to NH from August 28, 2018 through September 6, 2018. The multi-agency outbreak response team was onsite in



Hampton, NH and operated out of the Hampton Police Department building from August 29, 2018 through September 4, 2018.

## **B. Legionellosis**

*Legionella* bacteria are aerobic, Gram-negative, intracellular pathogens that are commonly found in water and soil [1]. Human infection is typically acquired through inhalation of aerosols containing *Legionella*. Most *Legionella* infections are sporadic; however, outbreaks can occur and are often associated with exposure to aerosolized water in large buildings such as hospitals, hotels and apartment buildings, as well as hot tubs, decorative fountains, and cooling towers [2].

Infection and illness attributed to *Legionella* bacteria are referred to as legionellosis. The two major clinical syndromes caused by *Legionella* bacterial infection are Legionnaires' disease and Pontiac fever. Legionnaires' disease is a pneumonia characterized by fever, cough, shortness of breath, muscle aches, headaches, and pulmonary infiltrates consistent with pneumonia [3]. Illness is often severe enough to require hospitalization and has an up to 10% fatality rate. Symptoms develop 2 to 14 days following exposure to an environmental source that aerosolizes the bacteria. Pontiac fever is an acute, nonspecific, self-limited febrile illness. Because of its self-limited and nonspecific nature, the epidemiology and pathogenesis of Pontiac fever have not been well characterized; however, it generally causes milder influenza-like illness without pneumonia after a shorter incubation period of about 24 to 48 hours [4].

There are at least 60 different species of *Legionella* bacteria; many are considered pathogenic (i.e., able to cause disease in humans), but most disease is caused by *Legionella pneumophila* serogroup 1. *Legionella* species are estimated to cause about 2 to 10% of cases of community acquired pneumonia, with over 80% of cases occurring in adults >50 years old [5]. In addition to older age, risk factors for Legionnaires' disease include smoking, chronic respiratory disease, diabetes mellitus, and other immunocompromising conditions [4].

Diagnostic tests include urinary antigen testing (although this test only detects *L. pneumophila* serogroup 1, which accounts for ~84% of infections) and culture of respiratory specimens for *Legionella*, most often sputum or bronchoalveolar lavage fluid [6]. Culturing the organism requires special culture media (Buffered Charcoal Yeast Extract medium), which is not always routinely available in clinical laboratories. For patients with compatible or confirmed pneumonia, treatment with azithromycin or levofloxacin is recommended. Treatment for Pontiac

fever is not recommended because it is a self-limited illness and patients do not benefit from antibiotic treatment [6].

From 2013 to 2017, DHHS received an average of 32 reports of legionellosis each year, with more cases occurring in the months of July and August. There are more cases of legionellosis diagnosed in mid to late summer months due to seasonality of exposures (e.g., cooling units, water sources, water temperatures) [5]. Nationally there has been an increase in cases of Legionnaires' disease since 2000. This may represent a true increase in the frequency of disease partially attributable to several factors including changing demographics (e.g., older U.S. population, more at-risk people), aging plumbing infrastructure, environmental changes, such as climate change, as well as better detection of infection through improved diagnostic tests or better disease reporting.



Illustration of *Legionella pneumophila* (Source: [CDC](#))

## II. METHODS

The investigation into the source of this outbreak included an epidemiologic, environmental, and laboratory component.

### A. Epidemiologic Investigation

The epidemiologic investigation consisted of case finding and interviewing activities. DHHS issued a statewide outbreak alert to healthcare providers, public health partners, and the general public to identify potential illnesses related to the outbreak and to provide recommendations to prevent illness. On August 25, 2018, DHHS issued a health alert message to more than 8,600 healthcare providers and partner organizations in NH ([Appendix 1](#)). The health alert announced identification of the outbreak and encouraged healthcare providers to consider *Legionella* infection when evaluating patients with possible community-acquired pneumonia and to ask patients about travel (including local travel) prior to symptom onset. The alert also informed healthcare providers to collect both urinary antigen and respiratory specimens for culture when testing for suspected *Legionella* infection and to promptly report suspected cases to DHHS. Notifications were also posted to public health agencies across the nation on August 25<sup>th</sup> and September 1<sup>st</sup> requesting reports of legionellosis cases with travel to NH within the 14 days prior to illness onset. These notices were also shared with bordering Canadian provinces. Finally, hotel guest notifications were made based on findings of the investigation and described in greater detail later in this report.

Public health professionals at DHHS were on-call 24 hours a day to receive reports of suspect illnesses and to provide consultation to healthcare providers and facilitate laboratory testing. All reports of people with illness potentially-related to this outbreak were initially considered “Persons Under Investigation.” As more information was learned about the person’s illness, the illness was categorized using case definitions, which were developed to determine likelihood of an illness being legionellosis associated with the outbreak. These definitions were based, in part, on the national case definition for legionellosis [7] and were developed and updated as needed throughout the course of the investigation. The final case definitions for the case counts presented in this report are described in [Table 1](#). To be included as a case in this investigation, all persons with illness were also required to have had an epidemiologic link to the outbreak, which was defined as onset of illness within 14 days of travel to Hampton, NH. The onset of the outbreak was determined by iteratively

expanding back the time period of interest, looking for illnesses two incubation periods (4 weeks) prior to the onset of illness for the earliest identified case.

**Table 1. Case definitions**

CLASSIFICATION <sup>†</sup>	LABORATORY CRITERIA	CLINICAL CRITERIA
Confirmed	<p>One of the following:</p> <p>A. Culture: isolation of any <i>Legionella</i> organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile site</p> <p>B. Urinary antigen testing: detection of <i>Legionella pneumophila</i> serogroup 1 antigen in urine using validated reagents</p> <p>C. Seroconversion: fourfold or greater rise in specific serum antibody titer to specific species of <i>Legionella</i> or serogroups of <i>Legionella pneumophila</i> using validated reagents on specimens collected 3–6 weeks apart</p> <p>D. Seroconversion: fourfold or greater rise in antibody titer to multiple species of <i>Legionella</i> using pooled antigen and validated reagents.</p> <p>E. DFA: Detection of specific <i>Legionella</i> antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody staining, Immunohistochemistry, or other similar method, using validated reagents.</p> <p>F. Nucleic Acid Test: Detection of <i>Legionella</i> species by a validated nucleic acid assay.</p>	<p>Clinically or radiographically diagnosed pneumonia (LD)</p> <p>OR</p> <ul style="list-style-type: none"> <li>Fever AND one other symptom: chills, headache, myalgia, fatigue, malaise, cough, (PF)</li> </ul>
Probable	Lack of a positive test result listed under the “Confirmed” laboratory criteria. Includes people not tested and those who tested negative.	<ul style="list-style-type: none"> <li>Radiographically diagnosed pneumonia (LD)</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>No alternate diagnosis that explains illness</li> </ul>
Suspect	Lack of a positive test result listed under the “Confirmed” laboratory criteria. Includes people not tested and those who tested negative.	<ul style="list-style-type: none"> <li>Clinically diagnosed pneumonia (LD)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Fever AND one other symptom: chills, headache, myalgia, fatigue, malaise, cough (PF)</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>No alternate diagnosis that explains illness</li> </ul>

LD: Legionnaires’ disease; PF: Pontiac Fever;

<sup>†</sup>All case classifications required illness onset within 14 days of travel to Hampton, NH

DHHS collected medical records for all persons under investigation in order to determine case classification. Collection of medical records and interviews were coordinated through the respective health departments based on a person's residency. DHHS and/or CDC classified all illnesses and those classified as a confirmed, probable, or suspect case of legionellosis were interviewed using a hypothesis-generating questionnaire ([Appendix 2](#)). Possible exposures identified through interviews were relayed to the field team in Hampton to guide the environmental assessment.

## **B. Environmental Investigation**

Because several initial cases did not report an overnight stay at The Sands Resort, the investigation team assessed the area around Ashworth Avenue in Hampton for potential sources of *Legionella* infection. Assessment activities included review of satellite images to identify potential cooling towers and canvassing the area on foot to look for possible sources for aerosolized warm water (e.g., public fountains, hot tubs, etc.). Additionally, major cooling tower sales and service companies in the New England Region were contacted to inquire about their knowledge of cooling towers in the immediate area of Hampton Beach. Establishments of potential interest were visited, based either on interviews with persons with confirmed, probable, or suspect legionellosis or identified during canvassing. Assessment of these areas included review of water management practices and collection of water parameters or samples, as indicated based on available evidence. Individuals responsible for operating and maintaining devices and premise plumbing systems were interviewed and operation reports, log sheets, plans and manufacturer product information sheets were reviewed. Water parameters measured included pH, free chlorine, and temperature.

Depending on the strength of epidemiologic links to illness and the risk of *Legionella* growth and transmission, the team determined whether samples should be collected for testing. Sampling for *Legionella* at possible exposures sites was undertaken per previously published protocols [8]. One-liter bulk water samples were collected from showers and sink faucets used by patients identified with illness onset in 2018. When possible, showerheads were removed before bulk water and swab sampling to allow access to the piping interior. Biofilm samples from sink faucets and showerheads were collected with Dacron-tipped sterile swabs. Sodium thiosulfate was added to each bulk water and swab sample to neutralize the disinfectant. Bulk water samples and swabs were stored in insulated coolers and sent to CDC within 48 hours of sample collection.

### C. Laboratory Investigation

Laboratory investigations included testing clinical specimens from patients and samples collected from the environment (e.g., swabs, water, filters, etc.).

#### Clinical Specimens

Testing of clinical specimens for *Legionella* was performed at multiple laboratories. Urinary antigen testing (UAT) was performed on patient specimens in clinical laboratories where patients sought care. Respiratory specimens were collected from patients that were symptomatic and UAT-positive when possible; we requested that respiratory specimens be sent to a public health laboratory for testing. Specimens, such as tissue, collected during autopsy were sent directly to CDC.

Sputum specimens received in the NH Public Health Laboratories (PHL) underwent *Legionella* direct fluorescent antibody (DFA) testing and culture. Smear slides were prepared from patient sputa and the DFA was performed using the *Legionella* (Direct) Fluorescent test system (Scimedx, Denville, NJ) according to manufacturer guidelines. The DFA assay contains species-specific polyvalent conjugate antibodies and detection is specific for *Legionella pneumophila* serogroups 1-6 but does not differentiate between those serogroups. Culture of *Legionella* from clinical specimens was performed using Buffered Charcoal Yeast Extract (BCYE) containing PAV (Remel, Lenexa, KS). Culture plates were placed in a humidity chamber to maintain moisture, incubated at 35°C for 14 days, and inspected daily for growth. Colonies with morphology consistent with *Legionella* species were sub-cultured, and a Gram stain and biochemical testing (hippurate and beta-lactamase) were performed to confirm genus-level identification. All remaining specimens from clinical samples were shipped to CDC for further testing. Materials and methods used for specimens sent to other public health laboratories are not described here, but due to accreditation and certification standards, methods are similar to those employed by the NH PHL and CDC.

At CDC, clinical samples were tested by multiplex polymerase chain reaction (PCR) and culture testing according to CDC's established protocols and procedures. Any *Legionella*-like organisms recovered were identified to species level. *Legionella pneumophila* isolates that were not serogroup 1 were tested by slide agglutination and DFA to confirm serogroup. *Legionella* isolates that were not *Legionella pneumophila* species underwent *mip* gene sequencing to determine species. Whole genome sequencing (WGS) was conducted on *Legionella pneumophila* isolates.

Whole genome multi-locus sequence typing (wgMLST) was used to analyze WGS and, where possible, sequence-based types (SBT) was determined from the sequences.

### **Environmental Samples**

All environmental samples were sent to CDC for multiplex PCR and culture testing according to established protocols and procedures [9]. Samples were processed within 48 hours of collection and inoculated on BCYE media plates, either without antibiotic selection or containing PVC and GPVC ([P] = polymyxin B (1000 U/L), [V] = vancomycin (5mg/mL), [C] = cyclohexamide (80 mg/mL), [G] = glycine (2 g/L)). Isolates displaying growth only when supplemented with cysteine were screened for *Legionella pneumophila* serogroup 1 antigen using monoclonal antibodies. Genomic DNA from isolates was extracted and tested using a multiplex *Legionella* PCR assay, which detects *Legionella* species, *Legionella pneumophila*, and *Legionella pneumophila* serogroup 1. Sanger sequencing of the *mip* gene was conducted for species confirmation. WGS was conducted on *Legionella pneumophila* isolates. wgMLST was used to analyze WGS and, where possible, sequence-based types (SBT) was determined from the sequences.

### III. RESULTS

The results of the epidemiologic, environmental, and laboratory investigations are described below.

#### A. Epidemiologic Investigation

A total of 49 persons with confirmed, probable, or suspect legionellosis were identified during this investigation, including 20 meeting criteria for confirmed legionellosis, 14 meeting criteria for probable legionellosis, and 15 meeting criteria for suspect legionellosis. An additional 37 persons reporting possibly compatible illnesses were investigated, with 33 lacking enough information to assign a case classification based on the case definitions ([Table 1](#)), three determined not to be cases of legionellosis, and one individual with confirmed legionellosis who denied visiting Hampton, NH during the two weeks before becoming ill. All 34 persons with confirmed or probable legionellosis exhibited symptoms consistent with Legionnaires' disease (i.e. *Legionella pneumoniae*). Among the 15 persons with suspect legionellosis, four exhibited symptoms consistent with Legionnaires' disease and 11 exhibited symptoms consistent with Pontiac fever. Most persons with confirmed and probable legionellosis were hospitalized as a result of their illness and two died. Both individuals who died were adults, one over age 65 years, with laboratory-confirmed Legionnaire's disease. See [Table 2](#) for additional clinical information for persons with confirmed, probable, or suspect legionellosis associated with this outbreak. Illness onset for all persons with confirmed, probable, or suspect legionellosis occurred between June 1<sup>st</sup>, 2018 and September 6<sup>th</sup>, 2018 ([Figure 1](#)).

Among all 49 persons with confirmed, probable, or suspect legionellosis, ages ranged from 3 to 88 years old and 24 (49%) were female. Most persons with confirmed, probable, or suspect legionellosis were visitors to Hampton, NH. Six (13%) were residents of NH; the majority were residents of Massachusetts (n=26, 53%). See [Table 3](#) for additional information on the characteristics of persons with confirmed, probable, or suspect legionellosis stratified by case classification.

Through the course of patient interviews, two areas of possible exposure in Hampton Beach were identified: The Sands Resort and the L Street and M Street block of Ashworth Avenue and Ocean Boulevard. A total of 34 (69%) persons with confirmed, probable, or suspect legionellosis reported overnight stays at The Sands Resort in the 14 days prior to illness onset. Out of these 34 persons who stayed at The Sands Resort, 17 (52%) reported using the hot tub, 21 (64%) reported



being in the hot tub room, and 24 (73%) reported taking a shower in a guest room. Additional information on The Sands Resort guests is provided in [Table 4](#).

Fifteen persons (31%) did not stay at The Sands Resort, but reported other exposures to nearby areas including exposure to the L Street and M Street block of Ashworth Avenue and Ocean Boulevard. Among these 15 people, 11 (73%) reported walking by The Sands Resort or visiting a nearby establishment within a few blocks of The Sands Resort in the northern area of Ashworth Avenue ([Figure 2](#)); the remaining four individuals, including one who died, had incomplete interview information so their presence in this immediate vicinity is not known, though all were known to be within approximately 0.5 miles of The Sands Resort in the Ashworth Avenue/Ocean Boulevard area. Ashworth Avenue is a one way street heading south and Ocean Boulevard is one way heading north until Island Path, therefore it is common for people who drive in this area to loop around both roads in order to get to various locations in the area.

In terms of exposures to other locations in Hampton, no other location with the potential for *Legionella* growth was visited by the majority of cases ([Table 3](#)). The only other hot tub that persons with confirmed legionellosis reported using was the Harris Sea Ranch Motel outdoor hot tub; two people reported using this hot tub, one of whom stayed overnight in the facility. Both of these individuals also walked in the northern area of Ashworth Avenue near The Sands Resort. Four additional persons with confirmed legionellosis reported being near the Harris Sea Ranch Motel hot tub, but at least two of these individuals were also in the immediate vicinity of The Sands Resort; the remaining two had incomplete interview information and it is not known if they had been in the vicinity of The Sands Resort.

The NH and national legionellosis case report databases were searched to identify historical cases of legionellosis associated with Hampton, NH. This search identified one case of Legionnaires' disease in a Canadian resident who visited The Sands Resort a year prior in August of 2017.

**Table 2. Clinical Features of Persons with Confirmed, Probable, and Suspect Legionellosis**

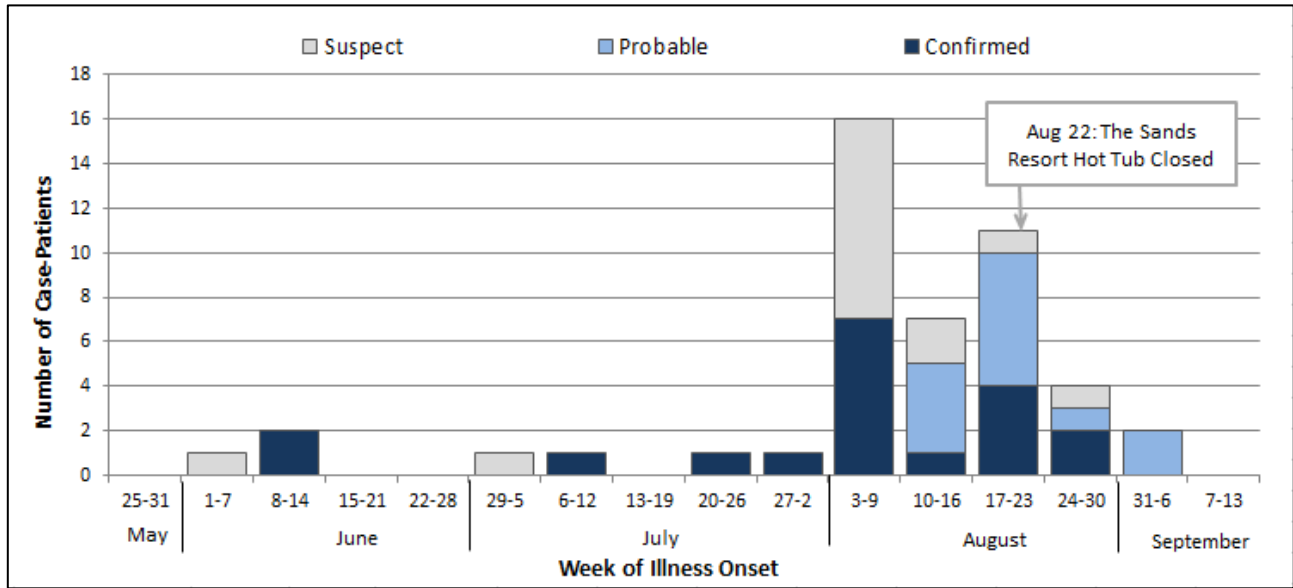
Characteristic	Confirmed n (%)	Probable n (%)	Suspect n (%)
Total	20	14	15
Hospitalized	16 (80)	5 (36)	1 (7)
Died	2 (10)	0 (0)	0 (0)
Illness Onset Dates (range)	6/10 – 8/26	8/10 – 9/6	6/1 – 8/25
Clinical Syndrome			
Legionnaire’s disease (pneumonia)	20 (100)	14 (100)	4 (27)
Pontiac Fever	0 (0)	0 (0)	11 (73)
Symptoms			
Fever	15 (75)	10 (71)	13 (87)
Cough	18 (90)	10 (71)	7 (47)
Myalgia	6 (30)	5 (36)	5 (33)
Malaise	14 (70)	6 (43)	5 (33)
Anorexia	2 (10)	1 (7)	6 (40)
Headache	9 (45)	5 (36)	5 (33)
Gastrointestinal Symptoms	5 (25)	5 (36)	4 (27)
Laboratory Results*			
Culture-positive	1 (5)	0 (0)	0 (0)
Urine antigen-positive	19 (95)	0 (0)	0 (0)
Direct-fluorescent antibody-positive	0 (0)	0 (0)	0 (0)
Nucleic acid test-positive	2 (10)	0 (0)	0 (0)
Seroconversion	NT	NT	NT

Note: See [Table 1](#) for case definitions for Confirmed, Probable, and Suspect cases.

\* This table provides information on known positive test results. Not all persons submitted clinical specimens for testing, nor were all specimens submitted subjected to each test.

NT: Not tested.

Figure 1. Epidemic Curve: Illness Onset Dates Over Time



Note: The exact illness onset date is not known for one confirmed and one probable case (n=47).

**Table 3. Characteristics of Persons with Confirmed, Probable, or Suspect Legionellosis**

Characteristic	Confirmed n (%)	Probable n (%)	Suspect n (%)
Total	20	14	15
Female	10 (50)	8 (57)	6 (40)
Male	10 (50)	6 (43)	9 (60)
<b>Age</b>			
Median (in years)	54	43	32
Range (in years)	33-88	3-78	6-62
<b>Residence</b>			
NH	1 (5)	1 (7)	4 (27)
MA	14 (70)	6 (43)	6 (40)
CT	2 (10)	2 (14)	0 (0)
NY	2 (10)	3 (21)	4 (27)
VT	1 (5)	0 (0)	0 (0)
Canada	0 (0)	2 (14)	0 (0)
Other	0 (0)	0 (0)	1 (7)
<b>Selected Area Locations*</b>			
Sea Ketch Restaurant	6 (30)	5 (36)	7 (47)
Casino Ballroom	5 (25)	1 (7)	3 (20)
Casino Arcade	4 (20)	3 (21)	7 (47)
Cascade Café	5 (25)	1 (7)	3 (20)
The Ashworth	4 (20)	0 (0)	4 (27)
Bernie's Beach Bar	3 (15)	2 (14)	6 (40)
JB's Seafood	3 (15)	0 (0)	3 (20)
Little Jack's Diner	2 (10)	1 (7)	3 (20)
L Street Tavern	2 (10)	0 (0)	0 (0)
The Goat	2 (10)	0 (0)	3 (20)
The Village Silversmith	2 (10)	0 (0)	0 (0)
Wally's Bar	2 (10)	1 (7)	3 (20)
<b>Overnight Stay</b>			
Sands Resort	14 (70)	9 (65)	11 (73)
Harris Sea Ranch	1 (5)	0 (0)	0 (0)
Other	3 (15)	4 (28)	4 (27)
No overnight stay	2 (10)	1 (7)	0 (0)

Note: See [Table 1](#) for case definitions for Confirmed, Probable, and Suspect cases.

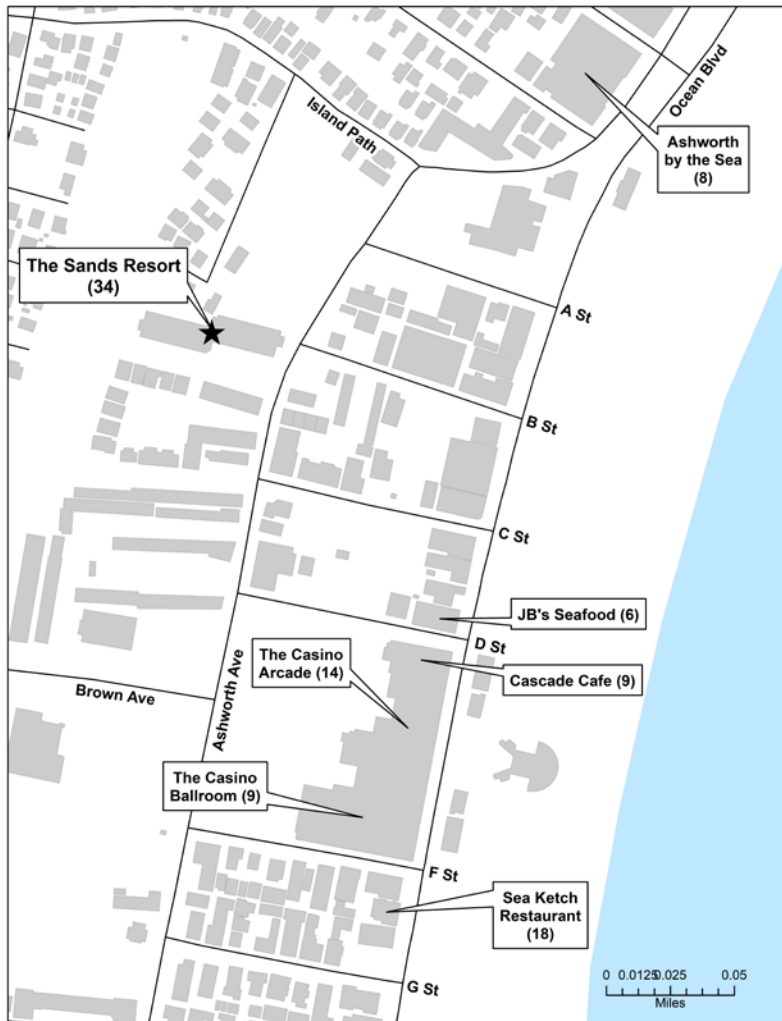
\* Indoor locations listed by two or more persons with confirmed legionellosis. Many individuals reporting walking around the Hampton Beach area, along the boardwalk, or visiting various locations that could not be precisely remembered.

**Table 4. Exposure to The Sands Resort by Persons with Confirmed, Probable, or Suspect Legionellosis**

Exposure	Confirmed n (%)	Probable n (%)	Suspect n (%)
Total	20	14	15
Spent time in area of the property	18 (90)	13 (93)	14 (93)
Overnight stay	14 (70)	9 (64)	11 (73)
Used hot tub	5 (25)	2 (14)	10 (67)
Went in hot tub room	7 (35)	4 (29)	10 (67)
Took shower in room	8 (40)	8 (57)	8 (53)

Note: See [Table 1](#) for case definitions for Confirmed, Probable, and Suspect cases.

**Figure 2. Map of Establishments in The Sands Resort Area Most Commonly Visited by Persons with Confirmed, Probable, or Suspect Legionellosis**



Note: Numbers in parentheses represent the number of persons with confirmed, probable, or suspect legionellosis who reported visiting each location.

## B. Environmental Investigation

The environmental investigation consisted of an assessment of the area for possible sources of *Legionella* bacteria and review of water management practices at establishments of interest based on canvassing of the area or interviews with persons reporting confirmed, probable, or suspect legionellosis. [Figure 3](#) provides a map of the area of interest.

**Identification of Cooling Towers:** No cooling towers within a 1.5-mile radius were identified on satellite imagery or through query of major cooling tower sales and service companies. One area with tightly clustered buildings was difficult to view on satellite imagery so a drone and operator were provided by the City of Dover, NH to further investigate the area. No cooling towers were identified.

**The Sands Resort:** The Sands Resort is a condominium hotel located at 32 Ashworth Avenue in Hampton, NH that has been in operation for around three decades. The hotel parking lot is located along a heavily trafficked part of Ashworth Avenue and adjacent to one of the main public parking lots for visitors to Hampton Beach. The property has four stories and 84 guest rooms located on the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> floors. The first floor has an office, storage/mechanical/utility rooms, a workout area, and a hot tub room. Each of the top three floors has 28 rooms with the same layout, each with a kitchen sink, bathroom sink, and a shower. The building is serviced by the public water system, Aquarion Water Company. Some of the units are privately owned, but reservations for all units are made centrally through The Sands Resort booking system.

According to the owner of The Sands Resort, the hot tub was installed in the early 1990s and had been operated the same way for at least 20 years, with the exception of installation of a new pump system in the spring of 2018. Per interviews with resort staff, the hot tub was maintained by manual feeding of disinfectant, which was measured twice a week after cleaning and before the hot tub was re-opened to guests.

The inspection of the hot tub identified significant concerns with the design, construction, equipment, operation and maintenance of the hot tub, which did not meet basic DES requirements [10], and was not permitted by DES. The hot tub volume measured 13 feet by 7 feet and was approximately 1200 gallons in the shape of an oval ([Figure 4](#)). It was housed in a room not much larger than the hot tub itself. The hot tub area had a single ventilation duct that exhausted directly outside into a parking area and next to outdoor showers, seating etc. ([Figure 5](#)). The owner and

maintenance staff reported that the hot tub was drained via sump pump and cleaned twice a week. In addition to a number of physical safety concerns, key observations relevant to this outbreak include:

- There was no automatic or automated disinfection system. Disinfectant was reported to be hand-fed every few days. No source of chlorine or bromine was identified on the premises.
- Available written records indicated that testing was only being conducted once every 2-4 days and that not all required test parameters were being measured or recorded. Available records showed bromine results only. No pH or temperature results were documented as being performed.
- Both test results and drain/clean schedules were recorded on clean sheets of white paper dating back only to August 1, 2018 (one month). Twelve months of records demonstrating daily monitoring prior to opening and every 4 hours during operation were not available, as required by administrative rules Env-Wq 1100 [10].

In regards to the potable water system, incoming cold water from the water main was not readily accessible for assessment or sampling the day of the site visit. Hot water at The Sands Resort was supplied by two boilers, which were set at 115°F and 120°F the day of the site visit. According to the owner, the boilers and accompanying water storage tanks were installed the previous winter. The hot water system did not recirculate. Units were selected for assessment and sampling based on where ill guests reported staying as well as potential for stagnation. Hot water temperatures at points-of-use ranged from 101.7–108.1°F, pH from 6.32–6.60, and free chlorine from 0.2–1.4 mg/L. Cold water was assessed from a distal point-of-use at the kitchen sink of unit 418. The temperature was 79.0°F, pH was 6.98, and there was a free chlorine residual of 0.7 mg/L.

Thirty-four bulk water and swab samples were collected from The Sands Resort, including 15 from guest room sinks and faucets, 9 from the hot tub, 6 from the boilers and storage tanks, 2 from the fitness room adjacent to the hot tub room, and 2 from an outdoor hose used by guests to rinse off after going to the beach ([Appendix 3](#)). Free chlorine in two of the bulk water samples collected at faucet heads was measured as being higher than that of the municipal water system servicing the building (2.3 mg/L and 1.3 mg/L in two guest rooms vs. 0.2 – 1.1 mg/L in the municipal water according to the 2017 routine municipal water testing report [11]).

On September 7, 2018, DES issued a formal Letter of Deficiency outlining the deficiencies noted during the inspection and recommending the hot tub stay closed until it was properly permitted and deficiencies were addressed, as required by state law RSA 485-A:26 and administrative rules Env-Wq 1100 [10]. On September 20, 2018, the owner of The Sands Resort reported that the hot tub would be permanently closed and removed from the property.

**Harris Sea Ranch Motel:** The Harris Sea Ranch Motel is located at 75 Ocean Boulevard, Hampton, NH. The establishment had an outdoor hot tub located in the center of a court yard facing Ocean Boulevard that was used by two persons with confirmed legionellosis. On August 30th, 2018, DES inspected the hot tub and determined that the un-permitted hot tub, as designed and constructed, was intended for residential use and did not meet the design and construction requirements of Env-Wq 1107 Design and Construction Features For Hot Tubs [10]. In addition to a number of physical safety concerns, there was no automatic or automated disinfection system, which was reported to be hand-fed. The temperature of the water was measured at 94°F with a pH of 7.05. The free chlorine level was noted to be greater than 10 mg/L, a level not safe for human contact, suggesting significant hyperchlorination of the hot tub prior to the arrival of investigators. Ten environmental samples were collected, including 1 bulk water sample and 6 swabs from the hot tub, a piece of the hot tub filter, and 1 bulk water sample and 1 swab from an outdoor hose. On September 7, 2018, DES issued a formal Letter of Deficiency outlining the deficiencies noted during the inspection and recommending the hot tub stay closed until it was properly permitted and deficiencies were addressed, as required by state law RSA 485-A:26 and administrative rules Env-Wq 1100 [10].

**Hampton Beach Public Shower South:** Hampton Beach is a major recreational area running along the Atlantic Ocean on the NH coast. It includes many business as well as an amphitheater and three public restroom / shower facilities (north, main, and south). The south public shower is located on Ocean Boulevard across from M Street. It was assessed during this investigation because of its proximity to the L-M streets portions of Ashworth Avenue, where some persons with confirmed, probable, or suspect legionellosis had reported visiting. No public health and safety concerns related to this outbreak were identified during the environmental assessment of this facility. Water parameters obtained from one showerhead revealed a free chlorine residual of 0.8, pH of 7.52 and temperature of 79.9°F. A bulk water sample was collected from the shower for *Legionella* testing.



**Village Silversmith:** The Village Silversmith is a retail business selling jewelry and other items located at 83 Ocean Boulevard, Hampton, NH. It was visited during this investigation because, upon canvassing of the area, it was noted to have a small fountain outside the front entrance for patrons to “mine” for gems. The fountain consisted of a pump and a trough approximately 6 inches wide and 48 inches long; the recirculating system held about five gallons of water. Minimal aerosolization potential was observed during the site visit. The temperature of the fountain water was measured at 79°F with a free chlorine residual of 0.1 mg/L. A bulk water sample and a swab from the scum line were collected from the fountain for *Legionella* testing.

**Other Locations Evaluated:** Other locations in the Hampton Beach area were also assessed based either on their prominence in the community or because they were specifically mentioned by one or more persons with confirmed, probable, or suspect legionellosis during interviews. These locations included Cascade Water Park and a decorative fountain at Buc’s Lagoon mini golf. The Cascade Water Park is a large public water slide located on D Street between Ashworth Avenue and Ocean Boulevard. Per the facility operator, disinfection was achieved with a puck-style chlorine feed system. A mixed-media pressure filter was used during the cleaning cycle, which had undergone appropriate backwash procedures. The facility operator maintained thorough operation records and demonstrated significant knowledge of water management for pathogen control. Free chlorine was measured at 4.0 ppm, within the range recommended for recreational water. Buc’s Lagoon is located on the corner of Ocean Boulevard and N Street and was noted during canvassing of the area to have a large decorative pond that included a waterfall and fountain. Per the facility owner, the attraction is closed and drained during the winter and refilled each spring with municipal water. Chlorine was added manually. Both locations were evaluated for risk of potential *Legionella* growth and transmission but no samples were collected because they were deemed unlikely to have caused the outbreak because they were not located in the areas where the majority of cases spent time, and/or because they were not at increased risk for *Legionella* growth and transmission. There were no cooling towers or other sources concerning for water aerosolization identified within 1.5 miles of the Hampton Beach area.

Figure 3. Map of the Hampton Beach Area and Locations of Environmental Investigations

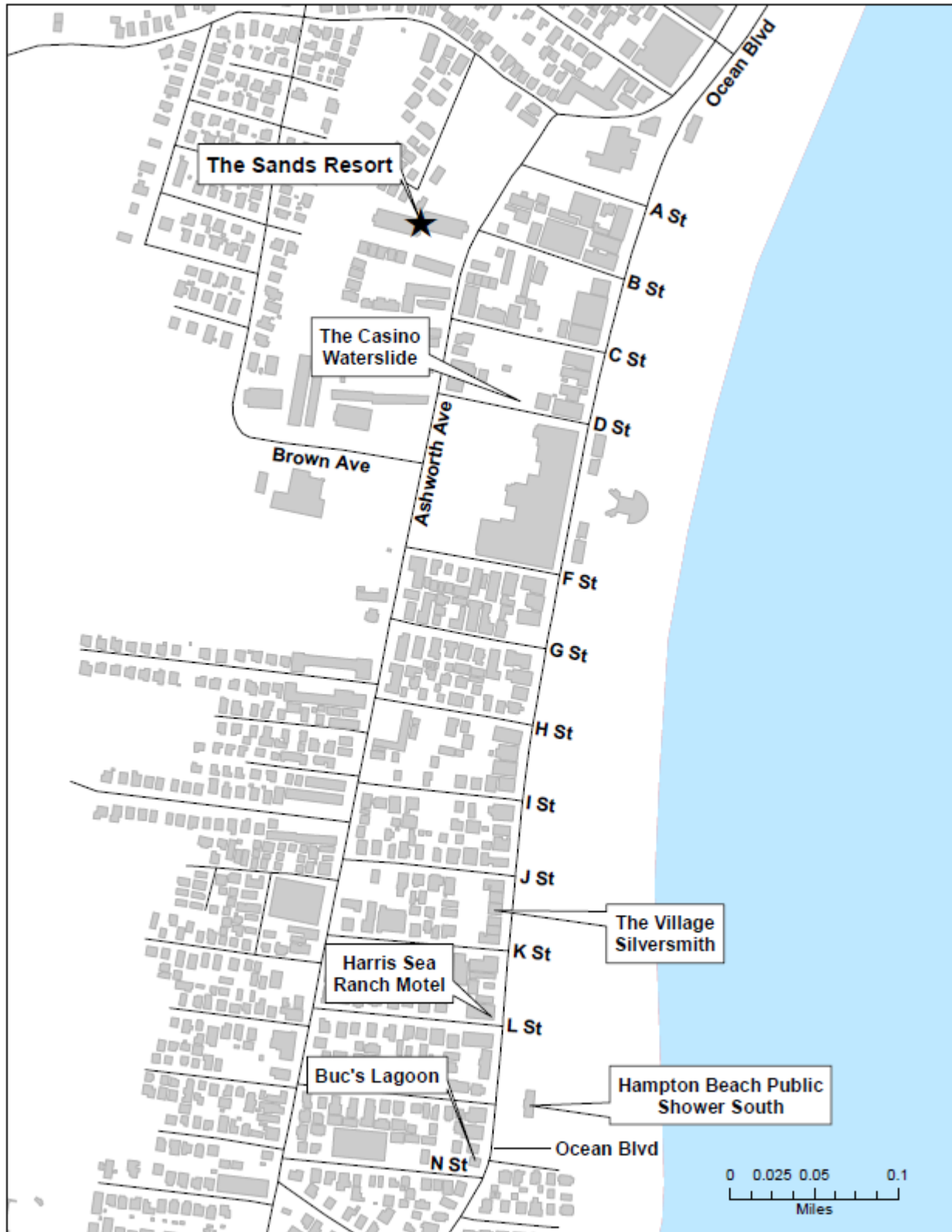


Figure 4. The Sands Resort Hot Tub at Time of Assessment



Figure 5. The Sands Resort Hot Tub Room Exterior Vent



### C. Laboratory Investigation

Clinical and environmental samples were collected during the course of this investigation. A summary of all samples submitted to CDC is provided in [Table 5](#).

#### **Clinical Specimens:**

Clinical specimens collected from patients with suspected legionellosis included urine, respiratory, and tissue samples. Clinical specimen test results for these persons are summarized in [Table 2](#). A total of 5 persons under investigation for suspected legionellosis had respiratory specimens collected for culture and sent to a public health laboratory. Four of these respiratory specimens were sent to the NH PHL for testing and 2 (50%) grew *Legionella* in culture; these positive specimens were shipped to CDC for additional testing. One sputum sample from a NY resident was sent to the NYS PHL where it was determined to be culture-negative; this specimen was also shipped to CDC for additional testing. Additionally, a lung tissue sample was collected from one individual during autopsy and shipped to CDC for testing.

Among the five clinical respiratory specimens sent to CDC, two came from patients associated with the outbreak and two were collected from patients who were ultimately determined to have alternative non-legionellosis diagnoses. The fifth specimen was collected from a patient with confirmed Legionnaires' disease who denied travel to the Hampton Beach area in the 14 days before illness; multiplex PCR and nested SBT of this patient's specimen identified *Legionella pneumophila* serogroup 1, sequence type 62, which was unrelated to the identified strain of *Legionella* in this outbreak, sharing less than 6% allele identity in the wgMLST analysis. Among the two outbreak-associated specimens, one was collected from a patient with confirmed Legionnaires' disease with an overnight stay at The Sands Resort who entered the hot tub room but did not use the hot tub. Multiplex PCR identified *Legionella pneumophila* serogroup 1 in this specimen and nested SBT indicated the isolate was sequence type 94 (ST94). The other outbreak-associated specimen, which was culture-negative, was collected from a patient with probable Legionnaires' disease who reported exposure to the Harris Sea Ranch Motel hot tub as well as being in the vicinity of The Sands Resort. This individual was diagnosed with pneumonia clinically but had negative UAT, which was tested at a local clinical laboratory after a 10-day course of antibiotics was completed.

The lung tissue collected from a The Sands Resort guest during autopsy was first submitted to the CDC pathology laboratory, which found evidence of *Legionella pneumophila* serogroup 1

using immunohistochemistry assays and *Legionella pneumophila* by PCR. The pathology lab also identified histopathologic evidence of pneumonia. The specimen was sent to the CDC *Legionella* laboratory for additional testing where *Legionella pneumophila* serogroup 1 was detected by PCR. *Legionella* DNA present in the specimen was revealed to be sequence type 94 (ST94) via the nested SBT method, which is the same strain identified in one other patient in this outbreak as well as the environmental samples collected from the hot tub at The Sands Resort.

**Environmental Samples:**

A total of 47 environmental samples were collected during the environmental assessment, including 34 samples collected from The Sands Resort, 10 samples collected from the Harris Sea Ranch Motel hot tub, two samples collected from the Village Silversmith's outdoor fountain, and one sample collected from the Hampton Beach South public showers. Test results for all environmental samples are available in [Appendix 3](#) and summarized in [Table 5](#). No *Legionella* bacteria were detected in the sample from the public shower or the samples collected from the Harris Sea Ranch Motel hot tub; however, the free chlorine levels in the Harris Sea Ranch Motel hot tub were very high and exceeded the upper range of the Hach DR900 instrument used to evaluate chlorine levels in this investigation (>10 mg/L). One of the two environmental samples collected from the Village Silversmith fountain was PCR-positive for *Legionella*; the isolate recovered from this sample was identified as *Legionella taurinensis*, which is a species of *Legionella* recovered from environmental sources and rarely, if ever, associated with disease [4].

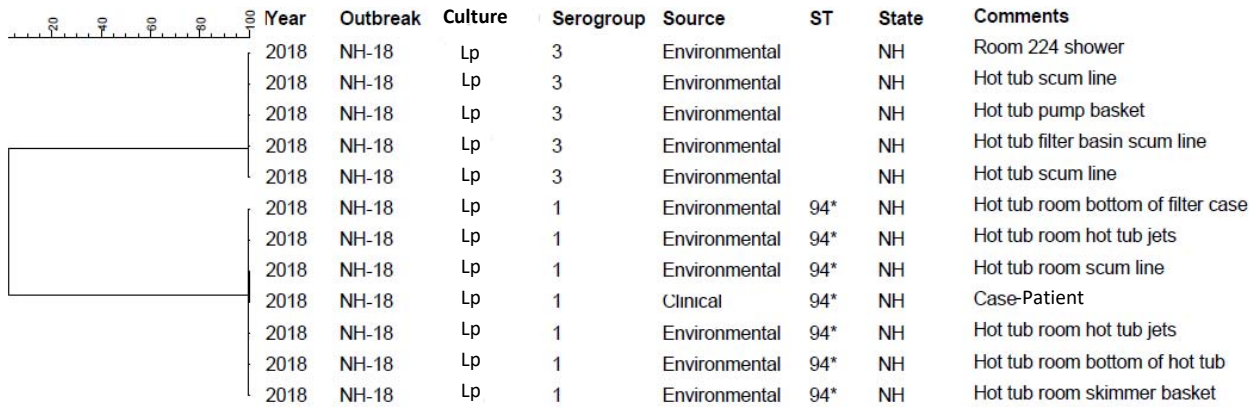
The nine samples collected from The Sands Resort hot tub were from the filter basin scum line (swab), bottom of filter case (swab), pump basket (bulk water), hot tub scum line (swab), bottom of hot tub (swab), jets (2 swabs), skimmer basket (swab), and cold water used to fill the hot tub (bulk water). *Legionella* bacteria were detected by PCR in seven of these samples. Eight samples grew *Legionella*-like organisms on culture, including one that was negative by PCR; some samples grew more than one type of *Legionella* species. The *Legionella*-like organisms were identified as *Legionella pneumophila* serogroup 1 (6 samples), *Legionella pneumophila* serogroup 3 (4 samples), *Legionella dumofii* (5 samples), and *Legionella quinlivanii* (3 samples). The significant diversity of *Legionella* species recovered from the hot tub suggests that conditions supporting *Legionella* growth and transmission were favorable.

Among the 25 non-hot tub samples collected from The Sands Resort, *Legionella* bacteria were detected in nine by PCR including in samples taken from guest rooms (224, 328, and 418), a boiler and storage tank, and the outdoor hose. One sample from the shower in guest room 224 grew *Legionella pneumophila* serogroup 3. Viable *Legionella* bacteria were not detected by culture in the remaining samples; however, because PCR detects DNA from both viable and non-viable bacteria, detection of the bacteria by PCR indicates the bacteria were present throughout much of the water system at some point.

**Whole Genome Sequencing:**

WGS was performed on the six *Legionella pneumophila* serogroup 1 isolates recovered from The Sands Resort hot tub. All six were found to share >99.8% allele identity with an isolate recovered from a person who stayed overnight at The Sands Resort prior to developing Legionnaires’ disease (Figure 6). These samples formed a distinct clade representing an ST94 strain of *Legionella pneumophila* serogroup 1 that is not among the most common strains seen in the United States [12]. Metagenomic sequencing was attempted on a fixed lung tissue specimen from a second patient, but it was ultimately unsuccessful; however, molecular subtyping also identified the strain in this specimen to be ST94. Five *Legionella pneumophila* serogroup 3 isolates recovered from The Sands Resort hot tub formed an additional distinct clade. No patient specimens with *Legionella pneumophila* serogroup 3 were identified for comparison.

**Figure 6. Dendrogram Demonstrating Genetic Relatedness between Environmental and Clinical Samples by Whole Genome Sequencing Analysis**



Lp: *Legionella pneumophila*; NH: New Hampshire

**Table 5. Samples Sent to the U.S. Centers for Disease Control and Prevention**

Sample Type	PCR pos (+)	PCR neg (-)	Culture pos (+)	Culture neg (-)	Culture not tested	Total
Clinical Specimens or Isolates	3 Lp1 <sup>¥</sup>	3	2 Lp1 <sup>¥</sup>	3	1 <sup>Ω</sup>	6
Environmental Samples	17	30	11	36	0	47
The Sands Resort	9 Lp1 7 L spp	18	10*	24	0	34
Harris Sea Ranch Hotel	0	10	0	10	0	10
Hampton Beach South Public Shower	0	1	0	1	0	1
The Village Silversmith Fountain	1 L spp	1	1†	1	0	2
<b>Total</b>	<b>20</b>	<b>33</b>	<b>13</b>	<b>39</b>	<b>1</b>	<b>53</b>

Lp1: *Legionella pneumophila* serogroup 1; L spp: *Legionella* species

<sup>¥</sup>The same two specimens that tested PCR-positive also tested culture-positive.

<sup>Ω</sup> The specimen-type (fixed-tissue) prevented culture testing.

\* 39 individual colonies were isolated from these ten samples. Of the 39 colonies, 16 were *Legionella pneumophila* serogroup 1, 10 were *Legionella pneumophila* serogroup 3, 8 were *Legionella quinlivanii*, and 5 were *Legionella dumoffii*.

† The isolate recovered from this sample was identified as *Legionella taurinensis*.

## IV. CONTROL MEASURES

Several measures to prevent further transmission of *Legionella* to individuals in the community were taken throughout the course of this investigation.

### A. Hot Tub Closures

On August 22, 2018, the Town of Hampton, NH Health Officer followed up on an email dated August 20, 2018 from a nurse at a local Board of Health in Massachusetts who was reporting two confirmed Legionnaires' disease cases possibly associated with a hot tub at The Sands Resort. The Hampton Health Officer called the owner of The Sands Resort to discuss the complaint and to instruct the owner to shut down the hot tub until it could be tested. On August 22, 2018 when the Massachusetts Department of Public Health confirmed the Legionnaires' disease cases, DHHS notified DES, which inspects public pools and hot tubs. DES had no record of the hot tub and made a plan to inspect The Sands Resort hot tub, which was tentatively scheduled for August 27, 2018. DHHS also called the Hampton Health Officer to inform him of the ill individuals and to confirm the hot tub was shut down until DES could conduct its inspection. Both DES and DHHS spoke to the owner of The Sands Resort on August 23, 2018 to reaffirm that the hot tub should be closed pending inspection. The Sands Resort owner indicated the hot tub had been drained. DES called the owner of The Sands Resort on August 27, 2018 to inform him that the DES inspection would be postponed pending coordination with DHHS and CDC, who would also be coming on site in response to DHHS' request for assistance.

On August 29, 2018, DHHS, DES, a Town of Hampton official, and CDC staff visited The Sands Resort to conduct an environmental assessment of the facility. The maintenance manager reported that the hot tub had been closed to guests since they were asked to close it on August 22, 2018. He reported they had drained, cleaned, and refilled it over the weekend and then drained it again on Monday August 27, 2018 in anticipation of the DES visit. He said they had put up signs on the door notifying guests that the hot tub was closed for use.

On August 30, 2018, the Harris Sea Ranch Motel was instructed to close its hot tub upon identifying two persons with confirmed Legionnaires' disease who reported using the hot tub at this location. DES also had no record of this hot tub and the facility was instructed to keep the hot tub closed until a completed application was submitted to DES for review and deficiencies identified in the August 30, 2018 inspection were corrected.



**B. Public Notification**

Following identification of the initial four *Legionella* infections in Hampton, DHHS alerted the public of the outbreak and recommended that people at increased risk of infection (those who are 50 years old or greater, have chronic respiratory disease, or have a weakened immune system) consider avoiding the area of Ashworth Avenue from Island Path to H Street until the source of the outbreak was identified. This recommendation was later expanded to include Ashworth Avenue from Island Path to M Street. The first notification was made via press release on August 25, 2018, with updates on the investigation provided on August 30<sup>th</sup>, August 31<sup>st</sup>, September 2<sup>nd</sup>, September 4<sup>th</sup>, September 6<sup>th</sup>, and September 18<sup>th</sup>. A total of seven press releases were issued ([Appendices 4-10](#)). Press avails were held on August 25<sup>th</sup> and August 30<sup>th</sup> to answer questions from the media and one public meeting was held on August 27<sup>th</sup> to provide information and answer questions from the Hampton business community.

DHHS operated a public inquiry line from August 25<sup>th</sup> to September 13<sup>th</sup> to answer questions from the public and take reports of potential illnesses that may have been associated with the outbreak. A set of Frequently Asked Questions was posted to the DHHS website ([Appendix 11](#)). The DHHS Bureau of Infectious Disease Control fielded calls from healthcare providers throughout the investigation and handled all calls from the public after the closure of the public inquiry line on September 13<sup>th</sup>. In addition to the number of calls made to the public inquiry line described in [Table 6](#), the Bureau of Infectious Disease Control responded to 63 calls from the public and 13 calls from healthcare providers regarding this outbreak.

**Table 6. Number of Calls to NH DHHS Public Inquiry Line, August 25 – September 13, 2018**

Type of Caller	Total
Number of Well Individuals with Questions	207
Number of Individuals Reporting Unconfirmed Illness	42
Number of Individuals Reporting Legionella Infection	9
Total	258

### C. Public Health Order

DHHS received initial test results from the CDC on September 2, 2018 showing detection of *Legionella* by PCR in both the hot tub and the water distribution system within The Sands Resort. Because legionellosis is a serious communicable disease that may adversely impact public health, on September 2, 2018, DHHS issued a public health order ([Appendix 12](#)) under RSA 141-C requiring the facility to 1) notify guests of the risk of Legionnaires' disease, 2) hire a contractor to remediate the establishment, and 3) conduct ongoing testing to ensure the building was remediated. In terms of guest notification, the Sands Resort was required to post signage ([Appendix 13](#)) at all entries to the premises and at the registration desk, to notify all guests at the time of reservation (including reservations by phone, internet, and in-person) using documents and exact wording provided by DHHS ([Appendix 14](#)), and to notify all guests at the time of check-in with a letter ([Appendix 15](#)). These documents were updated on September 13, 2018 at the request of The Sands Resort to reflect the remediation procedure that was performed at the facility ([Appendices 16-18](#)).

On August 30, 2018, The Sands Resort was asked to provide guest information for all reservations between June 1, 2018 and August 27, 2018 (the day the hot tub was drained and closed indefinitely). After the preliminary environmental test results were received demonstrating identification of *Legionella* via PCR from multiple locations throughout the facility, an additional list was requested for guests between August 28, 2018 and September 2, 2018, the date that guest notification was required proactively as part of the public health order. Contact information was provided for 1,348 guests from 24 states and Canada. All guests with valid mailing addresses were mailed notification letters ([Appendix 19](#)). Additionally, all guests with valid email addresses were sent an email ([Appendix 20](#)) with the same notification letter attached to expedite receipt of the letter. Any recent guests (those staying from August 17, 2018 – September 2, 2018) who were still in the window (incubation period) for potentially developing illness following their stay and who did not have a valid mailing or email address were attempted contact by telephone. Notified guests were asked to forward the information on to other individuals with whom they may have travelled.

#### D. Remediation of The Sands Resort

On September 3, 2018, The Sands Resort hired Resource Environmental Associates to conduct remediation activities. The contractor elected to remediate the water system by superheating the water and flushing the hot and cold water lines throughout the facility. Additionally, the contractor either replaced, or chlorinated fixtures and hoses. According to the contractor, the remedial action was carried out in accordance with methods described in Chapter 7 of the OSHA Technical Manual, which, as of 8/23/2018, had been archived by OSHA and replaced with updated information complementary to CDC and American Industrial Hygiene Association (AIHA) guidelines [13]. The remediation procedure was performed on September 5<sup>th</sup> and 6<sup>th</sup>. On September 6<sup>th</sup>, the contractor collected an initial round of post-remediation samples for testing to verify effective remediation. There were 44 samples (bulk water and swabs) taken from 14 guest rooms on the second, third, and fourth floors as well as the boilers. The hot tub was not tested because it had been closed indefinitely. Test results were provided to DHHS on September 25<sup>th</sup> showing all samples as negative for detection of *Legionella* at an ELITE member laboratory. Environmental *Legionella* Isolation Techniques Evaluation (ELITE) is a CDC program that recognizes laboratories that have demonstrated their ability to isolate (grow and identify) *Legionella* from a water sample using a culture method [14].

DHHS reviewed the test results of the initial round of post-remediation sampling and determined that some samples were collected less than 24 hours after remediation and the volume of water collected for each bulk water sample was less than recommended (1 liter). Contrary to best practices recommended by CDC and other organizations, the contractor did not recommend any subsequent testing. *Legionella* can regrow in a building water system following remediation, especially before a water management program is fully implemented. As such, CDC recommends the following post-remediation sampling strategy [15-16]. The initial post-remediation samples should be collected at least 24 hours after the water system has been restored to normal operating conditions. After the initial round, ongoing culturing is recommended at 2-week intervals for three months. If no *Legionella* bacteria are detected in cultures during the first three months, samples should be collected monthly for another three months. Once the period of heightened sampling is completed, periodic environmental sampling for *Legionella* should be included as part of a comprehensive water management program.

On September 28, 2018, DHHS issued a letter to The Sands Resort reaffirming that the public health order would remain in effect until all three of the following items were provided to DHHS:

1. Negative test results from post-remediation samples that included swabs and 1 liter samples taken at least 24 hours after remediation.
2. A written plan that the establishment will implement for ongoing *Legionella* testing that includes collecting and testing repeat samples taken at regular time intervals to ensure *Legionella* does not re-grow in the weeks and months following remediation.
3. A written water management plan that the establishment will implement.

Additional detail regarding these requirements was included in the letter ([Appendix 21](#)).

On October 11, 2018, The Sands Resort contractor collected a second round of post-remediation samples, which included 44 samples (bulk water and swabs) taken from 10 guest rooms on the second, third, and fourth floors and the boilers. The hot tub was not tested because the facility decided to close it permanently. Test results were provided to DHHS on October 22, 2018 showing all samples as negative for detection of *Legionella* at an ELITE member laboratory. On October 16, 2018, The Sands Resort contractor provided a written water management plan on behalf of The Sands Resort. On October 30, 2018, The Sands Resort contractor provided a written plan for ongoing *Legionella* testing at The Sands Resort, meeting the final requirement of the public health order and the order was lifted on October 30, 2018 ([Appendix 22](#)).

At the time of this report, The Sands Resort, or its contractor on its behalf, reported taking the following measures to reduce future risk of *Legionella* growth at this facility:

- Permanent removal of the hot tub
- Increasing boiler temperatures to maintain a minimum temperature in each hot water storage tank of at least 140°F
- Implementing a flushing program to purge stagnant water in rooms with prolonged vacancies
- Plans to purchase and install a copper silver ionization unit

Other actions may also have been implemented in accordance with The Sands Resort's new Water Management Plan.

## V. DISCUSSION

Our investigation of the outbreak of legionellosis in Hampton, NH resulted in identification of 20 individuals with confirmed Legionnaires' disease and another 14 individuals with probable Legionnaires' disease but who lacked laboratory confirmation of *Legionella* infection; these infections were likely acquired between May and August of 2018 in Hampton, NH. An additional 15 individuals reported experiencing either a non-specific febrile illness or pneumonia with a less clear connection to this outbreak. The only common exposure among a majority of cases was a stay at The Sands Resort, and we were able to identify the same strain of *Legionella pneumophila* serogroup 1 in both The Sands Resort hot tub and two patients with Legionnaires' disease, indicating that The Sands Resort, and specifically the hot tub, was the primary source of this outbreak. The inadequate maintenance of The Sands Resort's hot tub as well as other conditions within the establishment, such as low hot water temperatures, may have favored the growth of *Legionella* bacteria. *Legionella* bacteria were detected in nearly half of the environmental samples collected at The Sands Resort, with six samples from the hot tub growing the same strain of *Legionella pneumophila* serogroup 1. While not confirmed through the identification of *Legionella* and clinical-to-environmental isolate comparison, the risk posed by the potable water system at The Sands Resort is also concerning for possible transmission of legionellosis. Although not every person included in this investigation reported contact with The Sands Resort, travel by or around The Sands Resort was common due to its location in the area, and aerosolization of contaminated water from the hot tub to the external environment is likely given the direct external hot tub room powered ventilation unit that could have exposed additional people passing by The Sands Resort. We cannot, however, completely exclude the possibility of a second source, but this is less likely than a single point source given:

- 1.) The extent and thoroughness of the community environmental and epidemiologic investigation; and
- 2.) The lack of any other source identified.

Additionally, since the hot tub was permanently drained and closed on August 27th, there have been no new Legionnaires' disease cases who did not report exposure to the area before closure of the hot tub, lending further support that The Sands Resort hot tub was the main source of the

community outbreak. The Sands Resort reported not allowing anyone to use the hot tub after August 22<sup>nd</sup> but did report that the hot tub was filled for a period of time between August 22<sup>nd</sup> and August 27<sup>th</sup> so it is possible that *Legionella* bacteria may have continued to be emitted outside through the exhaust fan until the hot tub was drained and permanently closed on August 27<sup>th</sup>.

The significant diversity in *Legionella* species detected throughout The Sands Resort water systems indicates that conditions were favorable for growth of *Legionella* bacteria in this facility. In addition to *Legionella pneumophila* serogroup 1, other serogroups and species of *Legionella* were identified in samples collected from The Sands Resort including *Legionella pneumophila* serogroup 3, *Legionella quinlivanii*, and *Legionella dumoffii*. This outbreak, however, was due to infection with *Legionella pneumophila* serogroup 1 based on culture results and positive UATs; the UAT only detects *Legionella pneumophila* serogroup 1 [17]. No other environmental source of *Legionella pneumophila* serogroup 1 was identified in our investigation. The only other *Legionella* bacteria cultured from our environmental investigation was from the Village Silversmith mining fountain. The species identified in the mining fountain was *Legionella taurinensis*, which was not the species associated with this outbreak. Additionally, the mining fountain did not have an effective means of dispersal of aerosolized droplets of water containing *Legionella* bacteria. Due to the ubiquitous nature of *Legionella* bacteria in the environment, it is not surprising that *Legionella* bacteria were identified from other environmental samples. *Legionella* bacteria are found naturally in water and soil and it is not unusual to identify more than one species of *Legionella* when testing environmental samples [1]. There are more than 60 species of *Legionella*, at least 19 of which have been shown to cause human illness [1]. The vast majority (>90%) of infections worldwide, however, are caused by *Legionella pneumophila* serogroup 1 [18], which was the case in this outbreak. The remaining species rarely cause human illness [18].

The other potential source of *Legionella* bacteria initially considered was the Harris Sea Ranch Motel's outdoor hot tub. All environmental and water test results from the hot tub returned negative for *Legionella*; however, the absence of *Legionella* may have been due to the very high levels of chlorination found in this hot tub at the time of sampling, which may have degraded any *Legionella* DNA present. As such, the Harris Sea Ranch Motel cannot be completely ruled out as a potential source of Legionnaire's disease; however, it was not the primary source of this outbreak due to:

- 1.) The low number of persons with confirmed, probable, or suspect legionellosis who reported exposure to the establishment; and
- 2.) Identification of the same strain of *Legionella* from two people with confirmed legionellosis and from multiple environmental samples collected from The Sands Resort hot tub.

Reported cases of legionellosis in the United States have increased by more than 400% since the year 2000, with approximately 6,000 infections being reported each year in recent years [5]. Based on national data, infections tend to occur more frequently during the warmer months of summer and early fall [5], which is consistent with the increasing number of cases observed in this outbreak as the summer progressed. In the United States, 95% of all patients diagnosed with Legionnaires' disease and reported to the CDC were hospitalized [5], which is higher than was observed in this outbreak, likely due to active case finding associated with the outbreak. During routine passive surveillance, infections would more likely come to the attention of clinicians and public health authorities only if the infection was severe enough to warrant hospitalization. Whereas in this outbreak, a number of individuals sought medical care or reported their own illness after hearing about the outbreak when they may not have otherwise done so. In this outbreak, two people died from Legionnaires' disease leading to a fatality rate among confirmed cases of 10%. About 7%–8% of Legionnaires' disease infections result in death according to national data, though this statistic can be as high as 25% for people who acquired their infections in a healthcare setting, most likely due to other comorbidities that increase risk for complications from Legionnaires' disease [19]. Among confirmed Legionnaires' disease infections reported to CDC in 2015, approximately 19% had a healthcare exposure, 14% had a travel exposure, 3% had assisted- or senior-living exposure, and 67% did not identify having any of these exposures [5].

Approximately 20 outbreaks of legionellosis are reported each year in the United States, most of which are associated with buildings with complex or large water systems, like hotels, long-term care facilities, and hospitals [20]. *Legionella* grows best in stagnant water, between 77°F and 108°F, that does not contain enough disinfectant [21]. In order for disease transmission to occur, once the bacteria are present there also needs to be a mechanism to disperse the bacteria into the air, such as through a shower or faucet head, hot tub jets, or a fan. The identified source in most outbreaks are showers and faucets, hot tubs, decorative fountains, and cooling towers (parts of large centralized air conditioning systems) [20]. In this outbreak, the primary source of *Legionella*

was likely the hot tub at The Sands Resort, though the presence of *Legionella* bacteria was also detected in the potable water system, which may have been a source of infection for some guests. As mentioned, dispersion of aerosolized *Legionella* bacteria from the hot tub room into the external environment is also possible and could have affected others not reporting direct contact with The Sands Resort. It is not known how far droplets containing *Legionella* bacteria could have travelled into the Hampton community. In one outbreak in Spain, a small cooling tower located inside of a building that was emitting aerosols outside through a vent located 6 feet above ground level (similar to the height of The Sands Resort vent) was the source of 113 *Legionella* infections (in a population of more than 28,000) in people up to a ½ mile away [22]. As has been observed in other outbreaks, even with thousands of people potentially exposed, the number of people who become ill from such an exposure is very small and is highly dependent on a variety of factors, such as whether the fan was actively operating, the concentration of *Legionella* in the hot tub room at the time, and individual characteristics like age and immune system functioning [23].

Several factors likely contributed to the occurrence of this outbreak. The Sands Resort did not have a water management program in place at the time of the outbreak, which may have contributed to conditions favoring *Legionella* growth. Additionally, water in the facility's hot water tanks was kept at a temperature favorable for *Legionella* growth. The hot tub was not permitted by DES for public use and was not appropriately monitored and disinfected to prevent growth of *Legionella*. Inadequate water treatment and residual disinfectant below the recommended levels is one of the most common contributing factors to hot tub-associated legionellosis outbreaks [24]. These contributing factors are similar to those identified in other outbreaks that have been investigated in the United States, which have often been attributed to process failures, like lack of a *Legionella* water management program and improper maintenance of water systems [20].

Because two of the initial four persons with confirmed legionellosis did not stay overnight at The Sands Resort, DHHS initially investigated the possibility that a cooling tower may have been the source of the outbreak. Cooling towers are structures that contain water and a fan, which can disperse water containing *Legionella* bacteria into the air, and have been shown to cause community outbreaks of Legionnaires' disease. Outbreaks related to cooling towers typically involve transmission of aerosolized *Legionella* within ½ to 1 mile from the cooling tower, though farther distances have been reported [22, 25-28]. During this investigation, satellite imagery and a drone



were used to detect cooling towers within a 1.5-mile radius from the area of Ashworth Avenue and none were identified. There were cooling towers on buildings outside of the 1.5-mile radius; however, the distribution of persons with confirmed, probable, or suspect legionellosis associated with this outbreak were tightly clustered along Ashworth Avenue, with over half staying overnight at The Sands Resort, and therefore the epidemiology did not support transmission from a more distant cooling tower. Investigations into community legionellosis outbreaks consistently show a pattern of increased disease transmission and number of cases closer to the source of the outbreak with decreased transmission at farther distances [22, 28].

During this investigation, some concerns were raised by the public regarding the safety of the drinking water in Hampton. Municipal water systems may transiently contain very low concentrations of *Legionella* bacteria because these bacteria are found naturally in the environment. *Legionella* in municipal water can cause problems when they enter into building water systems that are not well maintained allowing the bacteria to establish itself and grow in individual facility water systems, including devices such as hot water tanks, showerheads, and hot tubs, as was the case in this outbreak. This is why it is important for buildings at increased risk of *Legionella* growth and transmission to have water management programs in place. These programs should include designation of a water management team, a comprehensive understanding and description of the water system, identification of areas where conditions are favorable for *Legionella* growth, implementation of monitored control measures to prevent growth, an action plan for when control limits are not met, and oversight, monitoring, and communication regarding the program itself [29].

This outbreak demonstrates the importance of collaboration between public health and environmental officials, laboratorians, and building managers, which was critical to determining the outbreak's source. The coordinated and rapid response of state and local officials prevented additional cases from occurring, which was demonstrated by the fact that illnesses stopped occurring after the implicated hot tub was closed and the building's water system remediated. Adherence to public bathing regulations and following an appropriate water management plan to reduce the risk of legionellosis is essential and may have prevented this outbreak.

## VI. RECOMMENDATIONS

### A. General Recommendations

1. Property owners should implement effective water management programs that align with American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 188 [29]. The key principles of effective water management include:
  - Maintaining water temperature outside the ideal range for *Legionella* growth
  - Preventing water stagnation
  - Ensuring adequate disinfection
  - Maintaining devices to prevent scale, corrosion, and biofilm growth
2. Property owners should follow proper hot tub maintenance and operation standards to ensure continuous, good water quality. The Model Aquatic Health Code provides health and safety guidance on the design, construction, operation, maintenance, policies, and management of public aquatic facilities, such as hot tubs [30].

### B. Property-Specific Recommendations

The following recommendations were provided to specific locations during the course of the investigation.

#### **The Sands Resort:**

In order to address factors that likely contributed to the outbreak at this property, the owner or manager should:

1. Maintain water temperatures outside the ideal range for *Legionella* growth
2. Prevent water stagnation by implementing a flushing program for unoccupied rooms/devices
3. Maintain devices to prevent scale, corrosion, and biofilm growth
4. Close the hot tub until a completed application has been submitted to DES for review and the cited deficiencies can be corrected.
5. Assure proper monitoring of hot tub water parameters by: (1) testing the water for disinfectant residual, pH, and temperature prior to opening to the public each day and every 4 hours during operation; (2) recording the test results on a dated daily log sheet; and (3) maintaining operational records for the previous 12 months and making these records available to DES and patrons upon request.

6. Use a water quality testing kit with unexpired reagents, such as diethylphenylene diamine (DPD) and phenol red, capable of testing for free and total chlorine or bromine and pH.
7. Install an automated disinfection system that meets the requirements of Env-Wq 1106.08(b), which includes: (1) a positive displacement pump-type unit providing hypo-chlorination; (2) an erosion unit using either hypo-chlorite or bromine tablets with control of the erosion rate; or (3) a salt electrolytic chlorine generator [10].
8. Maintain hot tub free chlorine residuals between 2 and 4 ppm as recommended by CDC [30].

The following additional recommendations were made related to safety, though not thought to contribute to the outbreak:

1. Plainly and conspicuously mark the depth of water in feet at or above the waterline on the vertical wall of the hot tub and on the top of the coping or edge of the deck or walkway next to the hot tub.
2. Assure that the leading edge of each stair tread, swim-out, and hot tub seat or bench is outlined with a 2-inch slip-resistant contrasting tile or other permanent marking.
3. Include a flow meter in the hot tub filtration system.
4. Assure that all visible piping, including waste lines and valves and other fittings, be color coded and labeled to identify their purpose and the direction of flow.
5. Protect hot tub suction outlets as required by the Virginia Graeme Baker Pool and Hot Tub Safety Act (VGBA).

**Harris Sea Ranch Motel:**

In order to address public health and safety concerns identified during the environmental assessment, the owner or manager should:

1. Close the hot tub until a completed application has been submitted to DES for review and the cited deficiencies can be corrected.
2. Develop and adopt safety rules for patrons of the hot tub and post conspicuously-displayed signs to inform patrons of the safety rules.
3. Assure that all gates are self-closing and self-latching, open only outward from the enclosed area, be equipped with a latch located on the hot tub side of the gate and at least three inches below the top of the gate, have no opening greater than ½ inch within 18 inches of the latch, and accommodate a locking device.

4. Plainly and conspicuously mark the depth of water in feet at or above the waterline on the vertical wall of the hot tub and on the top of the coping or edge of the deck or walkway next to the hot tub.
5. Assure that the leading edge of each stair tread, swim-out, and hot tub seat or bench is outlined with a 2-inch slip-resistant contrasting tile or other permanent marking.
6. Include a flow meter in the hot tub filtration system.
7. Install an automated disinfection system that meets the requirements of Env-Wq 1106.08(b), which includes: (1) a positive displacement pump-type unit providing hypo-chlorination; (2) an erosion unit using either hypo-chlorite or bromine tablets with control of the erosion rate; or (3) a salt electrolytic chlorine generator [10].
8. Maintain hot tub free chlorine residuals between 2 and 4 ppm as recommended by CDC [30].
9. Protect hot tub suction outlets as required by the Virginia Graeme Baker Pool and Hot Tub Safety Act (VGBA).

**The Village Silversmith:**

In order to address potential public health and safety concerns identified during the environmental assessment, the owner or manager should:

1. Drain and scrub the outside fountain weekly, or when it becomes visibly dirty, during the operating season.
2. Maintain a chlorine residual of 3-5 mg/L (as measured by a pool test kit) in fountain water.

**South Hampton Beach Public Shower:**

No public health and safety concerns related to this outbreak were identified during the environmental assessment. The manager should continue regular operation and maintenance.

**Casino Cascade Water Slide:**

No public health and safety concerns related to this outbreak were identified during the environmental assessment. The manager should continue regular operation and maintenance.

**Buc's Lagoon Mini Golf:**

No public health and safety concerns related to this outbreak were identified during the environmental assessment; however, the owner or manager should consider adding a disinfectant such as chlorine to the water throughout the operating season (i.e., past Memorial Day) to help control any potential bacterial growth.

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## APPENDIX 1: Health Alert

# THIS IS AN OFFICIAL NH DHHS HEALTH ALERT

Distributed by the NH Health Alert Network  
[Health.Alert@nh.gov](mailto:Health.Alert@nh.gov)  
August 25, 2018 0800 EDT  
NH-HAN 20180825



## Cluster of *Legionella pneumophila* Pneumonia (Legionnaire's Disease) Associated with an area of Ashworth Avenue in Hampton, NH

### Key Points and Recommendations:

1. The New Hampshire Division of Public Health Services (DPHS) has confirmed four patients with *Legionella* pneumonia (also known as Legionnaire's Disease) associated with Ashworth Avenue between Island Path and H Street in Hampton, New Hampshire.
2. These four cases likely acquired disease in late July or early August, based on clinical symptoms and the incubation period of *Legionella* bacteria.
3. NH DPHS is working with the Department of Environmental Services (DES) to identify potential sources of exposure and mitigate risk of additional cases.
4. Health care providers should consider *Legionella* infection when evaluating community-acquired pneumonia and ask patients about travel (including local travel) in the 10 days prior to symptom onset.
5. Diagnostic testing for *Legionella* infection should include both urine antigen and culture of respiratory specimens. The New Hampshire Public Health Laboratories is available to support testing.
6. While the investigation is underway, in an abundance of caution, DPHS has recommended that people who are at increased risk for severe disease from *Legionella* may consider postponing their visit to the area of Ashworth Avenue between Island Path and H Street in Hampton, New Hampshire. People who are at increased risk include those who are older than 50, who have chronic respiratory disease, or who have a weakened immune system.
7. Healthcare providers should report suspected and confirmed cases of *Legionella* infection to the Bureau of Infectious Disease Control at 603-271-4496 (after hours 603-271-5300).

### Background

The NH Division of Public Health Services (DPHS) has been notified of four patients with *Legionella pneumophila* pneumonia (Legionnaire's Disease) and has discovered that all four had traveled to the area of Ashworth Avenue between Island Path and H Street in Hampton, New Hampshire during the last week of July and first week of August, which is consistent with the incubation of *Legionella*. NH DPHS is also actively investigating additional suspect cases and is working closely with the Town of Hampton and the Department of Environmental Services to identify and mitigate the possible environmental source.



## NH DHHS-DPHS NH-HAN #20180825 Legionella in Hampton

*Legionella* bacteria are aerobic, gram-negative, intracellular pathogens that are commonly found in water and soil. Human infection is typically acquired through inhalation of contaminated aerosols. Most *Legionella* infections are sporadic; however, outbreaks can occur and are often associated with exposure to communal water supplies in large facilities such as hospitals, hotels, hot tubs, or apartment buildings. Prior outbreaks have also identified water or cooling towers as sources of *Legionella* bacteria.

The two major clinical syndromes caused by *Legionella pneumophila* are Legionnaires' disease (pneumonia) and Pontiac fever; the latter being an acute, nonspecific, self-limited febrile illness. Legionnaires' disease is a pneumonia characterized by fever, cough, shortness of breath, muscle aches, headaches, and pulmonary infiltrates consistent with pneumonia. Illness typically is severe enough to require hospitalization and has an up to 10% fatality rate. Symptoms develop 2-14 days following exposure to an environmental source. Because of the self-limited and nonspecific nature of Pontiac fever, the epidemiology and pathogenesis of this disease have not been well characterized.

*Legionella* species are estimated to cause about 2-10 percent of cases of community acquired pneumonia, with over 75% of cases occurring in adults >50 years old. In addition to older age, risk factors for Legionnaires' disease include smoking, chronic respiratory disease, diabetes mellitus, and other immunocompromising conditions.

From 2013 - 2017, DPHS received an average of 32 cases of *Legionella* pneumonia each year, with more cases generally occurring in the months of July and August. Nationally there has been an increase in cases since 2000. This may be a true increase in the frequency of disease due to several factors (e.g., older U.S. population, more at-risk people, plumbing infrastructure, or climate change) or partially attributed to increased use of diagnostic testing or better disease reporting. There are more cases of Legionella diagnosed in mid-late summer months' due seasonality of exposures (e.g., cooling units, water sources).

### Laboratory Diagnosis and Treatment

Diagnostic tests include urine antigen testing (although this test only detects *L. pneumophila* serogroup 1, accounting for 70-80% of infections) and culture of sputum or bronchoalveolar lavage fluid for Legionella. Culture requires special culture media (Buffered Charcoal Yeast Extract medium), which is not always routinely available. Respiratory specimens should be collected prior to antibiotic administration, if possible. The NH Public Health Laboratories can support providers with Legionella culture. Laboratory testing can be arranged by calling the Bureau of Infectious Disease Control at 603-271-4496 (after hours 603-271-5300). For patients with compatible or confirmed illness, treatment with azithromycin or levofloxacin is recommended.

### Additional Resources

Centers for Disease Control and Prevention (CDC) Frequently Asked Questions:

<https://www.cdc.gov/legionella/ga-media.html>

CDC Materials for Providers: <https://www.cdc.gov/legionella/clinicians.html>

CDC Materials for Diagnosis, Testing, treatment, and prevention:

<https://www.cdc.gov/legionella/clinicians/diagnostic-testing.html>

**NH DHHS-DPHS**

**NH-HAN #20180825 Legionella in Hampton**

**For any questions regarding the contents of this message, please contact NH DHHS Bureau of Infectious Disease Control at 603-271-4496 (after hours 1-800-852-3345 ext. 5300).**

To change your contact information in the NH Health Alert Network, contact Adnela Alic at 603-271-7499 or email [adnela.alic@dhhs.nh.gov](mailto:adnela.alic@dhhs.nh.gov).

Status: Actual  
Message Type: Alert  
Severity: Moderate  
Sensitivity: Not Sensitive  
Message Identifier: NH-HAN 20180825 Legionella in Hampton  
Delivery Time: 12 hours  
Acknowledgement: No  
Distribution Method: Email, Fax  
Distributed to: Physicians, Physician Assistants, Practice Managers, Infection Control Practitioners, Infectious Disease Specialists, Community Health Centers, Hospital CEOs, Hospital Emergency Departments, Nurses, NHHA, Pharmacists, Laboratory Response Network, Manchester Health Department, Nashua Health Department, Public Health Network, DHHS Outbreak Team, DPHS Investigation Team, DPHS Management Team, Northeast State Epidemiologists, New Hampshire Health Officers and Deputy Health Officers, MMRS, MRC, and Zoonotic Alert Team  
From: Dr. Elizabeth A. Talbot, MD – Deputy State Epidemiologist  
Originating Agency: NH Department of Health and Human Services, Division of Public Health Services

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## APPENDIX 2: Case Questionnaire

New Hampshire Department of Health and Human Services  
Legionella Outbreak Questionnaire – Hampton, NH, 2018

### Interviewer(s)

### Patient information

Name: \_\_\_\_\_ Age: \_\_\_\_\_ Sex:  M  F

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ County: \_\_\_\_\_

Phone: \_\_\_\_\_ Alt. phone: \_\_\_\_\_

State ID: \_\_\_\_\_ **Outbreak ID:** \_\_\_\_\_

### Signs and symptoms

Typical symptoms of Legionnaires' disease include cough, shortness of breath, fever, muscle aches, headaches

I understand that your first symptom started on <insert onset date> \_\_\_\_\_. Is this correct?

Yes  No  Not sure

If no, what was the first date you started feeling sick? \_\_\_\_\_

---

### General exposure information

Arrival at Hampton, NH: \_\_\_\_/\_\_\_\_/\_\_\_\_ Depart from Hampton, NH: \_\_\_\_/\_\_\_\_/\_\_\_\_

How did you get around Hampton during your stay? Select all that apply:

Walk  Personal car (driver or passenger)  Uber/Lyft  Bicycle  Skate  Other: \_\_\_\_\_

### Exposure information for Hampton Beach — area of Ashworth Avenue and Ocean Blvd

*Please refer to Appendix A for prompts as needed*

Did you visit any restaurants in Hampton Beach? If yes, which ones and on which days?

Did you visit the beach? If yes, did you use the public showers? If yes, can you tell us which ones (if there are multiple)?

Did you visit any other businesses or attractions in Hampton Beach? If yes, which ones and on which days?

Did you visit or spend time near the Cascade Waterslide at Hampton Beach Casino park located on D street?

Did you attend any events in Hampton Beach? If yes, what were they and on which days?

Do you recall spending time near any decorative water fountains or water features, either inside buildings or outside? If yes, where were they?

Public facilities: The facilities (restrooms, changing rooms, showers), not the beach itself.

North end of beach  Entered  Passed  Do Not Recall

Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily

Did you enter the area with the shower facilities?  Yes  No  Not Sure  Other

Other (explain): \_\_\_\_\_

Center of beach  Entered  Passed  Do Not Recall

Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily

Did you enter the area with the shower facilities?  Yes  No  Not Sure  Other

Other (explain): \_\_\_\_\_

South end of beach  Entered  Passed  Do Not Recall

Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily

Did you enter the area with the shower facilities?  Yes  No  Not Sure  Other

Other (explain): \_\_\_\_\_

**Exposure information for Hampton — area NW of the beach on Route 1/Lafayette Rd reached via 101 (Exeter-Hampton Expy) with Dunkin Donuts, CVS, Walgreens, Hannaford supermarket**

Did you visit any restaurants in Hampton? If yes, which ones and on which days?

Did you go to any stores or other businesses in Hampton? If yes, which ones and on which days?

Did you visit a grocery store (e.g., Royal Market II on Ashworth Ave, Surf Side Market Garden on Ocean Blvd)?

**Exposure information for Seabrook — area SW of the beach on Route 1/Lafayette Rd reached via NH-286 with shopping centers including a Walmart, Hobby Lobby, Home Depot and Lowes, Starbucks**

Did you visit any restaurants in Seabrook? If yes, which ones and on which days?

Did you go to any stores or other businesses in Seabrook? If yes, which ones and on which days?

**Other exposures not in Hampton Beach or vicinity**

During your stay in Hampton Beach, were there any other cities or towns that you visited to go out to eat, or shop, or for any other reason? If yes, where did you go?

I'd like to ask you some questions about your travel and exposures during the **14 days before you got sick**. The time period I'm asking about is between \_\_\_\_\_ and \_\_\_\_\_.

Did you work at, get treatment in, or visit a hospital?

- Yes    No    Not sure

*<If yes, check all that apply:>*

Exposure	Hospital name and location	Reason for visit	Date(s)
<input type="checkbox"/> Inpatient			Admission: _____  Discharge: _____
<input type="checkbox"/> Outpatient			
<input type="checkbox"/> Visitor			
<input type="checkbox"/> Employee			
<input type="checkbox"/> Volunteer			

Comments:

Did you work at, get treatment in, or visit a doctor's office, clinic, or dental office?

- Yes    No    Not sure

*<If yes, check all that apply:>*

Type of clinic	Exposure	Name of doctor and location	Reason for visit	Date(s)
<input type="checkbox"/> Doctor's office or clinic	<input type="checkbox"/> Outpatient <input type="checkbox"/> Visitor <input type="checkbox"/> Employee <input type="checkbox"/> Volunteer			
<input type="checkbox"/> Dentist	<input type="checkbox"/> Outpatient <input type="checkbox"/> Visitor <input type="checkbox"/> Employee <input type="checkbox"/> Volunteer			

Comments:

Did you work at, reside in, or visit a long-term care facility?

Yes  No  Not sure

*<If yes, check all that apply:>*

Type of facility	Exposure	Name of facility and location	Date(s)
<input type="checkbox"/> Long-term care facility (nursing home, rehab facility, or skilled nursing facility)	<input type="checkbox"/> Resident <input type="checkbox"/> Inpatient <input type="checkbox"/> Visitor <input type="checkbox"/> Employee <input type="checkbox"/> Volunteer		

Comments:

Did you work at, reside in, or visit a senior living or assisted living facility?

Yes  No  Not sure

*<If yes, check all that apply:>*

Type of facility	Exposure	Name of facility and location	Date(s)
<input type="checkbox"/> Senior Living (retirement homes without skilled nursing or personal care)	<input type="checkbox"/> Resident <input type="checkbox"/> Visitor <input type="checkbox"/> Employee <input type="checkbox"/> Volunteer		
<input type="checkbox"/> Assisted Living (facilities providing support with activities of daily living, i.e., bathing and dressing)	<input type="checkbox"/> Resident <input type="checkbox"/> Visitor <input type="checkbox"/> Employee <input type="checkbox"/> Volunteer		

Comments:

During the 10 days before you got sick, did you visit a hotel **without** staying overnight? (e.g., dinner, wedding, employee)?

Yes  No  Not sure

*<If yes, complete the following table:>*

Accommodation name	Address	City, state/ country	Date(s)	Reason for visit

Comments:

During the 10 days before you got sick, did you attend any conventions or public gatherings?

Yes  No  Not sure

*<If yes, complete the following table:>*

Type of event	Name of venue	Location	Date(s)

Comments:

During the 10 days before you got sick, did you work at, reside in, or visit a congregate living facility (e.g., correctional facility, shelter, dormitory, etc.)?

Yes  No  Not sure

*<If yes, complete the following table:>*

Type of event	Name of venue	Location	Date(s)

Comments:

During the 10 days before you got sick, did you have exposure to any of the following, either while traveling or at home?

Yes  No  Not sure

*<If yes, complete the following table:>*

Exposures	<Check one:>			Location	Date(s)
	Yes	No	Not sure		
Hot tub, Jacuzzi®, or whirlpool hot tub					
Sat NEAR a working hot tub but did not get in					
Pool					
Recreational misters					
Outdoor cooling mister					
Lawn or golf course sprinkler					
Steam room or wet sauna					

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Exposures	<Check one:>			Location	Date(s)
	Yes	No	Not sure		
Decorative fountain or waterfall					
Humidifier					
Shower (away from home only)					

Comments:

Did you use a nebulizer, CPAP, BiPAP, or any respiratory therapy equipment for the treatment of sleep apnea, COPD, asthma, or for any other reason?

Yes  No  Not sure

<If yes, complete the following table:>

Type of device	Location	Date(s)

If yes, does this device use a humidifier?  Yes  No  Not sure

If yes, describe what type of water you use in this device (e.g., sterile, tap, distilled) and how you clean it.

Where do you get your water at home? <Check all that apply>

- Municipal water system
- Private well
- Unknown
- Other (specify): \_\_\_\_\_

Do you recall any general construction, plumbing projects, water main breaks, or water line work either at your home or at any other locations during the 10 days before you got sick?

Yes  No  Not sure

<If yes, complete the following table:>

Type of work	Location	Date(s)

Comments:

During the 10 days before you got sick, did you shop at a grocery store where there were mister machines spraying the fruits and vegetables?



Yes  No  Not sure

*<If yes, complete the following table:>*

Name of store	Location	Date(s)

Comments:

During the 10 days before you got sick, did you work in a garden, have contact with potting soil, or visit a garden center?

Yes  No  Not sure

*<If yes, complete the following table:>*

Activity	Location	Date(s)

Comments:

During the 10 days before you got sick, did you visit an area with large buildings, such as shopping centers, high-rise offices or hotels, or industrial buildings?

Yes  No  Not sure

*<If yes, complete the following table:>*

Name	Location	Date(s)

Comments:

Do you work or volunteer full- or part-time?

Yes  No

*<If yes, complete the following table:>*

Job description	Name of employer	Location	Any exposure to misty water?

Comments:

Specifically, do you work in any of the following settings?

Exposures	<Check one:>			Location	Date(s)
	Yes	No	Not sure		
Construction					
Industrial/manufacturing plant with water spray cooling or processes					
Building water system/device operation or maintenance (e.g., cooling towers, plumbing, hot tubs)					
Water-related leisure activities (e.g., hotels, cruise ships, water parks)					
Waste water treatment plant					
Truck driving (long haul)					
Dishwashing (e.g., in a commercial or industrial kitchen)					
Custodial services (e.g., housekeeping, janitorial work)					
Other job with water exposures					

Comments:

**Appendix A:**  
**Restaurant Exposures**

For each of the following restaurants, please say if you ENTERED, recalled PASSING, or DO NOT RECALL. If you do not recall a particular restaurant, or are not sure, I have a brief description and location of each restaurant.

- Aloha Ice Cream  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
339 Ocean Avenue – Over 50 flavors of ice cream, soft serve and frozen yogurt.
- Ashworth Hotel Restaurant  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
5 Ocean Boulevard – Breaker’s Restaurant, Wharfside and The Sandbar.
- Bernie’s Beach Bar  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
73 Ocean Boulevard – Thatched Tiki bar, oceanside.
- Blink’s Fry Doe  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
191 Ocean Boulevard – Fried dough with toppings. Orange sign out front.
- Boardwalk Cafe  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
139 Ocean Boulevard – Next to casino ballroom, two floors with blue umbrellas.
- Boardwalk Fries  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
119 Ocean Boulevard – All kinds of deep-fried foods – fries, clams, etc. Cash-only.
- Breaker’s  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
295 Ocean Boulevard – American dining, big bar, ocean views. Next to Ashworth by the Sea.
- Cascade Cafe  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Seafood, wraps and rolls.
- Casino Fast Foods  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – At the casino, serve seafood, pizza, subs and wraps. Green sign.
- Charlie’s Tap House  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
9a Ocean Boulevard – Irish restaurant with karaoke and Club Madison.
- Coffee Break Cafe  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
23 Ocean Boulevard – Small coffee shop.
- Cristy’s Pizza  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
1 Riverview Terrace – Square pizza slices.
- Donut Factory  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Hot mini donuts.
- Dough Express  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Fried dough, just across from the beach.
- Farr’s Famous Chicken  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
47 Ashworth Avenue – Famous Fried chicken, potatoes and beans.
- Giuseppe’s Italian Sausage  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
193 Ocean Boulevard – Italian Sausage sandwiches.
- Jamacian Me Hungry  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Jamaican food.

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JB's Seafood     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
187 Ocean Boulevard – Seafood with indoor and outdoor seating. Corner of D and Ocean.

La Spiaggia     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
215 Ocean Boulevard – Pizza, chicken and ice cream parlor.

La Veranda Pizzeria     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
143 Ashworth Avenue – Pizza, wraps and salads.

Little Jack's Seafood     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
539 Ocean Boulevard – Seafood restaurant, large lobster on sign.

Lupe's 55 Mexican Restaurant     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
107 Ocean Boulevard – Mexican food on the strip. No indoor seating.

Lupe's 55 Cantina Mexican Grill     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
275 Ocean Boulevard – Mexican food, indoor seating, bar.

McGuirk's Ocean View     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
95 Ocean Boulevard – Seafood, 3 stories tall, lobster rolls, "shark attack" and clam chowder.

Millie's Tavern     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
17 L Street – Italian, seafood and BBQ.

Ocean Wok     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
7 Ocean Boulevard – Chinese cuisine.

Perkins Pier Clam Shack and Bar     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
134 Ashworth Ave – Clams, steaks.

Pizzeria 339     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
339 Ocean Boulevard – Seasonal pizza place.

Purple Urchin     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
167 Ocean Boulevard – Second level of casino, seafood.

Ron's Landing at Rocky Bend     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
379 Ocean Boulevard – Two-story, seafood, steaks, chicken, veal and pasta.

Rexall Drug     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
131 Ocean Boulevard – Beach equipment and souvenirs, just across from playground.

Sabo's Subs     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
C Street – Subs wrapped in Syrian bread and filled with meat and veggies.

Sal's Pizza     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
191 Ocean Boulevard – Large pizza slices, between C and D streets.

Sea Ketch Restaurant     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
127 Ocean Boulevard – Two stories, multiple outdoor decks, seafood and steaks.

Ships Inn Coffee Shop     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
27 B Street – Coffee shop.

Slush Factory     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily  
235 Ocean Boulevard – 12 flavors of slush.

South Beach Seafood     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_     Daily

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99 Ocean Boulevard – Casual seafood place, south end of strip.

Stillwell's Surfside Scoop  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
247 Ocean Boulevard – Ice cream, walls are the menus.

Stats Fast Food  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
195 Ocean Boulevard – Chicken, seafood, and wraps.

Taco Room  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
23 Ocean Boulevard – Tacos, burritos, salads.

The Coffee Place  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
109 Ocean Boulevard – Coffee on the south side of the boardwalk.

The Goat  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
20 L Street – Whiskey and burger bar.

Wally's Pub  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
144 Ashworth Avenue – Pizza and lobster.

Yummy Yougurt  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
119 Ocean Boulevard – 24 flavors of soft serve.

**Activity and Store Exposures**

For each of the following activities, please say if you ENTERED the LOCATION, recalled PASSING the LOCATION, or DO NOT RECALL. If you do not recall a particular activity or store, or are not sure, I have a brief description and location of each facility.

Aces and Eights Casino  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Casino.

Al Gauron Fisheries  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
1 Ocean Boulevard – Deep sea fishing, whale watching.

Blue Ocean Society  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
180 Ocean Boulevard – Sea life discovery center.

Big Fish Sculpture  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
275 Ocean Boulevard – Hand crafted gifts and art.

Buc's Lagoon  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
59 Ocean Boulevard – Mini golf.

Casino Cascade Water Slide  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Large water slide.

Casino Mini-Golf  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Mini golf.

Eccentric Hair  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
529 Ocean Boulevard – Hair salon, pedicure, massage, manicures.

Fox Run Mall  Entered  Passed  Do Not Recall Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
50 Fox Run Road – 100 stores, 15 minute drive away.

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Funarama     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Arcade.

Hampton Arts Network Gallery & Studio  Entered     Passed     Do Not Recall  
Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily                      367 Ocean Boulevard – Art gallery and studio.

Hampton Beach Casino     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Casino/Boardwalk area.

Hampton Beach Casino Ballroom     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Live music venue.

Hampton Beach Playground  Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
Ocean Boulevard

Hampton Historical Society  Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
Series of museums.

Jim’s Henna     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
109 Ocean Boulevard – Henna tattoos.

Just Premium Cigars     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
169 Ocean Boulevard – Cigar shop.

Mrs. Mitchell’s Gift Shop  Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
285 Ocean Boulevard – Souvenir shop.

New Hampshire Marine Memorial  Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
Ocean Boulevard – Large statue, north side of beach.

Ocean Cycles and Sports     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
367 Ocean Boulevard – Sporting goods.

Ocean Gaming     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
81 Ocean Boulevard – Poker room and casino.

Playland Arcade     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
211 Ocean Boulevard – Arcade.

Sanborn’s Fine Candies     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
59 Ocean Boulevard – Candy shop.

Sand and Santa Gift Shop  Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
63 Ocean Boulevard – Has large Santa in shorts outside, between M and N streets.

Surfside Market     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
Ocean Boulevard – Seasonal store with beach apparel and supplies.

Sweet Hannah’s     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
81 Ocean Boulevard – Candy shop.

The Candy Corner     Entered     Passed     Do Not Recall    Date of visit: \_\_\_/\_\_\_/\_\_\_  Daily  
197 Ocean Boulevard – Candy shop.

**APPENDIX 3: Environmental Samples Collected During the Investigation**

Sample type	Sample location	Sample description	Temp (°F)	pH	Free Cl2 (mg/L)	PCR Result	Culture	Organism Identified
bulk	Sands Resort	Room 427, shower, hot, showerhead off	101.8	6.55	1.4	Negative	Negative	na
swab	Sands Resort	Room 427, shower, showerhead off	na	na	na	Negative	Negative	na
swab	Sands Resort	Room 427, bathroom sink, aerator off	na	na	na	Negative	Negative	na
bulk	Sands Resort	Room 427, kitchen sink, hot	101.7	6.32	1.0 (1 <sup>st</sup> draw 2.3)	Negative	Negative	na
bulk	Sands Resort	Room 224, shower, showerhead off, hot	105.1	6.48	nc	Negative	Negative	na
swab	Sands Resort	Room 224, shower, showerhead off	na	na	na	Lp1	LLO	Lp3
swab	Sands Resort	Room 224, bathroom sink, aerator off	na	na	na	Negative	Negative	na
bulk	Sands Resort	Room 224, kitchen sink, hot	108.1	6.58	0.5 (1 <sup>st</sup> draw 1.3)	Lp1	Negative	na
swab	Sands Resort	hot tub, filter basin, scum line	na	na	na	Lp1	LLO	Lp1 <i>L. quinlivanii</i> Lp1 Lp3 <i>L. dumoffii</i>
swab	Sands Resort	hot tub, bottom of filter case	na	na	na	Lp1	LLO	Lp1 Lp1 Lp1 Lp1 <i>L. dumoffii</i>

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bulk	Sands Resort	hot tub, pump basket	nc	nc	0.0	Lp1	LLO	Lp3 Lp3 Lp3 Lp3 Lp3 <i>L. dumoffii</i>
swab	Sands Resort	hot tub, scum line	na	na	na	Negative	LLO	Lp3
swab	Sands Resort	hot tub, bottom of hot tub	na	na	na	Lp1	LLO	Lp3 Lp3 <i>L. quinlivanii</i> Lp1 <i>L. dumoffii</i>
swab	Sands Resort	hot tub, jets	na	na	na	<i>Legionella</i> species	LLO	Lp1 Lp1 Lp1 Lp1
swab	Sands Resort	hot tub, jets	na	na	na	<i>Legionella</i> species	LLO	<i>L. quinlivanii</i> <i>L. quinlivanii</i> Lp1 <i>L. dumoffii</i>
swab	Sands Resort	hot tub, skimmer basket	na	na	na	Negative	LLO	Lp1 Lp1 Lp1 Lp1
bulk	Sands Resort	hot tub, fill water, cold	nc	nc	0.0	Lp1	Negative	na
bulk	Sands Resort	fitness room bathroom, shower, showerhead off, hot	102.0	6.49	1.2	Negative	Negative	na
swab	Sands Resort	fitness room bathroom, sink, aerator off	na	na	na	Negative	Negative	na
bulk	Sands Resort	Room 328, kitchen sink, hot	107.1	6.42	1.1	Lp1	Negative	na



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bulk	Sands Resort	Room 328, shower, showerhead off, hot	103.1	6.42	nc	<i>Legionella</i> species	Negative	na
swab	Sands Resort	Room 328, shower, showerhead off	na	na	na	Negative	Negative	na
bulk	Sands Resort	hot water heater room, boiler #1, outlet valve	96.8	6.69	0.5	Negative	Negative	na
bulk	Sands Resort	hot water heater room, boiler #2, outlet valve	101.5	6.69	0.2	<i>Legionella</i> species	Negative	na
bulk	Sands Resort	hot water heater room, boiler #1, hot water outlet	101.8	6.73	0.4	Negative	Negative	na
bulk	Sands Resort	hot water heater room, boiler #2, hot water outlet	108.7	6.78	0.5	Negative	Negative	na
bulk	Sands Resort	hot water heater, expansion tank, corner	99.7	6.65	0.2	Negative	Negative	na
bulk	Sands Resort	outdoor shower hose	92.8	6.45	0.2	<i>Legionella</i> species	LLO	<i>L. quinlivanii</i> <i>L. quinlivanii</i> <i>L. quinlivanii</i> <i>L. quinlivanii</i>
swab	Sands Resort	outdoor shower hose	na	na	na	<i>Legionella</i> species	Negative	na
bulk	Sands Resort	hot water heater room, expansion tank near door	100.8	6.8	0	<i>Legionella</i> species	Negative	na
bulk	Sands Resort	Room 418, kitchen sink, cold	79.0	6.89	0.7	Negative	Negative	na
swab	Sands Resort	Room 418, bathroom sink, aerator off	na	na	na	Negative	Negative	na
swab	Sands Resort	Room 418, shower, showerhead off	na	na	na	Lp1	Negative	na
bulk	Sands Resort	Room 418, shower, hot	101.7	6.60	0.2	Negative	Negative	na
bulk	Hampton Beach South	Public shower, left, top shower, facing beach	79.9	7.52	0.8	Negative	Negative	na

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bulk	Harris Sea Ranch	Harris Sea Ranch hot tub	94.3	7.05	>10	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub jet, right side facing beach	na	na	na	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub jet, left side if facing beach	na	na	na	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub jet, right side if facing beach	na	na	na	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub, filter cartridge	na	na	na	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub, fill line	na	na	na	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch hot tub, filter compartment fill line	na	na	na	Negative	Negative	na
filter	Harris Sea Ranch	Harris Sea Ranch hot tub, filter	na	na	na	Negative	Negative	na
bulk	Harris Sea Ranch	Harris Sea Ranch, outdoor hose	nc	nc	nc	Negative	Negative	na
swab	Harris Sea Ranch	Harris Sea Ranch, outdoor hose	na	na	na	Negative	Negative	na
bulk	Village Silversmith	Ocean boulevard mining fountain	79	nc	0.1	Negative	Negative	na
swab	Village Silversmith	Ocean boulevard mining fountain scum line	na	na	na	<i>Legionella</i> species	LLO	<i>L. taurinensis</i> <i>L. taurinensis</i>

Lp1: *Legionella pneumophila* serogroup 1; Lp3: *Legionella pneumophila* serogroup 3;

LLO: *Legionella*-like organism; na: not applicable; nc: not collected

## APPENDIX 4: NH DHHS Press Release #1

**NOTE: DHHS Public Health officials will hold a press briefing to discuss the situation at 11:30 a.m. at the Division of Public Health Services, 29 Hazen Drive, Concord. Media outlets may also participate by phone at 1-866-304-8625, Conference Code 603 271 4477.**

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE

FOR IMMEDIATE RELEASE

August 25, 2018

FOR MORE INFORMATION

Public Information Office

(603) 419-0329 or [pio@dhhs.nh.gov](mailto:pio@dhhs.nh.gov)

### **Cluster of Legionella Pneumonia (Legionnaire’s Disease) Associated with an area of Ashworth Avenue in Hampton, NH**

**Concord, NH** – The New Hampshire Department of Health and Human Services’ Division of Public Health Services (DPHS) has identified four persons with Legionella pneumonia, also known as Legionnaire’s disease, a potentially serious bacterial pneumonia. These individuals likely acquired Legionella at the end of July or early August in the area of Ashworth Avenue, between Island Path and H Street in Hampton, New Hampshire. DPHS is investigating possible additional cases. DPHS is also actively investigating the source of these infections, which is usually from inhaling aerosol droplets of water contaminated with the bacteria. Sources of the aerosol can include showers, hot tubs, faucets, cooling towers, misters, and decorative fountains. It is not spread by drinking or swimming in water.

While the investigation is underway, in an abundance of caution, DPHS recommends that people who are at increased risk for severe disease from Legionella consider postponing their visit to the area of Ashworth Avenue between Island Path and H Street in Hampton, New Hampshire.

People who are at increased risk of getting sick include:

- People 50 years or older
- Current or former smokers
- People with chronic lung disease
- People with weakened immune systems
- People who take drugs that can weaken their immune systems (after a transplant operation or chemotherapy)
- People with underlying illnesses such as diabetes, kidney failure, or liver failure

“Legionella is a serious infection,” said Lisa Morris, Director of the Division of Public Health Services. “We want to make sure the public is aware of the potential risk of this disease so that each person can make a decision for themselves about visiting the area in the best interest of their health.”

Legionnaires' disease is a type of pneumonia caused by the Legionella bacteria. Most people exposed to Legionella will not get sick; however, it can cause severe illness and sometimes result in death. People do not spread Legionnaires' disease to other people. Legionnaires' disease symptoms are very similar to other types of pneumonia and can include cough, shortness of breath, fever, muscle aches, and headaches.

Symptoms will usually begin within 2 to 10 days after exposure to the bacteria. However, people should watch for symptoms for about two weeks after exposure. People who visited the area more than two weeks ago and have not developed symptoms are not at risk for disease. If an individual visited this area and developed symptoms within 14 days of their stay, they should contact their healthcare provider and seek medical attention.

If you have information or questions about this outbreak, please call the New Hampshire Department of Health and Human Services. A public inquiry phone line is available to answer questions from 8am - 4pm, including over the weekend, by calling 603-271-9461, or for those calling from within the state of New Hampshire, toll-free at 1-800-852-3345 ext. 9461.

For further information, please visit the CDC webpage at <https://www.cdc.gov/legionella/>.

###

## APPENDIX 5: NH DHHS Press Release #2

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
FOR IMMEDIATE RELEASE  
August 30, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
(603) 545-2964

### Update on Outbreak of Legionnaire’s Disease Associated with the area of Ashworth Avenue at Hampton, NH

**Concord, NH** – The New Hampshire Department of Health and Human Services’ Division of Public Health Services (DPHS) continues to investigate an outbreak of Legionnaire’s Disease associated with the Ashworth Avenue area of Hampton, NH. A total of 12 people have been identified with confirmed Legionnaire’s disease, a potentially serious bacterial pneumonia caused by the Legionella bacteria. These 12 people likely acquired their infections between early June and mid-August in the Hampton area. One of these 12 people, an elderly adult, has died due to complications related to Legionnaire’s disease.

DPHS and experts from the U.S. Centers for Disease Control and Prevention (CDC) are working diligently to identify a potential source of the bacteria and possible additional cases of Legionnaire’s disease. The majority of cases stayed or resided in the Ashworth Avenue area between Island Path and M Street but may have had other exposures in the area. As a precautionary measure, DPHS has closed the hot tub hot tubs at the Sands Hotel and the Harris Sea Ranch Motel because hot tub hot tubs in general are a known source of the bacteria that causes Legionnaire’s. The hot tubs no longer present a potential risk to the public and both hotels remain open.

While we believe that the current overall health risk to the community is low, individuals who are at higher risk of Legionnaire’s disease should continue to take steps to protect their health, including consideration of postponing their visit to the area if they are concerned about their health and talking to their healthcare providers. People with increased risk of getting sick from Legionella include:

- People with weakened immune systems
- People who take drugs that can weaken their immune systems (after a transplant operation or chemotherapy)
- People with chronic lung disease
- Current or former smokers
- People with underlying illnesses such as diabetes, kidney failure, or liver failure
- People 50 years or older

“We are working hard to identify the exact source of these infections,” said Lisa Morris, Director of the Division of Public Health Services. “Even though the information is preliminary, we want to allow the public to make informed decisions about visiting the area and their activities in the area.”

“Federal, state and local authorities are working cooperatively and diligently to address this situation and help mitigate any additional health risks,” stated Governor Chris Sununu. “Through regular communication and transparent transparency, we will ensure members of the public have the most up to date information so that they can make the best decisions for themselves and their families.”

Legionnaires’ disease is a type of pneumonia caused by the Legionella bacteria. Most people exposed to Legionella will not get sick; however, it can cause severe illness and sometimes result in death. Legionnaire’s disease is acquired from breathing in small drops of water that contain the bacteria. It cannot be passed from person to person contact. It cannot be contracted by drinking or coming into physical contact with water containing the bacteria (such as while swimming).

Legionnaires’ disease symptoms are very similar to other types of pneumonia and can include cough, shortness of breath, fever, muscle aches, and headaches. Symptoms will usually begin within 2 to 10 days after exposure to the bacteria. However, people should watch for symptoms for about two weeks after exposure. People who visited the area more than two weeks ago and have not developed symptoms are not at risk for disease. If an individual visited this area and developed symptoms within 14 days of their stay, they should contact their healthcare provider and seek medical attention.

If you have information or questions about this outbreak, please call the New Hampshire Department of Health and Human Services Public Inquiry Line by calling 603-271-9461, from 8:00 am to 4:00 pm, including weekends.

For further information, please visit the CDC webpage dedicated to the outbreak at <https://www.cdc.gov/legionella/index.html>.

###

**APPENDIX 6: NH DHHS Press Release #3**

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
**FOR IMMEDIATE RELEASE**  
August 31, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
(603) 545-2964

**Update on Outbreak of Legionnaire’s Disease Associated with the area of Ashworth Avenue at Hampton, NH**

**Concord, NH** – The New Hampshire Department of Health and Human Services’ (DHHS) Division of Public Health Services (DPHS), the New Hampshire Department of Environmental Services (DES), the U.S. Centers for Disease Control and Prevention (CDC) and the Town of Hampton continue to investigate an outbreak of Legionnaire’s Disease associated with the Ashworth Avenue area of Hampton, NH.

Two additional cases of Legionnaire’s disease have been confirmed since the previous update on August 30<sup>th</sup>. There are now a total of 14 confirmed cases of Legionnaire’s disease associated with Ashworth Avenue between Island Path and M Street in Hampton.

**Hampton Legionella Investigation Summary Report**

<b>NUMBER OF CONFIRMED ILLNESSES</b>	Total
Illness onset dates	6/14/18 – 8/24/2018
Hospitalized	12
Deaths	1
Total	14

DHHS and the CDC have been conducting environmental testing to identify a potential source of the bacteria that causes Legionnaire’s disease. Samples collected have been sent to the CDC laboratory in Atlanta; preliminary results from lab testing are expected to be available in the next one to two weeks.

DHHS and the CDC will continue the investigation throughout the Labor Day weekend, including additional environmental testing and conducting interviews and re-interviews with the individuals who contracted the disease. DHHS will update the number of confirmed cases on Tuesday, September 4<sup>th</sup> unless developments warrant otherwise.

If you have information or questions about this outbreak, please call the New Hampshire Department of Health and Human Services Public Inquiry Line by calling 603-271-9461, from 8:00 am to 4:00 pm, Monday through Friday. During the holiday weekend, the line will be open on Saturday and Sunday.

For more information on the investigation, please visit <https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>.

###



## APPENDIX 7: NH DHHS Press Release #4

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
**FOR IMMEDIATE RELEASE**  
September 2, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
(603) 545-2964

### **NH DHHS Issues Order to Sands Resort in Hampton, NH After Initial Results from CDC Testing Identify Presence of Legionella Bacteria**

**Concord, NH** –The New Hampshire Department of Health and Human Services (DHHS) has issued an order to the Sands Resort, 32 Ashworth Avenue, Hampton, NH, to take immediate steps to remediate the Legionella bacteria identified at the facility and notify guests of the bacteria’s presence. DHHS Commissioner Jeffrey A. Meyers issued the order after initial tests conducted by the Centers for Disease Control and Prevention (CDC) detected the presence of the Legionella bacteria from multiple sources within the Sands Resort water system, including, but not limited to the hot tub hot tub.

“Early test results from the CDC indicate the presence of the Legionella bacteria in several environmental samples taken from the facility’s water system. I have issued this order to ensure the health of guests and visitors of the establishment, as well as the health of Hampton residents and visitors,” said Commissioner Meyers. “The Sands Resort will immediately notify current and future guests of the Legionella outbreak and take steps to remediate the premise plumbing system in order to mitigate the risk to the public’s health.”

The premise plumbing system is the portion of the water distribution system from the water meter to the tap in homes and buildings. The CDC may have additional test results for samples taken from the Sands Resort in the next week. Test results are still pending for environmental samples taken from other locations in the affected area.

The order to remediate the water system and notify current or future guests of the Legionella outbreak and test results was issued pursuant to RSA 141-C:11-16, which requires the Commissioner of DHHS to take actions necessary to protect public health. Further actions will depend on additional testing results and the results of the Sands’ mitigation efforts.

The order is attached. For more information on the investigation, please visit [www.dhhs.nh.gov/dphs/cdcs/legionella.htm](http://www.dhhs.nh.gov/dphs/cdcs/legionella.htm).

###

**APPENDIX 8: NH DHHS Press Release #5**

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
**FOR IMMEDIATE RELEASE**  
September 4, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
603-545-2964

**Update on Outbreak of Legionnaire’s Disease Associated with the area of Ashworth Avenue at Hampton, NH**

**Concord, NH** – The New Hampshire Department of Health and Human Services’ (DHHS) Division of Public Health Services (DPHS), the U.S. Centers for Disease Control and Prevention (CDC) and the Town of Hampton continue to investigate an outbreak of Legionnaire’s Disease associated with the Ashworth Avenue area of Hampton, NH. Preliminary environmental culture results from the Sands Resort and other locations sampled during the community investigation are expected to be available in the coming days, but full culture results can take up to two weeks.

There has been one additional confirmed case since the previous update on August 31<sup>st</sup>. There are now a total of 15 confirmed cases of Legionnaire’s disease associated with Ashworth Avenue between Island Path and M Street in Hampton.

**Hampton Legionella Investigation Summary Report**

<b>NUMBER OF CONFIRMED ILLNESSES</b>	<b>Total</b>
Illness onset dates	6/14/18 – 8/24/2018
Hospitalized	13
Deaths	1
Total	15

As an update on the DHHS order issued to the Sands Resort last weekend, the Sands has hired an environmental consultant to begin the process of remediating the building’s water system this week. DHHS will continue to work with the management and consultant to ensure protection of the public’s health.

DHHS will provide additional updates on remediation efforts at the Sands Resort, the number of confirmed cases, and additional lab test results as more information becomes available.

For more information on the Legionella outbreak, please visit <https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>.

###

**APPENDIX 9: NH DHHS Press Release #6**

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
**FOR IMMEDIATE RELEASE**  
September 6, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
(603) 545-2964

**Update on Outbreak of Legionnaire’s Disease Associated with the Area of Ashworth Avenue at Hampton, NH**

**Concord, NH** – The New Hampshire Department of Health and Human Services’ (DHHS) Division of Public Health Services (DPHS), the U.S. Centers for Disease Control and Prevention (CDC), and the Town of Hampton continue to investigate an outbreak of Legionnaire’s Disease associated with the Ashworth Avenue area of Hampton, NH.

No additional cases have been confirmed since the previous update. A total of 15 individuals have been confirmed to have Legionnaire’s disease associated with Ashworth Avenue and the surrounding area. The last illness onset date is August 24th, which has not changed.

**Hampton Legionella Investigation Summary Report**

NUMBER OF CONFIRMED ILLNESSES	Total
Illness onset dates	6/14/18 – 8/24/2018
Hospitalized	13
Deaths	1
Total	15

[According to the CDC](#), Legionella is found naturally in fresh water. When present in a building’s water system, it can grow and spread in devices, such as hot water tanks, showerheads, and hot tubs that are not well maintained. This is why it is so important that [building owners and managers take steps to reduce the risk of Legionella](#) and keep the water in their buildings safe.

The Sands Resort, which received an order from DHHS last weekend to begin immediate remediation of the facility’s water system, is complying with the order. The resort has procured an environmental consultant and professional remediation of the building’s water system is underway. The hot tubs at the Sands Resort and the Harris Sea Ranch Motel remain closed.

Because DHHS has not identified any new individuals with Legionnaires’ disease who report spending time in Hampton after the hot tubs were closed, and because DHHS and the CDC have

not identified any new potential sources of community Legionella exposure, we believe the most likely sources of exposure have been eliminated or are being addressed through water system remediation. Therefore, DHHS believes that the current overall health risk to the community is low.

DHHS continues to work collaboratively with the CDC and Hampton officials on the investigation. Full environmental tests from multiple sites in Ashworth Avenue and surrounding areas are expected to be available sometime next week. In addition, several potential Legionnaires' disease cases are still being investigated. DHHS will provide additional information and updates as they are available.

For more information on the Legionella outbreak, please visit [www.dhhs.nh.gov/dphs/cdcs/legionella.htm](http://www.dhhs.nh.gov/dphs/cdcs/legionella.htm).

###

**APPENDIX 10: NH DHHS Press Release #7**

NH Department of Health and Human Services  
129 Pleasant Street – Hugh Gallen State Office Park  
Concord, NH 03301

PRESS RELEASE  
**FOR IMMEDIATE RELEASE**  
September 18, 2018

FOR MORE INFORMATION  
Jake Leon, Director of Communications  
(603) 545-2964

**Update #6 on Outbreak of Legionnaire’s Disease Associated with the Area of Ashworth Avenue at Hampton, NH**

Concord, NH –The NH Department of Health and Human Services (DHHS), the U.S. Centers for Disease Control and Prevention (CDC), and the Town of Hampton are winding down their investigation into an outbreak of Legionnaire’s disease in Hampton, NH.

A total of 18 individuals have been confirmed to have Legionnaire’s disease associated with Ashworth Avenue and the surrounding area. There have not been any new individuals reported to DHHS with suspect or confirmed Legionnaires’ disease since the hot tubs at the Sands Resort and the Harris Sea Ranch Motel were shut down the last week in August.

**Hampton Legionella Investigation Summary Report**

<b>NUMBER OF CONFIRMED ILLNESSES</b>	<b>Total</b>
Total	18
Illness onset dates	6/10/18 – 8/26/2018
Hospitalized	16
Deaths	1

The CDC has sent to DHHS the results of testing of the environmental samples taken from the Sands Resort and the Harris Sea Ranch. Water samples taken from the Sands Resort hot tub have been found to be growing the same strain of Legionella bacteria that was isolated from a patient diagnosed with Legionnaires’ disease and who reported staying at the Sands Resort. This suggests the hot tub at the Sands Resort as a source of Legionnaires’ disease. Additionally, because early test results from multiple water and environmental samples at the Sands Resort showed Legionella contamination, the Sands Resort hired an environmental consultant to clean and monitor the facility’s water system. The Sands’ water system was cleaned the week of September 3rd, and the environmental consultant has collected new water samples that are being tested at an independent laboratory to make sure the Legionella bacteria at the facility have been eliminated.

The Legionnaires' disease risk to the public is reduced while the hot tub is closed and the water system is undergoing remediation. The absence of any new individuals with Legionnaires' disease since the closure of the hot tub suggests that the current health risk to the community is low.

All environmental and water test results from the Harris Sea Ranch Motel hot tub have returned negative for Legionella. The absence of Legionella may be due to the very high levels of chlorination found in this hot tub at the time of sampling, so the Harris Sea Ranch Motel cannot be completely ruled out as a potential source of Legionnaires' disease. Not all people associated with this outbreak reported contact with the Sands Resort, but the environmental assessment and test results have not revealed any other source for the Legionnaires' disease outbreak.

According to the CDC, Legionella can be found naturally in fresh water and environmental sources. When introduced into a building's water system, it can grow and spread in devices, such as hot water tanks, showerheads, and hot tubs that are not well maintained. This is why it is so important that building owners and managers take steps to reduce the risk of Legionella and keep the water in their buildings safe.

For more information on the Legionella outbreak, please visit <https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>.

###

## APPENDIX 11: DHHS Frequently Asked Questions (Final Version)

### Cluster of Legionnaires' disease Associated with an Area of Ashworth Avenue in Hampton, New Hampshire

## Frequently Asked Questions September 6, 2018

#### What is the situation in Hampton with Legionnaires' disease?

The New Hampshire Department of Health and Human Services' Division of Public Health Services (DPHS) has identified **15 people** with Legionnaires' disease, a potentially serious bacterial pneumonia (lung infection) caused by *Legionella* bacteria. One of these people, an elderly adult, has died due to complications of Legionnaire's disease. These people likely acquired their infections between early June and mid-August in the Hampton Beach area.

#### Where is it coming from?

DPHS and experts from the U.S. Centers for Disease Control and Prevention (CDC) are working diligently to identify a potential source of the bacteria and possible additional cases of Legionnaire's disease. The majority of cases stayed or resided in the Ashworth Avenue area between Island Path and M Street but may have had other exposures in the area. As a precautionary measure, DPHS has closed the hot tub spas at the Sands Resort and the Harris Sea Ranch Motel because hot tub spas in general are a known source of the bacteria that causes Legionnaire's. The hot tubs no longer present a potential risk to the public. Preliminary laboratory testing has identified *Legionella* bacteria in the hot tub and other locations in the Sands Resort water system. NH DHHS is continuing to investigate the cause of this outbreak and is waiting for additional testing of samples taken from the Sands and other locations during the community investigation to be completed.

#### What is DPHS doing about this situation?

DPHS continues to work closely with the Town of Hampton, the Department of Environmental Services and the US CDC. We are investigating possible additional cases and investigating the source of these infections. DPHS has closed the implicated hot tubs until further notice, and they no longer present a potential risk to the public. DPHS is also working with local business and residents to minimize economic impact to the community. NH DHHS has issued a public health order on the Sands Resort requiring the establishment to notify guests of the potential risk of Legionnaires' disease if they stay at the resort. The Sands Resort is also required to hire a company to try to get rid of the bacteria that may be present in the hotel.

### Who do I call with questions about this situation?

If you have information or questions about this situation, please call the New Hampshire Department of Health and Human Services. A public inquiry phone line is available to answer questions from 8am -4pm, including over the weekend, by calling 603-271-9461, or for those calling from within New Hampshire, toll-free at 1-800-852-3345 ext 9461.

### What is Legionnaires' disease and how common is it in New Hampshire?

Legionnaires' disease is a very serious type of pneumonia caused by bacteria called *Legionella*. Between 12 and 63 cases are reported each year in New Hampshire with an average of 32. Most cases occur as single isolated events. Outbreaks are rare in New Hampshire.

### Why is it called Legionnaires' disease?

An outbreak of this disease in Philadelphia in 1976, largely among people attending a state convention of the American Legion, led to the name "Legionnaires' disease." Subsequently, the bacterium causing the illness was named *Legionella pneumophila*.

### How severe is the illness?

Legionnaires' disease is a very serious type of pneumonia that can be severe enough to cause death. About 1 in 10 people who get Legionnaires' disease will die from the infection.

### Where are *Legionella* bacteria found?

*Legionella* bacteria exist naturally in water and moist soil. They have been found in creeks and ponds, hot and cold water taps, hot water tanks, water in air conditioning cooling towers and evaporative condensers, hot tubs, decorative fountains, and soil at excavation sites.

### How is Legionnaires' disease spread?

People can get Legionnaires' disease by breathing in small droplets of water in the air (e.g., mist) containing *Legionella* bacteria. Less commonly, someone can breathe in *Legionella* when water accidentally goes into the lungs while drinking. In general, people do not spread Legionnaires' disease to other people. However, this may be possible under rare circumstances.

### Who gets Legionnaires' disease?

Most healthy individuals do not become infected with *Legionella* bacteria after exposure. People at increased risk of getting sick are those 50 years of age or older, current or former smokers, those with a chronic lung disease (like COPD or emphysema), those with a weak immune system from diseases like AIDS, cancer, diabetes, or kidney failure, and people who take drugs that suppress (weaken) the immune system (like after an organ transplant or chemotherapy).



### **What are the usual symptoms of Legionnaires' disease?**

The early symptoms of Legionnaires' disease may be flu-like with muscle aches, headache, tiredness and dry cough followed by fever, chills and occasionally diarrhea. Like with other types of pneumonia, common symptoms of Legionnaires' disease include rapid breathing or difficulty breathing and chest pain.

### **How soon do symptoms occur/appear?**

The incubation period for Legionnaires' disease ranges from two to 10 days, but is usually five to six days. Sometimes it can take longer so people should watch for symptoms for about two weeks after exposure.

### **How can I get tested?**

If you are not ill, you do not need to be tested for this infection. If you have symptoms consistent with pneumonia, then you should be seen by a healthcare provider. Your healthcare provider may perform a chest x-ray. They may also test your urine or do a laboratory test that involves taking a sample of sputum (phlegm) or washing from the lung. It is best to get both kinds of samples. The test results for these laboratory tests can take a few days to a week or more to get the results back.

### **I don't have insurance but have been sick and need to get tested?**

A healthcare provider must see you to evaluate your symptoms and decide if testing is appropriate. Unfortunately there is no way for us to provide you with this evaluation.

### **What is the treatment?**

Legionnaires' disease requires treatment with antibiotics (medicines that kill bacteria in the body), and most cases of this illness can be treated successfully. Healthy people usually get better after being sick with Legionnaires' disease, but they often need care in the hospital.

### **I think I have (or had) Legionnaire's disease. What do I do?**

If you have questions about your health, please contact your healthcare provider. If you have information or questions about this cluster, please call 603-271-9461.

### **I have been diagnosed with Legionnaires' disease, is my family at risk?**

There is very little risk that you can spread this infection to your family.

### **I visited Hampton, NH. What do I do?**

If your visit was longer than 14 days ago, you are beyond the usual time it takes to develop disease. If your visit was within 14 days, your risk of disease is very low. If you become ill, share your travel history and concerns with your primary care clinician and s/he can test, treat and report, if

appropriate. If your visit was within 14 days, and you are not ill, there is no recommendation for you to be tested or take antibiotics.

### **I live in Hampton, NH. What do I do?**

Although risk is low, DPHS recommends that people who are at higher risk of Legionnaire's disease should continue to take steps to protect their health, including consideration of avoiding the area of Ashworth avenue if they are concerned about their health and talking to their healthcare providers. People who are at increased risk include those who are 50 or older, who have chronic respiratory disease, or who have a weakened immune system. People who elect to travel should avoid going into hot tubs.

### **I have a trip planned to Hampton, NH. Should I cancel?**

While the investigation is underway, in an abundance of caution, DPHS recommends that people who are at higher risk of Legionnaire's disease should continue to take steps to protect their health, including consideration of postponing their visit to the area if they are concerned about their health and talking to their healthcare providers. People who are at increased risk include those who are 50 or older, who have chronic respiratory disease, or who have a weakened immune system. People should avoid going into hot tubs.

### **I cancelled my reservation or tickets for an event and was not provided a refund. What can I do?**

You will need to work directly with the establishment or company to request a refund. Different companies may have different refund policies and you will need to work with the company directly to resolve the matter.

### **Should I wear a mask in town?**

In general, we do not have evidence that this will help prevent disease. We are working to identify the source and may update this as we learn more.

### **Can I catch Legionnaire's from other people?**

It is extremely unlikely for Legionnaires' disease to spread from person to person.

### **Should I stay indoors?**

Since we have no evidence whether the *Legionella* bacteria are in an outdoor or indoor water source, we do not recommend staying indoors at this time. DPHS is actively investigating where the *Legionella* bacteria are coming from, but we do not know yet. As we learn more, we may change our recommendations about areas to avoid.

### **Can I get Legionnaire's Disease from my home air conditioning unit?**

No. *Legionella* grows and spreads in water sources. Home and car air-conditioning units do not use water to cool the air, so they are not a risk for *Legionella* growth.

### **Should I drink bottled water?**

DPHS has not made a recommendation to avoid drinking tap water.

### **Can I get Legionnaire's Disease from swimming in the ocean?**

No. Legionnaire's disease is usually acquired by inhaling aerosol droplets of water containing *Legionella* bacteria. Sources of the aerosol droplets can include showers, hot tubs, faucets, cooling towers, misters, and decorative fountains.

### **Should the DPHS or town cancel events or close hotels in town?**

While we believe that the current overall health risk to the community is low, DPHS is actively investigating where the *Legionella* bacteria are coming from. We are concerned by the preliminary test results at the Sands Resort and have taken steps to address these concerns with the establishment through a public health order. There are additional cases that did not stay at the Sands Resort and we are working to identify the source of these infections. In some situations, the source of the bacteria is never identified. If we identify the source, we will do whatever it takes to prevent additional transmission.

### **Why didn't DPHS close the Sands Resort?**

The public's health is our main priority. We continue to intensively and collaboratively investigate all possible sources of the *Legionella* bacteria. In consultation with CDC and Town officials, we are requiring the Sands Resort to remediate the outbreak, including notifications to all past, current and future guests of the presence of *Legionella* in the water system at the Sands and immediate water treatment to remove the *Legionella* bacteria through effective, standard methods. The Sands Resort is currently complying with these requirements to assure there are no *Legionella* present in the establishment. We are continuing to investigate and if we find more *Legionella* bacteria or if new illnesses are identified, we may take additional measures to protect the public.

### **How does Legionella grow and multiply in a building water system?**

A variety of internal and external factors, such as water main breaks, water temperature fluctuations, and inadequate levels of disinfectant, can lead to a *Legionella* problem in a building. *Legionella* grows and spreads in building water systems that have inadequate levels of disinfectant or temperature fluctuations allowing for *Legionella* bacteria to grow and spread, including in devices such as hot water tanks, showerheads, and hot tubs. It is critical that building owners and managers take steps to reduce the risk of *Legionella* in their buildings.

**Should I be concerned about drinking the municipal water in Hampton, NH?**

No. People get Legionnaires' disease when they breathe in small droplets of water in the air that contain the bacteria, not by drinking it.

**How do I get my water tested or treated?**

DPHS is not currently recommending that Hampton residents test or treat their water. The CDC has developed resources on how businesses that have devices that may make small droplets of water, such as shower heads, hot tub spas, and decorative fountains, can properly manage their water systems to prevent Legionnaire's disease available at:

<https://www.cdc.gov/legionella/wmp/index.html>

**Where can I learn more about Legionnaires' disease and this outbreak?**

General information on Legionnaires' disease is available on the CDC website at:

<https://www.cdc.gov/legionella/index.html>

Information about this outbreak is available on the NH DHHS website at:

<https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>

NH DHHS will continue to report results and updates as they become available and relevant for public health.

## APPENDIX 12: Public Health Order Issued to The Sands Resort



Jeffrey A. Meyers  
Commissioner

Melissa A. St. Cyr, Esq.  
Chief Legal Officer

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF HEALTH AND HUMAN SERVICES  
*OFFICE OF LEGAL AND REGULATORY SERVICES*  
*BUREAU OF GENERAL COUNSEL*

129 PLEASANT STREET, CONCORD, NH 03304-3857  
603-271-9226 1-800-852-3345 Ext. 9226  
Fax: 603-271-5850 TDD Access: 1-800-735-2964  
[www.dhhs.nh.gov](http://www.dhhs.nh.gov)

### ORDER TO NOTIFY GUESTS AND REMEDIATE BUILDING

TO: Mr. Tom Saab, Owner, The Sands Resort

ADDRESS: 32 Ashworth Avenue, Hampton, NH

The New Hampshire Department of Health and Human Services ("DHHS") has identified an outbreak of Legionella among individuals who stayed at the Sands Resort, 32 Ashworth Avenue, Hampton, New Hampshire beginning in July 2018. Legionella is a communicable disease that may adversely impact public health. People may be exposed to Legionella when they inhale aerosolized water droplets containing bacteria. Legionella can grow in water systems in the premise plumbing of large buildings (hot water heaters, storage tanks, and pipes), cooling towers, air conditioning systems, decorative fountains and hot tubs. The "premise plumbing system" is the portion of the water distribution system from the water meter to the tap in homes and buildings.

In accordance with NH RSA 141-C:9, I, the Commissioner of DHHS may investigate incidents of communicable disease. These investigations shall include, but not be limited to, inspections of buildings and conveyances and their contents and laboratory analysis of samples collected during the course of such inspections. This week, a number of samples were collected from several locations at The Sands Resort by the Centers for Disease Control working in support of the Department's investigation of a Legionella outbreak in Hampton. Additionally, pursuant to NH RSA 141-C:11-16, the Commissioner of DHHS may take actions necessary to protect public health, including the decontamination of your buildings at The Sands Resort. See RSA 141-C:16-a,I.

*The Department of Health and Human Services' Mission is to join communities and families in providing opportunities for citizens to achieve health and independence.*


Whereas to date nine individuals who have stayed at your property since July 2018 have been diagnosed with Legionnaires' Disease, and whereas preliminary testing at the Centers for Disease Control and Prevention has detected the presence of Legionella bacteria DNA in your establishment's hot tub, water heater, outdoor shower hose, and on the shower/sink heads in three guest rooms, DHHS orders you to take the following actions:

1. Immediately post signage, to be provided by the Department, notifying guests and visitors of the Legionella outbreak occurring at your establishment. This signage must be visible to all persons at all entries to the premises and at the registration desk.
2. Immediately notify all guests at the time of check-in, using documents provided by the Department, of the Legionella outbreak occurring at your establishment. We suggest you retain documentation that each notification was made.
3. Immediately notify all guests at the time of reservation (all forms including phone, internet, and in-person), using documents and exact wording provided by the Department, of the Legionella outbreak occurring at your establishment.
4. Within 48 hours of this order, hire at your own expense the services of a Legionella consultant or environmental consulting firm to conduct an assessment and initiate remediation actions within 24 hours of hire.
5. Within 24 hours of hire, have an assessment performed by the consultant and provide the Department with a written summary of actions taken toward remediation at least every 48 hours.
6. Perform ongoing Legionella testing to confirm remediation and report results to the Department as they become available.

This order will be in effect until DHHS is satisfied with remediation steps at The Sands to decrease transmission of Legionella bacteria to the public.

If you object to this Order, you may request a hearing in the superior court in accordance with RSA 141-C:14-a. You may make this request by filling out the form attached to this Order. Once you have completed the form, the law enforcement official or other person who delivered this order or a representative of DHHS will promptly deliver the form to the Superior Court. The court will then schedule a hearing to review this order.

Questions regarding this order may be directed to Elizabeth Daly, Chief, Bureau of Infectious Disease, Department of Health and Human Services, Tel. 603-271-4927.



Jeffrey A. Meyers, Commissioner  
New Hampshire Department of Health and Human Services

9/2/18 4:05 pm.  
Date

I hereby certify that this order was served in-hand to the above-named individual and upon the establishment of The Sands Resort on

September 2, 2018 at 7<sup>00</sup> a.m. (p.m.)

  
Signature of Person Serving Order

THE STATE OF NEW HAMPSHIRE

\_\_\_\_\_, SS  
Name of County

SUPERIOR COURT

**REQUEST FOR SUPERIOR COURT HEARING UNDER RSA 141-C:14-a TO REVIEW  
ORDER TO COOPERATE WITH THE ORDER TO NOTIFY GUESTS AND REMEDIATE  
BUILDING**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

NH RSA 141-C:14-a, I provides that: "Any person subject to an order for submission of a specimen or for examination, immunization, treatment, isolation, quarantine, provision of information, inspection of a building or conveyance, or any other order of the commissioner under this chapter ...may request a hearing in the superior court to contest such order."

My property, located at \_\_\_\_\_ is subject to an Order to Notify Guests and Remediate Building by the NH Department of Health and Human Services (DHHS) pursuant to RSA 141-C:12.

I hereby request a hearing in the superior court to contest this order.

I understand that I have the right to a hearing and a decision by the Court within 48 hours but no later than 120 hours after the time this request for a hearing is made.

I understand that if I sign this request and return it to the person serving the order, they must file it with the court under RSA 141-C:14-a, II. If I do not return it to the person serving me, I understand that I must file it with the court and provide notice to DHHS as provided below.

\_\_\_\_\_  
Signature of Person Requesting Hearing

\_\_\_\_\_  
Date and Time of Signature

I have served notice of this request for hearing on the Commissioner of the NH Department of Health and Human Services/Legal Unit, 129 Pleasant Street - Brown Building, Concord, NH 03301 and to the NH Department of Justice, 33 Capitol Street, Concord, NH 03301.

Date: \_\_\_\_\_

\_\_\_\_\_  
Signature of Person requesting hearing



**TITLE X  
PUBLIC HEALTH  
CHAPTER 141-C  
COMMUNICABLE DISEASE**

**Section 141-C:16-a**

**141-C:16-a Closure; Decontamination. –**

I. The commissioner, with the written approval of the governor, may close, direct, and compel the evacuation and decontamination of any building located within the state that is accessible to the public, such as businesses, primary and secondary schools, and universities, regardless of whether publicly or privately owned, when there is reasonable cause to believe the building may present an imminent danger to the public health. The commissioner may also cause any material located within or on the grounds of a building to be decontaminated or destroyed when there is reasonable cause to believe that the material may present imminent danger to the public health. Destruction of any material under this chapter shall be considered a taking of private property and shall be subject to the compensation provisions of RSA 4:46.

II. Notice shall be made by posting notice on all means of ingress or egress of the building and, within 24 hours of posting, mailing the notice, return receipt requested, to the owner of record. The notice shall state the reason for the action and its anticipated duration.

III. Orders issued pursuant to this section shall be effective immediately and shall remain in effect in accordance with this section unless the superior court issues a decision directing otherwise. Any person who is aggrieved by an order pursuant to this section may request a hearing in the superior court to contest that order. The superior court shall schedule and hold a hearing and issue a decision within 5 working days of the court's receipt of the request for a hearing, unless a shorter period is required for review. At the hearing, the burden of proof shall be on the commissioner to prove by clear and convincing evidence that the action taken is reasonably necessary to protect the health of the public.

IV. Orders issued under this section shall be subject to the due process provisions of RSA 141-C:14-a.

Source. 2002, 258:22. 2008, 336:1, eff. July 7, 2008.

APPENDIX 13: Initial Signage Required to be Posted at the Sands Resort

# PUBLIC HEALTH NOTICE

## Risk of Legionnaires' Disease

- Guests have been diagnosed with Legionnaires' disease after recently staying at the Sands Resort.
- Legionnaires' disease is a serious bacterial pneumonia that people get by breathing in small water droplets containing *Legionella* bacteria.
- Water tests at this property show *Legionella* bacteria have been, and may still be, present in our water system.
- Your risk of Legionnaires' disease may increase if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system.

For more information, call the New Hampshire Department of Health and Human Services at **603-271-9461**, or visit our website at <https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>

## APPENDIX 14: Initial Guest Notification Script for Sands Resort Reservations

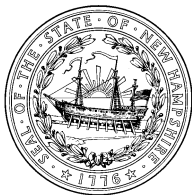
### SCRIPT FOR SANDS RESORT RESERVATIONS

I need to inform you that there is a currently an outbreak of Legionnaires' disease in Hampton, NH. Legionnaires' disease is a serious type of bacterial pneumonia caused by inhaling water droplets containing *Legionella* bacteria. The outbreak investigation is still in progress, but some of the people diagnosed with Legionnaires' disease have been guests at our property. Water samples collected at our property show that the *Legionella* bacteria are present in our water system.

People get Legionnaires' disease by breathing in small water droplets containing *Legionella* bacteria. Your risk of getting Legionnaires' disease is higher if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system.

We are cooperating with the NH Department of Health and Human Services to make sure the water is safe, and we are working to remove the bacteria from our water system. If you want more information about this situation, call the NH Department of Health and Human Services at 603-271-9461.

## APPENDIX 15: Initial Guest Notification Letter for Sands Resort Guests



Jeffrey A. Meyers  
Commissioner

Lisa M. Morris  
Director

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF HEALTH AND HUMAN SERVICES  
DIVISION OF PUBLIC HEALTH SERVICES  
BUREAU OF INFECTIOUS DISEASE CONTROL

29 HAZEN DRIVE, CONCORD, NH 03301  
603-271-4496 1-800-852-3345 Ext. 4496  
Fax: 603-271-0545 TDD Access: 1-800-735-2964  
www.dhhs.nh.gov

September 2, 2018

Dear Guest of the Sands Resort,

The New Hampshire Department of Health and Human Services (DHHS) and U.S. Centers for Disease Control and Prevention (CDC) are investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia caused by *Legionella* bacteria. This summer in Hampton New Hampshire (NH), DHHS has confirmed 14 people with Legionnaire's disease. Many, but not all, of these people stayed at the Sands Resort on 32 Ashworth Avenue, Hampton, NH. Water samples were tested to find out where the *Legionella* bacteria are coming from. These tests show that *Legionella* has been, and may still be present, in this hotel's water system. The investigation is still in progress and we are collaborating with many partners to clean the water system.

We want to make you aware of this situation so you can make a decision as to whether to stay at the Sands Resort or visit Hampton. People get Legionnaires' disease by breathing in small water droplets containing *Legionella* bacteria. You do not get Legionnaire's disease from other people, from eating food, or from swimming or bathing in water. Your risk of getting severe Legionnaires' disease is increased if you are 50 years of age or older, smoke cigarettes, and/or have certain medical conditions, such as a weakened immune system.

If you choose to stay at the Sands Resort, the following measures may help prevent infection:

- Take a bath instead of a shower. Showering is associated with an increased risk of Legionnaires' disease. A bath is safer because less water is aerosolized than during shower.
- Use bottled water for oral hygiene practices or drinking water in order to reduce any risk of inhaling or aspirating water containing the bacteria.

If you develop symptoms of pneumonia (such as fever, cough, and shortness of breath) within two weeks of staying at the Sands Resort, please seek medical attention right away. Show this letter to your healthcare provider so that he/she knows to test you for Legionnaires' disease. If your healthcare provider decides to test you, request that he/she use both a urine antigen test and a respiratory culture. If you are diagnosed with Legionnaires' disease, your healthcare provider will prescribe an antibiotic, may suggest you get care in the hospital, and should immediately report your diagnosis to your local or state health department.

The NH DHHS and CDC will continue working with the Sands Resort to protect the health of guests and employees. A fact sheet about Legionnaires' disease is included with this letter. You can learn much more about our investigation on our website (<https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>). Please share this information with others who stayed in your room. If you have any questions or concerns, please contact the New Hampshire Department of Health and Human Services public inquiry line at 603-271-9461.

Sincerely, The Bureau of Infectious Disease Control

APPENDIX 16: Updated Signage Required to be Posted at the Sands Resort

# PUBLIC HEALTH NOTICE

## Risk of Legionnaires' Disease

- Some guests who stayed at the Sands Resort during June, July, and August were diagnosed with Legionnaires' disease
- Tests of our water system and hot tub taken at the end of August found *Legionella* bacteria
- We hired an environmental consultant to clean and monitor our water system. Cleaning took place the week of September 3rd. New water tests are being done to make sure the *Legionella* bacteria is no longer present in our water system
- So far the NH Department of Health & Human Services has not identified new patients who developed Legionnaires' disease after we closed the hot tub and cleaned our water system
- Legionnaires' disease is a serious bacterial pneumonia that people get by breathing in small water droplets containing *Legionella* bacteria
- Your risk of Legionnaires' disease is greater if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system

For more information, call the New Hampshire Department of Health and Human Services at **603-271-4996**, or visit our website at <https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>

Updated 9/13/18

## APPENDIX 17: Updated Guest Notification Script for Sands Resort Reservations

### SCRIPT FOR SANDS RESORT RESERVATIONS

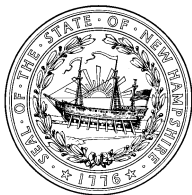
*Updated September 13, 2018*

I need to inform you that we recently experienced an outbreak of Legionnaires' disease. Some of the people diagnosed with Legionnaires' disease were guests at The Sands Resort from June through August. Water samples collected at our property show that the *Legionella* bacteria were present in our water system and hot tub.

Legionnaires' disease is a serious type of bacterial pneumonia caused by inhaling water droplets containing *Legionella* bacteria. People get Legionnaires' disease by breathing in small water droplets containing *Legionella* bacteria. Your risk of getting Legionnaires' disease is higher if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system.

We hired an environmental consultant to clean and monitor our water system to reduce the risk to our guests. Our water system underwent cleaning the week of September 3<sup>rd</sup>, and our consultant has collected new water samples and we are awaiting the test results from an independent laboratory to see if the *Legionella* bacteria have been eliminated. Additionally, the hot tub has been shut down and remains closed. NH DHHS continues to investigate but has not identified anyone with Legionnaires' disease since we closed the hot tub and cleaned our water system. If you want more information about this situation, call the NH Department of Health and Human Services at 603-271-4496.

## APPENDIX 18: Updated Guest Notification Letter for Sands Resort Guests



Jeffrey A. Meyers  
Commissioner

Lisa M. Morris  
Director

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF HEALTH AND HUMAN SERVICES  
DIVISION OF PUBLIC HEALTH SERVICES  
BUREAU OF INFECTIOUS DISEASE CONTROL

29 HAZEN DRIVE, CONCORD, NH 03301  
603-271-4496 1-800-852-3345 Ext. 4496  
Fax: 603-271-0545 TDD Access: 1-800-735-2964  
www.dhhs.nh.gov

September 13, 2018

Dear Guest of the Sands Resort,

The New Hampshire Department of Health and Human Services (DHHS) and U.S. Centers for Disease Control and Prevention (CDC) are investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia caused by *Legionella* bacteria. NH DHHS has confirmed 16 people with Legionnaire's disease. Many, but not all, of these people stayed at the Sands Resort on 32 Ashworth Avenue, Hampton, NH from June through August. Water was tested to find out where the *Legionella* bacteria came from and these tests show that the *Legionella* bacteria were in this hotel's water system and hot tub. The investigation is still in progress but, in response to these findings, the Sands Resort hired an environmental consultant to clean and monitor the facility's water system and reduce the risk of infection to guests. The water system was cleaned the week of September 3<sup>rd</sup>, and the environmental consultant has collected new water samples that are being tested at an independent laboratory to make sure the *Legionella* bacteria have been eliminated. Additionally, the hot tub has been shut down and will remain closed. NH DHHS has not yet identified any people with Legionnaires' disease who became ill after the hot tub was closed and the water system was cleaned.

We want to make you aware of this situation so you can make a decision as to whether to stay at the Sands Resort. People get Legionnaires' disease by breathing in small water droplets containing *Legionella* bacteria. You do not get Legionnaire's disease from other people, from eating food, or from swimming or bathing in water. Your risk of getting severe Legionnaires' disease is increased if you are 50 years of age or older, smoke cigarettes, and/or have certain medical conditions, such as a weakened immune system.

If you choose to stay at the Sands Resort, until the repeat water test results show the *Legionella* bacteria has been eliminated, the following measures may help prevent Legionnaires' disease:

- Take a bath instead of a shower. Showering is associated with an increased risk of Legionnaires' disease. A bath is safer because less water is aerosolized than during shower.
- Use bottled water for oral hygiene practices or drinking water in order to reduce any risk of inhaling, or aspirating, water containing the bacteria.

If you develop symptoms of pneumonia (such as fever, cough, and shortness of breath) within two weeks of staying at the Sands Resort, please seek medical attention right away. Show this letter to your healthcare provider so that he/she knows to test you for Legionnaires' disease. If your healthcare provider decides to test you, request that he/she use both a urine antigen test and a respiratory culture. If you are diagnosed with Legionnaires' disease, your healthcare provider will prescribe an antibiotic, may suggest you get care in the hospital, and should immediately report your diagnosis to your local or state health department.

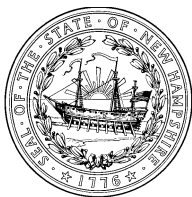
NH DHHS and CDC will continue working with the Sands Resort to protect the health of guests and employees. You can learn much more about our investigation on our website (<https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>). Please share this information with others who are staying in your room. If you have any questions or concerns, please contact the New Hampshire Department of Health and Human Services at 603-271-4496.

Sincerely,

The Bureau of Infectious Disease Control



## APPENDIX 19: NH DHHS Notification Letters for Sands Resort Guests



Jeffrey A. Meyers  
Commissioner

Lisa M. Morris  
Director

**STATE OF NEW HAMPSHIRE**  
**DEPARTMENT OF HEALTH AND HUMAN SERVICES**  
***DIVISION OF PUBLIC HEALTH SERVICES***  
***BUREAU OF INFECTIOUS DISEASE CONTROL***

29 HAZEN DRIVE, CONCORD, NH 03301  
603-271-4496 1-800-852-3345 Ext. 4496  
Fax: 603-271-0545 TDD Access: 1-800-735-2964  
www.dhhs.nh.gov

August 31, 2018

Dear Guest of the Sands Resort,

The New Hampshire Department of Health and Human Services is investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia, in Hampton, NH. A number of individuals have become ill after staying at the Sands Resort on 32 Ashworth Avenue, Hampton, NH this summer. People can get Legionnaires' disease by breathing in small water droplets containing *Legionella* bacteria. Your individual risk of coming down with Legionnaires' disease may increase if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system.

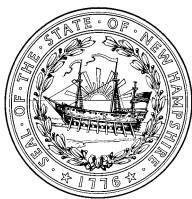
In response to this situation, the New Hampshire Department of Health and Human Services, the New Hampshire Department of Environmental Services, the Town of Hampton, NH, and the U.S. Centers for Disease Control and Prevention are conducting an investigation. We do not know whether the Sands Resort was the source of the bacteria that caused people to become sick. The investigation is still ongoing.

If you develop symptoms of pneumonia within two weeks of staying at the Sands Resort, please seek medical attention right away. Please also show this letter to your doctor so that he/she knows to test you for Legionnaires' disease. Pneumonia symptoms typically include cough, shortness of breath, fever, muscle aches, and headache. Ask your doctor to test you with both a urine test and a respiratory culture. If you test positive, ask your doctor to report your illness to your local or state health department as soon as possible. Your doctor should prescribe you an antibiotic for treatment if you develop symptoms and are diagnosed with Legionnaires' disease. You may also need care in the hospital. If your visit was longer than 14 days ago, you are beyond the usual time it takes to develop disease.

The New Hampshire Department of Health and Human Services will continue working with the Sands Resort to protect the health of guests and employees. A fact sheet about Legionnaires' disease is included with this letter. You can learn more on our website (<https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>). Please share this information with others who stayed in your room. If you have any questions or concerns, please contact the New Hampshire Department of Health and Human Services public inquiry line at 603-271-9461.

Sincerely,

The Bureau of Infectious Disease Control



Jeffrey A. Meyers  
Commissioner

Lisa M. Morris  
Director

**STATE OF NEW HAMPSHIRE**  
**DEPARTMENT OF HEALTH AND HUMAN SERVICES**  
***DIVISION OF PUBLIC HEALTH SERVICES***  
***BUREAU OF INFECTIOUS DISEASE CONTROL***

29 HAZEN DRIVE, CONCORD, NH 03301  
603-271-4496 1-800-852-3345 Ext. 4496  
Fax: 603-271-0545 TDD Access: 1-800-735-2964  
[www.dhhs.nh.gov](http://www.dhhs.nh.gov)

September 6, 2018

Dear Guest of the Sands Resort,

The New Hampshire Department of Health and Human Services is investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia, in Hampton, NH. A number of individuals have become ill after staying at the Sands Resort on 32 Ashworth Avenue, Hampton, NH this summer. People can get Legionnaires' disease by breathing in small water droplets containing Legionella bacteria. Your individual risk of coming down with Legionnaires' disease may increase if you are 50 years or older, smoke cigarettes, or have certain medical conditions, such as a weakened immune system.

In response to this situation, the New Hampshire Department of Health and Human Services, the New Hampshire Department of Environmental Services, the Town of Hampton, NH, and the U.S. Centers for Disease Control and Prevention are conducting an investigation. Preliminary laboratory testing at the Sands Resort has identified Legionella bacteria in the hot tub and other locations in the Sands Resort water system. NH DHHS issued a public health order on the Sands Resort on September 2nd, requiring the establishment to notify guests of the potential risk of Legionnaires' disease if they stay at the resort. As required by NH DHHS, the Sands Resort has hired a company to get rid of the bacteria that may be present in the hotel.

If you develop symptoms of pneumonia within two weeks of staying at the Sands Resort, please seek medical attention right away. Please also show this letter to your doctor so that he/she knows to test you for Legionnaires' disease. Pneumonia symptoms typically include cough, shortness of breath, fever, muscle aches, and headache. Ask your doctor to test you with both a urine test and a respiratory culture. If you test positive, ask your doctor to report your illness to your local or state health department as soon as possible. Your doctor should prescribe you an antibiotic for treatment if you develop symptoms and are diagnosed with Legionnaires' disease. You may also need care in the hospital. If your visit was longer than 14 days ago, you are beyond the usual time it takes to develop disease.

The New Hampshire Department of Health and Human Services will continue working with the Sands Resort to protect the health of guests and employees. A fact sheet about Legionnaires' disease is included with this letter. You can learn more on our website (<https://www.dhhs.nh.gov/dphs/cdcs/legionella.htm>).

Please share this information with others who stayed in your room. If you have any questions or concerns, please contact the New Hampshire Department of Health and Human Services public inquiry line at 603-271-9461.

Sincerely,  
The Bureau of Infectious Disease Control

## APPENDIX 20: NH DHHS Notification Emails for Sands Resort Guests

-----  
Date: Saturday, September 1, 2018

To: Guests of The Sands Resort between June 1, 2018 – August 27, 2018

Subject: NH DHHS Notice Regarding Your Recent Stay in Hampton NH

Hello –

You are receiving this email because we believe you may have stayed at the Sands Resort at 32 Ashworth Avenue in Hampton, NH since August 3, 2018. We wanted to make you aware that the New Hampshire Department of Health and Human Services is investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia, in Hampton, NH. A number of individuals have developed pneumonia after staying at the Sands Resort this summer. We do not know whether the Sands Resort was the source of the bacteria that caused people to become sick and the investigation is still ongoing.

Please see the attached letter for additional important information. This letter is also being mailed to your physical address if one was on file with the Sands Resort.

You can learn more on our [website](#). We have developed a list of [Frequently Asked Questions](#) to answer questions you may have. If you have any additional questions or concerns, or to report illness after staying at the Sands Resort, please contact the New Hampshire Department of Health and Human Services public inquiry line at 603-271-9461. This line is open Saturday 9/1 from 8am to 4pm, Sunday 9/2 from 8am to 1pm and Tuesday through Friday 9/4 – 9/7 from 8am to 4pm.

Please share this information with others who stayed in your room. Thank you.

Bureau of Infectious Disease Control  
NH Department of Health and Human Services  
29 Hazen Drive, Concord, NH 03301-6504  
Email: [nhbidc@dhhs.nh.gov](mailto:nhbidc@dhhs.nh.gov)

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Date: Thursday, September 6, 2018

To: Guests of The Sands Resort between August 28, 2018 – September 2, 2018

Subject: NH DHHS Notice Regarding Your Recent Stay in Hampton NH

Hello –

You are receiving this email because we believe you may have stayed at the Sands Resort at 32 Ashworth Avenue in Hampton, NH recently. We wanted to make you aware that the New Hampshire Department of Health and Human Services is investigating an outbreak of Legionnaires' disease, a serious type of bacterial pneumonia, in Hampton, NH. A number of individuals have developed pneumonia after staying at the Sands Resort this summer. Preliminary laboratory testing at the Sands Report has identified *Legionella* bacteria in the hot tub and other locations in the Sands Resort water system. NH DHHS issued a public health order on the Sands Resort on September 2nd, requiring the establishment to notify guests of the potential risk of Legionnaires' disease if they stay at the resort. As required by NH DHHS, the Sands Resort has hired a company to get rid of the bacteria that may be present in the hotel.

Please see the attached letter for additional important information. This letter is also being mailed to your physical address if one was on file with the Sands Resort.

You can learn more on our [website](#). We have developed a list of [Frequently Asked Questions](#) to answer questions you may have. If you have any additional questions or concerns, or to report illness after staying at the Sands Resort, please contact the New Hampshire Department of Health and Human Services public inquiry line at 603-271-9461. This line is open Monday through Friday from 8am to 4pm.

Please share this information with others who stayed in your room. Thank you.

Bureau of Infectious Disease Control  
NH Department of Health and Human Services  
29 Hazen Drive, Concord, NH 03301-6504  
Email: [nhbidc@dhhs.nh.gov](mailto:nhbidc@dhhs.nh.gov)

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## APPENDIX 21: Letter to The Sands Resort Reaffirming Conditions to Lift Order



Jeffrey A. Meyers  
Commissioner

Lisa M. Morris  
Director

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF HEALTH AND HUMAN SERVICES  
*DIVISION OF PUBLIC HEALTH SERVICES*

29 HAZEN DRIVE, CONCORD, NH 03301  
603-271-4501 1-800-852-3345 Ext. 4501  
Fax: 603-271-4827 TDD Access: 1-800-735-2964  
[www.dhhs.nh.gov](http://www.dhhs.nh.gov)

September 28, 2018

Tom Saab  
The Sands Resort  
32 Ashworth Avenue  
Hampton, NH 03842

Mr. Saab:

In August 2018, the New Hampshire Department of Health and Human Services (NH DHHS) identified an outbreak of *Legionella* infections among individuals who stayed at The Sands Resort, 32 Ashworth Avenue, Hampton, New Hampshire. Because *Legionella* infection is a serious communicable disease that may adversely impact public health, on September 2, 2018, NH DHHS issued a public health order under RSA 141-C, which remains in place. This order required you to 1) notify guests of the risk of Legionnaire's disease, 2) hire a contractor to remediate your establishment, and 3) conduct ongoing testing to ensure the building was remediated.

On September 3, 2018, you hired Dr. John Murphy of Resource Environmental Associates to conduct remediation activities, and NH DHHS advised Dr. Murphy about post-remediation sampling requirements. Dr. Murphy performed a remediation procedure at your establishment, and then collected post-remediation samples, which were submitted to an Elite certified laboratory. Knowing that these initial samples did not comply with our requirements, Dr. Murphy noted that he would collect a second set of samples the following week. We provided Dr. Murphy with additional information about the second sampling to assist him with collecting samples that would meet our requirements and that are consistent with best practices for post-remediation sampling as outlined by the Centers for Disease Control and Prevention (CDC).

On September 24, 2018, Dr. Murphy provided us with the test results for his initial sampling. Although, all samples were negative for detection of *Legionella* bacteria, some of the samples were collected less than 24 hours after remediation, and the volume of each bulk water sample was substantially less than 1 liter, which we had requested. As part of this communication, Dr. Murphy informed us that he did not plan to conduct any additional testing, contrary to best practice recommended by the CDC and other organizations. *Legionella* bacteria may not grow from water samples collected immediately after remediation; however, because *Legionella* can form biofilms that are difficult to eradicate, it can regrow in a building's water system in the weeks following remediation. Therefore, it is important to have a water management plan in place which includes regular re-sampling to periodically check for *Legionella* growth.

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in providing opportunities for citizens to achieve health and independence.*

Tom Saab  
The Sands Resort  
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As has been communicated in emails and during phone conversations, the public health order will not be lifted until all three of the following conditions are met:

1. One set of negative culture results on swabs and 1 liter samples taken at least 24 hours after remediation. These samples must be of a sufficient quantity to be representative of the establishment. Your expert contractor will need to develop an appropriate representative sampling strategy based on his assessment of the overall water system. Your contractor should sample from both the hot and cold water systems due to the cross connection of plumbing that was made during the remediation process. Your contractor should also take samples obtained from the central hot water system, including the boilers, hot water storage, hot water return (if there was a hot water return at this location), and fixtures from rooms that are proximal, medial, and distal to the boilers. Rooms where ill people stayed and locations that tested positive in the initial assessment should also be sampled following remediation.
2. A written plan that you will implement for ongoing *Legionella* testing that includes repeat samples taken at regular time intervals to ensure *Legionella* does not re-grow in the weeks and months following remediation. This should include culturing the water system at 2-week intervals for 3 months. If no *Legionella* is detected in cultures during the first 3 months of monitoring, cultures should then be collected monthly for another 3 months. Once this period of heightened sampling is completed, periodic environmental sampling for *Legionella* should be included as a component of a comprehensive water management program.
3. A written water management plan that you will implement. *Legionella* water management programs are now an industry standard for large buildings in the United States and are critical to helping prevent growth of the *Legionella* bacteria in your water system. CDC offers an online toolkit for developing a water management program to reduce *Legionella* growth and spread in buildings, which is available at: <https://www.cdc.gov/legionella/wmp/toolkit/index.htm>

We share a common goal of lifting the public health order and assuring there is no ongoing risk to the public. Should you have any questions regarding these requirements, you may contact me at 603-271-4927. Thank you for your cooperation.

Sincerely,



Elizabeth R. Daly, MPH  
Chief, Bureau of Infectious Disease Control

## APPENDIX 22: Letter Lifting the Public Health Order Issued to The Sands Resort



JEFFREY A. MEYERS  
COMMISSIONER

State of New Hampshire  
DEPARTMENT OF HEALTH AND HUMAN SERVICES  
128 PLEASANT STREET, CONCORD, NH 03301-0007  
603-271-2000 FAX: 603-271-4212 TDD: 603-271-1222 (RELAY NH) 1-800-735-3204

October 30, 2018

Mr. Tom Saab  
The Sands Resort  
32 Ashworth Avenue  
Hampton, NH 03842

Mr. Saab:

In August 2018, the New Hampshire Department of Health and Human Services (NH DHHS) identified an outbreak of *Legionella* infections among individuals who stayed at The Sands Resort, 32 Ashworth Avenue, Hampton, New Hampshire. Because *Legionella* infection is a serious communicable disease that may adversely impact public health, on September 2, 2018, NH DHHS issued a public health order under RSA 141-C. This order required you to 1) notify guests of the risk of Legionnaire's disease, 2) hire a contractor to remediate your establishment, and 3) conduct ongoing testing to ensure the building was remediated.

As of October 30, 2018, you have met all three requirements and NH DHHS, by notice of this letter, hereby lifts the public health order. Effective immediately you are no longer required to notify guests of the *Legionella* outbreak.

We thank you for your cooperation with our investigation. We will issue a report summarizing our investigation and will make this available to you when it is finalized and ready for public distribution. Should you have any additional questions or concerns, you may contact Beth Daly, Chief, Bureau of Infectious Disease Control at (603) 271-4927.

Sincerely,

A handwritten signature in blue ink that reads "Jeffrey Meyers".

Jeffrey A. Meyers  
Commissioner

*The Department of Health and Human Services' Mission is to join communities and families in providing opportunities for citizens to achieve health and independence.*