Influence of Social Media on an Acute Respiratory Outbreak at a High Profile Party Venue—
Los Angeles, February 2011

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The Call

- 2 PM on Friday, February 11
- Los Angeles County Department of Public Health notified of journalist inquiry
- Suspected legionellosis outbreak
- Conference held Feb 1–3
- Cluster of respiratory illness reported by attendees via social media
Wikipedia entry for Legionellosis on February 11, at time of LAC DPH notification.

Legionellosis

Legionellosis is a potentially fatal infectious disease caused by Gram-negative, aerobic bacteria belonging to the genus Legionella. Over 90% of legionellosis cases are caused by *Legionella pneumophila*, a ubiquitous aquatic organism that thrives in temperatures between 25 and 45 °C (77 and 113 °F), with an optimum around 35 °C (95 °F).

Legionellosis takes two distinct forms:

- **Legionnaires' disease**, also known as "Legion Fever", is the more severe form of the infection and produces pneumonia.
- **Pontiac fever** is caused by the same bacterium but produces a milder respiratory illness without pneumonia that resembles acute influenza.

Legionnaires' disease acquired its name in July 1976 when an outbreak of pneumonia occurred among people attending a convention of the American Legion at the Bellevue-Stratford Hotel in Philadelphia. On January 18, 1977 the causative agent was identified as a previously unknown bacterium, subsequently named *Legionella*. Some people can be infected with the *Legionella* bacterium and have only mild symptoms or no illness at all.

Outbreaks of Legionnaires' disease receive significant media attention. However, this disease usually occurs as single, isolated cases not associated with any recognized outbreak. When outbreaks do occur, they are usually in the summer and early autumn, though cases may occur at any time of year. The fatality rate often varies from 10% to 30% during various outbreaks. The death rate for patients who develop Legionnaires' disease while in the hospital is close to 50%, especially when antibiotics are delayed.

Los Angeles, California 2011

At a charity event being held at the Playboy Mansion on February 3rd 2011, more than 700 hundred people were exposed to what has now been determined to be Legionella. It was suspected that fog machines at the event might have been responsible. At least two hundred people have reported being seriously ill and one attendee from Sweden had died at home. After extensive testing was completed, legionellosis bacteria was found. Source www.dnjournal.com/archive/lowlowdown/2011/dailyposts/20110210.htm

References

Objectives

- Describe role of social media
- Summarize outbreak investigation
- Case-finding
- Characterization of illness
- Laboratory testing
Conference Description

- 715 attendees from 30 countries
- Conference at Hotel A
- Feb 1:
  - Kickoff party at Hotel A
  - Small party at Hotel B
- Feb 2: Party at Hotel C
- Feb 3: Party at Venue A
Timeline of Events

- Feb 1: Conference
- Feb 3: Party at venue A
- Feb 6: First blog post
- Feb 7: First social network post
- Feb 11: First inquiry to LAC DPH
- Feb 12: First news coverage
- Wikipedia post describes outbreak
Feb 7 – First Facebook post

Nico's Profile · Nico's Wall

Nico

Domainerflu count: Who else caught the disease at DFG?
February 7 at 11:06am · Like · Comment

5 people like this.

Nico

Stefan: 2
Mario: 3
Hakan: 4
Richard: 5
...
See More
February 7 at 11:07am · Like

Ken

Judy

February 7 at 11:09am · Like

Nico

That's 8

February 7 at 11:10am · Like

Ken

and Jeff

February 7 at 11:10am · Like

Thomas

That's 9 ;-

February 7 at 11:13am · Like

Stefan

I'll be there

February 7 at 11:19am · Like

Kerstin

Mario

Markus

Luuk

...
First, a well known domain who fell ill wrote, "I was as sick as ever till yesterday so my meet and greet immunity failed despite having a flu shot! Further my condition responded to strong antibiotics suggesting to me, the layman doctor, that it is bacterial in nature."

Second, my daughter, who is a 2nd year medical school student, wrote, "If there is a suspected water source as the culprit - like you mentioned the fog machine - and people are getting pneumonia you have to worry about getting a bacterial infection. If people aren't getting better they definitely need to see their doctors. So many people getting sick in one place, sounds like a case for the CDC."

So, if you are ill, do not take this lightly. We want to see everyone back at 100% as soon as possible.

(Posted Feb. 8, 2011)
Alleged Playboy Outbreak -- Grotto Under Investigation

2/15/2011 11:16 AM PST by TMZ Staff [like 801]

The legendary grotto at the Playboy Mansion has been targeted in a Health Dept. investigation into what may have caused a respiratory epidemic following a party at Hef’s place earlier this month.

EXCLUSIVE

TMZ has obtained a survey sent to everyone who worked at the Mansion during the week of an Internet-entrepreneur bash on Feb. 3 -- in an effort to see if there’s a connection between the mansion’s grottopool and the outbreak.
Case finding

- 79 persons self-reported illness
  - Facebook list
  - Blog comments
  - Tweets
- Internet survey sent to all 715 attendees
- 432 responses
  - 300 responses in first 2 days
Self-Reported Symptoms Among Ill Survey Respondents
(n=235)

Percent with symptom

Fever  Chills  Myalgia  Fatigue  Abd pain  Diarrhea  Cough  Dyspnea

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Case Definition

• Fever
• At least one additional symptom
  – Cough
  – Myalgias
  – Headache
  – Shortness of breath
• 123 of 432 respondents met case definition
Cases Among Conference Attendees, by Date of Symptom Onset
Risk of Illness Among Conference Attendees, By Exposure

<table>
<thead>
<tr>
<th>Exposure</th>
<th>RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staying at Hotel A</td>
<td>1.0</td>
<td>0.8–1.4</td>
</tr>
<tr>
<td>Feb 1 Hotel A party</td>
<td>0.9</td>
<td>0.7–1.2</td>
</tr>
<tr>
<td>Feb 1 Hotel B party</td>
<td>1.1</td>
<td>0.8–1.5</td>
</tr>
<tr>
<td>Feb 2 Hotel C party</td>
<td>1.3</td>
<td>0.9–1.7</td>
</tr>
<tr>
<td>Feb 3 Venue A party</td>
<td>3.8</td>
<td>2.0–7.5</td>
</tr>
</tbody>
</table>
Employee Surveillance

- Of 47 hostesses surveyed, 22 met the case definition
- Of 41 (of 67) employees surveyed, 3 met the case definition
- Total 148 cases
# Laboratory Findings (N=45)

<table>
<thead>
<tr>
<th>Lab Test</th>
<th>Pos</th>
<th>Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A (H1N1) Nasal Swab PCR</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Urine Legionella Antigen</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Legionella acute Serology</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Legionella paired Serology</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Influenza Serology</td>
<td>13</td>
<td>3</td>
</tr>
</tbody>
</table>
Radiology Findings

• 13 persons had chest radiographs performed
• No persons diagnosed with a radiographically confirmed pneumonia
Environmental Sampling

Legionella pneumophila isolated
Environmental Isolates of *Legionella pneumophila* (LP)

- Hot tub samples:
  - LP serotype 1 (4)
  - LP serotype 3 (3)

- Diatomaceous earth sample:
  - LP serotype 6 (1)

- 67 other specimen did not grow *Legionella*
Positive Effects of Social Media in Outbreak Investigation

• Identification of outbreak among geographically dispersed persons
• Encouraged rapid survey response
• Allowed for timely dissemination of LAC DPH recommendations for lab testing
Negative Effects of Social Media in Outbreak Investigation

- Wasted effort responding to rumors
  - Fog machine used mineral oil, no water
- Informal communication, protocols not established
- Amplified inaccurate media stories
- May have influenced recall
Conclusions

- Legionella exposure is supported by environmental not biological testing
- Laboratory and epidemiological evidence supports pH1N1 as the most likely outbreak etiology
- Social media influenced response
- Can be both help and hindrance
Using social media to detect outbreaks

- Growing trend
- 2008 Google flu trend
- Twitter: 200 million tweets a day
- Change in traditional public health
- ACMQ: The Ethics of Social Media in Healthcare: Garden of Eden, Minefield, or Both
- Question is how to leverage this data
Acknowledgements

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Role of Social Media in Investigating an Outbreak: The Good, The Bad, and The Ugly — Los Angeles, February 2011

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