



How a hotel convention became ground zero for this deadly bacteria

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From July 21 to July 24, 1976, more than 2,000 members of the Pennsylvania chapters of the American Legion attended their annual state convention at the Bellevue Stratford Hotel on Philadelphia's Broad Street. In the days that followed, Dr. Sidney Franklin, a physician at the Philadelphia V.A. Hospital, began treating several retired servicemen for odd, or atypical, forms of pneumonia. Many of these cases were quite serious, with complaints of severe shortness of breath and excruciatingly high fevers. Worse, none of the laboratory tests Dr. Franklin ordered helped in making a definitive diagnosis of these cases and the antibiotics he had at his disposal did not seem to work all that well. By Aug. 2, four of his patients had died.

It was at this point that Franklin called the U.S. Centers for Disease Control to help investigate this deadly pneumonia. Franklin was worried that his patients might be infected with a new strain of swine flu that had recently been diagnosed at Fort Dix in February of 1976. Indeed, it was precisely at this point in American history when the Gerald Ford administration was gearing up to deliver a mass immunization against "swine flu," a public health crisis some historians have referred to as "the epidemic that never was."

By Aug. 15, 182 Legionnaires who attended the convention were ill with serious forms of atypical pneumonia, and 29 had died. There were also a few odd but clinically similar cases, such as a Philadelphia bus driver, some pedestrians who had merely passed by the hotel, and one hotel employee who was the air conditioner technician.

The biggest problem with figuring out this epidemic was that it was caused by a "new" bacterium that doctors had not yet recognized, let alone treated. Another issue was the public scrutiny this epidemic elicited.

1976 marked the celebration of the nation's bicentennial and the lead up to that anniversary was filled with hoopla and cheers. Nowhere was it more intense than in the City of Brotherly Love. So, when it became known that former soldiers who had visited Philadelphia were now being struck by a deadly and unknown illness, the media spotlight on the epidemiologists struggling to figure it out was bright and harsh. Even the rock star (and now Nobel laureate) Bob Dylan added to the frenzy by writing a song about Legionnaires' disease:

*Some say it was radiation, some say there was acid on the microphone
Some say a combination that turned their hearts to stone
But whatever it was, it drove them to their knees
Oh, Legionnaire's disease*

The CDC task force rounded up all the usual suspects at the Bellevue Stratford Hotel, but kept coming up empty handed. They checked the cadmium content of pitchers used to serve the Vets their Bloody Marys, because cadmium poisoning sometimes resembles influenza. They checked the elevators, the carpets and wall paper for contaminants. They searched the rooms of shut-in residents for parakeets that might spread a flu-like, respiratory illness known as psittacosis.

On and on it went until after Christmas of 1976, when a CDC rickettsial diseases specialist named Joseph McDade holed himself up in the laboratory with a gaggle of guinea pigs and blood and tissue samples from those who became ill. He was still smarting over the criticism he received from a superior officer at a Christmas party for not yet finding the cause of the "Legionnaires' disease."

In one set of studies, Dr. McDade noted clusters of rod-shaped bacteria in the livers of guinea pigs who were injected with lung tissue from the Legionnaire patients. He then requested some serum from the patients to see if there was an antibody reaction to be found and, indeed, there was.

McDade later recalled, "My hair bristled...I wasn't sure what I'd got there but I knew it was something."

After more tests and experiments, he and his colleague Charles Shepard discovered a new bacterium, *Legionella pneumophila*. Although several CDC investigators were concerned about leaky refrigeration units in the hotel basement as a possible source for the bacterial invitation, it was not until another outbreak in 1977 that it was established that *Legionella* bacteria thrived in the cooling towers of large buildings which can be aerosolized and spread through air-conditioning systems. The bacterium is not spread by person-to-person contact but, instead, when breathed into one's lungs from a contaminated climate control system.

The Bellevue Stratford Hotel cases were probably the result of a temperature inversion on July 23 that produced an acute heating up of ambient temperature. This set in motion a rapid cooling of the warm air by the hotel's water tower. Thus, the disease-causing bacteria were aerosolized or misted both within the building and along its exterior sides, leading to illnesses among those who inhaled large amounts of bacteria.

Today, Legionnaires' disease can be prevented with better scrutiny and maintenance of air-conditioning and climate control systems and the reduction of stagnant water in such systems. Thanks to better diagnostic practices and better antibiotics that can penetrate the cell walls of the *Legionella* microbe, the disease itself can be more easily treated. Although there is a milder form, known as Pontiac fever (because this syndrome was first described in Pontiac, Michigan), the more serious Legionnaires' disease can lead to hospitalization and bumpy medical courses. The disease continues to be a public health risk wherever there are problems of maintenance of tall and extensive building complexes. Indeed, there have been several outbreaks reported around the nation and the world this summer.

Although we have yet to vanquish this odd and serious infection, it may well represent the first illness to be named after an annual convention!

By – **Dr. Howard Markel**

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