## 🖒 Like 🧈 Tweet 💼 Share

# ASSURED BIO LABS

November 2013 Newsletter

# November 2013 - About Legionella



#### Legionnaires Disease Song

By: Bob Dylan

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

I wish I had a dollar for everyone that died within that year Got 'em hot by the collar, plenty an old maid shed a tear Now within my heart, it sure put on a squeeze Oh, that Legionnaire's disease

Granddad fought in a revolutionary war, father in the War of 1812 Uncle fought in Vietnam and then he fought a war all by himself But whatever it was, it came out of the trees Oh, that Legionnaire's disease

Read more: http://www.bobdylan.com/us/songs/legionnaires-disease#ixzz2hKfEd95b

#### Legionnaires' Disease- the Reason Legionella Testing by: Marcus Reed, Lab Technician

At some point I'm sure some have wondered what exactly Legionnaires' disease is and what we can do to prevent its occurrence. Legionnaires' disease is a dangerous potentially fatal pneumonia, which is caused by infection of Legionella bacteria. Over 90% of the diagnosed cases are due to the bacterium Legionella pneumophila. As you may be aware, pneumonia is a lung infection that causes inflammation in lung tissue which can impair breathing. This disease, itself, is a relatively new problem and testing for the culprit, Legionella bacteria, is a means of reducing its occurrence.

The first cases of Legionnaires' disease were seen in 1976 at an American Legion convention at the Bellevue-Stratford Hotel in Philadelphia, Pennsylvania. An estimated 2,000 Legionnaires were at the convention celebrating the 200th anniversary of the signing of the Declaration of Independence in1776. After the convention's end, July 24th to be precise, a 61 year old American Legion bookkeeper named Ray Brennam died of an apparent heart attack. A few days later, Frank Aveni died with similar symptoms and on August 1st six more Legionnaires died. The victims ranged in age from thirty-nine to eighty-two. All complained of tiredness, chest pains, lung congestion, and fever.

Within a week, roughly 130 people were hospitalized, of these twenty-five died and all had attended the convention at the hotel. This lead to a response; The CDC launched an all-out investigation into the outbreak which identified a gram- negative rod shaped bacterium present in significant concentration in the cooling tower of the hotel's air conditioning system. The



Assured Bio Labs Will Be Observing These Holidays:

- Thanksgiving: November 28-29.

- Christmas: December 25-26

- New Years: January 1

- Martin Luther King Jr: \_ January 20.

## Meet Our Newest Employees!



Krystall Gibson : Krystall joined the team at Assured Bio in September. With over seven years experience as a Customer Service Representative, she is functioning in that capacity at the lab. Krystall is currently pursuing her bachelor's degree in Chemistry and enjoys to cook and travel in her spare time. Feel free to contact Krystall for

system not only harbored the bacteria, but also served as delivery mechanism, spreading the bacteria throughout the entire hotel. The Pennsylvania Health Department identified the specific culprit and named it Legionella pneumophila. While there have been other instances, the Philadelphia outbreak of Legionnaires' disease is the most famous case.

So let's look further, without getting too technical.

Legionella pneumophila was originally thought to only affect animals, but after the aforementioned outbreak- this was found to be untrue. This bacterium is unique in that it lives and replicates inside amoebae that live in water. The amoebae act not only as a reservoir for L. pneumophila but they also protect it from environmental hazards such as chlorination. Legionella bacteria are common bacteria present in most soil and aquatic systems.

Another common and much less dangerous infection associated with this genus is Pontiac Fever. It is caused is caused by various species of Legionella. Pontiac Fever (named after Pontiac Michigan- where it was first diagnosed) is a mild flu like infection that usually clears up on its' own. Legionella based illnesses do not spread from person to person, but through the inhalation of aerosolized water or soil containing the bacteria. Common environments include water tanks, cooling towers, and the evaporative condensers of A/C systems used in larger buildings. Showers, windshield washers, fountains, and hot tubs have also been known to contain these bacteria.

Due to Legionella pneumophila's deadly potential, outbreak prevention is key to reducing the likelihood of infection. The simplest way to do this is through routine testing. Sample collection is relatively easy and identification/enumeration is fairly inexpensive. Collection of samples can easily be managed with swabs or sterile sampling bottles. Areas containing warm water with the potential to become aerosolized are ideal sampling locations. Prevention through identification of potential reservoirs is the idea, so collecting multiple samples is crucial. Future outbreaks may simply be avoided by keeping this organism from proliferating in buildings with many occupants.



all of your service related needs.



Mehak Vohra: Mehak Vohra joined the Assured Bio Team at the end of August as an intern from Oak RIdge High School. She makes and designs the newsletters and advertisements for Assured Bio Labs. Mehak is currently a senior and plans to graduate high school and attend Georgia Tech next year. Mehak's favorite activities include running cross country and track for her school and hanging out with friends.

M-TRAP<sup>® and</sup> Legionella: New Developments

A M-TRAP<sup>®</sup> Legionella bacteria Capture Efficiency Evaluation was conducted at the CDC/NIOSH unit in Morgantown, WV and Assured Bio Labs Oak Ridge, TN. The study objective was to determine the efficiency of M-TRAP<sup>®</sup> in capturing airborne Legionella bacteria

Serial dilutions of *Legionella pneumophila* ATCC 33152 were placed in a Collison nebulizer and aerosolized for 10 minutes. M-TRAP<sup>®</sup> samples were pulled

# Legionella Analysis: Culture or <u>QPCR?</u>

### By: Merissa McGraw, Project Manager

At Assured Bio Labs, LLC we offer two types of analysis for Legionella isolation from the environment: Culture and QPCR. Both types can be performed on water and swab samples, both cost the same, so what are the differences and when do you use which analysis?

The culture analysis is the gold standard. It is the preferred method, to date, and is the method the CDC gears its proficiency testing towards. This is primarily because viability can be determined and since only viable cells are pathogenic this is an important factor in determining risk assessment. There are a few downsides of this analysis. The major complaint is the length of time it takes to get results. A Legionella culture can take up to two weeks or longer to turn positive. This is a long time when dealing with a potential outbreak. False negatives can easily occur with viable but nonculturable Legionella that can easily infect a person. Viable but nonculturable Legionella could better be described as not immediately culturable. These bacteria are in a state of little metabolic activity generally due to stress which could happen as a result of a disinfection process. Another factor is the differences between pre-treatment of samples between laboratories that can affect the detection of Legionella such as: sample size, concentration and acid treatment. Differences in selective media can also affect the detection of Legionella by culture and since there is no standard protocol only guidelines, it is difficult to say whether a negative culture is truly negative.

QPCR is a sensitive and guick analysis for Legionella isolation. Results can be determined within 24 hours of sample collection. This can be very useful in assessing an area for potential outbreak. Since the samples do not need to be cultured to gain results the problem with viable but nonculturable samples is also resolved. This fact also has a potential to produce false positives. Since QPCR detects Legionella DNA present within a sample, samples that have been disinfected with pieces of Legionella cells floating in the water could potentially produce a false positive. This is why it is imperative for a laboratory to use calibration curves to set a threshold for positive samples; Pieces of cells are not considered as full cells and are not reported as positive results. In other words a piece of Legionella cell will not have as much Legionella DNA present as a whole cell would and to be considered positive a sample much reach that whole cell threshold before being considered positive.

So when do you use which analysis? At Assured Bio we recommend utilizing both analyses especially if this is the first time sampling a site. This way you can get a quick yes or no Legionella is present via QPCR and in what concentration; then you can get a viable quantification with the culture analysis. Once a site has been remediated, culture analysis is generally recommended however as mentioned during this 10 minute time frame at 15 liters per minute for a total air volume of 150 L of air. Each dilution was run in triplicate.

Once sampling had finished, these M-TRAP<sup>®</sup> samples were packaged and shipped to Assured Bio Labs where DNA extraction and QPCR analysis was performed. Each dilution replicate was run six times on the Roche LightCycler® 480 II system utilizing the *Legionella pneumophila* specific assay according to Yang et al.

The M-TRAP® data followed the typical log linear trend associated with QPCR technology. The M-TRAP® was shown to detect aerosolized *Legionella* bacteria down to the 10<sup>o</sup>2 dilution; equivalent to 100 colony forming units this is the threat level of domestic water according to OSHA guidelines.

It was concluded that the M-TRAP<sup>®</sup> technology is an inexpensive and easy to use capture matrix to detect airborne *Legionella* bacteria for downstream molecular diagnostics such as QPCR.

The M-TRAP<sup>®</sup> capture efficiency provides end users with a reliable technology to investigate the potential threat of infection in both commercial and health care facilities with results available in as little as 24 hours from time of collection.

before with the introduction of the stress of disinfection Legionella cells could become viable but nonculturable and an assessment of the probability of infection would need to be used in determining whether both analysis are warranted. For example, a humidifier used in a hospital where immunocompromised individual are already more likely to contract infection versus a shower head at a gym where the individuals in this scenario are considered healthy and less likely to become infected. Always keep in mind if an outbreak has occurred it is best to perform both analyses just in case the samples are ever reviewed in a court case. Both analyses are recognized as acceptable measures of Legionella detection alone, however, both together reduce questionable results making a stronger case.



#### Water Feature Maintenance: By: Dylan Graves, Lab Technician

In sustaining a decorative water feature, many elements must be considered in order to maintain optimum performance as well as appearance. Factors such as location and the intended purpose of the fountain will determine the appropriate approach to regular care. First, whether the fountain is to house fish or simply to be for visual effect, filling it with distilled water will be the best choice when it is available. This is because distilled water is free of minerals and other additives commonly found in tap water which may contribute to the growth of unwanted microbes and algae. The buildup of these minerals after prolonged operation of the water feature may also be detrimental to pumps and other fountain equipment. In cases of outdoor ponds and fountains, regular removal of leaves and other debris can greatly prolong the life of pumps which easily become clogged and then burn out.

When dealing with concerns of waterborne microbes that can cause cloudy water and unpleasant odors, many chlorine-based treatments are readily available to the consumer. If applied at the appropriate recommended concentration, these chemical additives kill potentially harmful microbes after a relatively short dwell time. Unfortunately, the same can be said for fish and other wildlife present in the fountain at the time of treatment, so extra care should be taken when adding chemicals to features with animals. Following antimicrobial treatment, many choices of coagulants are also available. Use of a coagulant causes suspended particles to clump together and sink to the bottom, or become more easily captured in the circulation pump's filter media. All-in-all, research into basic maintenance can be extremely beneficial to anyone considering operating their own water feature, and a little work can ensure a long life for all pond equipment incorporated into the water feature.

For Water Feature Maintenance please follow this link: <u>http://www.legionellae.org/</u> guidelines/ControlofLegionellainWaterFeatures.pdf

#### Click to view this email in a browser

If you no longer wish to receive these emails, please reply to this message with "Unsubscribe" in the subject line or simply click on the following link: <u>Unsubscribe</u>

Click here to forward this email to a friend

Assured Bio Labs, LLC 228 Midway LN Suite B Oak Ridge, Tennessee 37830 US



Read the VerticalResponse marketing policy.