Enhancing *Legionella* Testing Capacity for Clinical and Environmental Samples at the Washington State PHL

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Outline

• Pre 2017 testing capabilities in Washington
• Our thought process on which tests to implement
• A brief look at the tests that were implemented
• A look at our future plans
• Helpful validation ideas
Legionnaires’ Disease Cases Reported to WA DOH by Year of Onset

Case counts are on an increasing trend nationally as well.
Legionella Testing in Washington

• Most hospitals do not collect a respiratory specimen, instead rely on the urine antigen test

• There were only few facilities that maintained the capacity to culture a clinical specimen
  – We are working to revise the WAC to state “isolates or the respiratory specimen associated with a positive result be submitted to the state”

• There were only 2 facilities that participated in the ELITE program

• If a large outbreak occurred, the state lab had no procedures for culturing clinical or environmental samples
What capabilities were needed

• After examining what the state lab can offer, we identified the areas that needed improvement
  – Rapid identification of isolates
  – Culture
  – Increase sensitivity and turn-around-time of samples using a molecular assay
  – Training for microbiologist to identify and isolate *Legionella* from specimens
Where to Start

• We decided to concentrate on enhancing clinical testing first

  – In clinical micro a procedure existed for identification of isolates
  – We had a microbiologist with experience *Legionella* isolates
  – Clinical testing was considered “easier” to implement since there were more resources available
  – We still had unresolved issues regarding testing in our environmental lab, i.e. incubators, BSC, filtering equipment
Isolate Identification

- First step was to expand identification capabilities
- Microgen Latex Kit
- Easy to use
- Rapid identification
- Added the ability to identify *L. pneumophila* SG1
- This kit can be used for clinical and environmental isolates

Photo courtesy of Microgen Bioproducts [https://microgenbioproducts.com](https://microgenbioproducts.com)
Add Selective Media

• Next we expanded our media to include BCYE-PAV and BCYE-GPVC
  – We chose to add these two antibiotic plates since they were cited the most for use in clinical and environmental isolation

• BCYE-PAC was also evaluated...
  – BCYE-PAC worked great for pneumophila, but very poor with other species.
  – 6/9 species didn’t grow
  – 4/9 species had poor recovery
Validate Culture and PCR

• Last step was to validate the culture and PCR
• These validations were done at the same time
  – Material was limited
  – The matrix was spiked
  – Had one dedicated microbiologist working on the validation
  – Able to dedicate a BSC and ABI 7500 FAST
Future Testing

• WGS

• MALDI-TOF

• Legiolert
Helpful Validation Hints

• Secure the testing material early on
  – Isolates
  – Matrix

• Write a very detailed validation plan

• Risk Assessment

• Have one person in charge of the validation. They write the plan, oversee the testing and present the data for approval
Helpful Validation Hints

• Create a flow diagram of the validation plan

Limit of Detection
Helpful Validation Hints

• Dedicate lab space for the validation

• Seek out training opportunities
  – CDC
  – Old ELITE PT
References

CDC’s ELITE program  


ISO 11731:2017 Water quality – Enumeration of Legionella

References
