



# Pseudomonas Putida (PsP) Cluster Associated with a Contaminated Bronchoscope (B) in a Medical ICU (MICU) at the University of Pittsburgh Medical Center (UPMC)



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## Abstract

### Background:

PsP is an environmental isolate infrequently identified as a pathogen in hospital settings. UPMC is a complex 757 bed tertiary care center with a case-mix index of 2.16. Since 2008 there have only been 8 hospital acquired PsP MICU patients. In October 2015, two MICU patients in adjacent rooms were identified with PsP hospital associated pneumonia (HAP). A multidisciplinary team reviewed any commonalities such as shared staff, geographic location and bronchoscopy procedures at bedside. All scopes are reprocessed with HLD and leak tested prior to use.

### Method:

9 Bs are used in the MICU, usage records were reviewed and all 9 were cultured. If a positive scope is identified, the scope lumen is evaluated for defects via boroscopy. PsP isolates underwent molecular typing using Pulsed Field Gel Electrophoresis (PFGE). The genome sequence of these PsP isolates were compared to genome sequences of 14 isolates in Genbank.

### Results:

- No deficiencies in B reprocessing were identified and no scope failed leak testing. Both PsP + MICU patients had undergone B with the same scope (V27) and this scope grew PsP. All other 8 Bs were culture negative. V27 was removed from service and no additional cases were identified. Boroscopy of V27 identified a kink in the biopsy channel likely associated with the HLD failure. The scope underwent maintenance which included replacement of the biopsy channel and V27 cultured negative prior to reuse.
- The MICU PsP isolates and scope V27 isolate were >90% similar by PFGE. A PsP isolate from another patient in a different UPMC area from 1 month prior to the cluster was positive. This PsP isolate was genetically related to MICU cluster with a 86.5% similarity. This clone was not closely related to other Genbank PsP genome sequences. This cluster likely represents a new clone that has not been previously sequenced.

### Conclusions:

- B, like ERCP and EUS scopes, become contaminated during use and may fail HLD despite defect free reprocessing
- Culturing implicated scopes can help identify exposure
- Luminal defects can increase risk of scope contamination.
- Boroscopy was crucial in identifying the luminal defect but are not a routine component of scope maintenance.
- Use of disposable scopes would eliminate risk and should be explored.
- Ongoing investigation is underway to evaluate the new PsP clone.

## Setting

The University of Pittsburgh Medical Center (UPMC) Presbyterian is a 762-bed tertiary care facility affiliated with the University of Pittsburgh Schools of the Health Sciences.



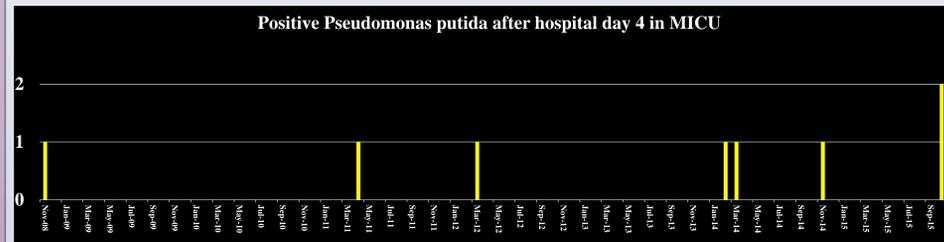
## Background - PsP

- Pseudomonas putida is a Gram-negative, rod-shaped, saprotrophic soil bacterium.
- Found in most soil and water habitats where there is oxygen
- Grows optimally at 25-30 C
- Pseudomonas putida are significant to the environment due to its complex metabolism and ability to control pollution.



## Background - MICU

MICU houses primarily lung transplant, acute and chronically ill pulmonary patients.



Since 2008 there have only been 8 hospital acquired PsP MICU patients.

In October 2015, two MICU patients in adjacent rooms were identified with PsP hospital associated pneumonia (HAP). A multidisciplinary team reviewed any commonalities such as shared staff, geographic location and bronchoscopy procedures at bedside. All scopes are reprocessed with HLD and leak tested prior to use.

## Background - Scopes

- 9 scopes primarily used in MICU
- Post Procedure Process:
  - Post patient procedure pre-cleaning begins by suctioning remaining saline through suction channel to begin to clear any bioburden
  - 50-60 ml syringe with Enzymatic detergent is then used to flush the biopsy channel of bronchoscope
  - Bronchoscope is then sponged with enzymatic detergent to remove gross contaminant on the outside lumen of the scope
  - Enzymatic detergent is then suctioned through the scopes channel to clear contaminants in the internal lumen of the scope and begin breakdown of protein
  - Bronchoscope is then bagged and sent to central sterilization for high level disinfection.



## Methods

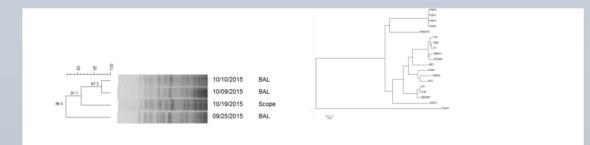
- 9 bronchoscopes are used in the MICU
  - Usage records were reviewed
  - All 9 bronchoscopes were cultured
- If a positive scope is identified, the scope lumen is evaluated for defects via boroscopy.
- PsP isolates underwent molecular typing using Pulsed Field Gel Electrophoresis (PFGE).
  - The genome sequence of these PsP isolates were compared to 14 isolates in Genbank.

## Results

- No deficiencies in bronchoscope reprocessing were identified and no scope failed leak testing.
- Both PsP + MICU patients had undergone bronchoscopy with the same scope (V27) and this scope grew PsP.
  - All 8 other bronchoscopes were culture negative.
- V27 was removed from service and no additional cases were identified.
- Boroscopy of V27 identified a kink in the biopsy channel likely associated with the HLD failure.
  - V27 underwent replacement of the biopsy channel and culture negative prior to reuse.



- The MICU PsP isolates and scope V27 isolate were >90% similar by PFGE.
- A PsP isolate from another patient in a different area from 1 month prior to the cluster was positive.
  - This PsP isolate was genetically related to MICU cluster with a 86.5% similarity.
  - This clone was not closely related to other Genbank PsP sequences.
- This cluster likely represents a new clone.



## Conclusions

- Bronchoscopes, like ERCP and EUS scopes, become contaminated during use and may fail HLD despite defect free reprocessing
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- Luminal defects can increase risk of scope contamination.
- Boroscopy was crucial in identifying the luminal defect but are not a routine component of scope maintenance.
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