Increased Sodium Hydroxide Concentration and it’s Potential Impact on TB Recovery

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AFB culture contamination rates should be kept between?

1. 1-2%
2. 2-5%
3. 5-10%
4. 10-15%
TB Case Overview

• Patient X
  – First AFB culture sent to the State Hygienic Laboratory (SHL) from Hospital A on 2/4 was negative for acid fast bacillus after three weeks
  – Two TBNAATs sent to the State Hygienic Laboratory (SHL) from Hospital B on 2/7 (smear negative and 2/8 (smear positive 2+) and 2/11 (smear negative)
    • 2/7 NAAT = MTB Not Detected
    • 2/8 NAAT = MTB Detected/Rifampin Resistance Not Detected
    • 2/11 NAAT = MTB Detected/Rifampin Resistance Not Detected
TB Case Overview

• Hospital B
  – SHL received a call from doctor at Hospital B asking if they could recollect samples and send to SHL for culture (No growth on NAAT cultures)
    • Culture collected on 4/29, 4/30 and 5/1 then sent to SHL
      – All three cultures end up as “No Acid Fast Bacillus Detected”
  – None of the three cultures from Hospital B (NAAT cultures) ever grow
Investigation

• Cross-Contamination?
  – Referred Processed Sputums (processed at submitting facility)
  – Not potential for cross-contamination at SHL
Investigation

• Interfering Substances?
  – Per the package insert
    • Lidocaine
    • Mucin
    • Ethambutol
    • Guaifenesin
    • Phenylphrine
    • Tea Tree Oil
    • *Mycobacterium scrofulaceum*
Investigation

- Contacted Hospital B
- Cross-Contamination – no other positive samples processed with NAAT samples
- Decontamination Method
- Original NAAT submissions had been collected before the patient started antibiotic therapy
Resolution

• Hospital B reveals they recently increased their concentration of NaOH to 8%
• Why?
  – Dealing with an increase in contamination rate
  – Hospital B has a large cystic fibrosis patient population
CLSI Recommendations

• Specimen Contamination Rate
  – Goal is b/n 2% and 5%
• Hospital B Specimen Contamination Rate
  • 1% and 2%

<table>
<thead>
<tr>
<th>Amount of NaOH in 100 mL water when reagent added to equal volume</th>
<th>% NaOH</th>
<th>%NaOH when added to equal volume Na citrate</th>
<th>Final concentration NaOH specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 g</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>5 g</td>
<td>5%</td>
<td>2.5%</td>
<td>1.25%</td>
</tr>
<tr>
<td>6 g</td>
<td>6%</td>
<td>3%</td>
<td>1.5%</td>
</tr>
<tr>
<td>8 g</td>
<td>8%</td>
<td>4%</td>
<td>2%*</td>
</tr>
</tbody>
</table>
CLSI Recommendations

• Important Note
  – 2% NaOH (final concentration) can be lethal to mycobacteria
  – Especially in smear negative samples
• Laboratories strongly encouraged to examine and correct problems in clinical and laboratory operations first
Laboratory Operations

• Lack of appropriate collection instructions for patients
• Lack of timely refrigeration during hold-times and transport
• Prelaboratory processing
• SHL practices
  – We consistently struggle with 10% liquid culture contamination rates
  – SHL splits samples if they require decontamination and are over 10 ml
  – New process – data pending
Cystic Fibrosis Specimen Recovery

- *Pseudomonas aeruginosa*
- Goal is highest possible recovery of NTM
- NALC-NaOH-oxalic method
- Chlorhexidine decontamination method
- Other Methods that have worked
- Benzalkonium, chloride-trisodium phosphate, oxalic acid and cetylpyridinium chloride