The problem: rising infection rate after TRUS biopsy

The setting: MUSIC

The intervention: augmented or tailored ATB

The results: ?
What is MUSIC?
Michigan Urologic Surgery Improvement Collaborative

- A Physician-led collaboration of urology practices in Michigan designed to improve care and make the State of Michigan the best place in the country to receive prostate cancer care.
  - Supported by contract from BCBS of Michigan
  - Director: David Miller, MD, MPH
  - Coordinating Center at UM Urology
Disclosures

- Agency for Healthcare Research and Quality (Grant Funding) – Miller
- Urology Care Foundation (Grant Funding) - Miller
- Blue Cross Blue Shield of Michigan (Contract for MUSIC) – Miller, Montie
- Histosonics, Inc. - Montie
MUSIC Participants

- AuSable Urology
- Bay Area Urology Associates
- Cadillac Urology Practice
- Cascades Urology
- Center for Urology
- Comprehensive Medical Center
  - Affiliates in Urology
  - Arnkoff, MD, and Weigler, DO, PC
  - Comprehensive Urology
  - Grosse Pointe Urology
  - Jeffrey L. Weingarten, MD, PC
  - Michigan Urological Institute
  - Oakland County Urologists
  - Urology Associates of Port Huron
- David L. Harold, MD, PC
- Detroit Medical Center - Urology
- Henry Ford Health System – Vattikuti Urology Institute
- Huron Valley Urology Associates
- Lakeside Urology
- Lansing Institute of Urology
- Michigan Institute of Urology
- Northern Michigan Urology
- Pinson Urology Center
- Spectrum Health Medical Group – Urology
- Tri City Urology
- University of Michigan, Department of Urology
- Urologic Consultants, PC
- Urology Associates of Battle Creek
- Urology Associates of Grand Rapids
- Urology Surgeons, PC
- Wayne State University Physicians Group – Urology
- West Shore Urology
- Western Michigan Urological Associates

Trained abstractor(s) at each practice
Highlight Reel

- 32 practices and nearly 200 participating urologists
- 29 practices contributing data to the registry
- More than 6,400 cases in the registry to date
- Implementation of multiple QI activities
MUSIC Playbook

Data

Information

Action

Outcomes
1. Efficient use of imaging (do bone scan/CT scan when appropriate, don’t when not)
2. Make radical prostatectomy safer with better outcomes using Patient-Reported Outcomes (PRO)
3. Introduce shared decision-making into daily practice
4. Make prostate biopsy safer and more efficient
Biopsy-Related Hospitalization Evaluation

- 30-day hospitalization rate after biopsy
- March 2012 – December 2013
- n = 6,331 biopsies
- Practice patterns for antibiotic prophylaxis
  » Compared against AUA best practice guidelines
- Culture data from infection-related cases
Hospitalization Rates in Michigan

91% due to infection

Average Hospitalization Rate 1.2%
Infection-related hospitalizations after prostate biopsy in a state-wide quality improvement collaborative

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\textsuperscript{5}Oakland University William Beaumont School of Medicine, Royal Oak, MI
Evaluation of Hospitalizations After Prostate Biopsy

- 89% of the ATB regimens used were AUA compliant

- 76% of hospitalizations associated with fluoroquinolone resistant bacteria

Even though non-compliant had higher hospitalization (3.8% vs. 0.89%, p = 0.0026), the problem is not non-compliance, it is antibiotic resistance.
Continued Evidence of Fluoroquinolone Resistance

<table>
<thead>
<tr>
<th>Compliant</th>
<th>Not Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 53</td>
<td>n = 6</td>
</tr>
</tbody>
</table>

*Fluoroquinolone Resistance*
Strategies for Improvement

● Pathway A: Tailor ATB to high risk patients
  • Rectal swab culture

or

● Pathway B: Expand spectrum of prophylactic ATB consistent with AUA guidelines and local antibiotic-resistance profile (easier to implement across multiple different practice settings)
UM Rectal Swab Implementation

- **Rationale:** potentially more effective, better ATB stewardship
- **Planning and preparation:**
  - Microbiology lab
  - Urologists & Mid-level providers
    - Particularly those who perform biopsies
  - Clinical staff
    - Nursing, Medical Assistants
  - Infectious Disease
    - Antibiogram: determine best augmented prophylaxis
How are we doing at UM?

- Swab protocol implemented 7/8/13
- Surveillance of all prostate biopsies
  » Initiated 8/14/13
  » Monitor for swab, culture results, referral source and antibiotics utilized
  » If no swab done, determined why not:
    – Orders placed before start of protocol
    – Referral from Non-participating provider
Overall Rates
By 2-week Rolling Average

<table>
<thead>
<tr>
<th>Biopsies (n)</th>
<th>Wks 1-2</th>
<th>Wks 3-4</th>
<th>Wks 6-7</th>
<th>Wks 8-9</th>
<th>Wks 10-11</th>
<th>Wks 12-13</th>
<th>Wks 14-15</th>
<th>Wks 16-17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>16</td>
<td>22</td>
<td>15</td>
<td>18</td>
<td>25</td>
<td>19</td>
<td>14</td>
</tr>
</tbody>
</table>

- Missed Opportunity
- Pending Lab
- Outside Dates
- Outside Provider
- Swab Performed
Case study

**Key Points**

- **ESBL positive *E. coli***

- **Resistant to**
  - Fluoroquinolones
  - TMP/SMX
  - Cephalosporins
  - Gentamicin
  - Aztreonam

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**Example 2**

**Rectal Culture**

*Escherichia coli*

Extended spectrum beta-lactamase positive. Resistant to therapy with penicillins, cephalosporins and aztreonam

<table>
<thead>
<tr>
<th>Organism</th>
<th>E. coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic</td>
<td>MIC</td>
</tr>
<tr>
<td>Amp./Sulbactam</td>
<td>&gt;=32</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>&lt;=64</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>16</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>&gt;=64</td>
</tr>
<tr>
<td>Cefepime</td>
<td>16</td>
</tr>
<tr>
<td>Aztreonam</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>&lt;=0.5</td>
</tr>
<tr>
<td>Meropenem</td>
<td>&lt;=0.25</td>
</tr>
<tr>
<td>Amikacin</td>
<td>&lt;=2</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>&gt;=4</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>&gt;=8</td>
</tr>
<tr>
<td>Tigecyclin</td>
<td>&lt;=0.5</td>
</tr>
<tr>
<td>TMP/SMX</td>
<td>&gt;=32</td>
</tr>
<tr>
<td>Pip./Tazo.</td>
<td></td>
</tr>
</tbody>
</table>

S=Suceptible  I=Intermediate  R=Resistant
### Addressing the Problem

#### Protocol

<table>
<thead>
<tr>
<th>Culture-Specific Antibiotics (Rectal Swab Culture)</th>
<th>(See IV for High-Risk patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Culture Sensitive to Ciprofloxacin:</strong></td>
<td><strong>Culture Resistant to Ciprofloxacin but sensitive to Cephalosporins:</strong></td>
</tr>
<tr>
<td>Ciprofloxacin PO</td>
<td>Culture directed antibiotics: (e.g., Cefazolin IM, Ceftriaxone IM)</td>
</tr>
</tbody>
</table>

### Checklist

#### Prostate Biopsy Checklist

**PATIENT NAME:** ——— ——— ——— ——— ———

**DOB:** ——— ——— ——— ——— ———  **PROSTATE BIOPSY DATE:** ——— ——— ——— ——— ———

1. Is there a rectal swab culture result available at the time of the biopsy?
   - a. *Yes,* will the patient be receiving culture-specific (i.e., tailored) antibiotic prophylaxis?
   - b. *No,* will the patient be receiving augmented antibiotics?
   - **Note:** If the answer to all 3 questions is "No," then STOP, DO NOT PROCEED with biopsy & ALERT the treating physician.

2. Were antibiotics started today?
   - a. *Time Antibiotics Started*  
   - b. *Time of Biopsy*  

3. Does the patient have diabetes that requires medication for blood sugar control?  
   - **Yes**  
   - **No**  
   - **N/A**

4. Does the patient or a family member work in a hospital, nursing home or health care facility?  
   - **Yes**  
   - **No**  
   - **N/A**

5. Did the patient receive treatment with antibiotics within 6 months of this biopsy (not including antibiotics prescribed for this biopsy)?  
   - **Yes**  
   - **No**  
   - **N/A**

6. Did the patient travel internationally within 6 months of this biopsy?  
   - **Yes**  
   - **No**  
   - **N/A**

7. Has the patient ever had a prostate biopsy prior to the current procedure?  
   - a. *Yes,* did he develop an infection related to the biopsy?  
   - b. *No,* did he develop no infection related to the biopsy?  
   - **Yes**  
   - **No**

8. Does the patient currently take any blood thinners (e.g., full-dose aspirin, Coumadin, Plavix, etc.)?  
   - a. *Yes,* have they been stopped and/or does the patient have aperi-procedure management plan?  
   - b. *No,*  
   - **Yes**  
   - **No**

9. Is the patient currently taking any immunosuppressant medications? (e.g., steroids, methotrexate, organ transplant meds, HIV/AIDS meds, etc.)  
   - **Yes**  
   - **No**  
   - **N/A**
Implementation of Quality Intervention Not Easy in 32 Practices

Prostate Biopsy Checklist Completion Rate By Practice

MUSIC Practices

% of Biopsies

Overall Checklist Completion Rate of 34% in first 3 months since initiation

99% Protocol indication rate when checklist completed

Frequency Protocol Indicated When Checklist Completed

MUSIC Practices

% of Biopsies
Future Plans

- If strategy works, continue.
- If rectal swab better, try to implement more broadly
- If strategy not working
  - Examine additional risk factors to identify higher risk group
  - Consider different augmented ATBs, formalin rinse, etc.