(Management Case Study)
Meeting Joint Commission Antimicrobial Stewardship Requirements with Limited Resources

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Disclosure

All planners, presenters, and reviewers of this session report no financial relationships relevant to this activity.
Learning Objectives

• List antimicrobial stewardship activities developed for a successful stewardship program based on consensus guidelines.
• Describe specific outcomes as a result of focused antimicrobial stewardship efforts.
• Discuss different reporting strategies of stewardship metrics.
1. (True or False) Education and policy development as well as direct patient interventions are both effective approaches to antimicrobial stewardship.

2. (True or False) Strategies to report antimicrobial stewardship program interventions are well defined in the literature.

3. (True or False) Reporting positive outcomes improves support for antimicrobial stewardship efforts.
Hospitals & Clinical Staff

Mercy Health - St. Anne Hospital - Toledo, OH
Beds = 98 (~65)
Daily Clinical = 0-4 hrs

Mercy Health - St. Charles Hospital - Oregon, OH
Beds = 250 (~150)
Daily clinical = 16 hrs
Residents = 1
Joint Commission MM.09.01.01

ELEMENTS OF PERFORMANCE
1. Leadership
2. Education (Staff/LIP)
3. Education (Patients/families)
4. Multidisciplinary team
5. Core elements
6. Protocols, policies & procedures
7. Collects, analyses & reports data
8. Act on improvement opportunities

CORE ELEMENTS
• Leadership commitment
• Accountability to a multidisciplinary team
• Drug Expertise
• Action
• Tracking
• Reporting
• Education

www.jointcommission.org/assets/1/6/HAP-CAH_Antimicrobial_Prepub.pdf
“Action”

- Policies/Protocols
  - IV to PO, pharmacokinetic dosing, renal dosing, formulary interchanges

- Surgical prophylaxis (2 doses to 1)

- Medical Informatics
  - Formulary, antimicrobial time-outs, end-dates, culture notification, order sets

- Microbiology Products
  - BioFire (FilmArray panels) vs. PNA FISH
Where to put your efforts? (STC)

- ED Pharmacist (Prospective)
- Antibiotic review (Concurrent)
  - Daily chart review
  - Twice weekly targeted antibiotic review
    - CMO, ID Specialist, Pharmacy
- Targeted lab/microbiology review
  - Positive blood cultures, C Diff, Procalcitonin
- DUEs
  - Retrospective feedback to providers
Where to put your efforts? (STA)

- Emergency Department
  - Dear Provider Program
  - Culture reviews
- Disease: Pulmonary
  - Reviews
  - MD recruitment
- Targeted antibiotic
  - Carbapenems & broad spectrum
- Positive cultures
- DUEs
Routine Reporting - STA

- Subcommittee
- Multidisciplinary Group
- CMCEC
- Med Exec/ Medical Staff
Tracking/Quarterly Reporting

- Blood Culture Contamination Rates
- Antimicrobial Dashboard
  - DOT, DDD, spend, broad spectrum antibiotics
- DUEs
- Intervention reports
  - % Agreement with ID Specialist
- Antibiograms
- Policy Changes
  - Restricted antimicrobials, end dates
Tracking/Reporting (STC)

• Surgical site infections
  – Infection control, Surgery

• C Diff Infection rates
  – Infection control, Pharmacy
Stewardship Dashboard

- Pharmacy interventions and other metrics
- Antimicrobial spend/WEIPA

- 2015: $26.99
- 2016: $13.20
Carbapenems

Ertapenem + Meropenem (DDD)
Contaminated Blood Cultures - IP& ED

INPATIENT

ED

INPATIENT

ED

Goal

Linear(ED)
Why track contaminated blood cultures?

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanco patients (n=)</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Vanco doses</td>
<td>17</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Revisits to the ED</td>
<td>--</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Unnecessary admissions</td>
<td>--</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Findings:

- 64% use could potentially have been avoided

- 7/17 cases were prescribed by ID
  - 59% non-specialist
Stewardship interventions

Chart Review and Recommendations Summary

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>De-escalation</td>
<td>12</td>
</tr>
<tr>
<td>Bug-drug mismatch</td>
<td>4</td>
</tr>
<tr>
<td>IV to PO</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prescriber Response</th>
<th>Number (%)</th>
<th>Number (%)</th>
<th>Number (%)</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/3/16-8/4/1</td>
<td>23/16-11/15/</td>
<td>1/23/16-1/10/</td>
<td>1/24/17-3/21/17</td>
<td></td>
</tr>
<tr>
<td>Accepted</td>
<td>10 (62%)</td>
<td>11 (65%)</td>
<td>10 (48%)</td>
<td>15 (79%)</td>
</tr>
<tr>
<td>Rejected</td>
<td>6 (38%)</td>
<td>6 (35%)</td>
<td>11 (52%)</td>
<td>4 (21%)</td>
</tr>
<tr>
<td>Total</td>
<td>16 (100%)</td>
<td>17 (100%)</td>
<td>21 (100%)</td>
<td>19 (100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ID Specialist Response</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>66 (90%)</td>
</tr>
<tr>
<td>Disagree</td>
<td>7 (10%)</td>
</tr>
<tr>
<td>Total</td>
<td>73 (100%)</td>
</tr>
</tbody>
</table>

- Respiratory & UTI
- ID specialist agrees with pharmacist recommendations approximately 90% of time.
C-Diff Data

VBP C-Diff Data

Year
2014
2015
2016
2017

Raw Number
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30

Month

# C-Diff
C. Diff Treatment Review

Mercy Health - St. Charles Hospital
Q1 2017 C. Difficile Reports

C. Diff Treatment

- 79% Appropriate
- 21% Inappropriate

N=19
Surgical antibiotics

- Pre-op antibiotic order set updated
- Pre-op antibiotics entered prior to procedure
  - review and dose adjustment
- Removal of ertapenem from order set
- Morning surgery huddles
Education

Educates staff and licensed independent practitioners...

...Education occurs upon hire or granting of initial privileges and periodically thereafter, based on organizational need.

- Residents’ Orientation Presentation
- Practitioner Orientation packet
- Antibiogram distribution
- Quarterly reports to medical staff
- Dear Provider Letter Program
- Required i-Learns
### Community-acquired pneumonia (CAP) in hospitalized patients

#### Empiric Treatment

<table>
<thead>
<tr>
<th>Patient NOT in ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone 1G IV Q24h PLUS</td>
</tr>
<tr>
<td>Azithromycin 500mg IV/PO Q24h</td>
</tr>
<tr>
<td>Levofloxacin 750mg IV/PO Q24h</td>
</tr>
<tr>
<td>Duration of treatment 7-8 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient in ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone 1G IV Q24h PLUS</td>
</tr>
<tr>
<td>Azithromycin 500mg IV Q24h</td>
</tr>
<tr>
<td>Ceftriaxone 1G IV Q24h PLUS</td>
</tr>
<tr>
<td>Levofloxacin 750mg IV Q24h</td>
</tr>
<tr>
<td>[If Allergy to Beta-Lactam antibiotics] Meropenem 1G IV Q8h PLUS</td>
</tr>
<tr>
<td>Azithromycin 500mg IV Q4h PLUS</td>
</tr>
<tr>
<td>Tobramycin 5mg/kg IV Q4h</td>
</tr>
<tr>
<td>Duration of treatment 7-8 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient in ICU with risk of pseudomomas (structural lung disease i.e. bronchiectasis), corticosteroid use, broad-spectrum antibiotics for 7 days in the past month, COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin 400mg IV Q12h PLUS</td>
</tr>
<tr>
<td>Piperacillin/Tazobactam 3.375G IV Q8h</td>
</tr>
<tr>
<td>Azithromycin 500mg IV Q24h PLUS</td>
</tr>
<tr>
<td>Tobramycin 5mg/kg IV Q4h PLUS</td>
</tr>
<tr>
<td>Piperacillin/Tazobactam 3.375G IV Q8h</td>
</tr>
<tr>
<td>Azithromycin 500mg IV Q24h PLUS</td>
</tr>
<tr>
<td>Tobramycin 5mg/kg IV Q4h PLUS</td>
</tr>
<tr>
<td>Meropenem 1G IV Q8h</td>
</tr>
<tr>
<td>Duration of treatment 10-14 days</td>
</tr>
</tbody>
</table>

*Depending on patient response/symptoms*

### Bacterial urinary tract infections (UTI)

#### Asymptomatic bacteruria

- Positive urine culture > 100,000 CFU/ml with no signs or symptoms
- No treatment unless the patient is:
  - Pregnant
  - Scheduled to have an urologic procedure
  - Post renal transplant
  - Neutropenic

### Acute cystitis

- Signs and symptoms (e.g. dysuria, urgency, frequency, suprapubic pain AND positive urine culture >100,000 CFU/ml AND pyuria (> 10 WBC/hpf)
- **Uncomplicated:**
  - Nitrofurantoin 100mg PO Q12h x 5 days
  - TMP/SMX 1 DS tab PO Q12h x 3 days
  - Cephalexin 500mg PO Q6h x 5-7 days
  - Cefazolin 1G IV Q8h x 5-7 days
  - Duration of treatment 3-7 days
- **Complicated:**
  - Ciprofloxacin 400mg IV Q12h
  - Ceftriaxone 1G IV Q24h
  - Duration of treatment 7 days

### Cellulitis

#### Non-purulent

- Moderate to Severe
  - Cefazolin 1G IV Q8h
  - [PCN allergy] Clindamycin 600mg IV Q8h
  - History of MRSA or high risk for MRSA
  - Vancomycin 15mg/kg IV Q12h (Pharmacy to dose)
  - Duration of treatment 5-7 days

### Clostridium Difficile (C. Diff)

- 3 loose stools within 24h with symptoms
- Consider alternative cause of diarrhea
- No solid stool samples tested
- Do not test patients with history of C. Diff if loose stools and symptoms are not present or after only one loose stool
- Do not test to confirm eradication
- Duration of treatment 10-14 days with at least 7 days post other antibiotics

#### Mild/Moderate

- [WBC < 15,000 cells/mm³ AND SCr < 1.5 x baseline]
  - Metronidazole 500mg IV/PO Q8h
  - Vancomycin 125mg PO Q6h

#### Severe

- [WBC > 15,000 cells/mm³ OR SCr ≥ 1.5 x baseline]
  - Vancomycin 125mg PO Q6h

### Interpreting the microbiology report

**Gram-positive cocci**

- Aerobic
  - In clusters
  - Coagulase (+): S. aureus
  - Coagulase (-): S. epidermidis, S. lugdunensis
- In pairs / chains
  - Diplococcus, Quellung positive: S. pneumoniae
- Alpha-hemolytic: Viridans group Streptococci, Enterococcus (farcetis and fassiacum)
- Beta-hemolytic: Group A strep (S. pyogenes)
- Group B strep (S. agalactiae)
- Group C, D, G strep

**Gram-negative cocci**

- Anaerobic: Peptostreptococcus spp.

**Gram-positive rods**

- Aerobic
  - Large: Bacillus spp.
  - Cocco-bacillus: Listeria monocytogenes, Lactobacillus spp.
  - Small, pleomorphic: Corynebacterium spp.
  - Branching filaments: Nocardia spp, Streptomyces spp.

**Gram-negative rods**

- Anaerobic
  - Non-lactose fermenting
  - Oxidase (+): P. aeruginosa, Aeromonas spp, Vibrio spp., Campylobacter spp. (curved)

PROTECTING CARBAPENEMS: Why is it important?

Antibiotic resistance is a global health concern that continues to grow with no solution in sight. According to the CDC, an estimated 2 million people in the United States become infected with antibiotic-resistant bacteria each year, with 23,000 of those cases ending in death due to the infection. Carbapenems are our most potent beta-lactam antibiotic in regards to gram-negative and gram-positive coverage and have the broadest spectrum of activity when compared to the other beta-lactams. Due to these unique features, carbapenems should be used as a last-line option when all other possible antibiotic choices have been exhausted.

Unfortunately, we have already seen an increase in carbapenem-resistant bacteria in the United States. The CDC reports that Carbapenem-resistant Enterobacteriaceae (CRE), such as carbapenem-resistant K. pneumoniae, can contribute to death.
### E.Coli susceptibilities 2016

<table>
<thead>
<tr>
<th></th>
<th>Cipro</th>
<th>Bactrim</th>
<th>Nitrofurantoin</th>
<th>Cefazolin</th>
<th>Ceftriaxone</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. V - ED</td>
<td>89</td>
<td>76</td>
<td>85</td>
<td>96</td>
<td>No data</td>
</tr>
<tr>
<td>St. V - IP</td>
<td>64</td>
<td>77</td>
<td>96</td>
<td>82</td>
<td>90</td>
</tr>
<tr>
<td>St. Anne - ED</td>
<td>79</td>
<td>76</td>
<td>97</td>
<td>94</td>
<td>95</td>
</tr>
<tr>
<td>St. Anne - IP</td>
<td>73</td>
<td>81</td>
<td>97</td>
<td>84</td>
<td>94</td>
</tr>
<tr>
<td>St. Charles – ED</td>
<td>79</td>
<td>75</td>
<td>96</td>
<td>93</td>
<td>94</td>
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<tr>
<td>St. Charles – IP</td>
<td>66</td>
<td>77</td>
<td>93</td>
<td>94</td>
<td>90</td>
</tr>
<tr>
<td>Tiffin</td>
<td>76</td>
<td>85</td>
<td>90</td>
<td>86</td>
<td>96</td>
</tr>
<tr>
<td>Willard</td>
<td>84</td>
<td>69</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Aminoglycoside coverage remains strong.
Education

Educates patients [and families]

- Discharge pamphlet
- Public postings ...

Antibiotics Aren’t Always the Answer

www.cdc.gov/getsmart

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
You’ve Been Prescribed an Antibiotic
Now What?

Your healthcare team thinks that you or your loved one might have an infection. Some infections can be treated with antibiotics, which are powerful, life-saving drugs. Like all medications, antibiotics have side effects and should only be used when necessary. There are some important things you should know about your antibiotic treatment.

AMS Examples - St. Charles

- General Staff Education
  - Pneumonia, sepsis, cellulitis, UTI, stewardship
  - Physician Grand Rounds
  - Nursing Grand Rounds
  - Resident lectures
- Pharmacy Newsletters
- Educational Flyers
Key Takeaways

- A successful stewardship program is possible even with a limited staff.
- Small continual changes, regardless of initial approach, will have a positive impact.
- Reporting metrics are a challenge, but focusing on appropriate use will show positive changes.
It Takes A Village

Lab
Pharmacy
Administration
ID Specialist
Med Staffing
Services
Infection Control
Prescribers
Quality
Nursing
Nursing Education
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Jen_Richardson@mercy.com