Antibiotic Stewardship in a Health System
Focus on the Small, Community Hospitals

2nd Annual Houston Antimicrobial Stewardship Symposium
Crowne Plaza Houston Near Reliant
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Outline
I. Stewardship in Healthcare Systems
II. Intermountain Healthcare
III. Demonstration of Stewardship within a healthcare network
   i Inpatient model
IV. Future Directions

What is a healthcare system?
Å Hospital Network: a network or group of hospitals that work together to coordinate and deliver a broad spectrum of services to their community.
Å Healthcare System: 2 or more hospitals owned, sponsored, or contract managed by a central organization.

What is a healthcare system?

I. Stewardship in Healthcare Systems
II. Intermountain Healthcare
III. Demonstration of Stewardship within a healthcare network
   i Inpatient model
IV. Future Directions

AS in Health Care Networks

Strengths / Opportunities
Å Leverage technology
Å Vigilance
Å Shared resources
Å Microbiology laboratory
Å Medical writers / education
Å EHR
Å Data
Å Dashboards
Å Consistency / standards
Å Messaging
Å Centralized P and T committee
Å Platform for outcomes research
Å Collaboration
Å Support and mentorship

Weakness / Challenges
Å Chain of command
Å Slow
Å Engagement
Å Identifying culture
Å Communication
Å Accountability (easy to hide)
Å Maintain gains

Largest Hospital Systems - 2015
Since 1975
• 22 hospitals
• 2,784 licensed beds
Since 1983
• Health plans
• 700,000+ members
Since 1994
• 1,200 employed physicians
• 558 advanced practice clinicians
Since 1997
• All key service lines

Intermountain Healthcare
Highly-Integrated Health System

Intermountain Stewardship

COLT
Infection Control Guidance Council

Central AS
Subcommittee (CASS)

MDRO
CAUTI
CLABSI

IMC
LDS
UV
MD
15 SCHs
PCH
TOSH

Data – NHSN AU Option and Dashboards
Vigilanz operations, maintenance, and reports
P and T Representation
Corner transition
Statewide Collaborative

Scope - Impact

2012 United State Non-federal Hospitals
4999 Registered Hospitals
72.4% (3,619) have < 200 beds
Many / most of these are without stewardship programs
All included in National Action Plan / Joint Commission / CMS
Very few studies of stewardship in these settings

AHA Statistics

Day RD, et al. Open Forum Infect Dis. 2015 May 12;2(2)

Large Urban Hospitals
- ASP focused
- Formal ID consultation available

Small Community Hospitals
- 597 Beds / 700 licensed
- 25% of IHC Beds
- No formal ASPs
- No Infectious Diseases MD support

Need and Potential of Antimicrobial Stewardship in Community Hospitals

Hospital Antimicrobial Stewardship in the Nonuniversity Setting

Kavita K. Tripathi, MPH, MS, Krist Kuper, m.d., Ph.d.

Antimicrobial Stewardship Programs in Community Hospitals: The Evidence Base and Case Studies

Christopher R. Napolitano and Theodore J. Bodenheimer

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Define an antibiotic stewardship strategy for Intermountain’s smaller hospitals that optimizes outcomes while maximizing resources.
Baseline Trends in 4 LCHs

SCORE Study

Stewardship in Community Hospitals Optimizing Outcomes and Resources

Define an antibiotic stewardship strategy for Intermountain’s smaller hospitals that optimizes outcomes while maximizing resources

SCORE

Stewardship in Community Hospitals Optimizing Outcomes and Resources

Cluster Randomized Controlled Trial

15 Hospitals

3 Antimicrobial Stewardship Program Types
   - Program 1 = 5 hospitals
   - Program 2 = 5 hospitals
   - Program 3 = 5 hospitals
Antibiotic Best Practices

- IV to PO Conversion
- Antibiotic Indications
- 48 Hour Antibiotic "Timeout"
- Monthly Antibiotic Report
- Access to ID Consultation: 1-801-50-SORE

Date: 08/29/2013 07:00
To: Dr. Sydnor, Mrs. Buckel in room T907

Mrs. Buckel in room T907 has been on vancomycin and piperacillin/tazobactam for 48 hours. This patient has allergies to no antibiotics, and appears to tolerate other oral therapies.

The following microbiology data are available:

Negative cultures to date

The CDC recommends re-evaluating antibiotic therapy at this time based on new data and the current clinical picture.

☐ Yes, I have acknowledged this patient’s current regimen, and plan to tailor their antibiotics.

☐ Yes, I have acknowledged this patient’s current regimen, and wish to continue the current regimen.

Please return to pharmacy at the time of discharge.
Access to Infectious Diseases
Physicians and Pharmacists

(801) 50-SCORE

- Adults and Pediatrics
- Physician and pharmacist options
- 24 hours a day / 7 days a week
  - Adults: SCORE attending
  - Pediatrics: Attending/fellow on call at PCMC

Restrictions - Programs 2 and 3

- Daptomycin, linezolid, ceftaroline
- Meropenem, tigecycline
- Amphotericin, voriconazole, posaconazole, micafungin

Program 3

- More PAF evaluation
- ID controlled restrictions
- Infectious diseases involvement
  - Positive blood cultures
  - S. aureus bacteremia
  - CNS infections
  - MDRO review
  - Home IV antibiotic therapy review

Results

- Primary Analyses
  - DOT/1000PD
  - All drugs
  - Category 4/5 drugs
  - Restricted drugs

- Secondary Analyses
  - SCORE hotline utilization
  - 30 day readmission, mortality
  - Change in MDRO
    - MRSA, ESBL, FQ res E. coli, C. diff
**Intermountain Healthcare**

### 30 Day Readmission Rates

**SCORE: 60-day readmission rate: baseline vs. intervention**

![Graph showing readmission rates](image)

### SCORE Hotline Results

**1,006 calls to the adult ID clinician**

- **Type of Call**
  - New: 77%
  - Follow-up: 23%

- **Time per call**
  - < 1 minute: 1.6%
  - 1 – 5 minutes: 47.4%
  - 5–15 minutes: 48%
  - >15 min: 2.6%

### Total Calls

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Total Calls</th>
<th>% of Total</th>
<th>Patient Days / Year</th>
<th>Calls / 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital 1</td>
<td>156</td>
<td>15.5%</td>
<td>6943</td>
<td>26.37</td>
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<tr>
<td>Hospital 2</td>
<td>22</td>
<td>2.1%</td>
<td>2904</td>
<td>21.49</td>
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<td>Hospital 3</td>
<td>64</td>
<td>6.3%</td>
<td>3814</td>
<td>14.64</td>
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<td>Hospital 4</td>
<td>15</td>
<td>1.5%</td>
<td>2083</td>
<td>0.54</td>
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<tr>
<td>Hospital 5</td>
<td>27</td>
<td>2.7%</td>
<td>2612</td>
<td>0.75</td>
</tr>
<tr>
<td>Hospital 6</td>
<td>22</td>
<td>2.2%</td>
<td>2575</td>
<td>0.65</td>
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<tr>
<td>Hospital 7</td>
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<td>2575</td>
<td>0.65</td>
</tr>
<tr>
<td>Hospital 8</td>
<td>22</td>
<td>2.2%</td>
<td>2575</td>
<td>0.65</td>
</tr>
<tr>
<td>Hospital 9</td>
<td>22</td>
<td>2.2%</td>
<td>2575</td>
<td>0.65</td>
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<tr>
<td>Hospital 10</td>
<td>5</td>
<td>0.5%</td>
<td>1270</td>
<td>0.25</td>
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<tr>
<td>Hospital 11</td>
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<td>0.5%</td>
<td>1270</td>
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</tr>
<tr>
<td>Hospital 12</td>
<td>5</td>
<td>0.5%</td>
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<tr>
<td>Hospital 13</td>
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<td>1270</td>
<td>0.25</td>
</tr>
<tr>
<td>Hospital 14</td>
<td>5</td>
<td>0.5%</td>
<td>1270</td>
<td>0.25</td>
</tr>
</tbody>
</table>

### Restricted Drugs

Intervention vs Expected: Program 3 vs 1
RR 0.39 (0.22, 0.68) p = 0.0009

Intervention vs Expected: Program 2 vs 1
RR 0.65 (0.39, 1.10) p = 0.10
SCORE Highlights

- The self referral
- “Can I send you a picture?"
  - Worms in stool/skin
  - I/(my patient) has this rash
- I have a Mormon missionary here from..."  
- 90 y/o with pseudomonas PJI and..."  
- I can’t pronounce this organism..."

2am Call from Park City

- S. aureus bacteremia
- Acute viral infections
  - CMV, VZV, HSV, HIV, Rabies, etc.
- CNS evaluations
- Asymptomatic bacteruria
- Bacteremias
- Diagnostic testing and interpretation

Conclusions

- Antimicrobial use in SCH is comparable to larger facilities
  - Stewardship is needed
- Stewardship is feasible and can improve antimicrobial use
- ID clinician access is needed in SCHs

Areas under active investigation

- Is DOT/1000PD a quality metric?
  - Does this process measure predict our outcome measures?
  - Does it inversely correlate with antibiotic prescribing appropriateness?
- How do we measure antibiotic prescribing appropriateness?
- Why did hospitals within groups perform so differently?

Value Add

- 2am Call from Park City
- Conclusions
- Areas under active investigation
- What's Next

What's Next

- How do we continue to improve the infectious diseases care in small, community hospitals?
- Maintaining the gains
TeleHealth Program

Intermountain Leadership

Clinician Consulting
- ED Crisis Care
  - >200 consultations
- Critical Care
  - 45% reduced mortality rate
- Education
  - Nutrition, diabetes, pharmacy...
- Infectious Diseases
  - Antibiotic stewardship
- Newborn Critical Care
  - 25% reduced transfers
- Pediatrics
  - Trauma + 18 specialties
- Stroke
  - 17% tPA administration
- ~15 additional pilots

Direct Patient Monitoring

Remote Patient Monitoring

Technology Platform: Fixed, Mobile, Devices, Data

Finance

Legal

Operations

TeleHealth Infectious Diseases Program

- Provide antibiotic stewardship support to all hospitals without ID trained stewardship providers (17 Hospitals)
  - Vigilanz, ID PharmD
- Provide ID consultation to Intermountain facilities that lack ID services (15 hospitals + outpatient clinics)
  - 2 Infectious Diseases Physicians
- Provide ID phone consultation to Intermountain providers
  - Maintenance of SCORE Hotline
- Target go live date: Summer 2016 Pilot

Clinical Benchmarking

Facility Report

Internal Benchmarking

Unit level
AS in Health Care Networks

**Strengths / Opportunities**
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- Vigilanz
- Shared resources
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- Data
- Dashboards
- Consistency / standards
- Messaging
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**Weakness / Challenges**
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- Slow
- Engagement
- Identifying culture
- Communication
- Accountability (easy to hide)
- Maintain gains

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Thank You

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