Jefferson Health in New Jersey: Antimicrobial Stewardship

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Jefferson Health New Jersey

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Administrative Director of Infection Prevention, Jefferson Health New Jersey

NJHA Antimicrobial Stewardship Collaborative In-Person Session, December 8, 2017
IT’S AN HONOR
RANKED 16TH BEST HOSPITAL IN THE NATION!

THOMAS JEFFERSON UNIVERSITY HOSPITAL

Among the Top 10 in the Nation

EAR, NOSE & THROAT

OPHTHALMOLOGY
Wills Eye Hospital

ORTHOPEDICS
Rothman Institute at Jefferson
Philadelphia Hand to Shoulder Center at Jefferson

Nationally Ranked Specialties

CANCER
Sidney Kimmel Cancer Center at Jefferson

CARDIOLOGY & HEART SURGERY

DIABETES & ENDOCRINOLOGY

GASTROENTEROLOGY & GI SURGERY

GERIATRICS

NEPHROLOGY

NEUROLOGY & NEUROSURGERY
Vickie and Jack Farber Institute for Neuroscience at Jefferson

UROLOGY
13 Hospitals

- Abington Hospital
- Abington – Lansdale Hospital
- Aria – Bucks County Hospital
- Aria – Frankford Hospital
- Aria – Torresdale Hospital
- Jefferson Hospital for Neuroscience
  - part of Vickie and Jack Farber Institute for Neuroscience at Jefferson
- Jefferson Cherry Hill Hospital
- Jefferson Stratford Hospital
- Jefferson Washington Township Hospital
- Methodist Hospital
- Physicians Care Surgical Hospital
- Rothman Orthopaedic Specialty Hospital
- Thomas Jefferson University Hospital
  - Sidney Kimmel Cancer Center at Jefferson (NCI-designated)

6,000 physicians/practitioners

7,200 nurses

50+ outpatient and urgent care locations

Over 3.6 million patient interactions annually
Thomas Jefferson University

9 Colleges + 4 Schools

• College of Architecture and the Built Environment
• College of Biomedical Sciences
• College of Health Professions
  – Aria Health School of Nursing
• College of Pharmacy
• College of Population Health
• College of Sciences, Health and the Liberal Arts

• Kanbar College of Design, Engineering and Commerce
  – School of Business Administration
  – School of Design and Engineering

• School of Continuing and Professional Studies
• Sidney Kimmel Medical College
  and also

• Philadelphia University Design Institute
• Philadelphia University Honors Institute

160+ Graduate & Undergraduate programs

63,000 Alumni
7,800 Students (full/part time)

over $110 million in public/private research funding.

5th largest university in Philadelphia

326 combined years of providing professional education

Nationally ranked in architecture, fashion design, primary care, research and strategic leadership

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE
Awards And Accolades: New Jersey
Jefferson Health in New Jersey

- Antimicrobial Stewardship (AS) Committee.
- Started in November 2014.
- Overall goals include to reduce unnecessary antimicrobial utilization by tracking days of therapy (DOT)/1000 patient days (PD) and to decrease hospital-acquired Clostridium difficile (C.diff) rates.
Core Elements of Hospital Antibiotic Stewardship Programs

- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education

Reference: https://www.cdc.gov/antibiotic-use/healthcare/implementation/core-elements.html
Leadership Commitment
Culture of Safety: Success will follow with Administrative support

President & CEO Joseph W. Devine; and Dr. Carman Ciervo, Executive VP & Chief Physician Executive; have made Safety & Quality the Number 1 priority for the organization.
Leadership Commitment

- Quality & Safety Department
- Always Put The Patient First
- Providing Optimal Care Ensures Economic Viability
- *No Vision, No Mission, No Success*: Need to know where you are going - and how to get there.
Administrative Leadership

- Antibiotic stewardship is a complex issue.
- Buy-in required at every level of the organization.
- Administrative support is needed to achieve the ultimate goal of using antibiotics for the right reasons, the right amount and the right length of therapy.
Use of Data

• Recognize that you have a problem.
• Need data to show that, in comparison to acceptable norms, the institution has above days of therapy (DOT) norms, compared to similar institutions.
• DOT - focus on antibiotics that are most being used/abused
• Coordinate microbiology reports, and *C. diff* rate. If the *C. diff* rate is high, you are likely using more antibiotics than you should.
• Business intelligence (BI)/information technology (IT) can pull data from Pharmacy and correlate that with Infection Control Reports/microbiology.
Data equals change

- Data leads improvement.
- Doctors who have often done practice for years the same way need to change the way they practice.
- Doctors and LIP are competitive and when you show them that they are an outlier, that incentivizes them to change behavior.
Building the Case to the Medical Executive Board (MEB)

- Present supporting data to show gaps in antibiotic stewardship.
- Showing data, changing process, and measuring success in quality lead to Medical Staff ownership.
Accountability
Antimicrobial Stewardship Leads

- Physician Champion - Dr. Cindy Hou
- Pharmacy Champion - Nikunj Vyas, ID Pharmacist
- Chief Nursing Champion - Marianne Kraemer
Makeup of Our AS Committee

- Clinicians - housestaff, IM, ED, Pulm/CC, ID, Administration
- Infection Prevention and Healthcare Epidemiology
- Quality Improvement
- Microbiology (Laboratory)
- Information Technology (IT)
- Nursing
Nursing Representation on our AS Committee
CDC’s The Core Elements of Hospital Antibiotic Stewardship Programs. Checklist:

- An early initiative on accountability to the checklist.
- Consider printing out the checklist and seeing where your site compares and where there are opportunities.

Reference: [https://www.cdc.gov/antibiotic-use/healthcare/pdfs/checklist.pdf](https://www.cdc.gov/antibiotic-use/healthcare/pdfs/checklist.pdf)
CDC Core Checklist (internally)

- We tracked our adherence to the checklist through an app that allows creation of a Gantt chart.

<table>
<thead>
<tr>
<th>NO</th>
<th>TASK</th>
<th>START</th>
<th>FINISH</th>
<th>DURATION</th>
<th>% COMP.</th>
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<td>7/6/2015</td>
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<td>100%</td>
<td></td>
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<tr>
<td>2</td>
<td>Budget</td>
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<td>2/1/2016</td>
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<td>100%</td>
<td></td>
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<td>3</td>
<td>Drug expertise: pharmacist leader</td>
<td>5/1/2015</td>
<td>5/1/2015</td>
<td>1</td>
<td>100%</td>
<td></td>
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<tr>
<td>4</td>
<td>Accountability: physician leader</td>
<td>5/1/2015</td>
<td>5/1/2015</td>
<td>1</td>
<td>100%</td>
<td></td>
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<tr>
<td>5</td>
<td>Key support</td>
<td>5/1/2015</td>
<td>7/6/2015</td>
<td>47</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Currently, an internal document to match adherence to checklist with our AS Committee minutes/documents.
Drug Expertise
Physician Drug Expertise

- Lead physician - Infectious Diseases (ID) physician
- The entire Department of Infectious Diseases
Pharmacy Drug Expertise

- Lead Pharmacist - ID Pharmacist
- Clinical pharmacists - PharmD at each campus
- Ongoing - Training staff pharmacists on antimicrobial stewardship.
What if your site does not have ID input?

• Having a Physician Champion is important - consider Internal Medicine, or Pulmonary/Critical Care input.

• Consider guidance from guidelines from the Infectious Diseases Society of America (IDSA): http://www.idsociety.org/PracticeGuidelines/

• Hospital Stewardship Programs: https://www.cdc.gov/antibiotic-use/healthcare/programs.html

When Reviewing National Guidelines, Consider Local Factors.

- Local microbiology: a hospital with an Oncology or Trauma ward may have different resistance patterns than a community hospital.
- Consider input from clinicians (Infectious Diseases, other physicians), and input from Microbiology (antibiogram).
- Our guidelines took into consideration local factors and national guidelines - developed for pneumonia, skin/soft tissue infections, urinary tract infections, and others.
Develop local Guidelines and Ordersets

- An antibiogram is helpful because for certain infections at your site, a more narrow spectrum antibiotic might be feasible.

<table>
<thead>
<tr>
<th>Antimicrobial</th>
<th>Reported January 1, 2016 - December 31, 2016</th>
<th>% Susceptible</th>
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</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>296</td>
<td>100</td>
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</table>

- AMIKACIN | AMPICILLIN | AMPICILLIN/SULBACTAM | CEFAZOLIN | CEFEPIME | CEFOTAXIME | CEFOTAXIME - NON-MEN | CEFTRIAZIME | CEFTRIAZONE | CIPROFLOXACIN | DAPTOXOMYCIN | ERYTHROMYCIN | GENTAMICIN | IMPENEM | LEVOFLOXACIN | LINEZOLID | NITROFURANTOIN | OXACILLIN | PIPERCLIN/TAZOBACTAM | TRIMETH/4SULFA | VANCOMYCIN |
What if your site does not have ID pharmacy input?

- Consider PharmD input.
- Society of Infectious Diseases Pharmacists (SIDP) offers courses for a fee.
  - Antimicrobial Stewardship Certificate for Acute Care: https://sidp.org/StewardshipCertificate/
Action
Selected examples of Action Items

• Add antibiotics to restricted list (requires ID consult for approval): e.g. All carbapenems.
• Antibiotic indication is required for all antimicrobials, and at the back end, 48-hour time-out by clinicians.
• Vancomycin kinetics by Clinical Pharmacy/ID Pharmacist.
• Pharmacy-led prospective audit and feedback of antimicrobials that place patients at risk for *C. diff*.
• Microbiology brought in rapid diagnostics - PCR test to identify pathogen names of bloodstream infections, viral vs. bacterial meningitis, viral causes of respiratory illness.
Be Inspired by the Literature

Efficacy of Fidaxomicin Versus Vancomycin as Therapy for Clostridium difficile Infection in Individuals Taking Concomitant Antibiotics for Other Concurrent Infections

Kathleen M. Mullane,1 Mark A. Miller,2 Karl Weiss,3 Arnold Lentnek,4 Yoav Golan,5 Pamela S. Sears,6 Youe-Kong Shue,6 Thomas J. Louie,7 and Sherwood L. Gorbach5,6

1Department of Medicine, University of Chicago, Chicago, Illinois; 2Division of Infectious Disease, Jewish General Hospital, McGill University, Toronto, Ontario, Canada; 3Department of Infectious Diseases and Microbiology, Maisonneuve-Rosemont Hospital, Université de Montréal, Montreal, Quebec, Canada; 4Wellstar Infectious Disease, Marietta, Georgia; 5Department of Medicine, Tufts Medical Center, Boston, Massachusetts; 6Optimer Pharmaceuticals Inc, San Diego, California; and 7Department of Medicine, University of Calgary, Calgary, Canada
Supplement of Article


• Scroll all the way down the page to Supplementary data - zip file -> Supplemental Table 1: Classification of Concomitant Antibiotics According to Risk of Contributing to CDI.
### Antibiotics: A Risk Factor for CDiff

#### High Risk for CDiff
- Clindamycin (Cleocin®)*
- Ceftriaxone (Rocephin®)*
- Ciprofloxacin (Cipro®)*
- Levofloxacin (Levaquin®)*
- Cefepime (Maxipime®)
- Ceftazidime (Fortaz®)
- Cefuroxime (Ceftin®)
- Ertapenem (Invanz®)
- Meropenem (Merrem®)

* Highest Association with CDiff

#### Medium Risk for CDiff
- Piperacillin/tazobactam (Zosyn®)*
- Amoxicillin/clavulanic acid (Augmentin®)*
- Ampicillin/sulbactam (Unasyn®)
- Amoxicillin (Amoxil®)
- Ampicillin
- Azithromax (Zithromax®)
- Aztreonam (Azactam®)
- Cefazolin (Ancef®)
- Cephalexin (Keflex®)
- Dalfopristin/-quinupristin (Synercid®)

#### Low Risk for CDiff
- Amikacin (Amikin®)
- Daptomycin (Cubicin®)
- Doxycycline (Vibramycin®)
- Fosfomycin (Monorol®)
- Gentamicin
- Linezolid (Zyvox®)
- Nitrofurantoin (Macrobid®)
- Polymixin (Colistin®)
- Rifampin (Rifadin®)
- Trimethoprim/-sulfamethoxazole (Bactrim®)

Kenny CDiff Task Force. 2015
The Right Antibiotic Makes a Difference!

**Figure 2.** Survival rate according to the presence of shock and empiric antibiotic treatment (log-rank test, \( p < 0.001 \)).

- **A:** Sepsis/Severe sepsis and appropriate treatment
- **B:** Sepsis/Severe sepsis and inappropriate treatment
- **C:** Septic shock and appropriate treatment
- **D:** Septic shock and inappropriate treatment

*CHEST 2003; 123:1615–1624.*
Jefferson Health in New Jersey

- Track all major stewardship initiatives and antibiotic use.
- Antibiotic use was high for high-risk antimicrobials for *C. diff*, total number of antibiotics per patient could be high, and *C. diff* was high.
- Mandatory ID Consult for any patient:
  1) with sepsis, severe sepsis, and septic shock.
  2) on 3 or more antibiotics.
  3) who has *C. diff*.

Reference:
https://academic.oup.com/cid/article/58/1/22/372657
Jefferson Health in New Jersey ASP Milestones

**ASP IMPLEMENTATION AND INTERVENTIONS**

- **ASP and ASP committee implemented system-wide**
  - Dec. 2014

- **Rapid Diagnostics on Blood Culture implemented**
  - March 2015

- **Aztreonam, and All Carbapenems Restricted to Infectious Diseases**
  - May 2015

- **UTI and SSTi Guidelines and Cascade Reporting implemented**
  - Jul 2015

- **Sepsis and > 2 Antibiotics, and RN antibiotic survey**
  - Jan 2016

- **Nursing Antimicrobial Education Implemented at ST**
  - May 2016

- **Prospective and Audit Pharmacy Intervention at WT**
  - Nov. 2014

- **Pharmacy Interventions expanded to ST and CH**
  - Feb. 2015

- **CDC Core Checklist and HAP/CAP Guidelines created**
  - May 2015

- **Antibiotics during Cdiff Policy Updated/RN Antibiotic Rounds**
  - Sept 2015

- **Rapid Diagnostics Expanded to Respiratory and CSF Cultures**
  - March 2016

- **Invited to be the Lead Clinical Faculty for NJHA ASP Collaborative**
  - June/July 2016
Tracking
“You have to be burning with an idea, or a problem, or a wrong that you want to right. If you're not passionate enough from the start, you'll never stick it out.” - Steve Jobs

“Measure Not, Improve Not”
Overall Data

• DOT from vendor.

• Average antibiotic DOT from national customers of vendor (2016-Quarter 3 2017) = 647.8 or 650 DOT/1000PD (average).

• All three campuses are below expected national average.
## Overall Antibiotics

<table>
<thead>
<tr>
<th>Year/Quarter</th>
<th>DOT/1000PD</th>
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<tbody>
<tr>
<td>Stratford</td>
<td>900</td>
</tr>
<tr>
<td>Cherry Hill</td>
<td>716</td>
</tr>
<tr>
<td>Washington Twp</td>
<td>910</td>
</tr>
<tr>
<td>National (Teaching)</td>
<td>691</td>
</tr>
<tr>
<td>National (Non-Teaching)</td>
<td>685</td>
</tr>
<tr>
<td>2014 Q1</td>
<td>826</td>
</tr>
<tr>
<td>2014 Q2</td>
<td>842</td>
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<td>842</td>
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<td>2017 Q1</td>
<td>545</td>
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<tr>
<td>2017 Q2</td>
<td>546</td>
</tr>
<tr>
<td>2017 Q3</td>
<td>100</td>
</tr>
</tbody>
</table>

**Note:** The table shows the DOT/1000PD for various locations and quarters from 2014 Q1 to 2017 Q3. The data indicates a general trend of decreasing DOT/1000PD over time, with some fluctuations.
Fluoroquinolone (FQ) Data

- DOT from vendor.
- Average FQ DOT from national customers of vendor (2016-Quarter 3 2017) = 47 DOT/1000PD (average).
- All three campuses are below expected national average.
<table>
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<tbody>
<tr>
<td>Stratford</td>
<td>145.9</td>
<td>134.8</td>
<td>151</td>
<td>143.6</td>
<td>135.2</td>
<td>147.3</td>
<td>103.2</td>
<td>79.5</td>
<td>65</td>
<td>55.9</td>
<td>55.4</td>
<td>39.3</td>
<td>36.1</td>
<td>33.2</td>
<td>33.4</td>
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<td>Cherry Hill</td>
<td>108.7</td>
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<td>93.2</td>
<td>85.7</td>
<td>110</td>
<td>94.9</td>
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<td>50.1</td>
<td>45.7</td>
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<td>31.7</td>
<td>21.5</td>
<td>19.2</td>
<td>17.1</td>
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<td>Washington Twshp</td>
<td>130.0</td>
<td>126.4</td>
<td>115.3</td>
<td>116.6</td>
<td>104.9</td>
<td>107.7</td>
<td>91.32</td>
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<td>47.2</td>
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<td>National (Teaching)</td>
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<td>53.4</td>
<td>79.5</td>
<td>69.3</td>
<td>65.5</td>
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**DOT/1000PD**

**FQ**

**Home of Sidney Kimmel Medical College**
Cumulative Annual Data

Jefferson Health in New Jersey: Antibiotic DOT/1000 PD vs HO-CDI Rate, including 2014 through Jan-Sept 2017

<table>
<thead>
<tr>
<th>Year</th>
<th>DOT/1000 PD</th>
<th>HO CDI Rate</th>
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<tr>
<td>2014</td>
<td>9455</td>
<td>5.1</td>
</tr>
<tr>
<td>2015</td>
<td>8298</td>
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<td>2016</td>
<td>6202</td>
<td>4.8</td>
</tr>
<tr>
<td>Jan-Sept 2017</td>
<td>4652</td>
<td>3</td>
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Cumulative DOT by Year (note 2017 is YTD)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>Jan-Sept 2017</th>
</tr>
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<tbody>
<tr>
<td>DOT/1000 PD</td>
<td>9455</td>
<td>8298</td>
<td>6202</td>
<td>4652</td>
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<tr>
<td>HO CDI Rate</td>
<td>5.1</td>
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<td>4.8</td>
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<tr>
<td>HO</td>
<td>61</td>
<td>72</td>
<td>56</td>
<td>27</td>
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<tr>
<td>Patient Days</td>
<td>119995</td>
<td>117195</td>
<td>117349</td>
<td>89251</td>
</tr>
</tbody>
</table>
While Reducing Antibiotic use, has that impacted Sepsis Mortality?

**2012**
- Sepsis Alert - ED Patients
  - Mortality Rate: 17.91%

**2013**
- ED Countdown Clocks
- Stacked Antibiotic Administration
- Antibiotics Stocked in ED
- ED/ICU Bundle Worksheet
- Sepsis Alert - Floor patients
  - Mortality Rate: 13.36%

**2014**
- Sepsis Warning in ED
- Lactate Turn-Around Time Goal 30 mins
- Sepsis on the Floors Taskforce
  - Lives Saved: 130.4
  - Mortality Rate: 11.88%

**2015**
- Nurse Initiated Lactic Acid Policy
  - Putting it All Together Guide
- SOTF Bundle Worksheet
- Prevent Sepsis Before it Occurs
- Reflex Lactic Acid Redraw for levels >2
  - Lives Saved: 189.6
  - Mortality Rate: 10.22%

**2016**
- Mandatory ID Consult
- Pilot: Direct calling of Sepsis Alerts on Floors
  - Lives Saved: 321.5
  - Mortality Rate: 8.85%

**2017**
- Changes made to ABX stocked in ED
  - Lives Saved: 233.5*
  - Mortality Rate: 8.48%*

*Data 1/1/17-8/31/17
Reporting
Use of devices (e.g., central venous catheters, endotracheal tubes, and urinary catheters) puts patients at risk for device-associated infections and minimizing device use is an important part of the effort to decrease the incidence of these infections. Additionally, device use has been associated with the presence of CRE. Therefore, minimizing device use in all healthcare settings should be part of the effort to decrease the prevalence of all MDROs, including CRE. In acute and long-term care settings, device use should be reviewed regularly to ensure they are still required and devices should be discontinued promptly when no longer needed. For more information, see the CDC guidance at [https://www.cdc.gov/hai/pdfs/cre/cre-guidance-508.pdf](https://www.cdc.gov/hai/pdfs/cre/cre-guidance-508.pdf).
Review of Data

• Infection Control data, including rates and device days to clinicians and nursing.
• Antibiotic DOT and HO-CDI at task forces, medical annual meeting, and nursing venues.
• Pharmacy and physician feedback to providers.
• Data presented to the Medical Executive Board.
Education
Antimicrobial Stewardship Education

• Occurs daily and year-round.
• On rounds as feedback to nursing and clinicians.
• Multiple lectures, jointly-delivered RN/ID physician lectures, grand rounds, ED resident conferences, and morning reports.
• Pharmacy feedback and lectures.
• Nursing Unit Councils, skills fairs and nursing symposiums.
In-Progress AS Education

• Discharge antibiotic counseling - pilot at Jefferson Cherry Hill Hospital. ID physician notification to pharmacy who then educates the patient or the family regarding the discharge antibiotic in detail.

• ID/IP Antibiotic Rounds - incorporating review of cultures, selection and changes in antimicrobials and the rationale, along with infection prevention with attention to devices.
Be Inspired by the Literature

The Critical Role of the Staff Nurse in Antimicrobial Stewardship—Unrecognized, but Already There

Richard N. Olans, Rita D. Olans, and Alfred DeMaria Jr

1Hallmark Health System, Inc., Melrose-Wakefield Hospital, 2MGH Institute of Health Professions - School of Nursing, Boston, and 3Bureau of Infectious Disease, Massachusetts Department of Health, William A. Hinton State Laboratory Institute, Jamaica Plain, Massachusetts

An essential participant in antimicrobial stewardship who has been unrecognized and underutilized is the “staff nurse.” Although the role of staff nurses has not formally been recognized in guidelines for implementing and operating antimicrobial stewardship programs (ASPs) or defined in the medical literature, they have always performed numerous functions that are integral to successful antimicrobial stewardship. Nurses are antibiotic first responders, central communicators, coordinators of care, as well as 24-hour monitors of patient status, safety, and response to antibiotic therapy. An operational analysis of inpatient admissions evaluates these nursing stewardship activities and analyzes the potential benefits of nurses’ formal education about, and inclusion into, ASPs.

Keywords. antimicrobial stewardship; antimicrobial stewardship program; antibiotic resistance; nursing; turnaround time.

https://academic.oup.com/cid/article/62/1/84/2462624
<table>
<thead>
<tr>
<th>Task</th>
<th>Start</th>
<th>Update</th>
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<td>1. Patient Admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Triage and appropriate isolation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Accurate allergy history</td>
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<td></td>
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<td>1.3 Early and appropriate cultures</td>
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<td>1.4 Timely antibiotic initiation</td>
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<td>1.5 Medication reconciliation</td>
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<td>2. Daily clinical progress monitoring</td>
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<td>2.1 Progress monitor and report</td>
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<td>2.2 Preliminary micro report and antibiotic adjustments</td>
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<td>2.3 Antibiotic dosing and de-escalation</td>
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<td>3. Patient safety and quality monitoring</td>
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<td>3.1 Adverse events</td>
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<td>3.2 Change in patient condition</td>
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<td>3.3 Final culture report and antibiotic adjustment</td>
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<td>3.4 Antibiotic resistance identification</td>
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<td>4. Clinical progress, pt education, discharge</td>
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<tr>
<td>4.1 IV to PO antibiotic, outpatient antibiotic therapy</td>
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<td>4.2 Patient education</td>
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<td>4.3 Length of stay</td>
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<tr>
<td>4.4 Outpatient management, long-term care, readmission</td>
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Nursing Antibiotic Rounds: Reviewing a Culture

- To promote awareness of Antimicrobial Stewardship for nursing systemwide.
- Nurse rounds 1:1 with IP and clinical nurse to review why patient is on antibiotic(s).
- Discussed microbiology report and its relation to ordered antibiotic.
- Brought discussion to physician.
Findings of Nursing Antibiotic Rounds

• Not familiar with how to interpret microbiology report.
• Not familiar with all classes of antibiotics.
• Do not see uniqueness of antibiotics.
• *Potassium analogy to antibiotics.*
Nursing-developed AS Course

• Initially, developed survey to determine nursing’s perception of cultures and terminology, such as sensitive, indeterminate and resistant.
• Two-hour course to review antibiotics, cultures and importance to nursing.
**AS Interventions Involving Nursing**

- **ASP started, with first RN representation**
  - Mar 2015

- **IP education on review of culture reports to staff RNs**
  - Jan 2016

- **Suggestion to include culture results on SBAR**
  - May 2016

- **Survey of RN on AS and Cultures**
  - Sept 2016

- **Joint IP/ID Physician Antibiotic Rounds at CH division**
  - Feb 2017

- **Joint RN/ID Physician gave international webinar on sepsis and stewardship**
  - June 2017

- **RN Lecture on AS for NJHA Stewardship Webinar**
  - Nov 2017

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- **ID Pharmacist education to RNs on AS and Antibiotics 101**
  - Nov. 2015

- **Olan’s article on Critical Role RN in Stewardship in unit councils/ RN Antibiotic Rounds**
  - June 2016

- **Development of Nursing Core Checklist of ASP**
  - Aug 2015

- **Face to Face RN Educator with Staff RN on Cultures at ST division**
  - Dec 2016

- **First formal RN AS Course/ ID Physician CBL to RN on AS**
  - March 2017

- **Publication of Nursing Core Checklist Abstract and ID Physician APIC Lecture on AS**
  - Nov 2017
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