Jefferson Health in New Jersey: Antimicrobial Stewardship

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NJHA Antimicrobial Stewardship Collaborative In-Person Session, December 8, 2017

Jefferson Health

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)*

BEST HOSPITALS
U.S.News WORLD REPORT
HONOR ROLL
2017-18

6,000 physicians/practitioners

7,200 nurses

MAGNET RECOGNIZED
AMERICAN NURSES CREDENTIALING CENTER

Abington Hospital, Jefferson Hospital for Neuroscience and Thomas Jefferson University Hospital are Magnet-designated hospitals

50+ outpatient and urgent care locations

Over **3.6 million** patient interactions annually

Jefferson Health®

Thomas Jefferson University

9 Colleges + 4 Schools

- College of Architecture and the Built Environment
- College of Biomedical Sciences
- College of Health Professions
- College of Nursing
  - 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

Jefferson
Philadelphia University +
Thomas Jefferson University
™

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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.

Safety

Quality

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.

KEY SUPPORT FOR THE ANTIBIOTIC STEWARDSHIP PROGRAM

Does any of the staff below work with the stewardship leaders to improve antibiotic use?

B.	Clinicians	❏ Yes	❏ No
C.	Infection Prevention and Healthcare Epidemiology	❏ Yes	❏ No
D.	Quality Improvement	❏ Yes	❏ No
E.	Microbiology (Laboratory)	❏ Yes	❏ No
F.	Information Technology (IT)	❏ Yes	❏ No
G.	Nursing	❏ Yes	❏ No

Reference: 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 Gannt chart.

NO	TASK	START	FINISH	DURATION	% COMP.	RESOURCE	ICON	02	09
		5/1/2015	6/6/2016	403	37%				
1	Letter of support	5/1/2015	7/6/2015	47	100%				
2	Budget	5/1/2015	2/1/2016	197	100%				
3	Drug expertise: pharmacist leader	5/1/2015	5/1/2015	1	100%				Drug expertise: pharmacist leader
4	Accountability: physician leader	5/1/2015	5/1/2015	1	100%				Accountability: physician leader
5	Key support	5/1/2015	7/6/2015	47	100%				

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

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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
- Johns Hopkins Antibiotic Management Guidelines: https://www.hopkinsmedicine.org/amp/guidelines/index.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.

ANTIMICROBIAL SUSCEPTIBILITY (REPORTED AS PERCENT SUSCEPTIBLE)

Reported January 1, 2016 - December 31, 2016	# of Isolates reported	AMIKACIN	AMPICILLIN	AMPICILLIN/SULBACTAM	CEFAZOLIN	CEFEPIME	CEFOTAXIME - NON-MEN	CEFTAZIDIME	CEFTRIAXONE	CIPROFLOXACIN	DAPTOMYCIN	ERYTHROMYCIN	GENTAMICIN	IMIPENEM	LEVOFLOXACIN	LINEZOLID	NITROFURANTOIN	OXACILLIN	PENICILLIN - NON-MEN	PIPERCILLIN/TAZOBACTAM	TRIMETH/SULFA	VANCOMYCIN
Escherichia coli	296	100	47	55	84	87		86	86	64			86	100	64		94			98	70	

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/
- SIDP/ASCP (American Society of Consultant Pharmacists) Long-Term Care Antimicrobial Stewardship Certificate Program. https://sidp.org/LTCStewardship/

Action

Selected examples of Action Items

- Add antibiotics to restricted list (requires ID consult for approval): egg. 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. Gorbach[5,6]

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

Supplement of Article

- https://academic.oup.com/cid/article/53/5/440/296084#supplementary-data
- 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 (Monurol®)
- Gentamicin
- Linezolid (Zyvox®)
- Nitrofurantoin (Macrobid®)
- Polymixin (Colistin®)
- Rifampin (Rifadin®)
- Trimethoprim/-sulfamethoxazole (Bactrim®)

Kennedy CDiff Task Force, 2015

KENNEDY HEALTH

MK.497

The Right Antibiotic Makes a Difference!
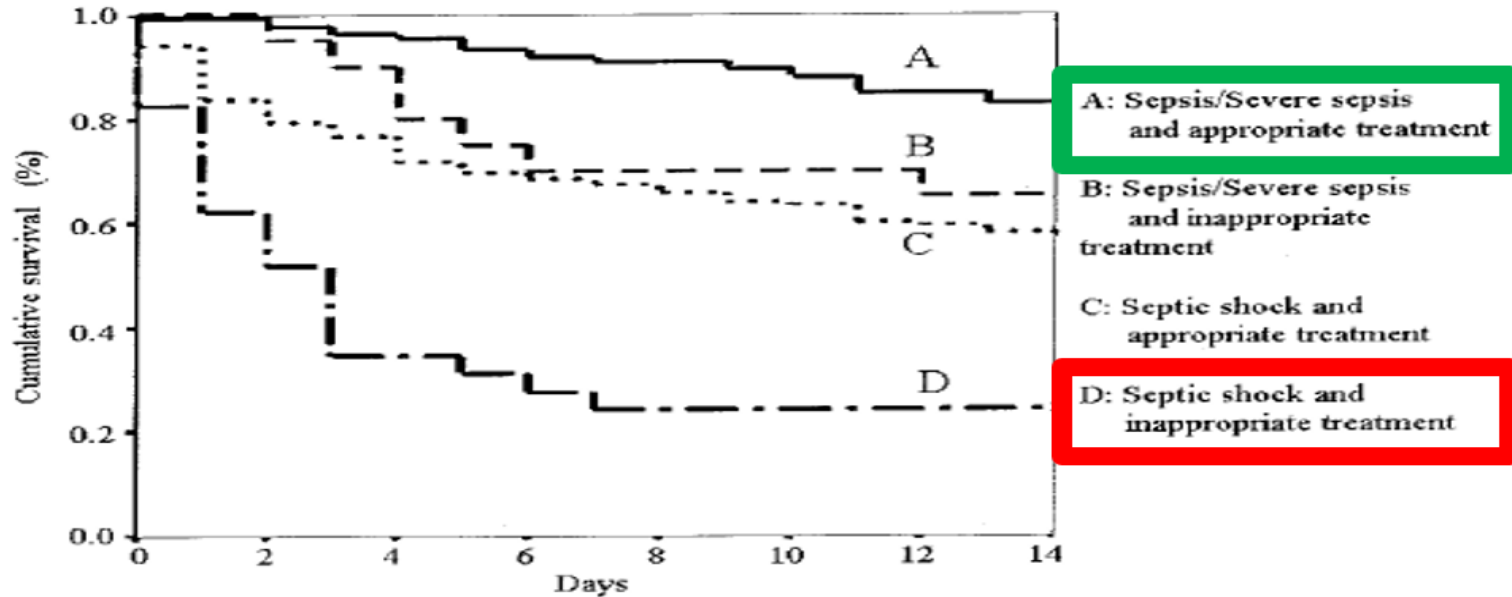
FIGURE 2. Survival rate according to the presence of shock and empiric antibiotic treatment (log-rank test, $p < 0.001$).

CHEST 2003; 123:1615–1624,

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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

Nov. 2014

Dec. 2014

Prospective and Audit Pharmacy Intervention at WT

Feb. 2015

Rapid Diagnostics on Blood Culture implemented

March 2015
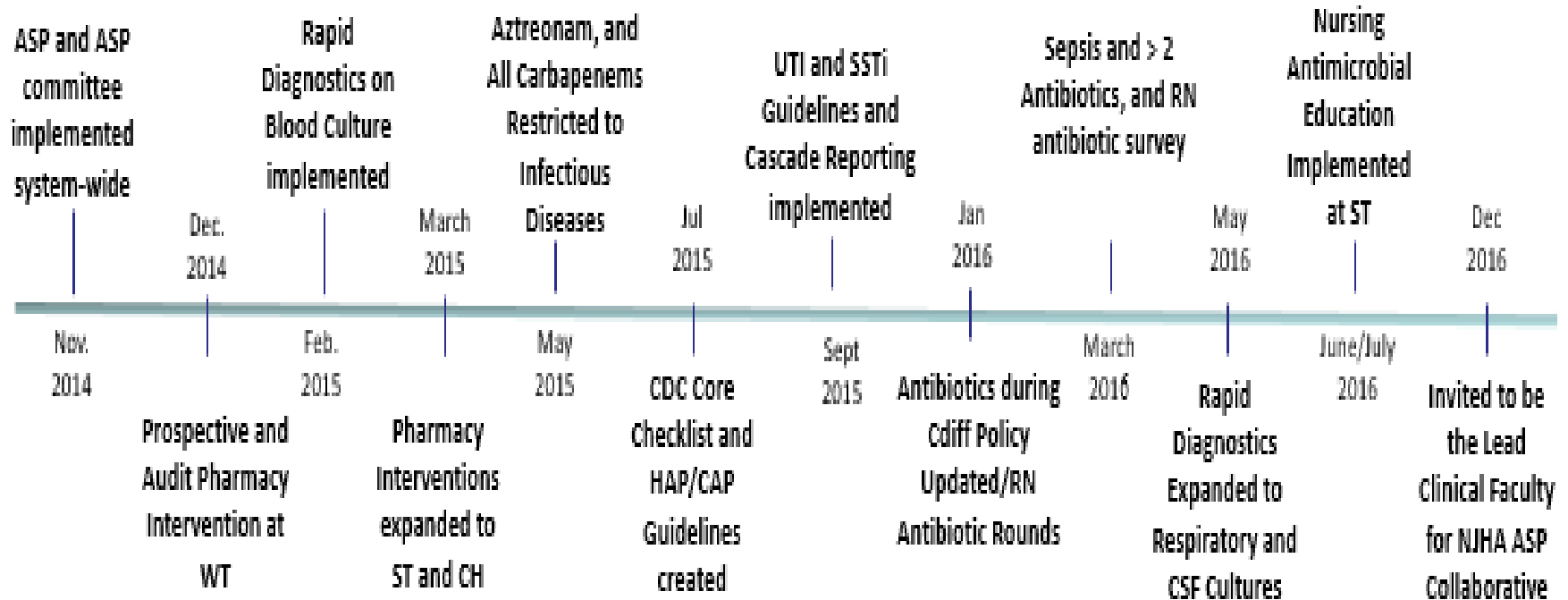
Pharmacy Interventions expanded to ST and CH

May 2015

Aztreonam, and All Carbapenems Restricted to Infectious Diseases

Jul 2015

CDC Core Checklist and HAP/CAP Guidelines created

Sept 2015

UTI and SSTi Guidelines and Cascade Reporting implemented

Jan 2016

Antibiotics during Cdiff Policy Updated/RN Antibiotic Rounds

March 2016

Sepsis and > 2 Antibiotics, and RN antibiotic survey

May 2016

Rapid Diagnostics Expanded to Respiratory and CSF Cultures

June/July 2016

Nursing Antimicrobial Education Implemented at ST

Dec 2016

Invited to be the Lead Clinical Faculty for NJHA ASP Collaborative

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Tracking

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"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

DOT/1000PD
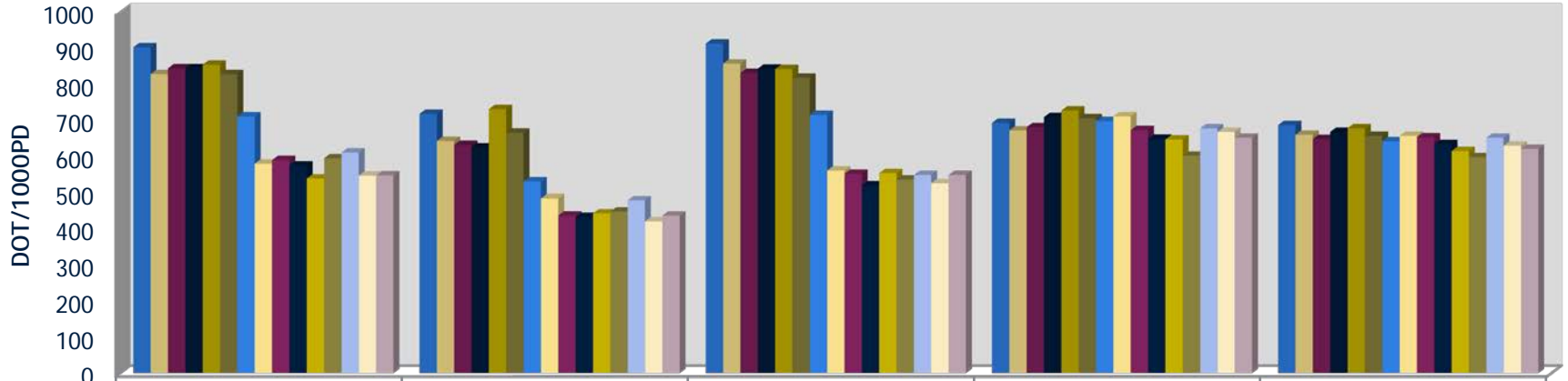
	Stratford	Cherry Hill	Washington Twshp	National (Teaching)	National (Non-Teaching)
2014 Q1	900	716	910	691	685
2014 Q2	826	641	855	670	658
2014 Q3	842	630	829	679	646
2014 Q4	842	623	841	707	666
2015 Q1	852	729	840	725	676
2015 Q2	826	664	816	704	655
2015 Q3	709	529	713	696	640
2015 Q4	578	483	559	709	655
2016 Q1	588	436	550	671	651
2016 Q2	573	432	518	647	632
2016 Q3	537	442	552	645	613
2016 Q4	593	447	534	600	596
2017 Q1	609	478	547	676	650
2017 Q2	545	420	524	666	628
2017 Q3	546	436	547	650	619

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.**

FQ
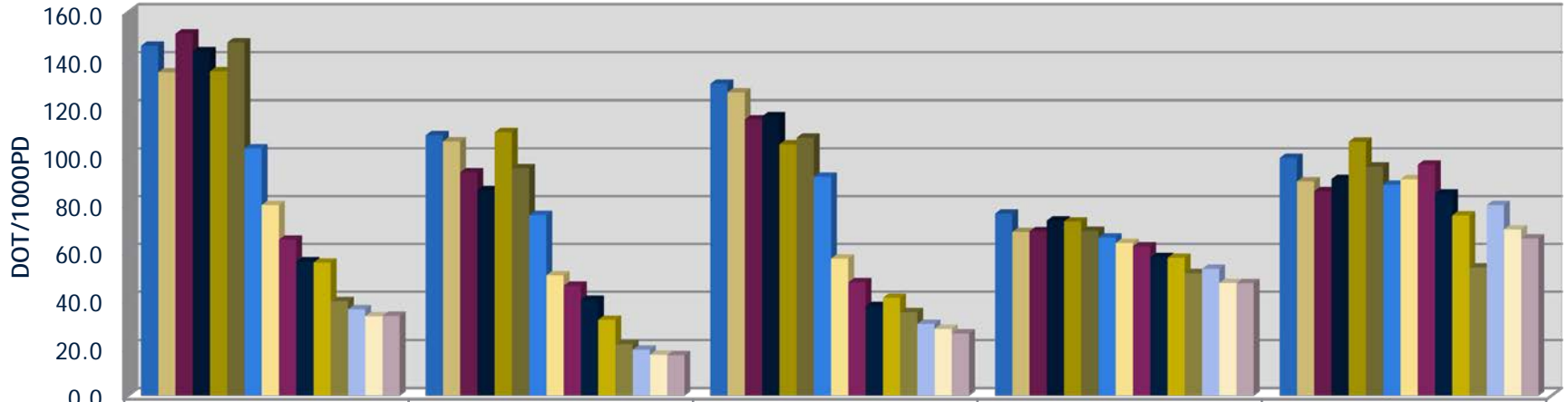
	Stratford	Cherry Hill	Washington Twshp	National (Teaching)	National (Non-Teaching)
2014 Q1	145.9	108.7	130.0	75.9	99.2
2014 Q2	134.8	106.1	126.4	68.2	89.4
2014 Q3	151	93.2	115.3	68.5	85.3
2014 Q4	143.6	85.7	116.6	73	90.4
2015 Q1	135.2	110	104.9	72.6	106
2015 Q2	147.3	94.9	107.7	68.7	95.6
2015 Q3	103.2	75.3	91.32	65.9	88
2015 Q4	79.5	50.1	57.1	63.6	90.3
2016 Q1	65	45.7	47.2	62.2	96.4
2016 Q2	55.9	39.8	37.2	57.7	84.3
2016 Q3	55.4	31.7	40.7	57.4	75.1
2016 Q4	39.3	21.5	34.9	51	53.4
2017 Q1	36.1	19.2	30	52.8	79.5
2017 Q2	33.2	17.1	27.9	46.9	69.3
2017 Q3	33.4	16.9	26	46.8	65.5

Cumulative Annual Data

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

	2014	2015	2016	Jan-Sept 2017
DOT/1000 PD	9455	8298	6202	4652
HO CDI Rate	5.1	6.1	4.8	3

DOT/1000 PD — HO CDI Rate
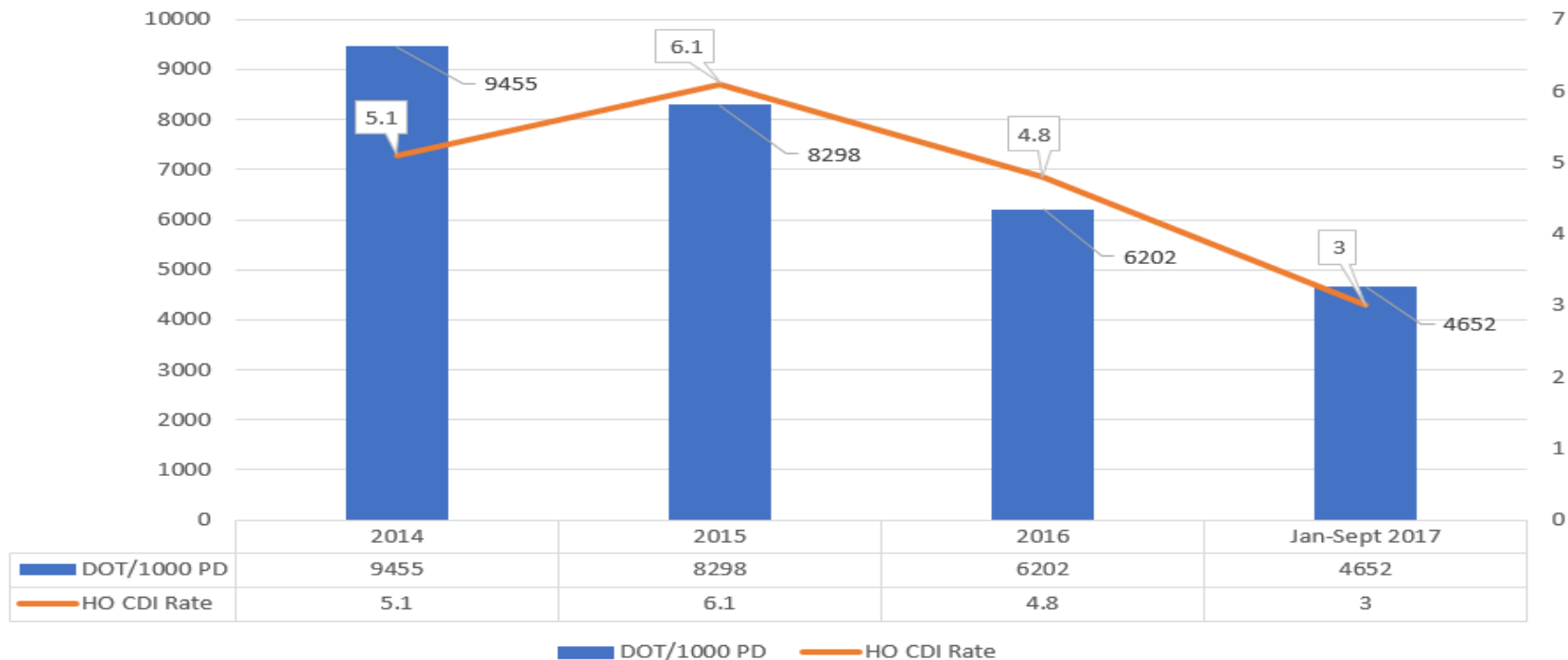
Cumulative DOT by Year (note 2017 is YTD)

	2014	2015	2016	Jan-Sept 2017
DOT/1000 PD	9455	8298	6202	4652
HO CDI Rate	5.1	6.1	4.8	3
HO	61	72	56	27
Patient Days	119995	117195	117349	89251

While Reducing Antibiotic use, has that impacted Sepsis Mortality?
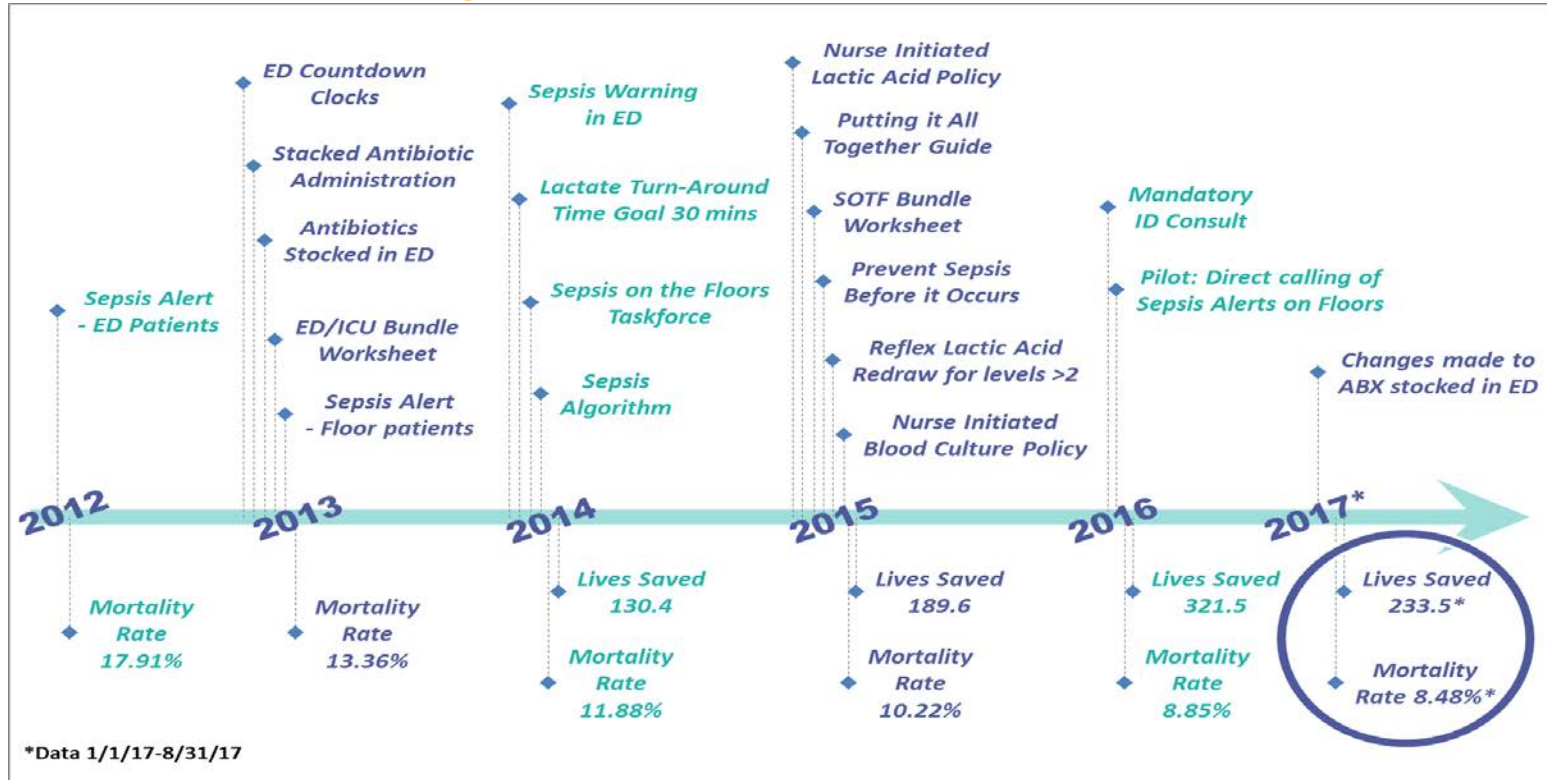
Reporting

Relationship of Devices to Stewardship

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

- Reference: 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,[1] Rita D. Olans,[2] and Alfred DeMaria Jr[3]

[1]Hallmark Health System, Inc., Melrose-Wakefield Hospital, [2]MGH Institute of Health Professions - School of Nursing, Boston, and [3]Bureau 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

Nursing Core Checklist of Antibiotic Stewardship, AJIC, Hou, C. *et al.*, 2017.

Task	Start	Update
1. Patient Admission		
1.1 Triage and appropriate isolation		
1.2 Accurate allergy history		
1.3 Early and appropriate cultures		
1.4 Timely antibiotic initiation		
1.5 Medication reconciliation		
2. Daily clinical progress monitoring		
2.1 Progress monitor and report		
2.2 Preliminary micro report and antibiotic adjustments		
2.3 Antibiotic dosing and de-escalation		
3. Patient safety and quality monitoring		
3.1 Adverse events		
3.2 Change in patient condition		
3.3 Final culture report and antibiotic adjustment		
3.4 Antibiotic resistance identification		
4. Clinical progress, pt education, discharge		
4.1 IV to PO antibiotic, outpatient antibiotic therapy		
4.2 Patient education		
4.3 Length of stay		
4.4 Outpatient management, long-term care, readmission		

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

Nov. 2014 — ASP started, with first RN representation

Mar 2015 — IP education on review of culture reports to staff RNs

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

Jan 2016 — Olan's article on Critical Role RN in Stewardship in unit councils/ RN Antibiotic Rounds

May 2016 — Suggestion to include culture results on SBAR

June 2016 — Development of Nursing Core Checklist of ASP

Aug 2016 — Survey of RN on AS and Cultures

Sept 2016 — Face to Face RN Educator with Staff RN on Cultures at ST division

Dec 2016 — Joint IP/ID Physician Antibiotic Rounds at CH division

Feb 2017 — First formal RN AS Course/ ID Physician CBL to RN on AS

March 2017 — Joint RN/ID Physician gave international webinar on sepsis and stewardship

June 2017 — Publication of Nursing Core Checklist Abstract and ID Physician APIC Lecture on AS

Nov 2017 — RN Lecture on AS for NJHA Stewardship Webinar

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