



(Management Case Study)
Establishing Pharmacy Participation in
Antimicrobial Stewardship Program in a Large
Academic Medical Center: One Year Experience

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Disclosure

- The program chair and presenters for this continuing education activity have reported no relevant financial relationships.

Learning Objectives

- Describe the process of integration of all pharmacists into Antimicrobial Stewardship Program (ASP) at levels based on the participation in patient care
- Review how interventions were structured and used as a process measure
- Report changes in an antimicrobial use as outcome measure

Self-Assessment Questions

- Question 1: Non-ASP clinical pharmacotherapy specialists (CPS) and hospital pharmacists were integrated into ASP at levels based on the participation in patient care (True or False)
- Question 2: Reports of interventions were disseminated weekly to the involved pharmacy staff and reviewed quarterly and annually at the institutional level (True or False)
- Question 3: Trend toward increased use of broad spectrum antibiotics was observed in 2015 (study period) compared to 2014 (True or False)

NYU Langone Medical Center (NYULMC)

- 725 bed tertiary care academic medical center
- State-of-the-art 24-h pharmacy
- Automated technologies
 - Swisslog, DoseEdge, Kitcheck, Aethon MedEx
- **Epic** computerized physician order entry (CPOE)
- Collaborative patient care
 - Hospital pharmacists
 - Clinical pharmacotherapy specialists - **CPS**
- PGY1 and PGY2 pharmacy residency programs



Antimicrobial Stewardship Program (ASP)

- Initiated in 2008 and expanded
 - ASP ID medical director, ID attendings, ID fellows,
ASP ID-trained CPS

- ASP interventions
 - Prior authorization for restricted anti-infectives
 - Prospective audit and feedback
 - Dosing and monitoring of aminoglycosides and vancomycin
 - **New initiative** in 2014
 - Electronic notifications TID of blood culture results based on rapid diagnostic testing (RDT)

- ASP hospital-wide guidelines and dosing protocols

Recognizing a Problem



- NYULMC prioritized **WHEN (Weekend, Holiday, Evening, Night) initiative**
 - To provide comprehensive care around-the-clock



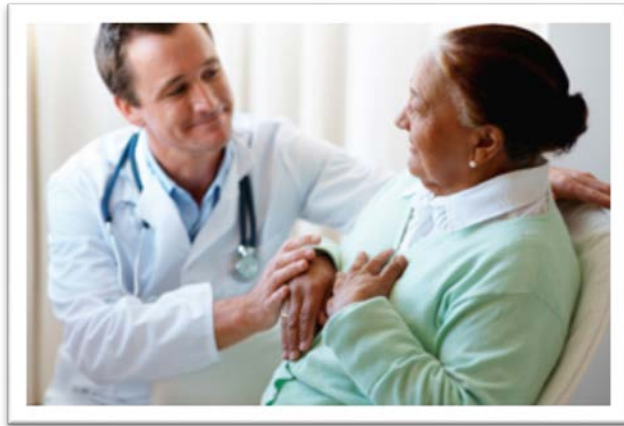
Aligning ASP activities with this initiative presented a **CHALLENGING TASK**



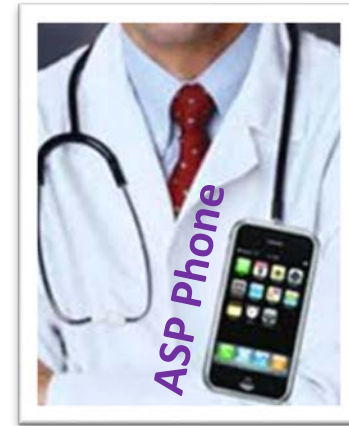
Standard Solution

Utilizing **ID Fellows** on evening and weekends

- ASP coverage distracts from direct patient care



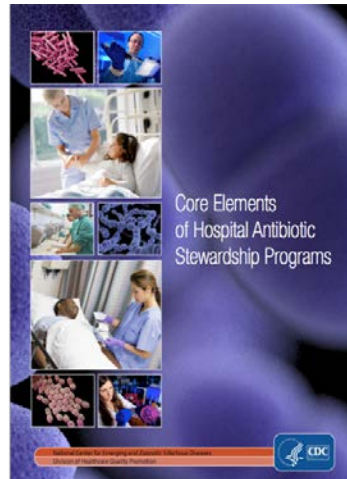
vs.



- Fragmented ASP coverage
 - Approve broader and more costly antibiotics

Gross R et al. CID 2001;33:285-95

CDC Recommendation



Pharmacy-driven interventions

Dose adjustment, IV to PO switch, automatic alerts,
therapeutic drug monitoring (TDM)

<http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>

Novel Solutions

Evaluation of pharmacy generalists performing antimicrobial stewardship services

JOSEPH J. CARRENO, RACHEL M. KENNEY, MARY BLOOME, JANE MCDONNELL, JENNIFER RODRIGUEZ,
ALLISON WEINMANN, PAUL E. KILGORE, AND SUSAN L. DAVIS



Leads to good outcomes

Engaging PGY2 pharmacy residents

Carreno J et al. AJHP 2015;72:1298-303

Siegfried J et al. AJHP special edition 2016 manuscript accepted

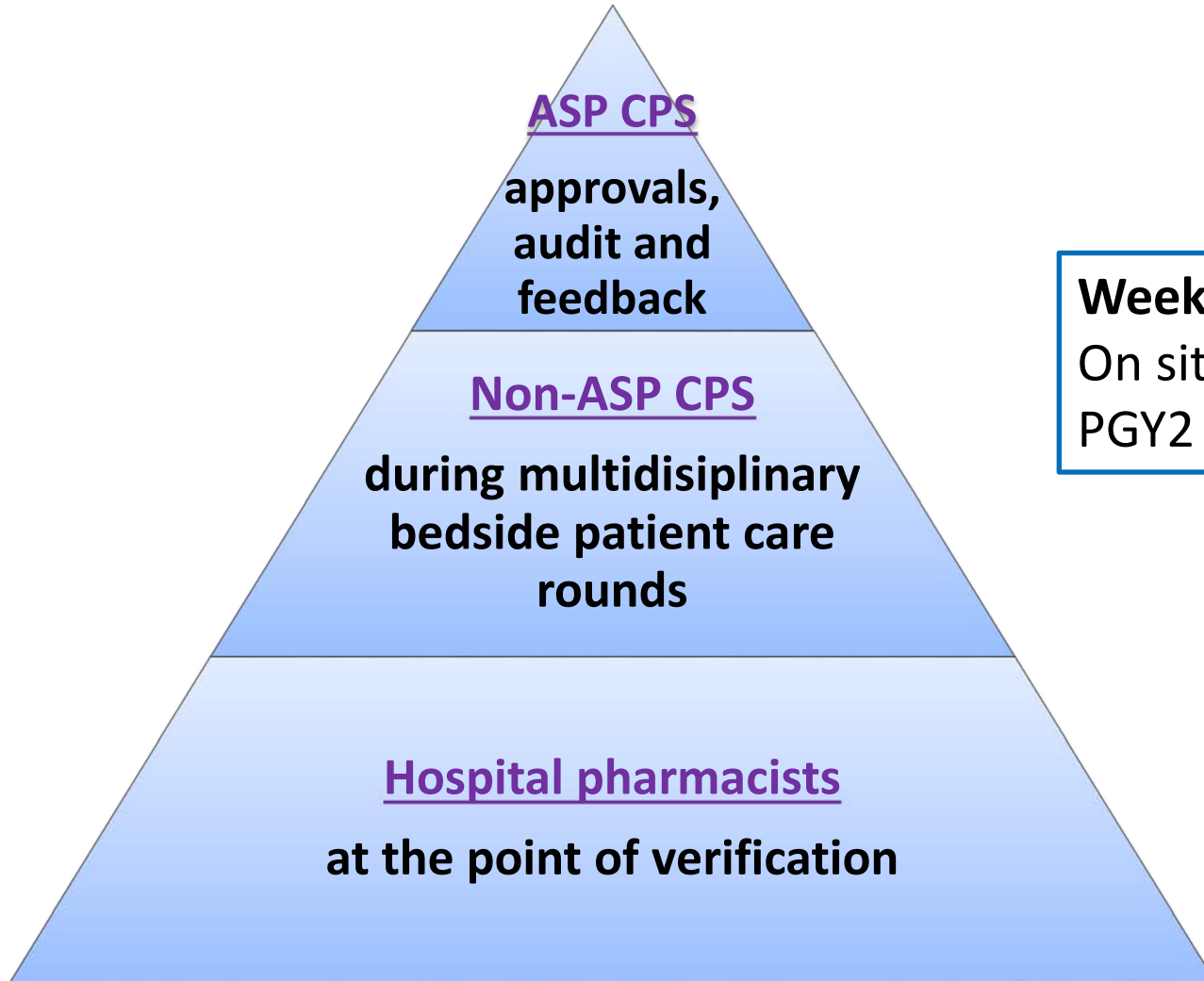
Complex Problem

- The **ideal pharmacy model to extend ASP coverage** provided by full-time ASP CPS with formal training in ID
 - Unknown



Our Solution

- Establish pharmacy participation in ASP at **different levels**
 - Based on the **participation in patient care**



Weekends 8 am - 4 pm
On site full ASP coverage by
PGY2 Pharmacy Residents

Getting Started

Epic iVents

- Designed to accommodate documentation of ASP interventions at different levels

ASP Interventions		Subtyp
Title	Number	
Antithrombotic Therapy Interventions	1104	
ASP Interventions	1102	
Investigational Pharmacy	1105	
Pharmacy Interventions	1100	
Rounding Interventions	1101	
Surgical Prophylaxis Interventions	1103	

Epic Workbench Report of iVents

- Used to provide
 - Quick daily review of documented iVents
 - Summary for weekly and quarterly reporting

Pharmacy iVents: Weekly Summary by Subtype

Dosing regimen adjustment	104
Restricted antibiotics – overnight verification	29
Restricted antibiotics – approval clarification	24
Drug interactions prevention – major	4
Allergic reaction prevention – major	3
Drug level reviewed	5

Education

- Hospital pharmacists
 - Four ASP/ID sessions followed by a competency exam
 1. **ASP goals, importance of appropriate antimicrobial use**
 - **Pharmacy participation in our ASP**
 2. Vancomycin dosing protocol
 3. Aminoglycosides dosing protocols
 4. Allergy, major anti-infective related interactions

- Non-ASP CPS, PGY2 residents
 - Guidelines review
 - New CPS - mandatory ASP report for approvals of restricted antibiotics for the first three months

- Pharmacy website
 - All the guidelines, dosing protocols, summaries, checklists

Ongoing Communication and Learning

- Reports of interventions (type and quantity) emailed weekly to the involved pharmacy staff
 - **Case for review included**
 - **To facilitate learning**
- **ASP update** at pharmacy weekly huddle and monthly staff meeting
- Reports of interventions reviewed quarterly and annually at the institutional levels
 - Antimicrobial Subcommittee
 - Pharmacy & Therapeutic Committee

Study Period - One Year

January 1, 2015

December 31, 2015



July 2015
Increase in staffing

- Additional CPS positions were filled
 - An ASP CPS
 - **Extending ASP weekday hours till 9 pm**
 - To support pharmacy evening shift
 - Three non-ASP CPS
 - **Extending coverage** to all Internal Medicine Teams and Medical ICU - Step Down Unit (SDU)

Endpoints

- Process measure
 - Interventions and acceptance rate

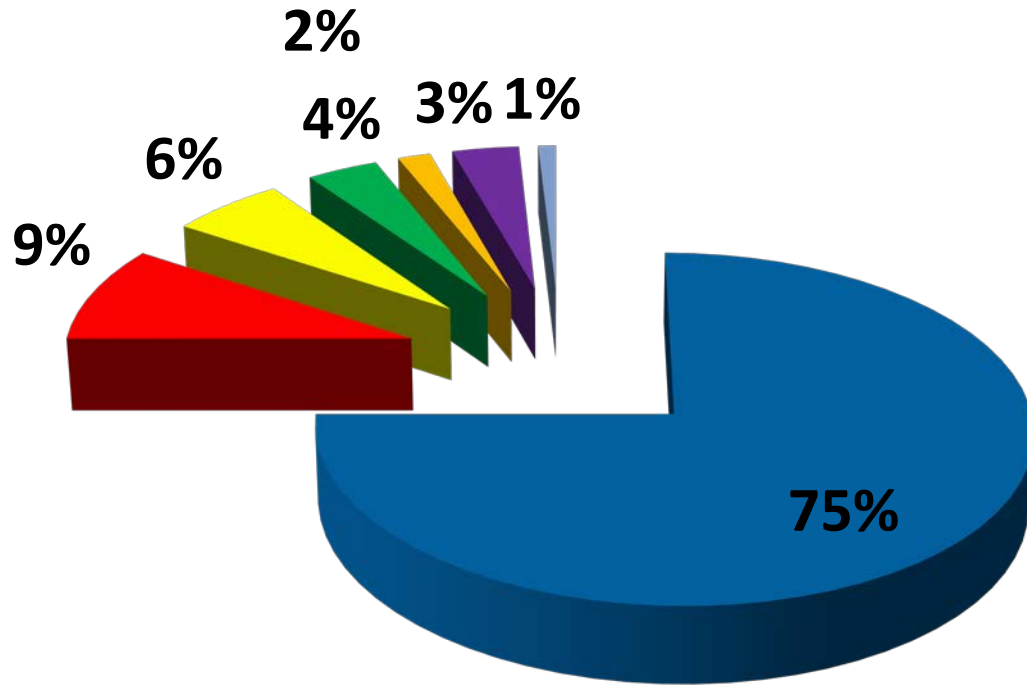
- Outcome measures
 - Antibiotic utilization
 - Rate of hospital-onset *Clostridium difficile* infection (CDI)
 - Rate of infections caused by carbapenemase-producing *Enterobacteriaceae* (CRE)

Process Measure

Pharmacy Interventions: Summary

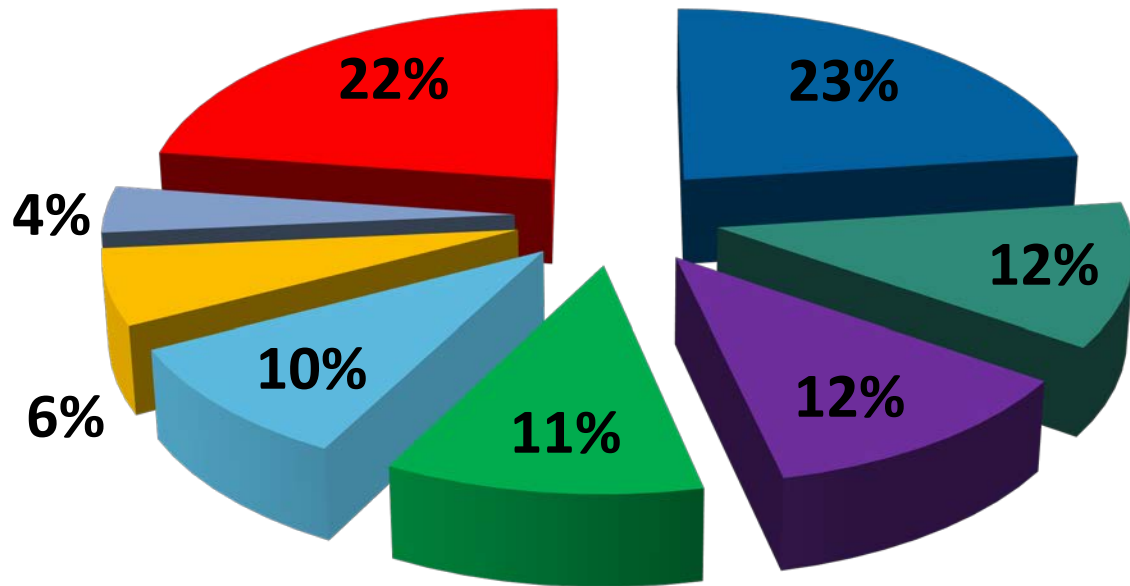
Type	Total, yearly (n) 2015	Quarters 1, 2	Quarters 3,4
ASP CPS, n=3	4,025	1,792	2,223
Non-ASP CPS, n=10	4,888	2,415	2,473
Hospital pharmacists, n=65	5,639	2,269	3,370

Interventions: Hospital Pharmacists



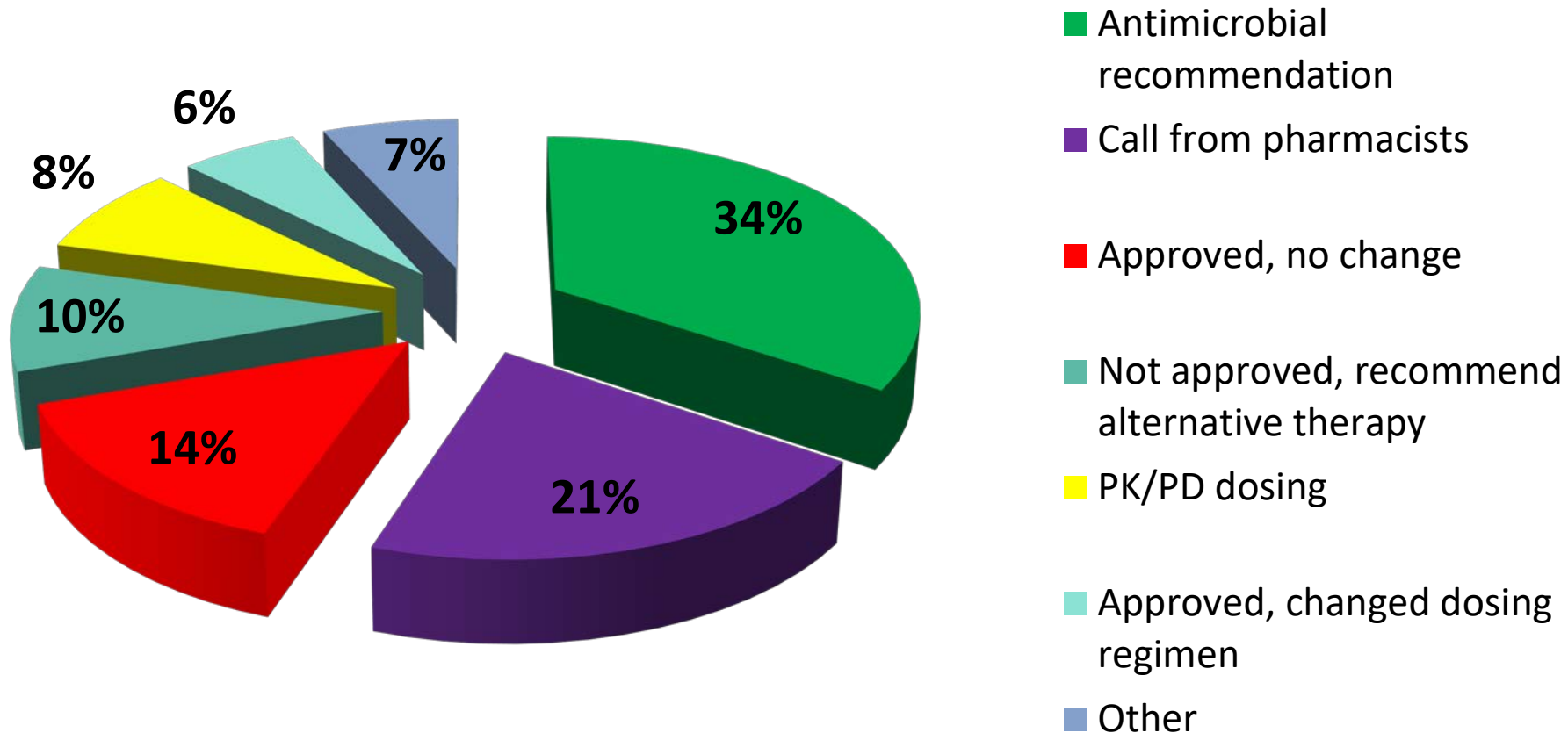
- Dosing regimen
- Approval clarification
- Overnight verification
- Major drug interactions
- Drug level review
- Severe allergy
- IV to PO switch

Interventions: Non-ASP CPS

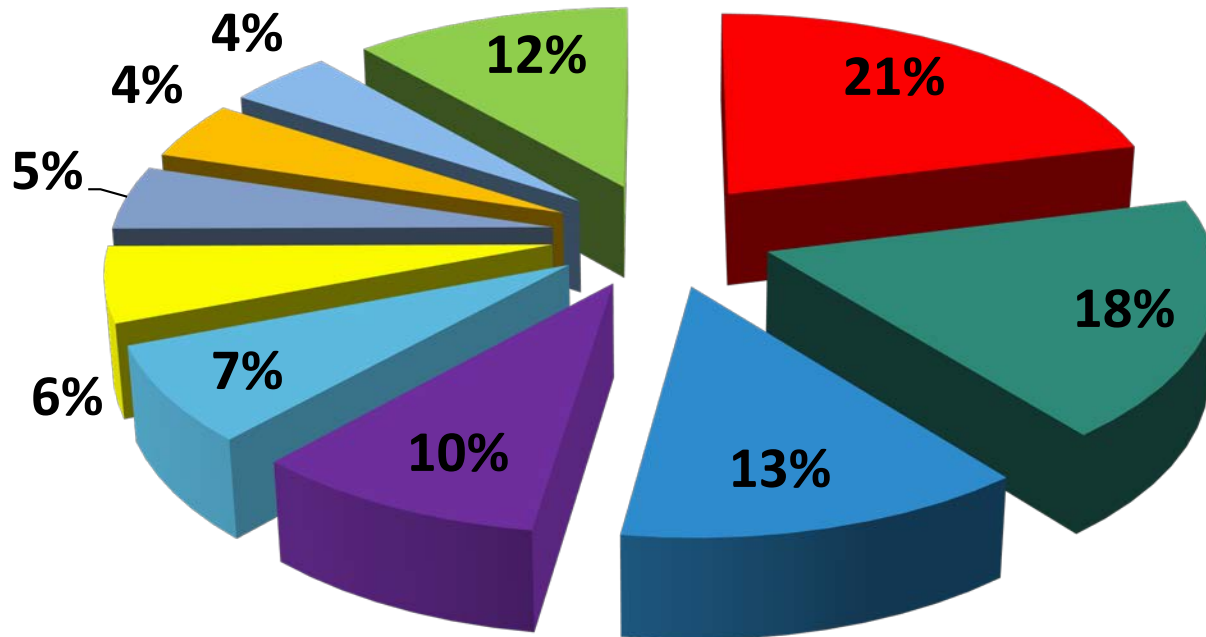


- Dosing adjustment
- Discontinue antibiotics
- TDM
- Initiate new antibiotic
- Drug-bug mismatch
- IV to PO
- Streamline
- Other

Interventions: ASP CPS – Stewardship Calls

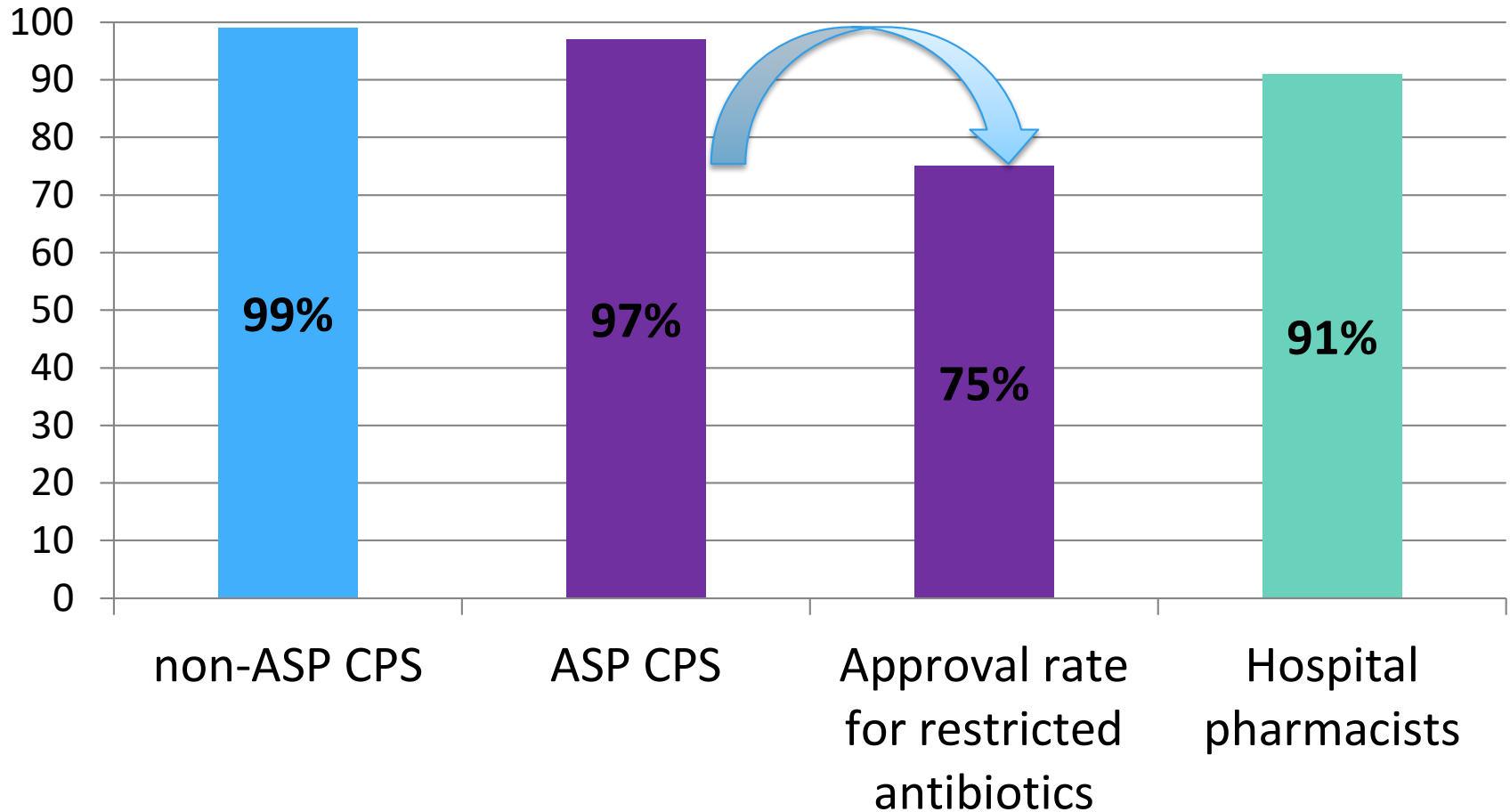


Interventions: ASP CPS – Prospective Review



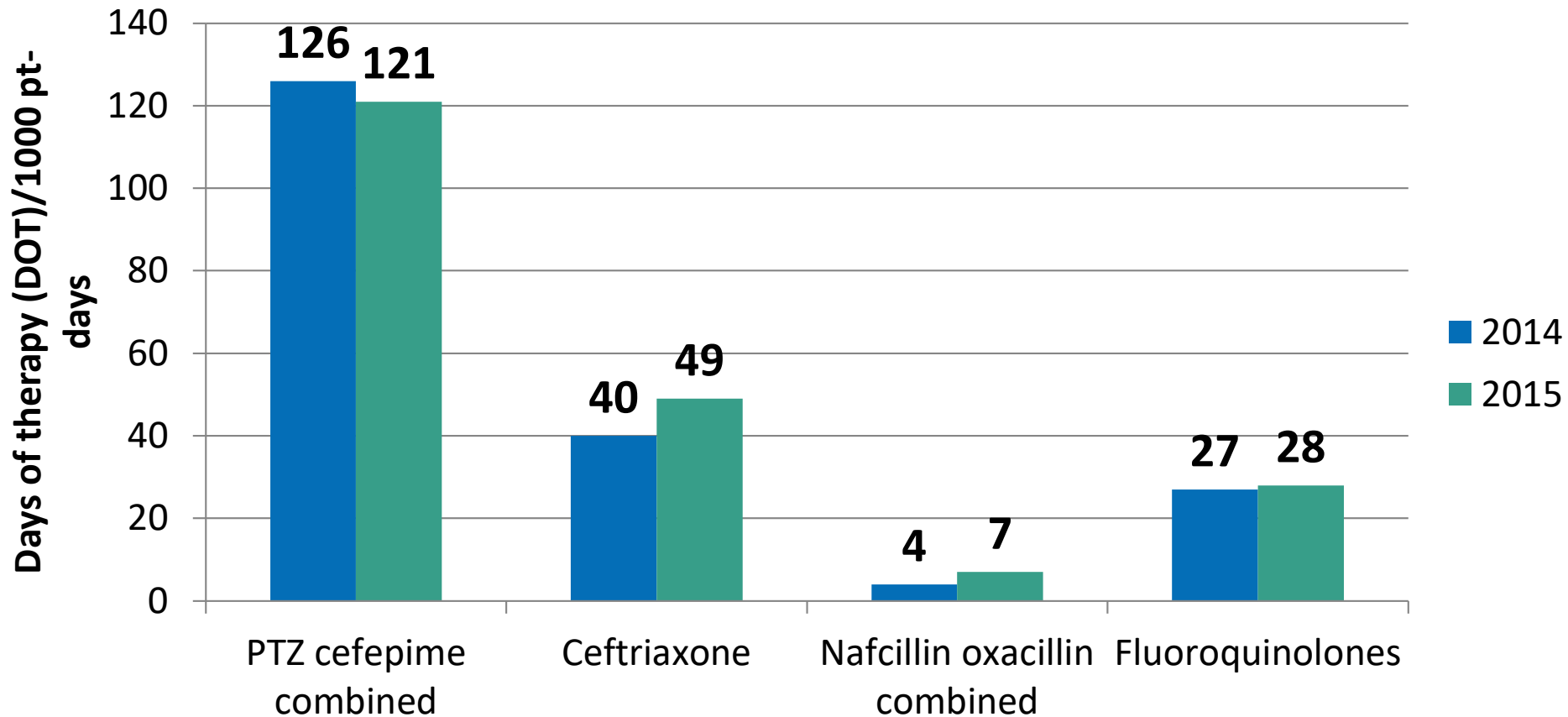
- PK/PD dosing
- Change dosing regimen
- Discontinue therapy
- Blood culture review
- Alternative therapy
- Narrow drug therapy
- Antiretroviral review
- Recommend duration
- IV to PO
- Other

Interventions: Acceptance Rate



Outcome Measures

Antimicrobial Utilization



Shift aligned with institutional guidelines

Hospital-onset CDI and CRE Rate

	2015	2014
Hospital-onset CDI ¹	0.9	1
Hospital-onset CRE ¹	0.1	0.1

¹ cases/1000 pt-days

Conclusion

- We expanded ASP-related services at our institution by:
 - Increasing ASP CPS staffing and **extending ASP hours**
 - Integrating **non-ASP CPS** at the time of multidisciplinary **bedside patient care rounds**
 - Involving **hospital pharmacists** at the point of **verification**
 - Integrating **PGY2 residents** into ASP **weekend** coverage
- We observed trend toward decreased use of broad spectrum antimicrobials and sustained low rate of hospital-onset CDI and CRE

Key Takeaways

- Key Takeaway #1
 - **Motivation** and **education** are key factors for integration of hospital pharmacists into ASP
- Key Takeaway #2
 - **Continuous communication** and **support** are essential for success
- Key Takeaway #3
 - **Integration into CPOE** (i.e, iVents and reports) is necessary for pharmacy participation, review and reporting

Acknowledgments

- Arash Dabestani – senior director of pharmacy
- John Papadopoulos – director of clinical services
- Greg Filipowski – assistant director of pharmacy operations
- Vinh Pham – ASP medical director
- Marco Scipione, Justin Siegfried – ASP CPS
- Tyler Lewis, Arnold Decano – PGY2 residents



Self-Assessment Question 1

- Non-ASP CPS and hospital pharmacists were integrated into ASP at levels based on participation in patient care (True or False)

Answer: True

Self-Assessment Question 2

- Reports of interventions were disseminated weekly to the involved pharmacy staff and reviewed quarterly and annually at the institutional level (True or False)

Answer: True

Self-Assessment Question 3

- Trend toward increased use of broad spectrum antibiotics was observed in 2015 (study period) compared to 2014 (True or False)

Answer: False



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