#1071

IMPACT OF A PHARMACIST-LED INTERVENTION TARGETING APPROPRIATE DURATION OF THERAPY OF ANTIBIOTICS AT HOSPITAL DISCHARGE

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DISCLOSURES

- IRB status: Exempt
- Co-investigators:
  - Heidi Simons, PharmD, BCPS, BCCCP
  - Jada Cunningham, PharmD, BCPS
  - Channa Richardson, PharmD, BCPS
  - Martin St. John, PharmD, BCPS
  - Aimee Thornton, PharmD
- Conflicts of interest: None
- Project sponsorship: None

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ST. PETER'S HEALTH

- About St. Peter's Health (SPH)
  - Nonprofit, community-owned
  - 123-bed hospital
  - Serves an estimated 97,000 people across five counties
  - Wide variety of specialty services and clinics
  - Pharmacy services including:
    - Antimicrobial stewardship (AMS)
    - Assistance with transitions of care

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BACKGROUND

- Longer durations contribute to antimicrobial resistance, increased risk of adverse events, and increased cost
- Shorter antibiotic durations are as effective as longer durations for many infections
- Each additional day of unnecessary antibiotics can cause harm
  - 3.4% increased risk per day of developing antibiotic resistance
  - 4% increased risk per day of experiencing an adverse event
- In 2021, up to 35% of patients discharged on antibiotics had already received a full course of treatment or more prior to discharge

Brower, K., et al. Hosp Pharm (2020); Tamma, P., et al. JAMA (2017); Curran, J., et al. Clin Microbiol Infect (2021)

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BACKGROUND

- Current practice at SPH
  - Automatic stop dates with initial order in Meditech
    - Duration varies based on indication selected
    - Meditech is the electronic health record utilized at SPH
  - All inpatients with active antibiotic orders are reviewed daily by AMS pharmacist
- Common errors related to duration of therapy
  - Miscounting total number of days of previous treatment
  - Omitting previous antibiotics when adequate coverage was still provided
  - Not adjusting the automatic stop date when changing antibiotics or when modifying from IV to PO

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STUDY OBJECTIVES

- **Primary Outcome**
  - Evaluate the impact of a pharmacist-led intervention targeting the duration of antimicrobial therapies prescribed at discharge
    - Assessed by counting the number of excess days of antibiotics that were avoided
- **Secondary Outcomes**
  - Readmission rates within 30 days of hospital discharge
  - Additional outpatient antibiotic prescribing for the same infection within 30 days
  - Reported adverse events related to antibiotics

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METHODS: STUDY DESIGN

- Single-center quasi-experimental design
- Phase 1: Pre-implementation
  - Retrospective chart review to collect preliminary data
  - January 1, 2022 through March 31, 2022
- Phase 2: Implementation
  - Development of a hospital-wide protocol allowing pharmacists to adjust duration of therapy for select indications
- Phase 3: Post-implementation
  - Prospective intervention phase and final data analysis
  - January 1, 2023 through March 31, 2023

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METHODS: PATIENT SELECTION

Inclusion Criteria
- Age 18+ years
- Clinically improving
- At least one of the following:
  - Uncomplicated/complicated UTI
  - Asymptomatic bacteriuria
  - CAP/HAP
  - Gram-negative bacteremia
  - COPD exacerbation
  - Pyelonephritis
  - Sinusitis
  - Appendicitis
  - Cholecystitis
  - Diverticulitis

Exclusion Criteria
- Pregnancy
- Any of the following:
  - Absence of source control
  - Necrotizing fasciitis
  - Cellulitis with lymphedema
  - Gram-positive bacteremia
  - Pyelonephritis with a stent
  - C. difficile as the primary infection
  - Prosthetic joint infection
  - Febrile neutropenia
  - Meningitis
  - Cholangitis
  - Cholecystostomy tube
  - Diverticulitis with prolonged ileus, bowel obstruction, perforation, or abscess

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METHODS: PROTOCOL DEVELOPMENT

INDICATION	DURATION
CAP	5-7 days
HAP	7 days
COPD exacerbation	≤5 days
Appendicitis	After appendectomy Uncomplicated: <24 hours Complicated: 4 days No surgery, antibiotics only 5-7 days
Cholecystitis	Surgery <7 days of symptoms <24 hours Surgery >7 days of symptoms 4 days
Diverticulitis	4-7 days

INDICATION	DURATION
Acute Bacterial Sinusitis	5 days
Cellulitis	5-7 days
Bacteremia (Gram Neg.)	7-14 days
Uncomplicated UTI	1-7 days (depending on agent chosen)
Complicated UTI, Catheter-Associated UTI, or Pyelonephritis	5-7 days (depending on agent chosen)
Asymptomatic Bacteriuria	0 days

METHODS: PROTOCOL DEVELOPMENT

Rx – Antibiotic Duration Adjustment

S: *Brief description of hospital course*

O:

Inpatient antibiotics:

-Antibiotic (dates administered)

Antibiotics prescribed at discharge:

-Antibiotic and duration prescribed

A/P: Patient evaluated by Antimicrobial Stewardship Service and meets criteria for adjustment of antibiotic duration at discharge. Patient was prescribed (antibiotic) at discharge for treatment of (indication). Per protocol, patient should receive a total of (XXX) days. Discharge orders have been modified.

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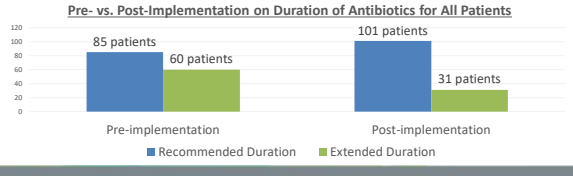
RESULTS: PRIMARY OUTCOME

- 277 total patients met inclusion criteria
  - 145 patients from pre-implementation; 132 patients from post-implementation
- Pharmacists made a total of 29 interventions to durations of antibiotics specifically at discharge

Pre- vs. Post-Implementation on Duration of Antibiotics for All Patients



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RESULTS: PRIMARY OUTCOME

Pre- vs. post-implementation on antibiotic duration by infection

No. of patients with recommended durations/total patients per indication

Indication	Pre-implementation	Post-implementation
CAP	27/51 (53%)	**34/46 (74%)**
HAP	3/3 (100%)	3/3 (100%)
Sinusitis	0/3 (0%)	**1/1 (100%)**
COPD Exacerbation	2/3 (67%)	**2/2 (100%)**
Cellulitis	3/18 (17%)	**16/24 (67%)**
Gram Neg. Bacteremia	6/7 (86%)	**4/4 (100%)**
Appendicitis	0/3 (0%)	**2/3 (67%)**
Cholecystitis	2/2 (100%)	2/3 (67%)
Diverticulitis	2/5 (40%)	1/3 (33%)
Pyelonephritis	3/6 (50%)	**3/4 (75%)**
Uncomplicated UTI	18/19 (95%)	15/17 (88%)
Complicated UTI	19/25 (76%)	**18/22 (82%)**

*Red text indicates infections with improved rates of recommended durations

RESULTS: PRIMARY OUTCOME

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Pharmacist impact on antibiotic durations post-implementation

No. of patients with recommended durations/total patients per indication

Indication	Before Pharmacist Intervention	After Pharmacist Intervention
CAP	23/46 (50%)	**34/46 (74%)**
HAP	3/3 (100%)	3/3 (100%)
Sinusitis	1/1 (100%)	1/1 (100%)
COPD Exacerbation	1/2 (50%)	**2/2 (100%)**
Cellulitis	10/24 (42%)	**16/24 (67%)**
Gram Neg. Bacteremia	2/4 (50%)	**4/4 (100%)**
Appendicitis	1/3 (33%)	**2/3 (67%)**
Cholecystitis	2/3 (67%)	2/3 (67%)
Diverticulitis	1/3 (33%)	1/3 (33%)
Pyelonephritis	2/4 (50%)	**3/4 (75%)**
Uncomplicated UTI	11/17 (65%)	**15/17 (88%)**
Complicated UTI	15/22 (68%)	**18/22 (82%)**

A total of 84 excess days of antibiotics were avoided!

RESULTS: SECONDARY OUTCOMES

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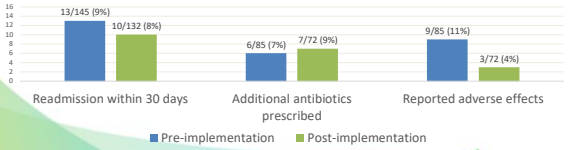
- Overall readmission rates were similar between groups
  - Readmissions for the same infection: 6 from pre-implementation, 4 from post-implementation
- Most common reported adverse effects were stomach upset, nausea, vomiting, or yeast infections



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DISCUSSION & CONCLUSION

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- There was a lower than expected number of interventions at time of discharge
  - Most interventions were proactively discussed with the provider prior to discharge
- Other possible variables impacting results other than direct pharmacy intervention
  - Education given to providers prior to implementation of protocol
  - Protocol was sent directly to providers for reference
  - More attentive order entry by providers
- Overall, pharmacists made a positive clinical impact on utilizing shorter durations of antibiotics when appropriate by avoiding 84 days of excess antibiotics within a 3-month period

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NEXT STEPS

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- SPH is transitioning from Meditech to EPIC in June
  - No automatic stop dates
  - Reference sheet with common durations
- Present results to stakeholder groups at SPH
- Offer education to outpatient providers at clinics, urgent cares, ED on appropriate use and duration of antibiotics
- Provide focused education on indications where extended durations are commonly prescribed (e.g., cellulitis)

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QUESTIONS?

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REFERENCES

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1. Brower KI, Hecke A, Mangino JE, Gerlach AT, Goff DA. Duration of antibiotic therapy for general medicine and general surgery patients throughout transitions of care: An antibiotic stewardship opportunity for noninfectious disease pharmacists. *Hospital Pharmacy*. 2020;56(5):532-536. doi:10.1177/0018578720928265
2. Tamma PD, Avdic E, Li DX, Dzintars K, Cosgrove SE. Association of adverse events with antibiotic use in hospitalized patients. *JAMA Internal Medicine*. 2017;177(9):1308. doi:10.1001/jamainternmed.2017.1938
3. Curran J, Lo J, Leung V, et al. Estimating daily antibiotic harms: An umbrella review with individual study meta-analysis. *Clinical Microbiology and Infection*. 2021;28(4):479-490. doi:10.1016/j.cmi.2021.10.022

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