Antimicrobial Stewardship Transition-of-Care

Improving antimicrobial use at hospital discharge through a collaborative pharmacist-led transition-of-care intervention

Antimicrobial Overuse at Discharge

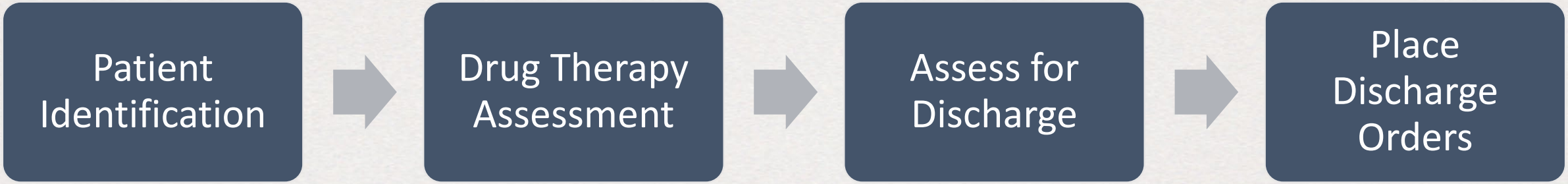
- **National Goal:** US National Action Plan goal to reduce antibiotic use by 50% in outpatient settings, by 20% in inpatient settings

- **Regional Data:** In a state-wide collaborative study of pneumonia management, 68% of patients received excess antibiotic therapy. Over 90% of the excess duration was prescribed at discharge.

- **Local Data:** In an observational study of fluoroquinolones at discharge, over 50% had unnecessarily prolonged duration.

Vaughn VM et al. *Ann Intern Med* 2019; 171(3):153-163
Mercuro NJ, et al. *Clin Infect Dis.* 2018; 67(8): 1306-7

Common steps in a Pharmacy-Based Transition of Care Model



Integrating Antimicrobial Stewardship Practices into TOC Process

Patient Identification → Drug Therapy Assessment → Assess for Discharge → Place Discharge Orders

- Screening tools & EMR assist with early identification
- Use local guidelines for antibiotic selection, dose, duration
- Pharmacist places discharge order and TOC progress note
- AMS and primary team pharmacists initiate assessment
- Pharmacist communicates with primary team

Henry Ford Health System — all for you

EMR = electronic medical record; AMS = antimicrobial stewardship; TOC = transition of care

Modifying AMS TOC for Varying Pharmacy Practice Model

TOC Processes	Academic Model	Community Model
Participating Team	Both Team and Location-based Services are geographically located All ward pharmacists participate	Location-based or provider-group-based patient identification AMS pharmacist leads intervention
Identification	EMR column of anticipated discharge + discussion during progressive rounds	Anticipated discharges received from nursing +/- EMR column of anticipated discharge +/- discussion during academic team rounds
Communication & Collaboration	Primary team pharmacist discusses during rounds or calls provider	AMS pharmacist pages/calls primary team provider
Ordering & Documentation	Primary team pharmacist creates discharge order, places EMR note	AMS pharmacist creates discharge order, places EMR note (with addendum if needed for paging communication)

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Tools for Implementation

- Stakeholder Discussion
- Workflow Guide for Pharmacists
- Institutional Guideline Support for Pharmacists
- Educational Overview for Physicians, Nurses
- Electronic Templates for Documentation
- Metrics for Success

Stakeholder Buy-In

Presentations included

- Overview of project goals, proposed process
- Steps in implementation

Participants at each site included

- Pharmacy director
- AMS Pharmacist and physician
- Outpatient pharmacy manager
- Physician unit director of participating wards
- Nurse managers of participating wards

Stakeholder Discussion Guide

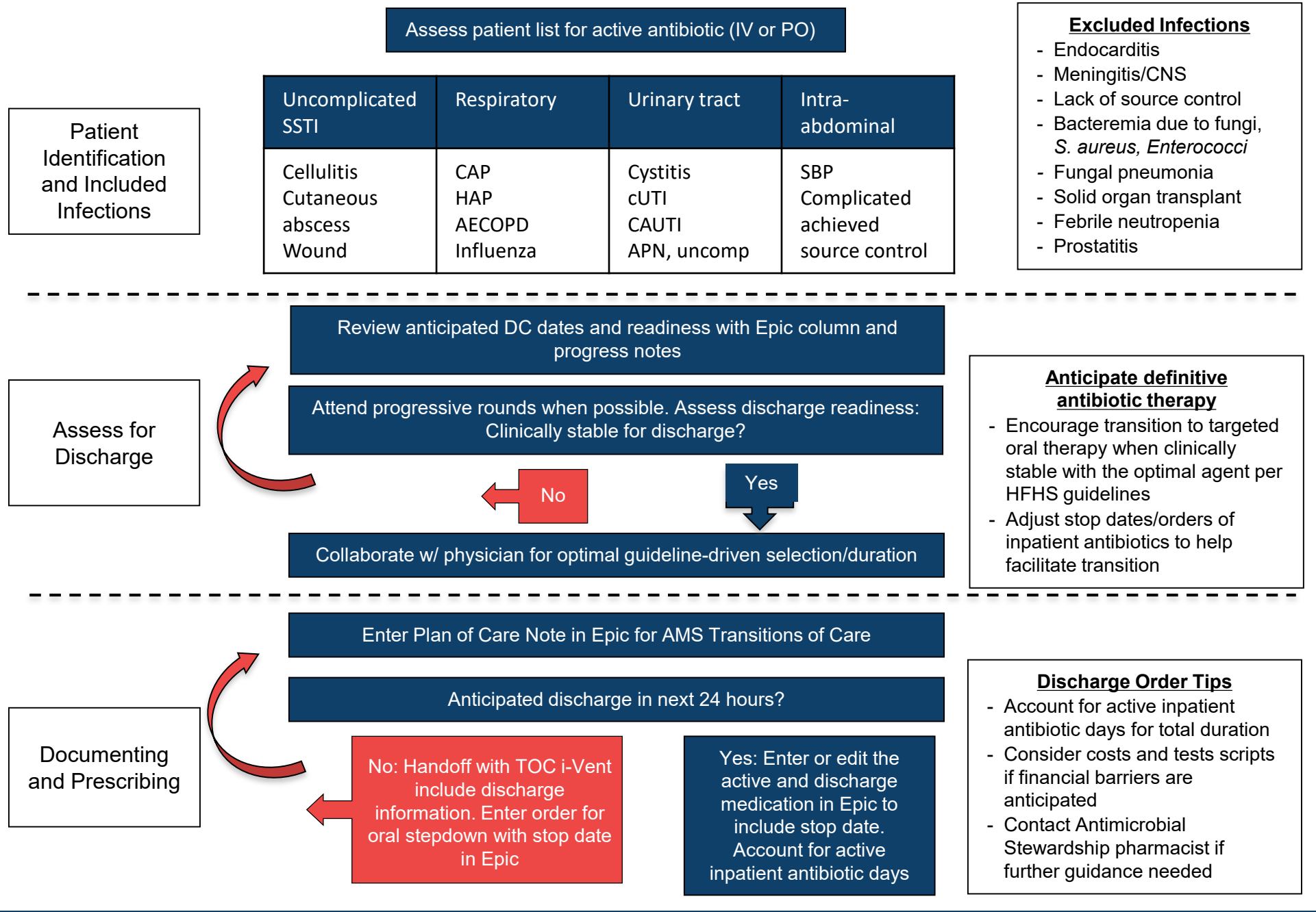
Making Antimicrobial Stewardship (AMS) at Transitions of Care (TOC) Work
Brainstorming Worksheet for Leaders

AMS TOC Steps	Questions for discussion	Discussion and Modifications	To Do List (tasks, people)
Patient Identification	How do pharmacists currently identify expected discharges? How to pharmacists identify patients to be send home on oral antibiotics? *Examples*: Column in medical record, obtain list from nurse managers, face-to-face discussion		
Evaluate appropriate duration	How is appropriate duration of therapy currently determined? *Examples*: Institutional guideline, recommendation from consult team, prescriber preference How do clinicians count "days of therapy?"		
Primary Team Contact and Discussion	How do pharmacists communicate recommendations for changes in drug therapy? Is this different for inpatient versus discharge medications? *Examples*: notes, paging, multidisciplinary rounds		
Pharmacist Inputs PO Discharge Orders	How is discharge medication reconciliation completed? Are antibiotics included in this process? Is it feasible for pharmacist to enter discharge antibiotics with an appropriate stop date?		
Pharmacist places medical record note	When pharmacists make changes to medication orders, including discharge prescriptions, are progress notes placed? Are antibiotics included in this process?		
Patient receives appropriate regimen from outpatient pharmacy	How does the outpatient pharmacy receive information about the appropriate stop date? What is the role of outpatient pharmacy in delivering discharge antibiotics to the patient bedside? For high-cost antibiotics is there a process to identify cost-related barriers?		

Oral Antibiotic Discharge: Pharmacist Workflow

Workflow guide for Pharmacists

- Developed in cooperation with primary pharmacists and AMS pharmacists
- Shared with pharmacy leadership
- Presented to pharmacists in educational sessions
- Included pharmacy students and residents
- Included in pocket cards for pharmacists
- Ongoing updates and tips shared through monthly FAQs document (via newsletter)



Institutional Guidelines for Selected Indications

- Summarized from pre-existing institutional guidelines
- Reviewed during educational sessions with pharmacists
- Reviewed during overview with physician stakeholders
- Included on pocket card for pharmacists

Oral Antibiotic Discharge: Selection and Duration Institutional Guideline

Respiratory Tract Infections	Community-acquired pneumonia, with or without risk factors (without microbiologic data)	• Amox/clav 1000/62.5 mg 2 tabs BID (non-formulary)
		  • + azithromycin 500 mg daily or doxycycline 100 mg BID
		• Amoxicillin 1000 mg TID + macrolide or doxycycline (above)
		• Cefuroxime 500 mg BID OR cefpodoxime 400 mg BID
		  • azithromycin 500 mg daily or doxycycline 100 mg BID
		• Doxycycline 100 mg BID
		• Moxifloxacin 400 mg OR levoflox 750 mg daily (non-form)
			5 days in patients with prompt clinical response
			7-10 days in patients with structural lung disease or delayed response
			
			(see Tier 1 Duration of Therapy guidelines for clinical stability criteria)

	Acute exacerbation of COPD (AECOPD)	• Doxycycline 100 mg BID (preferred) • Azithromycin 500 mg x1 then 250 mg daily	5-7 days
	Hospital acquired pneumonia (without microbiologic data)	• Moxifloxacin 400 mg OR levofloxacin 750 mg daily (non-form)	7 days w/prompt clinical response: tailor therapy to microbiologic data
	Influenza	• Oseltamivir 75 mg BID	5 days
Urinary Tract Infections	Uncomplicated UTI/cystitis: Align with organism susceptibility	• Nitrofurantoin (NFT) 100 mg BID • Sulfamethoxazole/trimethoprim (SMT) 1 DS tab BID • Beta-lactam (targeted to organism) • Fosfomycin 3 gm oral sachet (ESBL history only)	• NFT: 5 days • SMT: 3 days • Beta-lactams: 3-7 days • Fosfomycin: 2-3 doses
	Complicated UTI/ pyelonephritis Align with organism susceptibility	• Sulfamethoxazole/trimethoprim (SMT) 1-2 DS tab BID • Ciprofloxacin 500 mg BID • Beta-lactams (targeted to organism)	• SMT: 10-14 days* • Fluoroquinolones: 7 days • Beta-lactams: 10-14 days* *updated for new guidelines 2/19
	Asymptomatic bacteriuria	• Do not treat if not pregnant, or perioperative prophylaxis	0 days
Skin Structure Infection	Non-purulent cellulitis	• Cephalexin 500 mg QID, Cefuroxime 500 mg BID • Dicloxacillin 500 mg QID • Clindamycin 300-450 mg TID (severe beta lactam allergy)	5 days with prompt clinical response
	Purulent cellulitis/cutaneous abscess (suspected MRSA)	• Doxycycline 100 mg BID • Sulfamethoxazole/trimethoprim 1-2 DS BID	5 days with prompt clinical response
Intra-abdominal infection	Spontaneous bacterial peritonitis	• Moxifloxacin 400 mg or levoflox 750 mg daily (non-form)	5 days
	Complicated, community acquired intra-abdominal infection **with source control** eg appendicitis, cholangitis, diverticulitis s/p removal of foci	• Moxifloxacin 400 mg daily • Ciprofloxacin 500 mg BID + metronid 500 mg BID/TID • Cefuroxime 500 mg BID + metronidazole 500 mg BID/TID • Amox/clav 875/125 mg BID	4-7 days after source control* *7 days targeted therapy in transient bacteremia after foci removed

Education for Physicians and Nurses

- Discussed with internal medicine senior staff, house staff, and nurse managers in advance
- Shared with physicians and nurses on each participating unit within 1 month prior to implementation
- Included primary pharmacist for each unit when possible

Pre-Intervention Handout for Physicians and Nurses

Antimicrobial Stewardship Transitions of Care Overview

OPPORTUNITY

Within HFHS, about 400 patients per week are treated on medicine wards for common respiratory, skin, urinary, and intra-abdominal infections

40% receive an excess duration, **25%** develop antibiotic-side effects, **5%** develop multi-drug resistant infections

RESOURCES

To help manage this transition, over the years HFHS developed

- Accessible local guidelines
- Progressive rounds
- Antimicrobial stewardship
- Transitions of care services
- Prescription coverage check

Collaboration can distribute workload!

PROCESS

- Patients eligible to receive PO antibiotics at discharge
- Pharmacist will discuss antibiotic selection/duration with primary team on clinical/ progressive rounds
- Inpatient/discharge order placed with dose/ duration for specific infection, antibiotic, and renal function
- Pharmacist leaves note in chart, and provider signs order at discharge

Included	Excluded
Respiratory tract: • CAP • HAP • Acute COPD exacerbation • Influenza **Urinary tract:** • Cystitis • Complicated UTI • Pyelonephritis **Skin/soft tissue** • Cellulitis • Cutaneous abscess **Intra-abdominal** • SBP • Complicated peritonitis w/ adequate source control	• Solid organ transplant/ neutropenia • OPAT patients • Age <18 years • Endocarditis/endovascular infections • Bone/joint infection • Meningitis • Bacteremia due to: *S. aureus, Enterococci,* fungi • Necrotizing fasciitis • Abscess/fluid collection without removal of foci • Prostatitis • Pneumocystis pneumonia • Mycobacterial infections

What to expect:

- Pharmacist will routinely conduct surveillance on patients expected to be discharged on oral antibiotics: anticipate questions regarding discharge status
- When the plan for oral antibiotics has been determined with the team, a note will be placed in the chart for selection and duration based on patient-specific attributes
- The pharmacists' Transitions of Care note can be used for patient education and to communicate where the medication will be sent

Go Live Date for Your Unit: _____

Contact for questions: _____

Metrics for Successful Implementation

Process Measures

- Defined in advance to be feasible and meaningful
- Shared with pharmacy leaders at each site
- Reviewed regularly at the end of each month
- Used to identify barriers and opportunities
- Posted openly within the pharmacy department to encourage discussion

Total Number of Patients Served

Measurement: in a given month, how many AMS TOC notes were placed?

	November	December	January	February	March	April	May	June	July	August
# of patients served	65	74	118	80	197	178	161	205	215	265

Protocol Adherence

Measurement: 25 eligible patients randomly selected each block.
What percent had intervention completed?

Unit/Block	November		December		January		February		March		April		May		June		July		August	
Phase A units	54	57	80	60	85	83	46	75	70	83	87	70	31	83	83	77	55	79	75	71
Phase B units	*Pre-intervention Period*								83	46	78	71	55	57	63	78	36	29	75	53
Phase C units	*Pre-intervention Period*														36	45	29	45	45	64

Challenges to Consider in Advance

- Weekend discharges
  - If service is only implemented on weekdays, can weekend discharges be anticipated early?
- Working with outpatient pharmacy
  - For sites with an active “meds to beds” program, how will AMS TOC impact their workflow?
- Communicating with physicians, other prescribers with irregular hours
  - For prescribers with irregular hours, introduction of the
- Diagnoses not typically high priority for AMS intervention
  - Intervening on milder, uncomplicated infections is not usually a top priority (but maybe it should be). How does this impact workload?

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And all of the Henry Ford Hospital pharmacy staff, students and residents