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.

Common steps in a Pharmacy-Based Transition of Care Model

1. Patient Identification
2. Drug Therapy Assessment
3. Assess for Discharge
4. Place Discharge Orders
Integrating Antimicrobial Stewardship Practices into TOC Process

1. **Patient Identification**
   - Screening tools & EMR assist with early identification

2. **Drug Therapy Assessment**
   - Use local guidelines for antibiotic selection, dose, duration

3. **Assess for Discharge**
   - AMS and primary team pharmacists initiate assessment

4. **Place Discharge Orders**
   - Pharmacist communicates with primary team

   - Pharmacist places discharge order and TOC progress note

**Explanation:**
- **Patient Identification:** Screening tools and electronic medical records (EMR) assist in identifying patients early.
- **Drug Therapy Assessment:** Local guidelines are used to determine the appropriate antibiotic selection, dose, and duration.
- **Assess for Discharge:** Antimicrobial stewardship (AMS) and primary team pharmacists initiate the assessment process.
- **Place Discharge Orders:** The pharmacist communicates with the primary team and places the discharge order and TOC progress note.

**Abbreviations:**
- EMR = electronic medical record
- AMS = antimicrobial stewardship
- TOC = transition of care

**Note:** Henry Ford Health System all for you
## Modifying AMS TOC for Varying Pharmacy Practice Model

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

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

#### 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

<table>
<thead>
<tr>
<th>AMS TOC Steps</th>
<th>Questions for discussion</th>
<th>Discussion and Modifications</th>
<th>To Do List (tasks, people)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Identification</strong></td>
<td>How do pharmacists currently identify expected discharges? How to pharmacists identify patients to be send home on oral antibiotics? <em>Examples: Column in medical record, obtain list from nurse managers, face-to-face discussion</em></td>
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<tr>
<td><strong>Evaluate appropriate duration</strong></td>
<td>How is appropriate duration of therapy currently determined? <em>Examples: Institutional guideline, recommendation from consult team, prescriber preference</em> How do clinicians count “days of therapy?”</td>
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</tr>
<tr>
<td><strong>Primary Team Contact and Discussion</strong></td>
<td>How do pharmacists communicate recommendations for changes in drug therapy? Is this different for inpatient versus discharge medications? <em>Examples: notes, paging, multidisciplinary rounds</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pharmacist Inputs PO Discharge Orders</strong></td>
<td>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?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pharmacist places medical record note</strong></td>
<td>When pharmacists make changes to medication orders, including discharge prescriptions, are progress notes placed? Are antibiotics included in this process?</td>
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</tr>
<tr>
<td><strong>Patient receives appropriate regimen from outpatient pharmacy</strong></td>
<td>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?</td>
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</tbody>
</table>
**Oral Antibiotic Discharge: Pharmacist Workflow**

**Patient Identification and Included Infections**
- Uncomplicated SSTI
  - Cellulitis
  - Cutaneous abscess
  - Wound
- Respiratory
  - CAP
  - HAP
  - AECOPD
- Urinary tract
  - Influenza
  - Cystitis
  - cUTI
  - CAUTI
  - APN, uncomp
- Intra-abdominal
  - SBP
  - Complicated source control

**Assess patient list for active antibiotic (IV or PO)**

**Excluded Infections**
- Endocarditis
- Meningitis/CNS
- Lack of source control
- Bacteremia due to fungi, S. aureus, Enterococci
- Fungal pneumonia
- Solid organ transplant
- Febrile neutropenia
- Prostatitis

**Review anticipated DC dates and readiness with Epic column and progress notes**

**Anticipate definitive antibiotic therapy**
- Encourage transition to targeted oral therapy when clinically stable with the optimal agent per HFHS guidelines
- Adjust stop dates/orders of inpatient antibiotics to help facilitate transition

**Attend progressive rounds when possible. Assess discharge readiness: Clinically stable for discharge?**
- No
- Yes

**Enter Plan of Care Note in Epic for AMS Transitions of Care**

**Anticipated discharge in next 24 hours?**
- No: Handoff with TOC i-Vent include discharge information. Enter order for oral stepdown with stop date in Epic
- Yes: Enter or edit the active and discharge medication in Epic to include stop date. Account for active inpatient antibiotic days

**Documenting and Prescribing**
- No: Handoff with TOC i-Vent include discharge information. Enter order for oral stepdown with stop date in Epic
- Yes: Enter or edit the active and discharge medication in Epic to include stop date. Account for active inpatient antibiotic days

**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)

**Discharge Order Tips**
- Account for active inpatient antibiotic days for total duration
- Consider costs and tests scripts if financial barriers are anticipated
- Contact Antimicrobial Stewardship pharmacist if further guidance needed
## 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 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

### Urinary Tract Infections

- **Uncomplicated UTI/cystitis:**
  - 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**
  - 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

### Influenza

- Oseltamivir 75 mg BID
  - 5 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

### Spontaneous bacterial peritonitis

- Moxifloxacin 400 mg OR levoflox 750 mg daily (non-form)
  - 5 days

### Intra-abdominal infection

- **Complicated, community acquired intra-abdominal infection with source control**
  - 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

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**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
**Pre-Intervention Handout for Physicians and Nurses**

**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

**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 PQ 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**
- **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

**Excluded**
- 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: ____________
### 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

### Metrics for Successful Implementation

#### Total Number of Patients Served
Measurement: in a given month, how many AMS TOC notes were placed?

<table>
<thead>
<tr>
<th>Month</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td># of patients served</td>
<td>65</td>
<td>74</td>
<td>118</td>
<td>80</td>
<td>197</td>
<td>178</td>
<td>161</td>
<td>205</td>
<td>215</td>
<td>265</td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th>Unit/Block</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
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</thead>
<tbody>
<tr>
<td>Phase A units</td>
<td>54</td>
<td>57</td>
<td>80</td>
<td>60</td>
<td>85</td>
<td>83</td>
<td>70</td>
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<td>93</td>
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<td>55</td>
<td>83</td>
<td>77</td>
<td>64</td>
<td>36</td>
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<tr>
<td>Phase B units</td>
<td>83</td>
<td>46</td>
<td>78</td>
<td>71</td>
<td>55</td>
<td>57</td>
<td>63</td>
<td>78</td>
<td>36</td>
<td>29</td>
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<tr>
<td>Phase C units</td>
<td>36</td>
<td>45</td>
<td>29</td>
<td>45</td>
<td>45</td>
<td>64</td>
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*Pre-intervention Period*
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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