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System-wide Approach to Improve Outpatient Antibiotic Use

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Background on Allina Health

- Not-for-profit healthcare system serving MN and western WI
- Patient care facilities include
 - 12 hospitals (1,775 staffed beds)
 - Metro sites include Abbott Northwestern, United, Mercy, Unity
 - 13 Emergency Departments
 - 13 Urgent Cares
 - 62 Allina Health clinics
 - 23 Hospital-based clinics
 - 49 Rehabilitation locations
 - 15 Retail pharmacy sites
 - 2 Ambulatory care centers

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Antibiotic Stewardship in Allina Health

- Primary focus has been inpatient
- A key driver for Clostridium difficile reduction
- Leadership commitment at the site and system level
- Multiple private ID provider groups across the system
 - All are members of the Allina ID Physician/Pharmacy Task Force
- Two ID pharmacists at Abbott drive several system initiatives
- Monthly antibiotic use report for inpatient antibiotic use
- Reporting structure varies at each site
- Standardized mandatory education for all employees and patients

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Expansion to Outpatient Antibiotic Stewardship

- Initially driven by pharmacists in the ED
 - Providers asking for antibiotic recommendations for patients leaving
 - Pharmacists review cultures of patients discharged from ED
 - Pharmacists observing lack of standardization/best practice
 - Collaborative practice agreements for culture reviews
- Initially was a pharmacy student's project to develop a guide to use in the ED at Abbott (2015)
- Due to increased interest and usage, expanded Allina-wide (2017)

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Outpatient Antibiotic Guides

- Separated adult and pediatric recommendations
- Utilized guidelines, local antibiograms, current literature, clinical experience, and antibiotic stewardship principles
- Included:
 - First line and second line options
 - Duration of therapy
 - Additional comments useful for provider (e.g., resistance rates)
 - Tables with antibiotics requiring renal adjustment, brand/generic names, max doses for pediatrics

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Outpatient Antibiotic Guides

- Adult Guide
 - Feedback from ED providers/pharmacists on original guide
 - Updated by ID pharmacists at Abbott
 - Feedback and endorsement by the Allina ID MD/RX Task Force
 - Endorsement by the Allina Primary Care Council
 - Utilized Allina Sepsis Leadership Team to prioritize ED Smart Set build

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Pediatric Guide

- Feedback from ED providers/pharmacists on original guide
- Updated Abbott ID pharmacy resident and Children's Minnesota ASP pharmacist
- Approval process at Children's Minnesota
- Feedback by Allina Pediatric Council
- Feedback and endorsement by the Allina ID MD/RX Task Force
- Endorsement by the Allina Primary Care Council
- Utilized Allina Sepsis Leadership Team to prioritize ED Smart Set build

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Outpatient Antibiotic Guides

2017 Allina Health Adult Outpatient & ED Antibiotic Reference Guide

Endorsed by the Allina Health Primary Care Council and Allina Health Infectious Diseases Physician/Pharmacy Task Force

Skin/Soft Tissue							
Condition	First Line Therapy	Second Line Therapy	Notes				
Cellulitis, Purulent	SMX/TMP DS 1-2 tabs PO BID x5-14 days	Doxycycline 100mg PO BID x5-14 days	 Staph aureus resistance to Clindamycin = 22% Duration: usually 7 days Extend duration if immunocompromised 				
Cellulitis, Non-purulent	Cephalexin 500mg PO QID x5-14 days	Clindamycin 450mg PO QID x 5-14 days	Duration: usually 7 days Extend duration if immunocompromised				
Diabetic Foot, Mild	Amox/clav 875mg PO BID x7-14 days	Cephalexin 500mg PO QID x7-14 days					
Diabetic Foot, Moderate	Amox/clav 875mg PO BID	Levofloxacin 750mg PO daily +/- Metronidazole 500mg PO BID (add for anaerobic coverage)	 Duration: usually 2-4 weeks; depends on clinical improvement Pseudomonas: use Levofloxacin 				

2017 Allina Health and Children's Minnesota Joint Pediatric Outpatient & ED Antibiotic Reference Guide For Children ≥ 2 months old Endorsed by the Allina Primary Care Council, Allina Health Infectious Diseases Physician/Pharmacy Task Force, and Children's Minnesota

Skin/Soft Tissue						
Condition	First Line Therapy	Second Line Therapy	Notes			
Cellulitis, Purulent	SMX/TMP dose based on TMP; 5mg/kg/dose PO BID (max: 320mg/day)	Clindamycin 10mg/kg/dose PO TID <i>(max: 1.8g/day)</i>	Duration: 7 days I&D alone is the preferred treatment. Consider abx for systemic symptoms/incomplete abscess drainage			
Cellulitis, Non-purulent	Cephalexin 15mg/kg/dose PO TID(max: 3g/day)	Clindamycin 10mg/kg/dose PO TID <i>(max: 1.8g/day)</i>	■ Duration: 7 days			

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Outpatient Antibiotic Guides

Generic (Brand)	Require Renal Adjustment	Antibiotic	Pediatric Maximum Dose
1st Generation Cephalosporins	Amoxicillin Amoxicillin/clavulanate Cefdinir Cefotaxime Cefoxitin Ceftin Ceptrolin Ceptrolin Ceptrolin Ceptrolin Ceptrolin Ceptrolin Ceptrolin Ceptrolin Ceptrolin	Doses should never exceed the recommended adult dose: maximum doses listed below are for MOST indications – certain indications may permit higher dosing.	
Cefadroxil (Duracef) Generation Cephalosporins Cefuroxime axetil (Ceftin)		Amoxicillin Amox/Clav	<40 kg: 1000 mg/dose ≥40 kg: 2 GM/day
Cefoxitin (Mefoxin) Cefprozil (Cefzil)		Azithromycin (≥ 6 months)	500 mg/day on day 1 250 mg/day on days 2-4
Cefpodoxime (Vantin) 3rd Generation cephalosporins Cefotaxime (Claforan)	Imipenem Levofloxacin Meropenem	Cefdinir	600 mg/day
Cefdinir (Omnicef) Ceftriaxone (Rocephin)	Nitrofurantoin Penicillin	Cephalexin	3 GM/day
Ceftazidime (Fortaz) Cefixime (Suprax) 4 th Generation Cephalosporins	Sulfamethoxazole/Trimethoprim	Ciprofloxacin	1.5 GM/day
Cefepime (Maxipime) Fluoroquinolones		Clarithromycin (≥ 6 months)	1 GM/day
Moxifloxacin (Avelox) Levofloxacin (Levaquin) Ciprofloxacin (Cipro) Carbapenens Impeneny(clastatin (Primaxin)		Clindamycin	600 mg/dose
		Levofloxacin	750 mg/day
Ertapenem (Invanz) Meropenem (Merrem) Other		Metronidazole	500 mg/dose
Amoxicillin/clavulanate (Augmentin) Azithromycin (Zithromax)		SMX/TMP (<u>></u> 2 months)	160 mg TMP/dose
Clarithromycin (Blaxin) Clindamycin (Cleocin) Doxycycline (Vibramycin) Sulfamethoxazole/Trimethoprim (Bactrim, Septra) (SMX/TMP)		Tinidazole	2 GM/dose



Putting the Guides into Practice

- Allina antibiotic stewardship webpage
- Education through email with link to the guides
 - ED providers
 - Primary care providers
 - ED pharmacists
- ED smart sets
 - Adult (1/2018)
 - Pediatric (2/2018)
- Clinics
 - Individual orders (3/2018)
 - Order Panels (TBD)

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ED Smart Sets

Indications are collapsed by organ systems

ED SS ADULT Infectious Diseases Treatments ♠

For STD treatments - refer to a separate order set and/or smart set.

- ▼ Antibiotics for Skin/Soft Tissue Infections
 - ▶ For Cellulitis Purulent
 - ▶ For Cellulitis Non-Purulent
 - ▶ For Diabetic Foot Infection Mild
 - For Diabetic Foot Infection Moderate
- ▼ Antibiotics for Genitourinary Infections
 - ▶ For Uncomplicated Cystitis Females, non-pregnant
 - ▶ For Uncomplicated Pyelonephritis Females, non-pregnant
 - For Complicated Cystitis Males, pregnant, functional abnormality, immunocompromised, indwelling or recent catheter/stent
- ▼ Antibiotics for Lower Respiratory Tract Infections
 - ▶ For Community-Acquired Pneumonia



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 When indication is opened, provider is given 1st and 2nd line treatment options

- ▼ Antibiotics for Skin/Soft Tissue Infections
 - ▼ For Cellulitis Purulent
 - sulfamethoxazole-trimethoprim DS (BACTRIM DS) PO 1st line R-0, First occurrence now until 4/18/18
 - Odoxycycline (VIBRAMYCIN) PO 2nd line R-0, First occurrence now until 4/18/18

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ED Smart Sets

Pediatric options include both liquid and tablet/capsule forms

ED SS PED Infectious Diseases Treatments ≈

- ▼ Antibiotics for Skin/Soft Tissue Infections
 - ▶ For Cellulitis Purulent
- ▼ For Cellulitis Non-Purulent
 - Ocephalexin (KEFLEX) 250 mg capsule 1st line R-0, First occurrence now until 4/18/18
 - Ocephalexin (KEFLEX) 500 mg capsule 1st line R-0. First occurrence now until 4/18/18
 - Cephalexin (KEFLEX) 125 mg/5 mL suspension 1st line
 - Ocephalexin (KEFLEX) 250 mg/5 mL suspension 1st line R-0, First occurrence now until 4/18/18
 - \bigcirc clindamycin (CLEOCIN) PO solution 2nd line
 - Clindamycin (CLEOCIN) 300 mg capsule 2nd line

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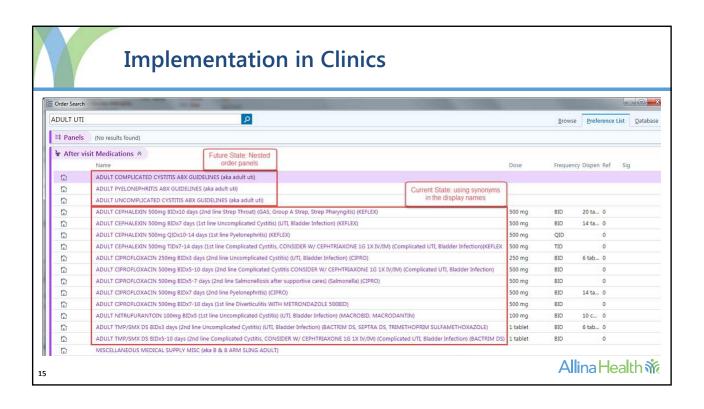


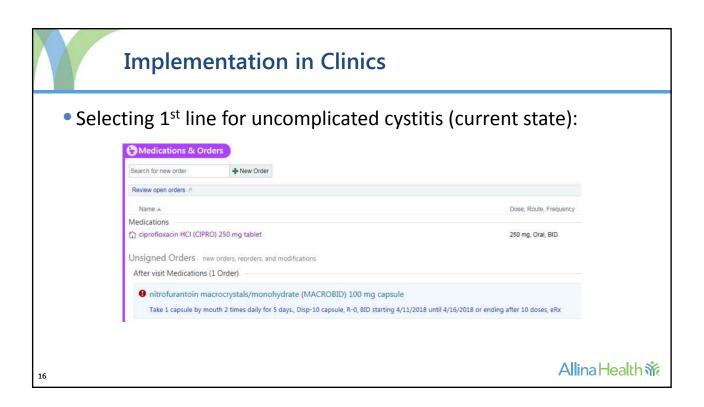
ED Smart Set Usage

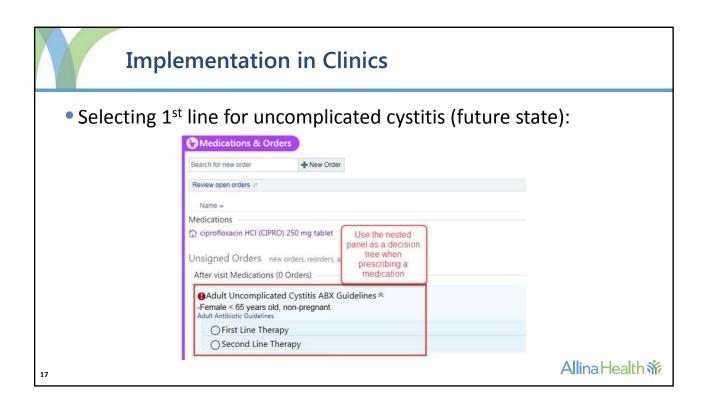
	Adult Smart Set	Pediatric Smart Set
Go-Live Date	1/2/2018	2/6/2016
Usage through March 2018	242	12
Number of ED Locations	10	5
Number of Providers	62	5

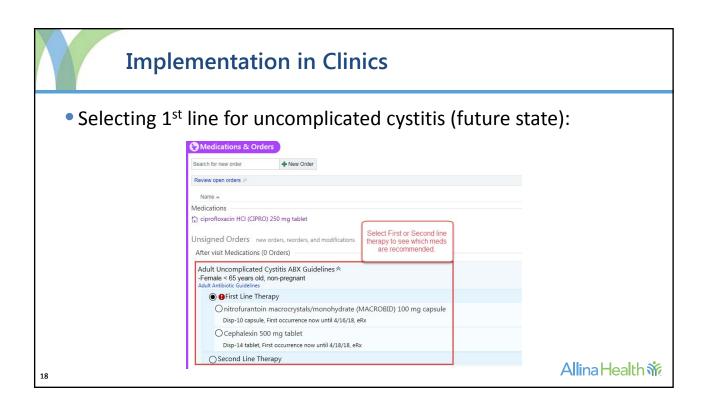
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- Getting input from key stakeholders
 - May need to go outside of your organization to find the expertise needed
 - Opinions vary and recommendations are not always straight forward
 - Moving from an inpatient focus to outpatient
- Putting recommendations into practice
 - Education, education, education
 - Prioritizing build of electronic tools to make it easier for providers
 - Ensuring providers have the most updated guide

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- Identify key stakeholders early
- Identify the expertise needed to create
 - Providers
 - Pharmacists
 - Informatics
- Get feedback but find a balance between too little and too much
- Determine how to provide the information and develop a plan
- Connect inpatient and outpatient IS resources

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