# Small Steps, Big Results: Outpatient Antibiotic Stewardship in Pediatric Medicine

Gregory Cook, PharmD, BCIDP

Children's Hospital New Orleans

Antimicrobial Stewardship

## Objectives

- Identify key principles and areas for optimizing outpatient antibiotic therapy, including diagnosis, treatment selection, and duration, with a focus on pediatric patients
- Describe evidence-based strategies and best practices for optimizing antibiotic use in the outpatient setting, and provide practical guidance for implementing these strategies in practice
- Evaluate the effectiveness of various approaches to implementing outpatient antibiotic stewardship programs, and develop a plan for incorporating these strategies into your own program



I have no financial disclosures or conflicts of interest with the presented material

## Why Outpatient ASP?

#### **Outpatient Antibiotics:**

- ~85% of all antibiotics
- ~60% of expenditures
- ~30% unnecessary



Sudaet al, J AntimicrobChemother, 2013. Public Health England, 2014. Public Health Agency of Sweeden, 2015. Hersh AL et al, *CID*, 2021.



#### Relationships are Key!

- Potential Team Members
  - Physician
  - Pharmacist
  - Clinic champions
  - Advanced Practice Providers
  - Data analyst



Gregory Cook, <u>PharmD</u>, BCIDP Infectious Diseases Clinical Pharmacist Children's Hospital New Orleans



Margarita <u>Silio</u>, MD Associate Professor of Clinical Pediatrics Tulane Pediatric Infectious Disease



#### ...but tough to build

- Our Outpatient Team
  - Physician
  - ID Fellow
  - Pharmacist
  - Chief Informatics Officer
  - VP of Ambulatory Care



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#### You'll Need Data...Lots and Lots of Data

Acute Otitis Media First-Line %



Pick a Target

Percent 2nd Line





# Why Target Cefdinir?

#### Kentucky Medicaid Antibiotic Prescription Data



#### Kentucky Medicaid Antibiotic Spend in Millions



Antibiotic Spend Cefdinir Spend

#### 90-Day Post-Prescription C.diff in Adults



Zhang J, et al. Antimicrob Agents Chemother. 2022 Dec

## C.diff in Pediatrics is Different

#### Risk of Clostridium difficile Superinfection in Children



Don't underestimate 3<sup>rd</sup> generation cephalosporin's propensity for microbiota disruption

## Acute Otitis Media

#### • Why do we still do amoxicillin?

• *Streptococcus pneumoniae* has lowest self-resolution rate

■ S. pneumoniae ■ H. influenzae ■ M. catarrhalis

Percent

Spontaneous Resolution by Otopathogen

#### What About Local Data?

Drug	<b>MIC Determination</b>	<b>CHNO Susceptibilities</b>			
Amoxicillin	Penicillin MIC ≤ 2	94%			
Cefdinir	Penicillin MIC ≤ 0.06	44%			

**Clinical Cure All Patients** 

90

Clinical Cure (PP)

			100						
tudu Desian	Multicenter, investigator blinded study of		90 -		82	85		8	32
tudy Design	6 month – 6-year-olds with AOM		80 -						
	Amox-Clav ES 45 mg/kg/dose q12h vs		70 -						
ntervention	Cefdinir 7 mg/kg/dose q12h	nt	60 -						
		erce	50 -						
		ط	40 -						
			30 -						
			20 -						
			10 -						
			0 -						
				Clin	nical C	ure (IT	Г)	Clinic	cal
					Cefdin	ir 🔳	Amox	-Clav	ES

S

Clinical Cure < 2 Years Old

			100					91	
Church - De siere	Multicenter, investigator blinded study of 6		90 -		83				
Study Design	month – 6-year-olds with AOM		80 -	74			75		
	Amox-Clav ES 45 mg/kg/dose q12h vs		70 -						
Intervention	Cefdinir 7 mg/kg/dose q12h	nt	60 -						
		erce	50 -						
Results	Cefdinir worse for < 24-month-olds (p=.04)	ď	40 -						
			30 -						
			20 -						
			10 -						
			0 +						
				Clinical C	ure (IT	T) Cli	nical Cu	ire (PP)	
				Cefdir	nir 🔳	Amox-Cl	av ES		

Clinical Cure Recurrent AOM

Study Design	dy Design Multicenter, investigator blinded study of 6 month – 6-year-olds with AOM			
Intervention	Amox-Clav ES 45 mg/kg/dose q12h vs Cefdinir 7 mg/kg/dose q12h			
Results	Cefdinir worse for recurrence (p=.01) Cefdinir worse for < 24-month-olds (p=.04)	ſ		

"Similar trends were observed in the ITT population"





#### Sustainably Intervene

# Informatics based approaches tend to be highly sustainable

#### Smart-Set

#### UPPER RESPIRATORY TRACT INFECTION & Manage User Versions \*

Group A Streptococcus Pharyngitis



#### **Best Practice Advisory**

Are you prescribing CEFDINIR for acute otitis media, sinusitis, or pharyngitis? Cefdinir is not a guideline recommended first
Ine antibiotic for the above infections. Cefdinir has poor Streptococcus pneumoniae coverage and is associated with increased Clostridium difficile superinfections.

t a

Consider taking these recommended actions after addressing this advisory:

Consider opening SmartSet: UPPER RESPIRATORY TRACT INFECTION Preview

Acknowledge Reason

No Yes - doesn't tolerate first line antibi... Yes - other Yes - Recurrent otitis, failed Augmentin...





Courtney A, et al. Unpublished Data. 2023



#### You'll Need Data...Lots and Lots of Data

Acute Otitis Media First-Line %



Pick a Target

Percent 2nd Line







				95% Confidence Interval			
First–line vs Non–first–line <sup>a</sup>		Sig.	OR	Lower Bound	Upper Bound		
First-line	Female	.211	1.03	.984	1.077		
	Male						
	Hispanic	<.001	1.16	1.063	1.264		
	Asian	.006	1.34	1.085	1.643		
	Black	<.001	1.43	1.349	1.517		
	Multiracial	.068	1.10	.993	1.223		
	Other	<.001	1.64	1.372	1.969		
	Patient Declined	.447	1.03	.947	1.131		
	White						
	Medicaid	<.001	1.13	1.073	1.179		
	Private						

#### Association Between First-Line Prescribing and Patient Characteristics

a. The reference category is: Non-first-line.

# Increasing Guideline-Concordant Durations of Antibiotic Therapy for Acute Otitis Media





Frost HM et al. J Pediatr. 2022

# Consensus Guidelines Still Work

## Clindamycin and Empiric MRSA Coverage

Clindamycin Susceptibility in Methicillin-Resistant Staphylococcus aureus



### Antibiotics for Cellulitis in 2021





■ AMOX ■ AUG ■ CEPH ■ CLINDA ■ DOXY ■ BACTRIM



#### Trends in Cellulitis Antibiotic Prescribing in the Emergency Department



## Consensus Guidelines

- Buy-in is a must from current providers
- Make them easily accessible for future providers
  - Apps
  - Order-sets
  - Order-panels
  - Health-record integration
  - PDF  $\rightarrow$  Antibiotic Handbooks

#### AgileMD – Integrate Pathways into the Health Record



### Clindamycin and Empiric MRSA Coverage

Clindamycin Susceptibility in Methicillin-Resistant Staphylococcus aureus



Our Next Steps and Known Barriers

#### Prescriber Reports

#### Acute Otitis Media Report

- General Pediatric clinics only
- At least 30 visits coded for specific infection
- Blinded data only
- Expanded by quarter to new infections

#### Acknowledged weaknesses:

- Errors/variation in ICD-10 coding
- "Delayed" antibiotic prescriptions still count
- Oral route only (ceftriaxone IM appears as no Rx)
- Verbal/Paper Rx not counted

#### Example Report



Antibiotic Prescription Rate for Acute Otitis Media Visits

#### Example Report



## Potential Barriers Experienced

- Data analytic expertise
- Misaligned financial incentives
- Getting outpatient provider involvement
- What metrics to track?
  - Antibiotic vs outcome based

#### Outpatient ASP isn't hard

# The time and resources need to be dedicated

#### Questions? Go Forth and Steward!



Gregory Cook, PharmD, BCIDP

Children's Hospital Antimicrobial Stewardship

Questions: <u>Gregory.Cook@LCMCHealth.org</u> or <u>GCook3@LSUHSC.edu</u>

# **Evaluation Reminder**

**Evaluation reminder for the 2023 Louisiana Office of Public Health Antimicrobial Stewardship Summit** 

Please use this QR code or log-on/type in the following URL: <u>https://bit.ly/AMR2023</u>

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- Select the rear-facing camera. Hold your device so that the QR code appears in the viewfinder in the Camera app.
- Tap the notification to open the link associated with the QR code.



