MANAGEMENT OF ARTI IN PEDIATRICS

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ANTIBIOTICS TO CHILDREN

Characteristic	Prescriptions, No. in Millions (%)[a]	Prescriptions per 1000 Persons, Rate
Age group, y		
0–2	15.4 (21)	1287
3–9	29.1 (40)	1018
10–19	29.3 (40)	691
Antibiotic agent (top 5)		
Amoxicillin	24.9	300
Azithromycin	15.2	183
Amoxicillin-clavulanate	7.2	87
Cefdinir	6.1	74
Cephalexin	4.6	56

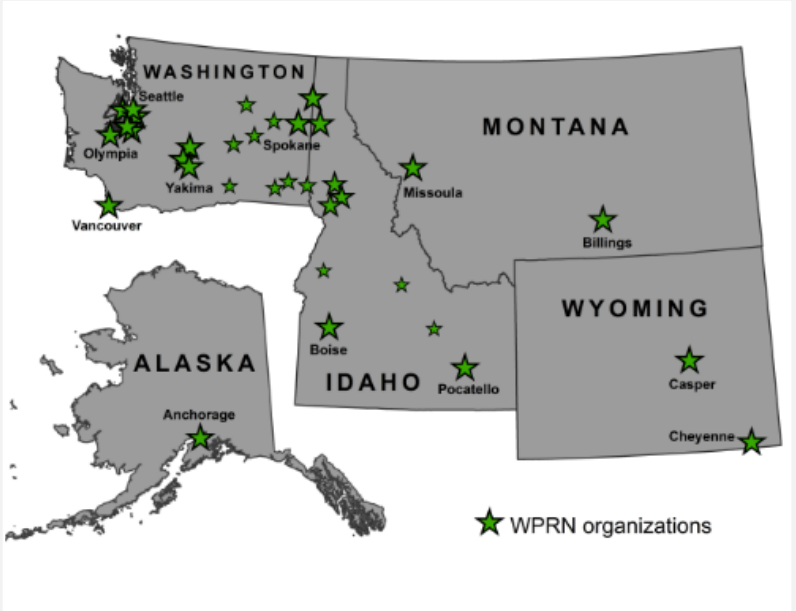
TABLE 1 Antibiotic-Prescribing Patterns Across Diagnostic Conditions

Condition	Across-Condition Contribution to Antibiotic Prescribing, %
Respiratory	72.3
ARTIs for which antibiotics are indicated	48.9
ARTIs for which antibiotics are not indicated	13.1
Other respiratory conditions for which antibiotics are not definitely indicated	10.3
Other	27.7
Skin/cutaneous/mucosal	11.9
Urinary tract infections[a]	2.0
Gastrointestinal infections	0.3
Miscellaneous infections	1.9
Other	11.6
Total	100[a]

Fleming-Dutra JAMA 2016; Hersh Pediatrics 2011

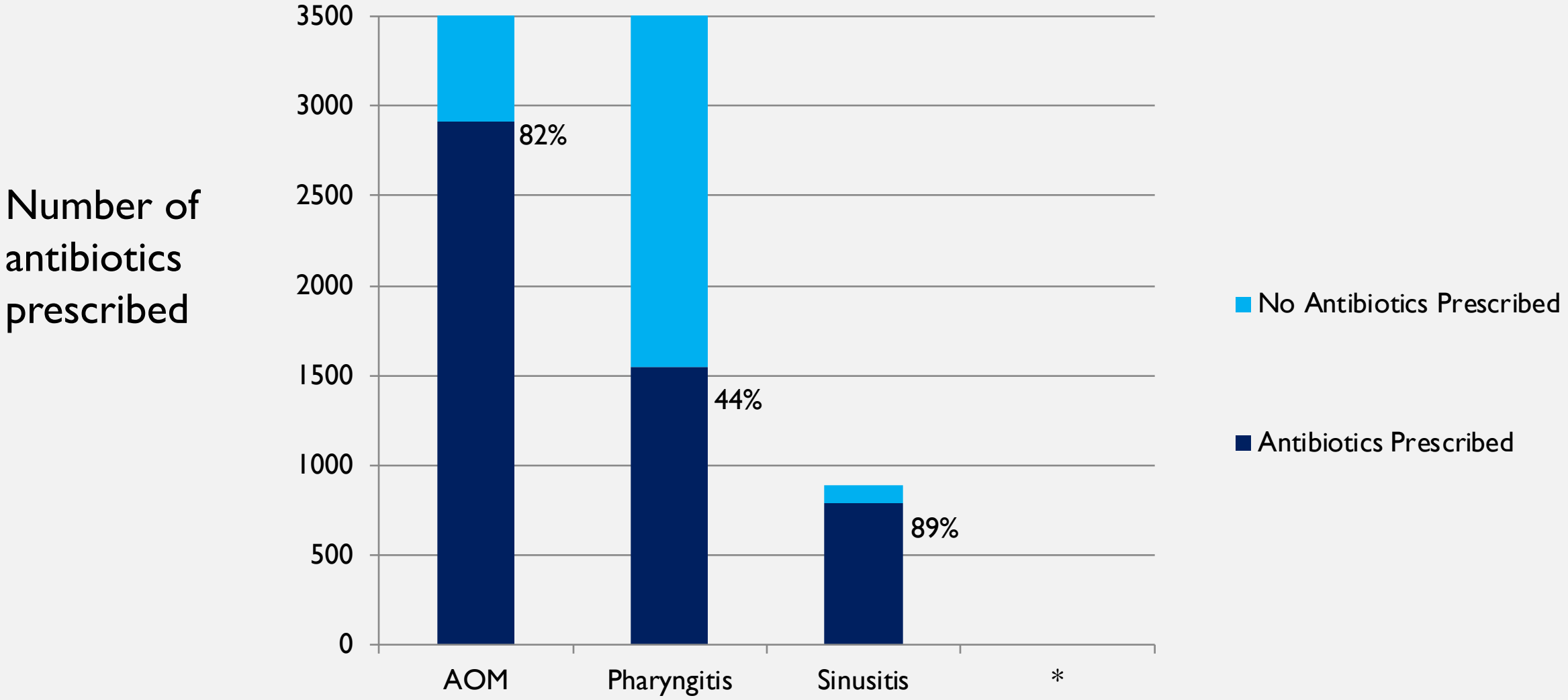
WWAMI REGION PRACTICE AND RESEARCH NETWORK (WPRN)

- 20 clinics across WWAMI region



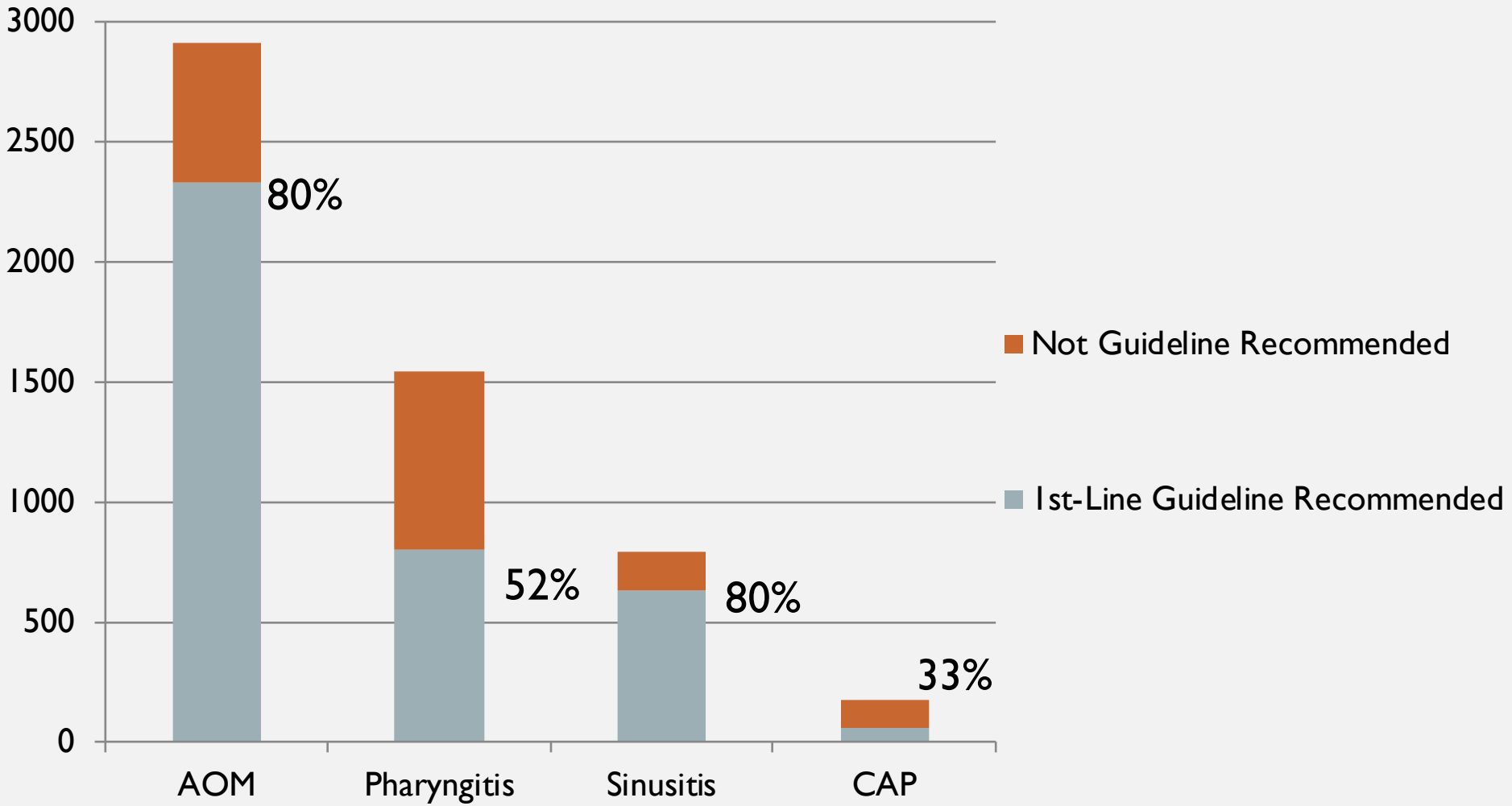
Characteristic		Patient Visits, N	Visits Prescribed an Antibiotic, N	Broad Spectrum Antibiotics, N (% of abx)	Antibiotics Rx "Not Indicated" N (% of abx)
	Total	**97,228**	**10,922 (11)**	**5821 (53)**	**4,250 (40)**

ANTIBIOTIC PRESCRIBING BY RESPIRATORY ILLNESS WHEN ANTIBIOTICS MAY BE INDICATED



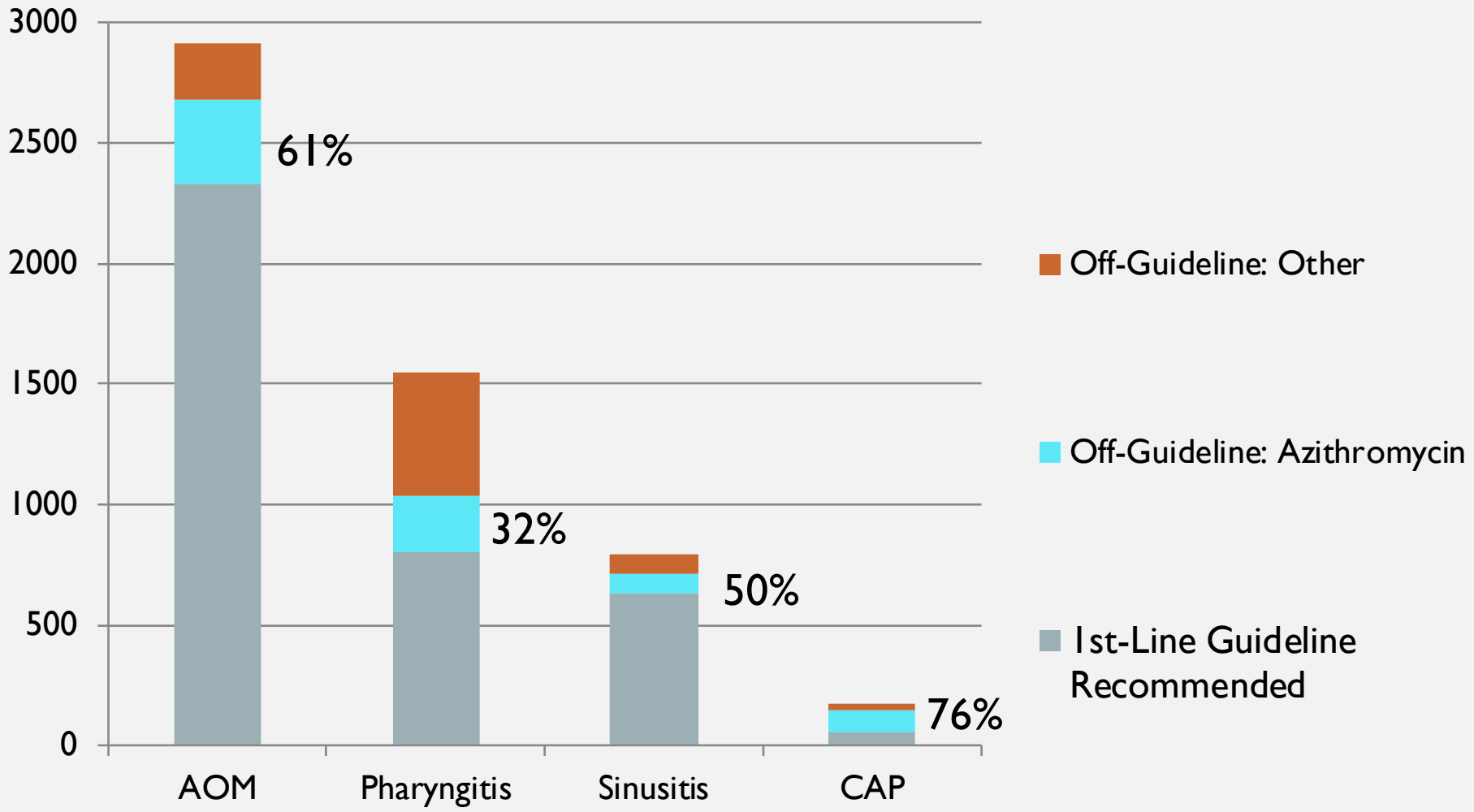
FIRST-LINE GUIDELINE RECOMMENDED ANTIBIOTICS

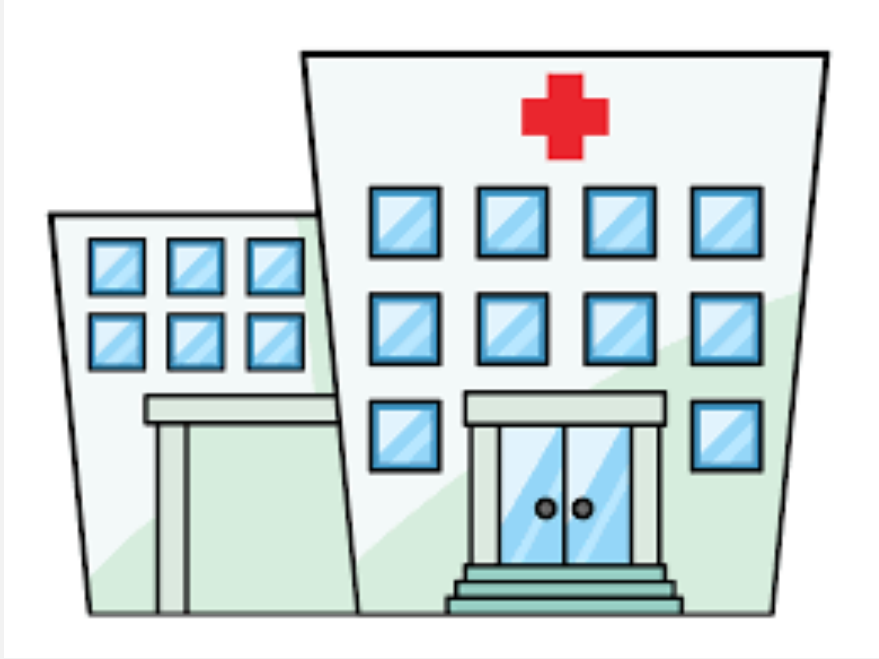
Number of antibiotics prescribed



OFF-GUIDELINE RECOMMENDED ANTIBIOTICS

Number of antibiotics prescribed





Patient Characteristics of visits to the ED by children

Characteristic		Ave annual pediatric visits (million)	Ave pediatric visits with antibiotic, %
	Total	**29**	**23%**

Poole *Pediatrics* 2019

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	Total	**29**	**23%**
Insurance Status	Private	8.7	20%
	Non-private	18.8	25%
Region	Urban	24.7	27%
	Rural	5.0	23%

Poole *Pediatrics* 2019

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	Non-private	18.8	25%
Region	Urban	24.7	27%
	Rural	5.0	23%
Provider Type	Physician	23.7	23%
	NP/PA	5.3	26%
Type of ED	General	25.1	24%
	Pediatric	4.1	20%

Poole *Pediatrics* 2019

Factors associated with Guideline Associated Antibiotic Use

Characteristic		Pediatric ED visits a/w GCAU, % antibiotic visits	AOR (CI)
Age (years)	<1	80%	1.00
	1-4	80%	1.07 (0.68-1.70)
	5-12	78%	1.11 (0.68-1.70)
	13-17	72%	0.92 (0.49-1.72)
Gender	Male	78%	1.00
	Female	78%	1.01 (0.78-1.30)

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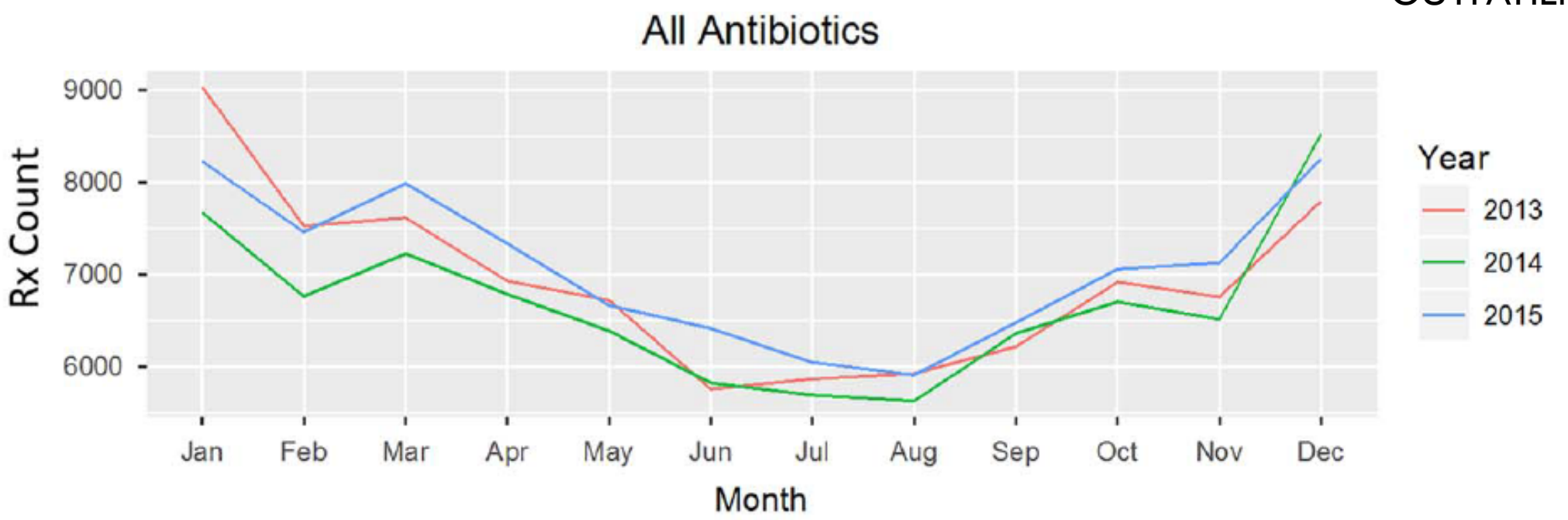
	Female	78%	1.01 (0.78-1.30)
Race	White	76%	1.00
	Black	81%	1.56 (1.15-2.11)
	Other		
Insurance Status	Private	75%	1.00
	Non-private	79%	1.32 (0.99-1.76)

Factors associated with Guideline Concordant Antibiotic Use

Characteristic		Pediatric ED visits a/w GCAU (% antibiotic visits)	AOR (CI)
US Census Region	Northeast	86%	1.00
	Midwest	78%	0.51 (0.34-0.77)
	South	76%	0.46 (0.32-0.67)
	West	77%	0.55 (0.35-0.87)
Region	Urban	71%	1.00
	Rural	79%	1.26 (0.99-1.60)
Type of ED	General	77%	1.00
	Pediatric	87%	2.01 (1.38-2.92)
NP/PA at visit?	No	78%	1.00
	Yes	79%	1.08 (0.84-1.39)
Diagnosis	Suppurative OM	81%	1.00
	Sinusitis	70%	0.51 (0.32-0.82)
	Pharyngitis	74%	0.72 (0.53-0.96)

ANTIBIOTIC USE IS NOT DECREASING

OUTPATIENT



Durkin, et al. *ICHE*, 2018

The Core Elements of Outpatient Antibiotic Stewardship

Commitment

Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.

Action for policy and practice

Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.

Tracking and reporting

Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or have clinicians assess their own antibiotic prescribing practices themselves.

Education and expertise

Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.

QUICK LOOK: GUIDELINES

Quick reference on CDC website: https://www.cdc.gov/antibiotic-use/community/for-hcp/outpatient-hcp/pediatric-treatment-rec.html

Dx	Path	Diagnostic Findings	Management	Common Questions	Comments by Nicole
AOM	Viral! S.pna	Must examine TM	• **Watchful waiting** • **Amoxicillin** • Amox/Clav: conjunctivitis or amox within 30d	Delayed prescribing?	Azithromycin is never appropriate

ACUTE OTITIS MEDIA

VIRAL

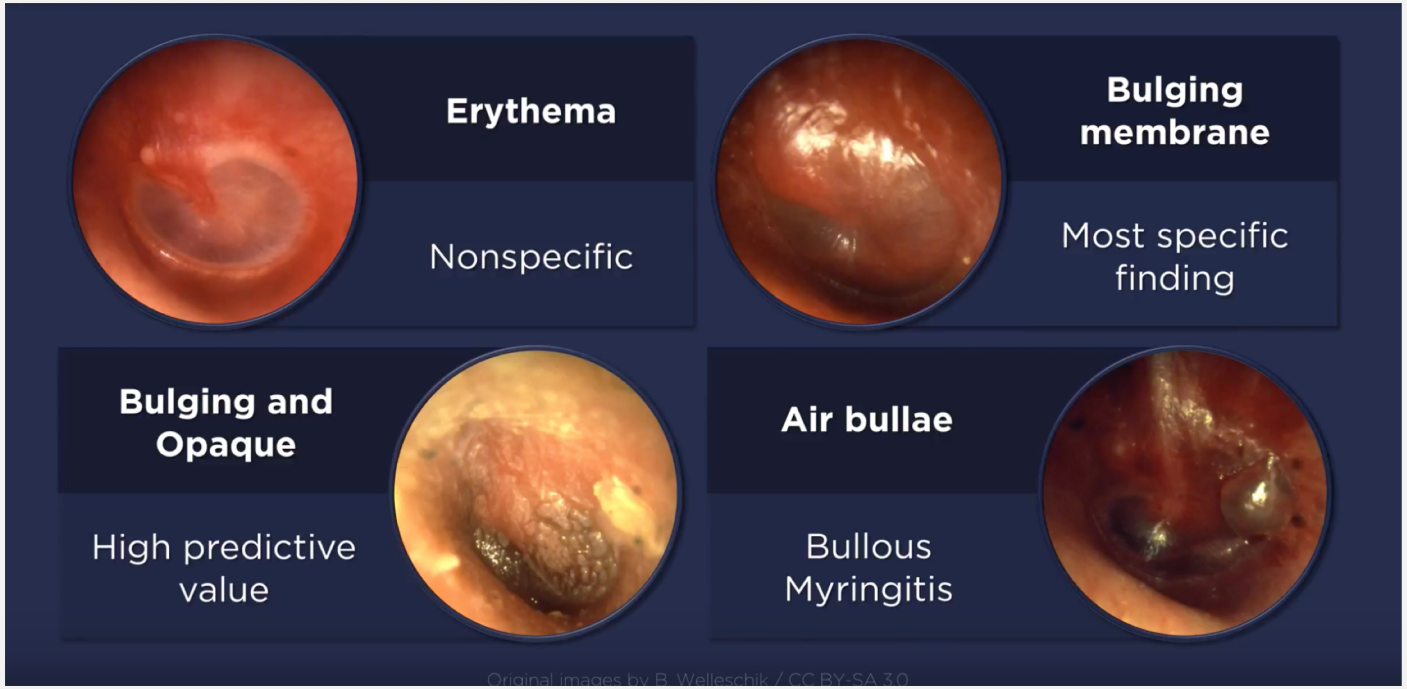


TABLE 2 Patient Outcomes by Group

Characteristic Group	OT, *n* (%)[a]	OT+P, *n* (%)[a]	*P*
Used antibiotics or saw another physician within 3 d of PED visit	13 (13)	40 (38)	<.01
Ever used antibiotics between PED visit and follow-up call	19 (19)	49 (46)	<.01
Days of otalgia after PED visit			.29
0	31 (532)	41 (39)	
1	18 (18)	20 (19)	
2	20 (20)	18 (17)	
3	18 (18)	13 (12)	
>4	11 (11)	13 (12)	
Days of fever after PED visit			.03
0	69 (70)	60 (57)	
1	9 (9)	10 (10)	
2	12 (12)	17 (16)	
3	6 (6)	9 (9)	
>4	2 (2)	9 (9)	
Used medications after PED visit for pain or fever	94 (94)	95 (90)	.26

[a] Denominators differ slightly because of missing data.

QUICK LOOK: GUIDELINES

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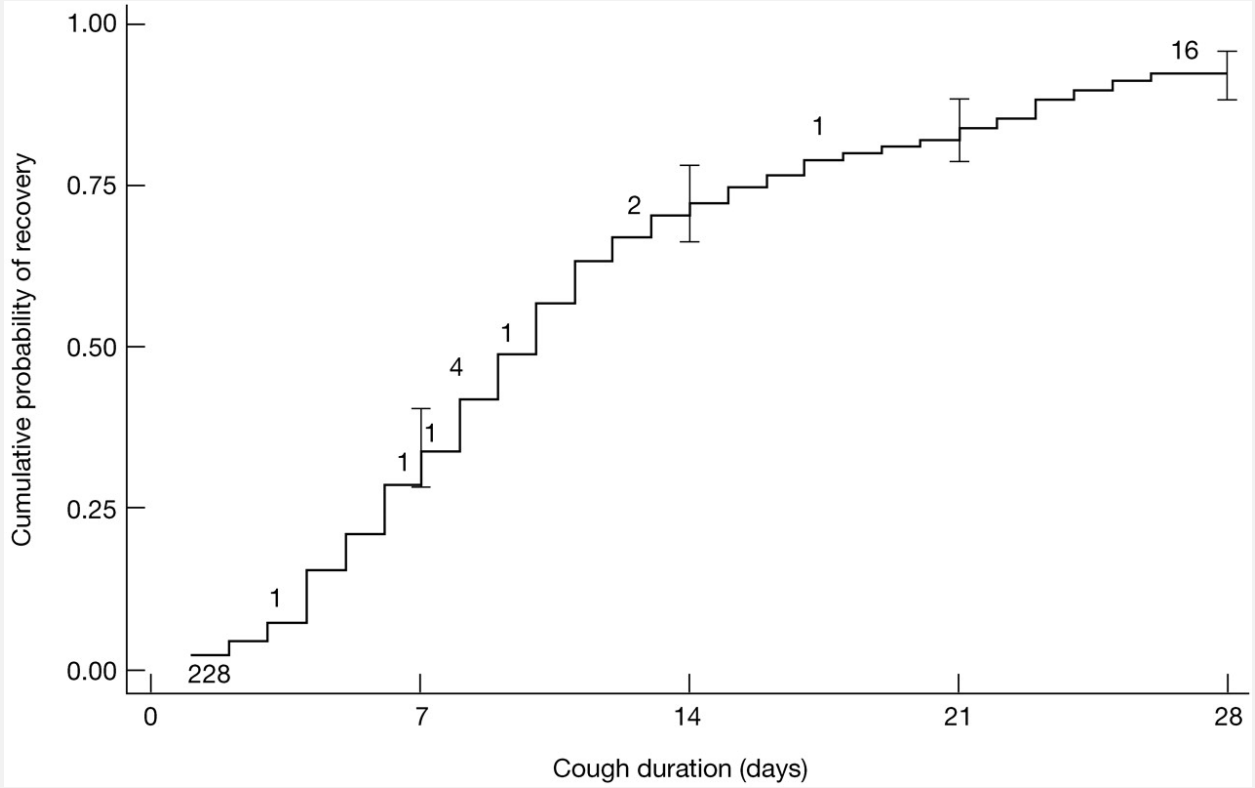
Sinusitis	Viral!	Persistent/worsening symptoms, nasal discharge, cough >10d Worsening or new onset fever/symptoms after initial improvement Fever ≥39°C, purulent nasal discharge for at least 3 consecutive days.	• **Watchful waiting** • **Amoxicillin** • Amox/Clav if not improving		WAY less common than diagnosis rates

COUGH DURATION



Family Practice, Volume 20, Issue 6, December 2003, Pages 696–705, https://doi.org/10.1093/fampra/cmg613

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SYMPTOM DURATION

Duration of the six symptoms (days) calculated using survival analysis

	Cough	Short of breath	Sleeplessness	Reduced activity	Unwell	Fever
Proportion resolved	Symptom duration in days[a] (95% CI)					
0.25	6 (5–7)	3 (3–4)	4 (3–5)	3 (3–4)	4 (3–4)	2 (2–3)
0.50	10 (9–10)	6 (5–7)	7 (6–9)	6 (5–7)	6 (5–7)	5 (4–6)
0.75	16 (13–19)	11 (9–14)	12 (11–15)	12 (9–15)	11 (9–14)	10 (7–12)
0.90	25 (23[b])	21 (17[b])	22 (18–25)	20 (17–22)	18 (15–25)	15 (13–19)

Hay, et al. *Family Practice*, 2003

QUICK LOOK: GUIDELINES

Dx	Path	Diagnostic Findings	Management	Common Questions	Comments by Nicole
Pharyngitis	Viral! GAS (~25%)	OP exam does not distinguish bacterial Fever, severe sore throat, lack of viral sx, LAD	PCN Amoxicillin	Rapid strep when no viral sx (cough, etc)	Rare in <3yo Carriers ~20%

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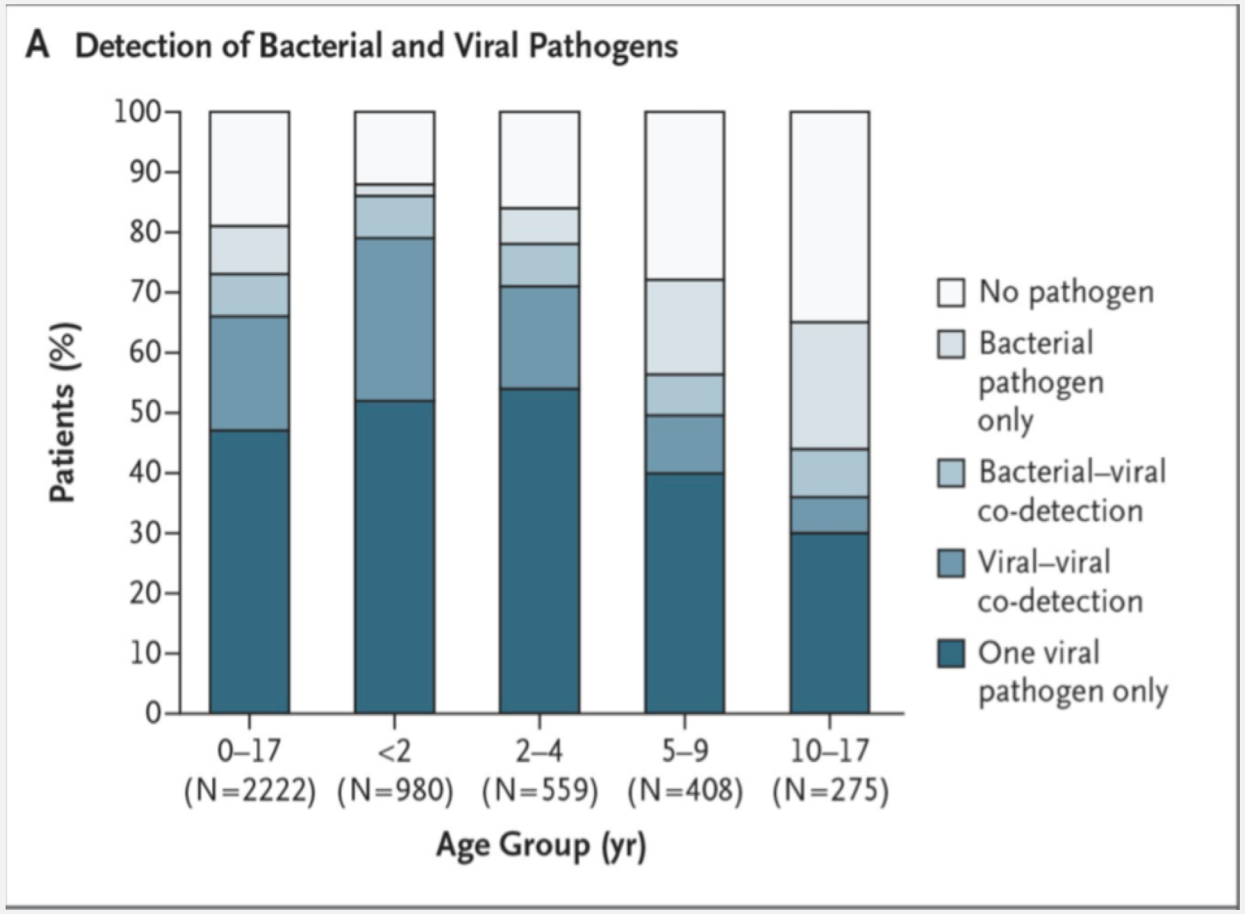
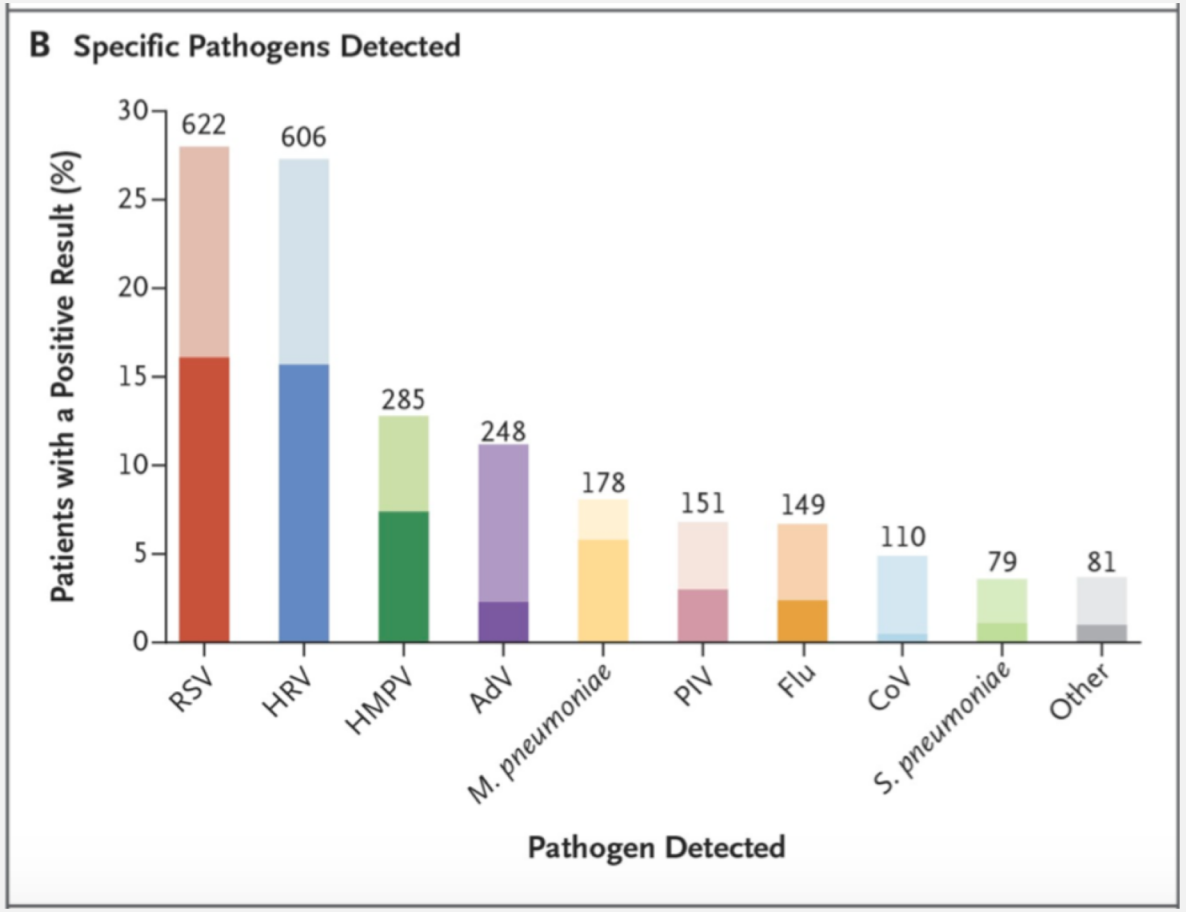
Bronchiolitis	Viral! RSV RV HMPV Parainfl	Wheeze, increased WOB, viral symptoms,	Oxygen, hydration	Bacterial pna too??? What's this schmutz on the CXR???	No routine CXRs Bacterial co-infection <5%

FEAR OF "MISSING SOMETHING"





Jain, et al. *NEJM*, 2015

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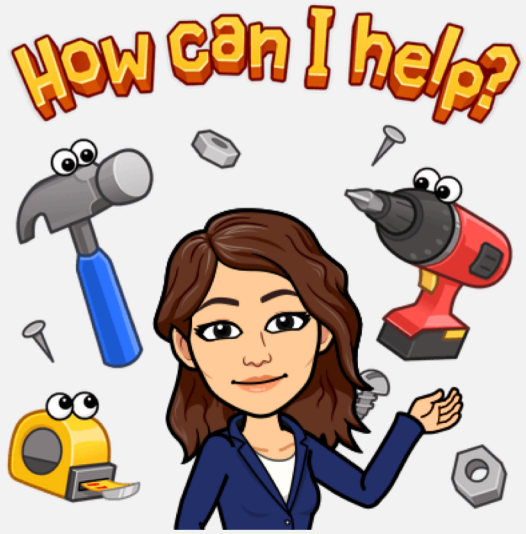
Bacterial CAP	S. pna M. pna (less common) S. aureus GAS	Focal exam Fever/symptoms worse after improvement	**Amoxicillin** Amox + Azithro	Atypical pna?	Atypical pna <2% of <5yo M. pna carriage is high Azithro monotx not guideline rec


NDC 59762-3060-1
1 Card x 6 Tablets
GREENSTONE® BRAND
azithromycin
tablets
250 mg*
A full course of antibiotic therapy in 5 daily doses
Distributed by:
Greenstone LLC
Peapack, NJ 07977
GREENSTONE
Take together
Your first day's dose
Take these 2 tablets as your first dose of azithromycin.
Then take 1 tablet each day for the next 4 days.
To remove tablets, press from this side.
Azithromycin keeps on working!
Days 6-10
Day 2
Day 3
Day 4

NEXT WEEK

Stewardship tools

Challenges being a steward with pediatric ARTI



CHALLENGES IN THE TREATMENT OF ARTI IN CHILDREN

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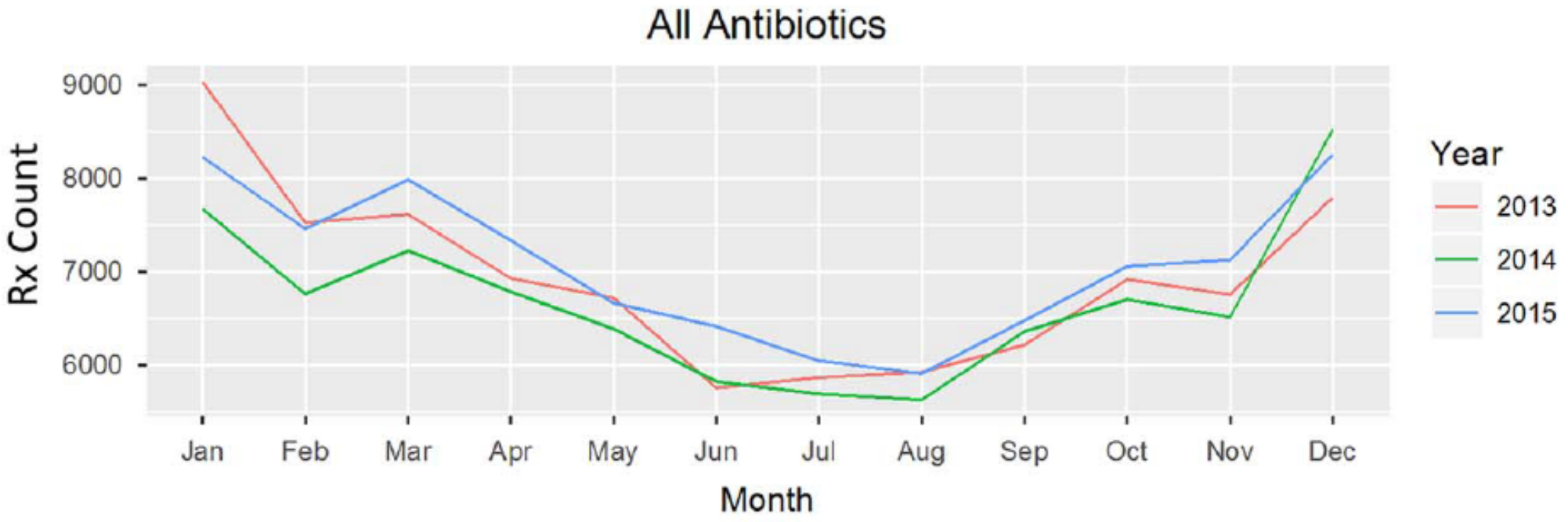
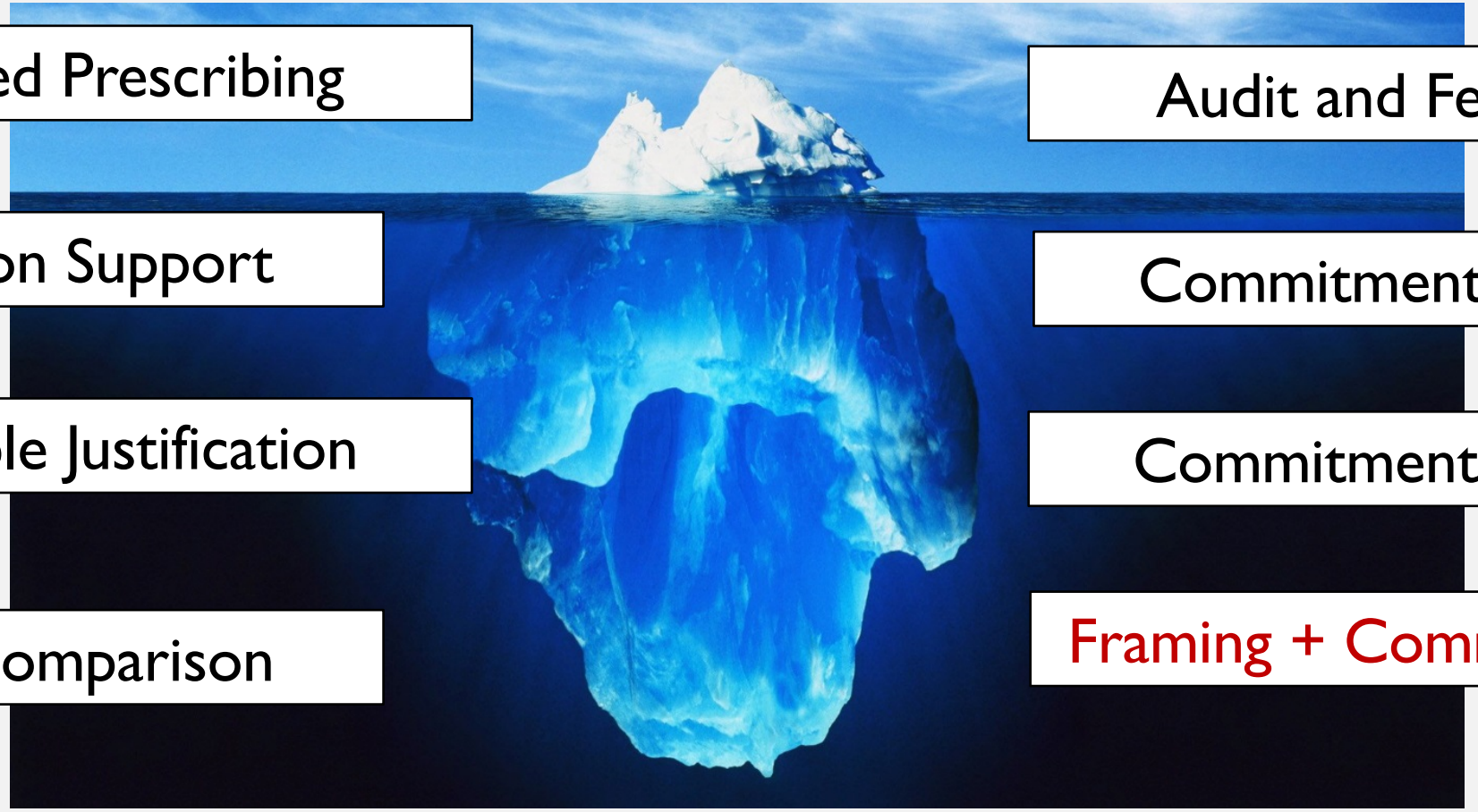


Durkin, et al. *ICHE*, 2018

Stewardship Tools



Delayed Prescribing

Decision Support

Accountable Justification

Peer Comparison

Audit and Feedback

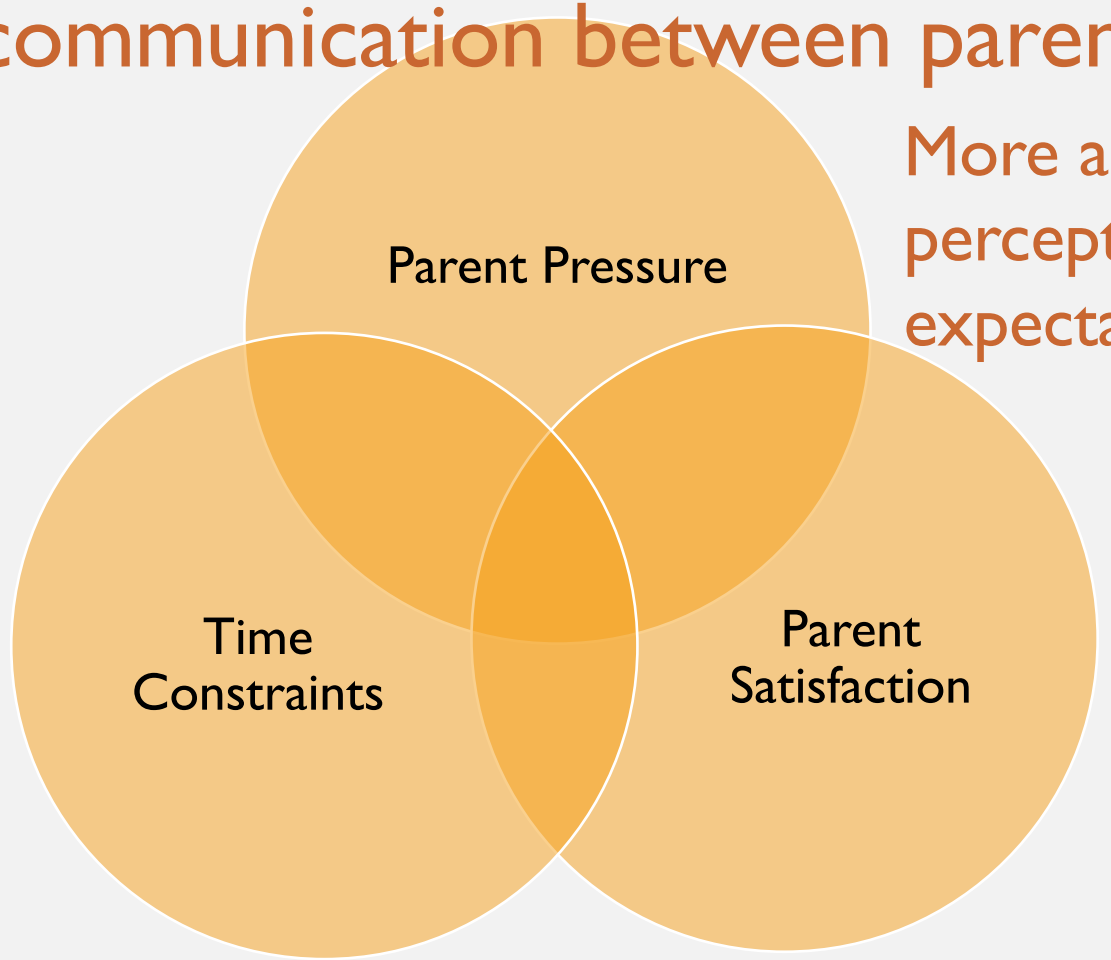
Commitment Posters

Commitment Posters

Framing + Communication

CLINICIAN IDENTIFIED BARRIERS

Effective communication between parents and clinicians



More accurate perception of expectations

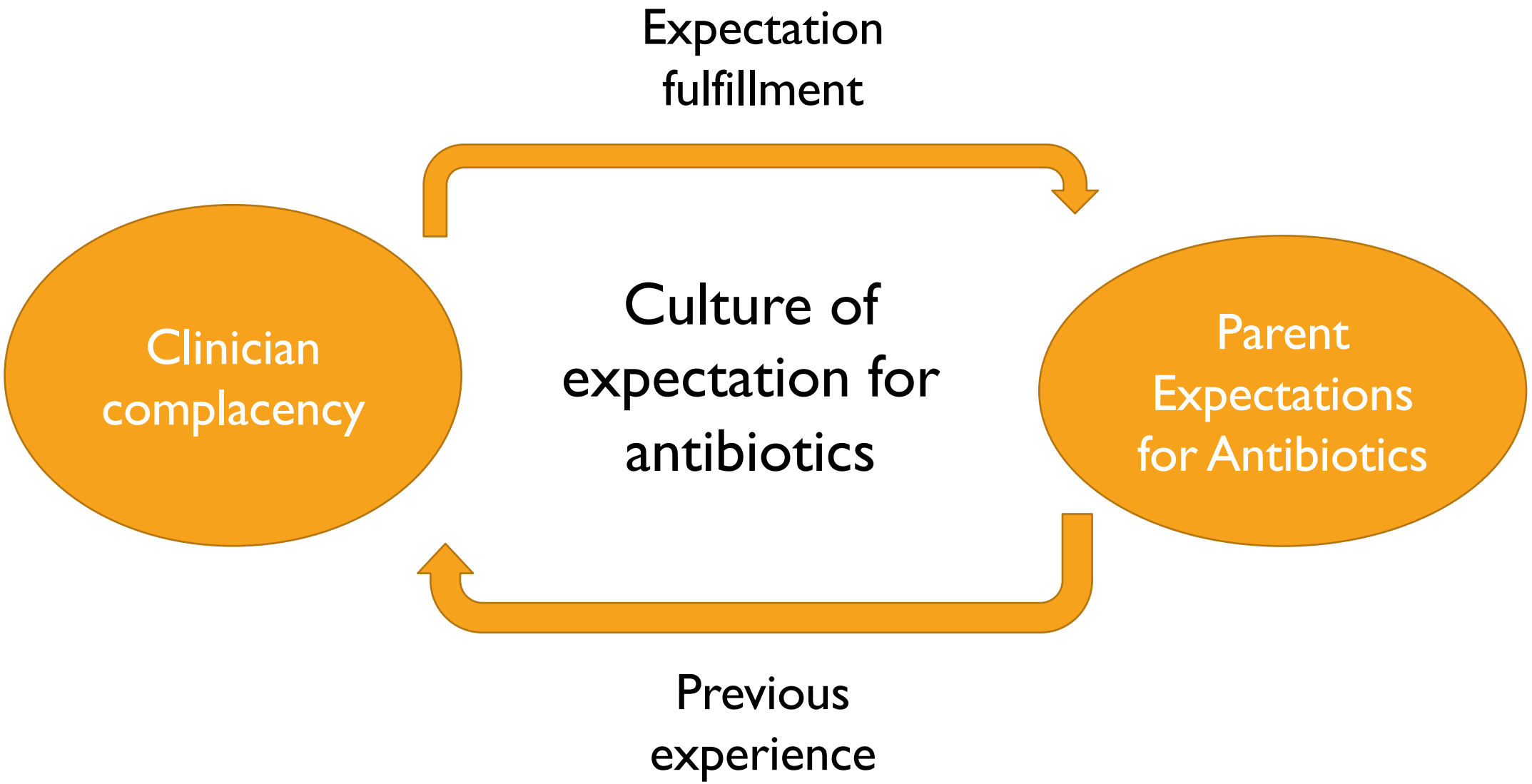
More efficient clinic visits

Higher satisfaction scores

More judicious antibiotic prescribing

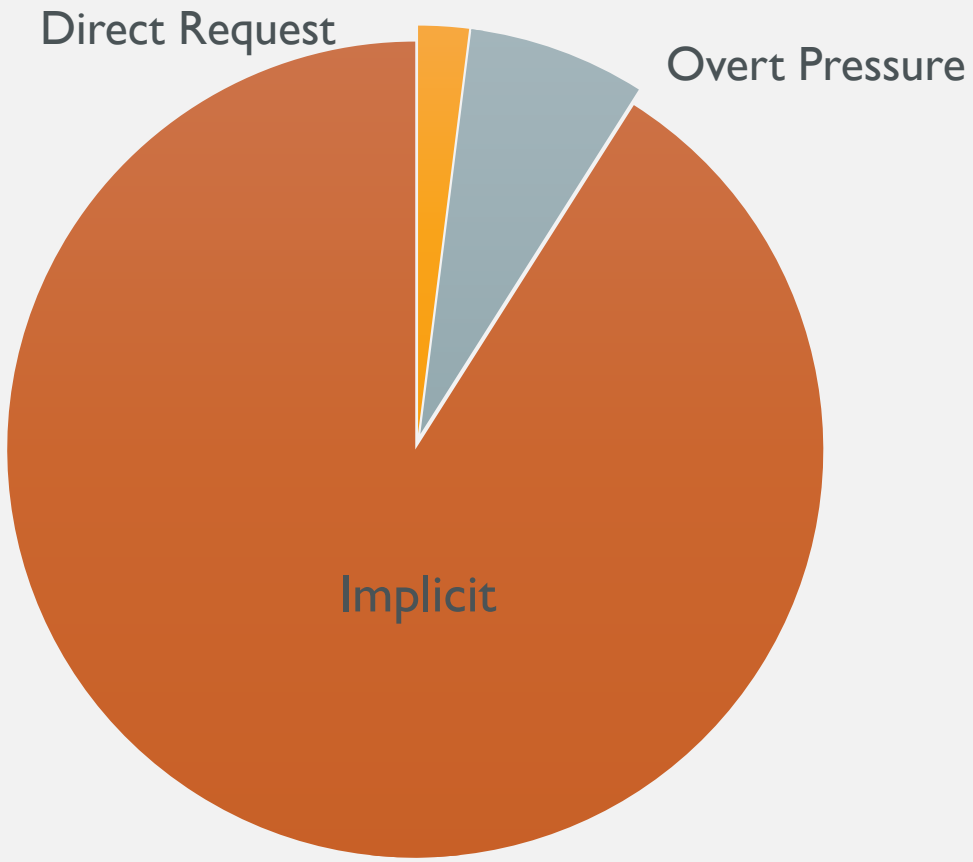
Poole *CPPAH* 2019

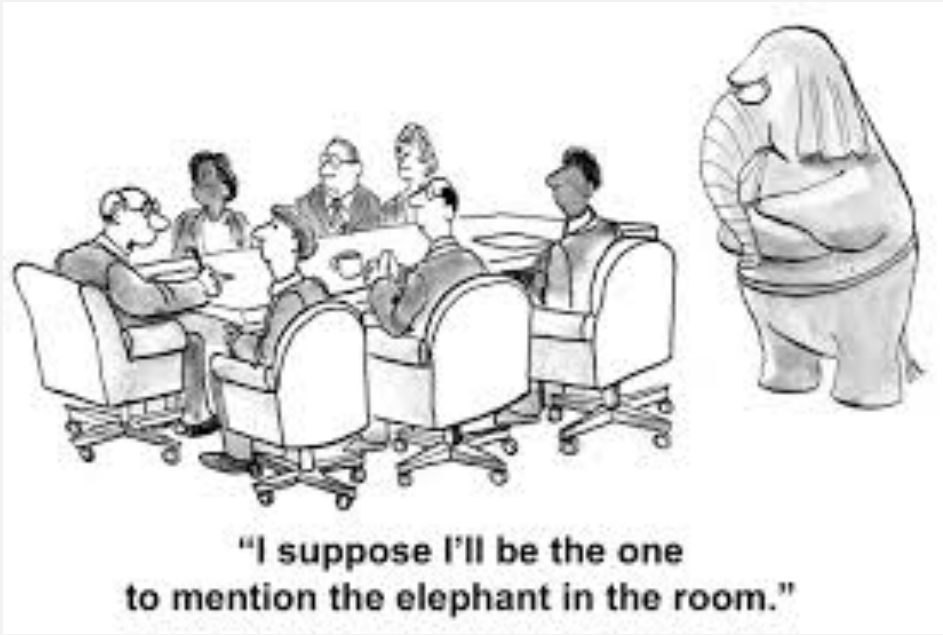
Poole *CPPAH* 2019



Szymczak, *ICHE* 2014

COMMUNICATION ABOUT ANTIBIOTIC EXPECTATIONS





Stivers 2007

WHEN PARENTS EXPECT ANTIBIOTICS:

1. Implicit communication styles:

- 'Candidate diagnosis': parents declare the child's diagnosis
  - Explicitly: "He has bronchitis."
  - Implicitly: "The next door neighbor has strep throat."
  - Looking for confirmation of diagnosis

2. Resist diagnoses that seem less severe

3. Question 'no treatment' plan

Stivers 2007, Stivers 2003

Clinician Perceptions Drive Prescribing

- Clinician perceptions of parental expectations for antibiotics drive inappropriate antibiotic prescribing
- A
- C ti

	Predicting Inappropriate Antibiotic Prescribing (Odds ratio)	Predicting Assignment of a Bacterial Diagnosis (Odds ratio)
13. Parent expectations for receiving antimicrobials	1.39 (.32, 6.05)	1.51 (.47, 2.84)
14. Parent attitudes toward prescribing	1.06 (.99, 1.13)	0.98 (.94, 1.02)
15. Physician perceptions of parental expectations for antimicrobials	23.3 (3.51, 154.65)*	5.25 (1.75, 15.73)*

Mangione-Smith, *Pediatrics* 1999

CLINICIAN-PARENT MISUNDERSTANDINGS

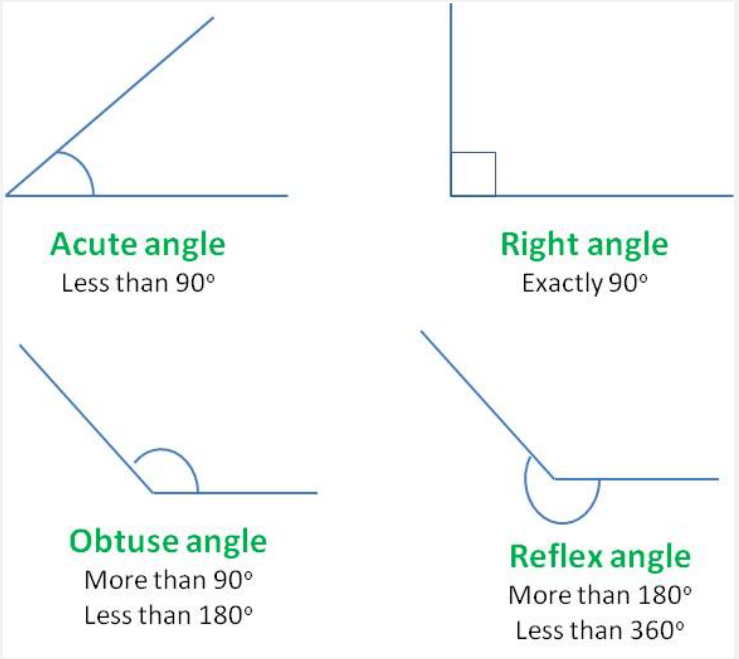
- If a parent mentions an antibiotic, clinicians are 4x more likely to think the parent expects an antibiotic.
- Parents expect:
  - Diagnosis
  - Reassurance that symptoms do not indicate a serious condition
  - Strategies for symptom resolution

Szymczak, *JPIDS* 2017; Stivers 2007

PARENT– CLINICIAN MISUNDERSTANDINGS

Assess severity of Illness	• Misunderstandings about severity of illness in bacterial versus viral diagnoses
Explain Symptoms	• Symptoms or diagnoses that warrant antibiotics
Help Alleviate Symptoms	• Therapeutic role of antibiotics
Provide Counsel	• Symptoms that indicate complications

ASSESS SEVERITY OF ILLNESS



*Elicit the symptoms that parents find concerning and why

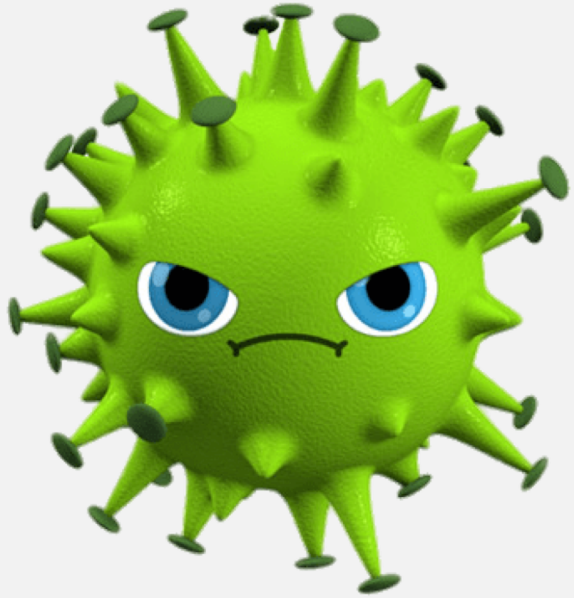
DETAILED PHYSICAL EXAM

- Helps assess severity of illness and explain symptoms
- Online commentary: Describe PE findings
  - 'No problem' commentary: addresses parent concerns and reassures parents that symptoms are not concerning ("Lungs sound all clear.")
  - 'Problem' commentary: identifies abnormal findings with concerning language ("This ear is quite red.")
- 'Problem' online commentary
  - Increased parent questioning of a non-antibiotic treatment plan
  - Associated with inappropriate antibiotic prescribing

EXPLAIN SYMPTOMS

- Parents trust their doctors
- Parents know antibiotics don't treat viruses

BUT: What is virus??



Box 2—Parents on doctors' diagnosis of viral illness in their child

Extract from group interview

Parent 2: They think they make you feel better saying it's a virus...but they make you feel worse

Parent 7: When they say it's a virus, I mean what kind of virus? Just where does it come from? Parent 1: You're none the wiser how they got it, what you can do, how long it will go on...

Parent 5: You feel you're no further forward...you just have to accept it if they don't explain further, I would like to know...

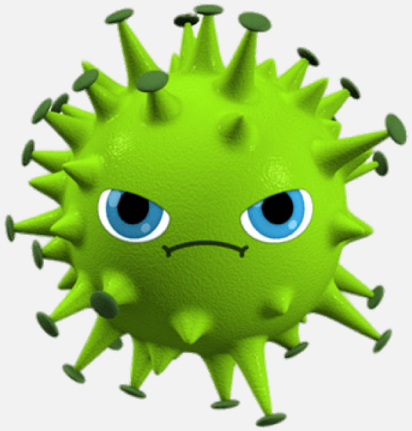
Parent 2: It's an unknown thing to a doctor, they can't pinpoint it, they don't know really...

Parent 1: I feel a bit annoyed really because you think they've studied for years to learn that and I haven't studied at all, you feel dissatisfied as if you wanted to hear something more...you just wish that everything was clean cut

Parent 4: At least if you really knew what it was then it's easier to cope with (Group 3)

Kai, BMJ, 1996

EXPLAIN SYMPTOMS



- Parents trust their doctors
- Parents know antibiotics don't treat viruses

BUT:

- Parents believe bacterial infections are more serious than viral
- Lack of knowledge: viruses can be severe, bacterial illnesses can be self-limiting.

*Discuss these specifics with parents

- Parents believe antibiotics treat more severe illnesses, not that antibiotics treat viruses.

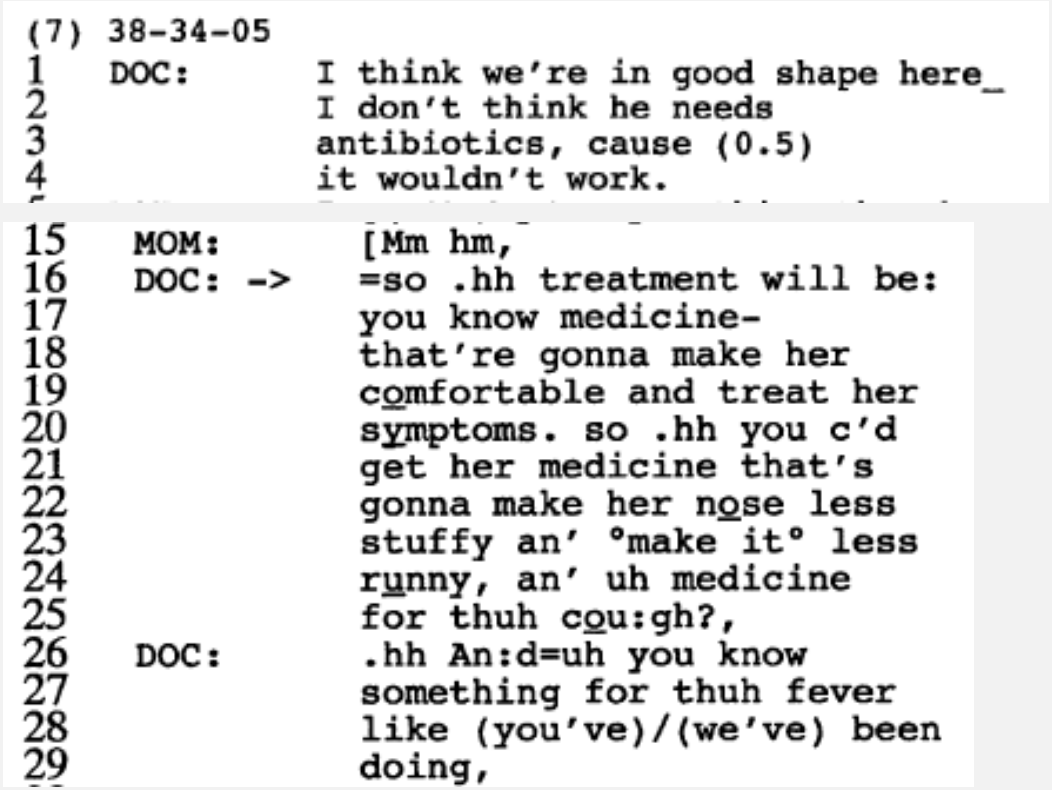
*Discuss in context of symptoms they find concerning

DELIVER A CLEAR DIAGNOSIS

- Specific and clear (e.g., "This is a really bad chest cold")
- Justify visit for parents
- Explain expectations for this diagnosis *Duration of symptoms
- Vague explanations appear dismissive
- Virus vs. Bacteria is poorly understood

HELP ALLEVIATE SYMPTOMS

- Concrete treatment recommendations
- Provide actionable steps
- Negative recommendations
- Positive recommendations



(7) 38-34-05

1	DOC:	I think we're in good shape here_
2		I don't think he needs
3		antibiotics, cause (0.5)
4		it wouldn't work.
15	MOM:	[Mm hm,
16	DOC: ->	=so .hh treatment will be:
17		you know medicine-
18		that're gonna make her
19		comfortable and treat her
20		symptoms. so .hh you c'd
21		get her medicine that's
22		gonna make her nose less
23		stuffy an' °make it° less
24		runny, an' uh medicine
25		for thuh cou:gh?,
26	DOC:	.hh An:d=uh you know
27		something for thuh fever
28		like (you've)/(we've) been
29		doing,

HELP ALLEVIATE SYMPTOMS

- 1,200 children with 800 ARTI seen by 60 pediatricians
-

Predictor Variable	Adjusted Risk Ratio[a]	95% CI	*P* Value
Communication practices			
Only positive treatment recommendations provided[b]	0.48	0.24-0.95	.04
Only negative treatment recommendations provided[b]	0.18	.02-1.43	.11
Both positive and negative treatment recommendations provided provided[b]	0.15	0.06-0.40	<.001
Contingency plan provided	1.66	0.65-4.23	.29

HELP ALLEVIATE SYMPTOMS

- Limit parents' ability to question initial 'negative' recommendation
  - Natural transition phrase: "on the one hand, [negative treatment recommendation], but on the other hand [positive treatment recommendation].
  - Language that assumes parental knowledge and rapidly moves to the treatment decision, such as, "as you know, [negative treatment recommendation], but what you can do is [positive treatment recommendation]".

PROVIDE COUNSEL AND CONTINGENCY PLAN

- Return precautions need to be specific
  - ¼ of patients receive
  - Vague information disempowers parent ("If it gets worse.")
- Establish trust and empower parent – be specific!
  - "If he starts using his ribs to breath or has less than 3 diapers/day."
- Increases parent satisfaction when parents do not receive antibiotics – ensure they can get one later if needed
  - Only 32% of patients receive an antibiotic when the prescription is delayed rather than immediately prescribed.

Mangione-Smith 1999; Spurling 2013

COMMUNICATION TECHNIQUES TO USE

Communication technique	Description	Examples

- Elicit parent concerns early
- Recognize parent communication behaviors
- Address concerning symptoms and use specific diagnosis
- Use physical exam
- Use communication techniques for treatment recommendations
- Take time/refine anticipatory guidance
- Use communication techniques when antibiotics are needed too!

MODULES

Dialogue Around Respiratory Illness Treatment (DART)
https://www.uwimtr.org/dart/

- 7 brief (max 5 min) Training Modules on Communication

REVIEW PAPER

Poole, NM. Judicious antibiotic prescribing in ambulatory pediatrics: Communication is key. Curr Probl Pediatr Adolesc Health Care. 2018 Nov;48(11):306-317. doi: 10.1016/j.cppeds.2018.09.004.