

Goals and Objectives

1. Address common misconceptions that are held by and propagated by health care providers.
2. Review data locally and across the United States to help shape our current opinions
3. Provide a framework for discussion by reviewing the scientific literature as evidence based guidelines
4. Make the argument for change from current practices
5. Discuss how we can improve.
 1. Address the question of why should we change.
 2. Provide data on what have others done to make change happen

An instructive tale about “hamburgers”: T. Grant Phillips, MD

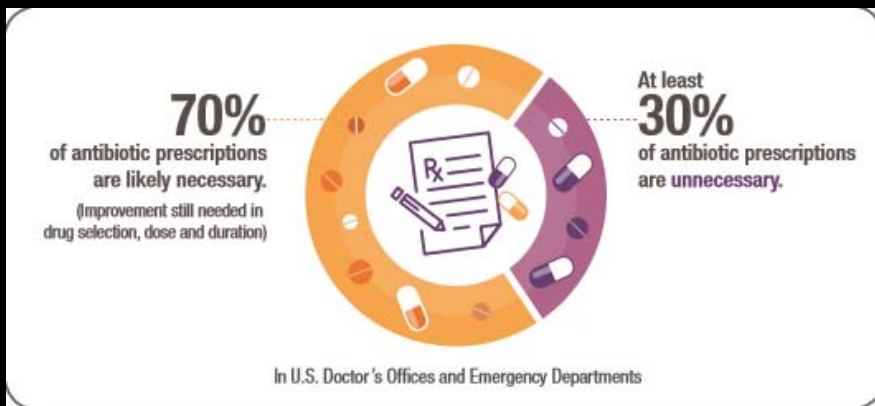
- As coach of a youth team, I used to take the kids to a hamburger stand after each game.
- The owner always greeted me warmly. “Hey doc, how many burgers today?”
- “Eleven,” I said one day. The owner looked distressed. “Hmm. I might not have that many.”
- “I have 11 hungry kids,” I interjected. They’ll be disappointed if they don’t each get a burger. This was our last game, you know.” “I’ll check again,” he replied. Soon he returned with 11 burgers. “Got lucky. Sorry about the scare.”
- “No problem. That’s why I come here. I always get what I want.” The next day a player’s mom called to say her son had diarrhea and was vomiting. “Could it be food poisoning?” she asked.
- I told her I would find out. I called the hamburger stand owner and told him that one of the kids was sick, and asked if the burgers could be responsible. To my surprise, he said Yes. “Remember, I didn’t think I had enough burgers, then came back with 11?” he said, without a hint of distress. “Well, I only had 10 that I knew were good. The 11th burger had been sitting around for a few hours. I thought it might be bad, but decided to take the chance.”

An instructive tale about “hamburgers”: T. Grant Phillips, MD

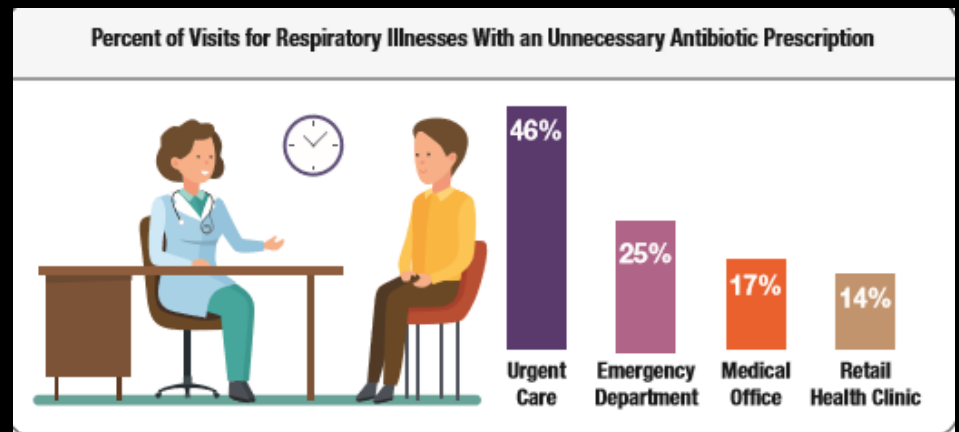
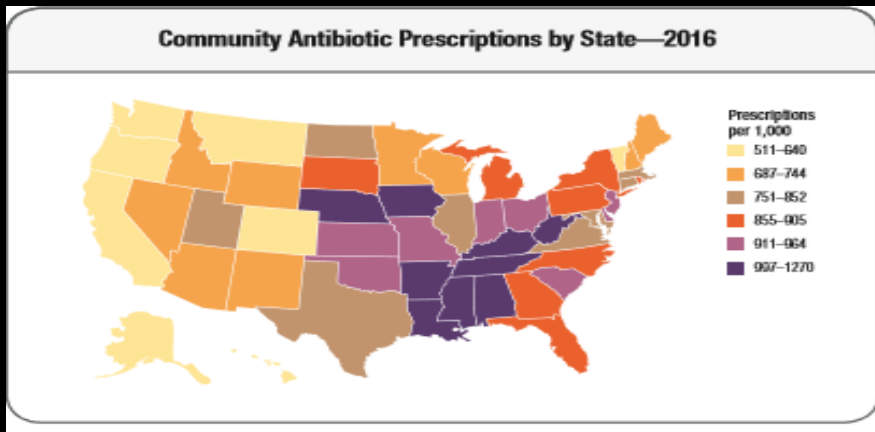
- “You *what?*” I asked, incredulous. “You know I always try to keep my customers happy. What’s the fuss? Only one kid got sick, and all he got was a little diarrhea.” Needless to say, I was flabbergasted. How much irresponsibility did he think was acceptable in the name of satisfaction?
- Whenever I tell this story, the response is usually an incredulous look and a recommendation that the owner of the hamburger stand be boiled in oil.
- Then I tell the truth: This incident never happened. It’s a parable I like to tell residents when we discuss the unnecessary use of antibiotics. You see, if you replace the word “hamburger” with “antibiotic,” and replace “stand owner” with “family doctor,” the story is virtually the same.
- When we give patients unnecessary antibiotics just to keep them happy, we are doing exactly what the owner did. Same principle, and same consequences. So why do most doctors think the hamburger story is ghastly, yet continue to prescribe unnecessary antibiotics?
- Studies indicate that **nearly 50% of antibiotics are unnecessary**, but **some patients are happier** when we prescribe them. Yet antibiotics have a number needed to harm (NNH) of **about 10**, if we define harm as antibiotic-associated diarrhea—about the same NNH as in the hamburger story. (That’s without counting the growing threat of antibiotic resistant organisms). So the next time you’re tempted to prescribe an unnecessary antibiotic to keep a patient happy, hand the patient a copy of this story instead

Phillips, T.G. An instructive tale about “hamburgers”. The Journal of Family Practice. 2013. November;62(11): 620.

Is this even a problem?



- Per the CDC: 47,000,000 abx unnecessarily prescribed per year
- Outpatient and inpatient antibiotic stewardship programs have started:
 - leadership, accountability, drug expertise, action, tracking, education
 - Reporting of clinicians



Is this even a problem?

Percent of Patients Receiving The Recommended First-Line Antibiotic by Condition, United States, 2010-2011*

Condition	Adults (20+ years of age)	Children (0-19 years of age)
Sinus infection	37%	52%
Pharyngitis (sore throat)	37%	60%
Middle ear infection	n/a	67%

Percent of Antibiotic Prescriptions That Were Unnecessary

Age group	All Conditions*	Acute respiratory conditions**
0-19 year olds	29%	34%
20-64 year olds	35%	70%
≥65 year olds	18%	54%
All ages	30%	50%

*All conditions included acute respiratory conditions, urinary tract infections, miscellaneous bacterial infections, and other conditions.

**Acute respiratory conditions included ear infections, sinus infections, sore throats, pneumonia, acute bronchitis, bronchiolitis, upper respiratory infections (i.e., common colds), influenza, asthma, allergy, and viral pneumonia.

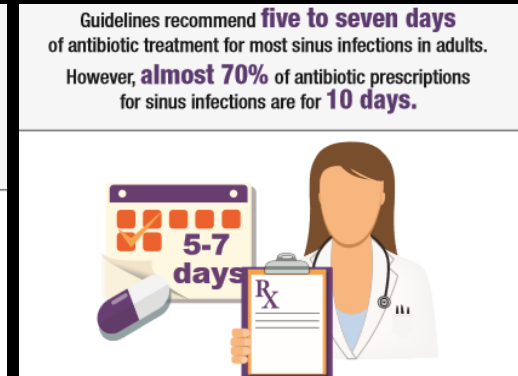
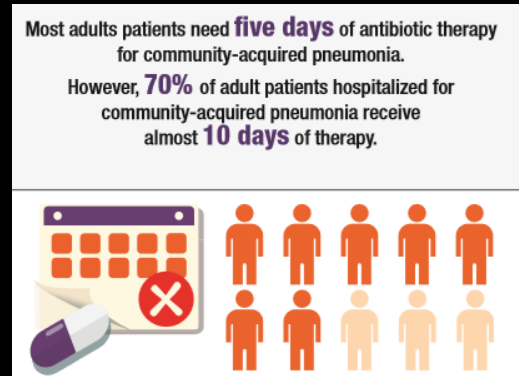
Oral Antibiotic Prescribing by Provider Type in the United States In 2014

Provider type	Number of antibiotic prescriptions in 2014 (millions)
Family Practice Physicians	58.1
Physician Assistants & Nurse Practitioners	54.4
Internal Medicine	30.1
Pediatricians	25.4
Dentistry	24.9
Surgical Specialties	19.9
Emergency Medicine	14.2
Dermatology	7.6
Obstetrics/Gynecology	6.6
Other	25.0
All Providers	266.1

Is this even a problem?

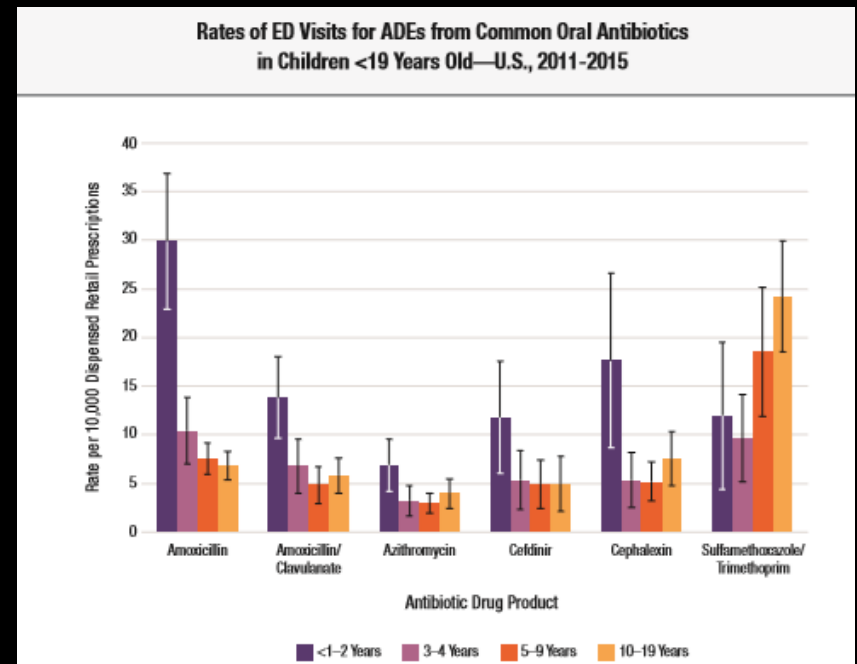
- Unnecessarily broad coverage
 - Fluoroquinolones
 - Not 1st line for sinusitis
 - Not 1st line for UTI
 - Rx given 6.3 million times in 2018 for above indications
 - Warnings from FDA in 2016 to use only for patients with conditions w/o alternative effective treatment
 - Warning in Dec 2018 due to increased risk of ruptures or tears in aorta
 - Zpack
 - 20% of the time it is given for sinus infections
 - 18% of time given for pediatrics
 - Guidelines advise against use in many cases due to resistance

- Unnecessarily long treatment
 - 70% of abx were for 10+days for sinusitis
 - IDSA → 7 days



Ok, but what's the harm? Better safe than sorry, Right?

- 140,000 ED visits each year due to adverse drug related events (ADE)
 - Young adults (20-34) twice as likely than age >64
 - 70,000 children (41% under age 2)
- Common ADEs
 - Rash, dizziness, nausea, diarrhea, yeast infections, C. difficile infection, life-threatening allergic reactions
 - Pediatrics: allergic reactions, rash, itching, angioedema



Why do we care?

A look at some data

- How often do we prescribe antibiotics?
- What is the resistance rate in our area?
- Local clinic
 - Total Percent of abx Rx < 7 days = 22%
 - Total Percent of abx RX > 7 days = 37%
 - Total % of abx rx < 7 days/Unknown days of duration = 41%
- ?? 63% unnecessary abx?

Local Hospital Data

Antimicrobial Susceptibility Report																	
Gram Negative Isolates																	
Organism	Sample (#)	Amikacin (AK)	Ampic sulb (A/S)	Ampicillin (AM)	Ceftriaxone (CAX)	Cefazolin (CFZ)	Cefepime (CPE)	Ceftioxime (CRM)	Gentamicin (GM)	Levofloxacin (LVX)	Meropenem (MER)	Nitrofurantoin (FD) (for urine only)	Piperacil Tazo (P/T)	TMP/SMX (T/S)	Tetracycline (TE)	Tobramycin (TO)	
Cumulative (All sources)																	
E.coli	386	100%	58%	40%	92%	87%	93%	-	87%	76%	100%	99%	98%	68%	-	87%	
K. pneumoniae	67	99%	-	0%	88%	90%	90%	-	93%	94%	99%	47%	96%	87%	-	89%	
P. mirabilis	25	100%	84%	84%	96%	92%	96%	-	92%	81%	100%	0%	100%	88%	-	95%	
Gram Positive Isolates																	
Organism	Sample (#)	Amox Clav (AUG)	Amp sulbactam (A/S)	Ampicillin (Am)	Cefazolin (Cz)	Azithromycin (AZI)	Ceftriaxone (Cax)	Clindamycin (Cld)	Gent Synergy (GmS)	Gentamicin (Gm)	Levofloxacin (Lvx)	Nitrofurantoin (Fd) (for urine only)	Oxacillin (Ox)	Penicillin (P)	Tetracycline (Te)	Trimethoprim sulfa (T/S)	Vancomycin (Va)
Cumulative (all sources)																	
Enterococcus sp.	25	a	a	92%	-	-	-	-	67%	-	35%	93%	-	91%	-	-	88%
S. aureus (MRSA)	28	-	-	-	-	-	-	68%	-	89%	19%	-	-	86%	93%	100%	
S. aureus (MSSA)	30	-	-	0%	100%	-	-	84%	-	100%	82%	-	100%	33%	87%	100%	100%
S. epidermidis	27	41%	-	0%	41%	-	-	74%	-	92%	46%	-	41%	4%	81%	52%	100%

The first isolate of a given species is resistant to all antibiotics tested (see antibiotic list below)

Outside Data

Reporting Period: 1/1/2017 to 12/31/2017 - Antibiotic and Steroid Analysis By Disease*

Disease	Unique Encounters by Disease	Number of Antibiotics Ordered by Disease	% Antibiotics Ordered by Disease	Number of Steroids Ordered by Disease	% Steroids Ordered by Disease
URI	37455	19783	53%	2880	8%
Sinusitis	17790	14951	84%	3354	19%
Otitis Media	9213	8025	87%	296	3%
Bronchitis	17068	13706	80%	5306	31%
Pharyngitis	18561	8847	48%	923	5%
Influenza	5877	1058	18%	172	3%

Reporting Period: 1/1/2017 to 12/31/2017 - Antibiotic Analysis Overall

Unique Encounters with a Listed Diagnosis	Number of AB Ordered	Unique Encounters with AB	% Encounters with AB Ordered	Number of Steroids Ordered	Unique Encounters with Steroid Ordered	% Encounters with Steroid Ordered
96937	61035	59715	62%	12458	11951	12%

Local data from hospital

National Healthcare Safety Network Frequency Table - All CDIF LabID Events

As of: July 15, 2019 at 2:38 PM

Date Range: LABID_EVENTS specDateYM 2018M01 to 2018M12

orgID=16731

Frequency Row Pct	Table of specimenSource by onset			
	specimenSource	onset		
	CO	CO-HCFA	HO	Total
STOOL	13 34.21	7 18.42	18 47.37	38
Total	13	7	18	38

National Healthcare Safety Network Frequency Table - All MRSA LabID Events

As of: July 15, 2019 at 2:41 PM

Date Range: LABID_EVENTS specDateYM 2018M01 to 2018M12

orgID=16731

Frequency Row Pct	Table of specimenSource by onset		
	specimenSource	onset	
	CO	HO	Total
BLDSPC	44 86.27	7 13.73	51
Total	44	7	51

Common areas of antimicrobial overuse

TABLE 3
Accuracy of Urinalysis for Disease Detection

<i>Condition</i>	<i>Test</i>	<i>Results</i>	<i>Sensitivity (%)</i>	<i>Specificity (%)</i>	<i>PPV</i>	<i>NPV</i>
Microscopic hematuria ⁴	Dipstick	≥ 1+ blood	91 to 100	65 to 99	NA	NA
Significant proteinuria ⁵	Dipstick	≥ 3+ protein	96	87	NA	NA
Culture-confirmed UTI ⁶⁻¹³	Dipstick	Abnormal leukocyte esterase	72 to 97	41 to 86	43 to 56	82 to 91
		Abnormal nitrites	19 to 48	92 to 100	50 to 83	70 to 88
		Abnormal leukocyte esterase or nitrites	46 to 100	42 to 98	52 to 68	78 to 98
		≥ 3+ protein	63 to 83	50 to 53	53	82
		≥ 1+ blood	68 to 92	42 to 46	51	88
		Any of the above abnormalities	94 to 100	14 to 26	44	100
	Microscopy	> 5 WBCs per HPF	90 to 96	47 to 50	56 to 59	83 to 95
		> 5 RBCs per HPF	18 to 44	88 to 89	27	82
		Bacteria (any amount)	46 to 58	89 to 94	54 to 88	77 to 86

PPV = positive predictive value; NPV = negative predictive value; NA = not applicable; UTI = urinary tract infection; WBCs = white blood cells; HPF = high-powered field; RBCs = red blood cells.

Information from references 4 through 13.

Bronchitis 2,4,5

- Usually (90% of the time) caused by viruses and antibiotics are not indicated in patients without chronic lung disease.
 - most commonly identified viruses are rhinovirus, enterovirus, influenza A and B, parainfluenza, coronavirus, human metapneumovirus, and respiratory syncytial virus.
- Bacteria are detected in 1% to 10% of cases of acute bronchitis.
 - Atypical bacteria, such as *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, and *Bordetella pertussis*, are rare causes of acute bronchitis.
 - In a study of sputum samples of adults with acute cough for more than five days, *M. pneumoniae* was isolated in less than 1% of cases and *C. pneumoniae* was not identified.
 - 10% of patients presenting with a cough lasting at least two weeks have evidence of *B. pertussis* infection. Antibiotics can eradicate *B. pertussis* from the nasopharynx. They do not seem to shorten the course of illness unless given in the first one to two weeks.

Bronchitis ^{2,4,5}

- Symptoms even with viral illness include: sputum production, dyspnea, nasal congestion, headache, and fever
- The first few days of an acute bronchitis infection may be indistinguishable from the common cold.
- Production of **sputum, even purulent**, is common and **does not correlate with bacterial infection**.
- The **duration** of acute bronchitis–related cough is typically **two to three weeks**, with a pooled estimate of 18 days in one systematic review.
- **Antibiotics** showed to provide only **minimal benefit**, reducing the cough or illness by about **half a day**
- Abx adverse effects include allergic reactions, nausea and vomiting, and C. difficile infection.
- Strategies to reduce inappropriate antibiotic use include delayed prescriptions, patient education, and calling the infection a chest cold. ²

Cough

- Most cough viral in first 10-14 days
- Most persistent symptom after viral URI is cough. After URI symptoms improve, cough may persist 4-6 weeks.
 - We even have a name for this – Post Viral Cough Syndrome
 - [https://journal.chestnet.org/article/S0012-3692\(15\)52842-0/pdf](https://journal.chestnet.org/article/S0012-3692(15)52842-0/pdf)
 - <https://www.aafp.org/afp/2011/1015/p887.html>
- Common causes of chronic cough
 - Bacterial, allergies, silent GERD, post viral cough, foreign body aspiration, medication related, asthma, upper airway cough syndrome, environmental exposure
 - If not better, then can workup further.
- Acute bronchitis = usually viral
 - No need for routine beta agonists, antibiotics, or steroids

Rhinosinusitis and Sinusitis

- Antibiotics should not be used for apparent viral upper respiratory tract illnesses (sinusitis, pharyngitis, bronchitis).
 - AAFP, ACP, AAP, IDSA, and Choosing Wisely Campaign
- The role of antibiotics for treatment of chronic rhinosinusitis is unclear, and there is scant evidence to support their use. ¹
- **Color of drainage does not equal bacterial etiology**
- **Usual etiology is still viral in the 1st 7-10 days.**
- Some data that even up to 21 days is viral.
- If symptoms worsening after 7 days, worsening sinus pain/pressure, worsening purulent drainage, unilateral sinus pain/dental pain or other objective findings – can consider bacterial etiology
- **Cough and cold medicines should not be prescribed or recommended for respiratory illnesses in children younger than four years.**
 - AAFP, AAP, and Choosing Wisely Campaign

Otitis Media – AAP and AAFP recommendations 16-18

- Many cases viral
 - Evidence does not support the routine use of steroids, antibiotics, antihistamines, or decongestants for the treatment of OME in children. Additionally, there is insufficient evidence for the use of complementary and alternative medicine for treating OME.
 - **Pneumatic Otoscopy.** Clinicians *should document* the presence of middle ear effusion *with pneumatic otoscopy* diagnosing OME in a child; additionally, they should perform pneumatic otoscopy to assess for OME in a child with otalgia, hearing loss, or both.
 - http://oto.sagepub.com/content/154/1_suppl/S1.full
 - https://www.youtube.com/watch?v=VB5qg_NfHis
- **Red TM does not equal infected.** Use otoscopy and pneumatic otoscopy
 - Improves sensitivity and specificity to 70-90%
- <6 months – treat
- 6-24 months and >24 months
 - if unilateral or if not too ill – repeat exam in 2-3 days vs. delayed prescriptions.

Table 2. Treatment Strategy for Acute Otitis Media

Initial presentation

Diagnosis established by physical examination findings and presence of symptoms

Treat pain

Children six months or older with otorrhea or severe signs or symptoms (moderate or severe otalgia, otalgia for at least 48 hours, or temperature of 102.2°F [39°C] or higher): antibiotic therapy for 10 days

Children six to 23 months of age with bilateral acute otitis media without severe signs or symptoms: antibiotic therapy for 10 days

Children six to 23 months of age with unilateral acute otitis media without severe signs or symptoms: observation or antibiotic therapy for 10 days

Children two years or older without severe signs or symptoms: observation or antibiotic therapy for five to seven days

Persistent symptoms (48 to 72 hours)

Repeat ear examination for signs of otitis media

If otitis media is present, initiate or change antibiotic therapy

If symptoms persist despite appropriate antibiotic therapy, consider intramuscular ceftriaxone (Rocephin), clindamycin, or tympanocentesis

Risk vs Benefit

- Study of antibiotic prescribing trends from 1996 to 2010:
 - antibiotics were prescribed in 71% of visits for acute bronchitis and that the rate of prescribing increased during the study period.
- prospective observational study
 - no difference in outcomes when antibiotics were prescribed to patients with **green or yellow sputum**, indicating that this is **not a useful indicator of bacterial infection**.
- **Smokers** more likely to receive antibiotic prescriptions – often 90% of the time
 - **no difference in outcomes**.
- Cochrane review: **no net benefit to using antibiotics for acute bronchitis in otherwise healthy individuals**.
 - antibiotics decreased cough duration by 0.46 days
 - decreased ill days by 0.64 days
 - decreased limited activity by 0.49 days
 - no difference in clinical improvement at follow-up.
- most common adverse - nausea, diarrhea, headache, skin rash, and vaginitis
 - **NNH = 5**.

OTC Medications²

- Antihistamines:

- Two trials showed **no benefit** compared with placebo in relieving **cough** symptoms.
- Combination **decongestant/antihistamines** are more likely to have **adverse effects with no to modest improvement** in cough symptom scores.
- In 2008, The U.S. FDA warned against the use of OTC cough medications containing antihistamines and antitussives in young children because of the high risk for harm, and these medications are no longer labeled for use in children younger than four years.

- Antitussives:

- work by reducing the cough reflex and can be divided into central opioids and peripherally acting agents.
- Codeine is a centrally acting, weak opioid that suppresses cough. Two studies show **no benefit from codeine** in decreasing cough symptom
- American College of Chest Physicians does not recommend its use in the treatment of upper respiratory tract infections
- Dextromethorphan is a nonopioid, synthetic derivative of morphine that works centrally to decrease cough.
- Three placebo-controlled trials show that **dextromethorphan, 30 mg, decreased the cough count by 19% to 36% (P < .05) compared with placebo, which is equivalent to eight to 10 fewer coughing bouts per 30 minutes.**
- Benzonatate is a peripherally acting antitussive that is thought to suppress cough via anesthesia of the respiratory stretch receptors. One small study comparing benzonatate, guaifenesin, and placebo showed significant improvement with the combination of benzonatate and guaifenesin, but not with either agent alone.

OTC Medications²

- EXPECTORANTS

- Guaifenesin is a commonly used expectorant. It is thought to stimulate respiratory tract secretions, thereby increasing respiratory fluid volumes and decreasing mucus viscosity, and it may also have antitussive properties.
 - A Cochrane review including three trials of guaifenesin vs. placebo showed some benefit.
 - In one trial, patients reported that guaifenesin decreased cough frequency and intensity by 75% at 72 hours compared with 31% in the placebo group (number needed to treat = 2).
 - A second trial showed decreased cough frequency (100% of the guaifenesin group vs. 94% of the placebo group; P = .5) and improved cough severity (100% of the guaifenesin group vs. 91% of the placebo group; P = .2) at 36 hours, and reduced sputum thickness (96% of the guaifenesin group vs. 54% of the placebo group; P = .001).
 - A third trial using an extended-release formulation of guaifenesin showed improved symptom severity at day 4

- Beta agonist inhalers

- A 2015 Cochrane review does not support the routine use of beta2 agonists for acute cough.
- Two trials included children and found **no benefit** from albuterol in decreasing daily cough scores, daily proportion of cough, or median duration of cough, although both studies excluded children who were wheezing at the time of evaluation or had signs of bronchial obstruction. The studies of adults had mixed results, but the findings suggest that beta2 agonists should be avoided if there is no underlying history of lung disease or evidence of wheeze or airway obstruction

- Honey:

- A Cochrane review – 2 small trials vs. Dextromethorphan, Benadryl, and no Treatment.
- Honey **better than no treatment** in decreasing the frequency and severity of cough, decreasing bothersome cough, and improving quality of sleep.
 - Given the warnings against the use of antitussives in young children, honey is a reasonable alternative for the relief of acute cough in children older than one year.

OTC Combination Medications issues⁶

- *Antihistamine/decongestant*: 12 trials. The odds ratio (OR) of treatment failure was 0.27 (95% confidence interval [CI], 0.15 to 0.50). The number needed to treat for an additional beneficial outcome (NNTB) was four (95% CI, 3 to 5.6). On the final evaluation day, 41% of participants in the placebo group had a favorable response compared with 66 % of those on active treatment
- *Antihistamine/analgesic*: three trials. Two reported on global effectiveness, and data from one study were presented (n = 290 on active treatment and 292 on ascorbic acid). The OR of treatment failure was 0.33 (95% CI, 0.23 to 0.46) and the NNTB was 6.67 (95% CI, 4.76 to 12.5). After six days of treatment, 43% of participants in the control group were cured, compared with 70% in the active treatment group. The second study also showed an effect in favor of active treatment.
- *Analgesic/decongestant*: six trials. One trial reported on global effectiveness: 73% on active treatment benefited, compared with 52% of the control group, who took paracetamol (available as acetaminophen in the United States). The OR was 0.28 (95% CI, 0.15 to 0.52).
- *Antihistamine/decongestant/analgesic*: five trials. Four trials reported on global effectiveness, and two could be pooled. Reported global effect (less than one severity point on a four- or five-point scale) was 52% with active treatment and 34% with placebo. The OR of treatment failure was 0.47 (95% CI, 0.33 to 0.67) and the NNTB was 5.6 (95% CI, 3.8 to 10.2). Two other trials found no beneficial effect. Two other studies did not show any effect. Two studies of antihistamine/decongestant combinations (113 children) could not be pooled. The active treatment had no significant effect.

OTC Medication Adverse Effects

- *Adverse effects:* The combination of antihistamine/decongestant caused more adverse effects than the control intervention, but the difference was not significant:
 - 157 of 810 participants (19 percent) versus 60 of 477 (13 percent) had one or more adverse effects (OR = 1.58; 95% CI, 0.78 to 3.21).
 - Participants taking analgesic/decongestant combinations had significantly more adverse effects than the control group (OR = 1.71; 95% CI, 1.23 to 2.37).
 - The number needed to treat for an additional harmful outcome was 14.
 - Neither of the other two combinations caused significantly more adverse effects.
 - Eleven of 90 participants (12 percent) taking the antihistamine/analgesic combination had one or more adverse effects versus nine of 91 (10 percent) taking the control medication (OR = 1.27; 95% CI, 0.50 to 3.23).
 - In one study of the antihistamine/decongestant/analgesic combination, five of 224 participants (2 percent) on active treatment experienced adverse effects versus nine of 208 (4 percent) on placebo.
 - Two other trials reported no differences between treatment groups, but numbers were not reported.

How can we tell if bacterial or viral

- General rule
 - usually viral >90 % if symptoms <7-10 days in immunocompetent otherwise healthy persons
- Meta-analysis based on individual patient data:
 - common clinical signs and symptoms were not effective in accurate diagnosis
- CRP and ESR
 - somewhat useful for confirming acute bacterial maxillary sinusitis.
- Four signs and symptoms that increase likelihood of bacterial etiology:
 - double sickening, purulent rhinorrhea, ESR>10mm/hr, and purulent secretion in the nasal cavity.
- Antibiotic therapy
 - consider after 7-10 days or if worsening after 7 days.
- Most guidelines including AAP/AAFP/ACP/IDSA/Choosing Wisely
 - support watchful waiting within the 7-10 after URI symptoms first appear

URI Summary³

- After 10 days of upper respiratory symptoms, the probability of bacterial rhinosinusitis is 60%
- Cochrane review
 - symptoms of bacterial rhinosinusitis had resolved in 47% of all patients after seven days with or without antibiotic therapy.
- 70% of patients improved within two weeks without antibiotics.
- Antibiotic therapy did increase cure rates for patients between seven and 15 days, but only 5% of patients having a faster cure.
- NNT = 11 to 15; NNH = 5-8
 - The risk of harm outweighs the potential benefit of antibiotic therapy
- Respiratory fluoroquinolones are not recommended as first-line antibiotics because they conferred no benefit over beta-lactam antibiotics and are associated with a variety of adverse effects
 - According to a recent U.S. Food and Drug Administration safety alert, fluoroquinolones should be reserved for patients who do not have other treatment options. Macrolides, including azithromycin (Zithromax), trimethoprim/ sulfamethoxazole, and second- or third-generation cephalosporins, are no longer recommended as initial therapy for acute bacterial rhinosinusitis because of high rates of resistance in *S. pneumoniae* and *H. influenzae*.

URI Summary^{3, 10}

- The recommended duration of therapy for uncomplicated acute bacterial rhinosinusitis is five to 10 days for most adults
- Decongestants, antihistamines, and guaifenesin are not recommended for patients with acute bacterial rhinosinusitis because of their unproven effectiveness, potential adverse effects, and cost
- However, data on intranasal corticosteroids as monotherapy for symptomatic relief in patients with acute sinusitis are limited
 - A Cochrane review, 4 RCTs of topical intranasal steroid vs placebo or no intervention as monotherapy for ABRS, found that steroids increased the rate of symptom improvement from 66% to 73% after 15 to 21 days (risk ratio, 1.10; 95% CI, 1.02-1.18).
 - A Cochrane review of systemic steroids for ABRS found no benefit over placebo when oral steroids were used as monotherapy
- A meta-analysis of six trials concluded that intranasal corticosteroids offered a modest therapeutic benefit in patients with acute sinusitis (number needed to treat = 13).³²
- Similarly, a 2013 Cochrane review found that patients receiving intranasal corticosteroids were more likely to experience symptom improvement after 15 to 21 days compared with those receiving placebo (73% vs. 66.4%; $P < .05$; number needed to treat = 15)
- Antihistamines may also worsen congestion by over drying the nasal mucosa. Current guidelines do not recommend antihistamines as an adjunctive therapy for acute bacterial rhinosinusitis, except in patients with a history of allergy

Table 2. Summary of Guidelines for the Diagnosis of Acute Rhinosinusitis in Adults Reference 3

Guideline	Signs and symptoms	Diagnostic criteria
Clinical Practice Guideline (update):	Purulent nasal discharge with nasal obstruction, facial pain, or facial	<i>Presumed acute viral rhinosinusitis:</i> Symptoms last less than seven days and do not worsen

rhinosinusitis:
to four days of illness; symptoms after initial presentation; seven days of initial presentation

rhinosinusitis:
days and do not worsen
rhinosinusitis:
10 days after start of URI; 3 days

rhinosinusitis:
waiting for first three days of

rhinosinusitis:
to four days of illness;
n 10 days after start of URI;
ee to four days

rhinosinusitis:
days and do not worsen
rhinosinusitis:
10 to 14 days
purulent nasal discharge, facial
ital swelling

rhinosinusitis:
to four days of illness;
n 10 days after start of URI;
0 days of initial improvement

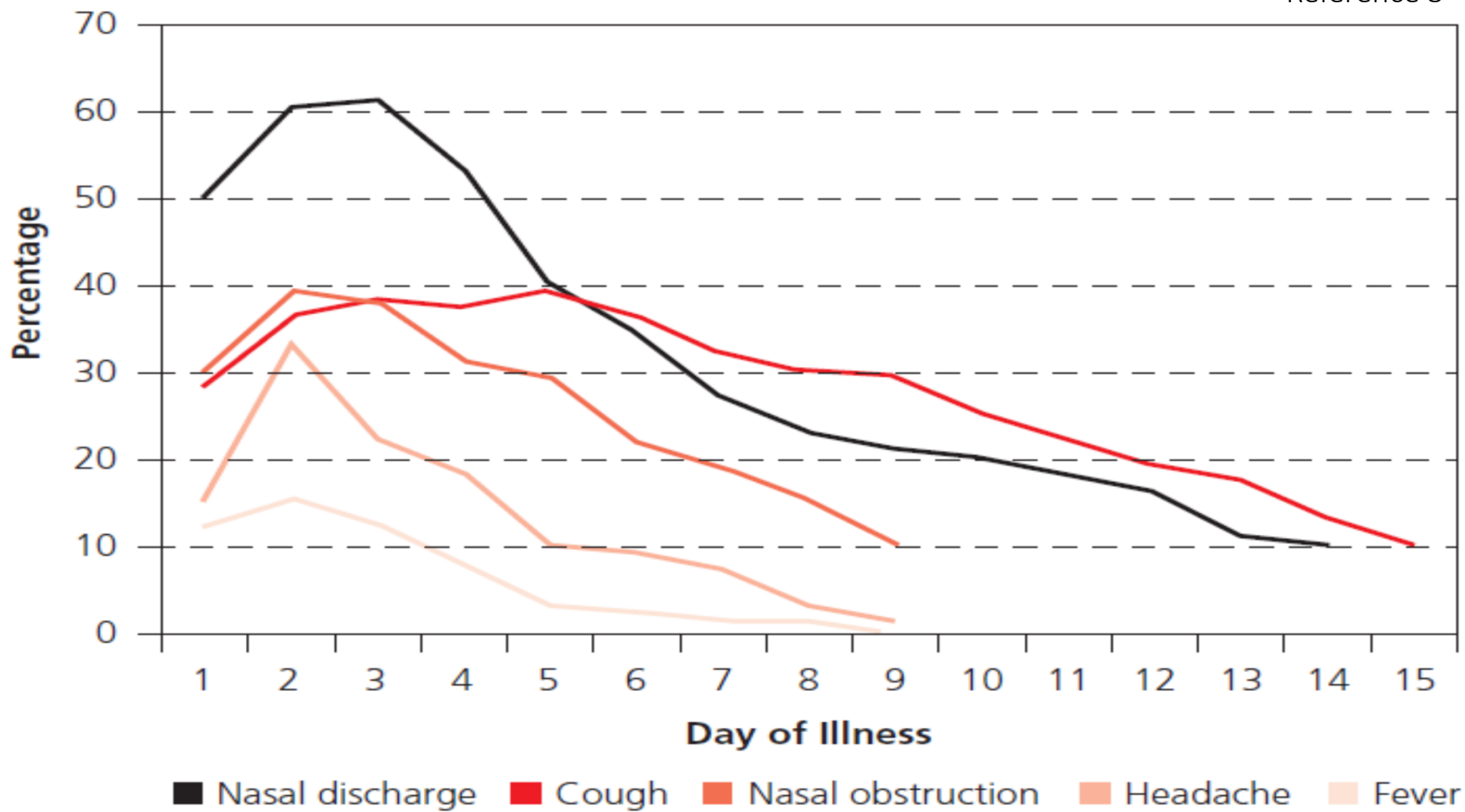
BEST PRACTICES IN INFECTIOUS DISEASE – RECOMMENDATIONS FROM THE CHOOSING WISELY CAMPAIGN

Recommendation	Sponsoring organizations
Avoid prescribing antibiotics in the emergency department for uncomplicated sinusitis.	American College of Emergency Physicians
Do not routinely obtain radiographic imaging for patients who meet diagnostic criteria for uncomplicated acute rhinosinusitis.	American Academy of Otolaryngology–Head and Neck Surgery
Do not routinely prescribe antibiotics for acute, mild to moderate sinusitis unless symptoms (which must include purulent nasal secretions and maxillary pain or facial and dental tenderness to percussion) last at least seven days or symptoms worsen after initial clinical improvement.	American Academy of Allergy, Asthma and Immunology American Academy of Family Physicians American Academy of Otolaryngology–Head and Neck Surgery

Table 4. Adjunctive Therapies for Acute Rhinosinusitis

Reference 3

<i>Treatment</i>	<i>Evidence summary</i>	<i>Comment</i>
Intranasal corticosteroids	Two systematic reviews of randomized controlled trials showed minimal benefit and symptom relief occurred late (at 15 to 21 days) ^{32,33}	Some agents available over the counter
Saline nasal irrigation	One small randomized controlled trial found hypertonic saline decreased nasal symptoms ³⁵ Another study found no significant difference between groups receiving no treatment vs. those treated with saline nasal solutions, topical decongestants, and intranasal corticosteroids ³⁴	Available in a low-pressure method using a spray or squeeze bottle or a gravity-flow method using a vessel with a nasal spout
Oral decongestants	No clinical trial evidence for patients with acute sinusitis	Significant adverse effects; phenylephrine is similar in effectiveness to placebo for nasal congestion due to seasonal allergic rhinitis ³¹
Topical decongestants	One comparative trial found no significant difference in improvement among groups receiving no treatment vs. those treated with saline nasal solutions, topical decongestants, and intranasal corticosteroids ³⁴	May cause rebound congestion when used for prolonged periods



Pharyngitis 4,5

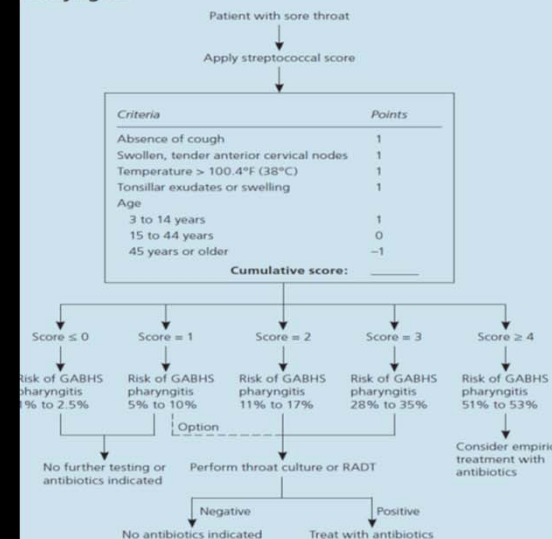
- mostly viral
- Use Clinical scoring, rapid antigen testing, throat culture to guide management
- If strep positive, use narrow spectrum treatment.
- Educating patients
 - about symptom duration (e.g., coughing can last up to six weeks) is a recognized approach to overcoming barriers to appropriate antibiotic prescribing.
 - addressing the serious harm that can result from use of antibiotics, such as Clostridium difficile infection, and their failure to reduce the time to recovery for most acute respiratory tract infections.

Table 1. FeverPAIN Scale for Pharyngitis

Signs and symptoms		Points
Fever in past 24 hours		1
Intensely inflamed tonsils		1
No cough or coryza		1
Presentation within three days of symptom onset		1
Purulent tonsils		1
Total:		_____

Points	Risk of group A or C streptococcal pharyngitis (%)	Recommendation
0 or 1	1 to 10	No testing or treatment needed; consider backup throat culture in children three to 15 years of age
2	11 to 17	Rapid antigen detection testing
3	28 to 35	Rapid antigen detection testing
4 or 5	51 to 53	Empiric antibiotics

Clinical Decision Rule for Diagnosing GABHS Pharyngitis



What about penicillin allergies?

- 10 % of U.S. patients report having allergic reaction of penicillin class
- <1% have true IgE-mediated allergy
 - Reactions occur <1 hr
 - Include hives, angioedema, wheezing, SOB, anaphylaxis
 - Anaphylaxis = 2 of the following
 - Skin: hives, flushing, itching, and/or angioedema
 - Respiratory: cough, nasal congestion, SOB, chest tightness, wheeze, sensation of throat closure or choking, and-or change in voice quality (laryngeal edema)
 - CV: hypotension, faintness, tachycardia or less commonly bradycardia, tunnel vision, chest pain, sense of impending doom, and/or loss of consciousness
 - GI: nausea, vomiting, abdominal cramping, and diarrhea
- 80% of patients with IgE mediated penicillin allergy lose their sensitivity after 10 yrs.

STRATEGIES TO REDUCE INAPPROPRIATE ANTIBIOTIC USE ^{2,11}

- Delayed prescribing - Cochrane review:
 - no difference in clinical outcomes between patients with acute bronchitis who were treated immediately with antibiotics and those with delayed or no antibiotic treatment.
 - Patients reported comparable satisfaction when given immediate vs. delayed antibiotics (92% vs. 87%).
- Delayed or no abx rx decrease abx use across 25 practices in UK by 40%
- Strongest predictor for an antibiotic prescription is the clinician's perception of patient desire for antibiotics.
- Patients want symptom relief and will often accept leaving without an antibiotic prescription if the clinician addresses their concerns, shows personal interest, discusses the expected course of the illness, and explains the treatment plan.
- Calling the infection a chest cold and educating the patient about the expected duration of illness (two to three weeks) are also helpful.

STRATEGIES TO REDUCE INAPPROPRIATE ANTIBIOTIC USE ^{12, 13}

Massachusetts and California Attempts

- 49 practices in Massachusetts and California (N = 243 clinicians) = various combinations of behavioral
 - automated alternative treatment suggestions when clinicians attempted to prescribe antibiotics for antibiotic-inappropriate diagnoses.
 - clinicians to enter an antibiotic justification note that became a permanent part of the medical record.
 - periodic e-mails to participating clinicians labeling them as either a “top performer” or “not a top performer” by comparing their antibiotic prescribing behavior with that of their peers.
 - Clinicians included internists (60%), nurse practitioners/physician assistants (19%), and family physicians (13%). The study excluded patients with chronic medical conditions that necessitate more frequent antibiotic prescriptions for acute respiratory tract infections (e.g., emphysema).
 - Practices were randomized to receive zero, one, two, or all three interventions for 18 months, and no cases were lost to follow-up.
 - Control group = 11% absolute reduction in inappropriate antibiotic prescribing rates
 - Hawthorne effect
 - Both the accountable justification and peer comparison interventions significantly decreased antibiotic prescribing rates compared with the control group (–7.0% and –5.2%, respectively).
 - However, the suggested alternatives intervention did not significantly reduce antibiotic prescribing rates compared with control.
 - The latter result is disheartening but consistent with previous findings about influencing clinical decision making: Information alone rarely changes behavior.
 - The most powerful influence continues to be peer pressure and the desire to conform.

What are others doing?

- Health Centric Advisors QIN (Maine QIN-QIO) – webinars regionally
 - Decreased abx for acute bronchitis in outpatient offices from 35% --0% in 1 yr
 - Dr. Dennis
 - Abx Rx decreased from 84%→ 8% in outpatient setting ant 67→54% in ED by giving goody bags with self care items like tissues/cough drops/information
- Health Services Advisor Group (Ohio QIN-QIO)
 - Sharing antibiotic use data and treatment recommendations with providers
 - Accountability document, departments notified, providers notified, pharmacist, chief ID physician notified. Providers given a chance to improve.
- Great Plains
 - Provided expert guidance on cases
- Atlantic Quality QIN (NY)
 - Created pocket guides
- HSAG QIN (Arizona)
 - Awareness campaigns
- Inpatient partnerships (ASN)
 - 15-20% reduction of broad spectrum abx use

What others are doing/have done

- University of Maryland
 - Level 1 abx <72 hrs unless positive culture or ID consult
 - Empiric use of level 2 abx needs ID consult in 24 hrs
 - Pharmacy reviews data and suggests de-escalation
 - Drug levels, renal function ordered by pharmacy to adjust doses
 - Pharmacy led IV→po switch
 - Pharmacy rounding, ID physician does annual abx education, order sets, clinical pathways, data tracking, reports
- Shore health system
 - Hard 5 day stop for azithromycin and 7 days for levofloxacin
 - Pharmacy purchases for abx decreased from 15→9% and cost per patient day decreased from \$16→\$8
 - Abx purchase savings of \$1 million over 4 yr period

STRATEGIES TO REDUCE INAPPROPRIATE ANTIBIOTIC USE ^{2,11,15}

- Delayed script or call if problems decreased antibiotic use by 50%
 - Recommended by several societies.
- Speaking to patients, giving pt education, calling it common cold, going over expected symptoms (color of drainage, fever presence, many symptoms presence means likely viral, etc.)
- 23% reduction of antibiotic use at urgent care w/ doctor education, monitoring, feedback
- Effective programs have improved patient outcomes and decreased antibiotic usage by up to 35%, with an annual savings to institutions of up to \$900, 000.
- Due to these substantial findings, in 2010 Kaiser added several EMR (EPIC) changes and reduced by 45%.
 - BPAs, Message alerts, Alternate option alerts, acknowledgement messages.

Now that we know better What can we do ?

- Clinician education and buy in – reduced 20% abx use in studies
 - Dashboard stats for abx use in URI codes < 7 days
 - Education on web-based required training annually along w/ department meetings and reminders
 - Include specialty care, APPs
 - Standardized patient handouts, videos in waiting areas, text based information during cold/flu season
 - Standardized patient information in EMR (.coldmsgpillai – EPIC)
 - URI templates (.uripillai – EPIC)
 - Evisits and triage protocols with Evidence based guidelines Evisits successful in doing this.
 - Patient satisfaction scores equal.
 - Discuss superbugs, complications, adverse events (rash, yeast infection, diarrhea, reduced gut flora, C-dif)
- Patient education: by doctors, handouts, explanation – reduced utilization by 40% at other places
 - Patient flyers or handouts
 - Nurses, MA use certain verbiage when rooming patients
 - Doctors reiterate the message after the exam. Sitting and talking is important
 - WE MUST Practice what we preach – for ourselves, colleagues, staff.
 - Standardized after visit summary
- Patient satisfaction: abx vs. counseling equal
 - Call back from parents is not increased if counseled adequately
- Monitoring and compliance
 - Dashboard stats
 - Chart audits
 - Annual review of improvement at CPI or med standards
 - Epic pop up with certain dx like Viral URI, URI, Sinusitis, bronchitis, Otitis media in children > 6 month
 - If <7 days, consider supportive care, portal f/u of abx rx, calling in w/o coming in, delayed script
 - Track abx use for Amoxil, Levaquin, zpack, augmentin, Omnicef
 - Track cdif rates

Now that we know better What can we do?

1. Prescription pads and symptom relief pads for patient education
2. Documentation for delayed prescribing and watchful waiting in EHR
3. Motivational interviewing training
4. Require explicit written justification in EHR for non recommended abx prescribing
5. Triage systems w/ evidence based guidelines for unnecessary ER and clinic visits
6. Audit and peer review – share data among all providers
7. Include in QI bonus structure
8. Require antibiotic stewardship CME or training annually
9. Align internal antibiotic stewardship tracking practices with reporting requirements and payment models o health plan incentive programs for abx assessment.
10. Track abx use for high priority conditions.
11. Videos in waiting rooms, webpages on these topics
12. Access to consultants
13. Patient handouts/graphics:
 1. <https://www.cdc.gov/antibiotic-use/community/materials-references/graphics.html>

My Sample Note for URI

- **History of Present Illness:**

- @NAME@ is a @AGE@ @SEX@ with PMH noted below presents today for complaints of ***. No Rhinorrhea, sore throat, nasal congestion, sinus pressure, cough. No cp/sob/wheezing/abd pain/vomiting/diarrhea/rash/arthralgias/myalgias/dizziness/headaches/vision changes/ear complaints. No dysuria/hematuria. No fever/chills. Symptoms improving. Daycare: {YES:16016}, Travel: {YES:16016}, Sick contacts: {YES:16016}, Eating well, drinking well, stooling normally, normal activity. Eating as usual. Urine output in the last 24 hours: ***, Liquid intake in the last 24 hours: ***, OTC meds used: ***, Rx meds used: ***, Recent hospitalization or emergency care: {YES:16016}, recent antibiotic use: {YES:16016}. ROS: see HPI for details.

- Problem List reviewed. PMH/PSH/FMH/Social Hx/OBGYN hx reviewed and updated

- Allergies: NKDA

- Home meds: RX: OTC:

- **Physical Examination:**

- Vitals: BMI: FDLMP
- General: active, alert, no distress, well hydrated.
- Head: nontender sinuses. No maxillary/mastoid/orbital/frontal pain. Negative (normal) transillumination
- Eyes: clear conj, no erythema or drainage
- Nose: +rhinorrhea, boggy turbinates
- Ears: clear canals and TMs
- O/P: clear, no erythema, exudates, enlargement. +cobblestoning
- Neck: supple, NO LAD
- Heart: regular rate and rhythm, no murmurs
- Lungs CTAB, no wheezes, no dyspnea, normal air movement
- Abd: soft, NT, ND+BS
- Ext: no c/c/e
- Skin: no rash

- **Assessment and Plan:**

- 1. Viral URI: supportive care discussed. Viral etiology discussed. No abx needed. OTC medication effects, side effects, limitations based on evidence, risks, all discussed. Risks of overdose discussed. Self resolution of viral illness discussed. D/w pt that abx not indicated, do not improve outcomes, do not prevent illness. D/w pt about annual flu shots, hand hygiene. Supportive care measures and evidence regarding vicks, steam, gargles, rest, fluids all discussed. Questions answered. RTC if unimproved or worse in 7-10 days.

My sample handout on URI

1. You have the common cold, caused by a virus. Antibiotics will NOT help this. This should improve by itself in about 7 days. There is no cure for this. Most over the counter medications have ingredients that are similar. None of them will cure your problems. They also may or may not help w/ the symptoms. Here are some things to try to feel better:
 1. Try Allegra D or Claritin D for 5 days to help w/ the runny nose and congestion, throat irritation, sinus pressure. Don't take for too long as it can raise the blood pressure and in men long term use can swell the prostate.
 2. Mucinex DM twice daily MAY possibly help with cough and phlegm production
 3. Tylenol every 8 hours can help w/ fever, chills, body aches, or headaches.
 4. Try vicks on your chest and under your nose nightly to help open up the nasal passages and help w/ the breathing.
 5. Try a teaspoon of honey at night to help w/ the cough/sore throat.
 6. Try to get steam before bed and when you first wake up to help w/ the sore throat/congestion/sinus pressure. Put 2 cups of water on the stove in a saucepan w/ 1/2 teaspoon of vicks vaporub (for the menthol). Then once at a boil, cover yourself with a towel and breath in the steam for 5 minutes.
 7. Gargling with warm, salty water can help ease the throat discomfort.
 8. Increase water intake to 8-10 glasses daily.
 9. Get some rest for next couple of days.
2. Call or send me a message if you are not better in 7-10 days or if you are getting worse. At that time we may need to consider a possibility of bacterial infection on top of the viral infection. At that time antibiotics may be needed, which I can just call in for you. Please ensure to provide your pharmacy when you call in.

Thank you for allowing me to be a partner for your health care needs.

Dr. Pillai

Resources

- CDC
 - Online free training course - <https://www.cdc.gov/antibiotic-use/community/for-hcp/continuing-education.html>
 - 8 hrs CE, fulfills PIP/IA/PSPA/MIPS
 - CDC Programs for Resource Limited settings
 - Hospital training programs
 - Outpatient projects
 - AAP – CDC's Core Elements of Outpatient Antibiotic Stewardship
 - Webinars – regionally (Maine)
- Results:
 - 1st abx rx improved compliance from 63.5 → 79.3%
 - Decreased fill rates for delayed prescriptions (SNAPs – safety net antibiotic prescriptions)
 - 4.5% → 24.5%
 - URI education at the practice
 - Increased from 66.1% → 86.7%

Benefits for making the effort to change

- Cost savings for hospitalizations due to resistance
- Reduce Call backs to clinic – if pt's educated
- Less calls for side effects and adverse reactions
- Improve provider and staff time.
- Less resistance, less failures, less overall admission/utilization
 - 20% less in studies
 - Improved savings, better cost savings to redirect to other resources or distributions
- Abx stewardship is a big focus
 - CDC initiatives
 - Hospital initiative
 - Presidential executive orders
 - Health plan initiatives
 - HHS initiatives
 - AQRH initiatives
 - CMS initiative
- https://www.cdc.gov/drugresistance/pdf/national_action_plan_for_combating_antibiotic-resistant_bacteria.pdf
 - Within one year: CDC will report outpatient prescribing rates for 2011 and 2012 and use this data to target and prioritize intervention efforts; CDC will establish a benchmark (in terms of prescriptions per population) for reduction in antibiotic use .
 - Within three years: Starting in 2016, CDC will issue yearly reports on progress in meeting the national target of 50% reduction in inappropriate use of antibiotics in outpatient settings (see above), as well as on overall trends in antibiotic prescribing, DOD will establish goals for reducing antibiotic use in DOD facilities that provide outpatient care for military personnel and their families, DOD will centralize reporting of outpatient antibiotic use and issue annual summary reports .
- Physician leader/champion

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