

Improving Antibiotic Prescribing- What You Need to Know and Where to Find it

Belinda Ostrowsky, MD, MPH

Medical Field Officer, NY

Division of Healthcare Quality Promotion (DHQP), CDC

Disclosures

- No financial disclosures.
- I recently transitioned from Montefiore/ Einstein to a position at CDC here with NYSDOH.
- I will be sharing insights and projects from both perspectives.

Scope of the Problem

- $\geq 50\%$ of outpatient antibiotics are **unnecessary** or **inappropriate**
- Roughly **75% of adults** receive antibiotics for acute bronchitis, this has not changed in > 20 years
- Most acute respiratory illnesses (ARIs) are due to viruses; antibiotics provide no benefit
- Providers agree that resistance and overuse is a problem, but **not in their practice**
- $1/5$ ER visits for **adverse drug events** are caused by antibiotics

Objectives

- Use cases to review guidelines for common adult antibiotic prescribing
- Local Prescribing Data
- Tools
- Local projects and strategies

Case 1: Your first patient of the day...

Is a 25 year-old female kindergarten teacher with no significant history except recurrent URIs and sinusitis up to 4-5 episodes per year over the past 2 years. She now presents with a week of thick, yellow nasal discharge, a scratchy throat and frontal headache. Temperature in office is 99F. She has received antibiotics for similar infections in the past and is requesting antibiotics on today's visit.

What do you do next?

- A) Give her a "Z-pack"
- B) Give her oseltamivir
- C) Do a rapid group A strep test and give her amoxicillin
- D) Reassure

What if she returns 4 days later with similar symptoms?

Rhinosinusitis

("URI" or the "common cold")

- Bacterial infections complicate only ~2%
- ~98% are caused by respiratory viruses (rhinovirus, coronavirus, parainfluenza, adenovirus, RSV, and influenza)
- Symptoms may last up to 14 days (average 7-11 days)
- Purulent nasal secretions **do not** predict bacterial infection **unless high fevers also present**
- Antibiotics **do not** shorten illness or prevent secondary bacterial infection

Signs of Bacterial Rhinosinusitis

1. Persistent symptoms > 10 days that are NOT improving
2. High fever (at least 39°C or 102°F) and purulent nasal discharge for at least 3-4 days
3. Initial viral URI with sudden worsening after 5-6 days (“double sickening” “double worsening”)

- **Primary bacterial pathogens:** *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *Streptococcus pyogenes*, *Staphylococcus aureus*
- First line: amoxicillin/ clavulanate, doxycycline (penicillin Allergic)
- NOT macrolides

Letter to Prescribers



Department
of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

July 2015

Dear Provider:

The Centers for Disease Control and Prevention (CDC) and the New York State Department of Health (Department) are working together to curb the overprescribing of antimicrobial agents.

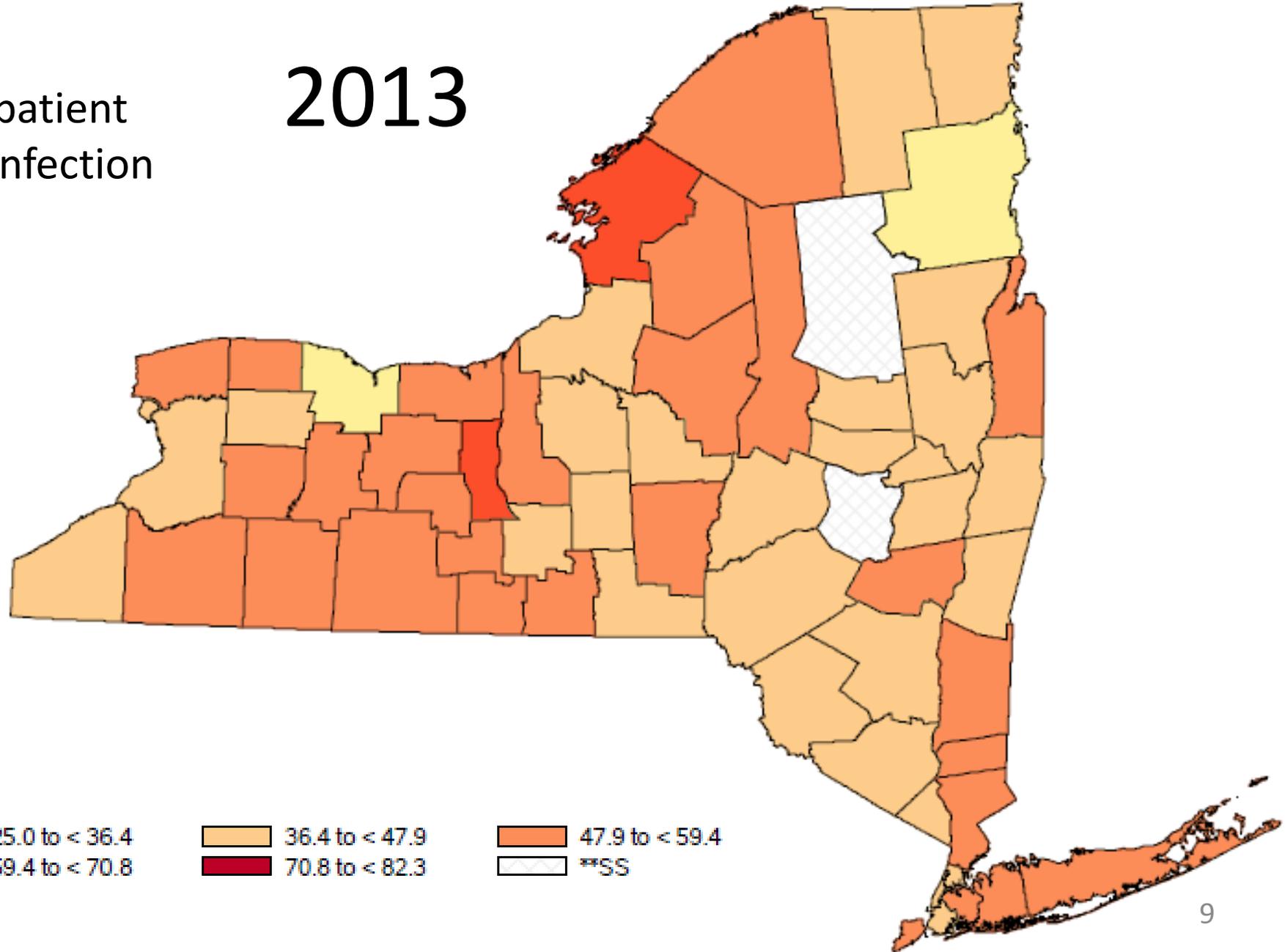
Recently, the Department performed an analysis of statewide adult outpatient Medicaid claims data from 2013. Based upon this analysis, **your practice has been identified as being located in an area of New York State that has an unexpectedly high rate of potentially avoidable antibiotic prescribing.** Please see the enclosed map.

- NYSDOH analyzed 2013 Medicaid claims data to determine NY counties where there is a high rate of avoidable antibiotic prescribing
- Based on analysis, NYSDOH sent “Dear Provider” letters to all potential antibiotics prescribers in high-prescribing counties



Potentially Avoidable Outpatient
Acute Upper Respiratory Infection
Antibiotic Prescribing,
Adjusted Rates by County
New York Medicaid
Adults 18-64 years old

2013



Adjusted* Rate of
Antibiotics Prescribed
per 100 Index Visits

“Be Antibiotics Aware: Smart Use, Best Care”

- CDC campaign to “improve antibiotic prescribing and use and to help combat antibiotic resistance”



CDC's "Be Antibiotics Aware"

ANTIBIOTICS AREN'T ALWAYS THE ANSWER.



Antibiotics save lives. Improving the way healthcare professionals prescribe antibiotics, and the way we take antibiotics, helps keep us healthy now, helps fight antibiotic resistance, and ensures that these life-saving drugs will be available for future generations.



The Facts:

When a patient needs antibiotics, the benefits outweigh the risks of side effects or antibiotic resistance.

When antibiotics aren't needed, they won't help you, and the side effects could still hurt you.

Common side effects of antibiotics can include rash, dizziness, nausea, diarrhea, or yeast infections. More serious side effects include *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which causes diarrhea that can lead to severe colon damage and death. People can also have severe and life-threatening allergic reactions.

Antibiotics do not work on viruses, such as colds and flu, or runny noses, even if the mucus is thick, yellow, or green.

Antibiotics are only needed for treating certain infections caused by bacteria. Antibiotics also won't help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.

Taking antibiotics creates resistant bacteria. Antibiotic resistance occurs when bacteria no longer respond to the drugs designed to kill them.

Each year in the United States, at least 2 million people get infected with antibiotic-resistant bacteria. At least 23,000 people die as a result.

If you need antibiotics, take them exactly as prescribed. Talk with your doctor if you have any questions about your antibiotics, or if you develop any side effects, especially diarrhea, since that could be a *C. difficile* (*C. diff*) infection which needs to be treated.

Reactions from antibiotics cause 1 out of 5 medication-related visits to the emergency department. In children, reactions from antibiotics are the most common cause of medication-related emergency department visits.

Symptom Relief for Viral Illnesses



1. DIAGNOSIS

- Cold or cough
- Middle ear fluid (Otitis Media with Effusion, OME)
- Flu
- Viral sore throat
- Bronchitis
- Other:

You have been diagnosed with an illness caused by a virus. Antibiotics do not work on viruses. When antibiotics aren't needed, they won't help you, and the side effects could still hurt you. The treatments prescribed below will help you feel better while your body fights off the virus.

2. GENERAL INSTRUCTIONS

- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throats in older children and adults, use ice chips, sore throat spray, or lozenges.
- Use honey to relieve cough. Do not give honey to an infant younger than 1.

3. SPECIFIC MEDICINES

- Fever or aches:
- Ear pain:
- Sore throat and congestion:

Use medicines according to the package instructions or as directed by your healthcare professional. Stop the medication when the symptoms get better.

Signed:

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-usa.

4. FOLLOW UP

- If not improved in _____ days/hours, if new symptoms occur, or if you have other concerns, please call or return to the office for a recheck.

Phone:

Other:



1 day ago

New York Initiatives

- Medicaid mapping project
- “Smart Use Guarantee” poster for providers



Your health is important to me.



That's why I'm signing the "Smart Use Guarantee."

Antibiotics don't work for viral infections like the common cold, most coughs, and most sore throats. Taking antibiotics when they don't work can do more harm than good by causing stomach upset, diarrhea, or allergic reactions.

I guarantee I will do my best to prescribe antibiotics only when you need them.

Antibiotics can be life-saving, but bacteria are becoming more resistant. If we're not careful about how we prescribe and use the antibiotics we've relied on for years, they might not work for us in the future. To learn more visit: cdc.gov.

Signature(s) _____



New York Initiatives

- Antibiotic prescribing guidelines

ADULT AND PEDIATRIC ANTIBIOTIC PRESCRIBING GUIDELINES

Adult Outpatient Treatment Recommendations 2017: Summary of Guidelines¹

Acute rhinosinusitis²⁻⁴

90-98% of cases are viral

Antibiotics may NOT help even if cause is bacterial

Diagnosis

Symptoms of acute **bacterial** rhinosinusitis are:

- Severe (>3-4 days), fever $\geq 39^{\circ}\text{C}$ (102.2°F) and purulent nasal discharge or facial pain;
- Persistent without improvement, such as nasal discharge or daytime cough for at least 10 days beyond the onset of viral upper respiratory symptoms; or
- "Double worsening", such as worsening or new onset fever, daytime cough, headache or nasal discharge within 10 days after initial improvement of a viral URI

Sinus radiographs are NOT routinely recommended.

Management

If bacterial, watchful waiting encouraged for uncomplicated infections with reliable follow-up.

Evidence-based supportive care:

- Saline nasal irrigation
- Intranasal glucocorticoids
- Oral decongestants when there is Eustachian tube dysfunction
- OTC analgesics and antipyretics

Macrolides (such as azithromycin) are NOT recommended due to high levels of *S. pneumoniae* antibiotic resistance (~40%).

If mild/moderate and no risk factors for resistance:

- amoxicillin/clavulanate 500/125 mg PO 3x/day or 875/125 mg PO 2x/day x 5-10 days (Some experts recommend amoxicillin.)

If severe disease or risk factors for resistance (>65 yo, antibiotics within 30 days, recent hosp, $\geq 10\%$ penicillin non-susceptible *S. pneumoniae*, immunocompromised):

- amoxicillin/clavulanate 2 g/125 mg PO 2x/day x 7-10 days.

Penicillin-allergic patients:

- doxycycline 100 mg PO 2x/day or 200 mg PO 1x/day x 5-10 days

See references for additional treatment options, including re-treatment after initial treatment failure, and other important information.

UHF Outpatient Antibiotic Stewardship Initiative

- Learning collaborative
- Focus on outpatient setting with focus on ARIs
- 9 hospitals/health systems & their 31 hospital owned practices participated in Stage I.
- 3 Activities:
 - 1) Patient prescribing
 - 2) Survey ASP activities
 - 3) Survey prescriber perceptions

**Taking antibiotics
for colds and flu?**



There's no point.

Stage I Findings

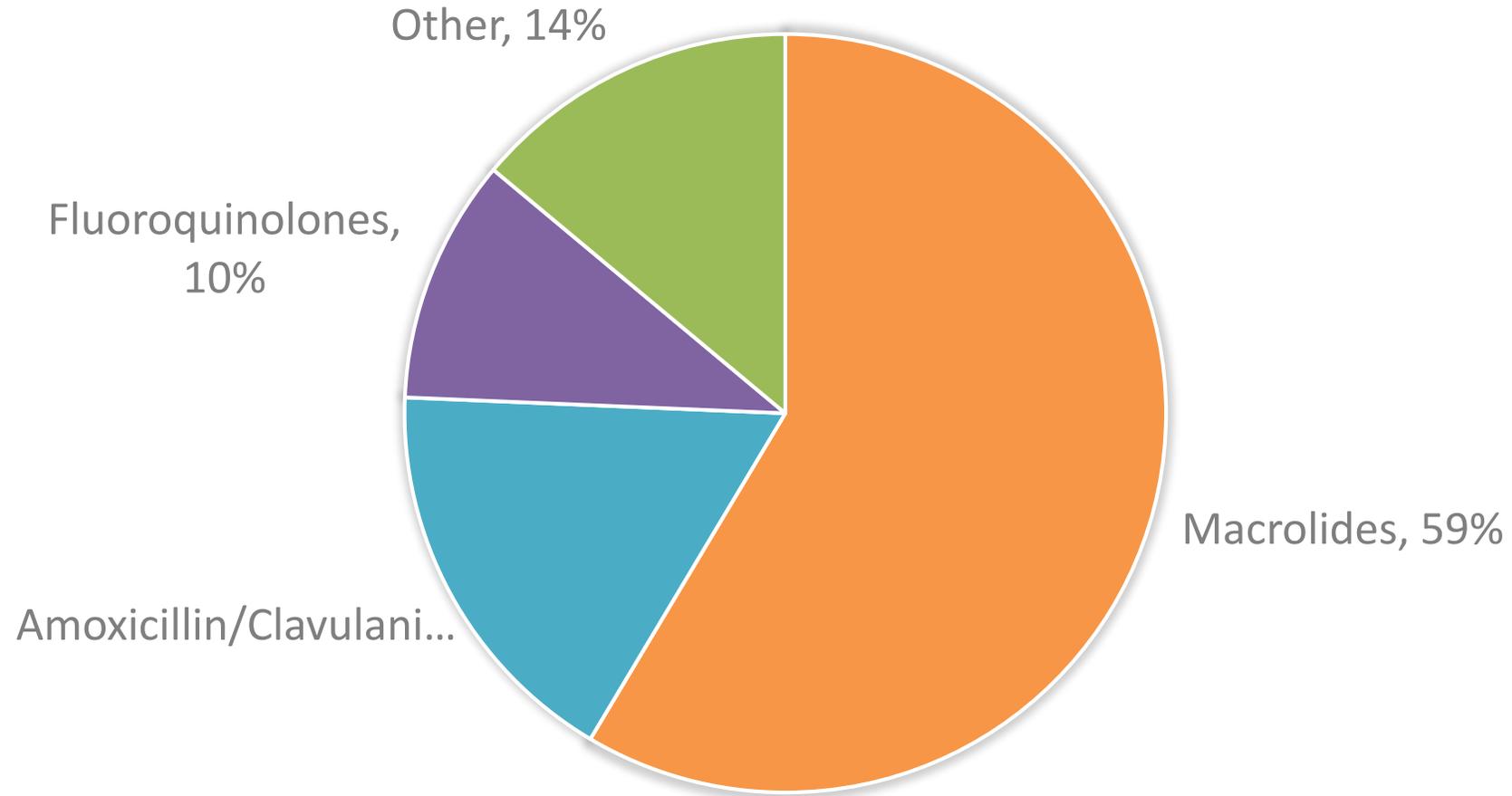
Prescribing:

- Overall rate of prescribing for ARIs was 37% (17%-71%)
- English speaking patients, commercially insured patients & patients with > 3 comorbidities, were prescribed more antibiotics
- Prescribing not consistent with clinical guidelines
- Attending physicians comprised <50% of all the prescribers, they prescribed close to 75% of the antibiotics

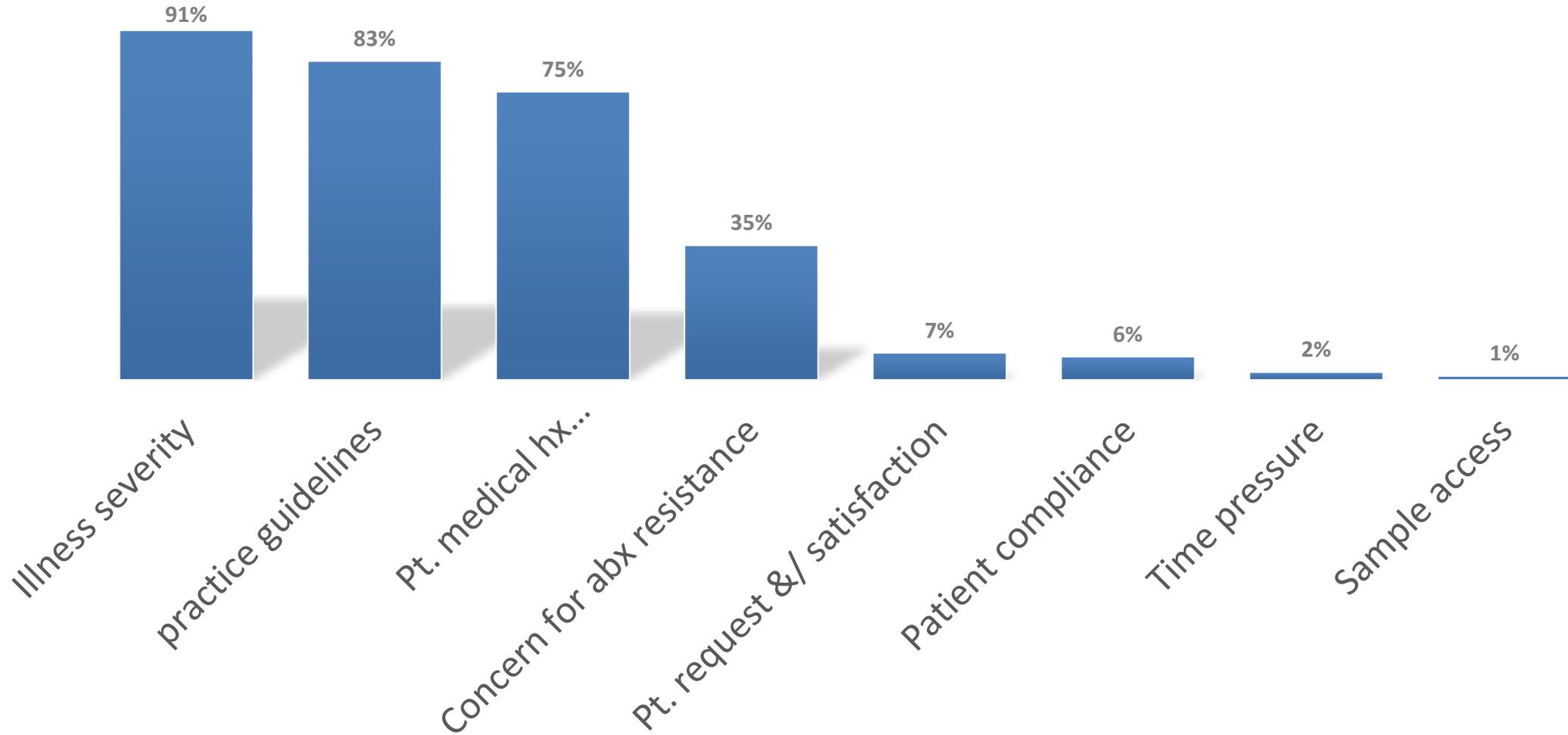
ASP Activities / Perceptions:

- Minimal outpatient antibiotic stewardship activities reported
- Few (7%) providers cited patient satisfaction/expectation as a factor that influences decision to prescribe

Types of Antibiotic Prescriptions (n=374)

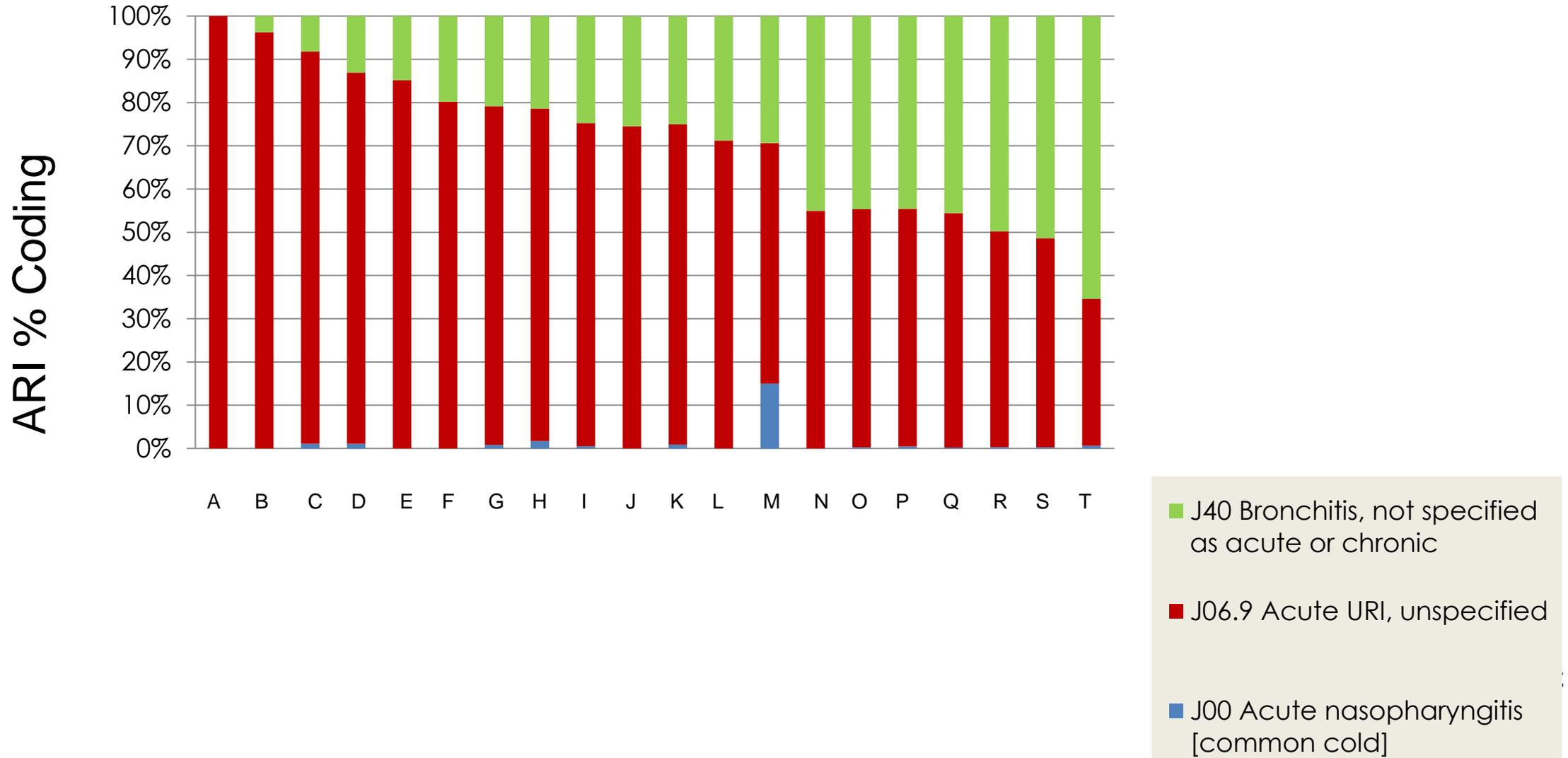


Factors that Impact Decision to Prescribe Antibiotics



Example of Health System Using the Data

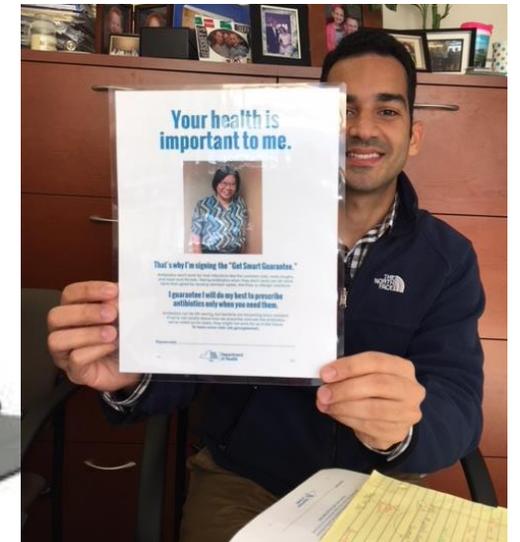
ARI Codes Distribution by Practices/ Clinics



TOOLS IN ACTION!



<https://www.youtube.com/watch?v=OWJcrRHnFEg>



Case 2

- Your 2rd patient is a 25 year old female with no PMH, sexually active with one male partner, reports 4 episodes of UTI in the past year with onset of symptoms usually after sexual intercourse with condoms. She's had several prior courses of ciprofloxacin.
- She now presents with dysuria and suprapubic tenderness. She has no fevers or flank pain on exam. She tried some left over cipro but it is not working. Urine dipstick shows +leukocyte esterase and nitrites.
- **What would you prescribe?**

Recommendations

Acute uncomplicated cystitis^{12, 13, 14}

Diagnosis

Nitrites and leukocyte esterase are the most accurate indicators of acute uncomplicated cystitis

Antibiotic treatment of asymptomatic bacteriuria is NOT recommended for healthy adults EXCEPT:

- pregnant women
- before some urological procedures

Management

First-line therapy in healthy non-pregnant, premenopausal women:

- nitrofurantoin 100 mg PO 2x/day x5 days (nitrofurantoin is NOT recommended if suspicious for early pyelonephritis)
- TMP-SMX 160/800 mg PO (one DS tablet) 2x/day x3 days (where local resistance is <20%)
- fosfomycin 3g PO x1 dose

Reserve fluoroquinolones (e.g. ciprofloxacin) for situations in which other agents are NOT appropriate.

See references for additional treatment options and other important information especially if early pyelonephritis is suspected.

4
*

5

“Antibiograms- The 101 Course”

Uses:

- Trends
- Estimates of likelihood that pathogens will be susceptible to common drugs
- Empiric regimen (with clinical info):
 - When no cultures available
 - When pathogen only available (before susceptibility data)

Limitations:

- Includes only patients with cultures
- May not be generalizable
- Does not give clinical presentation
- Only 1 factor (not replacement for clinical judgement)
- Patient’s own cultures should inform directed therapy

NEW YORK CITY ANTIBIOGRAM

2016 OUTPATIENT URINARY TRACT INFECTIONS

BRONX

ADULTS (>21 YEARS)

Bacterial Isolates	# Isolates Identified	Percent Susceptible							
		Aztreonam	Ampicillin-sulbactam	Cefazolin	Ceftriaxone	Ciprofloxacin	Levofloxacin	Nitrofurantoin	Tetracycline-sulfamethoxazole
Gram-Negative Organisms									
<i>Escherichia coli</i>	9140	46	55	85	93	78	80	97	88
<i>Klebsiella pneumoniae</i>	3032	0	80	94	93	88	93	88	88
<i>Proteus mirabilis</i>	782	79	85	90	99	87	88	0	88
<i>Enterobacter cloacae</i>	188	0	20	0	79	82	82	24	81
<i>Pseudomonas aeruginosa</i>	85	-	0	-	0	88	81	0	0
Gram-Positive Organisms									
<i>Enterococcus faecalis</i>	590	100	0	-	-	-	81	99	0

CITYWIDE

ADULTS (>21 YEARS)

Bacterial Isolates	# Isolates Identified	Percent Susceptible							
		Aztreonam	Ampicillin-sulbactam	Cefazolin	Ceftriaxone	Ciprofloxacin	Levofloxacin	Nitrofurantoin	Tetracycline-sulfamethoxazole
Gram-Negative Organisms									
<i>Escherichia coli</i>	22688	44	53	79	87	73	76	96	86
<i>Klebsiella pneumoniae</i>	4272	0	75	87	86	86	90	83	83
<i>Proteus mirabilis</i>	2884	74	87	89	94	79	86	0	80
<i>Pseudomonas aeruginosa</i>	165	-	0	-	0	76	79	0	0
<i>Enterobacter cloacae</i>	848	3	25	0	75	85	80	28	79
Gram-Positive Organisms									
<i>Enterococcus faecalis</i>	2820	99	0	-	-	86	84	99	0

KEY (% SUSCEPTIBLE)



ABOUT

This antibiogram was produced by the New York City Department of Health in consultation with experts at local healthcare systems and by compiling outpatient population data from all contributing facilities.

Contact Antibiogram@health.nyc.gov with comments, questions, or an interest in participating in next year's version.

NOTES

¹Test against ampicillin/sulbactam.

² Adult data from the Bronx include hospital facilities. ³ Number of isolates necessary with each antimicrobial; (0) denotes drug not tested or not indicated. ⁴ For uncomplicated UTIs due to *Escherichia coli*, *Klebsiella pneumoniae*, and *Proteus mirabilis*, culture results predict results for the oral agents cefazolin, cephalexin, ciprofloxacin, ciprofloxacin ER, ceftriaxone, cephalexin, and fosfomicin. ⁵ Clinical and Laboratory Standards Institute (CLSI) performance standards were applied.

ASYMPTOMATIC BACTERIURIA

¹ Asymptomatic bacteriuria is defined as isolation of a specific quantitative count of bacteria in an appropriately collected urine specimen from an individual without signs or symptoms of a urinary tract infection. ² Avoiding treatment of asymptomatic bacteriuria is important for reducing the development of antibiotic resistance. ³ Treatment of asymptomatic bacteriuria is not appropriate for women (premenopausal, non-pregnant), diabetes, the elderly, nursing home residents, or patients with genital and injury or incontinence control catheters. ⁴ Treatment of asymptomatic bacteriuria is appropriate for pregnant women and for patients undergoing urologic procedures in which mucosal bleeding is expected.

PEDIATRICS (<21 YEARS)

Bacterial Isolates	# Isolates Identified	Percent Susceptible							
		Aztreonam	Ampicillin-sulbactam	Cefazolin	Ceftriaxone	Ciprofloxacin	Levofloxacin	Nitrofurantoin	Tetracycline-sulfamethoxazole
Gram-Negative Organisms									
<i>Escherichia coli</i>	2562	44	53	84	93	84	88	98	87
<i>Klebsiella pneumoniae</i>	119	0	78	84	91	86	91	83	85
<i>Proteus mirabilis</i>	228	85	94	91	97	94	97	0	91
<i>Pseudomonas aeruginosa</i>	88	-	0	-	0	88	89	0	0
<i>Enterobacter cloacae</i>	24	0	25	0	86	94	95	47	95
Gram-Positive Organisms									
<i>Enterococcus faecalis</i>	207	100	50	-	-	100	96	100	0

Urine culture returns 48 hours later with the following result...
>100 K *Escherichia coli*

Drug	MIC	Interpretation
Ampicillin	>16	R
Amikacin	<=4	S
Ciprofloxacin	>2	R
Cefepime	>16	R
Meropenem	<=0.5	S
Nitrofurantoin	32	S
Piperacillin/tazobactam	>16	R
TMP/SMX	>2/38	R

Case 3

60 year old female with 3 days of an enlarging, painful lesion on her right leg, looks like a boil that she attributes to a “spider bite.”

T 98, BP 120/70, P 80

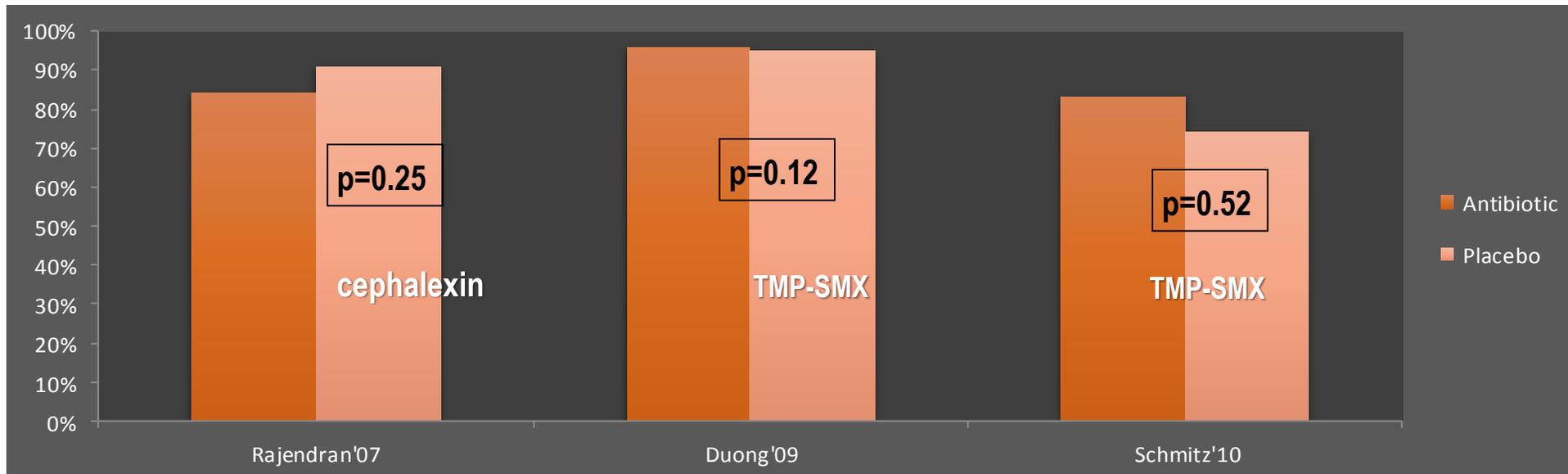


What is the appropriate management?

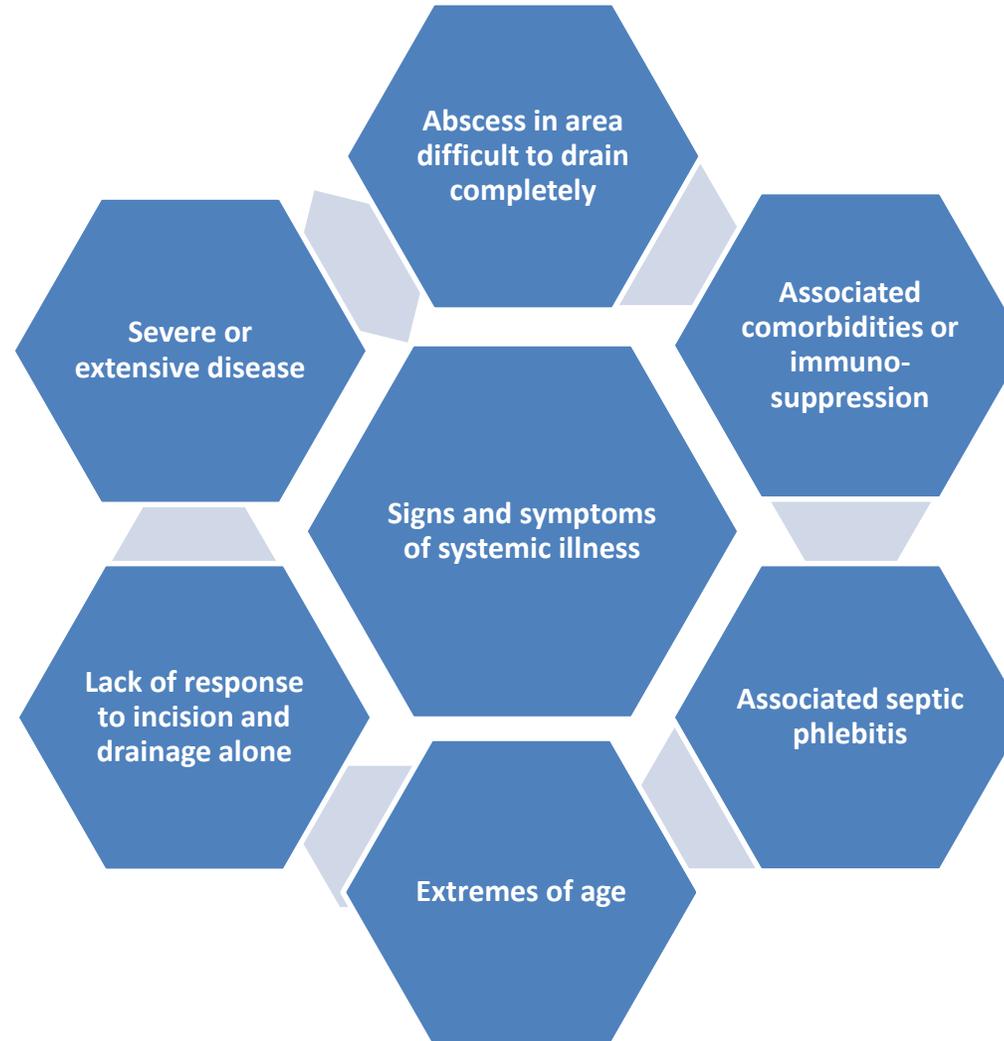
- A. Incision & drainage (I&D) alone
- B. I&D PLUS oral anti MRSA antibiotic
- C. Oral anti MRSA antibiotic

Abscesses

- Incision and drainage is the primary treatment
 - I&D alone likely adequate for simple abscesses/boils
- Do antibiotics provide additional benefit?
 - Multiple, observational studies: high cure rates with or without antibiotics
 - 3 RCTs of uncomplicated skin abscesses



Conditions in Which Antibiotic Therapy is Recommended After Incision and Drainage



Case 4

60 year old female presents with erythema of her right arm over the past 48 hours. It's tender and warm to touch. There is no purulent drainage or abscess. No complaint of joint involvement.
T 98.2, BP 130/72, P 77

What is the appropriate management?

- A. Clindamycin 450mg oral Q8 Hrs
- B. Cephalexin 500mg oral Q 6 Hrs, response & add TMP/ SMX if no response
- C. Cephalexin 500mg oral PLUS SMX 2 DS oral Q12Hrs



Nonpurulent SSTIs

Cellulitis with no purulent drainage or exudate

Empiric treatment for β -hemolytic strep is recommended

- Prospective study with 248 hospitalized patients
 - 73% due to β -hemolytic strep
 - 96% response rate to β -lactam antibiotics
- Multicenter, double-blind, randomized study with 500 patients
 - Clinical cure rate: cephalexin + TMP/SMX 84% vs. cephalexin 86%

Recommendations

- Cellulitis with purulent drainage/exudate
 - I&D is recommended
 - Empiric therapy for CA-MRSA is recommended
 - Empiric therapy for β -hemolytic strep unlikely needed
 - Duration: 5-7 days, based on clinical response

- Cellulitis with no purulent drainage or exudate
 - Add empiric treatment for MRSA if:
 - Fails to respond to β -lactam antibiotics
 - Patients with systemic infection
 - Duration: 5-7 days, based on clinical response

What Can You Do to Promote Judicious Prescribing?

- Be aware of the issues of over prescribing
- Be an ASP champion with other prescribers, patients/family
 - Messaging when no antibiotics are needed
 - When they are needed, to take as directed
- Understand local prescribing data
- Know what resources are available for individual prescribers (e.g., guidelines, tools, local microbiology)
- Know the guidelines
 - When no antibiotics are needed
 - When narrower antibiotics can be used
- Keep checking our NYSDOH AR website for updated resources and tools:
www.health.ny.gov/antibioticresistance