Preparing for Change: Antimicrobial Stewardship in Ambulatory Care

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Disclosure

- **Faculty have nothing to disclose.**

Objectives

- Discuss proposed regulatory standards for antimicrobial stewardship in the ambulatory care setting and describe an effective interprofessional antimicrobial stewardship team to meet or exceed the standards.

- Utilize antimicrobial surveillance data to identify potential targets for antimicrobial stewardship activities in the ambulatory care setting.

- Design innovative strategies for antimicrobial stewardship in the ambulatory care setting, including collaborative practice agreements and local prescribing guidelines.

Emerging Antimicrobial Resistance in the Community

MRSA, ESBL, and MDRSP!

Oh My!

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Time for a Poll

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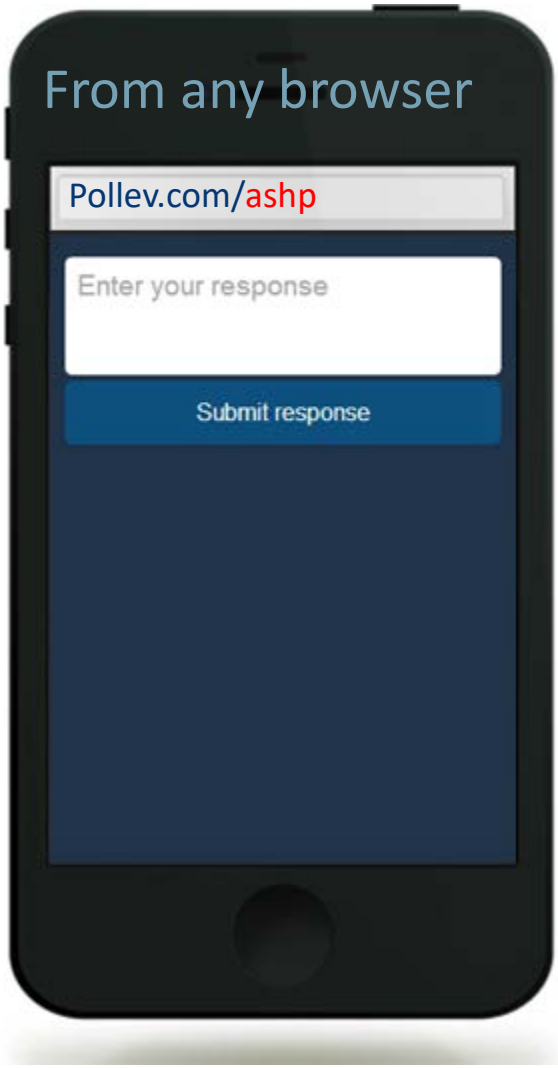
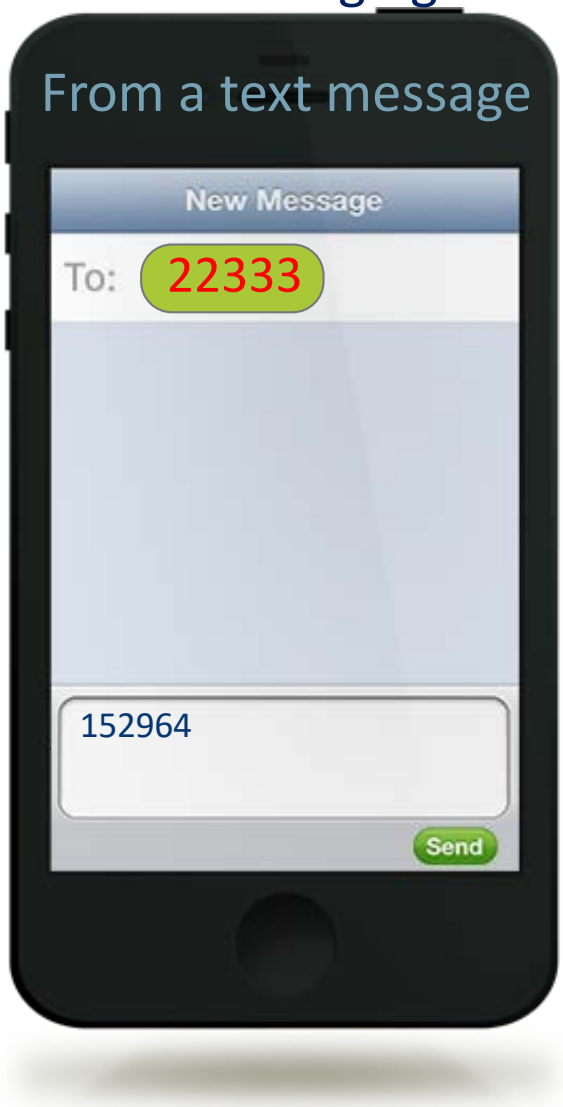




How to vote via text message

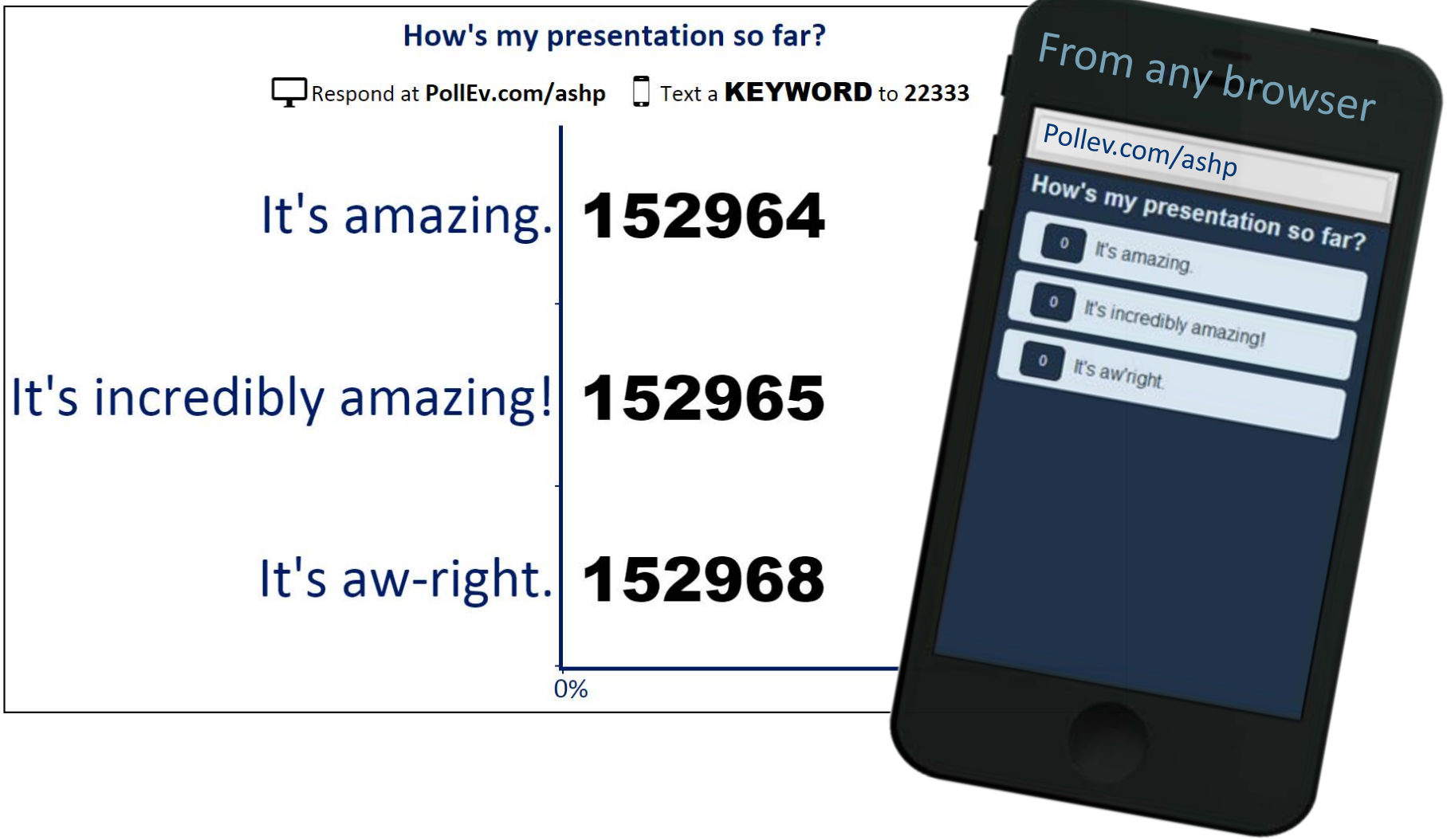
How's my presentation so far?

Respond at **PollEv.com/ashp** Text a **KEYWORD** to **22333**

It's amazing.	**152964**
It's incredibly amazing!	**152965**
It's aw-right.	**152968**

0%

How to vote via the web



Question1: Which of the following regarding drug resistant *Streptococcus pneumoniae* is true?

A. Easily spread through direct contact

B. Most commonly isolated in college aged patients (i.e., 18 to 25 years)

C. Frequently resistant to azithromycin

D. Remains highly susceptible to penicillin

Question 1

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Antimicrobial Resistance in the Community

- No longer limited to the "sickest" patients
- Rate of resistance increasing in the community faster than the hospital setting in some cases
- Commonly prescribed antimicrobials are becoming clinically insignificant

Kassakian SZ et al. Antimicrob Resist Infect Control 2014; 3: 9.

Community-Acquired Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA)

- 1990s: Methicillin Resistant *Staphylococcus aureus* (MRSA) isolated in community-based patients with no risk factors/history

- Produces exotoxin via Panton-Valentine leukocidin gene
  - Associated with increased virulence
  - Rarely seen in other strains of MRSA
  - Causes necrosis and lesions of the skin and mucosa

Daum RS. *N Engl J Med.* 2007; 357: 380-90.

Community-Acquired Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA)

- CA-MRSA most commonly associated with skin and soft tissue infections
- Can also cause hemorrhagic and/or necrotizing pneumonia and necrotizing fasciitis
- Easily spread through direct contact

Daum RS. *N Engl J Med.* 2007; 357: 380-90.

"Zithromax is the best antiviral ever invented!"

—A Physician I Worked With Who Shall Remain Nameless

Erythromycin-Resistant Group A *Streptococcus*

- **2001: Emergence of erythromycin resistance noted in isolates obtained from throat cultures in children**
  - **48% of isolates resistant in study group**
  - **38% of randomly selected isolates resistant**

- **Resistance results from either active efflux (mef genes) or target modification (erm genes)**
  - **erm genes → also confer lincosamide resistance**

Martin JM et al. *N Engl J Med.* 2002; 346: 1200-6.

Silva-Costa C et al. *Expert Rev Anti Infect Ther.* 2015; 13: 615-28.

Erythromycin-Resistant Group A *Streptococcus*

- Group A *Streptococcus* most commonly associated with pharyngitis
- Can also cause necrotizing fasciitis and toxic shock syndrome
- Easily spread via droplets and direct contact

Martin JM et al. *N Engl J Med.* 2002; 346: 1200-6.

Centers for Disease Control and Prevention. Antibiotic resistant threats in the United States, 2013. http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf

Drug-Resistant *Streptococcus pneumoniae* (DRSP)

- 30% of *Streptococcus pneumoniae* isolates are resistant to at least one antibiotic
- Frequently demonstrates resistance to penicillins and macrolides
- Rates of resistance are highest in patients aged <5 years and ≥ 65 years

Centers for Disease Control and Prevention. Antibiotic resistant threats in the United States, 2013. http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf

Drug-Resistant *Streptococcus pneumoniae* (DRSP)

- Most commonly associated with pneumonia
- Can also cause otitis media, meningitis, and bacteremia
- Easily transmitted via droplets

URL: Centers for Disease Control and Prevention. *Antibiotic resistant threats in the United States*, 2013. http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf

Extended-Spectrum Beta-Lactamase (ESBL)-Producing *Escherichia coli*

- **Community-acquired ESBL-producing *Escherichia coli* rates dramatically increasing**

- **Community-acquired ESBL pathogens often have a different gene than "typical" ESBL-producing pathogens**
  - **CTX-M variant**
  - **Demonstrate resistance to trimethoprim-sulfamethoxazole, tetracycline, gentamicin, and ciprofloxacin**

Pitout JD, et al. *J Antimicrob Chemother* 2005; 56: 52-9.

Kassakian SZ et al. *Antimicrob Resist Infect Control* 2014; 3: 9.

Extended-Spectrum Beta-Lactamase (ESBL)-Producing *Escherichia coli*

- Most commonly associated with urinary tract infection
- Can also cause intraabdominal infections
- Question animal → human transmission
- Easily spread through direct contact with contaminated surfaces

Pitout JD et al. *J Antimicrob Chemother* 2005; 56: 52-9.
Kassakian SZ et al. *Antimicrob Resist Infect Control* 2014; 3: 9.

And the List Goes On…

- Clindamycin-resistant Group B *Streptococcus*
- Fluconazole-resistant *Candida*
- *Clostridium difficile*
- *Neisseria gonorrhoeae*

Centers for Disease Control and Prevention. Antibiotic/antimicrobial resistance: biggest threats. http://www.cdc.gov/drugresistance/biggest_threats.html.

Question 1: Which of the following regarding drug resistant *Streptococcus pneumoniae* is true?

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B. Most commonly isolated in college aged patients (i.e., 18 to 25 years)

C. **Frequently resistant to azithromycin**

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Proposed Standards for Antimicrobial Stewardship

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Question 2: A decreased rate in which of the following is a proposed expectation from antimicrobial stewardship in ambulatory care?

A. Hospitalization for treatment of infections by 10%

B. Adverse drug events attributed to antibiotics by 30%

C. Inappropriate antibiotic use by 50%

D. Clinical failure attributed to antibiotics by 60%

Question 2

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White House National Action Plan for Combating Antibiotic-Resistant Bacteria

- **March 2015: The White House released a National Action Plan for Combating Antibiotic-Resistant Bacteria**

- **Several objectives were outlined describing the need for antimicrobial stewardship programs in *all* healthcare settings, including the community**

The White House. National Action Plan for Combating Antibiotic-Resistant Bacteria. March 2015. www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf

White House National Action Plan for Combating Antibiotic-Resistant Bacteria

- A reduction in inappropriate antibiotic use by ***50%*** in outpatient settings is expected

- Annual reporting of antibiotic use in outpatient settings to be used to guide future interventions
  - Centers for Disease Control and Prevention (CDC) will set new benchmarks for prescribing

The White House. National Action Plan for Combating Antibiotic-Resistant Bacteria. March 2015. www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf

The Joint Commission Proposed Rule on Antimicrobial Stewardship (MM.09.01.01 for Ambulatory Health Care)

- Education regarding antimicrobial resistance and antimicrobial stewardship practices upon hire and annually thereafter
- Education for patients and families on the appropriate use of antimicrobials
- The organization and leadership establish an antimicrobial stewardship program as a priority

The Joint Commission. Proposed Standard for Antimicrobial Stewardship in AHC, CAH, HAP, NCC, and OBS. https://jointcommission.az1.qualtrics.com/CP/File.php?F=F_5tDHGzIVDMHenDn

The Joint Commission Proposed Rule on Antimicrobial Stewardship (MM.09.01.01 for Ambulatory Health Care)

- **An antimicrobial stewardship multidisciplinary team including the following, when available:**
  - **Pharmacist(s)**
  - **Infection disease physician**
  - **Infection preventionist(s)**

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The Joint Commission Proposed Rule on Antimicrobial Stewardship

- **Antimicrobial stewardship program including the following core elements:**
  - **Leadership commitment**
  - **Accountability**
  - **Drug expertise**
  - **Action**
  - **Tracking**
  - **Reporting**
  - **Education**

The Joint Commission. Proposed Standard for Antimicrobial Stewardship in AHC, CAH, HAP, NCC, and OBS. https://jointcommission.az1.qualtrics.com/CP/File.php?F=F_5tDHGzIVDMHenDn

The Joint Commission Proposed Rule on Antimicrobial Stewardship

- **Antimicrobial stewardship program uses protocols such as:**
  - **Guidelines for antimicrobial use in adults and pediatric patients**
  - **Assessment of Appropriateness of Antibiotics for Community-Acquired Pneumonia**
  - **Treatment Guidelines for Common Infections**
  - **"Wait-and-See" Antibiotic Protocol**

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The Joint Commission Proposed Rule on Antimicrobial Stewardship (MM.09.01.01 for AHC)

- The organization collects and analyzes data on its antimicrobial stewardship program, including prescribing and resistance patterns
- Action(s) for improvement based on opportunities identified through the antimicrobial stewardship program are taken

The Joint Commission. Proposed Standard for Antimicrobial Stewardship in AHC, CAH, HAP, NCC, and OBS. https://jointcommission.az1.qualtrics.com/CP/File.php?F=F_5tDHGzIVDMHenDn

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Developing an Antimicrobial Stewardship Team

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Question 3: Which of the following is an essential member of the antimicrobial stewardship team?

A Administrative Assistant

B Clinical Microbiologist

C Information systems specialist

D Pharmacist

Question 3

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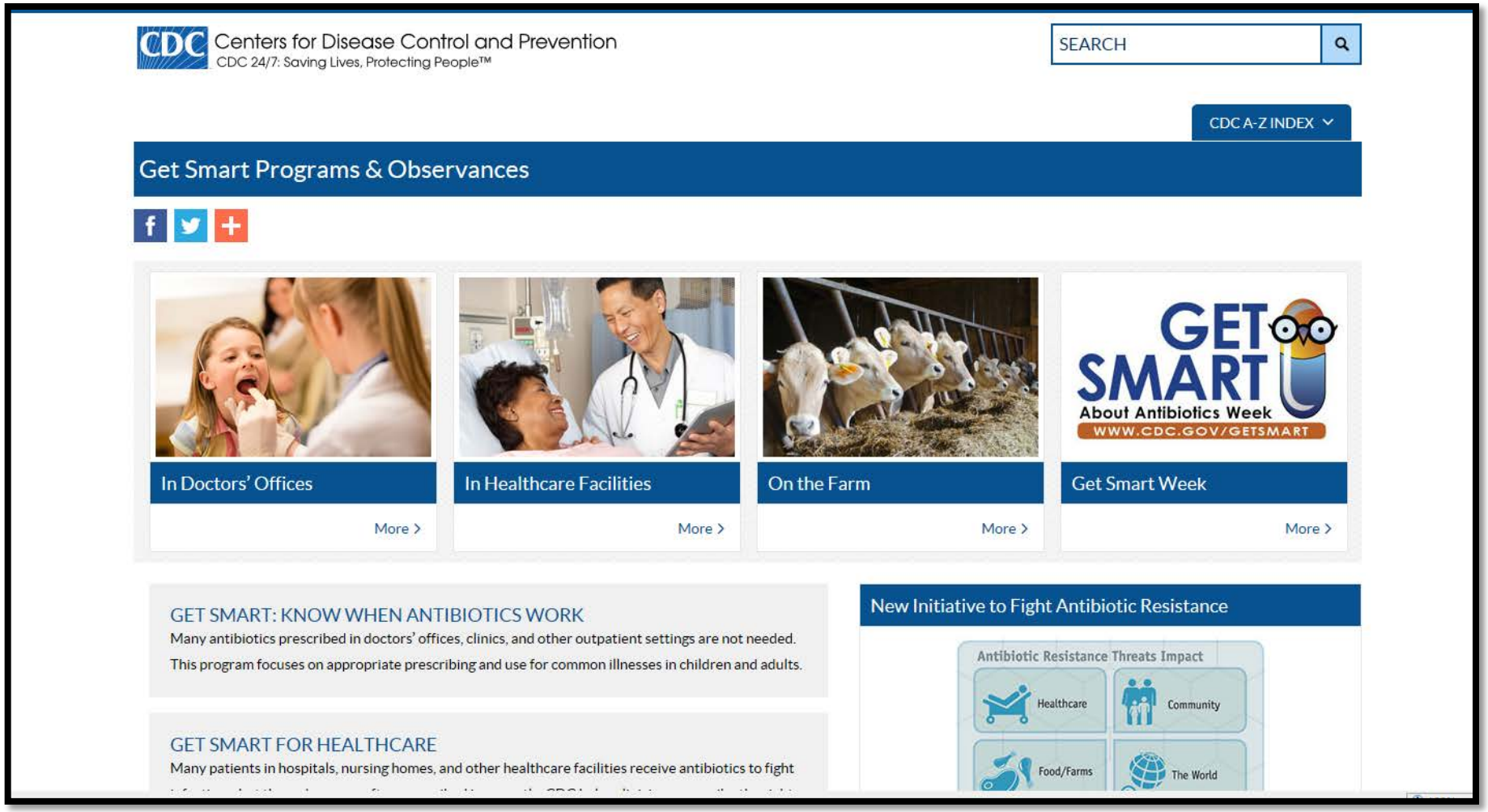

http://www.cdc.gov/getsmart/

Centers for Disease Control and Prevention. Get Smart programs & observances.

CDC Core Elements of Antibiotic Stewardship Programs

- Leadership Commitment: allow for dedicated time, resources, and participation
- Accountability: assign a stewardship program leader responsible for program outcomes
- Drug Expertise: identify a pharmacist leader
- Action: implement at least one recommended action/intervention

Centers for Disease Control and Prevention. Core elements of hospital antibiotic stewardship programs. 2014. http://www.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf

CDC Core Elements of Antibiotic Stewardship Programs

- **Tracking: monitor prescribing and resistance patterns**

- **Reporting: regular reporting on antibiotic use, resistance, and outcome measures**

- **Education: educate clinicians about resistance and optimal prescribing**

Centers for Disease Control and Prevention. Core elements of hospital antibiotic stewardship programs. 2014. http://www.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf

The Joint Commission Proposed Rule on Antimicrobial Stewardship (MM.09.01.01 for AHC)

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  - **Infection disease physician**
  - **Infection preventionist(s)**

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IDSA/SHEA* Guidelines for…Antimicrobial Stewardship: Team Members

- **Essential: Infectious diseases physician, pharmacist, hospital administration, medical staff leadership, local providers**
- **Optimal: clinical microbiologist, infection control specialist, information system specialist, hospital epidemiologist**

*= **Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America**

Dellit TH et al. *Clin Infect Dis.* 2007; 44:159–77.
Barlam TF et al. *Clin Infect Dis.* 2016; 62: e51-77.

The Antimicrobial Stewardship Team in Ambulatory Care

- **Physicians/Advanced Practice Providers**
  - Ambulatory Care
  - Infectious Diseases

- **Pharmacist(s)**
  - Ambulatory Care
  - Infectious Diseases
  - Community

The Antimicrobial Stewardship Team in Ambulatory Care

- Administration/Leadership
- Microbiologist
- Information system specialist/support
- Others?

The Antimicrobial Stewardship Team in Ambulatory Care

How do we get team members to be invested?

Question 3: Which of the following is an essential member of the antimicrobial stewardship team?

A Administrative Assistant

B Clinical Microbiologist

C Information systems specialist

D **Pharmacist**

Identifying Targets for Antimicrobial Stewardship

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Question 4: Based on surveillance data, which of the following would most benefit from targeted antimicrobial stewardship efforts?

A Epididymitis

B Meningitis

C Otitis externa

D Pharyngitis

Question 4

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Question 5: Based on surveillance data, which of the following would most benefit from targeted antimicrobial stewardship efforts?

A Amoxicillin

B Azithromycin

C Cephalexin

D Nitrofurantoin

Question 5

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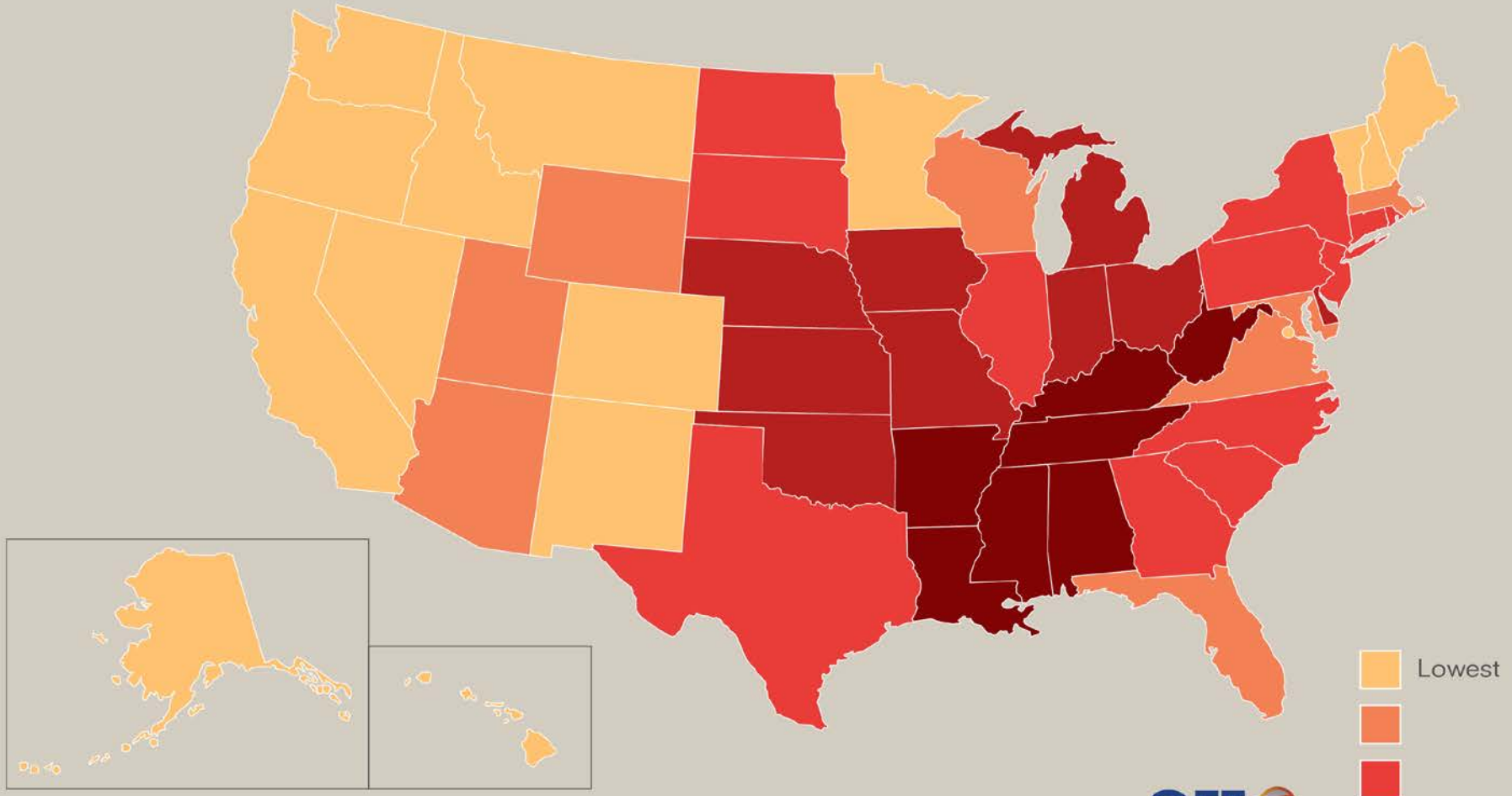
Community Antibiotic Prescribing Rates by State (2013/2014)*

50% of all antibiotics prescribed in U.S. health provider offices are either unnecessary or inappropriate



*Antibiotic prescriptions per 1000 persons
Prescribing data from 2014; population data from 2013

Source: IMS Health

GET SMART
About Antibiotics Week
WWW.CDC.GOV/GETSMART

IMS Health. http://www.cdc.gov/getsmart/community/images/usmap.jpg

Identifying Targets for Antimicrobial Stewardship

- Targets for antimicrobial stewardship should be high value, achievable, and measurable
- Target 1: “Common things are common”
- Target 2: “Where there is smoke, there is fire”
- Target 3: “Get the most bang for the buck”

Identifying Targets for Antimicrobial Stewardship: "Common Things are Common"

- 2011: 262.5 million courses of antibiotics prescribed
  - 842 prescriptions written per 1000 persons
  - 61.5% of antibiotic expenditures in the United States
- Prescribing rate highest for children aged 0—2 years: 1,287 prescriptions per 1,000 population
- Penicillins and macrolides most commonly prescribed
  - Azithromycin single most commonly prescribed antibiotic
  - Quinolones highest antibiotic expenditure

Hicks LA et al. *Clin Infect Dis.* 2015; 60: 1308.

Suda KJ et al. *J Antimicrob Chemother.* 2013; 68: 715-8.

Identifying Targets for Stewardship: "Common Things are Common"

Diagnosis	Number of Prescriptions per 1,000 Population [95% CI]	Percentage of Visits with Antibiotics Prescribed, All Ages
Sinusitis	56 [48-64]	72.2%
Otitis media	47 [41-54]	79.5%
Pharyngitis	43 [38-49]	62.2%

CI = confidence interval

Fleming-Dutra KE et al. *JAMA* 2016; 315: 1864-1873.

Identifying Targets for Stewardship: "Common Things are Common"

Diagnosis	Number of Prescriptions per 1,000 Population [95% CI]	Number of *Appropriate* Prescriptions	Percentage of Appropriate Prescriptions
Acute Respiratory Conditions	221 [198-245]	111	50.2%
All Conditions	506 [458-554]	353	69.8%

CI = confidence interval

Fleming-Dutra et al. *JAMA* 2016; 315: 1864-73.

Identifying Targets for Stewardship: "Where There is Smoke, There is Fire"

Pharyngitis		
	Percentage Positive for Group A *Streptococcus*	Percentage of Patients Receiving Antibiotics
Children	37	56.2
Adults	18	72.4

Fleming-Dutra KE et al. *JAMA* 2016; 315: 1864-1873.

Identifying Targets for Antimicrobial Stewardship: "Where There is Smoke, There is Fire"

- Treatment guidelines recommend penicillin/amoxicillin as first-line therapy for most sinusitis, otitis media, and *Streptococcal* pharyngitis

- Yet azithromycin is the most frequently prescribed antibiotic….

- …and now we have erythromycin-resistant Group A *Streptococcus*

Chow AW et al. *Clin Infect Dis.* 2012; 54: e72-112. Shulman ST et al. *Clin Infect Dis.* 2012; 55: 1279-82.

Hicks LA et al. *Clin Infect Dis.* 2015; 60: 1308-16. Centers for Disease Control and Prevention. Antibiotic resistant threats in the United States, 2013. http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf

Identifying Targets for Antimicrobial Stewardship: "Get the Most Bang for the Buck"

- Identify targets where prescribing is inappropriate
  - Are antibiotics needed?
  - Drug selection, dose, and duration

- Identify targets with either high level resistance or with low level but emerging resistance

Identifying Targets for Antimicrobial Stewardship: "Get the Most Bang for the Buck"

- **Upper respiratory tract infections**
  - Are antibiotics indicated?
  - Are first-line agents being utilized?

- **Urinary tract infections**
  - Are antibiotics indicated?
  - Are first line agents being utilized?
  - Is the duration of therapy appropriate?

Identifying Targets for Antimicrobial Stewardship: "Get the Most Bang for the Buck"

- Identify antimicrobial agents to target → identify prescribing patterns and focus on those
  - Fluoroquinolones
  - 3rd-generation cephalosporins

- Combine with local resistance information to target therapy
  - e.g., *Streptococcus pneumoniae* → azithromycin

Identifying Targets for Stewardship: "Get the Most Bang for the Buck"

Is it Really a Penicillin Allergy?

Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals

Did You Know? 5 Facts About Penicillin Allergy (Type 1, Immunoglobulin E (IgE)-mediated)

1. Approximately 10% of all U.S. patients report having an allergic reaction to a penicillin class antibiotic in their past.
2. However, many patients who report penicillin allergies do not have true IgE-mediated reactions. When evaluated, fewer than 1% of the population are truly allergic to penicillins.[1]
3. Approximately 80% of patients with IgE-mediated penicillin allergy lose their sensitivity after 10 years.[1]
4. Broad-spectrum antibiotics are often used as an alternative to penicillins. The use of broad-spectrum antibiotics in patients labeled "penicillin-allergic" is associated with higher healthcare costs, increased risk for antibiotic resistance, and suboptimal antibiotic therapy.[1]
5. Correctly identifying those who are not actually penicillin-allergic can decrease unnecessary use of broad-spectrum antibiotics.[1]

10% of the population reports a penicillin allergy but <1% of the whole population is truly allergic.

Before prescribing broad-spectrum antibiotics to a patient thought to be penicillin-allergic, evaluate the patient for true penicillin allergy (IgE-mediated) by conducting a history and physical, and, when appropriate, a skin test and challenge dose.

Centers for Disease Control and Prevention. Get smart: know when antibiotics work. Print materials for healthcare professionals. http://www.cdc.gov/getsmart/community/materials-references/print-materials/hcp/index.html.

Question 4: Based on surveillance data, which of the following would most benefit from targeted antimicrobial stewardship efforts?

A Epididymitis

B Meningitis

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Question 5: Based on surveillance data, which of the following would most benefit from targeted antimicrobial stewardship efforts?

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C Cephalexin

D Nitrofurantoin

Innovative Strategies for Antimicrobial Stewardship in Ambulatory Care

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Question 6: Which of the following should be performed prior to developing a guideline for the treatment of skin and soft tissue infections?

A Construct an antibiogram

B Conduct a provider preference survey

C Review the hospital treatment protocol

D Gather prescription benefit plan formularies

Question 6

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The Joint Commission Proposed Rule on Antimicrobial Stewardship

- **Antimicrobial stewardship program uses protocols such as:**
  - **Guidelines for antimicrobial use in adults and pediatric patients**
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Antimicrobial Stewardship Strategies

- Prospective audit with intervention and feedback
- Formulary restriction and preauthorization
- Education
- Guidelines and clinical pathways
- Antimicrobial order forms
- Streamlining or de-escalation of therapy
- Dose optimization
- Parenteral-to-oral conversion
- Computer surveillance and decision support

Dellit TH et al. *Clin Infect Dis* 2007; 44:159–77.

Barlam TF et al. *Clin Infect Dis* 2016; 62: e51-77.

Audit and Feedback

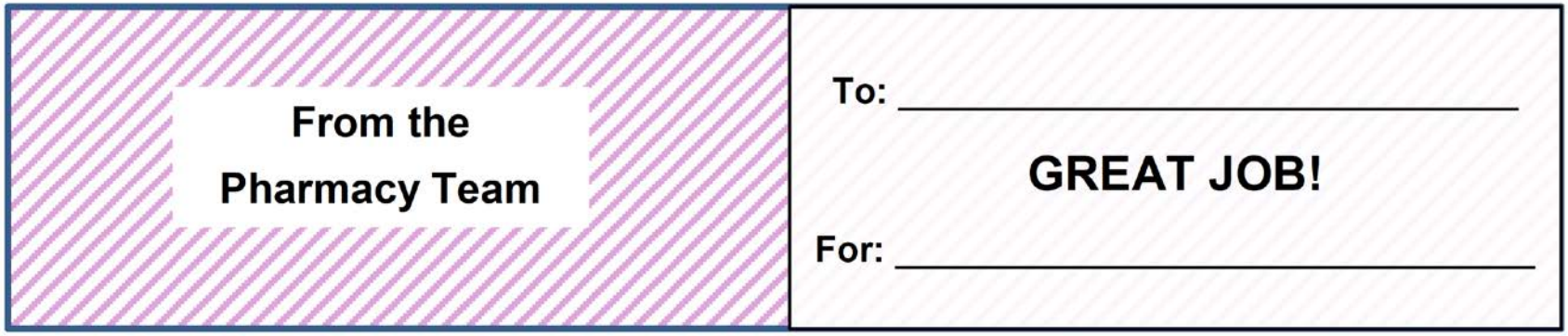
- Generally performed one-on-one on a patient-specific basis
- Can be performed as a summative review per disease state (e.g., urinary tract infection)
- Need to balance discussing when suboptimal choices are made to impact care and being the "police"

Dellit TH et al. *Clin Infect Dis.* 2007; 44:159–77.

Barlam TF et al. *Clin Infect Dis.* 2016; 62: e51-77.

Audit and Feedback

- **Candy bars work (much to my surprise)!**



Education

- **Ultimately, education should include both providers *and* patients**
- **Education *alone* is "only marginally effective" and does not result in sustained impact**
- **Education may be provided in any format possible**

Dellit TH et al. *Clin Infect Dis.* 2007; 44:159–77.

Barlam TF et al. *Clin Infect Dis.* 2016; 62: e51-77.

Viruses or Bacteria
What's got you sick?

Antibiotics only treat bacterial infections. Viral illnesses cannot be treated with antibiotics. When an antibiotic is not prescribed, ask your healthcare professional for tips on how to relieve symptoms and feel better.

Illness	Usual Cause		Antibiotic Needed
	Viruses	Bacteria	
Cold/Runny Nose	✓		NO
Bronchitis/Chest Cold (in otherwise healthy children and adults)	✓		NO
Whooping Cough		✓	Yes
Flu	✓		NO
Strep Throat		✓	Yes
Sore Throat (except strep)	✓		NO
Fluid in the Middle Ear (otitis media with effusion)	✓		NO
Urinary Tract Infection		✓	Yes

Antibiotics Aren't Always the Answer

www.cdc.gov/getsmart

GET SMART
Know When Antibiotics Work

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Rx

Name: _____

Date: _____/_____/_____

GET SMART
Know When Antibiotics Work

Diagnosis:

- ○ Cold
- ○ Cough
- ○ Flu
- ○ Middle ear fluid (Otitis Media with Effusion, OME)
- ○ Viral sore throat
- ○ Other: _____

You have been diagnosed with an illness caused by a virus. **Antibiotics do not cure viral infections.** If given when not needed, antibiotics can be harmful. The treatments prescribed below will help you feel better while your body's own defenses are fighting the virus.

General instructions:

- ○ Drink extra water and juice.
- ○ Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- ○ For sore throats, use ice chips or sore throat spray; lozenges for older children and adults.

Specific medicines:

- ○ Fever or aches:
- ○ Ear pain:
- ○ _____
- ○ _____

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

Follow up:

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

Signed: _____

CDC

For More Information call 1-800-CDC-INFO
or visit www.cdc.gov/getsmart

Centers for Disease Control and Prevention. Get smart: know when antibiotics work. Print materials for healthcare professionals. http://www.cdc.gov/getsmart/community/materials-references/print-materials/hcp/index.html

Treatment Guidelines

- **Treatment guidelines available at:** http://www.idsociety.org/IDSA_Practice_Guidelines/

- **Guidelines should be used in combination with local susceptibility and resistance patterns**

- **NB: guidelines may lag behind practice and are in need of an update…**

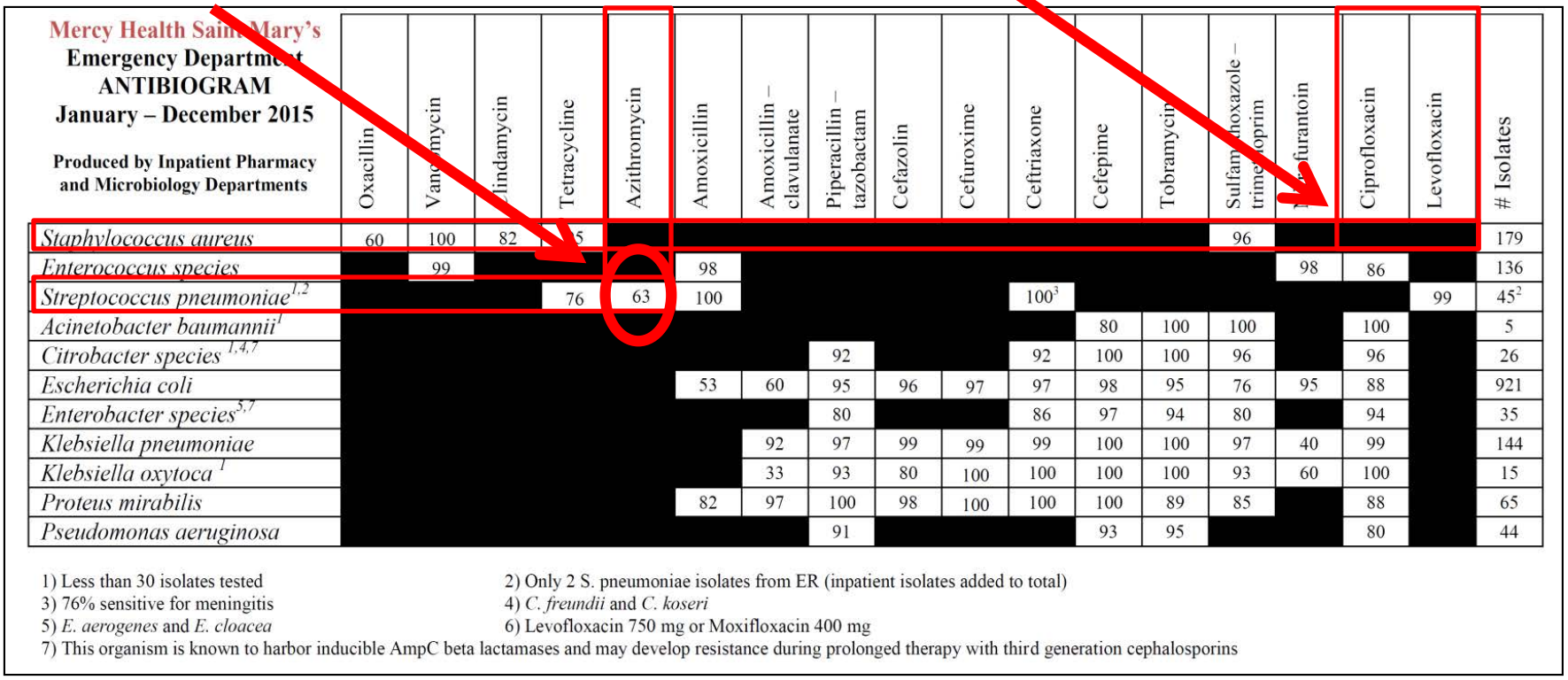
Treatment Guidelines

- Guidelines should include recommendations for diagnosis and testing, when applicable
- Education should accompany guideline implementation to ensure provider awareness and “buy in”
- Development should be a multidisciplinary effort

Dellit TH et al. *Clin Infect Dis.* 2007; 44:159–77.

Diagnosis	Suspected Pathogens	Empiric Therapy	Duration of Therapy
Skin and soft tissue infections, **Cellulitis**, non-purulent, without abscess	*Streptococci, Staphylococci*	First line:: • Cephalexin 500 mg PO q 6 h Second-line, severe beta-lactam allergy • Clindamycin 300 mg PO q 8 h	5 – 7 days
Skin and soft tissue infections, **Cellulitis, purulent OR with abscess** NOTE: Well drained abscesses do not need antibiotic treatment	Staphylococci, Staphylococci MRSA coverage suggested empirically with presence of abscess	First line: • Trimethoprim/ sulfamethoxazole 2 DS tabs PO q 12 h Alternative: • Doxycycline 100 mg PO q 12 h • Clindamycin 450 mg PO q 8 h	5 – 7 days
Skin and soft tissue infections, **Community-acquired** **Diabetic foot infection** **Vascular insufficiency** **Presumed polymicrobial infection**	*Staphylococcus aureus,* Streptococci, GNB, anaerobes	First line, no hx of MRSA: • Amoxicillin/clavulanate 875/125 mg PO q 12 h Hx of MRSA: • Doxycycline 100 mg PO q 12h PLUS amoxicillin/clavulanate 875/125 mg PO q 12 h • Trimethoprim/sulfamethoxazole 2 DS tabs PO q 12 h PLUS amoxicillin/clavulanate 875/125 mg PO q 12 h • Ciprofloxacin 500 mg PO q 12 h PLUS metronidazole 500 mg PO q 8 h PLUS doxycycline 100 mg PO q 12 h	7 - 14 days
Skin and soft tissue infections, **Cat/dog/human bite**	*Pasteurella,* Staphylococci, Streptococci, anaerobes	First line : • Amoxicillin/clavulanate 875/125 mg PO q 12 h Alternative, Beta-lactam allergy: • Doxycycline 100 mg PO q 12 h • Trimethoprim/sulfamethoxazole 2 DS tabs PO q 12 h PLUS metronidazole 500 mg PO q 8 h • Moxifloxacin 400 mg PO daily	Prophylaxis: 3-5 days Treatment: 5 –7days

The Antibiogram



Mercy Health Saint Mary's
Emergency Department
ANTIBIOGRAM
January – December 2015

Produced by Inpatient Pharmacy and Microbiology Departments

	Oxacillin	Vancomycin	Clindamycin	Tetracycline	Azithromycin	Amoxicillin	Amoxicillin – clavulanate	Piperacillin – tazobactam	Cefazolin	Cefuroxime	Ceftriaxone	Cefepime	Tobramycin	Sulfamethoxazole – trimethoprim	Nitrofurantoin	Ciprofloxacin	Levofloxacin	# Isolates
Staphylococcus aureus	60	100	82	95										96				179
Enterococcus species		99				98									98	86		136
Streptococcus pneumoniae[1,2]				76	63	100					100[3]						99	45[2]
Acinetobacter baumannii[1]												80	100	100		100		5
Citrobacter species[1,4,7]								92			92	100	100	96		96		26
Escherichia coli						53	60	95	96	97	97	98	95	76	95	88		921
Enterobacter species[5,7]								80			86	97	94	80		94		35
Klebsiella pneumoniae							92	97	99	99	99	100	100	97	40	99		144
Klebsiella oxytoca[1]							33	93	80	100	100	100	100	93	60	100		15
Proteus mirabilis						82	97	100	98	100	100	100	89	85		88		65
Pseudomonas aeruginosa								91				93	95			80		44

1) Less than 30 isolates tested
2) Only 2 S. pneumoniae isolates from ER (inpatient isolates added to total)
3) 76% sensitive for meningitis
4) *C. freundii* and *C. koseri*
5) *E. aerogenes* and *E. cloacea*
6) Levofloxacin 750 mg or Moxifloxacin 400 mg
7) This organism is known to harbor inducible AmpC beta lactamases and may develop resistance during prolonged therapy with third generation cephalosporins

Collaborative Practice Agreement

- **Culture-guided therapy adjustments are made when culture results are available**

- **Infectious diseases to consider:**
  - **Skin and soft tissue**
  - **Urinary tract infection**
  - **Group A *Streptococcus* pharyngitis**
  - **Infectious diarrhea**
  - **Sexually transmitted diseases**

Positive group A strep throat cultures

Documentation of patient emergency department encounter will be reviewed by the ED Pharmacist for symptoms of group A strep pharyngitis.

Patient will be contacted by to confirm resolution of symptoms if no treatment for group A strep pharyngitis was issued during UC visit and symptoms of pharyngitis were documented.

If during follow-up evaluation, the patient has continued symptoms of a group A strep pharyngitis, the patient will be issued antibiotic treatment for group A strep pharyngitis.

First-line Treatment

Penicillin VK 500 mg two times daily x 10 days

Second-line Treatment

Amoxicillin 875 mg two times daily x 10 days

(for penicillin allergic, cephalosporin tolerant)

Cephalexin 500 mg two times daily x 10 days

Alternative Treatment

Clindamycin 300 mg three times daily x 10 days

Collaborative Practice: Pharyngitis

	Pharmacist (n = 62)	RN/Physician (n = 28)	p-value
Treatment appropriate, n (%)	60 (96.8)	11 (39.3)	<0.001
Received antibiotic, symptoms not assessed, n(%)	1 (1.6)	19 (67.9)	<0.001
Revisit within 72 hours of initial visit, n (%)	2 (3.2)	4 (14.3)	0.073

Dumkow K et al. Unpublished data [publication in process].

"Wait-and-See" Method of Prescribing

- An antibiotic prescription is given but patient is instructed to wait 48—72 hours before filling
- Recommended for acute otitis media in children
- Reduces number of prescriptions filled with no change in patient/parent satisfaction

Lieberthal AS et al. *Pediatrics.* 2013; 131: e964-99.

"Wait-and-See" Method of Prescribing

- Could potentially be extrapolated to other infectious diseases most frequently caused by viruses

- Urinary symptoms with no sign of infection OR with positive sexually transmitted disease test results?

Viruses or Bacteria
What's got you sick?

Antibiotics only treat bacterial infections. Viral illnesses cannot be treated with antibiotics. When an antibiotic is not prescribed, ask your healthcare professional for tips on how to relieve symptoms and feel better.

Illness	Usual Cause		Antibiotic Needed
	Viruses	Bacteria	
Cold/Runny Nose	✓		NO
Bronchitis/Chest Cold (in otherwise healthy children and adults)	✓		NO
Whooping Cough		✓	Yes
Flu	✓		NO
Strep Throat		✓	Yes
Sore Throat (except strep)	✓		NO
Fluid in the Middle Ear (otitis media with effusion)	✓		NO
Urinary Tract Infection		✓	Yes

Antibiotics Aren't Always the Answer

www.cdc.gov/getsmart

GET SMART
Know When Antibiotics Work

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Rx

Name: _____

Date: _____/_____/_____

GET SMART
Know When Antibiotics Work

Diagnosis:

- ○ Cold
- ○ Cough
- ○ Flu
- ○ Middle ear fluid (Otitis Media with Effusion, OME)
- ○ Viral sore throat
- ○ Other: _____

You have been diagnosed with an illness caused by a virus. **Antibiotics do not cure viral infections.** If given when not needed, antibiotics can be harmful. The treatments prescribed below will help you feel better while your body's own defenses are fighting the virus.

General instructions:

- ○ Drink extra water and juice.
- ○ Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- ○ For sore throats, use ice chips or sore throat spray; lozenges for older children and adults.

Specific medicines:

- ○ Fever or aches:
- ○ Ear pain:
- ○ _____
- ○ _____

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

Follow up:

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

Signed: _____

CDC

For More Information call 1-800-CDC-INFO
or visit www.cdc.gov/getsmart

Centers for Disease Control and Prevention. Get smart: know when antibiotics work. Print materials for healthcare professionals. http://www.cdc.gov/getsmart/community/materials-references/print-materials/hcp/index.html

Future Trends

- Rapid viral testing
- Rapid diagnostic testing
- Outpatient intravenous antibiotics – who will manage this?

Barlam TF et al. *Clin Infect Dis.* 2016; 62: e51-77.

Question 6: Which of the following should be performed prior to developing a guideline for the treatment of skin and soft tissue infections?

A **Construct an antibiogram**

B Conduct a provider preference survey

C Review the hospital treatment protocol

D Gather prescription benefit plan formularies

Key Takeaways

- **Key Takeaway #1 – Emerging resistance and regulatory standards will require an increased focus and effort on antimicrobial stewardship in the ambulatory care setting**

- **Key Takeaway #2 – Antimicrobial stewardship offers a unique opportunity for expansion of pharmacist services and research**

- **Key Takeaway #3 – To get started, please refer to: Drekonja DM, Filice GA, Greer N, et al. Antimicrobial stewardship in outpatient settings: a systematic review. *Infect Control Hosp Epidemiol* 2015; 36: 142-152.**

Questions?

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- The Joint Commission. Proposed standards for antimicrobial stewardship in AHC, CAH, HAP, NCC, and OBS. https://jointcommission.az1. qualtrics.com/CP/File.php?F=F_5tDHGzIVDMHenDn. Accessed July 9, 2016.
- Centers for Disease Control and Prevention. Core elements of hospital antibiotic stewardship programs. http://www.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf. Accessed July 9, 2016.

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- Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011. *JAMA* 2016; 315: 1864-1873.
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- Lieberthal AS, Carroll AE, Chonmaitree T, et al. The diagnosis and management of acute otitis media. *Pediatrics* 2013; 131: e964-99.

Recommended Resources & Readings

- **The White House National Action Plan for Combating Antibiotic-Resistant Bacteria:** https://www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf

- **The Joint Commission Proposed Standard on Antimicrobial Stewardship:** https://jointcommission.az1.qualtrics.com/CP/File.php?F=F_5tDHGzIVDMHenDn

- **Centers for Medicare & Medicaid Services Proposed Rule on Infection Control and Antibiotic Stewardship Programs:** https://www.federalregister.gov/articles/2016/06/16/2016-13925/medicare-and-medicaid-programs-hospital-and-critical-access-hospital-cah-changes-to-promote#h-22.

Recommended Resources & Readings

- **Infectious Diseases Society of America (IDSA) Practice Guidelines:**
  http://www.idsociety.org/IDSA_Practice_Guidelines/

- **Centers for Disease Control and Prevention (CDC) Antimicrobial Stewardship Resources:**
  http://www.cdc.gov/getsmart/healthcare/

- **CDC Get Smart for Healthcare:**
  http://www.cdc.gov/getsmart/healthcare/index.html

Recommended Resources & Readings

- **ASHP Statement on the Pharmacist's Role in Antimicrobial Stewardship and Infection Prevention and Control:** https://www.ashp.org/DocLibrary/BestPractices/SpecificStAntimicrob.aspx

- **ASHP Resource Center:** http://www.ashp.org/menu/PracticePolicy/ResourceCenters/Inpatient-Care-Practitioners/Antimicrobial-Stewardship

Recommended Resources & Readings

- American Hospital Association's Antimicrobial Stewardship User Guide: http://www.ahaphysicianforum.org/resources/appropriate-use/antimicrobial/

- Drekonja D, Filice G, Greer N, et al. Antimicrobial stewardship programs in outpatient settings: a systematic review. VA-ESP Project #09-009: 2014. Available at: http://www.hsrd.research.va.gov/publications/esp/antimicrobial-outpatient-EXEC.pdf

Recommended Resources & Readings

- Drekonja DM, Filice GA, Greer N, et al. Antimicrobial stewardship in outpatient settings: a systematic review. *Infect Control Hosp Epidemiol* 2015; 36: 142-152.

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