Antimicrobial Stewardship in Ambulatory Care

ASHLEY M. WILDE, PHARMD, BCIDP

DIRECTOR OF INFECTIOUS DISEASES CLINICAL PROGRAMS AND RESEARCH

NORTON INFECTIOUS DISEASES INSTITUTE

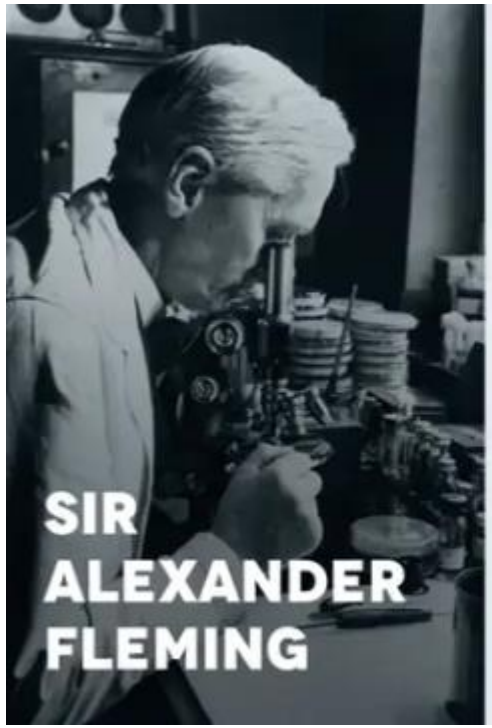
NORTON HEALTHCARE

Dawn of a New Age: The Antibiotic Era

- Alexander Fleming discovers penicillin in 1928
- Anne Miller hospitalized with sepsis in 1942
  - Successfully treated with penicillin
  - Died at age 90 in 1992

Rothman, L. (March 14, 2016). This Is What Happened to the First American Treated With Penicillin. TIME.
CDC. Antibiotic Resistance Threats in the United States, 2019.

Knew It From The Start



The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism.

Penicillin's discoverer predicted our coming post-antibiotic era 70 years ago. (2015, August 7). Business Insider. https://www.businessinsider.com/alexander-fleming-predicted-post-antibiotic-era-70-years-ago-2015-7?international=true&r=US&IR=T

What is Antimicrobial Stewardship?

Optimize infectious diseases clinical outcomes while minimizing unintended consequences of antimicrobial use

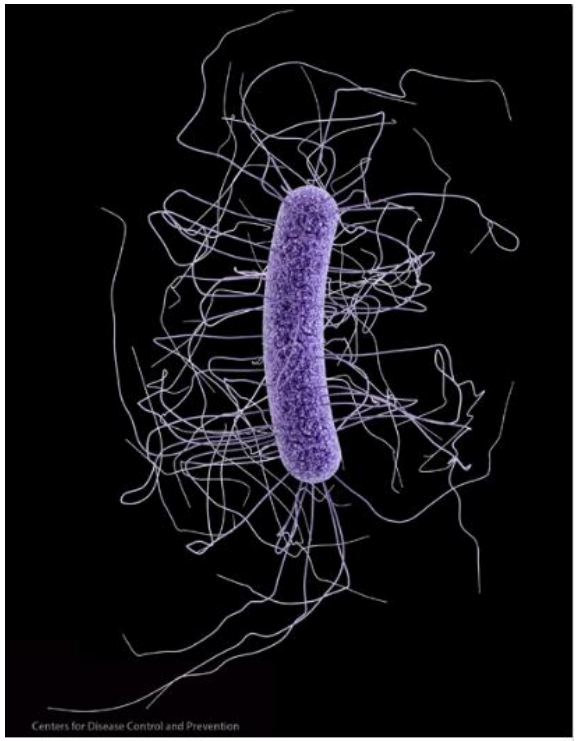
Antibiotics just in case!

?

Wikimedia Commons. Silhouette of an imbalanced justice scale. User 991joseph

Consequences of Antimicrobial Use

- Toxicity
  - #1 cause of emergency department visit for adverse event in children
  - 1 out of 5 ED visits for adverse drug events
- *C. difficile* infections
  - 500,000 cases in US annually
    - Incidence in the community is increasing
  - 29,000 die within 30 days annually
  - 15,000 deaths directly attributable annually
  - $4.8 billion - excess health costs



Clostridium difficile (*C. difficile*)

Shehab N, et al. JAMA. 2016 Nov;316(20):2115–25
Guh AY, et al. N Engl J Med 2020;382:1320–30
Centers for Disease Control and Prevention, 2019

Antimicrobial Resistance/MDRO

Culture & Susceptibility

KLEBSIELLA PNEUMONIAE

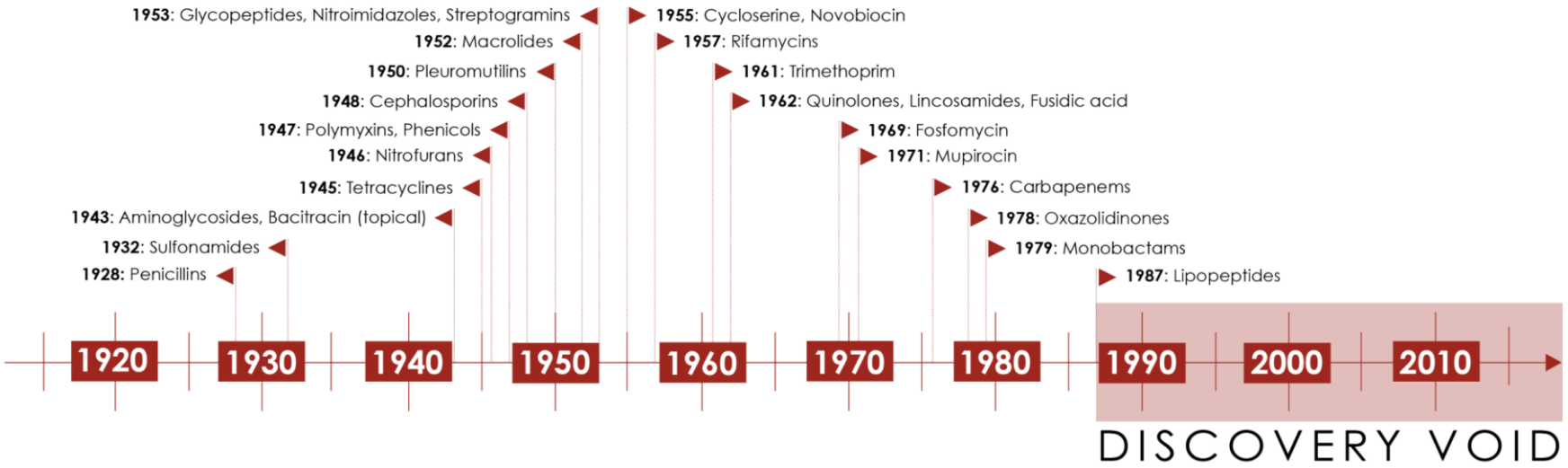
Antibiotic	Sensitivity	MIC	Status
Amikacin	Intermediate	=32	Final
Amoxicillin/Clavulanate	Resistant	>16/8	Final
Ampicillin	Resistant	>16	Final
Ampicillin/Sulbactam	Resistant	>16/8	Final
Cefazolin	Resistant	>4	Final
Cefepime	Resistant	>16	Final
Ceftazidime	Resistant	>16	Final
Ceftriaxone	Resistant	>32	Final
Ciprofloxacin	Resistant	>2	Final
Ertapenem	Resistant	>1	Final
Gentamicin	Resistant	>8	Final
Imipenem	Resistant	>8	Final
Levofloxacin	Resistant	>4	Final
Meropenem	Resistant	>8	Final
Nitrofurantoin	Resistant	>64	Final
Piperacillin/Tazobactam	Resistant	>64	Final
Tobramycin	Resistant	>8	Final
Trimethoprim/Sulfamethoxazole	Resistant	>2/38	Final

Demirjian A, et al. MMWR. 2015;64(32):871-3

KC Green. http://gunshowcomic.com/648

The Post-Antibiotic Era?

- Last novel class of antibiotic discovered in 1984



- November 14th, 2022
- No antibiotic approval in 3 years!

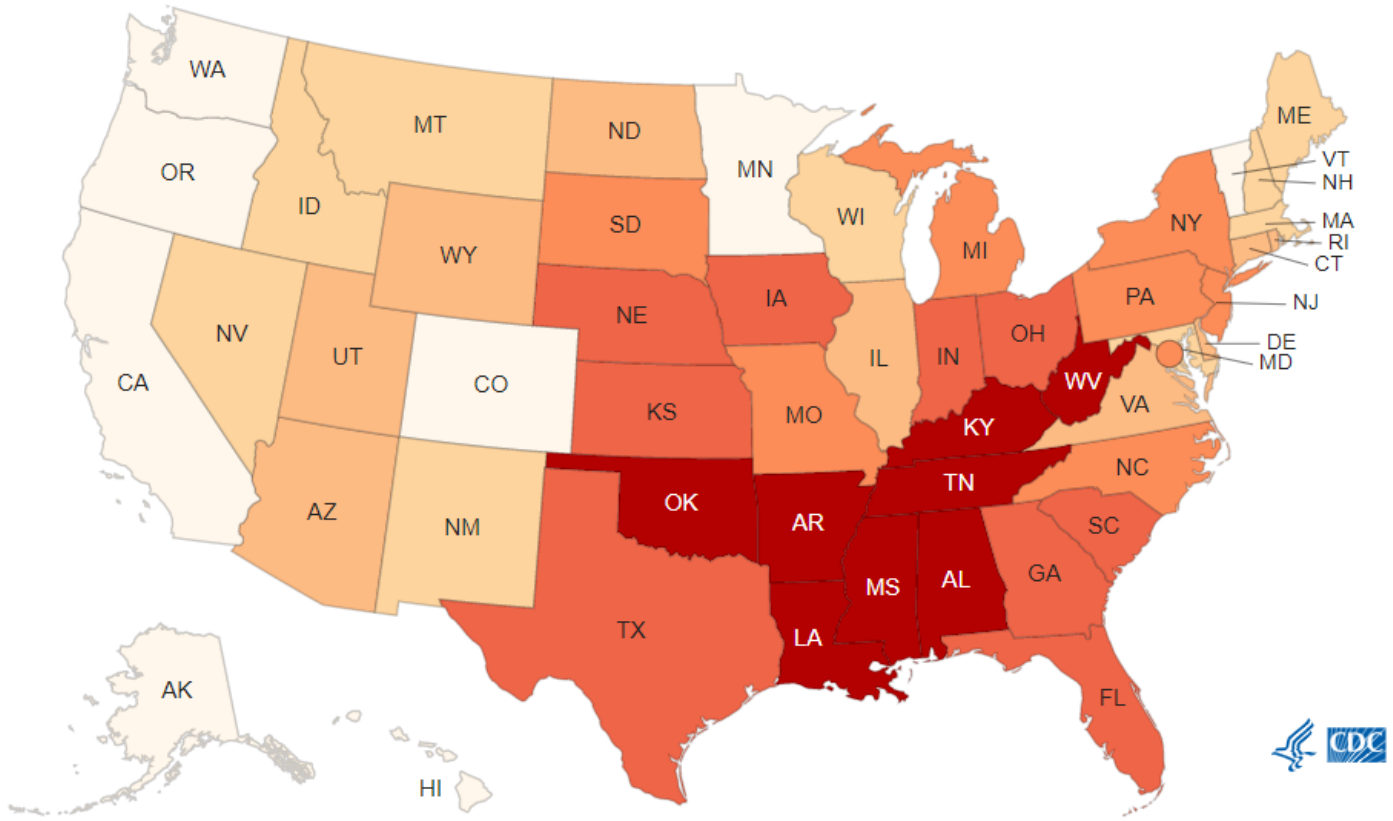
Hyun D. Pew Charitable Trusts. 18 Feb, 2021
Figure - ReAct Group. www.reactgroup.org/toolbox/understand/how-did-we-end-up-here/few-antibiotics-under-development

Outpatient Antibiotic Prescription Rate

- 211.1 million courses of antibiotics were dispensed in 2021 in US
- At least 28% of outpatient antibiotics are unnecessary
  - No antibiotic was needed at all
- Up to 50% of antibiotics prescriptions are inappropriate
  - Unnecessary use
  - Inappropriate selection
  - Dosing
  - Duration
- What if we changed the word antibiotic to *chemotherapy*
  - Up to 50% of chemotherapy is inappropriate

Centers for Disease Control and Prevention. Outpatient antibiotic prescriptions — United States, 2021.
Hersh AL, et al. *Clin Infect Dis.* 2021;72(1):133-137.
Centers for Disease Control and Prevention (CDC). *MMWR*. 2011;60(34):1153-6.
Pichichero ME. *JAMA*. June 19, 2002;287(23):3133-5.
Shapiro DJ, et al. J *Antimicrob Chemother*. 2014;69(1):234-40.

Community Antibiotic Prescriptions per 1,000 Population by State -2021



- KY is 5th highest state
- Kentucky: 938
- National average: 636
- ≈50% higher than average

Prescriptions Per 1,000 Population

354-466	472-551
555-619	635-675
677-765	766-1083

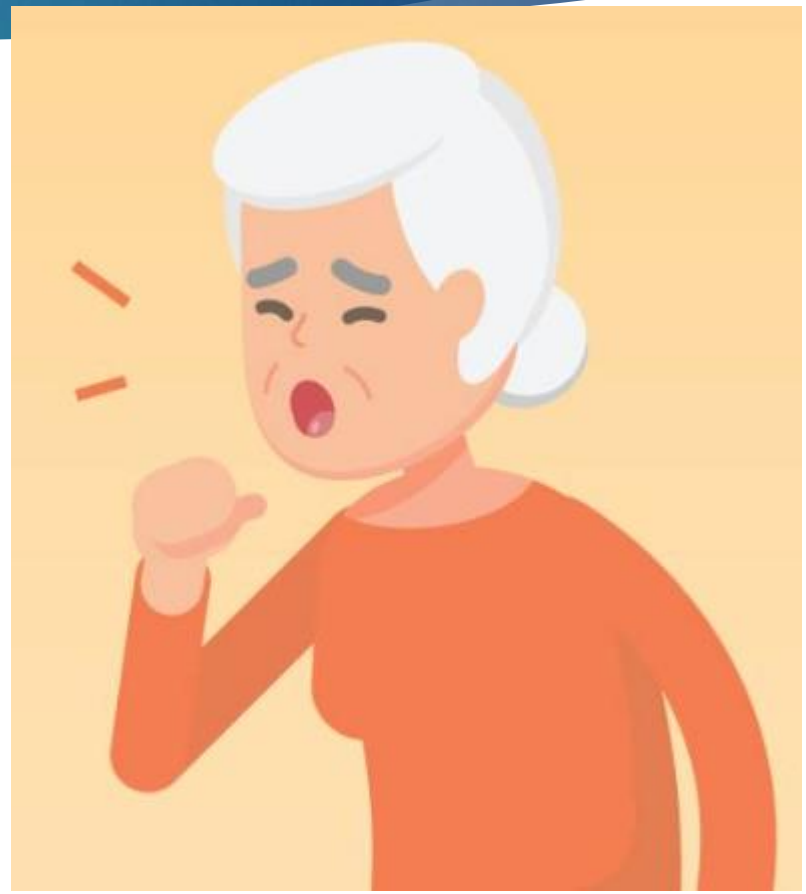
Centers for Disease Control and Prevention. Outpatient antibiotic prescriptions — United States, 2021

Antimicrobial Stewardship in Ambulatory Care

- Example clinical case
- Highlight opportunities for antimicrobial stewardship in ambulatory care
- Discuss behavioral tools to enhance ambulatory antimicrobial stewardship

Example Case

- 61 year old female
- Presenting complaint: “Coughing for a week. I took some amoxicillin I had and it didn’t help.”
- PMH:
  - Anxiety
  - Depression
  - Fibromyalgia
- Social history
  - Occasional smoker
  - Works from home, no known sick contact
- No known drug allergies



https://www.istockphoto.com/search/2/image?mediatype=illustration&phrase=woman+cough

Example Case

- Vital signs:
  - Temperature: 98.6 °F (37 °C)
  - Pulse: 75 BMP
  - Respiratory rate: 17
  - O2 sat: 96%
- ROS: + productive cough, notes yellowish green tinged sputum, + sore throat, + mild headache, denies SOA
- PE: lung exam clear to auscultation
- POC COVID-19/Flu/RSV negative
- Presumptive diagnosis: **Acute bronchitis**

Which of the following would you recommend?

A. Azithromycin 500 mg PO once, 250 mg daily for 4 days

B. Levofloxacin 500 mg PO daily x5 days

C. Doxycycline 100 mg PO BID x7 days

D. No antibiotic - supportive care/symptom management only

Which of the following would you recommend?

A. Azithromycin 500 mg PO once, 250 mg daily for 4 days

B. Levofloxacin 500 mg PO daily x5 days

C. Doxycycline 100 mg PO BID x7 days

D. No antibiotic - supportive care/symptom management only

Acute Bronchitis

- Presence of a cough with or without sputum production that lasts less than 3 weeks and that starts in the setting of a viral URI
- Purulent sputum or wheezing does not indicate a bacterial infection
- Antibiotic treatment of acute bronchitis is not recommended
  - No impact on severity of cough
  - No impact on duration of cough
  - Does NOT prevent complications:
    - Asthma exacerbation
    - Bronchiolitis
    - Pneumonia

Smith MP, et al. Acute Cough Due to Acute Bronchitis in Immunocompetent Adult Outpatients. Chest. 2020 Feb 21;S0012-3692(20)30329-9.
Adapted from Agency for Healthcare Research and Quality. Acute Bronchitis clinician one-pager

Avoiding Antibiotics

- This is not easy
- Office-based strategies
  - Pre-visit communication
  - Patient education materials
  - Clinician communication
  - Office staff communication

https://www.cdc.gov/antibiotic-use/community/images/social-media/cdc-au-social-media-1200x628-about-au-graphic3-v02.jpg

Pre-visit Communication

- Triage RN communication can prevent unnecessary visits for URI
  - ≈280,000 calls, self-care advice was sufficient in 88% of cases
    - *"Cold symptoms are caused by viruses. Unfortunately, we do not have medicines to cure a cold."*
    - *"If you feel comfortable managing your symptoms at home, you could save yourself a trip to the office. Your symptoms will likely last around 7–10 days. If your symptoms continue or become severe, or if you prefer a visit now, we would be happy to see you right away."*
- Discourage check-in staff from setting unrealistic expectations
  - *"Dr. X will get you fixed up right away"*

Harper R, et al. *Am J Manag Care*. 2015;21(4):264-70
Wattles BA, et al. Fam Pract Manag. 2021;28(6)10-4

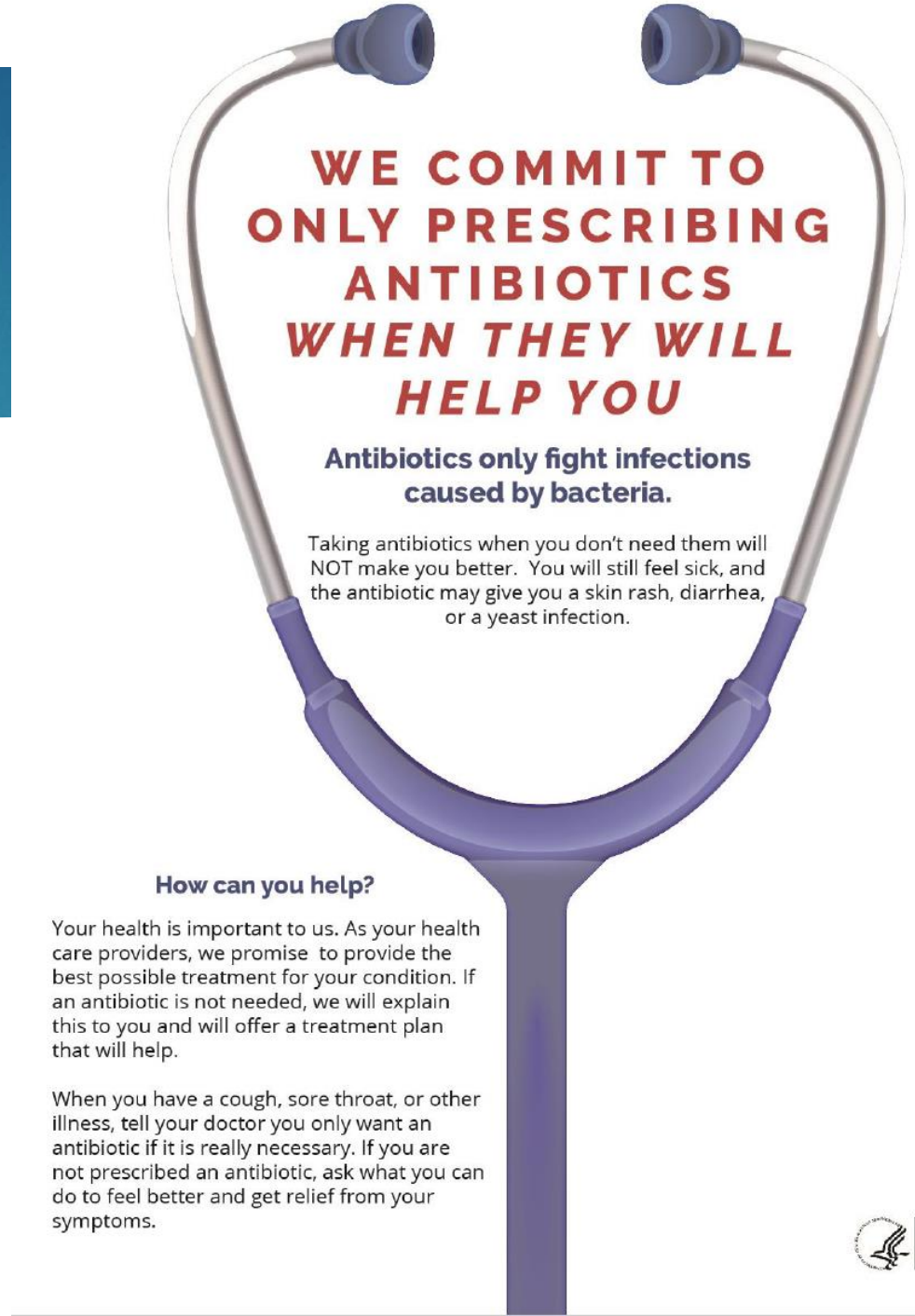
Patient Education Materials

- Waiting room
  - Posters, TV screen

Meeker D, et al. JAMA Intern Med 2014;174(3):425-31

Patient Education Materials

- Waiting room
  - Posters, TV screen
- Exam room poster
  - 12 week controlled study demonstrated a 19.7% absolute reduction in inappropriate antibiotic prescriptions for acute respiratory infections



Meeker D, et al. JAMA Intern Med 2014;174(3):425-31

Clinician Communication

Patients want to feel HEARD	"What I am hearing you say is [repeat the main concerns]." • Sit at eye level with the patient. • Nod your head when you agree instead of interjecting with words. • When examining the patient, verbally state the pertinent negatives based on the review of symptoms. "The good news is your lungs sound clear and you are not wheezing."

Adapted from Agency for Healthcare Research and Quality. Communicating with your patients a

Clinician Communication

Patients want to feel HEARD	"What I am hearing you say is [repeat the main concerns]." • Sit at eye level with the patient. • Nod your head when you agree instead of interjecting with words. • When examining the patient, verbally state the pertinent negatives based on the review of symptoms. "The good news is your lungs sound clear and you are not wheezing."
Patients want their feelings VALIDATED	"I am glad you came in today." "I am sorry you are not feeling well." "It sounds like you are not feeling well, let me see how I can help."

Adapted from Agency for Healthcare Research and Quality. Communicating with your patients clinician one-pager

Clinician Communication

POSITIVE discussion about antibiotic nonuse	"The good news is that you do not need an antibiotic." "Fortunately, you do not need an antibiotic, so here are a few other things I can offer you." "We now know that sometimes antibiotics can actually cause more problems, like diarrhea. The good news is that I can offer you a couple of good options today."

Adapted from Agency for Healthcare Research and Quality. Communicating with your patients clinician one-pager

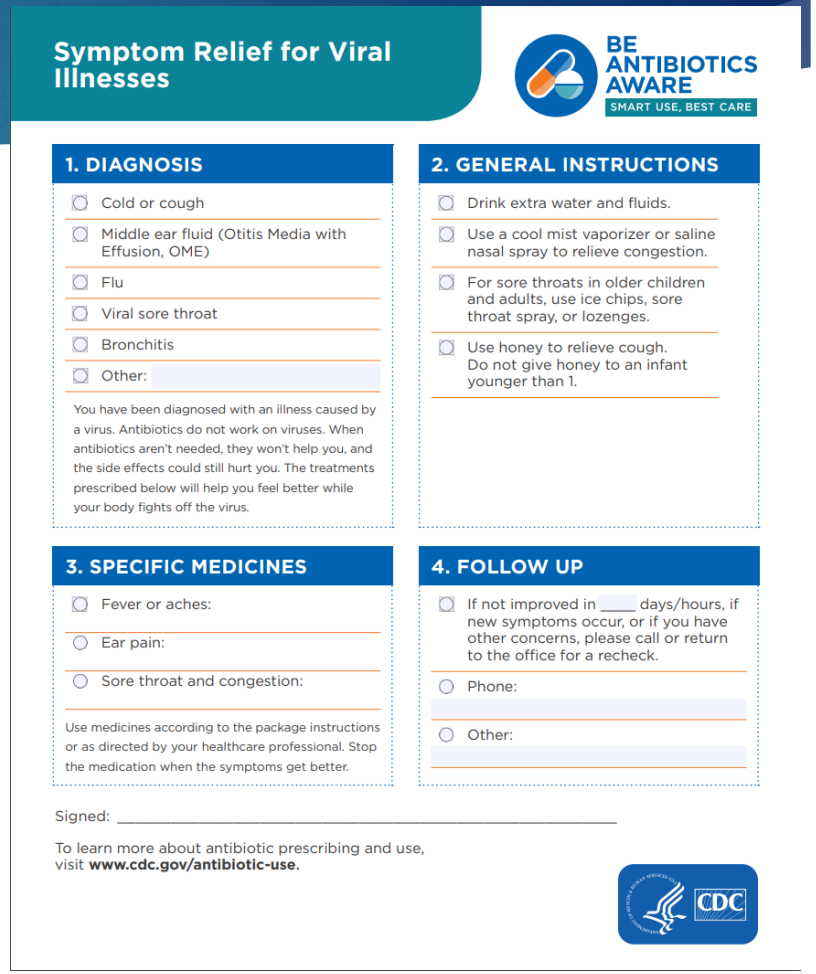
Clinician Communication

POSITIVE discussion about antibiotic nonuse	"The good news is that you do not need an antibiotic." "Fortunately, you do not need an antibiotic, so here are a few other things I can offer you." "We now know that sometimes antibiotics can actually cause more problems, like diarrhea. The good news is that I can offer you a couple of good options today."
Patients want to know when they will GET BETTER and when to RETURN to medical attention	• Provide details about when the patient is expected to feel better. • Provide specific guidance on when and where to return to medical attention. • Request patients repeat the plan and when to return to medical care to avoid misunderstandings.

Adapted from Agency for Healthcare Research and Quality. Communicating with your patients clinician one-pager

Treatment of Acute Bronchitis

- Over-the-counter medications
  - Dextromethorphan
  - Guaifenesin
  - Combination antihistamine-decongestants
- Prescription medications
  - Benzonatate
  - Codeine
  - Beta-agonists (if wheezing is present)
- Non-medicine supplements
  - Honey (ONLY for children over 1 year of age)



Symptom Relief for Viral Illnesses

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

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.

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:

Signed: _____

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

CDC

Adapted from Agency for Healthcare Research and Quality. Acute Bronchitis clinician one-pager https://www.cdc.gov/antibiotic-use/community/pdfs/aaw/CDC-AU_RCx_Relief_for_Viral_Illness_sm_v8_508.pdf

Post-visit Office Staff Communication

Patient comment	Appropriate response
"The last time I had this illness, antibiotics cleared it up right away."	"Luckily, most colds are caused by viruses and do not require antibiotics."

Wattles BA, et al. Fam Pract Manag. 2021;28(6)10-4

Post-visit Office Staff Communication

Patient comment	Appropriate response
"The last time I had this illness, antibiotics cleared it up right away."	"Luckily, most colds are caused by viruses and do not require antibiotics."
"I can't believe they wouldn't prescribe me an antibiotic."	"At least you don't have to worry about the nasty side effects they can cause."

Wattles BA, et al. Fam Pract Manag. 2021;28(6)10-4

Post-visit Office Staff Communication

Patient comment	Appropriate response
"The last time I had this illness, antibiotics cleared it up right away."	"Luckily, most colds are caused by viruses and do not require antibiotics."
"I can't believe they wouldn't prescribe me an antibiotic."	"At least you don't have to worry about the nasty side effects they can cause."
"This appointment was a waste of time."	"It's still good that you came in. It is always reassuring to know you don't have something more serious going on."

Wattles BA, et al. Fam Pract Manag. 2021;28(6)10-4

Post-visit Office Staff Communication

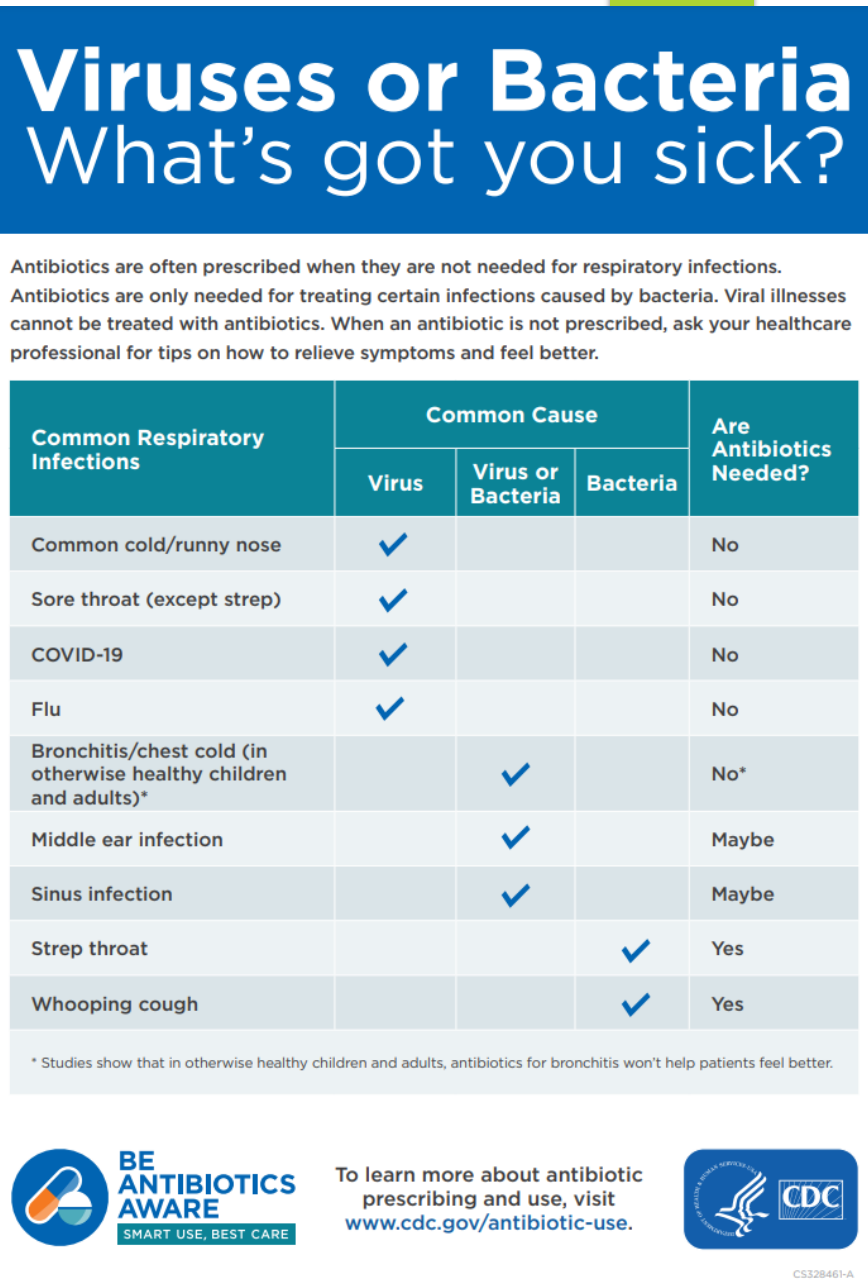
Patient comment	Appropriate response
"The last time I had this illness, antibiotics cleared it up right away."	"Luckily, most colds are caused by viruses and do not require antibiotics."
"I can't believe they wouldn't prescribe me an antibiotic."	"At least you don't have to worry about the nasty side effects they can cause."
"This appointment was a waste of time."	"It's still good that you came in. It is always reassuring to know you don't have something more serious going on."
"I guess I'll have to go somewhere else to get what I need."	"I'm sorry you are dissatisfied with your care here. I can assure you that Dr. X is committed to proving the best care to patients, and sometimes antibiotics can cause more harm than good."

Wattles BA, et al. Fam Pract Manag. 2021;28(6)10-4

Antimicrobial Stewardship is for All

More Information - CDC

- Be Antibiotics Aware campaign
  - https://www.cdc.gov/antibiotic-use/week/toolkit/graphics.html
- Implementation Resources for Outpatient Facilities
  - www.cdc.gov/antibiotic-use/core-elements/outpatient/implementation.html



Viruses or Bacteria
What's got you sick?

Antibiotics are often prescribed when they are not needed for respiratory infections. Antibiotics are only needed for treating certain infections caused by bacteria. 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.

Common Respiratory Infections	Common Cause			Are Antibiotics Needed?
	Virus	Virus or Bacteria	Bacteria	
Common cold/runny nose	✓			No
Sore throat (except strep)	✓			No
COVID-19	✓			No
Flu	✓			No
Bronchitis/chest cold (in otherwise healthy children and adults)*		✓		No*
Middle ear infection		✓		Maybe
Sinus infection		✓		Maybe
Strep throat			✓	Yes
Whooping cough			✓	Yes

* Studies show that in otherwise healthy children and adults, antibiotics for bronchitis won't help patients feel better.

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

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

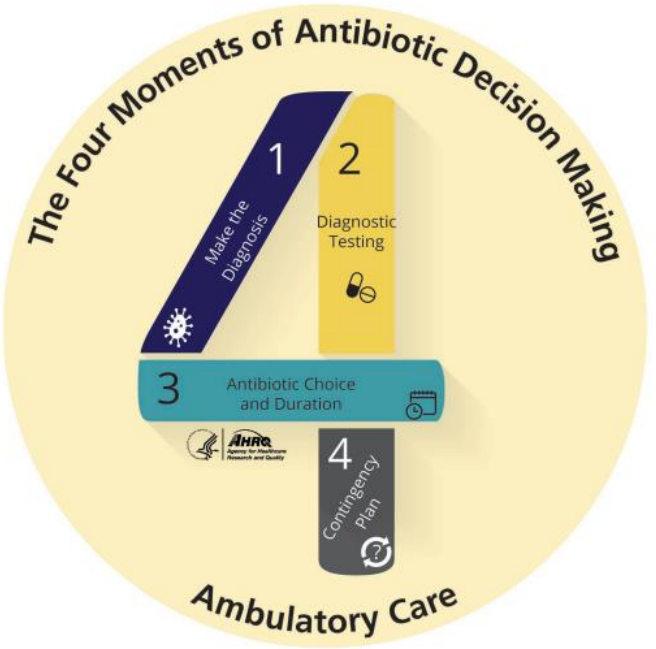
CDC

CS328461-A

https://www.cdc.gov/antibiotic-use/pdfs/VirusOrBacteria-Original-P.pdf

More Information - AHRQ

- Agency for Healthcare Research and Quality
- Toolkit to Improve Antibiotic Use in Ambulatory Care
  - www.ahrq.gov/antibiotic-use/ambulatory-care/index.html



Moment 1: Does my patient have an infection that requires antibiotics?

Moment 2: Do I need to order any diagnostic tests?

Moment 3: If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?

Moment 4: Does my patient understand what to expect and the followup plan?

AHRQ Pub. No. 17(22)-0030
September 2022

More Information - KASIC

Kentucky Antimicrobial Stewardship Innovation Consortium

- www.kymdro.org/kasic
- Ashley.Wilde@nortonhealthcare.org
- Twitter: @KASIC_MDRO