CME

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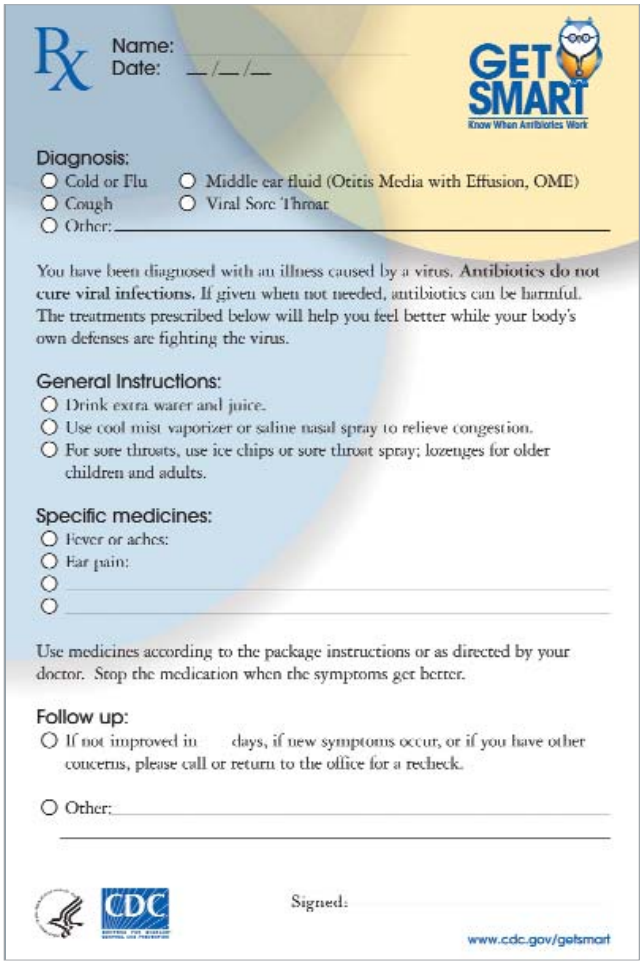
LEARNING OBJECTIVES

- Describe respiratory infectious processes
- Discuss the objectives of the CDC's "Get Smart: Know When Antibiotics Work" campaign
- Explain how the CDC's "Get Smart: Know When Antibiotics Work" materials can be utilized in the clinical setting.

Acute respiratory tract infections: When are antibiotics indicated?

The appropriate use of antibiotics is an important tool in the battle against antibiotic resistance. PAs can educate themselves and their patients about when to use these drugs.



Rx

Name:
Date: __/__/__

GET SMART
Know When Antibiotics Work

Diagnosis:
- ○ Cold or Flu
- ○ Cough
- ○ 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 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 doctor. 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: _____

CDC

Signed: _____

www.cdc.gov/getsmart

FIGURE 1. Prescription for treatment of a viral infection

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Inappropriate prescribing of antibiotics for acute respiratory tract infections contributes to the increasing prevalence of antibiotic resistance. In this second article of a series on antibiotic resistance, the authors discuss common respiratory infectious processes. A CDC campaign to educate both clinicians and the public about the judicious and effective use of antibiotics is described.

The CDC, World Health Organization, and Institute of Medicine have identified antimicrobial resistance as a major public health threat.[1-3] The inappropriate use of antibiotics for acute respiratory tract infections (ARIs) is believed to contribute to the rising incidence of antibiotic resistance.

ARIs are common illnesses that are treated by PAs. The term *acute respiratory tract infection* refers to several conditions, including the common cold, rhinosinusitis, pharyngitis, acute bronchitis, and acute otitis media. More than half of all antibiotics prescribed for ARIs are unnecessary because these infections are most likely viral and therefore not treatable with antibiotics.[4] Clinicians in ambulatory-care settings prescribe antibiotics for patients with a viral ARI in 40% to 50% of cases.[5,6] PAs and nurse practitioners (NPs) in office-based settings prescribe antibiotics to patients more often than do physicians.[6]

This article will review ARIs and the effective treatment of these infections. In addition, the CDC's "Get Smart: Know When Antibiotics Work" campaign is introduced to PAs. This campaign is designed to promote a more appropriate use of antibiotics in the treatment of ARIs.

COMMON RESPIRATORY TRACT INFECTIONS

The most common viral ARI is an upper respiratory tract infection (URI), also known as the common cold. Most

URIs are caused by viruses, with rhinovirus, parainfluenza virus, coronavirus, adenovirus, respiratory syncytial virus, and influenza virus accounting for most cases.[7] Influenza is a systemic illness that involves the upper respiratory tract and should be differentiated from other ARIs, particularly during the months when the influenza virus is circulating. Influenza in adults is differentiated by acute onset, significant fever, and marked myalgias. Rapid antigen tests are available for diagnosing influenza, and antiviral therapy may be appropriate for certain patients. Antibiotic treatment does not improve resolution of influenza infections or prevent complications. Only a small proportion of URIs become complicated by bacterial sinusitis or pneumonia; in these few cases, antibiotics may be useful. Most cases of uncomplicated URI resolve spontaneously within 1 to 2 weeks and require no treatment.

Acute sinusitis Obstruction of the sinus ostia after a URI may result in rhinosinusitis or acute sinusitis. Bacterial and viral rhinosinusitis are difficult to differentiate clinically, and overdiagnosis of acute bacterial rhinosinusitis is common. The presence of yellow or green purulent secretions from the nares or throat, by itself, does not differentiate between a bacterial and a viral infection.[8,9] Generally, the diagnosis of acute bacterial sinusitis in adults should be reserved for patients who have symptoms for 7 days or longer, purulent nasal secretions, and maxillary facial or tooth pain.[8,10] Symptomatic therapy is the preferred initial management for mild cases; the most narrow-spectrum antibiotic active against the likely pathogens, *Streptococcus pneumoniae* and *Haemophilus influenzae*, should be prescribed for patients with severe disease regardless of duration.[10] The dilemma in the treatment of URIs and sinusitis is the lack of a simple and accurate diagnostic test that reliably identifies rhinosinusitis; therefore, a clinical diagnosis is uncertain.

Pharyngitis Many office visits to primary care providers are for pharyngitis. Viruses are the most common cause of acute pharyngitis, and the condition should be managed with supportive therapy that includes analgesics, antipyretics, and gargle.[11] Group A streptococci (GAS) cause 15% to 30% of cases of acute pharyngitis in pediatric patients and 5% to 10% of cases in adults.[12] Patients infected with GAS, and a few other uncommon bacteria, will benefit from antibiotic therapy; therefore, the clinical goal is to identify those patients with a high probability of GAS infection. The most reliable indicators are fever, tonsillar exudates, tender anterior cervical lymphadenopathy, and absence of a cough. Patients with two or more of these features (referred to as the *Centor criteria*) are candidates for antigen testing or culture; patients with fewer than than two criteria do not need to be tested as they are less likely to be infected with GAS.[13-15] Clinicians may choose to treat patients with at least three of the four clinical criteria empirically with antibiotics. Penicillin is the treatment of choice for pharyngitis caused by a GAS infection.[11]

> "The Get Smart program uses a multidimensional approach to education on the appropriate use of medications for ARIs."

Acute bronchitis This ARI manifests as a cough with or without sputum production and lasts for up to 3 weeks. Chest radiography findings are normal.[16] Respiratory viruses are the cause of most cases of uncomplicated acute bronchitis; however, pneumonia must be considered in the differential diagnosis when patients present with an acute cough illness. Signs of pneumonia include fever, cough, tachypnea, tachycardia, and evidence of consolidation on chest auscultation. The presence of purulent sputum is not predictive of bacterial infection.[17] Patients with uncomplicated bronchitis may benefit from beta-agonist inhalers and antitussives. Acute bronchitis, like other ARIs, usually does not require antibiotic therapy.

ANTIBIOTIC EDUCATION CAMPAIGN

The CDC developed the National Campaign for Appropriate Antibiotic Use in the Community in 1995 to reduce inappropriate antibiotic use and curb the increasing incidence of antimicrobial resistance. In 2003, this program was renamed "Get Smart: Know When Antibiotics Work" in conjunction with the launch of a national media campaign. The campaign

KEY POINTS

- The term *acute respiratory tract infection* (ARI) refers to several conditions including the common cold, rhinosinusitis, pharyngitis, acute bronchitis, and acute otitis media. More than half of all antibiotics prescribed for ARIs are unnecessary because these infections are most likely viral and therefore not treatable with antibiotics.
- Influenza is a systemic illness that involves the upper respiratory tract and should be differentiated from other ARIs, particularly during the months when the influenza virus is circulating. Influenza in adults is differentiated by acute onset, significant fever, and marked myalgias. Rapid antigen tests are available for diagnosing influenza, and antiviral therapy may be appropriate for certain patients. Antibiotic treatment does not improve resolution of infleunza infections or prevent complications.
- Studies have demonstrated that clinician and patient education is a vital component of reducing inappropriate antibiotic use. The Get Smart campaign provides a variety of materials for clinicians and their patients that encourage appropriate antibiotic use for ARIs. All the Get Smart materials are available through the CDC Web site (www.cdc.gov/getsmart) free of charge without alteration.

set three objectives aimed at reducing antimicrobial resistance. The Get Smart program, based on the findings of several research studies, uses the multidimensional approach of educating both the public and clinicians on the appropriate use of prescription medications for ARIs.[18-22]

Objective 1: Promote adherence to appropriate prescribing guidelines among providers The Get Smart campaign is working with medical and pharmacy schools to incorporate courses on appropriate use of antibiotics into their curricula. Web-based modules from the Children's Hospital of Pittsburgh of the University of Pittsburgh Medical Center use video otoscopes to help residents improve their knowledge and skills related to diagnosing otitis media with effusion and acute otitis media. The modules are administered online through the University of Pittsburgh School of Medicine curriculum Web site (go to www.eprom.pitt.edu/03_home.asp for more information). Future plans include developing courses for nurses, NPs, PAs, physicians, and pharmacists. The campaign also has detailing sheets, similar to those used by the pharmaceutical industry, aimed at promoting appropriate antibiotic use among providers.

Objective 2: Decrease demand for antibiotics for viral URIs among healthy adults and parents of young children The Get Smart Campaign designed a viral "prescription pad" to help clinicians explain when an antibiotic is not the appropriate treatment (see Figure 1, page 22). The prescription pad helps the clinician explain that the patient's illness is a viral infection, not a bacterial infection. The form provides a means for the clinician to suggest symptomatic relief and includes a space for recommending when the patient should return to the office if symptoms do not resolve.

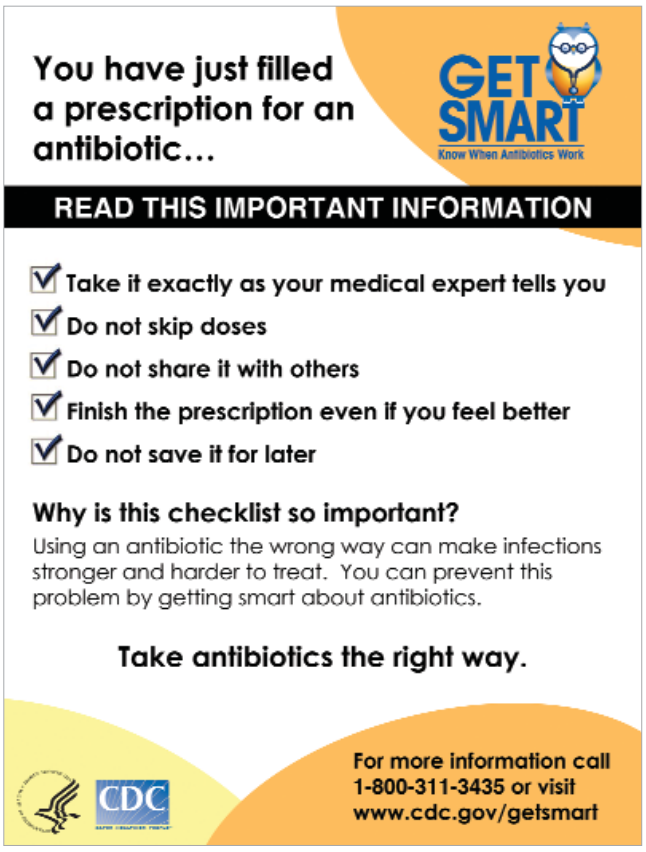

FIGURE 2. Get Smart antibiotic prescription adherence tool

> "Study results demonstrate that clinician and patient education is a vital component of reducing inappropriate antibiotic use."

Get Smart campaign materials can also be used by health care providers to initiate a conversation that reinforces the message of appropriate treatment of ARIs. The brochure, *Snort. Sniffle. Sneeze. No Antibiotics Please*, addresses the importance of prescribing antibiotics for children appropriately. The brochure provides a brief explanation of antibiotic resistance and answers frequently asked questions about antibiotic resistance. Similar brochures are targeted to adults (*Cold or Flu. Antibiotics Don't Work For You*), American Indian/Alaska Native populations (*Be Smart. Antibiotics Will Not Help a Cold or the Flu*), and Spanish-speaking populations (*A Veces, El Remedio Es Peor Que La Enfermedad*).

Question-and-answer pages specifically designed for parents are available in addition to the brochures. One page addresses common questions about otitis media with effusion and a second page addresses runny noses. Four posters that raise patients' awareness of appropriate antibiotic use are available for displaying in waiting and examination rooms; one poster is in Spanish.

Objective 3: Increase adherence to prescribed antibiotics for URIs The campaign also has a prescription adherence tool in the form of a flier or notepad (see Figure 2). This tool provides concise messages for patients about adhering to antibiotic prescription instructions. The five main messages are: (1) follow the directions on your prescription, (2) do not skip a dose, (3) do not share your prescription with others, (4) finish the prescription even if you feel better, and (5) do not save the antibiotic for later.

EFFECTIVENESS OF EDUCATIONAL INTERVENTIONS

A multidimensional approach to educating both the public and clinicians can reduce the number of inappropriate prescriptions for antibiotics to treat ARIs.[18-23] In a nonrandomized, controlled study of the providers and patients of four medical offices in Denver, Colorado, Gonzales and colleagues demonstrated the effectiveness of this approach.[18] The goal of the study was to reduce the number of prescriptions written for antibiotics to treat acute bronchitis in adults. Health care providers at the full-intervention sites were provided with feedback on physicians' prescribing practices, small group presentations, and practice tips on withholding

antibiotics for acute bronchitis in adults. Patient education materials included posters and information sheets in the waiting and examination rooms and household mailings that consisted of a letter from a clinic director, a brochure, and a refrigerator magnet with information about appropriate antibiotic use for ARIs. The limited-intervention site was provided with the office-based educational materials; and control sites provided usual care to their adult patients with acute bronchitis. Study results showed the number of prescriptions written at the full-intervention sites decreased considerably (from 74% to 48% [$P = .003$]), but not at the limited-intervention and control sites[18] (82% to 77% [$P = .68$], and 78% to 76% [$P = .81$], respectively).

Finkelstein and colleagues conducted a randomized trial including 12 pediatric practices in Boston, Massachusetts, and Seattle, Washington, to determine if an educational intervention for physicians and patients could decrease antibiotic prescriptions for children younger than 6 years with ARIs.[19] Similar to the Gonzales study, provider education included feedback on physicians' prescribing practices and small group presentations led by a pediatrician. Patient education consisted of brochures mailed to patients' homes and posters and brochures in the waiting and examination rooms of the physicians' offices. After 2 years, antibiotic prescriptions for children aged 3 to 36 months decreased by 0.41 prescriptions per person-year (18.6%) in the intervention practices compared to a decrease of 0.33 prescriptions (11.5%) in control practices ($P < .0001$). Among children aged 36 to 72 months, the number of prescriptions decreased by 0.21 prescriptions per person-year (15%) in the intervention practices and by 0.17 prescriptions (9.8%) in the control practices ($P < .0001$).[19]

These studies demonstrated that clinician and patient education is a vital component of reducing inappropriate antibiotic use. The Get Smart campaign provides a variety of materials that encourage appropriate antibiotic use. All the Get Smart materials are available through the CDC Web site (www.cdc.gov/getsmart) free of charge without alteration.

HOW THE CAMPAIGN MATERIALS WORK

Consider the following scenario: The mother of 6-year-old twins complains that she has been experiencing a sore throat and runny nose for the past 3 days, but she has no cough; she is concerned that she may have contracted strep throat from her children. She requests a Z-pack (arithromycin) so she will feel better in time for their upcoming vacation to Florida. What would be the appropriate evaluation and treatment for this patient? As a PA, how would you communicate your treatment decisions to her?

You take the patient's history and perform a physical examination, findings of which include a fever but no tonsillar exudates and no lymphadenopathy. You consider ordering a rapid strep test because the patient has two of the four Centor criteria (fever and no cough). If the test results are negative, you can explain to the mother that she probably does not have strep throat. Further explanation would include telling her the appropriate use of an antibiotic is for a bacterial infection; and she probably has a viral infection because strep throat usually manifests with tonsillar exudates and lymphadenopathy. In addition, you explain to the patient that antibiotics can sometimes cause adverse drug events and should not be taken unless a bacterial infection is present. You can also tell the patient that inappropriate use of antibiotics for ARIs increases antimicrobial resistance. You give the mother a Get Smart brochure that further reinforces your message.

The Get Smart viral prescription pad can be used to remind the mother to get rest and to drink plenty of fluids. Ice chips or throat lozenges may help soothe her sore throat. The proper dosages of OTC medications that contain acetaminophen or ibuprofen can help her feel more comfortable. You can tell the mother to call or return to the office if her symptoms worsen or if she is concerned for any reason.

> "The campaign materials can be used to educate patients about antimicrobial resistance and the appropriate use of antibiotics."

CONCLUSION

Antibiotic resistance is a growing health problem. Most ARIs are caused by viruses and are not effectively treated with antibiotics.The American Academy of Physician Assistants' policy on antimicrobial resistance states:

The AAPA believes that PAs should be aware of the rising problem of antimicrobial resistance in their clinical practice. PAs should incorporate into their knowledge base a full understanding of this issue to include: the natural course of infectious diseases, the appropriate use of antimicrobial therapy, and the importance of adherence to a prescribed therapy. The AAPA strongly recommends that PAs educate their patients regarding antimicrobial resistance.[24]

The CDC campaign "Get Smart: Know When Antibiotics Work" educates health care providers and patients about the appropriate use of antibiotics for the treatment of ARIs. PAs can use the campaign materials to increase their knowledge of when to prescribe antibiotics and to educate their patients about antimicrobial resistance and the appropriate use of antibiotics. JAAPA

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