

4. Educate



Primary care providers can educate patients about the potential harms of antibiotic treatment with the following fact sheets:

- Improving Antibiotic Use (page [16](#))
 - Download here: <https://tinyurl.com/impabxuse>
- Antibiotics Aren't Always the Answer (page [17](#))
 - Download here: <https://tinyurl.com/abxnotanswer>
- Preventing and Treating Ear Infections (page [18](#))
 - Download here: <https://tinyurl.com/noearinfection>
- Runny Nose from a cold: Does your child need antibiotics (page [19](#))
 - Download here: <https://tinyurl.com/noabx4nose>
- Preventing and Treating Bronchitis (page [20](#))
 - Download here: <https://tinyurl.com/preventbronc>

Improving Antibiotic Use

Download here: <https://tinyurl.com/impabxuse>

IMPROVING ANTIBIOTIC USE



BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

Do I really need antibiotics?



SAY YES TO ANTIBIOTICS
when needed for certain infections caused by **bacteria**.



SAY NO TO ANTIBIOTICS
for **viruses**, such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won't help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.



Antibiotics are only needed for treating certain infections caused by bacteria.

Antibiotics do NOT work on viruses.

Do antibiotics have side effects?

Anytime antibiotics are used, they can cause side effects. 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



Yeast Infections



Diarrhea

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.

1 out of 5

medication-related visits to the ED are from reactions to antibiotics.

Antibiotics save lives. When a patient needs antibiotics, the benefits outweigh the risks of side effects.

What are antibiotic-resistant bacteria?

Antibiotic resistance occurs when bacteria no longer respond to the drugs designed to kill them. Anytime antibiotics are used, they can cause antibiotic resistance.



Bacteria, not the body, become resistant to the antibiotics designed to kill them.

When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply.

Some resistant bacteria can be harder to treat and can spread to other people.

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.

Can I feel better without antibiotics?

Respiratory viruses usually go away in a week or two without treatment. To stay healthy and keep others healthy, you can:



Clean Hands



Cover Coughs



Stay Home When Sick



Get Recommended Vaccines

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



Antibiotics Aren't Always the Answer

Download here: <https://tinyurl.com/abxnotanswer>

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 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 emergency department visits. Reactions from antibiotics are a common cause of medication-related emergency department visits.



Questions to Ask Your Healthcare Professional

If your child is sick, here are three important questions to ask your healthcare professional:

1. What is the best treatment for my child's illness?

Your child can feel better without an antibiotic. Respiratory viruses usually go away in a week or two without treatment. Ask your healthcare professional about the best way to feel better while your child's body fights off the virus.

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

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

2. What do I need to know about the antibiotics you're prescribing for my child today?

The antibiotic prescribed should be the one most targeted to treat the infection, while causing the least side effects. Some types of antibiotics, such as fluoroquinolones, have a stronger link to severe side effects such as life-threatening *C. difficile* infections. The Food and Drug Administration (FDA) warns healthcare professionals to only prescribe fluoroquinolones when another treatment option is unavailable. These powerful antibiotics are often prescribed even when they are not the recommended treatment.

3. What can I do to help my child feel better?

Pain relievers, fever reducers, saline nasal spray or drops, warm compresses, liquids, and rest may be the best ways to help your child feel better. Your healthcare professional can tell you how to help relieve your child's symptoms.

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



Preventing and Treating Ear Infections

Download here: <https://tinyurl.com/noearinfection>

Preventing and Treating Ear Infections



What is an ear infection?

Ear infections can affect the ear canal or the middle ear.

Acute otitis externa (AOE) is the scientific name for an infection of the ear canal, which is also called swimmer's ear.

Middle ear infections are called *Otitis Media*, and there are two types of middle ear infections:

- **Otitis Media with Effusion (OME)** occurs when fluid builds up in the middle ear without pain, pus, fever, or other signs and symptoms of infection.
- **Acute Otitis Media (AOM)** occurs when fluid builds up in the middle ear and is often caused by bacteria, but can also be caused by viruses.



How are ear infections caused and how can they be prevented?

Bacteria

AOM is often caused by bacteria, and *Streptococcus pneumoniae* is a common bacterial cause of AOM.

- Ensure your child is up to date on vaccinations, including the pneumococcal vaccination which protects against *Streptococcus pneumoniae*. Breast feeding exclusively until your baby is 6 months old and continuing to breastfeed for at least 12 months can protect your baby from infections, including AOM.

Cold and Flu Season

AOM often occurs after a cold. Viruses cause OME (fluid in the middle ear), and then bacteria can grow in the fluid leading to AOM.

- Ensure your child is up to date on vaccinations and gets a flu vaccine every year.

Injury to the Ear

Foreign objects, like cotton swabs and bobby pins, can cause cuts and bruises in the ear canal, causing acute otitis external AOE.

- Avoid putting foreign objects in the ear.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

CS-281332A



Cigarette Smoke

Exposure to cigarette smoke can lead to more colds and more AOM.

- Avoid smoking and exposure to secondhand smoke.

Family History

The tendency to develop AOM can run in families.

- Family history is not preventable. Instead, focus on other prevention methods, like staying up to date on vaccinations, breast feeding, and avoiding smoke.

How are ear infections treated?

- **AOE** is usually treated with antibiotic ear drops.
- **OME** usually goes away on its own and does not benefit from antibiotics but sometimes antibiotics are needed.
- **AOM** may not need antibiotics in many cases because the body's immune system can fight off the infection without help from antibiotics, but sometimes antibiotics are needed.

Watchful Waiting

- Mild AOM often will get better on its own without antibiotic treatment, so your healthcare professional may recommend *watchful waiting* before prescribing antibiotics to you or your loved one. This means that your provider may wait a few days before deciding whether to prescribe antibiotics, while treating the symptoms of AOM. Watchful waiting gives your or your child's own immune system time to fight off the infection first before starting antibiotics. If you or your child don't get better in 2-3 days or get worse, your healthcare professional can recommend starting antibiotics.
- Another form of watchful waiting is *delayed prescribing*. This means that your healthcare professional may give you an antibiotic prescription, but ask you to wait 2-3 days to see if you or your child are still sick with fever, ear pain, or other symptoms before filling the prescription.

Symptom Relief

There are ways to relieve symptoms associated with ear infections – like ear pain – whether or not antibiotics are needed. Consider using acetaminophen or ibuprofen to relieve pain or fever. Ask your healthcare professional or pharmacist what medications are safe for you or your loved one to take.

Antibiotics, such as amoxicillin, are used to treat severe ear infections or ear infections that last longer than 2-3 days.

If your child has a fever of 102.2°F (39°C) or higher, discharge or fluid coming from the ear, symptoms are much worse, or symptoms last for more than two or three days for AOM, you should contact your healthcare professional. If your child has symptoms of OME for more than one month or hearing loss, contact your healthcare professional.



Page 2 of 2

Runny Nose from a Cold: Does your child need antibiotics?

Download here: <https://tinyurl.com/noabx4nose>

Runny Nose from a Cold: Does your child need antibiotics?

Q&A Guide for Parents

Your child has a cold and a runny nose. You might think this means your child needs an antibiotic. A runny nose, even if you're seeing thick yellow or green mucus, is normal when you begin to get better from a cold.

What causes a runny nose during a cold?

When germs that cause colds first infect the nose and sinuses, the nose makes clear mucus. This helps wash the germs from the nose and sinuses. After two or three days, the body's immune system fights back, changing the mucus to a white or yellow color. When bacteria that normally live in the nose grow back during the recovery phase, they then change the mucus to a greenish color. This is all normal and does not mean your child needs antibiotics.

What should I do?

- Try using a cool mist vaporizer or saltwater nose drops.
- Watch your child. Runny nose, cough, and symptoms like fever, headache, and muscle aches may be unpleasant, but antibiotics will not help and the symptoms won't go away any faster. When antibiotics aren't needed, they won't help and could even hurt you.

Are antibiotics needed for a runny nose?

A runny nose is a normal part of a cold. Antibiotics do not work on viruses like colds or



runny noses (even if the mucus is thick yellow or green). Your child's doctor or nurse may prescribe other medicine or give you tips to help with symptoms like fever and cough.

Why not just try antibiotics?

When antibiotics aren't needed, they won't help and could even hurt you. Taking antibiotics creates resistant bacteria. Antibiotic resistance occurs when bacteria change and adapt to defeat the killing power of antibiotics. Any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. Side effects of antibiotics can include rash, dizziness, stomach problems, or yeast infections.

Improving the way we take antibiotics can help fight antibiotic resistance and ensure that life-saving antibiotics will be available for future generations.

A runny nose typically gets better on its own, so antibiotics aren't needed. Talk to your healthcare professional about how to feel better while your body fights your illness.

To learn more about appropriate antibiotic prescribing and use, visit

www.cdc.gov/antibiotic-use

National Center for Emerging and Zoonotic Infectious Diseases

Division of office communication



C180001

Preventing and Treating Bronchitis

Download here: <https://tinyurl.com/preventbronc>

Preventing and Treating Bronchitis

Cough keeping you up at night? Soreness in your chest and feeling fatigued? You could have acute bronchitis, but be aware: an antibiotic will not help you get better.



What is Acute Bronchitis?

Bronchitis occurs when the airways of the lungs swell and produce mucus. That's what makes you cough. Acute bronchitis, often called a "chest cold," is the most common type of bronchitis. The symptoms last less than 3 weeks. If you're a healthy person without underlying heart or lung problems or a weakened immune system, this information is for you.

Symptoms of Acute Bronchitis:

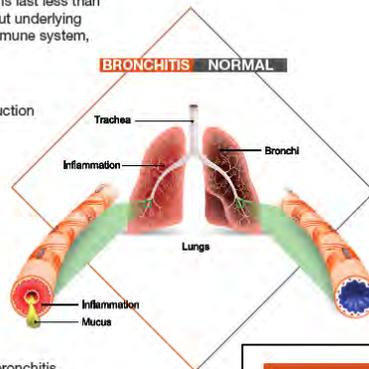
- ◆ Coughing with or without mucus production
- You may also experience:**
 - ◆ Soreness in the chest
 - ◆ Fatigue (feeling tired)
 - ◆ Mild headache
 - ◆ Mild body aches
 - ◆ Watery eyes
 - ◆ Sore throat

Causes

- ◆ Acute bronchitis is usually caused by a virus and often occurs after an upper respiratory infection.
- ◆ Bacteria can sometimes cause acute bronchitis, but even in these cases antibiotics are NOT recommended and will not help you get better.

When to Seek Medical Care

- See a healthcare professional if you or your child have any of the following:
- ◆ Temperature higher than 100.4 °F
 - ◆ Cough with bloody mucus
 - ◆ Shortness of breath or trouble breathing
 - ◆ Symptoms that last more than 3 weeks
 - ◆ Repeated episodes of bronchitis



CG275274A

Recommended Treatment

Good news! Acute bronchitis almost always gets better on its own—without antibiotics. Using antibiotics when they aren't needed can do more harm than good. Unintended consequences of antibiotics include side effects, like rash and diarrhea, as well as more serious consequences, such as an increased risk for an antibiotic-resistant infection or *Clostridium difficile* infection, a sometimes deadly diarrhea.

To Feel Better:

- ◆ Get plenty of rest
- ◆ Drink plenty of fluids
- ◆ Use a clean humidifier or cool mist vaporizer
- ◆ Breathe in steam from a bowl of hot water or shower
- ◆ Use lozenges (*do not give lozenges to children younger than 4 years of age*)
- ◆ Ask your healthcare professional or pharmacist about over-the-counter medicines that can help you feel better

Remember, always use over-the-counter medicines as directed. **Do not use cough and cold medicines in children younger than 4 years of age** unless specifically told to do so by a healthcare professional.

Your healthcare professional will most likely prescribe antibiotics for a diagnosis of whooping cough (pertussis) or pneumonia.

Prevention

- ◆ Practice good hand hygiene
- ◆ Make sure you and your child are up-to-date with all recommended vaccines
- ◆ Don't smoke and avoid secondhand smoke, chemicals, dust, or air pollution
- ◆ Always cover your mouth and nose when coughing or sneezing
- ◆ Keep your distance from others when you are sick, if possible

And Remember:

Antibiotics will not treat acute bronchitis. Using antibiotics when not needed could do more harm than good.



CHAPTER 4: SUPPLEMENTAL MATERIAL

These materials were compiled by CDPH to supplement the Educate Section of the IDPH Antibiotic Stewardship Toolkit.

Included:

- 1. CDC Script Pad – Symptom Relief for Viral Illnesses**
- 2. CDPH Brochure: Antibiotics Aren't Always the Answer**
- 3. CDC Handout: Preventing and Treating Bronchitis**
- 4. CDC Handout: Runny Nose from a Cold – Does your Child need antibiotics?**
- 5. CDC Handout: Preventing and Treating Ear Infections**
- 6. CDC Handout: Is it Really a Penicillin Allergy**
- 7. CDPH Poster: Using the Right Tool (English, Spanish)**
- 8. CDPH Poster: Virus or Bacteria – What Got You Sick?**
- 9. CDPH Poster: Do You Need Antibiotics?**

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.



Why does taking antibiotics lead to antibiotic resistance?

Any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. Antibiotic resistance is one of the most urgent threats to the public's health. Always remember:

1. Antibiotic resistance does not mean the body is becoming resistant to antibiotics; it is that bacteria have become resistant to the antibiotics designed to kill them.
2. When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply.
3. Some resistant bacteria can be harder to treat and can spread to other people.

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.



What is the right way to take antibiotics?

If you need antibiotics, take them exactly as prescribed.

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.

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 *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which needs to be treated. *C. diff* can lead to severe colon damage and death.

What are the side effects?

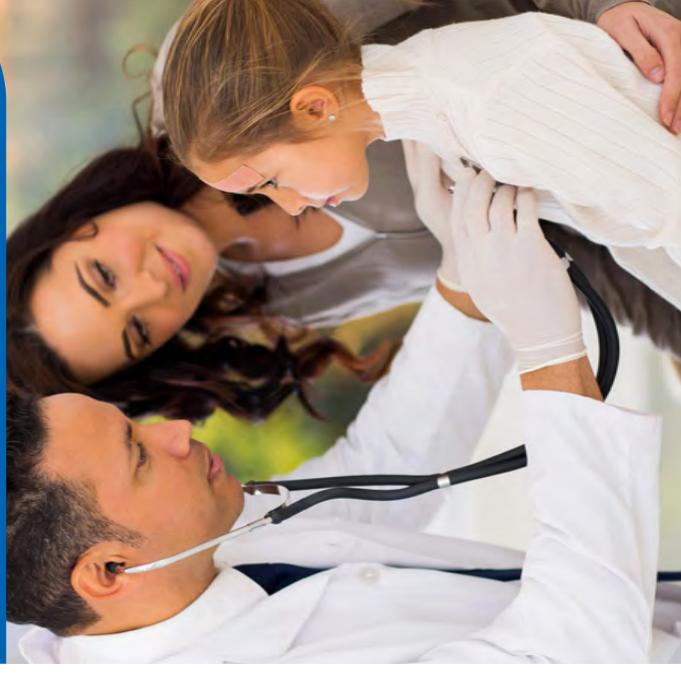
Common side effects range from minor to very severe health problems and can include:

- Rash
 - Dizziness
 - Nausea
 - Diarrhea
 - Yeast infections
- More serious side effects can include:
- *Clostridium difficile* infection
 - Severe and life-threatening allergic reactions

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



Antibiotics Aren't Always the Answer.





Why is it important to Be Antibiotics Aware?

Antibiotics save lives. 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. 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.

What do antibiotics treat?

Antibiotics are only needed for treating certain infections caused by bacteria. Antibiotics are critical tools for treating common infections, such as pneumonia, and for life-threatening conditions including sepsis, the body's extreme response to an infection.

What don't antibiotics treat?

Antibiotics do not work on viruses, such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won't help some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.

How can I stay healthy?

You can stay healthy and keep others healthy by:

- Cleaning hands
- Covering coughs
- Staying home when sick
- Getting recommended vaccines, for the flu, for example

Talk to your doctor or nurse about steps you can take to prevent infections.



Preventing and Treating Bronchitis

Cough keeping you up at night? Soreness in your chest and feeling fatigued? You could have acute bronchitis, but be aware: an antibiotic will not help you get better.



What is Acute Bronchitis?

Bronchitis occurs when the airways of the lungs swell and produce mucus. That's what makes you cough. Acute bronchitis, often called a "chest cold," is the most common type of bronchitis. The symptoms last less than 3 weeks. If you're a healthy person without underlying heart or lung problems or a weakened immune system, this information is for you.

Symptoms of Acute Bronchitis:

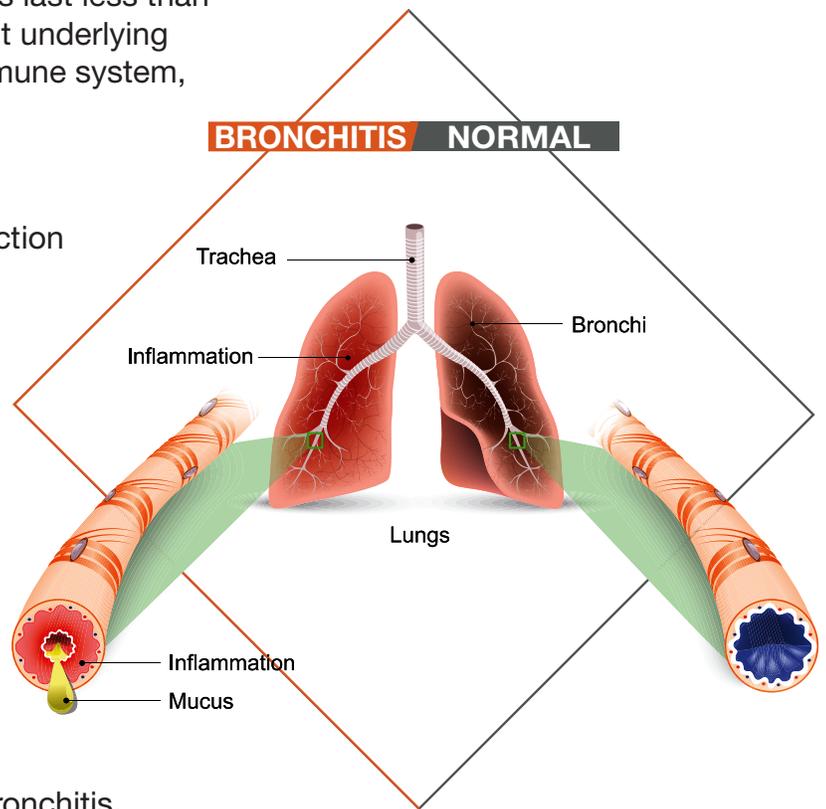
- ◆ Coughing with or without mucus production

You may also experience:

- ◆ Soreness in the chest
- ◆ Fatigue (feeling tired)
- ◆ Mild headache
- ◆ Mild body aches
- ◆ Watery eyes
- ◆ Sore throat

Causes

- ◆ Acute bronchitis is usually caused by a virus and often occurs after an upper respiratory infection.
- ◆ Bacteria can sometimes cause acute bronchitis, but even in these cases antibiotics are NOT recommended and will not help you get better.



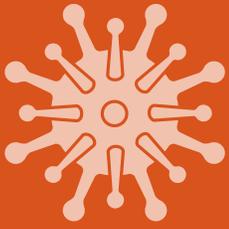
When to Seek Medical Care

See a healthcare professional if you or your child have any of the following:

- ◆ Temperature higher than 100.4 °F
- ◆ Cough with bloody mucus
- ◆ Shortness of breath or trouble breathing
- ◆ Symptoms that last more than 3 weeks
- ◆ Repeated episodes of bronchitis



Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases



Recommended Treatment

Good news! Acute bronchitis almost always gets better on its own—without antibiotics. Using antibiotics when they aren't needed can do more harm than good. Unintended consequences of antibiotics include side effects, like rash and diarrhea, as well as more serious consequences, such as an increased risk for an antibiotic-resistant infection or *Clostridium difficile* infection, a sometimes deadly diarrhea.

To Feel Better:

- ◆ Get plenty of rest
- ◆ Drink plenty of fluids
- ◆ Use a clean humidifier or cool mist vaporizer
- ◆ Breathe in steam from a bowl of hot water or shower
- ◆ Use lozenges (*do not give lozenges to children younger than 4 years of age*)
- ◆ Ask your healthcare professional or pharmacist about over-the-counter medicines that can help you feel better

Remember, always use over-the-counter medicines as directed. **Do not use cough and cold medicines in children younger than 4 years of age** unless specifically told to do so by a healthcare professional.

Your healthcare professional will most likely prescribe antibiotics for a diagnosis of whooping cough (pertussis) or pneumonia.

Prevention

- ◆ Practice good hand hygiene
- ◆ Make sure you and your child are up-to-date with all recommended vaccines
- ◆ Don't smoke and avoid secondhand smoke, chemicals, dust, or air pollution
- ◆ Always cover your mouth and nose when coughing or sneezing
- ◆ Keep your distance from others when you are sick, if possible

And Remember:

Antibiotics will not treat acute bronchitis. Using antibiotics when not needed could do more harm than good.



Runny Nose from a Cold: Does your child need antibiotics?

Q&A Guide for Parents

Your child has a cold and a runny nose. You might think this means your child needs an antibiotic. A runny nose, even if you're seeing thick yellow or green mucus, is normal when you begin to get better from a cold.

What causes a runny nose during a cold?

When germs that cause colds first infect the nose and sinuses, the nose makes clear mucus. This helps wash the germs from the nose and sinuses. After two or three days, the body's immune system fights back, changing the mucus to a white or yellow color. When bacteria that normally live in the nose grow back during the recovery phase, they then change the mucus to a greenish color. This is all normal and does not mean your child needs antibiotics.

What should I do?

- Try using a cool mist vaporizer or saltwater nose drops.
- Watch your child. Runny nose, cough, and symptoms like fever, headache, and muscle aches may be unpleasant, but antibiotics will not help and the symptoms won't go away any faster. When antibiotics aren't needed, they won't help and could even hurt you.

Are antibiotics needed for a runny nose?

A runny nose is a normal part of a cold. Antibiotics do not work on viruses like colds or



runny noses (even if the mucus is thick yellow or green). Your child's doctor or nurse may prescribe other medicine or give you tips to help with symptoms like fever and cough.

Why not just try antibiotics?

When antibiotics aren't needed, they won't help and could even hurt you. Taking antibiotics creates resistant bacteria. Antibiotic resistance occurs when bacteria change and adapt to defeat the killing power of antibiotics. Any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. Side effects of antibiotics can include rash, dizziness, stomach problems, or yeast infections.

Improving the way we take antibiotics can help fight antibiotic resistance and ensure that life-saving antibiotics will be available for future generations.

A runny nose typically gets better on its own, so antibiotics aren't needed. Talk to your healthcare professional about how to feel better while your body fights your illness.

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

Preventing and Treating Ear Infections



What is an ear infection?

Ear infections can affect the ear canal or the middle ear.

Acute otitis externa (AOE) is the scientific name for an infection of the ear canal, which is also called swimmer's ear.

Middle ear infections are called *Otitis Media*, and there are two types of middle ear infections:

- **Otitis Media with Effusion (OME)** occurs when fluid builds up in the middle ear without pain, pus, fever, or other signs and symptoms of infection.
- **Acute Otitis Media (AOM)** occurs when fluid builds up in the middle ear and is often caused by bacteria, but can also be caused by viruses.

How are ear infections caused and how can they be prevented?

Bacteria

AOM is often caused by bacteria, and *Streptococcus pneumoniae* is a common bacterial cause of AOM.

- ➔ Ensure your child is up to date on vaccinations, including the pneumococcal vaccination which protects against *Streptococcus pneumoniae*. Breast feeding exclusively until your baby is 6 months old and continuing to breastfeed for at least 12 months can protect your baby from infections, including AOM.

Cold and Flu Season

AOM often occurs after a cold. Viruses cause OME (fluid in the middle ear), and then bacteria can grow in the fluid leading to AOM.

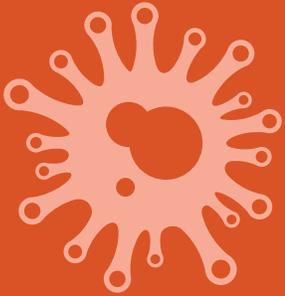
- ➔ Ensure your child is up to date on vaccinations and gets a flu vaccine every year.

Injury to the Ear

Foreign objects, like cotton swabs and bobby pins, can cause cuts and bruises in the ear canal that can get infected, causing acute otitis external AOE.

- ➔ Avoid putting foreign objects in the ear.





Cigarette Smoke

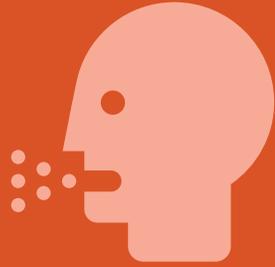
Exposure to cigarette smoke can lead to more colds and more AOM.

- Avoid smoking and exposure to secondhand smoke.

Family History

The tendency to develop AOM can run in families.

- Family history is not preventable. Instead, focus on other prevention methods, like staying up to date on vaccinations, breast feeding, and avoiding smoke.



How are ear infections treated?

- **AOE** is usually treated with antibiotic ear drops.
- **OME** usually goes away on its own and does not benefit from antibiotics but sometimes antibiotics are needed.
- **AOM** may not need antibiotics in many cases because the body's immune system can fight off the infection without help from antibiotics, but sometimes antibiotics are needed.

Watchful Waiting

- Mild AOM often will get better on its own without antibiotic treatment, so your healthcare professional may recommend *watchful waiting* before prescribing antibiotics to you or your loved one. This means that your provider may wait a few days before deciding whether to prescribe antibiotics, while treating the symptoms of AOM. Watchful waiting gives your or your child's own immune system time to fight off the infection first before starting antibiotics. If you or your child don't get better in 2–3 days or get worse, your healthcare professional can recommend starting antibiotics.
- Another form of watchful waiting is *delayed prescribing*. This means that your healthcare professional may give you an antibiotic prescription, but ask you to wait 2–3 days to see if you or your child are still sick with fever, ear pain, or other symptoms before filling the prescription.



Symptom Relief

There are ways to relieve symptoms associated with ear infections – like ear pain – whether or not antibiotics are needed. Consider using acetaminophen or ibuprofen to relieve pain or fever. Ask your healthcare professional or pharmacist what medications are safe for you or your loved one to take.

Antibiotics, such as amoxicillin, are used to treat severe ear infections or ear infections that last longer than 2–3 days.

If your child has a fever of 102.2°F (39°C) or higher, discharge or fluid coming from the ear, symptoms are much worse, or symptoms last for more than two or three days for AOM, you should contact your healthcare professional. If your child has symptoms of OME for more than one month or hearing loss, contact your healthcare professional.



Is it Really a Penicillin Allergy?

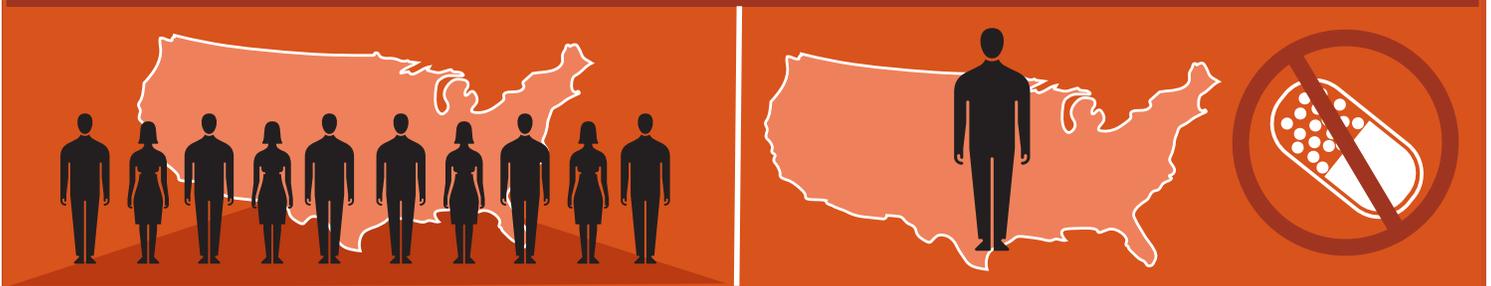
Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals

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 truly 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.

History and Physical Examination

The history and physical examination are important components when evaluating a patient’s drug reactions.¹

- Questions to ask during the examination:
 - What medication were you taking when the reaction occurred?
 - What kind of reaction occurred?
 - How long ago did the reaction occur?
 - How was the reaction managed?
 - What was the outcome?²
- Characteristics of an IgE-mediated (Type 1) reaction:
 - Reactions that occur immediately or usually within one hour¹
 - Hives: Multiple pink/red raised areas of skin that are intensely itchy³
 - Angioedema: Localized edema without hives affecting the abdomen, face, extremities, genitalia, oropharynx, or larynx⁴
 - Wheezing and shortness of breath
 - Anaphylaxis

- Broad-spectrum antibiotics are often used as an alternative to narrow-spectrum penicillins.
- Using broad-spectrum antibiotics can increase healthcare costs and antibiotic resistance, and may mean your patient receives less than the best care.
- Correctly identifying if your patient is actually penicillin-allergic can decrease these risks by reducing unnecessary use of broad-spectrum antibiotics.



Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

- Anaphylaxis¹ requires signs or symptoms in at least two of the following systems:
 - Skin: Hives, flushing, itching, and/or angioedema
 - Respiratory: Cough, nasal congestion, shortness of breath, chest tightness, wheeze, sensation of throat closure or choking, and/or change in voice-quality (laryngeal edema)
 - Cardiovascular: Hypotension, faintness, tachycardia or less commonly bradycardia, tunnel vision, chest pain, sense of impending doom, and/or loss of consciousness
 - Gastrointestinal: Nausea, vomiting, abdominal cramping, and diarrhea⁵

Penicillin Skin Tests and Challenge Doses

Based on the patient history and physical exam, additional tests may be needed to confirm a penicillin allergy.

Penicillin skin testing and challenge doses are reliable and useful methods for evaluating for IgE-mediated penicillin allergy.⁵

Penicillin Skin Testing

A positive result means the patient is likely to have a penicillin allergy. If negative, the skin test is usually followed by an oral penicillin class challenge (e.g., with amoxicillin) to safely rule out an IgE-mediated penicillin allergy.^{1,7}

- The current standard of care is to perform a skin test with the major determinant penicilloylpolylysine and commercially-available penicillin G.
- To rule out penicillin allergy, an oral challenge dose can be done after skin testing. The negative predictive value of skin testing with the major and minor determinants is more than 95%, but approaches 100% when followed by a challenge dose.²

A direct oral challenge without prior skin testing may also be performed in selected patients and can rule out penicillin allergy. For more information, please consult an allergist.

Special Considerations

Patients with severe hypersensitivity syndromes

Patients with other severe hypersensitivity syndromes—like Stevens-Johnson syndrome, toxic epidermal necrolysis, serum sickness, acute interstitial nephritis, hemolytic anemia, and drug rash with eosinophilia and systemic symptoms (DRESS)—should not use the offending drug in the future. The skin test and challenge described here are not appropriate for patients with these severe hypersensitivity syndromes.^{1,2,6}

Cephalosporin use in penicillin-allergic patients

Many cephalosporins, especially in the later generations, can be safely tolerated despite a penicillin allergy.^{6,8} Patients with anaphylaxis or other severe reactions to penicillin may require further evaluation prior to the use of cephalosporins.

Pediatric patients

Children who are receiving amoxicillin or ampicillin and have Epstein-Barr virus infection can develop a non-allergic, non-pruritic rash that can appear similar to an allergic reaction.^{1,9}

For more information about antibiotic use, visit www.cdc.gov/antibiotic-use.

References

1. Joint Task Force on Practice Parameters representing the American Academy of Allergy, Asthma and Immunology; American College of Allergy, Asthma and Immunology; Joint Council of Allergy, Asthma and Immunology. Drug allergy: an updated practice parameter. *Ann Allergy Asthma Immunol*. 2010 Oct;105(4):259-273.
2. Gonzalez-Estrada A, Radojicic C. Penicillin allergy: a practical guide for clinicians. *Cleve Clin J Med*. 2015 May;82(5):295-300.
3. Herrier RN, Apgar DA, Boyce RW, Foster SL. Patient assessment in pharmacy. New York: McGraw-Hill; 2015 [cited 2015 Aug 14]. Available from: <http://accesspharmacy.mhmedical.com/content.aspx?bookid=1074&Sectionid=62364288>.
4. Bernstein JA. Update on angioedema: evaluation, diagnosis, and treatment. *Allergy Asthma Proc* 2011; 32(6):408-412.
5. Sampson HA, Muñoz-Furlong A, Campbell RL, Adkinson NF Jr, Bock SA, Branum A et al. Second symposium on the definition and management of anaphylaxis: summary report—second National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network symposium. *Ann Emerg Med*. 2006; 47:373-380.
6. Blumenthal KG, Shenoy ES, Hurwitz S, Varughese CA, Hooper DC, Banerji A. Effect of a drug allergy educational program and antibiotic prescribing guideline on inpatient clinical providers' antibiotic prescribing knowledge. *J Allergy Clin Immunol*. 2014;2(4):407-412.
7. Macy E, Ngor E. Recommendations for the management of beta-lactam intolerance. *Clinical Rev Allergy Immunol*. 2014; 47:46-55.
8. Pichichero, ME. A review of evidence supporting the American Academy of Pediatrics recommendation for prescribing cephalosporin antibiotics for penicillin-allergic patients. *Pediatrics*. 2005 Apr; 115(4):1048-1057.
9. Centers for Disease Control and Prevention [Internet]. About Epstein-Barr Virus (EBV) [cited 2015 Aug 17]. Available from: <http://www.cdc.gov/epstein-barr/about-ebv.html>.

CDC thanks Mina Hong, PharmD Student Class of 2016 at Northeastern University, and Kimberly G. Blumenthal, MD, Division of Rheumatology, Allergy, and Immunology, Department of Medicine, Massachusetts General Hospital, Harvard Medical School, for their assistance preparing this fact sheet.

AN ANTIBIOTIC IS THE WRONG TOOL TO TREAT A VIRUS.



Make sure you use the right tool for the job.

Antibiotics save lives by treating certain infections caused by bacteria, not viruses like colds or flu. When they're not needed, antibiotics won't help you, and the side effects could still hurt you. Ask your doctor when an antibiotic is the right tool for your illness and when it's not.

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



LOS ANTIBIÓTICOS NO SON LA HERRAMIENTA CORRECTA PARA TRATAR UN VIRUS.



Asegúrese de usar la que corresponda.

Los antibióticos salvan vidas al tratar ciertas infecciones causadas por bacterias, pero no los virus como los del resfrío o la influenza. No lo ayudarán si no los necesita y sus efectos secundarios aun podrían hacerle daño. Pregúntele al médico cuándo un antibiótico es la herramienta correcta y cuándo no lo es.

Para saber más sobre la prescripción y el uso de antibióticos, visite www.cdc.gov/antibioticos.



**TOME CONCIENCIA
SOBRE LOS
ANTIBIÓTICOS**
BUEN USO, MEJOR TRATAMIENTO



**HEALTHY
CHICAGO**

CHICAGO DEPARTMENT OF PUBLIC HEALTH

Viruses or Bacteria

What's got you sick?

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

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



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



DO YOU NEED ANTIBIOTICS?



**BE
ANTIBIOTICS
AWARE**

SMART USE, BEST CARE

You feel sick and miserable and want to get better fast. It could be a cold or even the flu. You're probably thinking you need antibiotics to knock out your illness and help you feel better. **Not so fast!** When antibiotics aren't needed, they won't help you, and the side effects could still hurt you.

8 WAYS TO BE ANTIBIOTICS AWARE

1 Antibiotics save lives, but they aren't always the answer when you're sick.

2 Antibiotics do not work on viruses.

3 Antibiotics are only needed for treating certain infections caused by bacteria.

4 An antibiotic will NOT make you feel better if you have a virus.

5 Any time antibiotics are used, they can cause side effects.

6 Taking antibiotics creates resistant bacteria.

7 If you need antibiotics, take them exactly as prescribed.

8 Stay healthy: clean hands, cover coughs, and get vaccinated, for the flu, for example.

Talk to your healthcare professional about the best way to feel better.

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



**HEALTHY
CHICAGO**

CHICAGO DEPARTMENT OF PUBLIC HEALTH

