Department of
Public Health
CITY OF PHILADELPHIA

R-FAST

Respiratory Tract Infection
Focused Antibiotic Stewardship Toolkit

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Suspected LRI **SBAR**

Complete this form before contacting the resident's physician.

Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

Submitted by ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

S Situation

I am contacting you about a suspected lower respiratory tract infection for the above resident.

Vital Signs BP _____ /_____ HR _____ Resp. rate _____

Temp. _____ O2 Sat _____

B Background

☐ No ☐ Yes The resident has COPD

☐ No ☐ Yes The resident has diabetes

☐ No ☐ Yes The resident is a current smoker

☐ No ☐ Yes The resident is a former smoker

☐ No ☐ Yes Resident uses nebulizer/inhaler

☐ No ☐ Yes The resident is on supplemental O2

☐ No ☐ Yes O2 requirements have increased
specify O2 amount: _____

☐ No ☐ Yes Resident reports chest pain
or difficulty breathing

☐ No ☐ Yes Other active diagnoses (especially, chronic lung disease, chronic bronchitis, emphysema)

Specify: _____

_____

☐ No ☐ Yes Advance directives for limiting treatment related to antibiotics and/or hospitalizations

Specify: _____

_____

☐ No ☐ Yes Medication Allergies

Specify: _____

_____

☐ No ☐ Yes The resident is on Warfarin (Coumadin®)

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care ● www.ahrq.gov

PREVENT HAIs Healthcare-Associated Infections

www.ahrq.gov/NH-ASPGuide • June 2014
AHRQ Pub. No. 14-0010-2-EF

Nursing Home Name _____ Facility Fax _____

Resident Name _____

A Assessment Input (check all boxes that apply)

Criteria are met if one of the four situations are met

Resident with a fever of 102ºF (38.9ºC) or higher and one of the following

No Yes

- ☐ ☐ Respiratory rate of >25 breaths per minute
- ☐ ☐ New or worsened cough
- ☐ ☐ New or increased sputum production
- ☐ ☐ O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline

Resident with a fever of 100ºF (37.9ºC) and less than 102ºF (38.9ºC)

No Yes

- ☐ ☐ Cough and at least one of the following
  - ☐ Pulse >100
  - ☐ Delirium (sudden onset of confusion, disorientation, dramatic change in mental status)
  - ☐ Rigors (shaking chills)
  - ☐ Respiratory rate >25 breaths per minute

Afebrile resident with COPD and age >65

No Yes

- ☐ ☐ New or increased cough with purulent sputum production

Afebrile resident without COPD and age >65

- ☐ ☐ New or increased cough with purulent sputum production **and** at least one of the following
  - ☐ Respiratory rate >25
  - ☐ Delirium (sudden onset of confusion, disorientation, dramatic change in mental status)

Nurses: Please check box to indicate whether or not criteria are met

- ☐ **Nursing home protocol criteria are met.** The resident may have a lower respiratory tract infection and need a prescription for an antibiotic agent.†
- ☐ **Nursing home protocol criteria are NOT met.** The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.††

R – Request for Physician/NP/PA Orders

Orders were provided by clinician through ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

- ☐ Chest X-Ray
- ☐ For cough, consider using a cough suppressant Dose _____ Route _____ Duration _____
- ☐ For cough, consider using an inhaler/nebulizer Dose _____ Duration _____
- ☐ Acetaminophen _____ mg. Route _____ Duration _____
- ☐ Raise upper body (use multiple pillows) to sleep/rest
- ☐ Encourage _____ ounces of fluid by mouth or G-Tube for _____ hours
- ☐ Record fluid intake
- ☐ Encourage salt water gargles
- ☐ Assess vital signs, including temp, every _____ hours for _____ hours
- ☐ Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours
- ☐ Initiate intravenous fluid hydration and/or ☐ initiate hypodermoclysis.
- ☐ Initiate the following antibiotic(s)

  Antibiotic 1 _____ Dose _____ Route _____ Duration _____

  Antibiotic 2 _____ Dose _____ Route _____ Duration _____

  ☐ No ☐ Yes Pharmacist to adjust for renal function
- ☐ Other, specify: _____

Physician/NP/PA signature _____ Date/Time _____

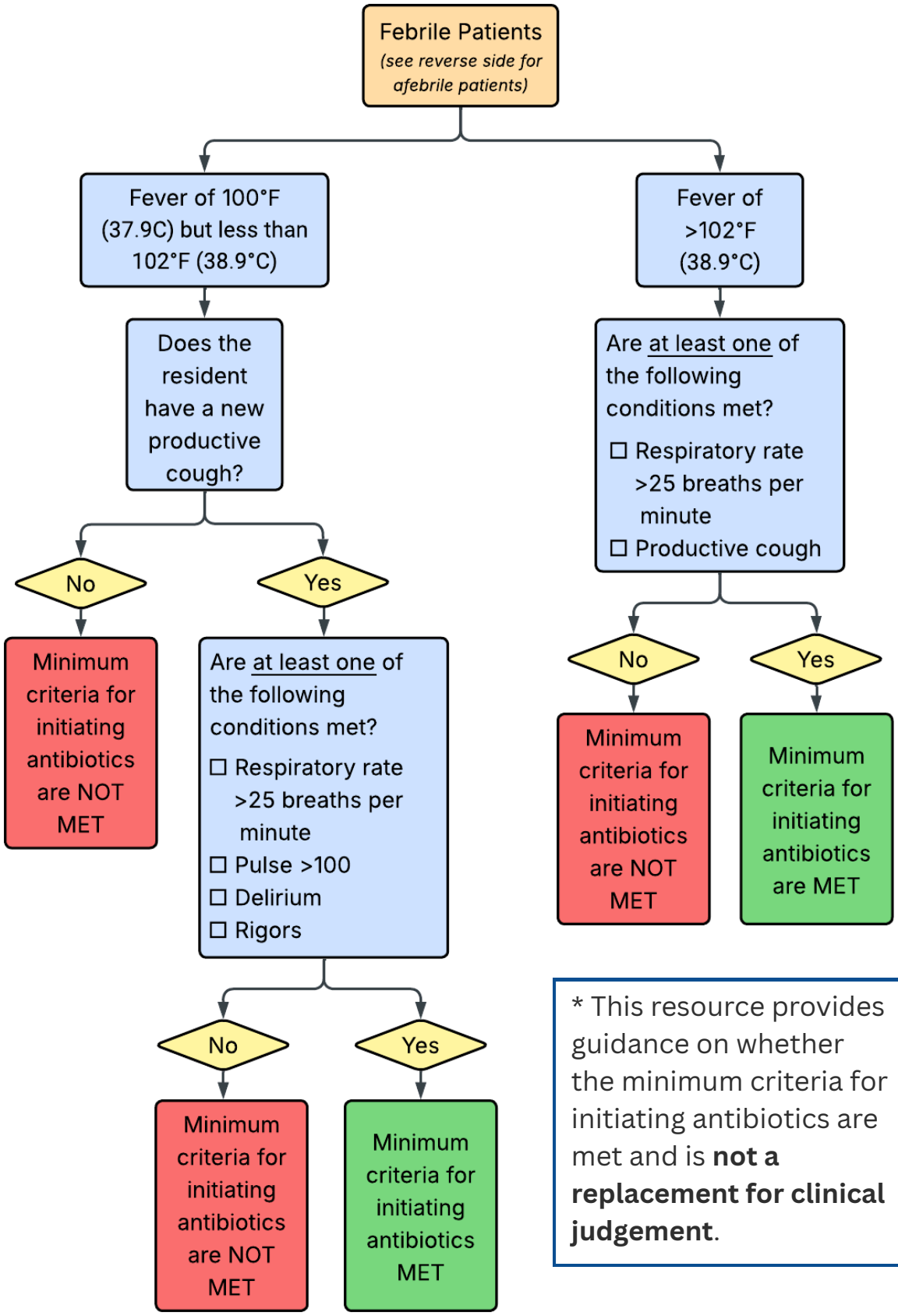
Telephone order received by _____ Date/Time _____

Family/POA notified (name) _____ Date/Time _____

† This is according to our understanding of best practices and our facility protocols.

†† This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active lower respiratory tract infection.

Minimum Criteria for Antibiotics in Suspected Lower Respiratory Tract Infections*



* This resource provides guidance on whether the minimum criteria for initiating antibiotics are met and is **not a replacement for clinical judgement**.

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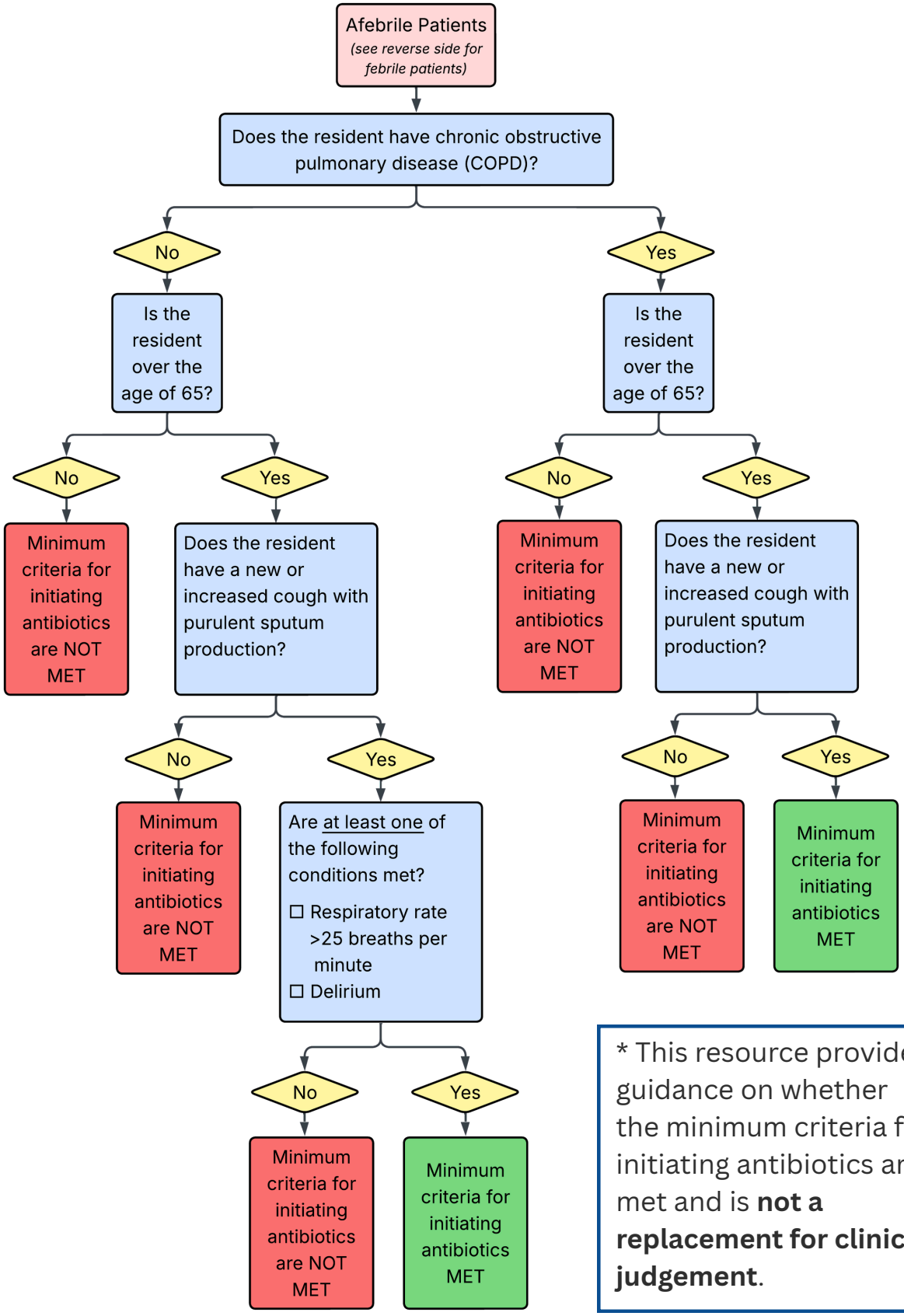
Based on AHRQ Pub. No. 17-0006-5-EF
October 2016
Nursing Home Antimicrobial Stewardship Guide

Minimum Criteria for Antibiotics in Suspected Lower Respiratory Tract Infections*



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Department of Public Health
CITY OF PHILADELPHIA

Based on AHRQ Pub. No. 17-0006-5-EF
October 2016
Nursing Home Antimicrobial Stewardship Guide

Minimum Criteria for Initiating Antibiotics for a Lower Respiratory Tract Infection

If a resident has a fever of >102°F (38.9°C), initiate antibiotics if one of the following criteria are met:

- Respiratory rate >25 breaths per minute, or
- Productive cough

If a resident has a fever of 100°F (37.9°C) but less than 102°F (38.9°C), initiate antibiotics if the following criteria are met:

- Cough **AND** at least 1 of the following:
  - Pulse >100, or
  - Delirium (sudden onset of confusion, disorientation, dramatic change in mental status), or
  - Rigors (shaking chills), or
  - Respiratory rate >25

Delirium is defined as a disturbance of consciousness with reduced ability to focus, shift, or sustain attention; change in cognition (such as memory deficit, disorientation) or development of a perceptual disturbance not better accounted for by dementia; and development of symptoms over a short period of time, with a tendency to fluctuate during the day.

If a resident is afebrile with COPD, and classified as high-risk because of age >65, initiate antibiotics if the following criterion is met:

- New or increased cough with purulent sputum production

If a resident is afebrile without COPD, and classified as high-risk because of age >65, initiate antibiotics if the following criteria are met:

- New or increased cough with purulent sputum production **AND** at least 1 of the following:
  - Respiratory rate >25, or
  - Delirium (sudden onset of confusion, disorientation, dramatic change in mental status)

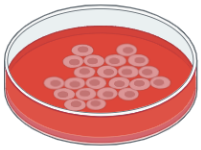
If none of the minimum criteria are met, consider initiating the following:

- Assess vital signs, including temp, every _____ hours for _____ hours.
- Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours.

Diagnostic Testing Considerations in Suspected Respiratory Tract Infections

Consider testing for COVID-19, influenza, and respiratory syncytial virus in…

- Febrile residents with respiratory symptoms during respiratory virus season.
- Residents experiencing chronic obstructive pulmonary disease exacerbations during respiratory virus season.
- Settings of known facility- or community-associated outbreaks.

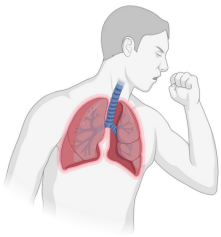


Consider collecting a sputum culture in residents with suspected pneumonia, particularly if one or more of the following criteria are met:

- Resident has a known history of multidrug-resistant organisms or *Pseudomonas aeruginosa*.
- Resident has had multiple recent antibiotic courses.
- Resident is not improving on antibiotic therapy.

Consider testing for atypical bacteria such as Mycoplasma pneumoniae, Legionella, Chlamydia pneumoniae, and Bordetella pertussis in…

- Residents experiencing significant ongoing respiratory symptoms when diagnostic workup has not identified a causative bacterial or viral pathogen.
- Residents with respiratory symptoms when there is a known facility-associated or community-associated outbreak.



Consider tuberculosis (TB) as a diagnosis in…

- Residents experiencing subacute or chronic symptoms such as productive cough with or without hemoptysis, weight loss, fever, and/or night sweats, especially if the resident is known to have latent TB infection or is a known contact of a contagious case of TB.

Consider ordering a chest X-ray for all residents meeting the minimum criteria to initiate antibiotics.

- To identify residents meeting the minimum criteria, please refer to the ‘Minimum Criteria for Initiating Antibiotics in Suspected Lower Respiratory Tract Infections’ handout included in this toolkit.

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Collection of Microbiological Cultures

Only collect bacterial cultures in <u>symptomatic</u> patients

Respiratory Cultures

When to collect a specimen

- Only if pneumonia is suspected—not for chronic obstructive pulmonary disease (COPD), bronchitis, or upper respiratory tract infections
- Prior to antibiotic administration

NOTE: A positive specimen does not necessarily mean that the organism is causing an infection. Many organisms are naturally present in the oral flora, and clinical context must be considered.

How to collect a specimen

1. Wash hands and use new gloves.
2. Obtain an early morning specimen.
3. Ask the resident to rinse his/her mouth out with water before collection and tell the resident you need phlegm from deep in his/her lungs.
4. Collect specimen in a sterile container.
5. Transfer to the lab or the refrigerator **within 15 minutes.**

References

CDC Specimen Collection Guidelines. https://www.cdc.gov/urdo/downloads/SpecCollectionGuidelines.pdf.

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June 2021

Antibiotic Timeout Tool

- The prescriber (physician or APP) should be contacted at 48-72 hrs after antibiotics are started to perform antibiotic timeout as specified below.
- The reassessment of antibiotics should occur based on additional data available including:
  - Resident's clinical response
  - Additional lab/culture data
  - Alternate explanation for the resident's status change
- Responses should be documented in the medical record.

Name of physician/AAP contacted: _____

Date: _____ Time: _____

Antibiotic #1: _____ Dose: _____ Route: _____

Antibiotic #2: _____ Dose: _____ Route: _____

Ask the prescriber to answer each of the following questions:

1. Does this resident have an infection that will respond to antibiotics? □ **Yes** □ **No** **Comment** _____

2. Is the resident on the right antibiotic(s), at the right dose, through the right route of administration (e.g., PO, IV)? □ **Yes** □ **No** **Comment** _____

3. Can a more targeted antibiotic be used to treat the infection? □ **Yes** □ **No** **Comment** _____

4. Can the duration of the antibiotic course be shortened? □ **Yes** □ **No** **Comment** _____

5. Would the resident benefit from additional infectious disease or antibiotic expertise to ensure optimal treatment of infection? □ **Yes** □ **No** **Comment** _____

Reference:
CDC Core Elements of Antibiotic Stewardship for Nursing Homes:
https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

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Long Term Care RISE
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Respiratory Virus Infections

Diagnosis

- Most respiratory tract infections are caused by viruses, not bacteria, and do not require antibiotic therapy.[1-3]
- Common infectious syndromes caused by respiratory viruses include:
  - Common cold[3]
  - Uncomplicated sinus infections with symptoms present for <2 weeks[4-5]
  - Acute bronchitis (approximately 90% caused by viruses)[6]
  - Exacerbations of chronic obstructive pulmonary disease (approximately 50% caused by viruses)[7-8]
- Common respiratory viruses that affect long-term care residents include influenza, SARs-CoV-2, rhinovirus, parainfluenza, human metapneumovirus, and respiratory syncytial virus (RSV)[3]

Signs and Symptoms of Viral Respiratory Infections

Respiratory virus infections typically present with several of the following symptoms:

- Fever[9]
  - Criteria for fever in older adults: any temperature >100°F, repeated temperatures >99°F or >2°F above resident's baseline
- Headache[1]
- Nasal congestion[1]
- Shortness of breath[1]
- Cough (dry or productive)[1]
- Wheezing[1]

In addition to the above, the following may indicate COVID-19* infection in the long-term care population:[10-13]

- Temperature ≥ 99.0°F
- Loss of taste or smell
- Diarrhea
- Acute mental status change

*COVID-19, caused by SARS-CoV-2, is a rapidly evolving situation. The information included here reflects the current state of understanding as of May 5, 2021. For ongoing updates, see https://www.cdc.gov/coronavirus/2019-ncov/index.html

Workup for Suspected Viral Respiratory Tract Infection

- Test for influenza (particularly during peak influenza season October–March) and SARS-CoV-2 or can send a respiratory virus panel if available[11,14-17,]
- For individuals with severe illness or clinical deterioration, consider:
  - CBC to evaluate for leukocytosis (high white blood cell count suggests bacterial pneumonia)[18]
  - Pulse oximetry[19,20]
  - Chest x ray[21,22]
    - Viruses can involve the lower respiratory tract and lead to changes on chest x ray
      - Most often the findings are bilateral interstitial changes or ground-glass opacities
    - Bacterial pneumonia is more commonly associated with lobar consolidations

Treatment for Viral Respiratory Tract Infections

- Supportive care: cough suppressants, fluids, supplemental oxygen, nebulizer treatments, chest physical therapy, encourage smoking cessation.[1]
- If a resident is diagnosed with influenza, start antiviral treatment and screen other residents for symptoms of influenza-like illness.[23]
- If consistent with goals of care, transfer the resident to an acute-care facility if the resident appears clinically unstable (e.g., unable to maintain O_2 saturation, hypotension, tachycardia)[20]

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June 2021

Influenza

Diagnosis

- Influenza should be suspected during influenza season (October–March) in nursing home residents with typical symptoms: sudden onset of fever, headache, sore throat, cough, myalgias, rhinorrhea.[1-3]
- Influenza testing should occur for residents with recent onset of signs and symptoms suggestive of influenza or acute respiratory illness, even if it's not influenza season.[4]
  - Once a laboratory-confirmed case of influenza has been identified in a resident, it is likely that there are additional cases in the nursing home.
    - Active influenza surveillance should occur until at least 1 week after the last influenza case has been identified.
    - Local public health and State health departments should be notified of every suspected or confirmed influenza outbreak in long-term care facilities.

Note: Infection with SARS CoV-2 should be considered in the differential for a resident with respiratory symptoms who is suspected of having influenza, and consideration should be given to appropriate isolation and testing for SARS CoV-2.[5,6]

Treatment

- All long-term care facility residents who have confirmed or suspected influenza should receive antiviral treatment immediately.[3,4]
- Antivirals are most effective if started ≤ 48 hours after symptom onset.[3,4]
- Antivirals may be started up to 96 hours after symptom onset and still reduce illness severity.[7]
- All nonsymptomatic residents on the unit should start oseltamivir promptly for a minimum of 2 weeks for chemoprophylaxis, regardless of whether they have received influenza vaccination.[4,5]
- Antivirals need to be dosed according to the resident's renal function. See the table below for suggested dosing.[4,8]

Indication	Usual Dose	Adjusted Dose	
Treatment	75mg twice daily x 5 days	CrCl 31-60 CrCl 10-30 Dialysis	30mg twice daily 30mg once daily 30mg after dialysis on dialysis days
Chemo-prophylaxis	75mg once daily for 2 weeks or 7 days after last known case whichever is longer	CrCl 31-60 CrCl 10-30 Dialysis	30mg once daily 30mg every other day 30mg after every other dialysis

CrCl = creatinine clearance

Prevention

- Influenza vaccination should be provided annually to all residents and health care personnel of long-term care facilities, ideally by the end of October.[4,9]
- Standard and droplet precautions should be initiated for all residents with suspected or confirmed influenza.[4]

References

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June 2021

Chronic Obstructive Pulmonary Disease (COPD) Exacerbations

Diagnosis

- A COPD exacerbation should be considered in a resident with a known history of COPD and increased cough, shortness of breath, or sputum production from baseline.[1-3]
- COPD exacerbations are commonly triggered by respiratory virus infections (e.g., rhinovirus, influenza, COVID-19) and testing for these should be considered.[4]
  - Even if it's not influenza season, test residents who are symptomatic for influenza, especially if two or more develop symptoms within 72 hours of each other.[5]
- Distinguishing COPD exacerbations and community-acquired pneumonia in a resident with a known history of COPD can be challenging.[1,6,7]
  - If a chest x-ray does not show a new infiltrate, a COPD exacerbation is more likely.
- When bacteria are involved with COPD exacerbation, the most common are *Haemophilus influenzae, Moraxella catarrhalis,* and *Streptococcus pneumoniae.*[8,9]
- *Pseudomonas aeruginosa*, *Klebsiella pneumoniae,* and other Gram-negative bacteria are less commonly associated with COPD exacerbations and are usually limited to residents with COPD who have had extensive antibiotic exposure. Sputum culture should be obtained for residents with this risk factor.[1,8,9]

Treatment

- In additional to standard treatment modalities (e.g., bronchodilators, anti-inflammatory agents, anti-cholinergics), antibiotics are generally recommended in patients with new sputum purulence plus either worsened shortness of breath or increased sputum production.[1-3]
- Known adverse events associated with antibiotics should be carefully weighed against the potentially marginal benefits that antibiotics provide prior to prescribing antibiotics to residents with mild COPD exacerbations.[2]
- Empiric treatment[1,2]
  - Azithromycin 500 mg orally once daily for 3 days or doxycycline 100 mg orally twice a day for 5 days[10-17]
    - Azithromycin has a long half-life; 3 days provides coverage for ~ 1 week.[18]
    - Azithromycin and doxycycline are less likely to cause *Clostridioides difficile* infection compared to alternate options[19-21]
  - If a resident recently received azithromycin or doxycycline, or is taking azithromycin prophylaxis, alternate options include amoxicillin/clavulanate or oral second and third generation cephalosporins[22]
  - Fluoroquinolones are discouraged unless the resident has a known history of infection due to organisms resistant to standard therapy.[22]
- Prophylactic antibiotics for individuals with recurrent COPD exacerbations (at least two per year) may result in a modest decrease in the frequency of future exacerbations.[1,23]
  - Prophylaxis should only be considered for residents who are already receiving maximized non-antimicrobial treatment
  - The decision to initiate prophylaxis should be made on a case-by-case basis taking into account frequency of exacerbations, resident preferences, potential risk factors, financial constraints, and input from the resident's pulmonologist and/or primary care practitioner.
- Recommended prophylactic regimens are azithromycin 250 mg orally daily or 500 mg three times a week.[1,23,24]
  - Azithromycin use has been associated with QTc prolongation
  - If Azithromycin prophylaxis is being considered, a baseline electrocardiogram should be obtained and additional QTc prolonging agents should be avoided whenever possible.

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Bacterial Pneumonia in Long-Term Care

Diagnosis

Pneumonia is lung inflammation described as infiltrates on chest x ray

Signs and symptoms of pneumonia include:

- New or worsening shortness of breath or cough, often with sputum production[1]
- Fever (temperature >100°F or repeated temperatures above resident's baseline)[1]
- Decreased room air pulse oximetry (or increased oxygen requirements)[2]
- Pleuritic chest pain (pain with breathing) in the chest, upper abdomen, or back[3]

In adults, about 75% of pneumonia is caused by bacteria and 25% is caused by viruses[4]

- A positive test for a respiratory virus (e.g., influenza, COVID-19) in a resident with infiltrates on chest x ray usually indicates viral pneumonia[5,6]
- Fewer than 15% of nursing home residents have bacterial and viral pneumonia at the same time[7,8]

Evaluation for Suspected Pneumonia

- Pulse oximetry to evaluate for decreased oxygenation[2,3]
- CBC to evaluate for increased white blood cell count or presence of bands[9]
- Chest x ray; a new infiltrate suggests pneumonia; helpful to compare to prior imaging[3,9]
- Sputum Gram stain and culture[3,9]
- Test for influenza (particularly during peak influenza season, October–March) and COVID-19 or can send a respiratory viral panel if available[3,9-14]
- *Streptococcus pneumoniae* urinary antigen, *Legionella* urinary antigen (if available)[3,9,15]

Treatment for Bacterial Pneumonia

- Supportive care: cough suppressants, fluids, supplemental oxygen, nebulizer treatments, chest physical therapy
- Residents with influenza should receive oseltamivir[16]
- Residents who are generally in reasonable health and who have not been hospitalized or exposed to broad-spectrum antibiotics in the previous 90 days, consider:[13,17]
  - Amoxicillin-clavulanic acid or a second or third generation oral cephalosporin for 5–7 days PLUS doxycycline (for 5–7 days) or azithromycin (for 3 days)
  - If severe penicillin allergy*: moxifloxacin or levofloxacin for 5–7 days
- Residents with risk factors for resistant Gram-negative bacteria (hospitalized or broad-spectrum antibiotics in the previous 90 days, history of *Pseudomonas*, immunocompromised, bronchiectasis, or tracheostomy), consider:[13,17]
  - Cefepime or piperacillin-tazobactam for 7 days PLUS doxycycline (for 7 days) or azithromycin (for 3 days)
  - If severe penicillin allergy: levofloxacin
- If severe illness, consider adding vancomycin OR linezolid to either of the above regimens (for coverage of methicillin-resistant *Staphylococcus aureus*)[13,17]
- Longer treatment courses than those recommended do not improve outcomes[17,18]
- Modify therapy if microbiology results indicate a narrower-spuctrum agent can be used[9,13,17]
- Consider hospital transfer if no clinical improvement within 24 hours of starting antibiotics or clinical instability (e.g., unable to maintain O2 saturation, hypotension, tachycardia)[3]

*Recommend determining allergy risk and prescribing beta-lactam antibiotics if low risk. Fluoroquinolones may cause several serious side effects such as *Clostridioides difficile* infections, prolonged QTc intervals, tendinopathy and tendon rupture, aortic dissections, seizures, or peripheral neuropathy.

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Aspiration Pneumonitis and Aspiration Pneumonia

Diagnosis

- **Aspiration pneumonitis** is an abrupt chemical injury caused by inhalation of sterile gastric contents. It generally causes fever, increased oxygen requirements, and an elevated white blood cell count, and this typically resolves within 1–2 days.[1-3]
- **Aspiration pneumonia** is a bacterial pneumonia that may develop in some residents (20–25%) 48–72 hours after an aspiration event.[4]

	Aspiration Pneumonitis	Aspiration Pneumonia
Pathophysiology	Acute lung injury from acidic material	Progression to bacterial infection
Clinical features	Range from no symptoms to productive cough, respiratory distress 2–5 hours after aspiration, and improvement within 24 hours	Tachypnea, cough, and fever
Chest x ray	May show infiltrates in the right lower lobe or multifocal infiltrates	
Treatment	Active monitoring Prevention—speech and swallow evaluation	Antibiotics Respiratory support

Treatment

- **Aspiration event and the resident remains stable[2,5]**
  - Antibiotics are not warranted; supportive care is the mainstay of therapy.
  - Prophylactic antibiotics do not help prevent the development of pneumonia.
- **Aspiration event and the resident becomes unstable**
  - The following signs are indicative of unstable residents: increased oxygen requirements, tachypnea, tachycardia, relative hypotension or temperatures persistently above 99°F or above the resident's baseline.[6,7]
  - Consider starting *one* of the following antibiotic regimens for residents who are clinically unstable with non-severe pneumonia[7,8]:
    - A beta-lactam (ampicillin/sulbactam, cefotaxime, ceftriaxone, OR ceftaroline) PLUS a macrolide (azithromycin OR clarithromycin), *or*
    - A respiratory fluoroquinolone (levofloxacin OR moxifloxacin).
  - It is not necessary to add additional anaerobic or atypical coverage to beta-lactam therapy.[3] Recent studies suggest that anaerobes do not play a major role in the etiology of aspiration pneumonia, and there is a strong need to reduce unnecessary antibiotic use due to the potential for complications as well as the increasing prevalence of antibiotic resistance.[8]
  - Consider transfer to an acute care setting if consistent with goals of care.[9]
- **For unstable residents with a history of infection or colonization with *Pseudomonas aeruginosa*, consider adding an antibiotic with activity against *Pseudomonas* to one of the regimens listed above:[8,10]**
  - Piperacillin-tazobactam OR cefepime OR ceftazidime OR imipenem OR meropenem OR aztreonam.
- **For unstable residents with a history of colonization or infection with methicillin-resistant *Staphylococcus aureus* (MRSA), consider adding vancomycin or linezolid to the above regimens.[3,10]**
- **Reassess at 48 hours.[2,9]**
  - If clinical symptoms resolve, antibiotics can be discontinued.[2]
  - If no or minimal improvement and bacterial aspiration pneumonia is suspected, treat for 5–7 days.[9]
  - For residents who were not started on antibiotics and who have not improved or have worsened, consider a course of antibiotic therapy (as above).[2]

Prevention

- Measures that may reduce risk of aspiration events include positioning the resident to sit up during meals and working with speech therapy to provide thickened liquids at meals if appropriate.[2]

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Legionellosis
Guidance for Healthcare Facilities

Department of Public Health
CITY OF PHILADELPHIA

Overview

Legionnaires' disease and Pontiac fever (a less severe, usually self-resolving version of the disease) are caused by *Legionella,* a naturally occurring, opportunistic pathogen. *Legionella* becomes a major health concern when it proliferates in the plumbing systems of healthcare facilities, which house highly vulnerable populations and often have complex water systems.

1 in 4 patients who contract Legionnaires' disease while at a healthcare facility will die.[1]

Risk Factors

- Immunocompromised
- Respiratory therapy equipment
- Chronic lung disease (e.g., COPD, emphysema) or underlying conditions (e.g., diabetes, renal failure, hepatic failure)
- Current or former smoker
- Aged 50+

Signs & Symptoms

Legionnaires' has an incubation period of 2-14 days. Symptoms include:

- Shortness of breath
- Cough (productive or non-productive)
- Fever
- Abdominal pain
- Diarrhea
- Nausea
- Lethargy
- Headache
- Pneumonia
- Respiratory failure

Transmission Pathways

Inhaling aerosolized water

Aspiration

Generally, **NOT** spread person-to-person

Sources of Infection

- Devices (showerheads, sink faucets, water fountains, ice machines)
- Nebulizers, CPAP machines, hydrotherapy equipment, bronchoscopes
- Decorative fountains
- Hot tubs
- Heating and cooling (central air-conditioning, hot water tanks or heaters, humidifiers, cooling towers)
- Soil

Evaluation and Identification

- Chest X-rays cannot be used to distinguish pneumonia caused by *Legionella* from pneumonia caused by other pathogens. A thorough clinical evaluation, including assessing patients for potential exposures (travel, recreational water usage, medical equipment, etc.,) is essential.
- Laboratory testing: Urine Antigen Test paired with either PCR or culture of lower respiratory specimen.

Treatment

- The first-line treatment for healthcare-associated or community-acquired pneumonia doesn't always include *Legionella*-directed antibiotics. Obtaining diagnostic testing is preferred before starting antibiotics, but treatment should not be delayed to accommodate testing.[2]
- *Legionella*-directed treatment typically includes respiratory fluoroquinolones (levofloxacin or moxifloxacin) or azithromycin, but these antibiotics may not be indicated in all clinical contexts.

Almost all cases of Legionnaires' disease are hospitalized, and may require ICU admission and mechanical ventilation.

1. https://www.cdc.gov/legionella/about/index.html
2. https://www.cdc.gov/legionella/hcp/clinical-guidance/index.html

Be Prepared: Critical Questions to Prevent Legionellosis

- Does your facility have a water management program?
- Has your facility conducted a risk assessment that meets CMS requirements to identify areas of potential *Legionella* growth and spread?[3]
- How often are your water systems tested for *Legionella*?
- If your building has cooling towers, how often are they tested for *Legionella*?
- Who is head of your facility's water maintenance?
- Have any faucets or showers gone unused for an extended period?
- Has any nearby construction affected your water supply?
- What is your protocol for a patient with legionellosis?

The Centers for Medicare & Medicaid Services (CMS) **requires** healthcare facilities to follow ASHRAE-compliant water management programs.[3, 4]

Steps to Create and Implement a Water Management Program (WMP)[5]

WMPs are unique to each facility to ensure the disinfection and maintenance of a building's water system and aim to reduce the risk of *Legionella* by preventing sediment, scale, corrosion, and biofilm growth.

1. Establish a WMP team *
2. Describe the building water systems
3. Identify areas where *Legionella* could grow
4. Decide where control measures should be applied and how to monitor them
5. Establish ways to intervene when control limits are not met
6. Make sure the program is running as designed and is effective
7. Document and communicate all activities

**This team should include someone who understands accreditation standard and licensing requirements, someone with IP expertise, an ID clinician, and a risk and quality management staff.*

Go to **https://www.cdc.gov/control-legionella/media/pdfs/toolkit.pdf** to develop your facility's Water Management Program!

Identifying an Outbreak

Either of the following instances are considered an outbreak:

- **1 case** with **≥10 days of continuous stay** at a healthcare facility during incubation
- **2 cases** in individuals that have spent **any portion** of their incubation period in the same healthcare facility within the last 12 months

Immediate Control Measures

During an outbreak, implementing the following control measures is recommended:

- Limit showers (use sponge baths)
- Avoid non-sterile water usage in patient rooms
- Provide bottled water to susceptible individuals
- Restrict non-sterile ice consumption
- Clean respiratory equipment with sterile water only if not already standard procedure
- In the affected patient's room and frequented areas:
  - Cease use of all associated faucets or install temporary point-of-use microbial filters
  - Conduct *Legionella* water testing
- Initiate retrospective (12 months) and prospective (up to 6 months) surveillance for other patients with pneumonia

If you identify a patient with legionellosis, notify the Philadelphia Department of Public Health. PDPH will launch an investigation into potential sources of exposure.

TO REPORT A CASE: Call PDPH at 215-685-6741 during business hours and ask to speak with a Surveillance Coordinator.

3. https://www.cms.gov/medicare/provider-enrollment-and-certification/surveycertificationgeninfo/downloads/qso17-30-hospitalcah-nh-revised-.pdf
4. https://www.cdc.gov/control-legionella/php/healthcare/federal-requirement.html
5. https://www.cdc.gov/control-legionella/php/healthcare/water-management.html

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 hour[1]
  - Hives: Multiple pink/red raised areas of skin that are intensely itchy[3]
  - Angioedema: Localized edema without hives affecting the abdomen, face, extremities, genitalia, oropharynx, or larynx[4]
  - 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.

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National Center for Emerging and Zoonotic Infectious Diseases

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- Anaphylaxis[1] 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 diarrhea[5]

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.

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Talking With Residents and Family Members About Lower Respiratory Tract Infections

My mother has a cough. She's bringing up yellow phlegm. Does she have pneumonia?

- There are many kinds of respiratory tract infections that can cause a cough, such as colds, bronchitis, influenza, and pneumonia.
- A cough by itself—even if it is associated with yellow phlegm—does not need to be treated with an antibiotic.
- Symptoms of a respiratory infection that may indicate the need for an antibiotic are a fever with a productive cough or difficulty breathing.

Last time this happened, the doctor prescribed an antibiotic and she got better.

- If your mother is experiencing a bad cough and fever or difficulty breathing, she should be evaluated for pneumonia and might need an antibiotic.
- If she has a cough without fever or difficulty breathing, she may have a chest cold, caused by a virus.
- Antibiotics will not help if she has a virus.
- Taking antibiotics when there is not an infection can be harmful.

What if she gets worse? She had "double pneumonia" last winter.

- We will check on your mother often to see how she is feeling.
- We will take her temperature and ask about her symptoms regularly.
- She may be given acetaminophen (Tylenol® or other brand) and/or a cough suppressant to help her feel better. We will encourage her to drink more.
- If needed, we can check her bloodwork and get a chest x ray.
- Some viruses, like influenza, can make people very sick. We can diagnose and treat influenza but do not have good medications for other viruses.

I'm still worried about my mother. What else can we do for her?

- Thank you for telling me about your concerns. What else are you noticing?
- We will check her vital signs every 6 hours. You can call us back tomorrow for an update.
- If something changes and she shows other signs or symptoms of a bacterial infection, an antibiotic can be given.

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As your healthcare providers, we are dedicated to prescribing antibiotics only when they are needed at

[Your Facility Name Here]

ANTIBIOTICS...

Will NOT help you feel better if you have a viral infection

ONLY fight infections caused by bacteria

Can cause more harm than good if taken when you don't really need them

Department of Public Health
CITY OF PHILADELPHIA

PROUD TO SUPPORT
BE ANTIBIOTICS AWARE
www.cdc.gov/antibiotic-use

[Your Facility Logo Here]

Why does taking antibiotics lead to antibiotic resistance?

Any time you take antibiotics, they can cause side effects and contribute to the development of 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 means bacteria are developing the ability to defeat 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 residents in the nursing home.

Up to 70% of residents in a nursing home receive one or more courses of antibiotics each year.

What if I have questions about antibiotics?

Talk to your healthcare professional if you have any questions about your antibiotics, such as:

- What infection does this antibiotic treat and do you know I have that infection?
- How long do I need to take this antibiotic?
- What are the potential side effects from this antibiotic?
- Could any of my other medications interact with this antibiotic?
- How will you know that the antibiotic is working for my infection?

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.

40%–75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.

To learn more about antibiotic prescribing and use, visit **www.cdc.gov/antibiotic-use** or call 1-800-CDC-INFO.

CS320449-A

Do You Need Antibiotics?

Information about antibiotics for nursing home residents and their families

BE ANTIBIOTICS AWARE

SMART USE, BEST CARE

Why is it important to *Be Antibiotics Aware* in nursing homes?

Antibiotics are life-saving drugs and are frequently prescribed in nursing homes. Remember, when antibiotics are needed, their benefits outweigh the risks of side effects and antibiotic resistance.

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

What do antibiotics treat?

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

What don't antibiotics treat?

Antibiotics do not work on viruses, such as those that cause colds, flu, bronchitis, 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.

What are the potential side effects of antibiotics?

Common side effects from antibiotics can include:

- Rash
- Nausea
- Yeast infections
- Dizziness
- Diarrhea

More serious side effects can include:

- Life-threatening allergic reactions
- Interactions between antibiotics and other medications
- Infections with antibiotic-resistant bacteria, including *C. difficile* (or *C. diff)*

What is a *C. diff* infection?

C. diff is a bacterial infection that needs immediate treatment. It can cause severe diarrhea that can lead to severe colon damage and death.

Antibiotics fight bacterial infections by killing bad germs, but can also get rid of the good germs that protect your body against harmful infections. The effect of antibiotics can last as long as several months. If you come in contact with *C. diff* germs during this time, you can get sick.

Symptoms of a *C. diff* infection include:

- Severe diarrhea
- Fever
- Loss of appetite
- Stomach tenderness or pain
- Nausea

More than 3 million Americans receive care or reside in nursing homes every year.

How can I stay healthy?

You can stay healthy and keep others healthy by:

- Insisting healthcare professionals and visitors clean their hands before touching you by washing with soap and water for 20 seconds or using a hand sanitizer that contains at least 60% alcohol
- Covering your cough to prevent the spread of germs
- Asking family or friends not to visit when they don't feel well
- Staying in your room when sick
- Protecting yourself by getting vaccines for flu and pneumonia and encouraging others around you to do the same

Talk to your healthcare professional about steps you can take to stay healthy and prevent infections.