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# ELDER CARE

## A Resource for Interprofessional Providers

### Pneumonia in Nursing Home Patients

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Pneumonia is a common infection among nursing home residents. It is also a serious infection, with 30-day mortality rates estimated at between 10 and 30 percent.

#### Etiology

Pneumonia in nursing home patients is often categorized as a form of healthcare-acquired pneumonia (HCAP), though some guidelines no longer recognize HCAP as a distinct entity. While usually bacterial in origin, the infecting microorganism in pneumonia in nursing home patients is not often identified in routine clinical practice.

*Streptococcus pneumoniae* is probably the most common cause. In more severe cases, such as those that require hospitalization, enteric gram-negative organisms and *S. aureus* may be more frequent pathogens than *S. pneumoniae*. Gram negatives and *S. aureus* can be associated with antimicrobial resistance, especially if a patient received antibiotics within the preceding 90 days, if there is a high incidence of antibiotic resistance in the community or facility, or if the patient is on dialysis or is immunosuppressed.

#### Diagnosis

The symptoms of pneumonia in nursing home patients are often subtle, but most patients have at least one respiratory finding, such as cough, increased respiratory rate ( $\geq 30$  breaths per minute), or the presence of crackles on auscultation. Decreased functional status is common.

Diagnosis is based on a new or progressive infiltrate on chest radiography plus clinical findings consistent with pneumonia. These include new-onset fever  $>100.4^{\circ}\text{F}$  ( $>38^{\circ}\text{C}$ ), leukocytosis, purulent sputum, or hypoxemia (Table 1). Sputum Gram stain and culture should be considered if the patient is able to generate a useful sample and also for hospitalized and/or severely ill patients. Blood cultures,

urinary antigen testing for common pathogens, and serum procalcitonin levels may be useful for sicker patients.

#### Table 1. Guideline Recommendations for Diagnosis of Nursing Home-Acquired Pneumonia

- New infiltrate on chest x-ray
- PLUS any one or more of the following:
  - \* New-onset fever  $>100.4^{\circ}\text{F}$  ( $>38^{\circ}\text{C}$ )
  - \* Elevated white blood cell count
  - \* Purulent sputum
  - \* Hypoxemia

#### Treatment

Treatment of pneumonia in nursing home patients is tailored to the likely cause of the infection and whether treatment will be provided in the nursing home or in a hospital.

**In the Nursing Home** For patients who do not require hospitalization, there is little evidence to support the superiority of one antibiotic over another. Limited guidelines and expert opinion recommend two equally-acceptable options, both of which focus on *S. pneumoniae* as the likely cause. These options are shown in Table 2. Oral therapy is preferred over parenteral therapy, though cephalosporins can be given intramuscularly if needed.

**In the Hospital** For patients who have more severe illness and require hospitalization, methicillin-resistant *S. aureus* (MRSA) and *Pseudomonas aeruginosa* are more likely to be involved. Current practice guidelines thus recommend treating hospitalized patients with antibiotics that cover these microbes. The recommended regimens are shown in Table 3.

#### TIPS ABOUT DIAGNOSIS AND MANAGEMENT OF PNEUMONIA IN NURSING HOME PATIENTS

- Be alert for subtle signs of pneumonia in nursing home patients – cough, tachypnea, or crackles on lung exam. Fever may not be present. The only sign may be a decrease in level of function.
- Diagnose pneumonia when a chest x-ray shows a new infiltrate, in combination with clinical signs.
- Treat mild cases of pneumonia in the nursing home with oral antibiotics (see Table 2).
- Treat more severe cases of pneumonia in the hospital with IV antibiotics (see Table 3).

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Some research suggests, however, that in-hospital treatment of nursing home patients with pneumonia with the “in-nursing home” regimens described on the previous page results in similar outcomes to the more aggressive “in-hospital” antibiotic regimens.

Regardless of the regimen used, however, antibiotics are frequently given intravenously initially but can often be changed to oral as the patient stabilizes. Antibiotics should be started within four to eight hours of diagnosis. Antibiotics given within the last 90 days should not be used again because of possible resistance to those agents.

The recommendations in Table 3 are for empiric treatment of severe pneumonia cases. Therapy should be adjusted based on culture results, local microbiology and resistance patterns, and specific patient risk factors for specific bacterial causes and adverse effects from particular medications.

**Table 2. Antibiotics for Treating Pneumonia in Nursing Home Patients in the Nursing Home**

- Option 1:  
Anti-pneumococcal fluoroquinolone (e.g., levofloxacin or moxifloxacin)
- Option 2:  
Amoxicillin/clavulanate extended release or a 2<sup>nd</sup> or 3<sup>rd</sup> generation cephalosporin  
PLUS  
Azithromycin or doxycycline

## Special Considerations

Older adults in nursing homes often have multiple medical problems and take many medications, all of which may complicate antibiotic dosing. Drug interactions also pose a challenge, as each antibiotic should be assessed for potential interactions with the patient’s other medications.

Many patients have impaired renal function, so medications that undergo renal excretion must be dosed appropriately after estimating creatinine clearance. Furthermore, in patients with overtly impaired renal function, it is best to completely avoid some antibiotics altogether - like aminoglycosides. Imipenem should be used with caution or not at all for patients who have seizure disorders, as this drug is associated with an increased rate of seizures.

**Table 3. Antibiotics for Treating Pneumonia in Hospitalized Nursing Home Patients**

- Antipseudomonal cephalosporin or antipseudomonal carbapenem or extended-spectrum beta lactam/beta-lactamase inhibitor  
PLUS
- Antipseudomonal fluoroquinolone or an aminoglycoside  
PLUS
- Anti-MRSA agent (vancomycin or linezolid)

## References and Resources

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NOTE: This edition of Elder Care is an update of a 2009 edition authored by Kyle Mills, PharmD, BCPS, and Bradford T. Winslow, MD, FAAP

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