

WHAT IS PNEUMONIA?

Pneumonia is a lung infection caused by bacteria, viruses or fungi. It is common in long-term care (LTC) and accounts for around 15 to 50% of infections in this setting.

The lungs' defense mechanisms can usually fight off pathogens. When these mechanisms are weak or the pathogen is strong, defenses are overwhelmed. This leads to infection. Pathogens can be passed from infected individuals (for example, through respiratory secretions). "Self-infection" can also occur, caused by microorganisms that already live in the nose and mouth. Aspiration pneumonia occurs when food, liquid or stomach contents are inhaled.

WHAT ARE RISK FACTORS FOR PNEUMONIA?

LTC residents are around six to ten times more likely to develop pneumonia compared to older persons living in the community. The following may increase risk of developing pneumonia:

- Dementia
- Swallowing difficulty
- COPD
- Cigarette smoking
- Certain medications: acid suppressants (e.g. proton pump inhibitors) or antipsychotics

HOW DOES PNEUMONIA PRESENT IN LONG-TERM CARE RESIDENTS?

A change in functional status (new or increasing confusion, falling, deteriorating mobility, reduced food intake, failure to



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cooperate with staff) or a fever should prompt an investigation for infection in LTC residents.

Residents in LTC have fewer "classic" pneumonia signs and symptoms. However, most have at least 1 respiratory symptom (e.g. new or worsening cough— see Table 1). Tachypnea (fast breathing) is helpful in screening for pneumonia in LTC residents. A respiratory rate ≥ 25 breaths per minute (counted for 1 full minute) strongly predicts pneumonia in LTC residents.

HOW IS PNEUMONIA DIAGNOSED?

Pneumonia is often diagnosed on clinical grounds in LTC, based on signs/symptoms, physical assessment and vital signs (Table 1). The gold standard for diagnosis is chest X-ray (CXR). A clinical practice guideline from Alberta suggests that "CXR should be performed in any resident with clinical findings consistent with pneumonia". However, this may not be available or possible in the LTC setting. When CXR is not available, tachypnea (respiratory rate ≥ 25 bpm) plus one additional sign/symptom (see Table 1) has been suggested to make a probable pneumonia diagnosis.

Pulse oximetry is also helpful in assessment of pneumonia. Infection guidelines for LTC suggest that pulse oximetry should be performed in residents whose respiratory rate is ≥ 25 breaths per minute to guide transfer to acute care or the need for oxygen therapy.

Other comorbidities (such as heart failure or COPD) should be considered when diagnosing pneumonia. In residents with cough and fever but without chest pain or tachypnea, consider viral respiratory tract infection (such as influenza between November and April).

TABLE 1. ASSESSMENT FOR PNEUMONIA

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| Probable Pneumonia When: |
| Respiratory rate \geq 25 breaths per minute (1 full minute) |
| PLUS 1 or More of the Following: |
| Fever (temperature \geq 37.8°C or increase 1.1°C above baseline) |
| New or increasing productive cough |
| New or increasing sputum production |
| Pleuritic chest pain |
| New or worsening abnormal findings on chest exam (e.g. crackles, wheezing) |
| New onset delirium or decreased level of consciousness |
| Dyspnea |
| Tachycardia |
| New or worsening hypoxemia |

Adapted from Nursing Home Acquired Pneumonia Checklist. Alberta Health Services 2015. Available: <http://www.dobugsneeddrugs.org/wp-content/uploads/nhap-checklist.pdf>

TRANSFER TO ACUTE CARE

Some residents may need to be transferred to acute care. Different criteria have been proposed to guide a decision. This is general guidance only and should not replace clinical judgement. Transfer to acute care could be considered if (1) goals of care are consistent with transfer to acute care AND (2) the resident meets one or more of the following criteria: in respiratory distress (respiratory rate $>$ 40 breaths per minute), pulse $>$ 125 bpm, O₂ sat $<$ 92% with supplemental oxygen, O₂ sat $<$ 90% with supplemental oxygen in COPD, not able to eat and drink, reduced consciousness, level of acuity cannot be managed at facility, hemodynamically unstable or deteriorating rapidly.

TREATMENT OF PNEUMONIA IN LONG-TERM CARE

Most residents can be managed on oral antibiotics (highlighted in Table 2). Antibiotics should be given as soon as possible if signs and symptoms of pneumonia are present (ideally within 4 to 8 hours). They should not be delayed to wait for CXR results. In choosing an antibiotic, consider resident factors such as kidney function, severity of pneumonia, allergies, recent antibiotic failure and ability to swallow. The duration of therapy depends on the resident's clinical status and co-morbidities. It is typically between 7 and 14 days. Shorter courses (minimum of 5 days) may be possible depending on the status of the resident and antibiotic chosen.

Other supportive care measures include oxygen therapy if O₂ sat $<$ 90% and ensuring adequate hydration (1 L per 24 hours to replace losses). Close monitoring is important, including: clinical status, vital signs, food/fluid intake and mental status.

TABLE 2. ANTIBIOTIC CHOICES RECOMMENDED BY THE 2013 CANADIAN ANTI-INFECTIVE GUIDELINES FOR COMMUNITY-ACQUIRED INFECTIONS.

| | |
|---------------------------|--|
| | ANY ONE OF THE FOLLOWING BETA-LACTAMS: |
| | Amoxicillin 1g TID |
| | Amoxicillin/Clavulanate 500mg TID or 875mg BID |
| | Cefuroxime Axetil 500mg BID |
| | Cefprozil 500mg BID |
| FIRST LINE THERAPY | PLUS ANY ONE OF THE FOLLOWING: |
| | Clarithromycin 500mg BID (or 1000mgXL daily) |
| | Azithromycin 500mg on first day, then 250mg daily x 4 days |
| | Doxycycline 100mg BID first day then 100mg daily |
| | OR ONE OF THE FOLLOWING: |
| | Levofloxacin 750mg daily x 5 days |
| | Moxifloxacin 400mg daily |



PREVENTION OF PNEUMONIA IN LONG-TERM CARE

The spread of respiratory infections can be limited by usual infection prevention practices. Hand hygiene should be practiced by LTC staff, residents and visitors. Ensuring residents have good oral hygiene is another important prevention measure.

Staff and residents should receive the influenza vaccine. The 23-valent pneumococcal vaccine (Pneumovax®) should be given to all residents as it reduces the risk of developing pneumonia. The most recent Canadian guidelines recommend use of the 13-valent vaccine (Prevnar®) in addition to Pneumovax® in all patients 65 years or older.

References available upon request.