



Toward
Optimized
Practice



Administered by the Alberta
Medical Association

2008 Update

Guideline for

The Diagnosis and Management of Nursing Home Acquired Pneumonia (NHAP)

This clinical practice guideline (CPG) was developed by an Alberta CPG Working Group.

EXCLUSIONS

- ◆ Hospital acquired pneumonia (onset within 14 days of discharge from an acute care facility)
- ◆ Aspiration pneumonia (see Appendix 1)
- ◆ Patients with cystic fibrosis, tuberculosis, or bronchiectasis

DEFINITIONS

- ◆ Pneumonia in a patient residing in a nursing home*

** This applies to any congregate residential setting for older and disabled patients that have high personal and professional care needs. These are sometimes known as long term care facilities, auxiliary hospitals, chronic care centres, or continuing care centres.*

ISSUES

- ◆ Treatment for NHAP should take into account the individual's personal directives
- ◆ There is a lack of well designed studies in this patient population
- ◆ Chest radiography is not widely available or practical in many locations
- ◆ Microbiologic diagnosis of NHAP has significant limitations and as such, treatment of NHAP is usually empiric
- ◆ Delay in administration of antibiotics for the empiric treatment of NHAP may lead to increased patient morbidity and mortality
- ◆ Inappropriate use of antibiotics may adversely affect patient outcomes and may increase antimicrobial resistance

GOALS

- ◆ To enhance an earlier detection and treatment of NHAP
- ◆ To increase the accuracy of the clinical diagnosis of NHAP
- ◆ To optimise the appropriate use of laboratory and diagnostic imaging services
- ◆ To optimise the use of antibiotics in the treatment of NHAP
- ◆ To foster teamwork in the evaluation and management of patients with NHAP
- ◆ To optimise the decision for patient transfer to hospital
- ◆ To improve patient outcomes through decreased morbidity and mortality.

PREVENTION

- ◆ Limit the spread of infections (e.g., hand washing and attention to outbreak management guidelines)
- ◆ Influenza and pneumococcal vaccines are recommended (see Appendix 2)
- ◆ Smoking cessation and avoidance of environmental tobacco smoke

DIAGNOSIS

Although a new infiltrate seen on chest X-ray with compatible clinical signs is the gold standard for the diagnosis of NHAP, in nursing home settings the diagnosis must often be made on clinical grounds alone. The physical examination must include blood pressure, heart rate, respiratory rate and auscultation of the respiratory system.

The above recommendations are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. They should be used as an adjunct to sound clinical decision making.

Symptoms & Signs Cluster

If chest X-ray is not available, tachypnea and at least 1 of the following signs and symptoms should be present to make a diagnosis of probable NHAP

Tachypnea

- Most important clinical predictive factor
- Respiratory rate ≥ 25 is associated with increased morbidity and mortality
- Respiratory rate ≥ 40 may be an indication for transfer to hospital

*Notes: Respiratory rate must be counted for a full minute
An elevated respiratory rate has a high sensitivity and specificity for the diagnosis of pneumonia.*

AND AT LEAST ONE OF THE FOLLOWING

◆ Fever

- Temperature of 37.8 C or greater is both a sensitive and specific predictor of infection (positive predictive value of 55% in nursing home residents)
- Elderly patients have lower basal body temperature therefore fever may be present when the temperature $>1.5^{\circ}\text{C}$ higher than baseline.

Note: Rigors are an important marker for bacteremia.

◆ Cough

- New productive cough is an important clinical symptom
- Unproductive cough is not uncommon in this patient population

◆ Pleuritic chest pain

- Pleuritic chest pain is a specific sign for pneumonia (also watch for pulmonary embolus)

◆ Crackles, wheezes or bronchial breath sounds

- New or increased

◆ New onset delirium and/or decreased level of consciousness, increased confusion

- Sensitive but not specific for pneumonia.

◆ Dyspnea

◆ Tachycardia

◆ New or worsening hypoxemia

- ◆ Ideally the diagnosis of pneumonia should be supported with chest X-ray, oxygen saturation, complete blood count and differential, blood cultures, and sputum cultures. As these tests are frequently unavailable in the nursing home setting, refer to management below.

Note: There is still value in performing these tests even after treatment has been initiated.

MANAGEMENT

Assessment

- ◆ Determine the degree of medical treatment desired by the patient or legal decision maker such as a guardian or agent named in an enacted personal directive.

◆ Review vital signs

- Consider transfer to hospital if impending respiratory failure or hemodynamic compromise

◆ Oxygenation

- Oxygen therapy is indicated for hypoxemia (e.g., $\text{O}_2 < 90\%$)
- If oxymetry is not available consider oxygen at 2 litres/minute

Note: COPD baseline oxygenation may be lower and therefore must be individually assessed

◆ Antibiotic therapy (see Table 1)

- Ideally antibiotic therapy should be initiated as soon as possible (within 4 hours) after diagnosis and prior to transfer

Note: Initiation of antibiotics after 8 hours is associated with an increased mortality

- Parenteral (IM) treatment may be considered if patient unable to swallow

◆ Hydration

- Ensure adequate hydration (1 litre in a 24 hour period is required to replace insensible losses under most circumstances).

Note: Consider hypodermoclysis

Note: Fluid requirement for older persons without cardiac or renal failure is 30ml/kg/day in addition to estimated fluid deficit.

Practice Point

In the presence of the above signs &/or symptoms administration of antibiotics should **NOT** be delayed pending the results of any diagnostic tests

TABLE 1: MANAGEMENT OF NHAP

<p><u>PATIENTS LIVING INDEPENDENTLY</u></p> <ul style="list-style-type: none"> If minimal comorbidities and totally mobile, refer to recommendations contained in the Guideline for the Management of Community Acquired Pneumonia 	
<p><u>PATIENTS TREATED IN THE NURSING HOME</u></p> <ul style="list-style-type: none"> Administer antibiotics as soon as possible Supplemental oxygen if available 	<p><u>PATIENTS BEING TRANSFERRED TO ACUTE CARE</u></p> <ul style="list-style-type: none"> Immediate administration of antibiotics (prior to transfer) Oxygenation if available Blood culture if available and not going to delay treatment
<p>RECOMMENDED THERAPY AND DOSE¹</p> <p>Amoxicillin² 500mg PO tid +/- (Macrolide⁴ or Doxycycline) 200mg PO 1st day then 100mg PO daily</p> <p>Alternative Cefuroxime axetil⁵ 500mg PO bid +/- (Macrolide⁴ or Doxycycline) 200mg PO 1st day then 100mg PO daily</p> <p>Severe Cephalosporin Allergy (Consider transfer) Doxycycline alone⁶ 200mg PO 1st day then 100mg PO daily</p> <p>OR</p> <p>Quinolone^{6,7}</p>	<p>RECOMMENDED THERAPY AND DOSE¹</p> <p>Amoxicillin² or Ampicillin³ 500mg PO tid or 1g IM q6h PLUS (Macrolide⁴ or Doxycycline) 200mg PO 1st day then 100mg PO daily</p> <p>OR</p> <p>Cefuroxime axetil⁵ or Cefuroxime sodium⁵ 500mg PO bid or 750mg IM q8h PLUS (Macrolide⁴ or Doxycycline) 200mg PO 1st day then 100mg PO daily</p> <p>OR</p> <p>Quinolone^{6,7}</p> <p>OR</p> <p>Cefotaxime 1g IM q8h PLUS Macrolide⁴</p>
<p>COMMENTS</p> <ol style="list-style-type: none"> Duration of antibiotic therapy is 10 days Amoxicillin retains the best coverage of all oral beta-lactams against <i>S. pneumoniae</i>, even intermediate strains. Resistance in Alberta is <5% for invasive disease. If patient unable to tolerate oral medication use IM. Consider adding a macrolide or doxycycline if there is underlying pulmonary disease: <ul style="list-style-type: none"> Azithromycin 500mg PO 1st day then 250mg PO daily for 4 days Clarithromycin 500mg PO bid Erythromycin 500mg PO qid <p><i>Note: For other erythromycin formulations give at least 1 gram per day (preferably 2 grams)</i></p> <ol style="list-style-type: none"> Cefuroxime provides better coverage of H. influenzae and M. catarrhalis in patients with COPD. Cefuroxime may be preferred in patients post influenza as it provides coverage for S. aureus. <i>Note: Amoxicillin-clavulanate provides similar coverage and may be considered in patients with COPD or post influenza.</i> Recent observation studies indicate that monotherapy may not be as efficacious as combination therapy in the management of pneumonia. Quinolones should be given with caution if the patient has received quinolone therapy within the last 6 months (especially ciprofloxacin) <ul style="list-style-type: none"> Levofloxacin 500mg IV/PO daily Moxifloxacin 400mg PO daily 	

General Management

- ◆ Analgesics/antipyretics for pain and fever
- ◆ Cough suppressants are not routinely recommended

CONTINUING MANAGEMENT

- ◆ In the nursing home setting, the care team needs to be involved in daily assessments to alert the physician to significant changes in patient status:
 - Mobility
 - Hydration:
 - 1 litre/day
 - Nutrition:
 - weight loss of >5-10% is related to increased morbidity (Significant weight loss in the nursing home >5% in 30 days or >10% in 6 months)
 - Review medication profile and consider holding or adjusting dosage where appropriate:
 - psychoactive drugs, including hypnotic sedative drugs
 - cardiovascular drugs-
 - Review antibiotic treatments at 48 to 72 hours for evidence of response to therapy:
 - temperature stabilization
 - lower respiratory rate
- ◆ If failure of therapy occurs, consider change in antibiotics or transfer to hospital if:
 - Hemodynamic compromise
 - Clinical deterioration after 72 hours of antibiotic therapy
 - No improvement after completion of antibiotic therapy
- ◆ Consider:
 - Host-related factors:
 - non-infectious pulmonary pathology
 - immunosuppression
 - Pathogen-related factors
 - antibiotic resistance
 - Non-bacterial etiology
 - viruses
 - Mycobacterium spp
 - fungi
 - Drug-related factors
 - adherence
 - malabsorption
 - drug-drug interactions
 - drug fever

BACKGROUND

Introduction

Nursing home-acquired pneumonia (NHAP) is defined as pneumonia occurring in a resident of a Long Term Care (LTC) facility. Prevalence ranges between 1.1 to 2.5% in chronic care facilities¹, has an incidence of 13 - 48% of all LTC infections and is a common cause for transfer to hospital.² Lower respiratory tract infections and pneumonia are very common infectious disorders in LTC facilities.³ In one region 8% of all transfers to hospital were diagnosed in the emergency department with pneumonia, 20% of whom were transferred back to LTC for further treatment.⁴ NHAP mortality may be as high as 44%.⁵ Higher mortality rates (two to threefold) distinguishes NHAP from CAP.

NHAP was first described in 1978.⁶ Since then there has been much written regarding NHAP and its management but there has been a lack of well-designed studies in this patient population.⁷ In the absence of randomized controlled trial data for empiric drug therapy, many clinicians have extrapolated findings from community acquired pneumonia (CAP) clinical pathways and guidelines.⁸ There is little, if any, evidence to support the application of CAP guidelines to nursing homes primarily due to advanced patient age and disease complexity in the risk stratification process. Recent work by Loeb and colleagues in Ontario have demonstrated that the use of a clinical pathway reduced the number of transfers to hospital and had comparable clinical outcomes to a 'usual' treatment group.⁹

LTC is a unique health care delivery setting with many, often complex, considerations when it comes to clinical decision-making. There are few guidelines that exist to assist physicians in prescribing for LTC patients.¹⁰ The following key elements impact the assessment and management of NHAP in this setting.

Risk Factors

Nursing home patients have lower levels of functioning, are at an advanced age and have significant co-morbid conditions, e.g., COPD, dementia and atherosclerotic heart disease. Other risk factors identified for death from nursing home acquired pneumonia include aspiration, bed-fast state, cerebrovascular accident, difficulty with oropharyngeal secretions, dysphagia, feeding tube, frailty, incontinence, and sedative hypnotic use.

Decision-making

The high prevalence of dementing illness in LTC is a further limitation on good and reliable decision-making. Many patients and families do not wish to pursue life supporting or life prolonging therapies. In LTC, palliative treatment options are often preferred over aggressive life supporting therapies. Understanding a patient's wishes is

often very challenging and it is imperative that all health care professionals understand how decisions are made regarding individual patient care. It is important that every effort is made to determine a patient's wishes regarding treatment. An enacted personal directive will greatly assist health care providers make the correct decisions where the patient is unable to direct care.

Etiology and pathophysiology

The microbiological demographics in LTC are not well understood and will vary between centres. Streptococcus pneumoniae (*S. pneumoniae*) is recognized as the most common organism in NHAP. One recent prospective study found a prevalence of 55% in patients transferred to hospital with NHAP.¹¹ There are concerns with the development of penicillin resistant *S. pneumoniae* and the true prevalence of atypical pathogens is not known.

NHAP more closely resembles community-acquired pneumonia (CAP) than nosocomial pneumonia. The pathophysiology of NHAP is the same as for CAP. The most common pathogens are *S. pneumoniae*, *H. influenzae* and *M. catarrhalis*. Less common pathogens in NHAP are *Legionella* and *Chlamydia pneumoniae*, although *C. pneumoniae* is emerging as a pathogen in NHAP.

Elderly patients are also more likely to be colonized with gram-negative organisms (especially if decreased functional status, institutionalized and multiple co-morbid illnesses).

Tuberculosis (TB) should always be considered (especially in the elderly) given that there is a 10 to 30 times increased incidence of TB in long term care residents. LTC residents account for 20% of all TB cases in older people.^{12,13} There is a need to be mindful of TB admission screening findings such as old TB on chest X-ray or Mantoux testing results.

Aerobes are not important pathogens in CAP. Although the elderly and patients in LTC have a higher incidence of aspiration, the role of anaerobes in this setting remains controversial. Anaerobic coverage is not recommended in NHAP unless there is severe periodontal disease, putrid sputum, or evidence of necrotizing pneumonia or lung abscess.¹³

In up to 50% of cases, a viral infection precedes the development of pneumonia and undoubtedly plays a role in the pathogenesis of pneumonia.^{14,15} Viruses may inhibit important host defences, including ciliary activity, neutrophil function, and other lung defence mechanisms.¹⁵ Cigarette smoke compromises mucociliary function and macrophage activity. Alcohol impairs the cough reflex, increases oropharyngeal colonization with gram-negative

bacilli, and may inhibit immune mechanisms.¹⁵ Elderly patients are at increased risk of developing pneumonia due to multiple factors: increased number and severity of co-morbidities, decreased mucociliary clearance, diminished cough reflex, increased aspiration, increased colonisation with gram-negatives, and depressed immune system.¹⁵

Differential Diagnosis

The most common causes of diagnostic confusion in this population are non-infectious cardiac and pulmonary disorders. Congestive heart failure (CHF) is a common disorder resembling NHAP. CHF may represent an exacerbation of a pre-existing CHF resulting in shortness of breath for the patient thus resembling the presentation of NHAP. It may also co-exist with NHAP.

Chest radiographs are the best way to diagnose NHAP. Patients with NHAP have segmental or lobar distribution of infiltrates as seen on chest X-rays. Patients with CHF will have a redistribution of vasculature to the upper lobes, usually accompanied by cardiomegaly. Pre-existing chest X-rays may reveal previous interstitial lung disease that can be confused with the appearance of NHAP.

Fever of 38°C or more accompanied by pulmonary symptoms suggests NHAP, especially when accompanied by a productive cough. However, in elderly patients, the febrile response may be blunted. Thus, the absence of fever is unhelpful in making the differential diagnosis.

Pleural effusions can also cause diagnostic confusion in the diagnosis of pneumonia. Bacterial pneumonias, particularly due to *S. pneumoniae* and *H. influenzae*, may be accompanied by pleural effusion. Pleural effusions without associated infiltrates are not pneumonia.

Diagnosis

Diagnosis of pneumonia is based on a patient's history, co-morbidities, physical findings, and chest X-ray. Symptoms of NHAP most commonly include fever, chills, dyspnea, pleuritic chest pain, and cough. With increasing age, symptoms of infection may not be as apparent and physical signs may be diminished. Fever may be less commonly observed but delirium and confusion may be more common in this population. Delirium or acute confusion is found in 44.5% of elderly patients with pneumonia.¹⁶

Tachypnea is the only physical sign for which a predictive value can be calculated for LTC residents. Normal respiratory rate in the elderly is 16 to 25 breaths per minute.¹⁰ A respiratory rate of > 25 breaths per minute has a sensitivity of 90% and a specificity of 95% for the diagnosis of pneumonia.¹⁷

A single temperature of 38.3°C has a sensitivity of only 40% for predicting infection. Lowering the threshold to 37.8°C increases the sensitivity to 70% while maintaining specificity at 90%. A temperature of 37.8°C or greater is both a sensitive and specific predictor of infection (positive predictive value of 55% in nursing home residents). Basal body temperature in the frail elderly is lower than 37°C however.^{14,18} An increase of 1.5°C over baseline on at least two occasions may be a better temperature criterion in the elderly.¹⁹ Regular vital signs are an essential component of initial and continuing assessment of all patients with NHAP.

Investigations

Chest X-Ray

Chest X-ray (CXR) is the gold standard for diagnosis of NHAP and should be done in all patients with findings consistent with pneumonia where possible. There is considerable variability in performing CXR in LTC.¹⁸ Evidence of acute pneumonia i.e. new infiltrate is present in 75% to 90% of CXRs done in LTC.¹⁸ It is recognised however that many centres do not have access to CXRs and the diagnosis must be made based on clinical findings.

Some radiographic patterns suggest certain infections and may help to support a diagnosis of pneumonia versus an alternate cause. Comorbid lung or cardiovascular disease can be identified and the severity of the illness may be judged by the extent of lung involvement on CXR.

Complete blood count (CBC)

CBC with differential is recommended for all patients. In the elderly, the total WBC count and number of bands are one of the best indicators of bacterial infection.²⁰ Hospitalised patients admitted from the nursing home may need additional tests including: glucose, electrolytes, creatinine and ALT.

Sputum collection

Collection of sputum for Gram stain and culture is recommended if the patient has a productive cough. However, most sputums taken in long term care are of poor quality because of poor expectoration and an inability to provide an adequate sample.²¹ Although sputum collections may be of limited value, special attention should be paid to the Gram stain especially if intracellular organisms are seen.

Blood cultures

Blood cultures should be drawn in all cases of suspected NHAP if available. Blood cultures should be done prior to the initiation of antibiotics if possible. However treatment should not be delayed for tests or results. Obtaining a blood culture within 24 hours of presentation has been associated with improved 30 day survival in patients with community acquired pneumonia.²²

Oxygen saturation

Oxygen saturation should be assessed by pulse oximetry. If O₂ sat < 89% or patient has COPD, arterial blood gas should be drawn on room air, or on baseline O₂ if patient is receiving chronic oxygen. Hypoxemia is one of the important indicators of acute severity and short term mortality in CAP and NHAP.²³

Serology and invasive testing

Serology is **not** routinely recommended. Legionella urinary antigen testing is not recommended routinely as *Legionella spp* is rare locally.

Routine use of invasive testing (bronchoscopy, bronchoalveolar lavage, etc.) is **not** recommended.

The presence of recurrent pneumonia should lead to investigation for immune system disorders or structural abnormalities and antibiotic resistance.

Management

General

Adequate hydration of patients with NHAP is essential. Many patients with pneumonia are dehydrated due to increased insensible water loss. Nutritional status, especially in the elderly, is a very important factor. (Significant weight loss in the nursing home setting is defined as >5% loss in body weight in 30 days or 10% in 6 months). Weight loss of >5-10% can result in increased mortality.¹ Oxygen is often not available in the LTC setting and the need for such therapeutic support may be an indication for transfer to hospital.

Antibiotic Therapy (see Table 1)

It is critical that antibiotics be given as soon as possible after the diagnosis of pneumonia is made.²⁴ Most patients with NHAP can be managed with oral antibiotics.^{25,26} The choice of empiric therapy is based on the likely micro-organism, severity of illness, allergies, recent treatment failure and ability to swallow. There is little evidence to differentiate in terms of efficacy between the antibiotics suggested in Table 1 for NHAP. However it is felt that empiric therapy of NHAP should always cover *S. pneumoniae*, and intracellular pathogens such as *M. pneumoniae* and *C. pneumoniae*. Antibiotics of initial choice for NHAP are listed in Table 1. Monotherapy is not recommended in severe pneumonia. It should also be noted that the appropriate use of antibiotics within nursing homes mitigates against the development of antimicrobial resistance and problems such as *Clostridium difficile*.

Amoxicillin

This provides very effective activity against *S. pneumoniae* even in cases of high level resistance to penicillin.

Macrolide

A macrolide may be added if there is underlying lung disease such as COPD or in severe pneumonia. Macrolides are also effective against atypical pneumonia such as *Chlamydia pneumoniae*, *Mycoplasma pneumoniae* or *Legionella*. However, macrolide resistance in *S. pneumoniae* exceeds 10% and coverage of *Haemophilus spp* may not be optimal. Azithromycin has no appreciable serum concentrations and should not be used in patients with rigors/chills as this may indicate bacteremia.

Cefuroxime

May be considered in cases of penicillin allergy or post influenza pneumonia where *Staph aureus* may be a potential pathogen.

Doxycycline

S. pneumoniae resistance is known to be low (Capital Health authority 5%) and makes this an excellent choice. Many physicians have reported excellent clinical results using doxycycline in the management of NHAP.

Respiratory fluoroquinolones

Levofloxacin and moxifloxacin provide excellent coverage of the pathogens involved, but because of their broad spectrum and potential for increasing resistance in *S. pneumoniae*, they should be reserved for patients who 1) have failed first line therapy or 2) are elderly and have co morbidities. Ciprofloxacin does not have adequate coverage of *S. pneumoniae* and should not be used in the management of NHAP.

Antibiotic resistance has become a significant issue among US nursing homes. Heavy utilization of the fluoroquinolone group of antibiotics has contributed to the development of resistance due to their widespread empiric use.²⁷ Antibiotic resistant organisms are currently felt to be a less significant issue in Canadian centres due in large part to the restricted use of fluoroquinolones.

Hospitalisation

Thirty-three out of 1000 nursing home residents are hospitalised with NHAP versus 1.14 per 1000 population who require hospitalisation due to CAP.¹⁴

For patients with NHAP, referral to acute care for a more supported treatment environment should be considered in the following circumstances:

- Respiratory distress (e.g. respiratory rate over 40)
- Tachycardia (pulse over 125)
- CHF
- Systolic BP less than 90mmHg
- Signs of impending hemodynamic instability
- Signs of respiratory failure
- Reduced level of consciousness
- Clinical judgement of the attending physician at any time
- Level of acuity that cannot be managed at the facility
- Limited capacity to support the illness at the facility e.g. oxygen not available.

All patients diagnosed with NHAP should receive oral or parenteral antibiotics within 4 to 8 hours of diagnosis. Even those patients that require admission to hospital for treatment of pneumonia. If antibiotic therapy is delayed for more than 8 hours, the mortality rate is much higher than if antibiotics are given within 8 hours.²⁸ Recovery is often prolonged in the elderly and may take up to several months. Hospitalization of this population may often hasten functional decline.

Continuing Management

In the LTC setting key management teams should be involved in the daily reassessment of patients. The monitoring of vital signs and the communication of changes in vital signs are key to successful NHAP management. This requires the involvement of nursing, pharmacy, dietitians, occupational therapy and physiotherapy staff to monitor mobility, eating and response to antibiotics. Medication profiles need to be reviewed as often as the need for psychoactive medication changes during an acute infectious disease such as NHAP.

Prevention

- Smoking cessation and avoidance of environmental tobacco smoke. Smoking is the strongest independent risk factor for invasive pneumococcal disease in adults.²²
- Limit the spread of viral infections (e.g., hand washing). Hand washing can prevent up to 80% of the most common infectious diseases (mostly viral) which may predispose to pneumonia.
- Influenza vaccine is recommended annually for high risk patients (see Appendix 2)
- Pneumococcal vaccine is recommended for high risk patients (see Appendix 2)
- Rehabilitation (occupational therapy and/or physiotherapy) and nutritional programs where appropriate

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Toward Optimized Practice (TOP) Program

Arising out of the 2003 Master Agreement, TOP succeeds the former Alberta Clinical Practice Guidelines program, and maintains and distributes Alberta CPGs. TOP is a health quality improvement initiative that fits within the broader health system focus on quality and complements other strategies such as Primary Care Initiative and the Physician Office System Program.

The TOP program supports physician practices, and the teams they work with, by fostering the use of evidence-based best practices and quality initiatives in medical care in Alberta. The program offers a variety of tools and out-reach services to help physicians and their colleagues meet the challenge of keeping practices current in an environment of continually emerging evidence.

TOP Leadership Committee

Alberta Health and Wellness
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To Provide Feedback

The Working Group for NHAP is a multi-disciplinary team composed of family physicians, infectious diseases specialists, pediatricians, hospital and community pharmacists. The team encourages your feedback. If you have difficulty applying this guideline, if you find the recommendations problematic, or if you need more information on this guideline, please contact:

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APPENDIX 1: ASPIRATION PNEUMONIA²⁹

Definitions

- **Aspiration pneumonitis:** chemical injury caused by the inhalation of gastric contents, resulting in inflammatory reaction. No antibiotic therapy recommended in aspiration pneumonitis
- **Aspiration pneumonia:** development of radiographically evident infiltrate following the aspiration of colonized oropharyngeal material

Risk Factors for Aspiration Pneumonia

- Decreased level of consciousness
- Dysphagia
- Anatomic abnormality of the upper GI tract
- Mechanical interference of the GI tract (ET/NG tubes)

Clinical Picture

- Usually older patient with above risk factors
- Infiltrates in dependent lung segments, especially RLL
- Episode of aspiration often not witnessed
- May progress to abscess/empyema within 1-2 weeks

Etiology

- Role of anaerobes is controversial
- Gram stain may be helpful in diagnosis and decision to use anti-anaerobic therapy
- Choice of antibiotic dependent on clinical situation
 - Cefuroxime has good activity against most oral anaerobes

Prevention

- Bedside swallowing assessment and modified barium swallow if indicated
- Staff education to identify residents at risk or with dysphagia
- Ensure appropriate diet and liquid consistency
- Address positioning issues eg hyper-extended neck
- Ensure upright position with meals and tube feeds
- Routine dental evaluations and oral hygiene especially in patients with xerostomia
- Treatment of xerostomia

Usual Pathogens	Recommended Therapy and Dose	Duration	Comments
<u>Nursing Home Acquired</u> S. pneumoniae H. influenzae S. aureus Enterobacteraceae ¹	Cefuroxime IV/PO 750mg IV q8h/500mg PO bid OR Levofloxacin 500mg PO daily	10 days 10 days	1. Alcoholism and enteral feeding may be risk factors for colonization with these organisms
<u>Nursing Home Acquired with poor oral hygiene/severe periodontal disease</u> S. pneumoniae H. influenzae S. aureus Enterobacteraceae ¹ Oral anaerobes Streptococci spp Eikenella corrodens	Amoxicillin-clavulanate 875mg PO bid OR [Cefuroxime IV/PO 750mg IV q8h/500mg PO bid PLUS Metronidazole IV/PO 500mg IV/PO q12h] OR [Levofloxacin 500mg PO daily PLUS Metronidazole IV/PO 500mg IV/PO q12h]	10-14 days ² 10-14 days ² 10-14 days ²	2. If x-ray evidence of necrotizing pneumonia or abscess, treat for 3 to 6 weeks

Influenza vaccine should be given annually to:

High Risk:

- Adults and children with chronic cardiac or pulmonary disorders (bronchopulmonary dysplasia, cystic fibrosis, asthma)
- Adults and children with chronic conditions: diabetes and other metabolic diseases, cancer, immunodeficiency (including HIV), immunosuppression (including renal transplants), renal disease, anemia, hemoglobinopathy
- Residents of nursing homes or long term care facilities
- People ≥ 65 years of age
- Children and adolescents treated with long term ASA
- People at high risk of influenza complications travelling to foreign destinations where influenza is likely to be circulating

People capable of transmitting influenza to those at high risk:

- Health care workers and other personnel who have continuous, direct care contact with people in high risk groups (above)
- Household contacts (including children) of people at high risk who cannot be immunized or are immunosuppressed or elderly/frail

Others:

- People who provide essential community services and other adults who wish to reduce their chances of acquiring infection and consequently missing work
- Pregnant women in high risk groups (vaccine is considered safe for pregnant women, regardless of stage of pregnancy)

Protection begins 2 weeks post vaccination and lasts up to 6 months (may be less in the elderly).

Pneumococcal polysaccharide vaccine

Strongly recommended - High Risk*:

- Asplenia (traumatic/surgical/congenital)
- Splenic dysfunction
- Sickle-cell disease

Notes Where possible give vaccine 10 to 14 days prior to splenectomy or at beginning of chemotherapy for Hodgkin's disease.

** Vaccine failures may occur in this group - advise counselling (re: fulminant pneumococcal sepsis and need to seek early medical advice with fever).*

Recommended:

- All persons ≥ 65 years old
- All residents of long term care facilities
- Patients with chronic cardiovascular/pulmonary disease, cirrhosis, alcoholism, chronic renal disease, diabetes mellitus, HIV infection, and other conditions associated with immunosuppression, chronic cerebrospinal fluid leak.

Note: Vaccine may be administered simultaneously with influenza vaccine (separate injection site).

Not Recommended:

- Children < 2 years of age
- Asthma (as the single underlying condition)
- Otitis media (as the single underlying condition)
- Severe allergy to any component of the vaccine.