

# *Fraser Health pandemic preparedness*

DRAFT

Last revised: April 2006

## **General Management of Patients in Acute Care Facilities During an Influenza Pandemic**

### **1. OVERVIEW – GENERAL MANAGEMENT OF PATIENTS IN ACUTE CARE FACILITIES**

#### **1.1. Scope and purpose of this document**

This document is intended for use in Fraser Health during a declared pandemic outbreak for those health care workers (HCW's) in acute care settings responsible for the treatment of individuals requiring admission to an acute care facility.

This summary is designed to provide guidance for HCW's in Fraser Health based on the best evidence available from previous pandemic and inter-pandemic periods. Guidance may evolve as clinical/pathological information on the eventual pandemic virus emerges. Therefore, once an influenza pandemic is underway, users are strongly urged to ensure that they refer to the most up-to-date version of these guidelines (**NOTE: It is anticipated that updates will be provided via the Fraser Health pandemic Web site – anticipated launch in mid-2006**).

The advice is specific to a pandemic situation and **does not apply to the management of seasonal increases in influenza, community acquired pneumonia, lower respiratory tract infections or exacerbations of COPD.**

#### **1.2. Introduction**

Initial management will depend on the assessment of the reason for admission, the presence of complications, and the impact of the influenza infection on any pre-existing disease, or psychosocial factors.

In broad terms, the most likely clinical reasons for admission will be (in order of frequency):

Lower respiratory tract complications:

- Primary viral pneumonia
- Secondary bacterial pneumonia
- Mixed bacterial and viral pneumonia
- Non-pneumonic bacterial exacerbation of chronic lung disease such as COPD (possibly with a mixed viral infection)

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Cardiac complications:

- Exacerbation of pre-existing cardiac disease with cardiac failure and/or arrhythmia
- Primary myocarditis

Other complications:

- Exacerbation of other pre-existing disease, such as diabetes mellitus
- Neurological complications
- Rhabdomyolysis
- Severe sinusitis

The initial management is likely to involve that of respiratory and cardiac complications, especially bronchitis and pneumonia. These complications are discussed below. Management of other less common primary influenza complications (such as rhabdomyolysis, encephalopathy) is not covered in this document.

### **1.3. Admission templates and rationale**

The following are examples of an initial order set, as well as the rationale, which could be used to streamline the care of patients requiring admission for complications secondary to a novel influenza virus infection. Specifically, the following information regarding the in-hospital management of bronchitis and pneumonia has been included for ease of reference.



**1.3.1. CAP order**

**Pre-Printed Physician Orders for  
PANDEMIC COMMUNITY  
ACQUIRED PNEUMONIA**

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**ELDER ALERT = \***

Allergies (If none, indicate this):

\_\_\_\_\_

Admit to: (Most responsible physician)

\_\_\_\_\_

Consultant: \_\_\_\_\_

Date & Time	<p><i>Cross out and initial order not indicated; place (✓) in boxes as appropriate.</i></p>
	<p>1. DAT or _____</p> <p>2. AAT or _____</p> <p><b>3. Investigations:</b></p> <p>3.1 Chest x-ray, PA and lat; Day 3 repeat CXR</p> <p>3.2 CBC, electrolytes, BUN, Serum Cr, blood glucose; Day 3 repeat CBC</p> <p>3.3 O<sub>2</sub> sat on room air (x 15 minutes) daily and prn</p> <p>3.4 Other _____</p> <p><b>4. Standard Orders:</b></p> <p>4.1 Vital signs and temp QID x 48 hrs; then BID x 48 hrs; then OD *</p> <p>4.2 Consult Respiratory Therapy</p> <p>4.3 Consult Physiotherapy *</p> <p>4.4 O<sub>2</sub> to keep O<sub>2</sub> sat &gt;90%; call MD if FiO<sub>2</sub> &gt;50% required to maintain O<sub>2</sub> sat &gt;90%</p> <p><b>5. Medication Orders: (please circle IV or PO)</b></p> <p>- Dosage adjustment for renal dysfunction as per pharmacist *</p> <p><input type="checkbox"/> Initiate IV: _____ <b>OR</b> <input type="checkbox"/> Saline lock</p> <p><input type="checkbox"/> Oseltamivir 150 mg PO BID</p> <p><input type="checkbox"/> Oseltamivir 75 mg PO BID</p> <p><input type="checkbox"/> <b>If recent fluoroquinolone</b> (last 3 months): Cefuroxime 750mg IV Q8H (first dose STAT) plus Azithromycin 500mg IV / PO OD (first dose STAT)</p> <p><input type="checkbox"/> <b>If recent macrolide or cephalosporin</b> (last 3 months): Moxifloxacin 400mg IV / PO OD (first dose STAT)</p> <p><input type="checkbox"/> Salbutamol 2-4 puffs MDI Q6H and Q30 minutes prn with spacer</p> <p><input type="checkbox"/> Salbutamol 2.5-5.0mg via neb Q6H and Q30 minutes prn</p> <p><input type="checkbox"/> Ipratropium 2 puffs MDI Q6H with spacer</p> <p><input type="checkbox"/> Ipratropium 0.25 – 0.50mg via neb Q6H</p> <p><input type="checkbox"/> Acetaminophen 325-650mg PO/PR Q4H prn fever/pain</p> <p><input type="checkbox"/> Heparin 5000U SC Q12H; discontinue when actively mobilizing *</p> <p><input type="checkbox"/> Bowel Protocol</p> <p><b>Other medications:</b> physician to use doctor order sheet for other medications.</p>

Physician Signature: \_\_\_\_\_

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### 1.3.2. Empirical Therapy – Admitted bronchitis and COPD patients

The principles are similar to those outlined for such patients managed in the community.

Antibiotics should cover the likely bacterial pathogens including: *S pneumoniae*, *H influenzae*, *M catarrhalis* and *Staph aureus*.

Patients at risk of complications or super-infection should be considered for antibiotics in the presence of lower respiratory features. These include patients who are within the group currently recommended for influenza vaccination.

Oral therapy should be sufficient for those without adverse severity features and who are able to take oral medication.

Antibiotics should be considered in those previously well adults who develop worsening symptoms (recrudescent fever or increasing dyspnoea).

See the treatment table below for specific antibiotic choices.

### 1.3.3. Empirical Therapy – Non-severe influenza-related pneumonia patients

During a pandemic, patients will be suffering from primary viral pneumonia, or combined viral-bacterial pneumonia, or secondary bacterial pneumonia. The principles of antibiotic selection for non-severe influenza-related pneumonia are similar to those for the management of sporadic community acquired pneumonia in general, except that adequate cover for *Staph aureus* should be included in any empirical regimen. It is also not necessary to routinely provide cover for atypical pathogens (*Mycoplasma pneumoniae*, *Chlamydia sp.*, *Coxiella burnetti*, *Legionella sp.*) during a pandemic as the large majority of patients will be hospitalized as a direct result of influenza and its complications caused by bacterial infection.

See the treatment table below for a summary of antibiotic choices.

#### **Recommendations:**

- **All patients with pneumonic involvement should receive antibiotics.**
- **Most patients can be adequately treated with oral antibiotics.**
- **Oral therapy with co-amoxiclav or a tetracycline is preferred.**
- **When oral therapy is contra-indicated, recommended parenteral choices include intravenous co-amoxiclav, or a second or third generation cephalosporin (cefuroxime or cefotaxime respectively).**
- **A macrolide (erythromycin or clarithromycin) or a fluoroquinolone active against *S pneumoniae* and *Staphylococcus aureus* is an alternative regimen for those intolerant of penicillins or where there are local concerns over *C difficile* associated diarrhoea.**
- **Antibiotics should be administered within 4 hours of admission.**

### 1.3.4. Empirical therapy - Severe influenza-related pneumonia patients

Mortality is greatly increased in those with severe pneumonia. The illness may progress before microbiological information is available.

Preferred and alternative initial treatment regimens are summarized in the table below. The recommendation of broad-spectrum  $\beta$ -lactam regimens plus a macrolide in those with severe influenza-related pneumonia is based on the following rationale:

- While *S pneumoniae* and *Staph aureus* remain the predominant pathogens, Gram negative enteric bacilli, although uncommon, carry a high mortality.
- The recommended empirical regimen will offer double cover for the likely pathogens implicated in influenza-related pneumonia and there is some evidence to indicate that combination therapy is associated with better outcomes in severe pneumonia.
- Although there is no evidence of an increased incidence of infection by atypical pathogens in influenza-related pneumonia, in severe pneumonia, it is felt necessary to include cover for atypical pathogens, particularly *Legionella* sp. as it may not be possible at the outset to distinguish between patients with sporadic severe community acquired pneumonia in whom *Legionella* infection is important, and influenza-related pneumonia.

Parenteral administration of antibiotic is recommended in those with severe community acquired pneumonia regardless of the patient's ability or otherwise to take oral medication. This is to ensure prompt, high blood and lung concentrations of antibiotic.

#### **Recommendations:**

- **Patients with severe pneumonia should be treated immediately after diagnosis with parenteral antibiotics.**
- **An intravenous combination of a broad spectrum beta-lactamase stable antibiotic, such co-amoxiclav or a second (eg cefuroxime) or third (eg cefotaxime) generation cephalosporin, together with a macrolide (clarithromycin or erythromycin) is preferred.**
- **An alternative regimen includes a fluoroquinolone with enhanced activity against pneumococci together with a broad spectrum  $\beta$ -lactamase stable antibiotic or a macrolide.**

### 1.3.5. When should the IV route be changed to oral?

#### **Recommendations:**

- **Patients treated initially with parenteral antibiotics should be transferred to an oral regimen as soon as clinical improvement occurs and the temperature has been normal for 24 hours, providing there is no contra-indication to the oral route.**

### 1.3.6. How long should antibiotics be given?

#### **Recommendations:**

- **For most patients admitted to hospital with non-severe and uncomplicated pneumonia, 7 days of appropriate antibiotics is recommended.**
- **For those with severe, microbiologically undefined pneumonia, 10 days treatment is proposed. This should be extended to 14 to 21 days where *S aureus* or Gram negative enteric bacilli pneumonia is suspected or confirmed.**

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**1.3.7. Preferred and alternative initial empirical antibiotic treatment regimens and parenteral to oral switch regimens for pneumonic and non-pneumonic lower respiratory tract infections complicating influenza managed in acute care facilities**

<b>PREFERRED ALTERNATIVE</b>	
<b>[1] Hospital-treated, non-pneumonic bronchial complications (including exacerbations of COPD and acute bronchitis) requiring antibiotic therapy</b> • co-amoxiclav 625mg tds PO, • Macrolide (erythromycin 500 mg qds PO or clarithromycin 500 mg bd bPO)	
<b>OR</b>	<b>OR</b>
doxycycline 200mg stat and 100mg od PO	Fluoroquinolone with enhanced pneumococcal activity, e.g. levofloxacin 500 mg od PO or moxifloxacin 400mg od POc
<b>[2] Hospital-treated, not severe pneumonia</b> • co-amoxiclav 625mg tds PO	• Macrolide (erythromycin 500 mg qds PO or clarithromycin 500 mg bd bPO)
<b>OR</b>	<b>OR</b>
doxycycline 200mg stat and 100mg od PO	Fluoroquinolone with enhanced pneumococcal activity, e.g. levofloxacin 500 mg od PO or moxifloxacin 400mg od POc
<b>OR if IV needed</b>	
• co-amoxiclav 1.2 g tds IV	• Macrolide (erythromycin 500 mg qds PO or clarithromycin 500 mg bdbPO)
<b>OR</b>	<b>OR</b>
cefuroxime 1.5 g tds IV or cefotaxime 1g tds IV	levofloxacin 500 mg od IV c
<b>[3] Hospital-treated, severe pneumonia</b>	
• co-amoxiclav 1.2 g tds IV	• Fluoroquinolone with some enhanced pneumococcal activity
or cefuroxime 1.5 g tds IV	e.g. levofloxacin 500 mg bd IV, PO c
or cefotaxime 1g tds IV <b>PLUS</b>	<b>PLUS, EITHER</b> Macrolide (erythromycin 500 mg qds PO or clarithromycin 500 mg bdbPO)
Macrolide (erythromycin 500 mg qds PO or clarithromycin 500 mg bdb PO)	<b>OR</b> Beta-lactamase stable antibiotic
	(co-amoxiclav 1.2 g tds IV or cefuroxime 1.5 g tds IV or cefotaxime 1g tds IV)

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**1.3.8. Recommended therapy of most likely microbiologically define causes of pneumonia complicating influenza**

<b>PATHOGEN</b>	<b>PREFERRED</b>	<b>ALTERNATIVE</b>
<i>S pneumoniae</i>	amoxicillin 500 mg – 1.0 ga tds PO or benzylpenicillin 1.2 g qds IV	cefuroxime 0.75-1.5 g tds IV or cefotaxime 1-2 g tds IV or ceftriaxone 2g od IV or erythromycin 500 mg qds PO or clarithromycin 500 mg bd PO
<i>S aureus</i>	<b>Non-MRSA:</b> flucloxacillin 1-2 g qds IV ± rifampicin 600 mg od or bd, PO/IV	Consult local microbiologist for further advice.
	<b>MRSA:</b> vancomycin 1 g bd IV (dose monitoring) ± rifampicin 600 mg od or bd PO/IV	
<i>H influenzae</i>	<b>Non-β-lactamase-producing: amoxicillin 500 mg td or ampicillin 500 mg qds IV</b>	cefuroxime 750 mg -1.5g tds IV or cefotaxime 1-2 g tds IV or ceftriaxone 2 g od IV or fluoroquinoloneb PO or IV
	β-lactamase-producing: co-amoxiclav 625 mg tds PO or 1.2 g tds IV	
Gram negative enteric bacilli	cefuroxime 1.5 g tds or cefotaxime 1-2 g tds IV or ceftriaxone 1-2 g bd IV	fluoroquinoloneb IV or imipenem 500 mg qds IV or meropenem 0.5-1.0 g tds IV
<i>P aeruginosa</i>	ceftazidime 2 g tds IV ± gentamicin or tobramycin (dose monitoring)	EITHER ciprofloxacin 40 ± gentamicin or tobramycin (dose monitoring)

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### 1.3.9. When can patients be safely discharged from hospital?

#### **Recommendations:**

- **Patients should be reviewed before 24 hours of discharge home. Those with more than 2 of the following unstable clinical factors should consider remaining in hospital:**
  - **temperature > 37.8°C**
  - **heart rate > 100/min**
  - **respiratory rate > 24/min**
  - **systolic blood pressure <90mmHg**
  - **oxygen saturation < 90%**
  - **inability to maintain oral intake and abnormal mental status.**

### 1.3.10. What arrangements should be made for follow-up after hospital discharge for influenza and by whom?

#### **Recommendations:**

- **Follow-up clinical review should be considered for all patients who suffered significant complications or who had significant worsening of their underlying disease, either with their general practitioner or in an acute care facility.**
- **At discharge or at follow-up, patients should be offered access to information about their illness (e.g., Self-care Guide), take home medication and any follow-up arrangements.**
- **It is the responsibility of the acute care team to arrange the follow up plan with the patient and the general practitioner.**

## **2. GENERAL MANAGEMENT OF CHILDREN ADMITTED TO AN ACUTE CARE FACILITY**

### **2.1. Summary recommendations**

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- Where possible children should be cohorted using rapid virological tests.
- Patients whose oxygen saturation is 92% or less while breathing air should be treated with oxygen given by nasal cannulae, head box, or face mask to maintain oxygen saturation above 92%.
- When children are unable to maintain oral intake supplementary fluids should when possible be given by the enteral route. Intravenous fluids in those with severe pneumonia should be given at 80% basal levels.

## 2.2. When can children be safely discharged from an acute care facility

Children can be safely discharged from hospital when:

- **Child is clearly improving.**
- **Is physiologically stable.**
- **Can tolerate oral feeds.**
- **Respiratory rate is < 40/min ( <50/min in infants)**
- **Awake oxygen saturation is >92% in air.**

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