



# Pneumonia

## Guidelines for treating children and adults

BY DENNIS M. BOWIE, MD

Each year, community acquired pneumonia (CAP) accounts for approximately one million physician visits and nearly 60,000 hospitalizations in Canada. It's one of the leading causes of death from infectious disease. With pneumonia season just around the corner, both children and adults are at risk, though the management guidelines differ for both populations. While respiratory viruses are the common culprits for pneumonia among younger children, a bacterial cause is more likely in older children and adults.

When it comes to treatment, the penicillin-like drugs and macrolides are used more frequently in children, while the advanced macrolides, respiratory quinolones and the beta lactam antibiotics are more effective in adults.

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### Causative pathogens

- age is a good predictor of the likely pathogens
- viruses, i.e. respiratory syncytial virus, parainfluenza, influenza and adenovirus, accounting for most lower respiratory tract infections, including pneumonia, are a frequent cause in younger children less than two years of age
- viruses alone may account for 14-35% of CAP in children
- in older children, bacterial causes are more likely, i.e. *Streptococcus pneumoniae*, *Haemophilus influenzae* type b (Hib), nontypable *H. influenzae* (NTHI) and *Moraxella catarrhalis*
- a significant number of CAP cases (8-40%) represent a mixed infection
- nasopharyngeal aspirates from all children younger than 18 months should be sent for viral antigen detection, i.e. immunofluorescence, with or without viral culture

### In children

#### Treatment

- teach families of children well enough to be cared for at home how to manage pyrexia, prevent dehydration and to look for signs of deterioration
- avoid nasogastric tubes in severely ill children; they may compromise breathing, especially in infants with small nasal passages
- young children who present with mild symptoms of lower respiratory tract infection don't require antibiotics
- amoxicillin is 1<sup>st</sup> choice for oral antibiotic therapy in children age five or younger; alternatives are the amoxicillin/clavulanate-like drugs, cefaclor, erythromycin, clarithromycin and azithromycin
- because *M. pneumoniae* is more prevalent in kids older than age five, a macrolide may be used as 1<sup>st</sup> line empirical treatment

#### Hospitalization

##### Infants

- age < 6 months
- oxygen saturation < 92%, cyanosis
- respiratory rate > 70 breaths/min
- laboured or difficult breathing
- intermittent apnea, grunting
- poor feeding
- noncompliant parents/caretakers

##### Older children

- oxygen saturation < 92%, cyanosis
- respiratory rate > 50 breaths/min
- difficulty in breathing
- grunting
- signs of dehydration
- noncompliant patient/parent/caretaker

### Treatment — adults

#### Outpatients

- Previously healthy and no recent antibiotic therapy:
  - macrolide\* OR
  - doxycycline
- If individual was recently on antibiotic therapy:
  - respiratory fluoroquinolone<sup>†</sup> OR
  - an advanced macrolide<sup>§</sup> plus high-dose amoxicillin OR
  - an advanced macrolide<sup>§</sup> plus high-dose amoxicillin-clavulanate.
- For patients with co-morbidities, e.g. COPD, diabetes, renal or congestive heart failure, malignancy, and no recent antibiotic therapy:
  - an advanced macrolide<sup>§</sup> OR
  - respiratory fluoroquinolone<sup>†</sup>
- If recent antibiotic therapy:
  - respiratory fluoroquinolone<sup>†</sup> alone OR
  - an advanced macrolide<sup>§</sup> plus a beta-lactam<sup>‡</sup>

#### Inpatients

- Patients with pneumonia and no recent antibiotic therapy:
  - respiratory fluoroquinolone<sup>†</sup> alone OR
  - an advanced macrolide<sup>§</sup> plus a beta-lactam<sup>‡</sup>
- If recent antibiotic therapy:
  - an advanced macrolide<sup>§</sup> plus a beta-lactam<sup>‡</sup> OR
  - a respiratory fluoroquinolone alone (selection depends on nature of recent antibiotic therapy)
- Latest adult CAP guidelines emphasize initiation of antibiotic therapy within four hours of hospital registration. This likely applies to children, though the mortality rate in children is lower.

#### Nursing home

- In patients receiving treatment in a nursing home:
  - a respiratory fluoroquinolone<sup>†</sup> alone OR
  - amoxicillin-clavulanate plus an advanced macrolide<sup>§</sup>
- Recent controversy over using the newer respiratory quinolones as 1<sup>st</sup> line:
  - fear of making individuals resistant to good antibiotics
  - concern that recently hospitalized patients or those from nursing homes may be resistant to quinolones

\* macrolide: azithromycin, clarithromycin, or erythromycin

§ advanced macrolide: azithromycin, clarithromycin

† respiratory fluoroquinolone: levofloxacin, gatifloxacin, moxifloxacin

‡ beta-lactam: cefotaxime, ceftriaxone, or a beta-lactam/beta-lactamase inhibitor

### Hospitalization — adults

#### For immunocompetent adults, admission criteria is based on:

- pre-existing conditions that compromise safety of home care
- Pneumonia Patient Outcomes Research Team (PORT) severity index with recommendation for home care for risk classes I, II, and III
  - the PORT severity index is based on patient characteristics (mainly age), co-morbid illness, physical and laboratory findings, which are given a score to characterize the risk category leading to admission or treatment as an outpatient
- clinical judgement
- more emphasis is placed on trying to get an etiologic diagnosis in sick individuals admitted

#### References:

1. Jadavji T et al. A practical guide for the diagnosis and treatment of pediatric pneumonia. *CMAJ* 1997;156:703-11.
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3. Mandell LA et al. Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults. *Clin Infect Dis* 2003;37:1405-33.