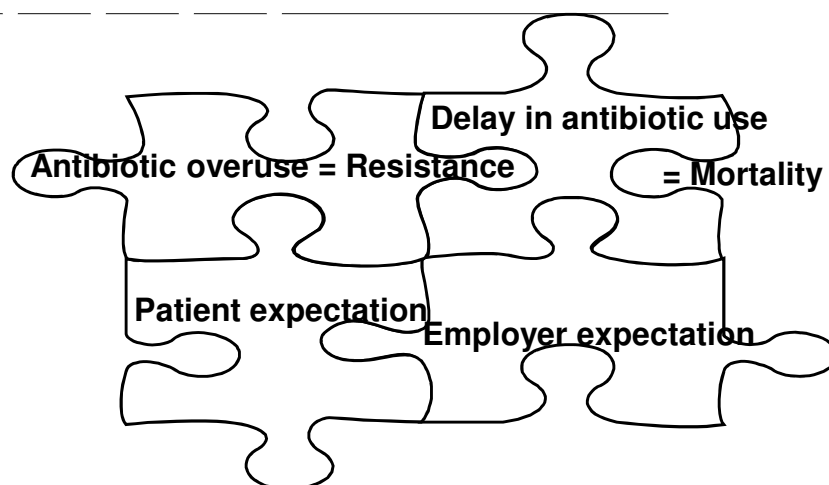


# Management of URTI's in Children

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# Antibiotics - Dilemmas for General Practitioners



## Present URTI Guidelines

- Diagnose URTI
- Decide if antibiotic necessary
- Oral amoxicillin 90mg/kg/day
- Alternative therapy =  
Augmentin/Cefpodoxime

Brink A, et al. SAFPJ 2009;51:105-113

## Common Cold

- There is good evidence and consensus that there is no indication for antibiotics for the common cold.
- Cough, mucopurulent secretions, duration = do not indicate bacterial infection
- 30% kids cough for > 10 days

Antibiotics for upper respiratory tract infections: an overview of Cochrane reviews. Arroll B. Respiratory Medicine 2005;99:255-261

## Recurrent URTI's

- Children get up to 12 URTI's in a year
- Mean number = 6 for infants
- When recurrent URTI consider:
  - Allergy
  - Immune deficiency
  - Primary ciliary dyskinesia

## The prevalence of nasopharyngeal antibiotic-resistant pneumococcal carriage in children

- 303 children
- All children and siblings 1 month to 5 years attending 8 Paediatric practices
- Nasopharyngeal sampling and parent interviews
- Pneumococci isolated from 121 children (40%)
- PenR or PenIR isolates:
  - >60% were highly resistant to cefaclor (Ceclor) and cefixime (Fixime) and 33% highly resistant to cefuroxime (Zinnat/Zinacef)
- Odds of isolating pneumococci were 1.89 and 2.31 times higher in hospital admission history or daycare attendance

## The prevalence of nasopharyngeal antibiotic-resistant pneumococcal carriage in children

- Antibiotic use in previous 30 days reduced carriage but isolates were 4 times more likely to be resistant
- 1986
  - Pneumococcal carriage 44,4%, PenR 4,4%, Multiple resistance in 17,7%
- 1999
  - Pneumococcal carriage 40%, **Multiple resistance in 37,2%, Antibiotic resistance in 69,4%**,
  - Pen R in ~50%, 12% highly resistant
- **“An essential factor in the increase of antibiotic resistance, is the availability and use of paediatric services and antibiotics in children in the private sector”**
  - 57% had antibiotics in the previous 90 days.

Klugman and Paediatric Study Group SAMJ Volume 90

## Pharyngitis

- For streptococcal tonsillitis
- Optional use antibiotics
- The benefit in terms of symptoms is only about 16 h (**NNTB from 2 to 7 at day 3 for pain**) compared with placebo,
- Serious complications, such as rheumatic fever and glomerulonephritis, are now rare in developed countries.

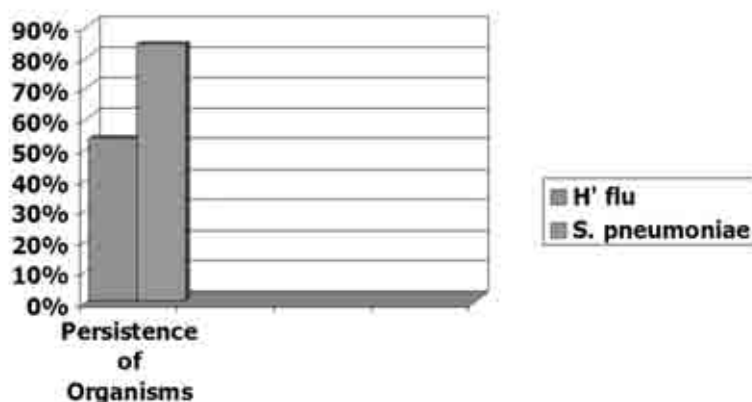
Antibiotics for upper respiratory tract infections: an overview of Cochrane reviews. **B. Arroll. Respiratory Medicine 2005;99:255-261**

## AOM

- The reviews of antibiotics for acute otitis media have concluded that benefit is not great with a number needed to treat for a benefit (NNTB) of 15. Recent US guidelines are recommending a delay in prescriptions in children over the age of 6 months.

Antibiotics for upper respiratory tract infections: an overview of Cochrane reviews. Arroll B. *Respiratory Medicine* 2005;99:255-261

## Persistence rates when AOM treated with placebo

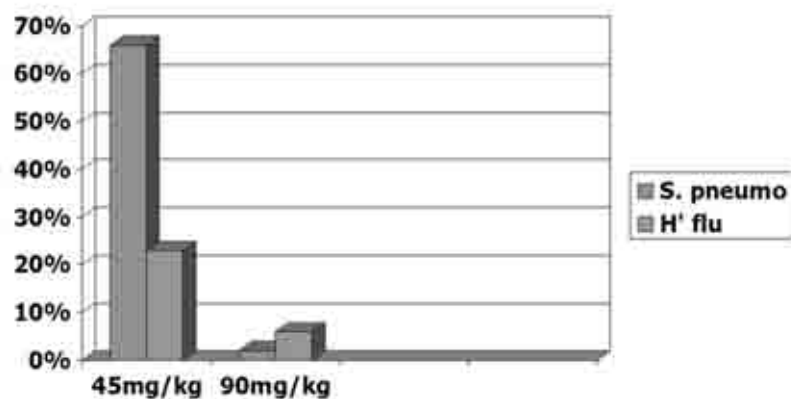


R Dagan. Personnel communication

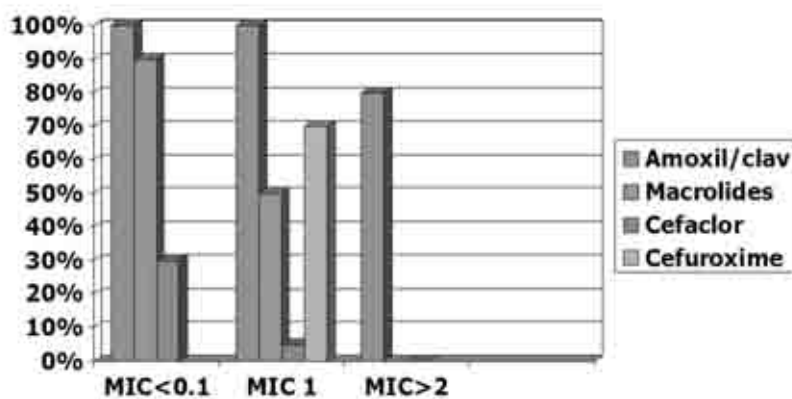
## Reasons not to use Antibiotics in AOM

- 30% AOM culture negative
- Low rate of mastoiditis
- Polyanna effect – spontaneous resolution high
- Side – effects
- Cost
- Collateral damage

## Persistence of organisms after Amoxil/clav use



## S. Pneumoniae sensitivity to Antibiotics



Many S. pneumos and H' flu's resistant to TMX/SMX

## 3<sup>rd</sup> Generation Cephalosporins

- Cefpodoxime should be used
- Consider it as an alternative drug
  - Day care attendance
  - Recent antibiotic (3 months)
  - Recent AOM
- Not all cephalosporins are efficacious

## Concentration

- *S. pneumo*/ *H' flu*/ *M. catarrhalis* are located extracellularly in interstitial fluid
- B-lactam antibiotics work in extracellular fluid
- Macrolides have good tissue penetration but work poorly in interstitial space

R Dagan. Personnel communication

## Antibiotic duration

- 5-7 days in children < 2 years old
- 5 days in children > 2 years old
- This is highly debatable
- New Meta-analysis suggests 3-5 days



## AOM Prevention

- Altering day care center attendance patterns;
- Breastfeeding for at least the first six months;
- Avoiding supine bottle feeding and
- Reducing or eliminating pacifier use in the second six months of life.
  
- The usefulness of these interventions is unclear.

## Acute Sinusitis Diagnosis

- Clinical Diagnosis
  - \*>7 days
  - \*Cough
  - \*No imaging required
  - \*Endoscopy may be useful
- Purulent discharge
  - Abnormal transillumination     *CMAJ 1997;156(6)*
  - Maxillary dental pain
  - Poor response to decongestants
  - History of colored nasal discharge

Risk factors for and outcomes of bloodstream infection caused by ESBL-producing *Escherichia coli* and *Klebsiella* species in children  
*Paediatrics* 2005;115: 942-949

TABLE 2. Univariate Analysis of ESBL-EK Infection and Antimicrobial Use in the 30 Days Before Infection

Antibiotic, n (%)	ESBL (n = 35)	Non-ESBL (n = 105)	P Value
Third-generation cephalosporins*	19 (54)	18 (17)	.000
Ceftazidime only	15 (43)	12 (11)	.000
Extended-spectrum penicillins†	6 (17)	6 (6)	.073
Carbapenems‡	3 (9)	0 (0)	.015
Anti-anaerobes§	13 (37)	25 (24)	.131
Aminoglycosides	24 (69)	50 (48)	.034
Quinolones (ciprofloxacin)	2 (6)	1 (1)	.154
Trimethoprim/sulfamethoxazole	16 (46)	15 (14)	.000

\* Includes ceftazidime, ceftioxone, and cefotaxime.

† Includes ticarcillin/clavulanate, piperacillin, ampicillin, amoxicillin/clavulanate, and ticarcillin.

‡ Includes imipenem, meropenem.

§ Includes ticarcillin/clavulanate, piperacillin, ampicillin/sulbactam, imipenem, meropenem, metronidazole, clindamycin, and ceftioxone.

|| Includes gentamicin, tobramycin, and amikacin.

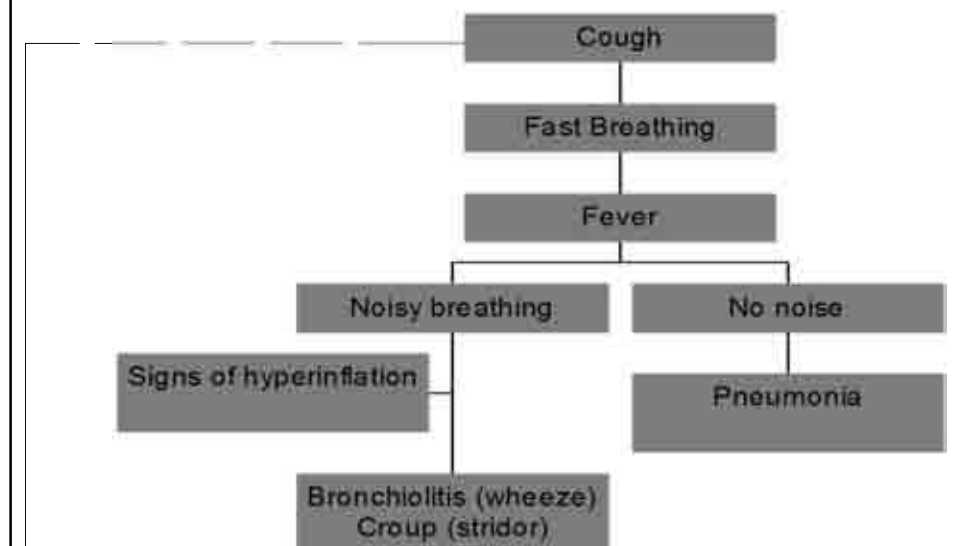
## HIV-infected children

- No evidence that PK/PD principles are different to healthy children
- No evidence that the organisms are significantly different
- Ear-swab culture was done in five patients with acute otitis media with perforated tympanic membranes. *Streptococcus pneumoniae*, *Staphylococcus aureus* and diphtheroid species were found predominantly. *Pseudomonas aeruginosa* predominated in the chronic suppurative otitis media group. All specimens showed resistance to co-trimoxazole.

Savitree Chaloryoo *International Journal of Pediatric Otorhinolaryngology* 1998; 44:103-107

Brink A. Personnel communication

## Clinical Approach to Acute Cough



## Respiratory rate

- Most important sign of respiratory distress
- > 50 bpm 2 –12 months
- > 40 bpm 1-5 years.

## Definition CAP

- Acute infection (less than 14 days) acquired in the community, of the lower respiratory tract, leading to cough or difficulty breathing, tachypnoea or chest-wall indrawing
- Accounts for 30-40% of all hospital admissions
- Case fatality rate 15-28%

## Causes CAP

- Bacterial:
  - Strep Pneumoniae
  - Haemophilus influenzae
  - Staph aureus
  - Moraxella catarrhalis
- Atypical bacteria
  - Mycoplasma pneumoniae
  - Chlamydophila pneumoniae/trachomatis
- Viral
  - RSV
  - Human metapneumovirus
  - Parainfluenza
  - Adenovirus
  - Influenza
  - Rhinovirus
  - Measles virus

## Diagnosis CAP

- 1. Determine whether pneumonia present: Clinical:
  - Acute cough/dyspnoea or tachypnoea (> 50 bpm 2 –12 months; >40bpm 1-5 years.
  - Saturation
  - Consider HIV-infection

### WHO - Recommendations for the Management of Pneumonia in Children

Diagnosis	Symptoms	Treatment
No pneumonia	Cough without fast breathing	No antibiotic
Non-severe pneumonia	Cough with fast breathing	Oral antibiotics at home
Severe pneumonia	Lower chest indrawing	Parenteral antibiotics – Benzylpenicillin or Ampicillin
Very severe pneumonia	General danger signs	Parenteral antibiotics

## Aetiological diagnosis

- Clinical features and CXR do not suggest aetiology
- Acute phase reactants may not suggest bacterial cause (combination better)
- Blood culture – positive in 5% - 18% (HIV)
- Culture – induced sputum (not NPA)

## Treatment CAP

- Antibiotics for all – Amoxicillin (90mg/kg/day tds 5 days) – (IV Ampicillin) or Cephalosporin that works
- < 2 months add aminoglycoside/cephalosporin
- > 5 years add macrolide
- HIV-infection add aminoglycoside
- HIV-exposed < 6 months add cotrimoxazole
- AIDS add cotrimoxazole

## Therapies not indicated

- Physio
- Mucolytics
- Postural drainage
- Nebulised bronchodilators
- Steroids (- PCP)

## Treatment of Bronchiolitis

- Humidified oxygen: Beneficial
- ?? Antibiotics - associated infection
- ??Efficacy of Bronchodilators
  - Inhaled & oral B2 agonists
  - Inhaled ipratropium bromide
  - theophyllines
- ??Use of corticosteroids
- ?Use on leukotriene antagonists
- ?Efficacy of immunoglobulin

## **Orelox Indications**

- Indicated for the short-term treatment of upper and lower respiratory tract infections due to susceptible micro-organisms :
  - \* Otitis media
  - \* Tonsillitis and pharyngitis
  - \* Pneumonia

## **Dosage and directions for use**

- In Children: The dosage depends on the weight of the child being treated. The average dose is 8-16 mg/kg/day administered in two doses at 12 hourly intervals with meals.
- 10kg = 5-10 ml every 12 hours
- The use of Orelox in newborn infants under 2 weeks of age should not be used.