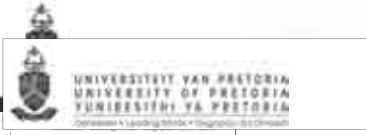
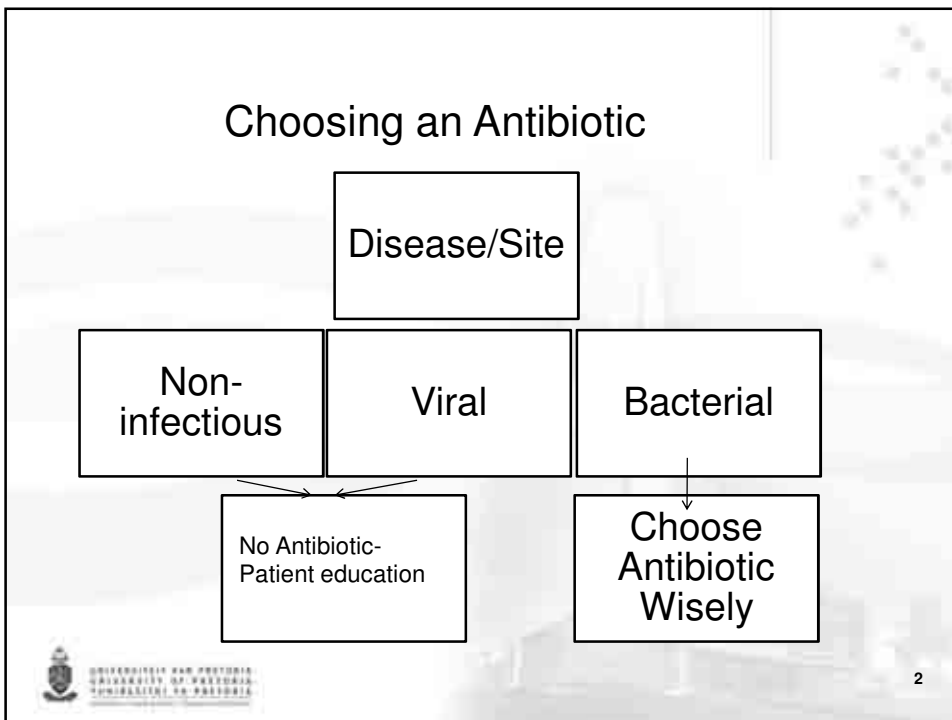
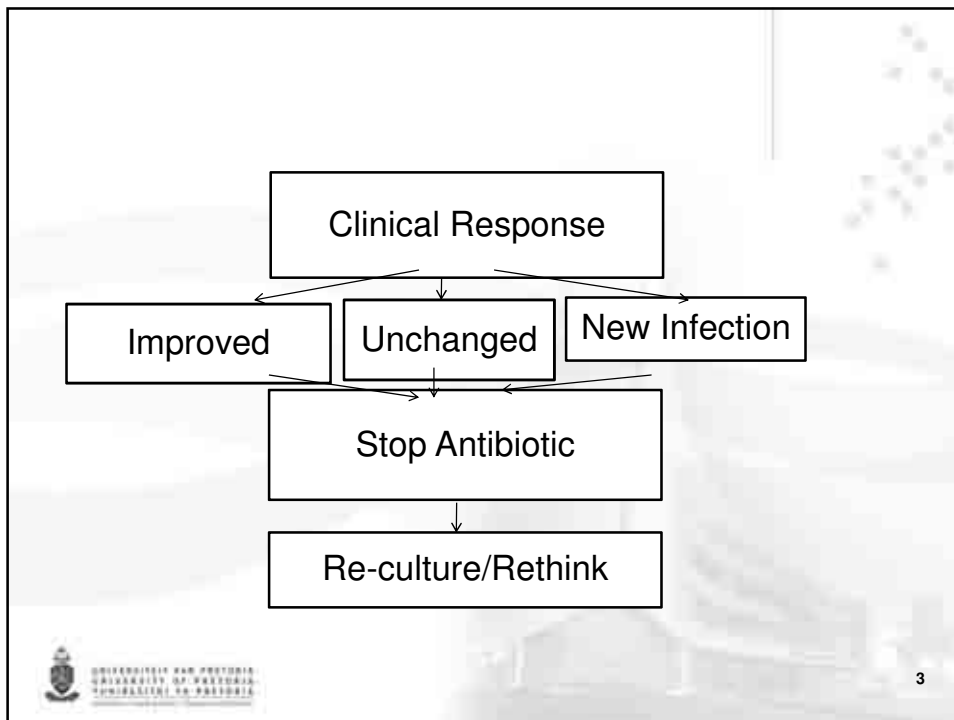


Principles of Antibiotic Use

- The 6 Step Plan

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 Department of Paediatrics and Child Health



Step 1. Is it an Infection?

- Tips for Diagnosing Allergy:
- Recurrence
- Blocked nose a dominant feature
- Allergic facies
- Family history
- Allergy testing

The slide features a large heading 'Step 1. Is it an Infection?' followed by a bulleted list of tips for diagnosing allergy. The background is a blurred image of a building.

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Step 2. Is it a Viral infection?

- Common Cold:
- Winter predominance
- Sniffles
- Mucus (even green)
- Not localised

- 30% of individuals cough for more than 10 days

Step 2. Is it a Viral infection?

- Bronchiolitis:
- Hyperinflation
- Noisy breathing

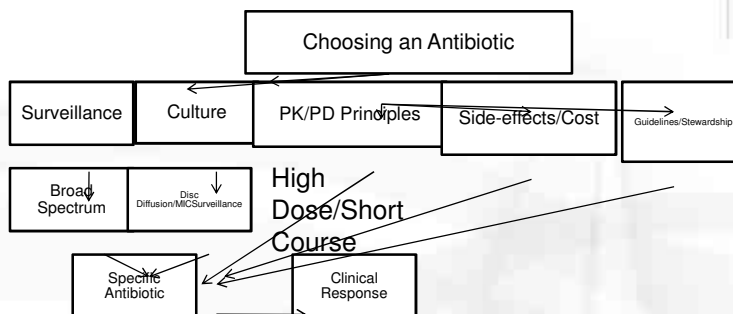
- Aetiology: Rhinovirus/RSV/PIV/Influenza/HMP

Step 3. Picking an Antibiotic for a Bacterial Illness?

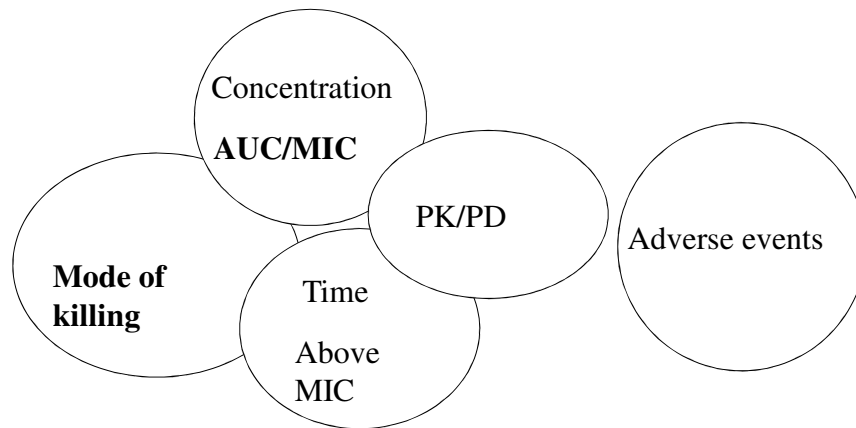
- PK/PD
- Break points
- MIC

- Amoxil TDS/Augmentin BD (slow release formulation)

- Guidelines



Selecting Antibiotics



Dosage

- Consider antibiotic for relevant organisms
- Consider dosage interval and total dose depending on the antibiotic mode of killing (pk/pd principles)
- PK = Effect of body on drug (absorption, availability, metabolism, excretion)
- PD = Effect of drug on body (receptor binding, tissue penetration)



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



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

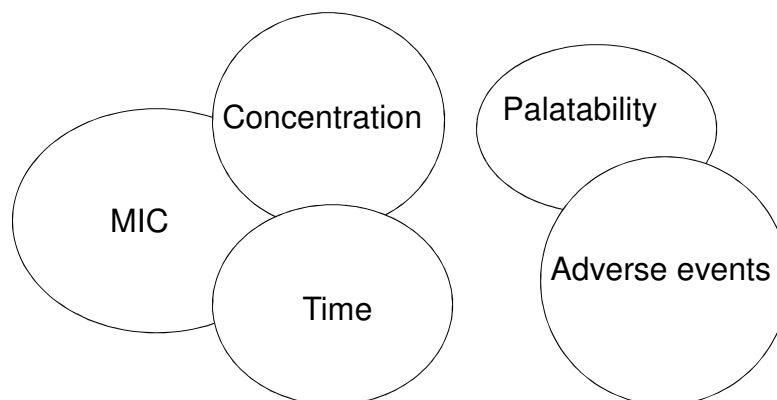


Treatment of Bronchiolitis

- 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



Selecting Antibiotics



Step 4. What Dose of Antibiotic?

- High dose: 90 mg/kg/day – Pneumococcus
- Add clavulanate – H'flu

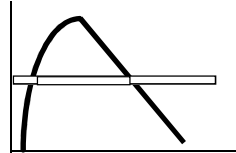
Dosage

- Correct antibiotic dosages and duration
- Correct antibiotic administration
- Concentration dependent antibiotics (Aminoglycosides, quinolones) = single daily concentration
- Time dependent antibiotics (B-lactams, vancomycin, pip-taz, carbapenems, linezolid) = continuous infusion over 24 hours (3-4 hours for carbapenems, TDS for linezolid)

Using PK/PD

Predictors of Bacterial Eradication: PK/PD Profiles

Time-Dependent Agents

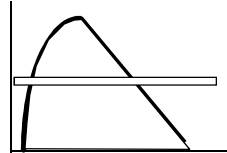


Includes:

- Penicillins
- Cephalosporins
- Linezolid

Clinical and bacteriologic success correlates with length of time bacteria are exposed to agent at concentration that exceeds MIC

Concentration-Dependent Agents



Includes:

- Fluoroquinolones
- Aminoglycosides
- Tetracyclines

Successful therapy correlates with parameters that involve blood concentration of agent and MIC



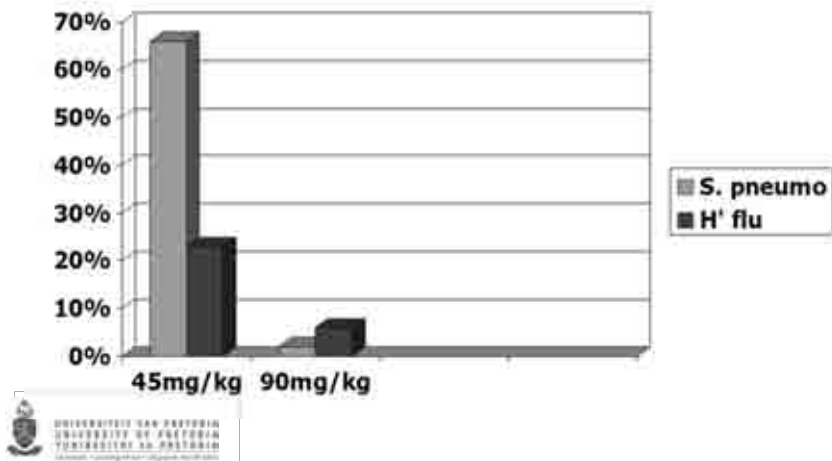
Craig WA. *Clin Infect Dis.* 1998;26:1-12; Peric M, et al. *Clin Ther.* 2003;25:169-177.
SAHP. *Otolaryngol Head Neck Surg.* 2004;130:1-45.

Break point

- MIC that allows ideal PK/PD of antibiotic
- = 40-50% for time dependent killers
- = Peak concentration > 90% above MIC for concentration dependent killers



Persistence of organisms after Amoxil/clav use



Step 5. What Duration of Antibiotics?

- Pakistan data pneumonia
- ?URTI

Pneumonia Study

- Seven sites in 5 Pakistan cities
- Children with severe pneumonia
- Randomised to ambulatory group (oral amoxicillin 80-90 mg/kg/day in 2 doses x 5 days or
- Hospitalised group (IV ampicillin 100mg/kg/day in 4 doses) x 48 hours then oral amoxicillin.
- Results:
 1. 2037 children aged 3-59 months
 2. Treatment failures:
 - hospitalised group 8.6%
 - ambulatory group 7.5%
 3. Deaths within 14 days:
 - hospitalised group 4
 - ambulatory group 1



Hazi T, et al. Lancet 2008;371: 49-56

Results

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Hazi T, Fox LM, Fox MP, et al for the New Outpatient Short-Course Home Oral Therapy for Severe Pneumonia Study Group
Lancet 2008;371: 49-56

Step 6. What About a New Infection?

- HAP
- ESBL
- MRSA
- Pseudomonas

E coli

- < 1960 – Sensitive Ampicillin
- 1963 – B-lactamase production
- 3rd Generation Cephalosporin use
- CTX-M15 Production – Escape DNA into plasmids
- 3rd Generation Cephalosporin resistance

- OR death if bacteraemic = 2
- Prevalence 10% UK, 50% Turkey, 60% Asia, 50% SA

- Carbapenem use
- Carbapenemase production (esp Greece – 40%, Israel – 20%)
- Rare in Enterobacteriaceae, common in Acinetobacter

Macrolide Resistance in Pneumococci

- Efflux pump – MEF A/MEF B
- Or Ribosomal methylase (ERM B)
- Erythromycin resistance may emerge within therapy of individual patient
- Therefore combine macrolide with B-lactam antibiotic
- Most traits of H'flu resistant to macrolides

Cough Mixtures, Decongestants and Mucolytics



