Respiratory tract infections in children – major changes to prescribing recommendations

1) Fever in children is extremely common and results in over 50% of primary care activity in children under 5 years of age. Although parental anxiety about missing a serious infection is driving this increasing activity, the absolute risk of a child having a serious bacterial infection has markedly reduced since the introduction of conjugate vaccines against strep pneumo, HiB and meningococcus.

2) Parents seek a consultation because:

- It provides a proper 'health-check' and in their opinion, removes any 'health-threat'
  - Parents lack confidence to distinguish self-limiting illnesses from serious ones but believe that clinicians can
- They want advice on what symptoms to look out for and when to seek help.
- They do not generally seek antibiotics (although this is something that can be clarified during the consultation). Parents generally believe that Abs are required to treat 'severe' infections rather than to treat bacterial infections:
  - parents often believe that features suggesting a severe infection include high fever, prolonged duration of symptoms and degree of impact on the child (sleep / school)
  - Parents perception of susceptibility also plays a role in their expectation for Abs (younger, underlying health issues)

3) The factors associated with clinicians prescribing antibiotics include:

- Perceived vulnerability of children, especially young children.
- Seeking safety in the face of uncertainty (especially if re-presentation)
  - Uncertainty is driven by the difficulty in distinguishing bacterial and viral infections.
  - Perceived risk of suppurative complications from an untreated bacterial respiratory tract infection, especially in young children.
- Repercussions of 'missing something' in a child
  - The media are inclined to pick up on any cases where significant morbidity/death in a child that has resulted from a healthcare professional 'missing' a severe infection.
  - Staff with little experience of seeing unwell children are less confident at ruling out severe infection.

4) Young children have far lower rates of suppurative complications than older children, even when antibiotics are not prescribed:

- Rate of mastoiditis following otitis media (age 0-4 years versus 5-15 years): 1.33 vs 2.39 per 10,000
- Rate of quinsy after tonsillitis (age 0-4 years versus 5-15 years): 1.59 vs 5.99 per 10,000

5) There is good evidence to show that addressing parental concerns during a consultation results in significant reductions in future reconsultation rates, as well as marked reductions in Ab prescribing (Francis NA, BMJ 2009):

- Focus on the reasons the parent sought a consultation (rather than the distinction between viral and bacterial infections).
- Reassure the family that although their child has an infection that is having an impact on their sleep/feeding, their symptoms are not indicative of a severe infection in terms of objective parameters / 'red-flags'. Parents should also be provided with information about the likely duration of symptoms and advice on how to manage them.
- Most importantly, one must clearly explain the symptoms that parents should look out for and the actions required if they were to occur. All this information should ideally be provided both verbally and in writing (see Healthier Together safety netting sheet: http://www.what0-18.nhs.uk/health-professionals/primary-care-staff/safety-netting-parents/fever-children-less-5-years-age/

6) One of the major challenges facing clinicians is distinguishing whether a child presenting with an RTI has a bacterial or viral infection. It is often extremely difficult to make this decision clinically and there are few reliable diagnostic tests that can assist in a community based setting. This uncertainty often results in clinicians prescribing "just in case". However, there is an increasing body of evidence to show that antibiotics to do not significantly reduce severity or duration of symptoms in the majority of children with RTIs, irrespective of the aetiology:

i) Acute otitis media (AOM)

A systematic review of 13 RCTs (3401 children and 3938 AOM episodes) from high-income countries demonstrated that antibiotics have no early effect on pain, a slight effect on pain in the days following and only a modest effect on the number of children with tympanic perforations, contralateral otitis episodes and abnormal tympanometry findings at two to four weeks and at six to eight weeks compared with placebo. This suggests that in high-income countries, most cases of AOM spontaneously remit without complications. Even in children with AOM under 2 years of age, there is evidence to suggest that antibiotics make very little difference to the severity of symptoms in the majority of children.

ii) Tonsillitis

There is data, albeit limited, to suggest that antibiotics have little or no impact in reducing the severity of symptoms in the majority of children with acute tonsillitis

iii) Lower respiratory tract infections (LRTIs)

The lack of evidence around the benefits of Abs in children with LRTIs is demonstrated by the fact that there is currently a randomised controlled trail recruiting children between 6 months and 12 years of age presenting with an acute uncomplicated lower respiratory infection (LRTI), defined as an acute cough judged to be infective in origin, lasting <21 days. Patients will be

randomised to either an antibiotic arm (amoxicillin) or placebo for 7 days and the primary outcome being evaluated is the duration of significant symptoms

7) Ensuring consistent prescribing approaches across the urgent care pathway is paramount – inconsistent approaches drive parental anxiety and promote health seeking behaviour. The following guidelines for treatment of RTIs with antibiotics are being promoted across primary and secondary care in Wessex:

i) Acute otitis media

Consider starting oral antibiotics **only if any of the following criteria are met** in a child presenting with AOM (bulging ear drum or discharge): -

- Symptoms for 4 days or more
- Purulent discharge from ear canal (not due to otitis externa)
- Systemically unwell
- Under 6 months of age with presumed acute OM.
- In child 6 months - 2 years old, consider starting Abs if the following features are present:-
  - Bilateral OM
  - Unilateral OM and symptom score of >8 in child 6 months-2 years old (0=no symptoms, 1=a little, 2=a lot) for the following criteria: -
    - fever (>39 degrees = score of 2)
    - tugging ears
    - crying more
    - irritability
    - difficulty sleeping
    - less playful
    - eating less.

ii) Tonsillitis

Base decision to treat on FeverPAIN score (Fever, Purulence, Attend within 3 days of onset or less, severely Inflamed tonsils, No cough or coryza):

- score 0-1 = 18% streptococci: use no antibiotics
- score 2-3: 34-40% streptococci, use back up/delayed antibiotic
- score ≥4: 62-65% streptococci, use immediate Ab

This score is validated in children aged 3 years and older. However, younger children are less likely to have a bacterial aetiology and are less likely to develop complications.

iii) LRTIs

There is a paucity of evidence to guide antibiotic prescribing decisions in children and most national guidelines tend to focus on LRTIs in adults. Prior to the results of the ARTIC PC study being made available, a pragmatic approach seems most appropriate, with consideration of antibiotics if persistent/recurrent fever over preceding 24-48 hours with chest wall recession and tachypnoea.

8) Compliance with treatment re taste of oral antibiotic suspensions and frequency of dosing. Aim to use an antibiotic that is palatable and minimises dosing frequency in

order to optimise adherence. Penicillin V and flucloxacillin suspensions are not well tolerated by children due to their taste.
This has been the main driver for changing from penicillin V suspension in young children to amoxicillin bd in the most recent version of the Wessex primary care guidelines (www.nhsantibioticguidelines.org.uk).

- Although there has been great anxiety about prescribing amoxicillin in patients with tonsillitis due to the risk of adverse events associated with EBV, there is emerging data to suggest that the use of amoxicillin does not significantly increase the risk of rash in acute EBV – see https://adc.bmj.com/content/101/5/500 . In addition, data suggests that EBV accounts for as little as 1% of tonsillitis presenting to doctors (see https://www.ncbi.nlm.nih.gov/pubmed/17904463) and more importantly, EBV is extremely rare prior in children below 12 years of age. For this reason, the current recommendation is to use penicillin V bd tablets for children able to swallow tablets.
- For review of dosing frequency bd versus qds, see https://www.ncbi.nlm.nih.gov/pubmed/10654979

9) Dosing recommendations. The most recent version of the Wessex primary care guidelines has proposed higher doses of oral Abs for children (you may find that the dosing for children above 12 years of age exceeds that routinely used in adults!) This This is because there is emerging data demonstrating underdosing of Abs in children using the current BNFc age-bands (See https://www.bmj.com/content/351/bmj.h5447). The consensus of the guideline development group was to base antibiotic doses on the upper limit of BNFc recommendations. The rationale for this is to avoid treatment failures due to under-dosing in the small number of children that require Ab treatment for respiratory tract infections.

10) **Need to challenge the bacterial versus viral paradigm:**

It is extremely difficult for a clinician to confidently distinguish a mild/moderate bacterial infection from a viral illness. Yet we remain obsessed about making this distinction. This partly stems from our firmly held belief that if a bacterial infection is not treated with antibiotics, the patient is likely to come to harm.

There is also a very real risk that focusing on whether an infection is caused by a bacteria or virus (and then trying to justify why a patient does not need antibiotics in terms of “it’s just a virus”) negatively impacts on the effectiveness of the consultation. Parents seek the advice of a healthcare professional because are worried that their child might be seriously unwell. The role of the clinician is to establish whether or not this is the case, and if not, to effectively convey their professional opinion to the family. Examining the patient thoroughly and checking physiological parameters (heart rate, respiratory rate, capillary refill) can help reassure the parent. Explaining your findings in terms of objective markers of severity (red, amber, green criteria) and providing the family with clear information about what to watch out for (safety netting) is also extremely effective in allaying parental anxiety.

Clinicians should adopt a *severity of illness approach* when deciding whether to prescribe antibiotics rather than relying on their ability to distinguish bacterial from viral infections. Not only is this likely to significantly reduce antibiotic prescribing, but an effective consultation that effectively addresses the concerns of the parent is far more likely to reassure them and to empower them in the long-term. Perhaps they will feel confident enough to not seek your input the next time their child has a fever?

11) Most children labelled with a penicillin allergy are not allergic to penicillin – lifelong implications of attaching a label of penicillin allergy in childhood in terms of likelihood of adverse infective outcomes and colonisation with resistant organisms:

- Features suggestive of a true penicillin allergy (type 1 hypersensitivity):
    - Timing post Ab (within 60 mins of first dose)
    - Symptoms: urticaria, angio-oedema, wheeze, anaphylaxis
    - NOT genetic / not familial
    - True penicillin allergy rare in childhood