Assessment and Management of Acute Wheeze

Craig McDonald
Consultant Paediatrician
Session Aims

• Structured Assessment of the Wheezy Child

• Management tailored to severity
  - Home care for moderate exacerbations
  - Treatment of severe / life threatening attacks

• Discuss some “special cases”

• Discuss follow up / monitoring following exacerbations
Basics - Start with ABCD

- **Airway**

- **Adequacy of breathing**
  - Effort of breathing
  - Respiratory rate
  - Grunting
  - Breath sounds
  - Chest expansion
  - Heart rate
  - Skin colour

- **Circulation**
  - Pulse
  - Capillary refill time

- **Disability**
  - Alertness using either AVPU or GCS
History

• How long / how did it start
  - Coryzal symptoms – blocked, runny nose
• Eating and drinking?
  - How much vs Normally?
  - Are there any signs of dehydration?
• Previous episodes of similar nature
  - How does this compare
• Pattern to episodic wheeze
  - Triggers
• Past Medical History
  - Neonatal problems e.g. RDS, ex prem etc
• Family history of asthma / atopy
• Consider foreign bodies
Assessing Severity

- “People presenting to a healthcare professional with an acute exacerbation of asthma receive objective measurement of severity at presentation”
  (NICE Quality Standard 9)

- Assess as standard (In & Out of Hospital)
  - Pulse rate
  - Respiratory rate and degree of breathlessness
  - Use of accessory muscles of respiration
  - Amount of wheezing
  - Peak Expiratory Flow Rate (if child familiar with PEF)
  - Degree of agitation and conscious level
  - Oxygen Saturations
Examination - Inspection

• General impressions
  - Many signs can be seen from a distance
  - Think “telescope” rather than “stethoscope”

• Breathing Effort
  - Recession / Indrawing of the chest
  - Tachypnoea
  - Nasal flaring
  - Grunting / Head bobbing in babies
  - Talking

• Level of alertness
Examination - Auscultation

- Auscultation less helpful than in adults
  - Difficult to localise sounds
  - Are crepitations uni- or bilateral
  - Degree of wheeze ≠ sickness

- Secretions
  - Bubbly, rattly “phlegmy” sounds
  - Often called wheeze by parents
Examination

• Wheeze
  - Constriction of lower airways
    • → Turbulent Airflow
  - Airways narrowed by constriction or oedema
  - Is an EXPIRATORY sound
  - Often audible at a distance
  - Prolonged expiration

• Stridor
  - Harsh upper airway noise
  - Implies obstruction by eg swelling, foreign body
  - Usually INSPIRATORY but severe stridor is biphasic
Examination

• Respiratory rate
  - Sometimes only sign that child is unwell
  - Important to know range of normal

• Heart Rate
  - Stress response
  - Bradycardia is a preterminal sign

<table>
<thead>
<tr>
<th>(Adapted from APLS†)</th>
<th>Respiratory Rate at rest:</th>
<th>Heart Rate</th>
<th>Systolic BP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school 2 - 5 years</td>
<td>25 - 30</td>
<td>95 - 140</td>
<td>85 - 100</td>
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<tr>
<td>School 5 - 11 years</td>
<td>20 - 25</td>
<td>80 - 120</td>
<td>90 - 110</td>
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<td>Adolescent 12-16 years</td>
<td>15 - 20</td>
<td>60 - 100</td>
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O₂ Saturations

• BTS Guideline (6.7.2 - 2009 update)
  – “Essential in the assessment of all children with acute wheeze”
  – “Should be available … in both primary and secondary care settings”.
  - Low SpO₂ Post initial bronchodilator treatment
    • -> more severe group

• Cyanosis
  - Not usually detectable until severe
  - Life threatening

• “Consider intensive inpatient treatment for children with SpO₂ <92% in air after initial bronchodilator treatment”
  - (EVIDENCE LEVEL B)
When it’s not Wheeze

• Acute stridor – croup / FB / epiglottitis
• Panic attack with hyperventilation
• Pneumonia
• Pneumothorax
• Heart failure in infants (heart murmur/liver enlarged)

Make sure you are on the right pathway!
Criteria for hospital assessment
- Bucks Pathway
## Acute Assessment

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MODERATE EXACERBATION
Treatment

• **Beta Agonists**
  - β2 agonists should be given as first line treatment
  - pMDI + spacer preferred option in
    • mild to moderate asthma
    • under 5’s
  - Give 2 - 10 puffs depending on response
  - If no improvement after 10 puffs of β2 agonist refer to hospital

Shake

“Skoosh”

5-10 (tidal) breaths

(Brief) Rest / O₂
3 day oral pred "if asthmatic"

- **Steroids**
  - Give EARLY in the treatment of acute asthma attacks *(within 1hr - Standard 10)*
  - 20 mg for children 2-5 years old
  - 30-40 mg for children >5 years
  - Oral and IV of similar efficacy
    - If vomiting repeat dose. Consider IV if recurrent.
  - 3 days usually sufficient.

- **Panickar et al (NEJM 2009; 360; 329-38)**
  - Randomised double blind trial of
    - Prednisolone 10-20mg (depending on age)
    - Versus placebo
    - In 687 children under 5
    - Wheezy attacks presenting to hospital
  - No significant difference in:
    - Duration of hospitalisation
    - Duration of salbutamol use
    - 7 day symptom score
## Assess the Response

<table>
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<tr>
<th>Good Response</th>
<th>Poor Response</th>
</tr>
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| • If no risk factors...  
• Send Home with personalised written action plan + **Safety Net**  
• Consider 3 days of oral Prednisolone  
• Antibiotics should not be routinely given.  
• Check inhaler technique  
• Advise Parents to contact GP next day to arrange a F/U within 48-72 hrs  
• Remember to check they have enough inhaler and appropriate spacer | • Consider hospital admission/999  
• Oxygen if SpO₂ < 94%  
• Continue with further doses of Salbutamol while awaiting transfer  
• Add Ipatropium dose mixed with salbutamol nebuliser  
• Can give 3 doses in 1ˢᵗ hour |
Moderate Exacerbation

- Can be managed at home
  - Regular high dose bronchodilator
    - e.g. 5-10 puffs 4 hourly - gradually reducing
    - Make sure method of doing this is known and understood

- Oral prednisolone 20-40mg daily for 3 days

- Early clinical review: 1 - 14 days depending on severity

- Clear safety net instructions

- All this written down in clear self management plan
How to Treat your Wheeze/Asthma

Name:______________________________

Date:____________________________

Useful Websites:
Asthma UK: www.asthma.org.uk
Teenage Health Facts: www.teenagehealthfacts.com
www.childhealthbacks.com

Smoking even outdoors will make asthma worse
National Smoking Helpline: 0800 022 4332
http://www.smokefree.nhs.uk
Management at Home

• Regular bronchodilator - reduce gradually

**Six Steps to reducing your Salbutamol (Blue Reliever Inhaler) usage**

(If your child is sleeping and breathing comfortably you do not need to wake them to give them their inhalers overnight).

One puff every five breaths using the Spacer (Tidal Breathing)

1. Inhale 10 puffs every 4 hours for 24 hours
2. Then inhale 8 puffs every 4 hours for 24 hours
3. Then inhale 6 puffs every 6 hours for 24 hours
4. Then inhale 4 puffs every 6 hours for 24 hours
5. Then inhale 2 puffs every 6-8 hours for 24 hours
6. Then inhale 2 puffs as and when required

If your child gets more wheezy or breathless, go back up a step and contact your GP as soon as possible.
Moderate Exacerbation

- Can be managed at home
  - Regular high dose bronchodilator
    - e.g. 5-10 puffs 4 hourly - gradually reducing
    - Make sure method of doing this is known and understood
- Oral prednisolone 20-40mg daily for 3 days
- Early clinical review: 1 - 14 days depending on severity
- Clear safety net instructions
- All this written down in clear self management plan
# Safety net instructions

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<th>MODERATE</th>
<th>MILD</th>
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| **If your child:**  
- becomes unresponsive  
- becomes blue  
- is having severe difficulty breathing  
  - using tummy muscles  
  - ribs are sinking in  
- unable to complete sentences  
- is unable to take fluids and is getting tired  
- is pale, drowsy, weak or quiet  | **If your child is:**  
- having some difficulty in breathing / noisy breathing  
- Mild wheeze and has breathlessness that is not responding to the usual reliever (blue inhaler) treatment  
- Using their blue reliever inhaler -- more than 2 puffs every 4 hours  
- Breathing more quickly than normal  | **If your child is:**  
- Using their reliever more than usual but is not breathing quickly and is able to continue doing day to day activities and is able to talk in full sentences  |

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<tr>
<th>You need EMERGENCY help</th>
<th>You need to contact a nurse or doctor today</th>
<th>Needs doctor / nurse review over the next few days, unless deteriorating. Continue to use blue inhaler as required. Read this leaflet about how to help with your wheeze / Asthma symptom control.</th>
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| Ring 999 - you need help immediately  
If you have a blue inhaler use it now -  
1 puff per minute via Spacer  
UNTIL AMBULANCE ARRIVES  
Nearest Hospitals (open 24 hours 7 days a week):  
Frimley Park, Surrey  
Hillingdon Hospital  
John Radcliffe, Oxford  
Milton Keynes Hospital  | Increase blue inhaler 10 puffs every 20 minutes 4 hourly via spacer and  
Please ring your GP surgery during the day or when your GP surgery is closed, please call NHS 111 by dialling 111. |
| Royal Berkshire, Reading  
Stoke Mandeville Hospital, Aylesbury  
Wexham Park Hospital, Slough |
SEVERE / LIFE THREATENING ATTACKS
I’m really worried about Sophie ....
Severe / Life Threatening Attack

• Be calm even if you do not feel calm
• Call for help within the building
• Get a proper history & examination
• Get someone to call 999 ambulance
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Severe / Life Threatening Attack

- **High Flow Oxygen**
  - Death results from hypoxia
  - mask or nasal specs

- **Nebulised Salbutamol**
  - Severe or life threatening asthma (SpO2 <92%) should receive
    - Frequent doses of *nebulised* bronchodilators
    - Air driven nebulisers may exacerbate hypoxia in severe asthma
    - Doses can be repeated every 15-30 minutes
    - Urgent (Blue light) transfer to hospital
    - $O_2$ and nebulised $\beta$2 agonists during transfer
    - If required spacers can be - Give $O_2$ by nasal specs or between puffs

- **Ipratropium**
  - Can be mixed with salbutamol nebs
  - Up to 3 doses in 1st hour

- **Steroids**
  - As for moderate exacerbations
**Summary - Acute Management**

- **Assess & Categorise**
  - Moderate vs Severe vs Life threatening according to:
    - Pulse rate / Resp rate / SpO2
    - Respiratory distress / Wheeziness / PEFR
    - Conscious level

- **Treat**
  - Use β-agonists early and repeatedly
  - Nebulise if low SpO₂ or poor response to pMDI
  - Add nebulised ipratropium if ongoing poor response
  - Give steroids within an hour of presentation
  - Normalise SpO₂ with O₂ via tight fitting face mask
  - Patients with low SpO₂ need ambulance transfer
Special Cases
What about the under 1’s

- Careful history and examination, checking heart rate, respiratory rate, temperature, and saturation.
- Low threshold for hospital assessment if under 2 months of age - most will need admission.
- No inhaled or oral treatments likely to be helpful.
- Mild bronchiolitis can be managed at home if child able to feed: give small frequent feeds.
- Clear safety net advice on worsening respiratory distress or ability to take feeds.
- See Bronchiolitis Advice leaflet.
Discussion

- Points of difficulty in the assessment of infants
- Value of observation and early (1-2 hour) re-assessment
- Value of watching the child take a feed
What about anaphylaxis?

- Suspect anaphylaxis if
  - puffy face / lips/ tongue, urticarial rash, known history of severe allergy
- Give oxygen
- Treat with IM adrenaline (1 in 1,000 adrenaline)
  - Safe, and a good treatment for asthma
  - 0.5ml (adult / large child)
  - 0.125 - 0.25 for smaller children
WHAT'S NEXT?
Follow up after exacerbations

- Code and capture asthma admissions and ED attendances – key outcome measure of practice asthma care
- Follow up within 48 hours (NICE) or at the longest 7 days of discharge – certainly by phone, preferably face-to-face
- Identify any avoidable factors and review PAAP – or provide if not already given
- Adjust management if necessary
# Read Coding Exacerbations

<table>
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<th>Event</th>
<th>Suggested Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Exacerbation of Asthma</td>
<td>H333</td>
</tr>
<tr>
<td>Emergency Admission Asthma</td>
<td>8H2P</td>
</tr>
<tr>
<td>ED Attendance Asthma</td>
<td>No Code</td>
</tr>
<tr>
<td>Follow-up Respiratory Assessment</td>
<td>6632</td>
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High Risk Asthma Register

• Consider establishing a register for patients
  - On BTS Step 4 or Step 5
  - Frequent admissions or ED attendances
  - Post any ITU / HDU admission
  - Psychosocial problems or known non-adherence causing poor control
  - High beta agonist use
    • >8 blue inhalers per year
Possible Coding for High Risk Asthma

• 13Zu
  - “At Risk of Emergency Hospital Admission”

• Makes health professionals aware of their risk status, prompts rapid response to calls, notification of OOH service via special patient notes etc.

• This code is used for the avoiding unplanned admissions DES and would involve provision of a care plan
Session Aims

• Structured Assessment of the Wheezy Child
• Management tailored to severity
  - Home care for moderate exacerbations
  - Treatment of severe / life threatening attacks
• Discuss some “special cases”
• Discuss follow up / monitoring following exacerbations
QUESTIONS
Asthma Review and Personalised Asthma Action Plans (PAAP)

Jane Setchell
Marilyn Plummer
We are giving good care but we need to improve
PERSONAL ASTHMA ACTION PLANS (PAAP) IN NRAD

- Only 4/28 of the children who died had a PAAP

Key Recommendation...

- All people with asthma should have a PAAP that mentions
  1. Triggers and current treatment
  2. How to spot symptoms getting worse and what to do then
  3. What to do in emergency and when to call for help
Latest BTS/SIGN Asthma Guideline 2014

Grade A Evidence

Self-management education, supported by a written personalised asthma action plan, should be offered to all patients on general practice active asthma registers.
LATEST BTS/SIGN GUIDELINE ALSO RECOMMENDS THAT IN PRIMARY CARE...

“Practices should ensure they have trained professionals and an environment conducive to providing supported self management”

- Ensure routine reviews
- Use structured protocols and templates
- Community pharmacist support
- Educational resources
- Telephone advice
- IT based education and monitoring

(BTS/SIGN -asthma-guideline-2014, pg41/4.3.1)
KEY COMPONENTS OF AN ASTHMA REVIEW

- Assess control – RCP3Qs/ACT and exacerbation history
- Review the diagnosis
- Identify triggers
- Check and correct inhaler technique/ spacer use – watch them use their inhaler
- Assess medication use – look at prescription records and ask (non-judgementally) about regular preventer use.
- How long does a blue inhaler last? Less than three months – poor control. Less than one month – danger!
- Assess rhinitis
- Ask about smoking
- Adjust therapy according to symptoms following guidelines
- Provide a written PAAP aimed at achieving patient-centred goals.
TRIGGERS

- Storms and weather
- Chemicals
- Exercise
- Viruses and bacterial infections
- Medicines
- House Dust Mite
- Pollens, mould and Spores
- Pet hair
- Painting and decorating
- Animals
HOW TO USE THE SPACER DEVICE CORRECTLY

- Showing is better than telling
- When using the spacer device... Is the child cooperative? Do they push the device away?
- What advice should we give about how to hold a child, how to give encouragement to accept the medication? Can the spacer be used while the child is asleep?
- Wash the spacer monthly with soapy water and leave to air dry
- Change the spacer yearly
EXAMINATION IN ASTHMA REVIEW – IS IT NEEDED?

- Not always needed
- Necessary if the child is symptomatic when reviewed
- Necessary if the original diagnosis seems uncertain
- May be necessary to assess upper airway problems - check nose (is there a runny nose or nasal blockage?) and throat (post nasal drip, tonsil enlargement?)
HOW EFFECTIVE ARE PAAPs?

Grade A Evidence from reviews of 261 RCT’s show self management, education and written PAAP’s improve health outcomes

A further 35 RCT’s give evidence for pre-school children

PAAPs...

- Reduce the need for emergency care and intervention
- Improve markers of asthma control

References, BTS/SIGN-asthma-guidelines-2014, pg38/4.1
How effective are we at giving PAAPs?

- QOF does not require us to document PAAPs being given or discussed – but please ask whether they have a written PAAP – if not offer one, and document this so we can audit the effect.

- Asthma Management Plan Given 663U

- If they already have a PAAP ask to see it and update as necessary
My Asthma Plan

1. My asthma medicines
   - My best peak flow is ___________
   - My preventer inhaler is called ___________ and its colour is ___________
   - I take ___ puff/s of my preventer inhaler in the morning and ___ puff/s at night. I do this every day even if I feel well.
   - Other asthma medicines I take every day:
     - My reliever inhaler is called ___________ and its colour is ___________. I take ___ puff/s of my ___________ colour reliever inhaler when I wheeze or cough, my breath becomes short, or I have a cough.

2. When my asthma gets worse
   - I will know my asthma is getting worse if:
     - I have a cough, wheeze, it is hard to breathe or my chest hurts, or
     - I am waking up at night because of my asthma, or
     - I am taking my reliever inhaler every day, or
     - My peak flow is less than ___________

   When this happens: I keep taking my preventer medicines as normal.
   - And also take ___ puff/s of my ___________ colour reliever inhaler every four hours.
BUCKINGHAMSHIRE PATIENT LEAFLET

How to Treat your Wheeze/Asthma

Name: ..............................................
Date: ..............................................

Useful Websites:
Asthma UK: www.asthma.org.uk
Teenage Health: www.teensweathelp.com
www.chishti.mhsbuck.com

Smoking even outdoors will make asthma worse
National Smoking Helpline: 0800 022 4332
http://www.smokefree.nhs.uk
FORM FP1010 CAN BE USED TO WRITE A PAAP
Asthma UK Under 5’s Asthma Action Plan – available online
http://www.asthma.org.uk/advice-asthma-and-me
HOW TO OFFER A PERSONALISED ASTHMA ACTION PLAN

- Ask “What do you need to know to feel more confident about being able to deal with your asthma? “
- Start the self management discussion so that it answers this question.
- Move on from that to discuss any other issues that might be important.
- If a written PAAP is not wanted after a good discussion, leave it for now – but leave the offer open.
- It is good to discuss how to manage at school. Under 8’s need an asthma inhaler with the label on and with directions on how to use it.
- How to manage if parents are separated? Suggest a gym bag with the child’s inhalers and spacer in, and try to involve both parents in the PAAP to improve their understanding and compliance.
KEY INGREDIENTS OF WRITTEN PAAPs

- How to handle exercise induced symptoms if they occur – which should be rare if control is good. (prevention, pre-exercise treatment, post-exercise treatment)
- How to avoid triggers (if possible)
- How to recognise deterioration (which may include PEFR measurement)
- How to increase the dose of blue reliever (including spacer use) in attacks
- How to increase the dose of brown preventer (including spacer use) in attacks (if appropriate)
- When to take reserve course of prednisolone (if given)
- Danger signs and when to call for help
DISCUSSION OF AN EXAMPLE

- We are going to review Freddie, a 7 year old boy with recurrent attendances to A&E and several admissions with asthma. His treatment is clenil beclometasone 100mcg twice daily. He uses the blue inhaler a lot.
- What should we do?
WRITE A PAAP FOR FREDDIE AND HIS MUM OR DAD

- Use either “My Asthma Plan” (Asthma UK) or the Buckinghamshire “How to treat your Wheeze/Asthma” leaflet
- Do this in pairs – one of you be the health professional and one the parent (or child!)
- Think of the important points to cover
So what did you put in the Plan?
DISCUSSION OF AN EXAMPLE – SOME SUGGESTIONS

- Is it really asthma – check the notes.
- Review his medication.
- How much use of blue reliever inhaler?
- Is the preventer being used regularly?
- Is a spacer being used?
- Inhaler technique, times and dosage all correct?
- Any other medication that might cause wheezing?
- Smoking in family or the child themselves? – advise about stopping
- Should we step up on the asthma treatment ladder?
SMOKING CESSATION

- Does anyone in the family smoke?
- Do they want to stop?
- Explain how important it is to stop. Offer referral to see a smoking cessation adviser.
- Document the referral
- Consider referring them to a hard hitting U-tube clip. Bryan Curtis smoked for 20 years starting at age 13. He developed lung cancer and died 2 months later leaving a wife and 2 young children.
- https://www.youtube.com/watch?v=dVLtNgAhPRg
HOW CAN WE ENCOURAGE COLLEAGUES TO GIVE AND USE PAAPs?

- Provide materials – easy access – paper /online
- Address concerns about time
- Help with coping strategies both from the parent and the child
- Address concerns and questions about drug dosages, administration methods, and side effects
- Explain how to give clear safety-netting advice
TAKE HOME MESSAGES

- Written PAAPs improve outcomes - offer to all
- Time spent explaining them is time well spent
- Start from the parent/patient’s agenda and concerns
- Understand how they cope and understand the family situation, school etc
- Have a variety and choose what suits the parent and the child the best
- Enter Read Code when given – key process measure 663U
- Review them after any exacerbation of symptoms
DISCUSSION

- Any questions?
- When should a nurse doing an asthma review get the child seen by a GP?
Respiratory Care in Children
Better Care for Better Outcomes

Dr Duncan Keeley
GP Thame
Thames Valley Strategic Clinical Network
We are giving good care but we need to improve
Hospital Admissions Asthma 2012-2013 (Rates per 100,000)

2.5 Fold variation between highest and lowest
Seven things we can do get the basics right

1. Manage acute severe illness effectively
2. Improve the standard of diagnosis
3. Know how to use therapeutic trials in diagnosis.
4. Know how to teach inhaler technique, including the use of spacers
5. Understand inhaled steroid dosages to avoid under and over treatment of asthma
6. Organise good follow-up and review – including prompt review after hospital attendance - and make more use of written self management plans
7. Share skills with the whole team.
Improving the standard of respiratory diagnosis
## Cough and wheeze in children

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<th>Age 0-1 year</th>
<th>Age 1-5yr</th>
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<tr>
<td>Common – acute bronchiolitis, episodic viral wheeze</td>
<td>Common – episodic viral wheeze, multiple trigger wheeze ? asthma</td>
<td>Common – asthma</td>
</tr>
<tr>
<td>Don’t miss – congenital heart or lung abnormalities, cystic fibrosis, aspiration</td>
<td>Don’t miss – foreign body, aspiration, cystic fibrosis, TB, persistent bacterial bronchitis</td>
<td>Don’t miss – foreign body, TB, persistent bacterial bronchitis</td>
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Acute bronchiolitis

- Age 1-9 months, coryzal symptoms for a few days then worsening cough, difficulty in breathing and difficulty in feeding
- OE fever, tachypnoea, recession, scattered crackles +/- wheezes (listen for murmur, check femorals, feel for liver)
- Management – safe feeding - small frequent oral feeds
- No medication of proven benefit..
- Hospital assessment if feeding poor, sats <92 or look ill – give oxygen if sats are low
- Safety net advice if sending home
Under 5 wheezing – two patterns

### Episodic Viral Wheeze
- Isolated wheezing episodes
- Often with evidence of viral cold
- Well between episodes
- No history of atopy in child or family

### Multiple Trigger Wheeze
- Episodes of wheezing
- More triggers than just colds
- Symptoms of cough / wheeze between episodes
- Personal or family history of asthma/eczema/hay fever / allergy
Under 5 wheezing – management

Episodic Viral Wheeze
- No treatment if mild
- Evidence for effectiveness of any treatments - including prednisolone – is weak
- Salbutamol by spacer may help
- Intermittent montelukast 4mg daily started at onset of episode may help

Multiple Trigger Wheeze
- No treatment if mild
- More likely to respond to asthma treatments – use trials of therapy if symptoms severe or recurrent
Three more serious diagnoses

- Foreign Body
- Pneumonia
- Persistent bacterial bronchitis
Foreign body

• Take any history of choking seriously – CXR / refer paediatrics if in doubt
• Foreign body may cause stridor or paroxysmal coughing which may settle if the FB moves down into a bronchus
• Localised wheeze might be a clue
• If unrecognised at the time may then cause a chronic cough
Sudden onset cough due to foreign body
Pneumonia

- Acute onset cough and fever with rapid breathing +/- grunting
- Systemic symptoms prominent
- Respiratory rate raised – this may be the only physical sign apart from fever
- Abnormal chest signs on auscultation may be absent - or localised (crackles/altered breath sounds)
- May have pleuritic chest pain or abdominal pain
- Diffuse wheezing unlikely to be due to bacterial chest infection
- A child with difficulty in breathing due to bacterial chest infection will look ill
- If pneumonia suspected consider a same-day chest X ray and paediatric opinion
Persistent bacterial bronchitis

• Rare but important problem
• Prolonged/repeated loose cough
• Responds partially to antibiotics but recurs
• Needs prolonged (6 weeks +) antibiotic course and physiotherapy
• Important to rule out cystic fibrosis
• If suspected – CXR and refer to paediatrician
Asthma diagnosis
How do we get it right?

- History (repeated)
- Examination (repeated)
- Plot height and weight in red book
- Physiological testing - PEFR charting or spirometry - if over 5
- Trials of therapy with symptom monitoring and review
- CXR and refer to paediatrician if in doubt
## Clues to more serious diagnoses

<table>
<thead>
<tr>
<th>Clinical clue</th>
<th>Possible diagnosis</th>
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<tbody>
<tr>
<td><strong>Perinatal and family history</strong></td>
<td></td>
</tr>
<tr>
<td>symptoms present from birth or perinatal lung problem</td>
<td>cystic fibrosis; chronic lung disease; ciliary dyskinesia; developmental anomaly</td>
</tr>
<tr>
<td>family history of unusual chest disease</td>
<td>cystic fibrosis; developmental anomaly; neuromuscular disorder</td>
</tr>
<tr>
<td>severe upper respiratory tract disease</td>
<td>defect of host defence</td>
</tr>
<tr>
<td><strong>Symptoms and signs</strong></td>
<td></td>
</tr>
<tr>
<td>persistent wet cough</td>
<td>cystic fibrosis; recurrent aspiration; host defence disorder</td>
</tr>
<tr>
<td>excessive vomiting or possetting</td>
<td>reflux (±aspiration)</td>
</tr>
<tr>
<td>dysphagia</td>
<td>swallowing problems (±aspiration)</td>
</tr>
<tr>
<td>abnormal voice or cry</td>
<td>laryngeal problem</td>
</tr>
<tr>
<td>focal signs in the chest</td>
<td>developmental disease; postviral syndrome; bronchiectasis; tuberculosis</td>
</tr>
<tr>
<td>inspiratory stridor as well as wheeze</td>
<td>central airway or laryngeal disorder</td>
</tr>
<tr>
<td>failure to thrive</td>
<td>cystic fibrosis; host defence defect; GOR</td>
</tr>
<tr>
<td><strong>Investigations</strong></td>
<td></td>
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<tr>
<td>• focal or persistent radiological changes</td>
<td>• developmental disorder; postinfective disorder; recurrent aspiration; inhaled foreign body; bronchiectasis; tuberculosis</td>
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CHILD with symptoms that may be due to asthma

Clinical assessment

High Probability

Intermediate Probability

Low Probability

Consider tests of lung function and atopy

Consider referral

Investigate/treat other condition

Response?

Yes

Asthma diagnosis confirmed
Continue Rx and find minimum effective dose

No

Assess compliance and inhaler technique. Consider further investigation and/or referral

Further investigation
Consider referral

Response?

Yes

No

Continue Rx
Asthma diagnosis – using form FP1010

Date chart started:

Comments/Notes: (You should especially record here night-time symptoms or any events such as a cold which may affect readings)

Preventer Treatment Started

![Graphs and charts showing daily readings and comments notes](image-url)
Using therapeutic trials in diagnosis

- Inhaled salbutamol 200 – 500 mcg (two to five puffs) by metered dose inhaler and spacer given as needed up to four times daily. Use 5 puffs to start with especially in under 5’s
- Inhaled corticosteroid e.g. beclometasone as clenil modulate 100-200mcg twice daily (clenil 50 2-4 puffs twice daily or clenil 100 1-2 puffs twice daily) by metered dose inhaler and spacer. This must be given regularly
- Review to assess response at two, four and six weeks.
- The same or higher dosage of inhaled steroid should be used for children under 5, (up to 800mcg daily for 4 weeks only) since difficulties with inhaler use generally reduced the delivered dosage in young children.
- Apparent good response should be followed by a trial withdrawal of treatment over 4-8 weeks to see whether symptoms recur.
- Or consider short trial of montelukast
Document the basis for an asthma diagnosis

• The basis for a diagnosis of asthma should be clearly documented in medical records, at the time the diagnosis is first entered, in the form of a brief summary...

Asthma

• Recurrent cough and wheeze for one year with nocturnal and exercise induced cough between episodes. Wheezing heard on examination x 3. Has eczema, mother and one brother have asthma. PEFR 270 min 360 max. No features to suggest alternative diagnosis. Good response to treatment in last 6 weeks.
Take home messages about respiratory diagnosis

• Be careful making a diagnosis – and document the basis for it
• Repeated careful history and examination needed
• Seek physiological evidence of reversible airways obstruction in children old enough to do the tests
• Review the basis for diagnosis if you take over a child’s care or if asthma treatment does not work
• Use trials of introducing and withdrawing treatment
• If in doubt – get a CXR and refer
Manage acute severe wheezing illness effectively
Obviously very ill child..

- Be calm even if you do not feel calm
- Call for help within the building
- Get someone to call 999 ambulance
- Take the time to get a proper history and do a careful examination: the history taking can be delegated if you are busy doing things
- Give oxygen and high dose salbutamol
If you think it might be anaphylaxis

- Suspect anaphylaxis if puffy face / lips / tongue, urticarial rash, known history of severe allergy
- Give adrenaline i.m.: safe, and a good treatment for asthma
- Dose of 1 in 1,000 adrenaline (small ampoule) is 0.5ml (adult / large child) 0.25 ml or 0.125 ml for smaller children
- Give oxygen
Bucks Pathway Documents - Management and Criteria for Hospital Assessment
## Acute Assessment

<table>
<thead>
<tr>
<th></th>
<th>Green - Moderate</th>
<th>Amber - Severe</th>
<th>Red - Life Threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking</td>
<td>In sentences</td>
<td>Not able to complete a sentence in one breath. Taking two breaths to talk or feed.</td>
<td>Not able to talk / Not responding Confusion / Agitation</td>
</tr>
<tr>
<td>Auscultation</td>
<td>Good air entry, mild-moderate wheeze</td>
<td>Decreased air entry with marked wheeze</td>
<td>Silent chest</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>Normal range: ≤ 40 breaths/min (2-5 yrs) ≤ 30 breaths/min (&gt;5 yrs)</td>
<td>Above normal range: &gt; 40 breaths/min (2-5 yrs) &gt; 30 breaths/min (&gt;5yr)</td>
<td>Cyanosis Poor respiratory effort Exhaustion</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>≤ 140 bpm (2-5 yrs) ≤ 125 bpm (&gt;5 yrs)</td>
<td>&gt; 140 bpm (2-5 yrs) &gt; 125 bpm (&gt;5 yrs)</td>
<td>Tachycardia or bradycardic Hypotension</td>
</tr>
<tr>
<td>SpO₂ in air</td>
<td>≥ 92%</td>
<td>&lt; 92%</td>
<td>&lt; 92% plus anything else in this column</td>
</tr>
<tr>
<td>PEFR (if possible)</td>
<td>&gt; 50% of predicted</td>
<td>33-50% of predicted</td>
<td>&lt; 33% of predicted</td>
</tr>
<tr>
<td>Feeding</td>
<td>Still feeding</td>
<td>Struggling</td>
<td>Unable to feed</td>
</tr>
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</table>
Moderate Acute Wheeze

Ten puffs of salbutamol by spacer – tidal breathing 1 puff to 5 breaths

Consider 3 day course of prednisolone – first dose now
2-5 years 20mg  > 5 years 30-40mg
## Assess the Response

<table>
<thead>
<tr>
<th>Good Response</th>
<th>Poor Response</th>
</tr>
</thead>
</table>
| • If no risk factors...  
• Send Home with personalised written action plan + **Safety Net**  
• Consider 3 days of oral Prednisolone  
• Antibiotics should not be routinely given.  
• Check inhaler technique  
• Advise Parents to contact GP next day to arrange a F/U within 48-72 hrs  
• Remember to check they have enough inhaler and appropriate spacer | • Consider hospital admission/999  
• Oxygen if SpO2 < 94%  
• Continue with further doses of Salbutamol while awaiting transfer  
• Add Ipatropium dose mixed with salbutamol nebuliser  
• Can give 3 doses in 1st hour |
Severe / Life Threatening Wheeze

Call 999

High Flow Oxygen by mask or nasal specs

Nebulised Salbutamol

- Frequent doses of **nebulised** bronchodilators
- Doses can be repeated every 15-30 minutes
- Urgent transfer to hospital $O_2$ - nebulised salbutamol during transfer
- If required spacers can be used – Give $O_2$ by nasal specs or between puffs
- Air driven nebulisers may exacerbate hypoxia in severe asthma

Ipratropium

- Can be mixed with salbutamol nebs, up to 3 doses in 1st hour

Steroids

- As for moderate exacerbations – first dose now
If you are letting the child go home...
Home Care of Moderate Exacerbation

• Continue regular high dose bronchodilator – e.g. 5-10 puffs salbutamol 4 hourly – gradually reducing
• Make sure method of doing this is known and understood
• Oral prednisolone 20-40mg daily for 3 days
• Inhaled steroid treatment to continue for at least one month (if asthma likely)
• Early clinical review: 1–14 days depending on severity
• Clear safety net instructions
• All this written down in clear self management plan
Local Management Plan for Exacerbations
Reduce salbutamol gradually

Six Steps to reducing your Salbutamol (Blue Reliever Inhaler) usage

(If your child is sleeping and breathing comfortably you do not need to wake them to give them their inhalers overnight).

One puff every five breaths using the Spacer (Tidal Breathing)

1. Inhale 10 puffs every 4 hours for 24 hours
2. Then inhale 8 puffs every 4 hours for 24 hours
3. Then inhale 6 puffs every 6 hours for 24 hours
4. Then inhale 4 puffs every 6 hours for 24 hours
5. Then inhale 2 puffs every 6-8 hours for 24 hours
6. Then inhale 2 puffs as and when required

If your child gets more wheezy or breathless, go back up a step and contact your GP as soon as possible.
Safety net instructions

**LIFE THREAT**

**If your child:**
- becomes unresponsive
- becomes blue
- is having severe difficulty breathing
  - using tummy muscles
  - ribs are sinking in
- unable to complete sentences
- is unable to take fluids and is getting tired
- is pale, drowsy, weak or quiet

**You need EMERGENCY help**

Ring 999 - you need help immediately

If you have a blue inhaler use it now - 1 puff per minute via Spacer

**UNTIL AMBULANCE ARRIVES**

Nearest Hospitals (open 24 hours 7 days a week):
- Frimley Park, Surrey
- Hillingdon Hospital
- John Radcliffe, Oxford
- Milton Keynes Hospital
- Royal Berkshire, Reading
- Stoke Mandeville Hospital, Aylesbury
- Wexham Park Hospital, Slough

**MODERATE**

**If your child is:**
- having some difficulty in breathing / noisy breathing
- Mild wheeze and has breathlessness that is not responding to the usual reliever (blue inhaler) treatment
- Using their blue reliever inhaler – more than 2 puffs every 4 hours
- Breathing more quickly than normal

**You need to contact a nurse or doctor today**

Increase blue inhaler 10 puffs every 20 minutes 4 hourly via spacer and

Please ring your GP surgery during the day or when your GP surgery is closed, please call **NHS 111** by dialling 111.

**MILD**

**If your child is:**
Using their reliever more than usual but is not breathing quickly and is able to continue doing day to day activities and is able to talk in full sentences

**Needs doctor / nurse review over the next few days, unless deteriorating.** Continue to use blue inhaler as required. Read this leaflet about how to help with your wheeze / Asthma symptom control.
Take home messages – acute severe asthma

• Have oxygen and a paediatric pulse oximeter in the practice: death results from hypoxia – oxygen is key
• Give nebulised bronchodilator with oxygen driven nebuliser for severe attack / sats <92%
• Know how to give high dose bronchodilator by spacer – can be combined with oxygen
• Know how to give a clear written self management plan and safety net advice if not sending in to hospital
• Any child who has needed high dose bronchodilators should have 3+ days oral steroid and early review
• Arrange practice review within 2-7 days of any child admitted or seen in ED (NICE standard 48 hours)
Effective treatment of continuing asthma
The key to success in inhaled treatment
Spacers

• At least double the proportion of the dose deposited in the lungs (20% vs 10%)
• Greatly reduce oral deposition (10% vs 80%)
• Better treatment effect, fewer side effects
• As effective as nebuliser for giving high dose inhaled treatment in exacerbations
• Easy to teach method of use – showing better than telling
• Light cheap portable and prescribable
• Everyone with asthma should have one
Know and teach good inhaler technique

• The majority of health professionals do not know how to teach inhaler use properly
• Make sure you do
• Attend a course
• Share the knowledge with your team
Know and teach good inhaler technique

• Vital to teach this at the outset and check it regularly.
• Very common cause of treatment failure
• Spacers needed for all young children – and advantageous for all, especially for inhaled corticosteroids and in exacerbations.
• MDI (with or without spacer) slow (5 seconds) breath in. Dry powder fast breath in
Asthma UK videos for inhaler technique

- Excellent online resource - covers all inhaler types including spacer use in children

When to start regular preventer treatment?

• How many times was the blue bronchodilator inhaler used in last week?

• If answer is 3 or more (on a regular basis) regular preventer treatment is advised

• Answer can be Read Coded (663z)
Know your inhaled steroid dosage equivalents

- Beclometasone (Clenil) 100mcg
- Budesonide 100mcg
- Beclometasone (Qvar) 50mcg (not licensed under 12)
- Fluticasone 50mcg are equivalent

Do not use an inhaled steroid without knowing its dose equivalence to clenil/beclometasone
Care with inhaled steroid dosage

Fluticasone and Qvar are twice as potent as clenil becometasone

Use 200mcg clenil/BDP equivalent daily for maintenance, and not more than 400mcg

Double this (800mcg daily) acceptable for short 4 week trial of treatment in some cases

Add Stage 3 treatment (eg LABA or montelukast) for over 5s before increasing above 400mcg daily on a regular basis

Step down inhaled steroid dosage if symptoms well controlled – half the dose for 4-8 weeks and review

Measure and plot height periodically in children on regular inhaled steroids.

Refer to paediatrician if needing more than 400mcg daily (under 5) or 800mcg daily (over 5)
**Children Less than 5 yrs**

**STEP 1**
Regular preventer therapy

**STEP 2**
Initial add-on therapy

- Inhaled short-acting \( \beta_2 \) agonist as required
- Add inhaled steroid 200-400 mcg/day**, or leukotriene receptor antagonist if inhaled steroid cannot be used.
- Start at dose of inhaled steroid appropriate to severity of disease.

**STEP 3**
Persistent poor control

**STEP 4**
Refer to respiratory paediatrician.

In those children taking inhaled steroids 200-400 mcg/day consider addition of leukotriene receptor antagonist.

In those children taking a leukotriene receptor antagonist alone reconsider addition of an inhaled steroid 200-400 mcg/day.

In children under 2 years consider proceeding to step 4.

* BDP or equivalent
* Higher nominal doses may be required if drug delivery is difficult
Children age 5-12 yrs

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.

**STEP 1**
Mild intermittent asthma

**STEP 2**
Initial add-on therapy

- **Inhaled short-acting β₂ agonist as required**
- Add inhaled steroid 200-400 mcg/day* (other preventer drug if inhaled steroid cannot be used) 200 mcg is an appropriate starting dose for many patients
- Start at dose of inhaled steroid appropriate to severity of disease.

1. Add inhaled long-acting β₂ agonist (LABA)
2. Assess control of asthma:
   - good response to LABA
     - continue LABA
   - benefit from LABA but control still inadequate
     - continue LABA and increase inhaled steroid dose to 400 mcg/day* (if not already on this dose)
   - no response to LABA
     - stop LABA and increase inhaled steroid to 400 mcg/day. If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

**STEP 3**
Persistent poor control

**STEP 4**
Increase inhaled steroid up to 800 mcg/day*

**STEP 5**
Continuous or frequent use of oral steroids

Use daily steroid tablet in lowest dose providing adequate control

Maintain high dose inhaled steroid at 800 mcg/day*

Refer to respiratory paediatrician

* BDP or equivalent
Regular Review and Personal Asthma Action Plans
Key components of an asthma review

- Assess control – RCP3Qs/ACT and exacerbation history
- Review the diagnosis
- Identify triggers
- Check and correct inhaler technique/ spacer use – watch them use their inhaler
- Assess medication use – look at prescription records and ask (non-judgementally) about regular preventer use.
- How long does a blue inhaler last? Less than three months – poor control. Less than one month – danger!
- Assess rhinitis
- Ask about smoking
- Adjust therapy according to symptoms following guidelines
- Provide a written PAAP aimed at achieving patient-centred goals.
Written personal asthma action plans (PAAPs) improve outcomes in asthma

• This is a Grade A evidence based assertion emphasised in the latest BTS/SIGN guideline
• But we don’t give them
• Need to be given in the context of patient/parent focussed discussion starting from the outcomes that the child or parent wants to achieve
• This takes time – which is probably why we don’t use them as much as we could – but it saves time and emergency consultations in the long run
How to offer a Personalised Asthma Action Plan

- Ask “What do you need to know to feel more confident about being able to deal with your asthma?“
- Start the self management discussion so that it answers this question.
- Move on from that to discuss any other issues that might be important.
- If a written PAAP is not wanted after a good discussion, leave it for now – but leave the offer open
- It is good to discuss how to manage at school. Under 8’s need an asthma inhaler with the label on and with directions on how to use it
- How to manage if parents are separated? Suggest a gym bag with the child’s inhalers and spacer in, and try to involve both parents in the PAAP to improve their understanding and compliance.
Key ingredients of written PAAPs

• How to handle exercise induced symptoms if they occur – which should be rare if control is good (prevention, pre-exercise treatment, post-exercise treatment)
• How to avoid triggers (if possible)
• How to recognise deterioration (which may include PEFR measurement)
• How to increase the dose of blue reliever (including spacer use) in attacks
• How to increase the dose of brown preventer (including spacer use) in attacks (if appropriate)
• When to take reserve course of prednisolone (if given)
• Danger signs and when to call for help
Asthma UK Plan
http://www.asthma.org.uk/Shop/my-asthma-plans

**My Asthma Plan**

1. **My asthma medicines**
   - My best peak flow is: 
   - My preventer inhaler is called: 
     and its colour is: 
   - I take [ ] puffs of my preventer inhaler in the morning and [ ] puffs at night. 
     I do this every day even if I feel well. 
   - Other asthma medicines I take every day: 
     - My reliever inhaler is called: 
       and its colour is: 
       I take __ puffs of my [ ] reliever inhaler when I wheeze or cough, my 
       peak flow is less than: 

2. **When my asthma gets worse**
   - I will know my asthma is getting worse if:
     - I have a cough, wheeze, it is hard to breathe or my chest hurts, or
     - I am waking up at night because of my asthma, or
     - I am taking my reliever inhaler every day, or
     - My peak flow is less than: 
   - When this happens: I keep taking my preventer medicines as normal. 
   - And also take __ puffs of my [ ] reliever inhaler every four hours.
Form FP1010 can be used to write a PAAP
Empowering parents to use higher doses of inhaled treatments

• In attacks inhalers work less well so much bigger doses are needed
• Call for help if high doses needed but ..
• High dose salbutamol is safe – one nebule = 25 puffs from a salbutamol MDI
• Give 5-10 puffs slowly one puff at time with a rest between puffs. Avoid overbreathing.
Take home messages – PAAPs

• Written PAAPs improve outcomes
• Time spent explaining them is time well spent
• Start from the parent/patient agenda/concerns
• Understand how they usually cope and understand the family and school situation,
• Have a variety of PAAPs available and choose what suits the parent and the child the best
• Enter Read Code when given – key process measure - Asthma Management Plan Given 663U
• Review them after any exacerbation of symptoms
Some Read Codes for Key Quality Markers

Good codes to include in Asthma Review consultations

• Annual Asthma Review 66YJ
• Inhaler Technique Observed 6637
• Asthma Management Plan Given 663U
• Spacer Device in Use 663l (lower case letter L)
• Number of times SABA used last week 663z

Coding exacerbations and follow-up

• Acute Exacerbation of Asthma H333
• Hospital Admission with Asthma 8H2P
• Follow-up Respiratory Assessment 6632

(could be used for post-exacerbation follow-up)
Make sure the learning is shared in the whole team

- Patients and parents see different team members – consistent advice about how to treat asthma is reassuring and more likely to be followed
- Organise an in-practice meeting on childhood respiratory care
- Try to agree as much as possible about how asthma is managed in the practice
Consider joining PCRS-UK – http://www.pcrs-uk.org/
Questions ?
RESPIRATORY ILLNESS IN CHILDHOOD

Diagnosis – getting it right
Dr Duncan Keeley
General Practitioner
Thames Valley Strategic Clinical Network
Contents

• URTI – a reminder
• Bronchiolitis and under 5 wheezing
• History and Examination
• Clues to more serious diagnoses
• Some more serious diagnoses
• Asthma diagnosis
• Criteria for referral
Upper respiratory tract infection

- Most children with cough have minor self limiting viral upper respiratory tract infection
- These children need minimal symptomatic treatment (encourage fluids, paracetamol if feverish)
- Main focus today is on wheezing illness and asthma and how we can improve diagnosis and treatment
- Is the illness severe? Is it recurrent?
# Cough and wheeze in children

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- Management – safe feeding - small frequent oral feeds
- No medication of proven benefit..
- Hospital assessment if feeding poor, sats <92 or look ill – give oxygen if sats are low
- Safety net advice if sending home
Under 5 wheezing – two patterns

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<th>Multiple Trigger Wheeze</th>
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<td>• Isolated wheezing episodes</td>
<td>• Episodes of wheezing</td>
</tr>
<tr>
<td>• Often with evidence of viral cold</td>
<td>• More triggers than just colds</td>
</tr>
<tr>
<td>• Well between episodes</td>
<td>• Symptoms of cough / wheeze between episodes</td>
</tr>
<tr>
<td>• No history of atopy in child or family</td>
<td>• Personal or family history of asthma/eczema/hay fever / allergy</td>
</tr>
</tbody>
</table>
Treatment of under 5 wheezing

Episodic Viral Wheeze

- No treatment if mild
- If treatment needed – can try salbutamol by spacer, episodic montelukast 4mg daily - but evidence for effectiveness of all treatments weak

Multiple Trigger Wheeze

- No treatment if mild
- If treatment needed – treat like asthma
Can we diagnose asthma in under 5’s?

- Features of multiple trigger wheeze make asthma after age 5 more likely
- EVW is not asthma – avoid the label
- But MTW if treated is treated like asthma
- Asthma label in primary care allows recall, structured follow-up and QOF payment
Making the diagnosis - history

- Story of this illness and of previous respiratory illnesses, get details of nature and duration, any interval symptoms – dyspnoea on feeding or exercise, cough after exercise, cough at night, any history of choking (FB) or cough after feeding (aspiration), persistent nasal blockage or discharge.

- Detail of previous respiratory illnesses is very important - were they “normal colds” or more than that? Look at records.

- Past medical history – from birth onwards.

- Family history – any current chest illness? , asthma eczema hay fever allergy? TB?

- Drug treatment – need detail, doses, adherence – don’t assume inhalers = asthma.

- Don’t assume earlier medical diagnoses were correct.
Making the diagnosis - examination

- temperature, pulse, respiratory rate, oxygen saturation,
- nose and throat - can they breathe through the nose?
- observe breathing pattern - recession, tracheal tug, alar flare
- listen to the heart (rate, murmur?)
- chest auscultation - signs diffuse or focal?
- check for liver (may be pushed down in bronchiolitis - marked enlargement? heart failure)
- femoral pulses in infants
- skin - ? eczema
- look at growth chart if available - ? failure to thrive - note height/weight
- examination may be entirely normal in asthma between episodes
Three important non-asthma diagnoses

- Pneumonia
- Persistent bacterial bronchitis
- Foreign body
Pneumonia

- Acute onset cough and fever with rapid breathing +/- grunting
- Fever high and systemic symptoms prominent
- Respiratory rate raised – this may be the only physical sign apart from fever
- Abnormal chest signs on auscultation may be absent - or localised (crackles/altered breath sounds)
- May have pleuritic chest pain or abdominal pain
- Diffuse wheezing unlikely to be due to bacterial chest infection
- A child whose difficulty in breathing is due to bacterial chest infection will look ill
- If pneumonia suspected get a same-day chest X ray
Persistent bacterial bronchitis

- Rare but important problem
- Prolonged/repeated loose cough
- Responds partially to antibiotics but recurs
- Needs prolonged (6 weeks +) antibiotic course and physiotherapy
- Important to rule out cystic fibrosis
- If suspected – CXR and refer to paediatrician
Foreign body

• Take any history of choking seriously – CXR/refer to paediatrics if in doubt
• Foreign body may cause stridor or paroxysmal coughing which may settle if the FB moves down into a bronchus
• Localised wheeze might be a clue
• If unrecognised at the time may then cause a chronic cough
Sudden onset cough
A bean
Asthma Diagnosis
How do we get it right?

- History (repeated)
- Examination (repeated)
- Plot height and weight in red book
- Physiological testing if over 5 - PEFR charting or spirometry (if staff trained in performance and interpretation)
- Trials of therapy with symptom monitoring and review
- CXR and refer to paediatrician if in doubt
**CHILD** with symptoms that may be due to asthma

**Clinical assessment**

**High Probability**

**Intermediate Probability**

**Low Probability**

**Consider tests of lung function and atopy**

**Trial of Treatment**

Response?

Yes

Asthma diagnosis confirmed
Continue Rx and find minimum effective dose

No

Assess compliance and inhaler technique. Consider further investigation and/or referral

**Consider referral**

Investigate/treat other condition

Response?

No

Further investigation Consider referral

Yes

Continue Rx
Asthma more likely if ..

- More than one of cough/wheeze/chest tightness/difficulty breathing
- Especially if frequent/recurrent/worse in night or early morning/ not just with colds / triggered by exercise, cold, smoke, dust, animals
- History of atopy in child or family
- Widespread wheeze on examination
- Improvement in symptoms/lung function with treatment
Asthma less likely if ..

- Symptoms with colds only
- No symptoms between episodes
- Cough without wheeze or shortness of breath
- Loose / moist cough
- Repeatedly normal chest exam/ PEFR when symptomatic
- No response to asthma treatment
- Clinical features of alternative diagnosis
## Clues to more serious diagnoses

<table>
<thead>
<tr>
<th>Clinical clue</th>
<th>Possible diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perinatal and family history</strong></td>
<td></td>
</tr>
<tr>
<td>symptoms present from birth or perinatal lung</td>
<td>cystic fibrosis; chronic lung disease; ciliary dyskinesia;</td>
</tr>
<tr>
<td>problem</td>
<td>developmental anomaly</td>
</tr>
<tr>
<td>family history of unusual chest disease</td>
<td>cystic fibrosis; developmental anomaly; neuromuscular disorder</td>
</tr>
<tr>
<td>severe upper respiratory tract disease</td>
<td>defect of host defence</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td><strong>Symptoms and signs</strong></td>
<td></td>
</tr>
<tr>
<td>persistent wet cough</td>
<td>cystic fibrosis; recurrent aspiration; host defence disorder</td>
</tr>
<tr>
<td>excessive vomiting or possetting dysphagia</td>
<td>reflux (±aspiration)</td>
</tr>
<tr>
<td>abnormal voice or cry</td>
<td>swallowing problems (±aspiration)</td>
</tr>
<tr>
<td>focal signs in the chest</td>
<td>laryngeal problem</td>
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<tr>
<td>inspiratory stridor as well as wheeze failure to</td>
<td>developmental disease; postviral syndrome; bronchiectasis;</td>
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<tr>
<td>thrive</td>
<td>tuberculosis</td>
</tr>
<tr>
<td></td>
<td>central airway or laryngeal disorder</td>
</tr>
<tr>
<td></td>
<td>cystic fibrosis; host defence defect; GOR</td>
</tr>
<tr>
<td><strong>Investigations</strong></td>
<td></td>
</tr>
<tr>
<td>• focal or persistent radiological changes</td>
<td>• developmental disorder; postinfective disorder; recurrent aspiration; inhaled</td>
</tr>
<tr>
<td></td>
<td>foreign body; bronchiectasis; tuberculosis</td>
</tr>
</tbody>
</table>
Peak flow charting

- Peak flow measurement possible in children over 5
- Most parents will do a peak flow diary for 2-4 weeks to provide supportive evidence of variable airways obstruction or response to treatment.
- Parents can be asked to measure the child’s peak flow before and after six minutes running.
- Repeated variability of >20% correlating with symptoms is supportive of an asthma diagnosis.
- The results of peak flow testing should be interpreted with caution as part of the whole clinical picture.
- Serial peak flow measurements on their own do not reliably rule the diagnosis in or out.
Asthma diagnosis – using form FP1010
Asthma diagnosis – using form FP1010

DAILY READINGS
Best of 3 blows, morning and evening

Date chart started:

Preventer treatment started

Number of doses of reliever medicine taken to relieve symptoms in 24 hours

Comments/Notes: (You should especially record here night-time symptoms or any events such as a cold which may affect readings)
Spirometry

- Spirometry with reversibility testing using a bronchodilator can be performed in children over 5-7 years.
- Provides more information than a peak flow measurement but can not be done as often and may be normal when asymptomatic.
- FEV1/FVC ratio of <0.7 before bronchodilator implies significant airway obstruction. An increase of FEV1 of >12% after bronchodilator is supportive of an asthma diagnosis.
- Upcoming NICE asthma diagnosis guideline will place increased emphasis on spirometry in asthma diagnosis.
Spirometry – performed when symptomatic

Pre Bronchodilator
Pre FEV1 2.71 L
Post FEV1 3.07 L (13% increase)

Post Bronchodilator

Flow (L/s)
0 1 2 3 4 5

Volume (L)
0 1 2 3 4 5
Chronic cough

- May be asthma, but rare for asthma never to cause wheeze as well
- Loose cough suggests recurrent bacterial infection which is rare – CF, bronchiectasis, immune deficiency, persistent bacterial bronchitis
- Reflux history or cough after feeding suggests reflux
- Remember whooping cough and viral imitators - paroxysmal – video recording helpful
Don’t forget the mobile phone
- a video is worth a thousand words
Antibiotics not needed for:

- URTI (except severe tonsillitis)
- Acute bronchiolitis
- Acute bronchitis
- Croup
- Acute viral wheezing
- Asthma episodes
Children should not need repeated courses of antibiotic

- If you see a child who has been given several courses of antibiotics for respiratory illnesses, think “are we missing something”

- Carefully go over the history and examination and review the medical records
Trials of therapy for asthma

- Inhaled corticosteroid e.g. beclometasone as clenil modulite 100-200mcg twice daily (clenil 50 2-4 puffs twice daily or clenil 100 1-2 puffs twice daily) by metered dose inhaler and spacer. This must be given regularly for at least 4 weeks.
- Children under 5 need the same or higher dose since difficulties with inhaler use reduce the delivered dosage.
- Inhaled salbutamol 200 – 500 mcg (two to five puffs) by metered dose inhaler and spacer if coughing or wheezing - given as needed up to four times daily.
- Review to assess response at two, four and six weeks.
- Apparent good response should be followed by a trial withdrawal of treatment over 4-8 weeks to see whether symptoms recur.
- Or consider short trial of montelukast
The key to success in inhaled treatment
Document the basis for an asthma diagnosis

• The basis for a diagnosis of asthma should be clearly documented in medical records, at the time the diagnosis is first entered, in the form of a brief summary…

Asthma
• Recurrent cough and wheeze for one year with nocturnal and exercise induced cough between episodes. Wheezing heard on examination x 3. Has eczema, mother and one brother have asthma. PEFR 270 min 360 max. No features to suggest alternative diagnosis. Good response to treatment in last 6 weeks.
Asthma: four errors in diagnosis which we should try to avoid

- Overdiagnosis of asthma in children under 5 with recurrent viral associated cough and wheezing.
- Overdiagnosis (or overestimation of asthma severity) in older children with shortness of breath due to anxiety or physical unfitness.
- Delayed diagnosis in children presenting with recurrent cough and wheeze who DO have asthma.
- Mistaken diagnosis of asthma in children with more serious chronic respiratory disorders (cystic fibrosis, bronchiectasis, TB and many others).
How to talk about asthma and wheeze with parents

- Explain the uncertainties with diagnosis especially in under 5’s
- May indeed “grow out of it” especially if not asthma
- Discuss triggers (colds, cats, dogs, pollen, dust, exercise, tobacco smoke) and prevention (no known effective prevention except tobacco smoke avoidance)
- Treatment worthwhile if it usefully controls persistent or frequently recurrent symptoms
Criteria for hospital referral

- Diagnosis unclear
- Symptoms present from birth
- Excessive vomiting or possetting
- Severe or persistent upper respiratory infection
- Persistent wet or productive cough
- Failure to thrive
- Nasal polyps
- Unexpected clinical findings - focal chest signs, abnormal voice or cry, dysphagia, inspiratory stridor
- Failure to respond to conventional treatment (particularly inhaled steroids above 400mcg per day
- Frequent use of steroid tablets
- Parental anxiety or need for reassurance.
Further investigations - mainly in hospital

- chest X ray indicated where more serious diagnoses are suspected (easily arranged in primary care)
- formal exercise challenge testing
- sweat testing
- investigations for tuberculosis
- tests of atopy – skin prick and blood testing – may sometimes be helpful.
Take home messages about respiratory diagnosis

- Be careful making a diagnosis – and document the basis for it
- Repeated careful history and examination needed
- Seek physiological evidence of reversible airways obstruction in children old enough to do the tests
- Review the basis for diagnosis if you take over a child’s care, or if asthma treatment does not work
- Use trials of introducing and withdrawing treatment
- If in doubt – get a CXR and refer
Discussion
WHEEZING AND ASTHMA

Effective management of continuing symptoms

Dr Duncan Keeley
Key points

- Trials of therapy important for diagnosis but you must know the dosages – avoid continuing treatment with higher dose inhaled steroids in children (>400mcg daily of clenil beclometasone or equivalent)
- Good inhaler technique is vital and many health professionals don’t know how to teach it
- Spacers are vital for effective inhaler use in young children – and in persons of any age having an asthma attack – so everyone should have one
- Short course montelukast may be effective for recurrent acute viral wheezing episodes in under 5s
Under 5 wheezing – two patterns

Episodic Viral Wheeze
- Isolated wheezing episodes
- Often with evidence of viral cold
- Well between episodes
- No history of atopy in child or family

Multiple Trigger Wheeze
- Episodes of wheezing
- More triggers than just colds
- Symptoms of cough / wheeze between episodes
- Personal or family history of asthma/eczema/hay fever / allergy
Under 5 wheezing – management

Episodic Viral Wheeze

• No treatment if mild
• Evidence for effectiveness of any treatments - including prednisolone – is weak
• Salbutamol by spacer may help
• Intermittent montelukast 4mg daily started at onset of episode may help

Multiple Trigger Wheeze

• No treatment if mild
• More likely to respond to asthma treatments – use trials of therapy if symptoms severe or recurrent
RCT evidence on inhaled corticosteroids in recurrent wheezing in the under 5s

- ICS improve symptoms in children with recurrent wheezing and a positive asthma predictive index, but do not affect the likelihood of asthma in subsequent years (Guibert TW et al. NEJM 2006)
- Intermittent ICS (400mcg budesonide x 2wk) for acute wheezing episodes has no effect on progression and no short term benefit during episodes (Bisgaard H. et al. NEJM 2006)
- Regular ICS for recurrent wheezing under 5 do not effect lung function or prevalence of asthma at age 5 (Murray CS et al. Lancet 2006)
Trial of therapy – Salbutamol

- Salbutamol by spacer
- For child of any age start by trying 5 puffs (500mcg) one puff at a time with a rest between puffs.
- One dose of old fashioned ventolin syrup contained 2mg, the equivalent of 20 puffs from a salbutamol MDI - one nebule 2.5mg = 25 puffs
- If salbutamol works the child will accept other inhalers more readily
- If salbutamol works (child feels better, symptoms improve) you know you are on the right track.
- If salbutamol does not work you might still be on the right track but stronger treatment needed (or diagnosis wrong!)
When to start regular preventer treatment

- How many times was the blue bronchodilator inhaler used in last week?
- If answer is 3 or more (on a regular basis) regular preventer treatment is advised
- Answer can be Read Coded (663z)
Trial of therapy – Inhaled Corticosteroids

- Inhaled corticosteroids by spacer
- E.g. beclometasone as clenil modulite 50mcg (light brown) inhaler 2-4 puffs (100-200mcg) twice daily - or clenil modulite 100mcg (dark brown) inhaler 1-2 puffs (100-200mcg) twice daily
- Judge initial dose by severity of symptoms
- Must be used regularly for 4-8 weeks, with PEFR charting if child old enough to do this
- Review at 2 weeks and 4 weeks
- Can also have salbutamol as needed
Trial of ICS (continued)

- If symptoms have resolved at review reduce and stop ICS over 4 weeks to see if symptoms recur
- If symptoms improved but not gone continue, stepping dosage up or down as appropriate
- Check inhaler technique
- Ask about adherence and parental concerns
Trial of ICS (continued)

If no benefit after 4-8 weeks...
• Treatment not being given?
• Inhaler technique wrong?
• Spacer not being used?
• Exposure to triggers?
• Diagnosis wrong? – review / refer
If all these are ok – step up the treatment.
Know your inhaled steroid dosage equivalents

- Beclometasone (Clenil) 100mcg
- Budesonide 100mcg
- Beclometasone (Qvar) 50mcg (not licensed under 12)
- Fluticasone 50mcg

are equivalent in potency

Do not use an inhaled steroid without knowing its dose equivalence to clenil/beclometasone
Care with inhaled steroid dosage

Aim not to use more than 400mcg clenil/BDP equivalent daily, though double this (800mcg daily) acceptable for short 4 week trial of treatment.

Add Stage 3 treatment (eg LABA or montelukast) before going above 400mcg daily on a regular basis

Refer to paediatrician if needing more than 400mcg daily on a regular basis

Step down inhaled steroid dosage if symptoms well controlled – half the dose for 4-8 weeks and review

Measure and plot height periodically in children on regular inhaled steroids.
Stepping down inhaled steroid dosage

• Important to do this if symptoms well controlled
• If child well (no cough at night, able to exercise fine, little or no blue inhaler use) half the regular dose of ICS till next visit
• Advise going back to the higher dose if symptoms obviously recur
• Remember – using a spacer virtually eliminates mouth deposition of inhaled steroid
Ask about parental concerns over using inhaled corticosteroids

- Inhalers contain steroids but at very low dose
- Tiny dose of a naturally occurring hormone used for their anti-inflammatory effect
- Long experience over many years in asthma treatment show they are safe at the low dosages generally used
- Possibility of a very small effect on growth – but we will measure and plot growth to check there is no problem (if continued use needed)
Montelukast

- Leukotriene receptor antagonist
- May be effective in short course for problematic recurrent episodic viral wheeze in under 5s - and easier than teaching inhaler use in this context.
- May be useful at stage 3 in continuing treatment of asthma (not controlled on low dose inhaled steroids) though try LABA first.
- Easy to give a trial of this treatment: response is rapid if the drug is effective.
Children Less than 5 yrs

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.

**STEP 1**
Mild intermittent asthma

**STEP 2**
Initial add-on therapy

Inhaled short-acting $\beta_2$ agonist as required

Add inhaled steroid 200-400 mcg/day**

* or leukotriene receptor antagonist if inhaled steroid cannot be used.

Start at dose of inhaled steroid appropriate to severity of disease.

**STEP 3**
Persistent poor control

In those children taking inhaled steroids 200-400 mcg/day consider addition of leukotriene receptor antagonist.

In those children taking a leukotriene receptor antagonist alone reconsider addition of an inhaled steroid 200-400 mcg/day.

In children under 2 years consider proceeding to step 4.

**STEP 4**
Refer to respiratory paediatrician.

* BDP or equivalent
† Higher nominal doses may be required if drug delivery is difficult
Children age 5-12 yrs

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.

MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP

STEP 1
Mild intermittent asthma

STEP 2
Initial add-on therapy

- Regular preventer therapy
- Add inhaled steroid 200-400 mcg/day* (other preventer drug if inhaled steroid cannot be used) 200 mcg is an appropriate starting dose for many patients
- Start at dose of inhaled steroid appropriate to severity of disease.

STEP 3
Persistent poor control

1. Add inhaled long-acting β₂ agonist (LABA)
2. Assess control of asthma:
   - good response to LABA
     - continue LABA
   - benefit from LABA but control still inadequate
     - continue LABA and increase inhaled steroid dose to 400 mcg/day* (if not already on this dose)
   - no response to LABA
     - stop LABA and increase inhaled steroid to 400 mcg/day. *If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

STEP 4
Increase inhaled steroid up to 800 mcg/day*

- Use daily steroid tablet in lowest dose providing adequate control
- Maintain high dose inhaled steroid at 800 mcg/day*
- Refer to respiratory paediatrician

STEP 5
Continuous or frequent use of oral steroids

* BDP or equivalent
Step 3 treatment under age 5

- Check diagnosis, compliance, inhaler technique and spacer use before stepping up
- If on clenil beclometasone 200-400mcg daily add montelukast
- If on montelukast add clenil beclometasone 200-400mcg daily
- If the new agent is successful try withdrawal of the older agent first if stepping down after good control established
Step 3 Treatment over age 5

• Check diagnosis, compliance, inhaler technique and spacer use before stepping up
• Try 200mg 400mcg daily of clenil/beclometasone or equivalent before going up to Step 3 (discuss - views differ)
• Refer to paediatrician if not controlled on 800mcg daily of clenil beclometasone or equivalent
Local (Buckinghamshire) Formulary Options for Combination Inhalers at Stage 3 in over 5s

- Symbicort 100/6 (budesonide/formoterol) Turbohaler 1-2 puffs bd (licensed from age 6)
- Seretide 50 (fluticasone/salmeterol) MDI 1-2 puffs bd (licensed from age 4)

Both give a dose equivalent to clenil beclometasone 200-400mcg daily

Combinations are convenient and aid compliance, but reduce flexibility in inhaled steroid dosage during exacerbations and may result in delay in stepping down when control is good.
Remember the nose in children with asthma

• Persistent nasal blockage makes asthma control worse – “whole airway inflammation”
• Some children may need nasal steroid drops to control this
• Montelukast sometimes effective in helping both nose and chest symptoms
Non drug management

- Avoid tobacco smoke exposure – encourage smoking parents to stop
- Know the triggers and avoid them if possible – or adjust treatment if not avoidable
- Exercise is good – adjust treatment to minimise exercise induced symptoms
- Discuss the pros and cons of difficult things like pets and house dust mite control measures
Inhaler technique

• Vital to teach this at the outset and check it regularly.
• Very common cause of treatment failure
• Spacers needed for all young children – and advantageous for all, especially for inhaled corticosteroids and in exacerbations.
• If using MDI without spacer: slow breath in (5 seconds) Dry powder fast breath in
• Make sure you know how to teach this and share this knowledge with everyone in your team
Asthma UK videos for inhaler technique

- Excellent online resource - covers all inhaler types including spacer use in children
The key to success in inhaled treatment
Spacers

- At least double the proportion of the dose deposited in the lungs (20% vs 10%)
- Greatly reduce oral deposition (10% vs 80%)
- Better treatment effect, fewer side effects
- As effective as nebuliser for giving high dose inhaled treatment in exacerbations
- Easy to teach method of use – showing better than telling
- Light cheap portable and prescribable
- Everyone with asthma should have one
- Code as Spacer Device in Use 663I (lower case letter L)
Portable bronchodilator inhaler for school age children

- Spacers are large and uncool
- Children with well controlled asthma should not need regular bronchodilator but must have access to one for school / exercise
- Supply a dry powder or breath actuated MDI device (eg Easihaler, Turbuhaler) for this
- Should still have MDI/spacer for inhaled corticosteroid and rescue bronchodilator at home – more effective in exacerbations
Some Read Codes for Key Quality Markers

Good codes to include in Asthma Review consultations

- Annual Asthma Review 66YJ
- Inhaler Technique Observed 6637
- Asthma Management Plan Given 663U
- Spacer Device in Use 663I (lower case letter L)
- Number of times SABA used last week 663z

Coding exacerbations and follow-up

- Acute Exacerbation of Asthma H333
- Hospital Admission with Asthma 8H2P
- Follow-up Respiratory Assessment 6632
  (could be used for post-exacerbation follow-up)
Take home messages

• Trials of therapy important in diagnosis
• Know your dosages and feel comfortable in making detailed dosage recommendations
• Know how to teach and encourage spacer use
• Know how to discuss and address parental concerns about inhaled steroids
• Remember to try stepping treatment down if control is good
• Consider trying intermittent montelukast for troublesome recurrent viral wheeze in under 5s
Discussion
Consider joining PCRS-UK – http://www.pcrs-uk.org/