Outline

• Scale of the problem
• Viral Induced Wheeze vs Asthma
• How to approach an asthma (annual) review
• Acute presentation
• Scenarios
The scale of the problem

- 1.1 Million children in the UK are currently receiving treatment for asthma

- 2 in every class (1 in 11 children have asthma)

- Every 17 minutes a child is admitted to hospital in the UK because of their asthma
  - 75% preventable
  - 30,000 – 40,000 admissions a year

- 1/3 of preschool children have a wheezy episode

Asthma UK – Key Facts and Statistics
What Impact is it having?

- 40% of children said their asthma stops them having fun
- 51% had problems visiting friends
- 98% said their asthma stopped them doing “something”
- 87% of children have missed at least one day of school because of their asthma
- 49% had problems joining in with general lessons
- 48% had problems going on school trips
- 73% had problems joining in PE lessons
- 10% of children under 15 with asthma symptoms experience attacks so severe they can't speak

Asthma UK – Key Facts and Statistics
Asthma Death Review Summary

Why asthma still kills
The National Review of Asthma Deaths (NRAD)
The National Review of Asthma Deaths (NRAD)

Key findings

Use of NHS services

1. During the final attack of asthma, 87 (45%) of the 195 people were known to have died without seeking medical assistance or before emergency medical care could be provided.
2. The majority of people who died from asthma (112, 57%) were not recorded as being under specialist supervision during the 12 months prior to death. Only 83 (43%) were managed in secondary or tertiary care during this period.
3. There was a history of previous hospital admission for asthma in 47% (90 of 190).
4. Nineteen (10%) of the 195 died within 28 days of discharge from hospital after treatment for asthma.
5. At least 40 (21%) of the 195 people who died had attended a hospital emergency department with asthma at least once in the previous year and, of these, 23 had attended twice or more.
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Medical and professional care

1. Personal asthma action plans (PAAPs), acknowledged to improve asthma care, were known to be provided to only 44 (23%) of the 195 people who died from asthma.
2. There was no evidence that an asthma review had taken place in general practice in the last year before death for 84 (43%) of the 195 people who died.
3. Exacerbating factors, or triggers, were documented in the records of almost half (95) of patients; they included drugs, viral infections and allergy. A trigger was not documented in the other half.
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Wheezing in the preschool child (< 5 years)

• Common presentation to paediatric services

• 1/3 of preschool children will have a wheezy episode

• Only about 20% of these will go onto have a diagnosis of asthma

Tucson Children's Respiratory Study: 1980 to present

• Wheeze for many pre-school children is not associated with atopy and resolves by school age in the vast majority of cases

Wheeze Patterns

Temporal pattern of wheeze

• Episodic (viral) wheeze  
  Wheezing during discrete time periods, often in association with clinical evidence of a viral cold, with absence of wheeze between episodes

• Multiple-trigger wheeze  
  Wheezing that shows discrete exacerbations, but also symptoms between episodes

Duration of wheeze

• Transient wheeze  
  Symptoms that commenced before the age of 3 yrs and are found (retrospectively) to have disappeared by the age of 6 yrs; transient wheeze may be episodic or multiple-trigger wheeze

• Persistent wheeze  
  Symptoms that are found (retrospectively) to have continued until the age of 6 yrs; persistent wheeze may be episodic or multiple-trigger wheeze

• Late-onset wheeze  
  Symptoms that start after the age of 3 yrs; late-onset wheeze may be episodic or multiple-trigger wheeze
## Treatment options for Viral Induced Wheeze

| Preventer | Yes | No strong evidence of beneficial effect |
| Start URTI | Yes | High dose ICS may work - Height (?) | No strong evidence of beneficial effect |
| Wheeze/DIB | Too late | No strong evidence of beneficial effect | Reserved for those needing HDU or strong atopy history |
Four key Steps:

• Is this asthma?

• Is there good control?

• What is impacting on control?

• What action needs to be taken?
CLINICAL FEATURES THAT INCREASE THE PROBABILITY OF ASTHMA

- More than one of the following symptoms - wheeze, cough, difficulty breathing, chest tightness - particularly if these are frequent and recurrent; are worse at night and in the early morning; occur in response to, or are worse after, exercise or other triggers, such as exposure to pets; cold or damp air, or with emotions or laughter; or occur apart from colds
- Personal history of atopic disorder
- Family history of atopic disorder and/or asthma
- Widespread wheeze heard on auscultation
- History of improvement in symptoms or lung function in response to adequate therapy.
CLINICAL FEATURES THAT LOWER THE PROBABILITY OF ASTHMA

- Symptoms with colds only, with no interval symptoms
- **Isolated cough in the absence of wheeze or difficulty breathing**
- History of moist cough
- Prominent dizziness, light-headedness, peripheral tingling
- Repeatedly normal physical examination of chest when symptomatic
- Normal peak expiratory flow (PEF) or spirometry when symptomatic
- No response to a trial of asthma therapy
- Clinical features pointing to alternative diagnosis

With a thorough history and examination, a child can usually be classed into one of three groups:

- **high probability** – diagnosis of asthma likely
- **low probability** – diagnosis other than asthma likely
- **intermediate probability** – diagnosis uncertain.
# Is (My) Asthma Controlled

<table>
<thead>
<tr>
<th><strong>Lung Function</strong></th>
<th>&gt;80% predicted or best</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime symptoms</td>
<td>NONE</td>
</tr>
<tr>
<td><strong>Night time awakenings due to asthma</strong></td>
<td>NONE</td>
</tr>
<tr>
<td>Limitations on activity including exercise</td>
<td>NONE</td>
</tr>
<tr>
<td><strong>Exacerbations</strong></td>
<td>NONE</td>
</tr>
<tr>
<td>Need for rescue medication</td>
<td>NONE</td>
</tr>
</tbody>
</table>
Asthma Control Test (ACT)

During the past 4 weeks:

1. How often did your asthma **prevent** you from getting as much done at work, **school** or home?

2. How often have you had **shortness of breath**?

3. How often did your asthma (wheezing, coughing, chest tightness, shortness of breath) **wake you up**?

4. How often have you **used your reliever inhaler**?

5. How would you **rate your asthma control**?

What does your score mean?

**Score: 25 – WELL DONE**
- Your asthma appears to have been UNDER CONTROL over the last 4 weeks.
- However, if you are experiencing any problems with your asthma, you should see your doctor or nurse.

**Score: 20 to 24 – ON TARGET**
- Your asthma appears to have been REASONABLY WELL CONTROLLED during the past 4 weeks.
- However, if you are experiencing symptoms your doctor or nurse may be able to help you.

**Score: less than 20 – OFF TARGET**
- Your asthma may NOT HAVE BEEN CONTROLLED during the past 4 weeks.
- Your doctor or nurse can recommend an asthma action plan to help improve your asthma control.
Children's ACT

Have your child complete these four questions.

1. How is your asthma today?
   - Very Bad
   - Bad
   - Good
   - Very Good

2. How much of a problem is your asthma when you run, exercise or play sports?
   - It's a big problem, I can't do what I want to do.
   - It's a problem and I don't like it.
   - It's a little problem but it's okay.
   - It's not a problem.

3. Do you cough because of your asthma?
   - Yes, all of the time.
   - Yes, most of the time.
   - Yes, some of the time.
   - No, none of the time.

4. Do you wake up during the night because of your asthma?
   - Yes, all of the time.
   - Yes, most of the time.
   - Yes, some of the time.
   - No, none of the time.

Please complete these questions on your own.

5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms?
   - Score
   - Not at all
   - 1-3 days
   - 4-10 days
   - 11-18 days
   - 19-24 days
   - Everyday

6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma?
   - Score
   - Not at all
   - 1-3 days
   - 4-10 days
   - 11-18 days
   - 19-24 days
   - Everyday

7. During the last 4 weeks, how many days did your child wake up during the night because of asthma?
   - Score
   - Not at all
   - 1-3 days
   - 4-10 days
   - 11-18 days
   - 19-24 days
   - Everyday
What can impact on Asthma Control?
Pharmacotherapy

Monoclonal anti-IgE (omalizumab, Xolair)

Steroids

Montelukast

Allergen

Allergic asthma

Antigen-presenting cell

Th2 cell

Eosinophil

IgE

B Cell Plasma cell

Mast cell Basophil

Histamine Leukotrienes Prostaglandins Cytokines Basic proteins & enzymes

IL-4 IL-13

IL-5

FcεRI

Pharmacotherapy

Steroids

Monoclonal anti-IgE (omalizumab, Xolair)

Montelukast
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

- Add inhaled short-acting $\beta_2$ 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.

**STEP 3**
Persistent poor control

1. Add inhaled long-acting $\beta_2$ 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**
Continuous or frequent use of oral steroids

- Increase inhaled steroid up to 800 mcg/day*

**STEP 5**
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

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**Symptoms vs Treatment**

**British Thoracic Society**
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**
Regular preventer therapy

Inhaled short-acting β₂ 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**
Initial add-on therapy

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**
Persistent poor control

Refer to respiratory paediatrician.

* BDP or equivalent
† Higher nominal doses may be required if drug delivery is difficult
BTS Guideline: Major Changes

• More ipratropium bromide in first 2 hours in acute severe or life-threatening asthma

• 1\textsuperscript{st} choice add on to inhaled steroids:
  – if <5yo: montelukast
  – If >5yo: long-acting beta-agonist

• Serial PEFR, spirometry or eNO offers little benefit in monitoring over clinical symptom-based assessment in children
Which Inhaler & What Strength?

**Bronchodilator**
- Salbutamol 100mcg
- Salbutamol 200mcg
- Bricanyl 500mcg

**Inhaled corticosteroid (ICS)**
- Beclometasone 50mcg
- Beclometasone 100mcg
- Fluticasone 50, 125 & 250mcg
- Fluticasone 50, 100 & 500mcg
- Pulmicort 100, 200 & 400mcg

**ICS/LABA**
- Seretide 50, 125 & 250 Plus 25mcg Salmeterol
- Seretide 100, 250 & 500 Plus 50mcg Salmeterol
- Symbicort 100/6, 200/6 & 400/12mcg
- Symbicort 6 & 12mcg

- Meter Dose inhaler
- Accuhaler
- Turbohaler

**LABA**
- Salmeterol 25mcg
- Salmeterol 50mcg
- Formoterol 6 & 12mcg
### A Guide to Selecting an ‘Aerochamber Plus’?

<table>
<thead>
<tr>
<th>Device</th>
<th>Approx Age</th>
<th>Tidal Breathing</th>
<th>Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant ‘Aerochamber plus’</td>
<td>0-6 months</td>
<td>✓</td>
<td>Mask very rigid, not always tolerated, switch to yell if mask will fit</td>
</tr>
<tr>
<td>Child ‘Aerochamber plus’</td>
<td>6 months +</td>
<td>✓</td>
<td>Soft mask helps kids tolerate it better</td>
</tr>
<tr>
<td>Adult ‘Aerochamber Plus’ with mask</td>
<td>10 years +</td>
<td>✓</td>
<td>Useful for older children with learning disabilities who cannot use the mouth piece</td>
</tr>
<tr>
<td>‘Aerochamber Plus’ with mouthpiece</td>
<td>4 years plus (approx)</td>
<td>×</td>
<td>Ensure no musical sounds &amp; nasal flaring if breathing in through nose</td>
</tr>
</tbody>
</table>
Self management – Getting the Basics right!!

- Asthma Plan
- Inhaler Technique
- Adherence
- Education
- Flu Vaccine
- Avoid triggers
  - (Air pollution, Smoking, Aeroallergens)
- Healthy diet
  - (Studies in adults and children have shown that a high intake of fresh fruit and vegetables is associated with fewer asthma symptoms and better lung function)
- Exercise
  - Warm up and warm down. Use bronchodilator pre-exercise
  - Good evidence that exercise helps asthma
NICE quality standard for asthma (2012/13)

1. People with newly diagnosed asthma have a diagnosis made in line with BTS/SIGN guidance.

2. Adults who have recently developed asthma are assessed for causes linked to their place of work.

3. People with asthma receive a written plan with details of how their asthma will be managed.

4. People with asthma are given training in using their inhaler before they start any new inhaler treatment.

5. People with asthma have a review of their asthma and its management at least once a year.

6. People with asthma who have symptoms have an assessment of how well their asthma is controlled.
7. People with asthma who go to see a healthcare professional because their symptoms have worsened have their symptoms measured at the time of the appointment.

8. People aged 5 years or older who see a healthcare professional with severe or life-threatening asthma are given oral or intravenous steroids within 1 hour.

9. People admitted to hospital with a sudden worsening of asthma have a review by a member of a specialist team before discharge.

10. People who received treatment in hospital or through out-of-hours services for a sudden worsening of their asthma see a healthcare professional in their own GP practice within 2 working days of treatment.

11. People with asthma that is difficult to control are offered an assessment by a team that specialises in managing ‘difficult asthma’.
Assessing & managing the acutely unwell Child

Acute Asthma Attack Management Pathway for Known Asthmatic Children (5 – 18 Years)

1. **History & Examination**
   - History: Cough, wheeze, shortness of breath, chest tightness.
   - Examination: Auscultation, peak flow measurement, lung sounds.

2. **Diagnosis**
   - Ongoing asthma management.

3. **Management**
   - **Step 1:** Oral steroids, inhalers, and nebulizers.
   - **Step 2:** O2 therapy, IV fluids, and antibiotics.
   - **Step 3:** Hospital admission for observation.

4. **Follow-up**
   - Review in 24-48 hours.

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   - **Step 3:** Hospital admission for observation.

4. **Follow-up**
   - Review in 24-48 hours.
When to refer?

Referral to secondary care if: (See box 14)
- Diagnosis unclear or in doubt
- Symptoms present from birth or perinatal lung problem
- Excessive vomiting or possetting
- Persistent wet or productive cough
- Family history of unusual chest disease
- Failure to thrive
- Nasal polyps

Referral to secondary care if: (See box 14)
- Unexpected clinical findings eg focal signs, abnormal voice or cry, dysphagia, inspiratory stridor
- Failure to respond to conventional treatment (particularly inhaled corticosteroids above beclometasone 400 mcg/day (or equivalent) or frequent use of steroid tablets)
- Parental anxiety or need for reassurance

14. Secondary Care Referrals

Barnet Hospital
Switchboard: 020 8216 4600

Royal Free Hospital
Dr. Rahul Chodhari
R.Chodhari@nhs.net
Switchboard: 020 7794 0500

North Middlesex Hospital
Dr. Arvind Shah
Switchboard: 020 8887 2000

University College Hospital
Dr. Eddie Chung
Switchboard: 020 3456 7890

Whittington Hospital
Dr. John Moreiras
John.Moreiras@nhs.net
Switchboard: 020 7272 3070
Summary

• Asthma is common
  – large disease burden
  – morbidity & mortality

• Doing the simple things well

• Regular asthma review

• Structured approach