Immediate Management

1) Oxygen

In acute severe asthma, hypoxia kills. Oxygen is the priority. Give 100% O\textsubscript{2} by face mask (5 l/min). Use a pulse oximeter to determine oxygen saturation. Aim for saturation of >93%.

2) Severity assessment

An initial assessment of severity on arrival of the child and prior to nebulisation is essential for planning ongoing management:

<table>
<thead>
<tr>
<th>SEVERITY</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEF (% predicted)</td>
<td>&gt;80%</td>
<td>60-80%</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>&lt;40</td>
<td>&gt;40</td>
<td>&gt;40</td>
</tr>
<tr>
<td>Pulsus paradoxus</td>
<td>Not palpable</td>
<td>Not palpable</td>
<td>Palpable</td>
</tr>
<tr>
<td>Wheezing</td>
<td>Expiratory</td>
<td>Expiratory &amp; Inspiratory</td>
<td>Soft breath sounds</td>
</tr>
<tr>
<td>Speech</td>
<td>Normal</td>
<td>Normal</td>
<td>Impaired</td>
</tr>
<tr>
<td>Feeding</td>
<td>Normal</td>
<td>Impaired</td>
<td>Impaired</td>
</tr>
</tbody>
</table>

- Place in the most severe category in which there are 2 or more features.
- Peak expiratory flow rate (PEFR) is the most important measurement in children over 5 years. Under 5 years the respiratory rate is the most helpful single measurement. A rate of more than 40/min is cause for concern.
- All children classified as SEVERE on arrival should be admitted, regardless of response.

3) Bronchodilator (use for all categories of severity)

a. Under 6 years, or very distressed

SALBUTAMOL 8mg/ml (Venteze) or FENOTEROL 1mg/ml (Berotec) 2ml in 2ml normal saline by nebulisation. Use a flow rate of 5 l/min and ensure the nebuliser is working properly.

AND

IPRATROPIUM BROMIDE (Atrovent), one dose only, 1ml (125mcg/ml 1month-1year; 250mcg/ml 1-5years; 500mcg/ml >5years) in 1ml saline.

b. Over 6 years, not very distressed, and able to use spacer

FENOTEROL (Berotec) or SALBUTAMOL (Venteze) by metered dose inhaler. USE A SPACER. Give 5 puffs into the spacer allowing the child to breathe normally for 5 breaths between each puff.

AND

IPRATROPIUM BROMIDE (Atrovent). Administer as for salbutamol/fenoterol but one dose only (250mcg 1-5 years; 500mcg >5 years)

REPEAT fenoterol or salbutamol after 20 minutes if no response, but do NOT repeat ipratropium.

4) Steroids

- PREDNISONE 2 mg/kg PO stat (max dose 40 mg). If vomiting, use DEXAMETHASONE 0.3 mg/kg IM or IV stat

5) Adrenaline & Intravenous Salbutamol

CALL FOR HELP

Patients in extremis with a very severe attack should be given ADRENALINE 0.01 ml/kg of 1:1000 subcutaneously immediately, and SALBUTAMOL (15 ug/Kg IV over 10-15 minutes) if unable to use a nebuliser.
After nebulisation or MDI, assess response…

<table>
<thead>
<tr>
<th>RESPONSE</th>
<th>NO RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE</td>
<td>NO RESPONSE</td>
</tr>
<tr>
<td>PEF (% predicted)</td>
<td>70-90%</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>&lt;40</td>
</tr>
<tr>
<td>Pulsus paradoxus</td>
<td>&lt;10 mmHg</td>
</tr>
<tr>
<td>Wheezing</td>
<td>Expiratory</td>
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<td>Speech</td>
<td>Normal</td>
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</tbody>
</table>

- Response = improvement in 2 or more parameters (for PEF, improvement must be >10 %)
- Place in the most severe category in which there are 2 or more features

Then, depending on response…

If there is a good response and patient remains “mild” for 1 hour after treatment:
1) Continue steroids for 5 days
2) Review current management: "Cool ICE":
   - classification (see Chronic Childhood Asthma guideline)
   - inhaler technique
   - comprehension
   - environment control
3) Discharge on appropriate medication. Ensure adequate follow-up. (See “Follow Up” below)

If there is a poor response after 2 doses of bronchodilator 20 minutes apart:
- MILD: give hourly nebs for 4 hours in OPD/Casualty, then reassess
- MODERATE: admit to high care
- SEVERE: admit to high care

In Ward:
1) OXYGEN via face mask (5 l/min) or nasal catheter (2 l/min) plus saturation monitoring
2) BRONCHODILATOR by nebulisation using SALBUTAMOL or FENOTEROL 1-6 hourly and IPRATROPIUM BROMIDE (ATROVENT) 6 hourly. Frequency of nebulisation should be reviewed often. The goal is to return the child to future home maintenance therapy as quickly as possible
3) PREDNISONE 2 mg/kg 24H PO (maximum dose 40 mg), for 5 days
4) MONITOR AND CHART PEAK EXPIRATORY FLOW (age 5-6 years and above) before and after each nebulisation
5) MAINTAIN HYDRATION by encouraging drinking according to thirst. IV fluids are unnecessary unless vomiting or clinically dehydrated

Unnecessary:
- Chest X-rays and antibiotics are not necessary as a routine in an acute attack. Do a chest X-ray if you suspect a pneumothorax.

Dangerous:
- Sedatives
- Intravenous theophylline

Before Discharge

| An attack of acute severe asthma indicates failure of maintenance management. Therefore: |

1) Review the causes and possible precipitating factors, and intervene where feasible
2) Adjust maintenance drug management if necessary
3) Ensure the patient/parents understand the aims and details of management
4) Discuss with the patient/parents a plan for managing future emergencies
5) Steroid dependent patients should be seen by the paediatrician before discharge
6) Discharge on maintenance medication, including PREDNISONE 2 mg/kg/day (maximum dose 40 mg) for up to 7 days if necessary, then stop

Follow-Up

All patients who have been admitted should be followed up at a dedicated Asthma Clinic until home maintenance therapy is well established. Once this is achieved consideration can be given to referring patients for Level 1 follow up.