DoH Guidelines for the Initial Diagnosis and Management of Paediatric Asthma (0-17yrs) by Primary Healthcare Providers

April 2018
<table>
<thead>
<tr>
<th><strong>Document Title:</strong></th>
<th>DoH Guidelines for the Initial Diagnosis and Management of Paediatric Asthma (0-17yrs) by Primary Healthcare Providers</th>
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<tr>
<td><strong>Document Ref. Number:</strong></td>
<td>DoH/Guidelines/ Initial Diagnosis and Management of Paediatric Asthma (0-17yrs)</td>
</tr>
<tr>
<td><strong>For Further Advice Contact:</strong></td>
<td>Public Health Division</td>
</tr>
<tr>
<td><strong>Applies To</strong></td>
<td>All Primary Healthcare Providers licensed by DoH engaged in the management of Paediatric Asthma in the Emirate of Abu Dhabi</td>
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<tr>
<td><strong>Classification</strong></td>
<td>Public</td>
</tr>
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1. INTRODUCTION
Asthma is one of the top public health priorities at Department of Health (DoH). The goal of DoH’s Asthma program is to reduce the emergency department visits, hospitalization absenteeism from school and work and death of patients due to asthma. This can be achieved by improving the diagnosis and management of asthma at primary care settings. The goals of asthma treatment for asthma control includes the following:
• Prevent symptoms.
• Maintain normal daily living activities.
• Maintain normal lung function.
• Prevent disease complications and medication side effects.

2. ABOUT THESE GUIDELINES
These Guidelines have been developed based on review of evidence from the Global Initiative for Asthma (GINA) and the National Asthma Education and Prevention (NAEPP) and the Canadian Thoracic Society Guidelines. In addition, they take into account Abu Dhabi’s healthcare delivery system, the local cultural and social aspects and context of the Emirate.

3. PURPOSE
The purpose of these guidelines is to improve the diagnosis and management of paediatric asthma by primary health care physicians. In doing so, the Guidelines will contribute toward the following:
3.1. Avoidance of premature deaths related to asthma.
3.2. Provision of an evidence base rational for the referral of asthma patients.
3.3. Provision of quality and safe care to asthma patients in primary healthcare settings.
3.4. Enhance the quality of life for people with asthma.
3.5. Embed ongoing education on Asthma management.
3.6. Promote efficient use of resources for managing and treating asthma patients.

4. SCOPE
These Guidelines apply to:
4.1. All primary Healthcare Providers who are engaged in the diagnosis and management of paediatric asthma in the Emirate of Abu Dhabi.
4.2. All children 0 to 17 yrs with asthma and their guardians.
### 5. ABBREVIATIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFC</td>
<td>Chlorofluorocarbon</td>
</tr>
<tr>
<td>CME</td>
<td>Continuing medical education</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing professional development</td>
</tr>
<tr>
<td>CT</td>
<td>Computed tomography</td>
</tr>
<tr>
<td>DoH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>DPI</td>
<td>Dry powder inhaler</td>
</tr>
<tr>
<td>GINA</td>
<td>Global Initiative for Asthma</td>
</tr>
<tr>
<td>HFA</td>
<td>Hydrofluoralkane</td>
</tr>
<tr>
<td>ICS(^1)</td>
<td>Inhaled corticosteroids</td>
</tr>
<tr>
<td>IgA</td>
<td>Immunoglobulin A</td>
</tr>
<tr>
<td>IgE</td>
<td>Immunoglobulin E</td>
</tr>
<tr>
<td>IgG</td>
<td>Immunoglobulin G</td>
</tr>
<tr>
<td>IgM</td>
<td>Immunoglobulin M</td>
</tr>
<tr>
<td>LABA</td>
<td>Long Acting Beta2 Agonist</td>
</tr>
<tr>
<td>LTR</td>
<td>Leukotriene receptor antagonist</td>
</tr>
<tr>
<td>MDT</td>
<td>Multi-disciplinary team</td>
</tr>
<tr>
<td>mmHg</td>
<td>Millimeter(s) of mercury</td>
</tr>
<tr>
<td>NAEPP</td>
<td>National Asthma Education and Prevention Program</td>
</tr>
<tr>
<td>OCS</td>
<td>Oral Corticosteroid</td>
</tr>
<tr>
<td>pMDI</td>
<td>Pressurized Metered Dose Inhaler</td>
</tr>
<tr>
<td>PRN</td>
<td>Patient Reader Necessary &quot;as necessary&quot;</td>
</tr>
<tr>
<td>RAST</td>
<td>Radioallergosorbent test</td>
</tr>
<tr>
<td>RTI</td>
<td>Respiratory Tract Infection</td>
</tr>
<tr>
<td>SABA</td>
<td>Short Acting Beta2 Agonist</td>
</tr>
</tbody>
</table>

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\(^1\) Are considered the most potent and consistent anti-inflammatory agents for long-term asthma management therapy
6. RECOMMENDATIONS FOR THE DIAGNOSIS AND MANAGEMENT OF PAEDIATRIC ASTHMA

The following recommendations have been set out to assist primary healthcare practitioners, patients and/or their guardians to make decisions about the appropriate healthcare for paediatric asthma management. They are designed to support the decision-making processes in paediatric patient care. However, these Guidelines are not and cannot be exhaustive, they are not intended to override the responsibility of Healthcare Professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian. Therefore, primary Healthcare Providers should use their own clinical judgement to address specific case scenarios.

6.1. Recommendation 1: Diagnosis of paediatric asthma

The following may be considered in the diagnosis of paediatric asthma:

6.1.1. The presence of any of the asthma indicators:

6.1.1.1. Recurrent breathlessness, chest tightness, wheezing or cough. Symptoms are often worse at night and early morning, may vary over time and in intensity, may follow viral RTI, exercise, emotions or exposure to aeroallergens or irritants and exposure to cold weather.

6.1.1.2. Symptoms of wheezing or cough occur in the absence of respiratory infection. In particular where:

6.1.1.2.1. There is absence of seasonal variation in wheeze.
6.1.1.2.2. There is a history of other allergic diseases (eczema, allergic rhinitis) or asthma in first degree relatives.
6.1.1.2.3. Wheeze is heard on auscultation
6.1.1.2.4. Symptoms persist after 3 years of age.

6.1.2. Differential diagnoses need to be given special consideration, including but not limited to assessment of the following:

6.1.2.1. Chronic lung disease of prematurity.
6.1.2.2. Cystic fibrosis.
6.1.2.3. Foreign body aspiration.
6.1.2.4. Vascular ring.
6.1.2.5. Laryngotracheomalacia.
6.1.2.6. Immune deficiency (bronchiectasis).
6.1.2.7. Gastroesophageal reflux.
6.1.2.8. Aspiration due to swallowing dysfunction.
6.1.2.9. Primary ciliary dyskinesia.
6.1.2.10. Congenital heart disease.
6.1.2.11. Vocal cord dysfunction.
6.1.2.12. Habitual or psychogenic cough.
6.1.2.13. Chronic upper airway cough syndrome.

6.1.3. If there is doubt about the diagnosis of asthma, a plain x-ray may help to exclude structural abnormalities, chronic infections such as tuberculosis, or an inhaled foreign body. Referral to pediatric pulmonologist may be made for further investigations to exclude potential comorbidities or differential diagnosis.

6.1.4. Investigations may include, but not limited to, complete blood count, lymphocyte subset, immunoglobulins IgA, IgG, IgM, IgE, RAST (IgE to common allergens), IgG subclasses, sweat chloride, genetic testing, barium or gastrografin study of the gastrointestinal tract, CT chest and bronchoscopy.

6.1.5. For children 6 years and older, spirometry test or other tests can be used to confirm asthma (i.e. personal peak flow meter).

6.1.6. Spirometry - For children 6 years and older. however, the use of this tool may be impractical and unreliable in a primary healthcare setting, therefore, it should not be used alone to establish a diagnosis of asthma in children.

6.1.7. All health professionals managing patients with asthma are recommended to have access to spirometry and to be competent in the interpretation of the results.

6.1.8. For children 5 yrs or younger, a trial treatment for 2 to 3 months with short-acting beta2 agonist (SABA) used as needed and recommended dose of Inhaler Corticosteroid (ICS) may help to confirm the diagnosis of asthma. Marked clinical improvement during treatment and deterioration when treatment is stopped support the diagnosis of asthma.

6.2. Recommendation 2: Initial treatment and referral

6.2.1. Initial treatment for children age 0-5 yrs is reported in (Appendix 1 part A) and for children age 6-17 yrs is reported in (Appendix 1 part B). and

6.2.2. Children 0-17 yrs Referral Guidelines to appropriately qualified and trained Healthcare Professionals are reported in (Appendix 2).

6.3. Recommendation 3: Assessment and monitoring

6.3.1. The initial assessment may include but is not limited to the following.

6.3.1.1. Review of triggers and risk factors in accordance with (Appendix 3) (including assessment of atopy).

6.3.1.2. Recognition of level of control over last 4 weeks (controlled, partially controlled, and uncontrolled asthma). using (Appendix 4).

6.3.1.3. Extent of medication compliance, inhaler technique and side effects.

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2 The goals of asthma assessment are to determine the severity of the disease, its impact on patient health and the risk of future exacerbation, hospital admissions or death.
6.3.1.4. Treatment plan\(^3\) and any necessary changes to address treatment and management needs.

6.3.1.5. Forced peak expiratory flow (PEF) where possible and in accordance with this Guideline, (personal best PEF as the highest value achieved over 2–3 weeks of twice daily pre- and post-bronchodilator monitoring during a period of good asthma control).

6.3.2. Children with asthma may receive assessment and review of their current treatment regime and level of asthma control in accordance with (Appendix 4) and in accordance with the following timelines:

6.3.2.1. At intervals of 1–3 months..

6.3.2.2. At least annually if not requiring controller medications..

6.3.2.3. More frequently if asthma is poorly controlled..

6.3.2.4. After an exacerbation.

6.3.2.5. Within one week of the exacerbation.

6.4. Recommendation 4: Pharmacological management:

6.4.1. The pharmacological management includes the following elements:

6.4.1.1. Relief therapy: defined as treatment taken by the patient for immediate relief of symptoms.

6.4.1.2. Control therapy: defined as therapy that has the potential to control the disease.

6.4.2. All medications need to be explained to the parents/guardians and/or by a licensed Healthcare Professional (pharmacist and physician), including through providing information on:

6.4.2.1. The name(s) of the medication.

6.4.2.2. The method of action of the medication.

6.4.2.3. The route of delivery.

6.4.2.4. The frequency of administration.

6.4.2.5. The technique to administer the medication (including the need to use any specific devices for its administration).

6.4.2.6. The possible side effects or interaction with other medication or substances. and

6.4.2.7. Other signs and symptoms that may coincide with medication administration.

6.4.3. Information is best given in clear and understandable language.

6.4.4. The selection of pharmacologic treatment is needed to be based on the current level of asthma control and treatment:

\(^3\) The goal of asthma self-management plan is to enable patients with asthma to gain knowledge, confidence and skills to assume a major role in the management of their asthma. This will help to achieve good control of symptoms, maintain normal activity levels and minimize future exacerbations.
a. A low dose of ICS is recommended as preferred initial treatment for children.
b. Adjusting asthma medication, stepping up or down, according to level of control (Appendix 1 A&B).
c. If control has been maintained for at least three months, treatment may be stepped down.
d. Inhaled medications are the preferred treatment. They deliver drugs directly to the airways, resulting in potent therapeutic effect with fewer side effects.

6.4.5. The recommended delivery devices to deliver inhaled medication is reported in (Appendix 5).

6.5. Recommendation 5: Asthma education for parents/guardians and/or children
6.5.1. Education and guidance should be ideally available and accessible for all parents/guardians and/or children with asthma.
6.5.2. The essential elements of asthma education to be delivered to all parents/guardians and/or children ideally include:
   6.5.2.1. Basic facts about asthma.
   6.5.2.2. Environmental control measures such as that described at (Appendix 3).
   6.5.2.3. Recognition of level of asthma control over last 4 weeks (Appendix 6 part A & B).
   6.5.2.4. Use of rescue and controller medications.
   6.5.2.5. Inhaler technique.
   6.5.2.6. Recording symptoms in diary or similar document.
   6.5.2.7. Following an action plan including at least, but not limited to information in (Appendix 7) and
   6.5.2.8. Importance of compliance with treatment and follow-up visits.
   6.5.2.9. Asthma education should be provided by appropriately trained personnel with asthma specific expertise (nurse, asthma educator, respiratory therapist, and physician).

6.6. Recommendation 6: Special consideration in managing patients with asthma aged 12 to 17 yrs
6.6.1. Asthma diagnosis may be based on:
   6.6.1.1. Careful history taking, clinical examination, and objective measures of airway obstruction and airway hyper-responsiveness.
   6.6.1.2. Smoking status.
   6.6.1.3. Exercise induced asthma.
   6.6.1.4. Psycho-social factors.
   6.6.1.5. Inhalation technique.
6.7. **Recommendation 7: Management of asthma exacerbations**

6.7.1. Severe exacerbation is considered life-threatening emergency. GINA provides Guidelines for Management of Asthma Exacerbations in the acute care setting that can be applied in primary care settings too (Appendix 8).

6.7.2. It is necessary to promptly and thoroughly assess the severity of the acute attack to determine the required type of treatment (Appendix 9).

6.7.3. Treatment is to be administered concurrently to achieve the most rapid relief of the exacerbation in accordance with guidance for initial treatment.

6.7.4. Response to the treatment may have ongoing assessment.

6.7.5. Refer to the emergency unit if:
   1. The patient presented with severe exacerbation.
   2. Exacerbation is not resolved within 1-2 hours of treatment.
   3. Acute treatment cannot be delivered at home due to social circumstances.

6.7.6. Follow up visits may be in accordance with the specified content and frequency detailed in this guideline.

6.7.7. LABA monotherapy is not advisable in an acute asthma exacerbation.
7. APPENDICES
Appendix 1: A. Recommended management of paediatric asthma (0-5 yrs)

**Intermittent Asthma**

**Step 1**

*Preferred:* SABA PRN

*Consider to add ICS for children with intermittent viral-induced wheeze and no interval symptoms, particularly if they have been admitted and or have used systemic corticosteroids.*

**Step 2**

*Preferred:* SABA PRN + daily Low dose ICS

*Alternative:* Leukotriene receptor antagonist (LTRA) Intermittent ICS

**Step 3**

*Preferred:* SABA PRN + double low dose ICS

*Alternative:* Low dose of ICS + Leukotriene receptor antagonist (LTRA) modifiers

**Step 4**

Continue Step 3 medications and refer for expert consultation

**Persistent Asthma: Daily Medication**

Consult with asthma specialist at step 3

Consider step up for patients with persistence symptoms and/or exacerbation

Consider step down once good asthma control achieved and maintained for about 3 months

At each step, consider checking for inhaler technique, adherence, triggers and comorbidities.

- Confirm the symptoms are due to asthma and refer for expert consultation if diagnosis is in doubt.
- Consider short course of oral systemic corticosteroids if exacerbation is severe or patient has history of previous severe exacerbations.
- Caution: Frequent use of SABA may indicate the need to step up treatment.

The Low Daily Dose is defined as the dose that has not been associated with clinically adverse effects in trials the included measures of safety. The low Daily Dose of:

- Beclomethasone dipropionate (HFA) is 100 mcg
- Budesonide pMDI + spacer is 200 mcg
- Budesonide nebulized is 500 mcg
- Fluticasone propionate (HFA) is 100 mcg
- Ciclesonide is 160 mcg
B. Recommended management of paediatric asthma (6-17yrs).

<table>
<thead>
<tr>
<th>Intermittent Asthma</th>
<th>Persistent Asthma: Daily Medication</th>
</tr>
</thead>
</table>

**Step 1**
*Preferred:*
SABA PRN

*Alternative:*
Daily Low dose ICS* for patients at risk of exacerbations

**Consider step down once good asthma control achieved and maintained for about 3 months**

**Step 2**

*Preferred:*
Daily Low dose ICS*

*Alternative:*
Leukotriene receptor antagonist (LTRA)

**Step 3**

*Preferred:*
Medium daily dose ICS*
OR
Low daily dose ICS* + LABA

*Alternative:*
Medium dose of ICS* + Leukotriene receptor antagonist (LTRA)

As needed short acting beta2 agonist (SABA)

**Step 4**

*Preferred:*
Continue Step 3 medication

Refer for expert consultation

At each step, consider checking for inhaler technique, adherence, triggers and comorbidities.

- Confirm the symptoms are due to asthma and refer for expert consultation if diagnosis is in doubt.
- Consider short course of oral systemic corticosteroids if exacerbation is severe or patient has history of previous severe exacerbations.
- Caution: Frequent use of SABA may indicate the need to step up treatment.
*Daily Doses of ICS by age

<table>
<thead>
<tr>
<th>Drug</th>
<th>Age</th>
<th>Low Dose (mcg)</th>
<th>Medium Dose (mcg)</th>
<th>High Dose (mcg)</th>
</tr>
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<tbody>
<tr>
<td>Beclomethasone dipropionate (CFC)</td>
<td>6-11 years</td>
<td>100 - 200</td>
<td>&gt;200 - 400</td>
<td>&gt;400</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>200 - 500</td>
<td>&gt;500 - 1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Beclomethasone dipropionate (HFA)</td>
<td>6-11 years</td>
<td>50 - 100</td>
<td>&gt;100 - 200</td>
<td>&gt;200</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>100 - 200</td>
<td>&gt;200 - 400</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Budesonide (DPI)</td>
<td>6-11 years</td>
<td>100 - 200</td>
<td>&gt;200 - 400</td>
<td>&gt;400</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>200 - 400</td>
<td>&gt;400 - 800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>Budesonide (nebulas)</td>
<td>6-11 years</td>
<td>250 - 500</td>
<td>&gt;500 - 1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Ciclesonide</td>
<td>6-11 years</td>
<td>80</td>
<td>&gt;80 - 160</td>
<td>&gt;160</td>
</tr>
<tr>
<td>Ciclesonide (HFA)</td>
<td>≥ 12 years</td>
<td>80 - 160</td>
<td>&gt;160 - 320</td>
<td>&gt;320</td>
</tr>
<tr>
<td>Fluticasone furoate (DPI)</td>
<td>6-11 years</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>100</td>
<td>NA</td>
<td>200</td>
</tr>
<tr>
<td>Fluticasone propionate (DPI)</td>
<td>6-11 years</td>
<td>100 - 200</td>
<td>&gt;200 - 400</td>
<td>&gt;400</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>100 - 250</td>
<td>&gt;250 - 500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Fluticasone propionate (HFA)</td>
<td>6-11 years</td>
<td>100 - 200</td>
<td>&gt;200 - 500</td>
<td>&gt;500</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>100 - 250</td>
<td>&gt;250 - 500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Mometasone furoate</td>
<td>6-11 years</td>
<td>110</td>
<td>≥220 - &lt;440</td>
<td>≥440</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>110 - 220</td>
<td>&gt;220 - 440</td>
<td>&gt;440</td>
</tr>
<tr>
<td>Triamcinolone acetonide</td>
<td>6-11 years</td>
<td>400 - 800</td>
<td>&gt;800 - 1200</td>
<td>≥1200</td>
</tr>
<tr>
<td></td>
<td>≥ 12 years</td>
<td>400 - 1000</td>
<td>&gt;100 - 2000</td>
<td>&gt;2000</td>
</tr>
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</table>

Refer to 2017 Global Initiative for Asthma
Appendix 2. Pulmonary specialist referral

<table>
<thead>
<tr>
<th>Consider pulmonary specialist referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ Clinical features that suggest an alternative diagnosis/require further investigations:</td>
</tr>
<tr>
<td>✓ Failure to thrive,</td>
</tr>
<tr>
<td>✓ Neonatal or very early onset of symptoms,</td>
</tr>
<tr>
<td>✓ Vomiting or choking associated with respiratory symptoms,</td>
</tr>
<tr>
<td>✓ Continuous wheezing,</td>
</tr>
<tr>
<td>✓ Failure to respond to asthma controller medications,</td>
</tr>
<tr>
<td>✓ No association of symptoms with typical triggers such as viral URTI,</td>
</tr>
<tr>
<td>✓ Focal lung or cardiovascular signs,</td>
</tr>
<tr>
<td>✓ Finger clubbing,</td>
</tr>
<tr>
<td>✓ Hypoxemia outside context of viral illness,</td>
</tr>
<tr>
<td>✓ History of recurrent oral thrush, watery stools, sinopulmonary infections, skin infections/abscesses.</td>
</tr>
<tr>
<td>→ Patient with frequent exacerbations despite adequate controller medications.</td>
</tr>
<tr>
<td>→ Intensive care unit admission.</td>
</tr>
</tbody>
</table>
### Strategies for avoiding common allergens and pollutants

- **Decreasing environmental exposure to the following can enhance asthma control:**
  - All types of smoking.
  - Perfumes and burning fragrances such as bakhour.
  - Drugs, food additives and preservatives that cause symptoms.

- **Other interventions have shown to decrease the exposure to indoor allergens, but clinically controversial:**
  - Outdoor pollens, sand storms and mold: Close windows and doors and remain indoors when pollen, sand storm and mold counts are highest.
  - House dust mites: wash bed linens and blankets weekly in hot water and dry in the sun. Use anti-allergic bedding if possible and/or mattress covers and encasings. Replace carpets with hard flooring, especially in sleeping rooms. Use vacuum cleaner with filters.
  - Pets with fur: Use air filters. Remove the pet from the home, or at least from the sleeping area.
  - Cockroaches: Clean the home thoroughly. Use pesticide spray, but make sure the patient is not at home when spraying occurs.
  - Indoor mold: Reduce humidity in the house. Clean damp areas frequently.
### Appendix 4: Assessment of Asthma Control:

**A. Classification of Asthma Severity in children 0-11yrs**

#### I. Assessing asthma control children 0-11 yrs (last 4 weeks)

<table>
<thead>
<tr>
<th>Features</th>
<th>Controlled (all of the following)</th>
<th>Partially Controlled (Any measure present)</th>
<th>Uncontrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daytime symptoms</strong> (wheezing, cough, difficult breathing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children 0-5 yrs. : &gt;1 day/week</td>
<td>None</td>
<td>1 or 2 features</td>
<td></td>
</tr>
<tr>
<td>Children 6-11 yrs. : &gt;2 days/week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Activity limitation</strong> (i.e. Laughing, crying, playing..)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Night time symptoms</strong> (awakening)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Need for reliever</strong> (SABA))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children 0-5 yrs. : &gt;once/week</td>
<td>Normal</td>
<td>&lt;80% predicted or personal best (if known)</td>
<td></td>
</tr>
<tr>
<td>Children 6-11 yrs. : &gt;twice/week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FEV₁ or peak flow</strong> (Lung function)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma control test score ≥4 years age</td>
<td>≥20</td>
<td>16–19</td>
<td>&lt;16</td>
</tr>
</tbody>
</table>

#### II. Assessing asthma future risk factors (should be at diagnosis, periodically and specially for patients with exacerbation history)

<table>
<thead>
<tr>
<th>Asthma flare-ups within the coming months</th>
<th>Children 0-5 yrs.</th>
<th>Children 6-11 yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor adherence with controller medication, or incorrect inhaler techniques.</td>
<td>High SABA use.</td>
</tr>
<tr>
<td></td>
<td>Uncontrolled asthma symptoms.</td>
<td>Low FEV₁ (&lt;60%).</td>
</tr>
<tr>
<td></td>
<td>The start of the child’s usual seasonal “flare-up” especially in combination with viral infection.</td>
<td>Comorbidities i.e obesity, food allergy gastroesophageal reflux, rhinosinusitis..</td>
</tr>
<tr>
<td></td>
<td>Exposure to tobacco smoke, indoor or outdoor air pollution &amp; indoor allergens.</td>
<td>Uncontrolled asthma symptoms.</td>
</tr>
<tr>
<td></td>
<td>Major psychological or socioeconomic problems for child or family.</td>
<td>The start of the child’s usual seasonal “flare-up” especially in combination with viral infection.</td>
</tr>
<tr>
<td></td>
<td>≥1 hospitalizations due to acute asthma.</td>
<td></td>
</tr>
</tbody>
</table>
- Exposure to tobacco smoke, indoor or outdoor air pollution & indoor allergens.
- Major psychological or socioeconomic problems for child or family.
- ≥1 hospitalizations due to acute asthma.

| Develop fixed airflow limitation | **Children 0-5yrs:**
|                                 | • Severe asthma with several hospitalization.
|                                 | • History of recurrent bronchiolitis.
|                                 | **Children 6-11yrs:**
|                                 | • Inadequate ICS treatment.
|                                 | • Exposure to tobacco smoke, noxious chemicals, manufacturing fumes.
|                                 | • Low initial FEV1, persistent symptoms in between episodes, or blood eosinophilia while alternative diagnosis such as foreign body, cystic fibrosis and bronchopulmonary aspergillosis (ABPA) should be considered.

| Medication side effects         | • Frequent courses of OCS or high-dose ICS.
|                                 | • Incorrect use of inhaler or nebulized medications (Must review technique during each visit).

Refer to 2017 Global Initiative for Asthma
**Appendix 5. The recommended Inhaler delivery devices**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Preferred Device</th>
<th>Alternative Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 years</td>
<td>pMDI plus a spacer with face mask</td>
<td>nebulizer with face mask</td>
</tr>
<tr>
<td>4-6 years</td>
<td>pMDI plus a spacer with mouthpiece</td>
<td>pMDI plus a spacer with a face mask or, a nebulizer with mouthpiece or face mask</td>
</tr>
<tr>
<td>&gt; 6 years</td>
<td>Dry powder inhaler, or breath-actuated pMDI, or pMDI with spacer and mouth piece</td>
<td>Nebulizer with mouthpiece</td>
</tr>
</tbody>
</table>
Appendix 6: A. Asthma Control Test (ACT) for children ages 4 to 11 yrs.
(English version):

Asthma Control Test (from 4 to 11 years old)

Do you want to know about your child asthma control level, or if your child treatment plan need to be changed, then simply:
- Choose the most appropriate answer and write it’s score in the circle to the right.
- The total score will help you and the doctor to discuss the treatment plan.

First: Help your child to respond to the first four questions:

**Q1**: How do you feel your asthma is today?
- 0 Very bad
- 1 Bad
- 2 Good
- 3 Very good

**Q2**: To what extent does asthma prevent you from playing, running or exercising?
- 0 Very bad, I can’t play & run
- 1 Bad, I don’t like it, Sometimes I can’t play & run
- 2 Bad, but still I can play & run
- 3 Good, I can always play & run

**Q3**: Does asthma make you cough?
- 0 Yes, always
- 1 Yes, sometimes
- 2 No, rarely
- 3 No, never cough from asthma

**Q4**: Does asthma disturb your sleep at night?
- 0 Yes, always
- 1 Yes, sometimes
- 2 No, rarely
- 3 No, never wake up from asthma

Second: Complete the remaining questions on your own:

**Q5**: During the past 4 weeks, how often did your child have asthma attack during daytime?
- 0 Every Day
- 1 19-24 Days/Month
- 2 11-10 Days/Month
- 3 1-3 Days/Month
- 4 Never

**Q6**: During the past 4 weeks, how often did your child have wheezing during day time?
- 0 Every Day
- 1 19-24 Days/Month
- 2 11-18 Days/Month
- 3 1-3 Days/Month
- 4 Never

**Q7**: During the past 4 weeks, how often did your child wake up during night from asthma?
- 0 Every Day
- 1 19-24 Days/Month
- 2 11-18 Days/Month
- 3 1-3 Days/Month
- 4 Never

If your child’s score is 19 or less this may indicate that your child’s asthma is not controlled as it should be. Share it with the doctor & ask him if your child treatment plan needs changing.

Asthma Control Test (ACT) for children ages 4 to 11 yrs. (Arabic version):

B. Asthma control Test (ACT) for children ages 12yrs and older:

Cont. Score definition of ACT for children ages 12 yrs and older:

**Score 19 or less**
asthma is uncontrolled or poorly controlled. Discuss your result with your doctor. There are other treatments that can control your asthma.

**Score 24-20**
You have some control over your asthma. You can do better. Ask your doctor if you should change your treatment plan.

**Score 25**
You have control over your asthma, good work. Keep it up.

Appendix 7: A. Asthma self-management plan for children/guardians
B. Arabic translation of the Asthma self-management plan for children/guardians
## Appendix 8. Primary care management for acute paediatric asthma

<table>
<thead>
<tr>
<th>Asthma Severity</th>
<th>Mild / Moderate</th>
<th>Severe / Life-threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If required, administering oxygen therapy, and titrating oxygen saturation to target of 94-98% (children).</td>
<td>Arrange immediate transfer to higher level care and while waiting give:</td>
</tr>
</tbody>
</table>
|                | • Give SABA (100 mcg per puff) using pMDI with spacer or by 2.5mg nebulizer.  
• Repeat every 20 minutes for the first hour. | 1. SABA via nebulization with oxygen.  
2. Ipratropium bromide.  
3. Methylprednisolone 1 mg/kg BID, IV maximum 60 mg |
|                | **SABA**  
5-10 kg. 4 puffs by pMDI + spacer (repeat every 20 min. for the first hour and then prn)  
or 2.5 mg (0.5 ml) nebulized  
10-20 kg 6 puffs pMDI + spacer (repeat every 20 min. for the first hour and then prn) or 3.75 mg (0.75 ml)nebulized  
>20 kg albuterol 5 mg (5 ml) or 8 puffs pMDI+spacer (repeat every 20 min. for the first hour and then prn) | |
|                | **Ipratropium bromide**  
Add to SABA in the first hour in moderate-severe exacerbation or poor response to initial SABA treatment  
5-10 kg 500 mcg over 1 hour or 250 mcg every 20 minutes X 2 doses  
> 10 kg 1000 mcg over 1 hour, or 500 mcg every 20 minutes X 2 doses | |
|                | **Oral prednisolone (1-2mg/kg) Max. 60mg daily**  
Dexamethasone preferred for all ages for mild to moderate asthma exacerbation:  
5-8 kg: 4 mg  
8-12 kg: 8 mg  
>12 kg: 8 mg | |
|                | **Observation**  
Monitor closely for 1-2 hr. | |
|                | **IF**  
1. Failure to respond after 1hr or showing tachypnea, and decreasing oxygen saturation, arrange immediate transfer to higher-level care.  
2. Symptoms improved but recur within 3-4hrs continue SABA and definitely start oral steroids.  
3. Symptoms are controlled within 1-2 hrs. give SABA every 3-4hrs. and double low dose of ICS (for few weeks or months.)  
4. Time to discharge, patient/guardian should receive the proper follow-up visit plan (2-7 days), check inhaler technique and adherence and provide and explain the self-management action plan | |
### Appendix 9. Assessment of asthma severity in exacerbation

<table>
<thead>
<tr>
<th>Asthma Severity</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Rate per min</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3 years</td>
<td>27-34</td>
<td>35-39</td>
<td>&gt;40</td>
</tr>
<tr>
<td>4-5 years</td>
<td>25-30</td>
<td>31-35</td>
<td>&gt;36</td>
</tr>
<tr>
<td>6-12 years</td>
<td>21-26</td>
<td>27-30</td>
<td>&gt;31</td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>19-23</td>
<td>24-27</td>
<td>&gt;28</td>
</tr>
<tr>
<td><strong>Oxygen Saturation (SpO2) on room air</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5 yrs.</td>
<td>95% - 97%</td>
<td>≥92%</td>
<td>&lt; 92%</td>
</tr>
<tr>
<td>≥6 yrs.</td>
<td>90% - 95%</td>
<td></td>
<td>&lt; 92%</td>
</tr>
<tr>
<td><strong>Auscultation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End expiratory wheezes only</td>
<td></td>
<td>Expiratory wheezing</td>
<td>Inspiratory and expiratory wheezing to diminished breath sounds</td>
</tr>
<tr>
<td><strong>Retractions</strong></td>
<td>Intercostal</td>
<td>Intercostal &amp; substernal</td>
<td>Intercostal, substernal and supraclavicular</td>
</tr>
<tr>
<td><strong>Dyspnea</strong></td>
<td>Speaks in short sentences, prefers sitting to lying, coos and babbles</td>
<td>Speaks in partial sentences, short cry</td>
<td>Unable to speak or drink Short Drowsy, confused or silent chest</td>
</tr>
</tbody>
</table>
8. REVIEWERS

<table>
<thead>
<tr>
<th>Name of Reviewers</th>
<th>Profession</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Afaf Alblooshi</td>
<td>Medical Research Specialist  UAE University</td>
<td>United Arab Emirates University</td>
</tr>
<tr>
<td>Dr. Alia Alkalbani</td>
<td>Specialist Pediatrician</td>
<td>Tawam Hospital</td>
</tr>
<tr>
<td>Dr. Anwar Sallam</td>
<td>Consultant Pediatric Pulmonologist</td>
<td>Sheikh Khalifa Medical City</td>
</tr>
<tr>
<td>Dr. Asma Al Nuaimi</td>
<td>Consultant Pediatric Pulmonologist</td>
<td>Zayed Military Hospital</td>
</tr>
<tr>
<td>Dr. Durdana Iram</td>
<td>Consultant Pulmonologist</td>
<td>Tawam Hospital</td>
</tr>
<tr>
<td>Dr. Eyman Bashir Shebani</td>
<td>Consultant Pediatrician</td>
<td>Sheikh Khalifa Medical City</td>
</tr>
<tr>
<td>Dr. Jayachandran Ramchandran Panickar</td>
<td>Consultant Pediatric Pulmonologist</td>
<td>Sheikh Khalifa Medical City</td>
</tr>
<tr>
<td>Dr. Majid Mohammed Al Saleh Al Teneiji</td>
<td>Specialist Pediatrician</td>
<td>Tawam Hospital</td>
</tr>
<tr>
<td>Dr. Mohammed Al Samri</td>
<td>Consultant Pediatric Pulmonologist</td>
<td>Tawam Hospital</td>
</tr>
<tr>
<td>Dr. Sofia Konstantinopoulou</td>
<td>Consultant Pulmonologist</td>
<td>Sheikh Khalifa Medical City</td>
</tr>
<tr>
<td>Dr. Vishwanath K Gowraiah</td>
<td>Consultant Pediatric Pulmonologist</td>
<td>NMC Royal Hospital, Abu Dhabi</td>
</tr>
</tbody>
</table>

9. BIBLIOGRAPHY

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