



Asthma Management



Components of Asthma Management

- Measures of Asthma Assessment & Monitoring
- Education for a Partnership in Asthma Care
- Control of Environmental Factors & Comorbid Conditions that affect Asthma
- Medications



Prevention of Asthma

- Reduce exposure to indoor allergens
- Avoid tobacco smoke
- Avoid vehicle emission
- Identify irritants in the workplace
- Explore role of infections on asthma development, especially in children and young infants



Other co-morbid factors

GERD
Rhinitis
Anxiety



Regular Assessment and Monitoring

ASTHMA SEVERITY

ASTHMA CONTROL

RESPONSE TO THERAPY



Clinical Control of Asthma

- No (or minimal)* daytime symptoms
- No limitations of activity
- No nocturnal symptoms
- No (or minimal) need for rescue medication
- Normal lung function
- No exacerbations

** Minimal = twice or less per week*

Classification of Asthma Severity (0–4 years of age)

Components of Severity		Classification of Asthma Severity (0–4 years of age)			
		Intermittent	Persistent		
	Mild		Moderate	Severe	
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	0	1–2x/month	3–4x/month	> 1x/week
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2 exacerbations in 6 months requiring oral systemic corticosteroids, or ≥4 wheezing episodes/1 year lasting > 1 day AND risk factors for persistent asthma		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time. →			
		Exacerbations of any severity may occur in patients in any severity category.			
Recommended Step for Initiating Therapy (See figure 4–1a for treatment steps.)		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	
		In 2–6 weeks, depending on severity, evaluate level of asthma control that is achieved. If no clear benefit is observed in 4–6 weeks, consider adjusting therapy or alternative diagnoses.			

Level of severity is determined by both impairment and risk. Assess impairment by caregivers recall of previous 2-4 weeks

NOT Currently Taking Controllers

Components of Severity		Classification of Asthma Severity (5–11 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV₁ between exacerbations • FEV₁ >80% predicted • FEV₁/FVC >85%	• FEV₁ = >80% predicted • FEV₁/FVC >80%	• FEV₁ = 60–80% predicted • FEV₁/FVC = 75–80%	• FEV₁ <60% predicted • FEV₁/FVC <75%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) 		
		 Consider severity and interval since last exacerbation.  Frequency and severity may fluctuate over time for patients in any severity category.			
		Relative annual risk of exacerbations may be related to FEV ₁ .			
Recommended Step for Initiating Therapy (See figure 4–1b for treatment steps.)		Step 1	Step 2	Step 3, medium-dose ICS option	Step 3, medium-dose ICS option, or step 4
		and consider short course of oral systemic corticosteroids			
		In 2–6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

NOT Currently Taking Controllers

Components of Severity		Classification of Asthma Severity ≥12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV ₁ /FVC: 8–19 yr 85% 20–39 yr 80% 40–59 yr 75% 60–80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily, and not more than 1x on any day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV₁ between exacerbations • FEV₁ >80% predicted • FEV₁/FVC normal	• FEV₁ >80% predicted • FEV₁/FVC normal	• FEV₁ >60% but <80% predicted • FEV₁/FVC reduced 5%	• FEV₁ <60% predicted • FEV₁/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note) 		
		 Consider severity and interval since last exacerbation.  Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV ₁ .			
Recommended Step for Initiating Treatment (See figure 4–5 for treatment steps.)		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	Step 4 or 5
		In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			



Levels of Asthma Control

<i>Characteristic</i>	Controlled (All of the following)	Partly controlled (Any present in any week)	Uncontrolled
Daytime symptoms	None (2 or less / week)	More than twice / week	3 or more features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms / awakening	None	Any	
Need for rescue / "reliever" treatment	None (2 or less / week)	More than twice / week	
Lung function (PEF or FEV₁)	Normal	< 80% predicted or personal best (if known) on any day	
Exacerbation	None	One or more / year week	1 in any week

Assessing Asthma Control in Children 0 - 4 Years of

Components of Control		Classification of Asthma Control (Children 0–4 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	1x/month	>1x/month	>1x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	2–3/year	>3/year
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.		

Assessing Asthma Control in Children 5 - 11 Years of Age

Components of Control		Classification of Asthma Control (Children 5–11 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week but not more than once on each day	>2 days/week or multiple times on ≤2 days/week	Throughout the day
	Nighttime awakenings	≤1x/month	≥2x/month	≥2x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	Lung function - FEV₁ or peak flow - FEV₁/FVC	>80% predicted/personal best >80%	60–80% predicted/personal best 75–80%	<60% predicted/personal best <75%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2/year (see note)	
		Consider severity and interval since last exacerbation		
	Reduction in lung growth	Evaluation requires long-term followup.		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.		

Assessing Asthma Control in Youths ≥ 12 Years of Age & Adults

Components of Control		Classification of Asthma Control (Youths ≥12 years of age and adults)		
		Well-Controlled	Not Well-Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	> 2 days/week	Throughout the day
	Nighttime awakening	≤2x/month	1–3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	> 2 days/week	Several times per day
	FEV ₁ or peak flow	> 80% predicted/ personal best	60–80% predicted/ personal best	< 60% predicted/ personal best
	Validated Questionnaires ATAQ ACQ ACT	0 ≤0.75* ≥20	1–2 ≥1.5 16–19	3–4 N/A ≤15
Risk	Exacerbations	0–1/year	≥2/year (see note)	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term followup care		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.		

ASTHMA THERAPY ASSESSMENT QUESTIONNAIRE® (ATAQ)

1. In the past 4 weeks did you miss any work, school, or normal daily activities because of your asthma? (1 point for YES)
2. In the past 4 weeks, did you wake up at night because of your asthma? (1 point for YES)
3. Do you believe your asthma was well controlled in the past 4 weeks? (1 point for NO)
4. Do you use an inhaler for quick relief from asthma symptoms? If yes, what is the highest number of puffs in 1 day you took of this inhaler? (1 point for more than 12)

Total points = 0–4, with more points indicating more control problems

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Asthma Control Questionnaire (ACQ)

- | | | |
|---|---|-----------------------------------|
| 1. On average, during the past week, how often were you woken by your asthma during the night? | 0 | Never |
| | 1 | Hardly ever |
| | 2 | A few minutes |
| | 3 | Several times |
| | 4 | Many times |
| | 5 | A great many times |
| | 6 | Unable to sleep because of asthma |
| 2. On average, during the past week, how bad were your asthma symptoms when you woke up in the morning? | 0 | No symptoms |
| | 1 | Very mild symptoms |
| | 2 | Mild symptoms |
| | 3 | Moderate symptoms |
| | 4 | Quite severe symptoms |
| | 5 | Severe symptoms |
| | 6 | Very severe symptoms |
| 3. In general, during the past week, how limited were you in your activities because of your asthma? | 0 | Not limited at all |
| | 1 | Very slightly limited |
| | 2 | Slightly limited |
| | 3 | Moderately limited |
| | 4 | Very limited |
| | 5 | Extremely limited |
| | 6 | Totally limited |
| 4. In general, during the past week, how much shortness of breath did you experience because of you asthma? | 0 | None |
| | 1 | A very little |
| | 2 | A little |
| | 3 | A moderate amount |
| | 4 | Quite a lot |
| | 5 | A great deal |
| | 6 | A very great deal |

Asthma Control Questionnaire (ACQ)

- | | |
|--|---------------------------------|
| 5. In general, during the past week, how much of the time did you wheeze ? | 0 Not at all |
| | 1 Hardly any of the time |
| | 2 A little of the time |
| | 3 A moderate amount of the time |
| | 4 A lot of the time |
| | 5 Most of the time |
| | 6 All the time |
| 6. On average, during the past week, how many puffs of short-acting bronchodilator (eg. Ventolin) have you used each day? | 0 None |
| | 1 1–2 puffs most days |
| | 2 3–4 puffs most days |
| | 3 5–8 puffs most days |
| | 4 9–12 puffs most days |
| | 5 13–16 puffs most days |
| | 6 More than 16 puffs most days |

To be completed by a member of the clinic staff

- | | |
|--|------------------|
| 7. FEV ₁ pre-bronchodilator: | 0 >95% predicted |
| | 1 95–90% |
| FEV ₁ predicted | 2 89–80% |
| | 3 79–70% |
| FEV ₁ % predicted | 4 69–60% |
| (Record actual values on the dotted lines | 5 59–50% |
| and score the FEV ₁ % predicted in the next | 6 <50% predicted |
| column) | |

Asthma Control Test

1. In the past **4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?

All of
the time

1

Most of
the time

2

Some of
the time

3

A little of
the time

4

None of
the time

5

2. During the past **4 weeks**, how often have you had shortness of breath?

More than
once a day

1

Once a day

2

3 to 6 times
a week

3

Once or twice
a week

4

Not at all

5

3. During the past **4 weeks**, how often did your **asthma** symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?

4 or more
nights a week

1

2 or 3 nights
a week

2

Once a week

3

Once
or twice

4

Not at all

5

4. During the past **4 weeks**, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?

3 or more
times per day

1

1 or 2 times
per day

2

2 or 3 times
per week

3

Once a week
or less

4

Not at all

5

5. How would you rate your **asthma** control during the **past 4 weeks**?

Not controlled
at all

1

Poorly
controlled

2

Somewhat
controlled

3

Well
controlled

4

Completely
controlled

5

Childhood Asthma Control Test

Have your child complete these questions.

1. How is your asthma today?



0

Very bad



1

Bad



2

Good



3

Very good

2. How much of a problem is your asthma when you run, exercise or play sports?



0

It's a big problem, I can't do what I want to do.



1

It's a problem and I don't like it.



2

It's a little problem but it's okay.



3

It's not a problem.

3. Do you cough because of your asthma?



0

Yes, all of the time.



1

Yes, most of the time.



2

Yes, some of the time.



3

No, none of the time.

4. Do you wake up during the night because of your asthma?



0

Yes, all of the time.



1

Yes, most of the time.



2

Yes, some of the time.



3

No, none of the time.

Childhood Asthma Control Test

Please complete the following questions on your own.

5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms?

5

Not at all

4

1-3 days

3

4-10 days

2

11-18 days

1

19-24 days

0

Everyday

6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma?

5

Not at all

4

1-3 days

3

4-10 days

2

11-18 days

1

19-24 days

0

Everyday

7. During the last 4 weeks, how many days did your child wake up during the night because of asthma?

5

Not at all

4

1-3 days

3

4-10 days

2

11-18 days

1

19-24 days

0

Everyday

Asthma Control Test (ACT)

- For adults and children ≥ 12 yr : An ACT score of ≥ 20 indicates a child with well-controlled asthma, a value of 16-19 indicates not well-controlled asthma, and ≤ 15 indicates very poorly controlled asthma
- Childhood ACT (C-ACT, for children 4-11 yr): A score ≥ 20 indicates well controlled, 13-19 indicates not well controlled; and ≤ 12 indicates very poorly controlled.



Component 4: Asthma Management and Prevention Program

Reliever Medications

- Rapid-acting inhaled β_2 -agonists
- Systemic glucocorticosteroids
- Anticholinergics
- Theophylline
- Short-acting oral β_2 -agonists



Component 4: Asthma Management and Prevention Program

Controller Medications

- Inhaled glucocorticosteroids
- Leukotriene modifiers
- Long-acting inhaled β_2 -agonists
- Systemic glucocorticosteroids
- Theophylline
- Cromones
- Anti-IgE, Anti-IL4, Anti-IL5
- Second generation Antihistamine

Classifying Severity AFTER Control is Achieved – All Ages

Lowest level of treatment required to maintain control	Classification of Asthma Severity			
	Intermittent	Persistent		
		Mild	Moderate	Severe
	Step 1	Step 2	Step 3 or 4	Step 5 or 6

(already on controller)

Stepwise Approach for Managing Asthma in Children 0-4 Years of Age

**Intermittent
Asthma**

Persistent Asthma: Daily Medication
Consult asthma specialist if step 3 care or higher is required.
Consider consultation at step 2

Step 1

Preferred
**SABA
PRN**

Step 2

Preferred
**Low dose
ICS**
Alternative
**Montelukast
or
Cromolyn**

Step 3

Preferred
**Medium
Dose ICS**

Step 4

Preferred
**Medium
Dose ICS**

AND

**Either:
Montelukast
or LABA**

Step 5

Preferred
**High
Dose ICS**

AND

**Either:
Montelukast
or LABA**

Step 6

Preferred
**High
Dose ICS**

AND

**Either:
Montelukast
or LABA**

AND

**Oral
corticosteroid**

**Step up if
needed**

(first check
adherence,
environmen-
tal control)

**Assess
control**

**Step
down if
possible**

(and
asthma is
well
controlled
at least 3
months)

Patient Education and Environmental Control at Each Step

Quick-relief medication for ALL patients -SABA as needed for symptoms.
With VURI: SABA every 4-6 hours up to 24 hours.
Consider short course of corticosteroids with (or hx of) severe exacerbation

Stepwise Approach for Managing Asthma in Youths ≥ 12 Years of Age & Adults

Intermittent Asthma

Persistent Asthma: Daily Medication
Consult asthma specialist if step 4 care or higher is required.
Consider consultation at step 3

Step 1

**SABA
PRN**
As needed
ICS
formoterol

Step 2

Preferred:
Low dose ICS

Alternative:
Cromolyn,
LTRA,
Nedocromil or
Theophylline

Step 3

Preferred:
Low-dose ICS +
LABA
OR – Medium
dose ICS

Alternative:
Low-dose ICS +
either LTRA,
Theophylline

Step 4

Preferred:
Medium
Dose ICS +
LABA

Alternative:
Medium-
dose ICS +
either LTRA,
Theophylline

Step 5

Preferred
High
Dose ICS +
LABA

AND

Consider
Omalizumab
for patients
who have
allergies

Step 6

Preferred
High dose
ICS + LABA +
oral
corticosteroid

AND

Consider
Omalizumab
for patients
who have
allergies

**Step up if
needed**

(first check
adherence,
environmental
control &
comorbid
conditions)

**Assess
control**

**Step
down if
possible**

(and
asthma is
well
controlled
at least 3
months)

Each Step: Patient Education and Environmental Control and management of comorbidities

Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

- **Quick-relief medication for ALL patients** -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of oral systemic corticosteroids may be needed.
- **Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.**

Low, medium and high dose inhaled corticosteroids Children 6–11 years



Inhaled corticosteroid	Total daily dose (mcg)		
	Low	Medium	High
Beclometasone dipropionate (CFC)	100–200	>200–400	>400
Beclometasone dipropionate (HFA)	50–100	>100–200	>200
Budesonide (DPI)	100–200	>200–400	>400
Budesonide (nebulers)	250–500	>500–1000	>1000
Ciclesonide (HFA)	80	>80–160	>160
Fluticasone furoate (DPI)	n.a.	n.a.	n.a.
Fluticasone propionate (DPI)	100–200	>200–400	>400
Fluticasone propionate (HFA)	100–200	>200–500	>500
Mometasone furoate	110	≥220–<440	≥440
Triamcinolone acetonide	400–800	>800–1200	>1200

- This is not a table of equivalence, but of estimated clinical comparability
- Most of the clinical benefit from ICS is seen at low doses
- High doses are arbitrary, but for most ICS are those that, with prolonged use, are associated with increased risk of systemic side-effects

Low, medium and high dose inhaled corticosteroids Adults and adolescents (≥ 12 years)



Inhaled corticosteroid	Total daily dose (mcg)		
	Low	Medium	High
Beclometasone dipropionate (CFC)	200–500	>500–1000	>1000
Beclometasone dipropionate (HFA)	100–200	>200–400	>400
Budesonide (DPI)	200–400	>400–800	>800
Ciclesonide (HFA)	80–160	>160–320	>320
Fluticasone furoate (DPI)	100	n.a.	200
Fluticasone propionate (DPI or HFA)	100–250	>250–500	>500
Mometasone furoate	110–220	>220–440	>440
Triamcinolone acetonide	400–1000	>1000–2000	>2000

- This is not a table of equivalence, but of estimated clinical comparability
- Most of the clinical benefit from ICS is seen at low doses
- High doses are arbitrary, but for most ICS are those that, with prolonged use, are associated with increased risk of systemic side-effects



Component 4: Manage Asthma Exacerbations

Treatment of exacerbations depends on:

- The patient
- Experience of the health care professional
- Therapies that are the most effective for the particular patient
- Availability of medications
- Emergency facilities



Component 4: Manage Asthma Exacerbations

Primary therapies for exacerbations:

- Repetitive administration of rapid-acting inhaled β_2 -agonist
- Early introduction of systemic glucocorticosteroids
- Oxygen supplementation

Closely monitor response to treatment with serial measures of lung function



Emergency Department Management

Acute Asthma



Assess, treat and monitor asthma

- Monitoring:
- Typically patients should be seen 1-3 months after the initial visit, and every 3 months thereafter
- After an exacerbation, FU within 2-4 weeks

Asthma Action Plan

DATE: ____/____/____ PATIENT NAME: _____
 WEIGHT: _____ PARENT/GUARDIAN NAME: _____ PHONE: _____
 HEIGHT: _____ PRIMARY CARE PROVIDER/CLINIC NAME: _____ PHONE: _____
 DOB: ____/____/____ WHAT TRIGGERS MY ASTHMA: _____

Baseline Severity

Best Peak Flow

Always use a **holding chamber/spacer with/without** a mask with your inhaler. (circle choices)

GREEN ZONE

You have ALL of these:

- ☐ Breathing is good
- ☐ No cough or wheeze
- ☐ Can work/play easily
- ☐ Sleeping all night

Peak Flow is between:

 and

80-100% of personal best

DOING WELL

Step 1: Take these controller medicines every day:

MEDICINE	HOW MUCH	WHEN

Step 2: If exercise triggers your asthma, take the following medicine **15 minutes before** exercise or sports.

MEDICINE	HOW MUCH

GO!

YELLOW ZONE

You have ANY of these:

- ☐ It's hard to breathe
- ☐ Coughing
- ☐ Wheezing
- ☐ Tightness in chest
- ☐ Cannot work/play easily
- ☐ Wake at night coughing

Peak Flow is between:

 and

50-75% of personal best

GETTING WORSE

Step 1: Keep taking **GREEN ZONE** medicines and **ADD** quick-relief medicine:

_____ puffs or 1 nebulizer treatment of _____

Repeat after 20 minutes if needed (for a maximum of 2 treatments).

Step 2: Within 1 hour, if your symptoms aren't better or you don't return to the **GREEN ZONE**, take your **oral steroid** medicine _____ and call your health care provider today.

Step 3: If you are in the **YELLOW ZONE** more than 6 hours, or your symptoms are **getting worse**, follow **RED ZONE** instructions.

CAUTION

RED ZONE

You have ANY of these:

- ☐ It's very hard to breathe
- ☐ Nostrils open wide
- ☐ Ribs are showing
- ☐ Medicine is not helping
- ☐ Trouble walking or talking
- ☐ Lips or fingernails are grey or bluish

Peak Flow is between:

 and

Below 50% of personal best

EMERGENCY

Step 1: Take your quick-relief medicine **NOW**:

MEDICINE	HOW MUCH

or 1 nebulizer treatment of _____

AND

Step 2: Call your health care provider **NOW**

AND

Go to the emergency room **OR CALL 911** immediately.

GET HELP NOW!

_____ This Asthma Action Plan provides authorization for the administration of medicine described in the AAP.
 _____ This child has the knowledge and skills to self-administer quick-relief medicine at school or daycare with approval of the school nurse.

DATE: ____/____/____ MD/NP/PA SIGNATURE: _____

This consent may supplement the school or daycare's consent to give medicine and allows my child's medicine to be given at school/daycare.
 My child (circle one) **may / may not** carry, self-administer and use quick-relief medicine at school with approval from the school nurse (if applicable).

DATE: ____/____/____ PARENT/ GUARDIAN SIGNATURE: _____

FOLLOW-UP APPOINTMENT IN _____ AT _____ PHONE: _____

