ASTHMA DIAGNOSIS AND TREATMENT

ADULTS AND CHILDREN > 5 YEARS

	Mild Intermittent Step 1	Mild Persistent Step 2	Mod. Persistent Step 3	Severe Persistent Step 4
Symptom Frequency	≤ 2 per week	> 2 per week	Every day	Continuous
Nocturnal Symptoms	≤ 2 per month	>2 per month	>1 per week	Frequent
PEF Max	≥80%	≥80%	>60 and < 80%	≤60%
PEF Variabiltiy	<20%	20-30%	>30%	>30%
Broncho-dilator Use	<1 per week	≤8 puffs / day	10 puffs / day	>10 puffs / day
Activity		May be limited	Limited	Limited
Post Attack Pulmonary Function	Normal	Normal	May not return to normal	May not return to normal
Chronic Control Medication (Daily)	None	Flunisolide (Aerobid) MDI with spacer 2 puffs BID **OR** Triamcinolone (Azmacort) MDI 4 puffs BID **Alternative** Nedocromil (Tilade) MDI with spacer 2 puffs QID	Flunisolide (Aerobid) MDI with spacer 4 puffs BID **OR** Budesonide (Pulmicort) MDI 2-3 inhalations QD **AND** Salmeterol (Serevent) Discus* 1 inhalation QD-BID	Budesonide (Pulmicort) MDI >3 inhalations QD **AND** Salmeterol (Serevent) Discus* 1 inhalation QD-BID
Acute Rescue Medication**	Albuterol MDI with spacer 2-4 puffs q 4-6 hr PRN or 0.5 ml via nebulizer q 4-6 hr +/- Ipratropium (Atrovent) 500mcg (1 vial) via nebulizer q 6 hr – may mix with albuterol			
Acute Viral Respiratory Infections***	Albuterol q 4-6 hr up to 24 hours (longer with MD consult) For severe exacerbations: short course "burst" of prednisone 40-60mg per day as a single or two divided doses for 3-10 days.			

* Avoid use of salmeterol without concomitant inhaled steroids. Overuse of salmeterol has been associated with worsening asthma and increased mortality in a retrospective report.

** Use of albuterol >2 times per week in intermittent asthma (daily or increasing use in persistent asthma) may indicate the need to initiate or increase long-term control medications.

*** Hi Dose Taper: 60mg day 1, 60mg day 2, 40mg day 3, 40mg day 4, 20mg day 5, 20mg day 6, 10mg day 7, 10mg day 8
Low Dose Taper: 40mg day 1, 35mg day 2, 30mg day 3, 25mg day 4, 20mg day 5, 15mg day 6, 10mg day 7, 5mg day 8

ASTHMA DIAGNOSIS AND TREATMENT

INFANTS AND CHILDREN ≤ 5 YEARS

	Mild Intermittent Step 1	Mild Persistent Step 2	Mod. Persistent Step 3	Severe Persistent Step 4
Symptom Frequency	≤ 2 per week	> 2 per week	Every day	Continuous
Nocturnal Symptoms	≤ 2 per month	>2 per month	>1 per week	Frequent
Broncho-dilator Use	<1 per week	≤ 8 puffs / day	10 puffs/ day	>10 puffs / day
Activity		May be limited	Limited	Limited
Post Attack Pulmonary Function	Normal	Normal	May not return to normal	May not return to normal
Chronic Control Medication (Daily)	None	Flunisolide (Aerobid) MDI with aerochamber mask 1 puff BID *≥ 6 Years* ***OR*** Budesonide (Pulmicort) respules 0.25 mg BID *≥ 1 Year* ***OR*** Fluticasone* 44 or 50 mcg (Flovent) 2 puffs BID *≥ 4 yrs* ***OR*** Montelukast* (Singulair) 4mg QPM *≥ 1 year* **May Consider** Nedocromil (Tilade) MDI with spacer 2 puffs QID *≥ 6 yrs*	Flunisolide (Aerobid) MDI with aerochamber mask 2 puffs BID *≥ 6 Years* ***OR*** Budesonide (Pulmicort) respules 0.5 mg BID *≥ 1 Year* ***OR*** Fluticasone* 100 or 110 mcg (Flovent) 2 puffs BID *≥ 4 yrs* **May Consider** Montelukast* (Singulair) 4 mg QPM *≥ 1 year*	Flunisolide (Aerobid) MDI with aerochamber mask 2 puffs BID *≥ 6 Years* ***OR*** Budesonide (Pulmicort) respules 0.5 mg BID *≥ 1 Year* ***OR*** Fluticasone* 220 or 250 mcg (Flovent) 2 puffs BID *≥ 4 yrs* **May Consider** Montelukast* (Singulair) 4 mg QPM *≥ 1 year*
Acute Rescue Medication**	Albuterol MDI with spacer 2-4 puffs q 4-6 hr prn or 0.5 ml via nebulizer q 4-6 hr			
Exacerbation	Severe exacerbations: short "burst" of prednisone 2mg/kg per day as a single or divided dose for 3-7 days. Maximum dose = 60mg per day.			

Age ranges are determined by the FDA

* Neither Fluticasone nor Montelukast are available on the CIH formulary

** Use of Albuterol > 2 times per week in intermittent asthma (daily or increasing use in persistent asthma) may indicate the need to initiate or increase long-term control medications.

Asthma symptoms may change (improve or worsen) over time. Reassess at each visit.

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Normal Males					
Height (in)	**60**	**65**	**70**	**75**	**80**
Age (years)					
20	554	575	594	611	626
25	580	603	622	640	656
30	594	617	637	655	672
35	599	622	643	661	677
40	597	620	641	659	675
45	591	613	633	651	668
50	580	602	622	640	656
55	566	588	608	625	640
60	551	572	591	607	622
65	533	554	572	588	603
70	515	535	552	568	582
75	496	515	532	547	560

Normal Females					
Height (in)	**60**	**65**	**70**	**75**	**80**
Age (years)					
20	444	460	474	486	497
25	455	471	485	497	509
30	458	475	489	502	513
35	458	474	488	501	512
40	453	469	483	496	507
45	446	462	476	488	499
50	437	453	466	478	489
55	427	442	455	467	477
60	415	430	443	454	464
65	403	417	430	441	451
70	390	404	416	427	436
75	377	391	402	413	422

Normal Children and Adolescents (Males and Females)			
Height (in)	**Peak Flow**	**Height (in)**	**Peak Flow**
43	147	**55**	307
44	160	**56**	320
45	173	**57**	334
46	187	**58**	347
47	200	**59**	360
48	214	**60**	373
49	227	**61**	387
50	240	**62**	400
51	254	**63**	413
52	267	**64**	427
53	280	**65**	440
54	293	**66**	454

References: Nunn AJ, Gregg I. *Brit Med J* 1989; 298: 1068-70
Polgar G, Promadhat V. *Pulmonary function testing in children: techniques and standards.* Philadelphia, W.B. Saunders Company, 1971.

ASTHMA DIAGNOSIS AND TREATMENT

Long term therapy is recommended for children <5 years with:

1. Symptoms > twice/week **or**
2. Severe exacerbations < 6 weeks apart **or**
3. Three episodes of wheezing in the past year lasting > one day **and** affecting sleep **if** child has risk factors for developing asthma including:
   a. Family history of asthma **or**
   b. Physician diagnosed atopic dermatitis **or**
   c. **Two** of the following:
      1) Physician diagnosed allergic rhinitis
      2) Wheezing apart from colds
      3) Peripheral blood eosinophilia

If asthma is refractory to treatment, consider

Poor compliance with inhaled corticosteroid → mask w/ aerochamber, patient education
Exposure to offending allergans → immunotherapy
Gastroesophageal reflux → H_2 blockers
Sleep apnea → referral to ENT

The stepwise approach

Step Down: Review treatment every 1-6 months. Implement gradual stepwise reduction in treatment if possible.
Step up: If poor control, then review med technique, adherence, and environmental factors. Consider step up.

Goals of therapy: asthma control

Minimal or no chronic symptoms day or night
Minimal or no adverse effects from medications
Maintain near normal pulmonary function
Minimal use of short-acting beta$_2$ agonist (<1x/day, < 1 cannister/month)
No limitations on activities: no school/work missed
Minimal or no exacerbations

Comparative Inhaled Corticosteroid Dosages – Adults / Children

Drug	**Low Dose**		**Medium Dose**		**High Dose**	
	Adult	Children	Adult	Children	Adult	Children
Budesonide DPI 200mcg/dose (Pulmicort®)	1-2	1	2-3	1-2	>3	>2
Flunisolide MDI 250mcg/dose (Aerobid®)	2-4	2-3	4-8	4-5	>8	>5
Triamcinolone MDI 100mcg/dose (Azmacort®)	4-10		10-20		>20	
Fluticasone MDI 44 mcg/dose	2-6	2-4	-	-	-	-
Fluticasone MDI 110 mcg/dose	-	-	3-6	2-4	>6	>4
Fluticasone MDI 220 mcg/dose (Flovent®)	-	-	-	-	>3	>2
Beclomethasone 42mcg/dose	4-12	2-8	12-20	8-16	>20	>16
Beclomethhasone 84mcg/dose (Vanceril®)	2-6	1-4	6-10	4-8	>10	>8

PATIENT EDUCATION (Disease state-Topic-Level of Understanding-Prov Code-Time (min)-Goals)

Complications	ASM-C	Equipment	AMS-EQ	Tobacco Use	ASM-TO
Exercise	ASM-EX	Nebulizer	ASM-NEB	Second Hand Smoke	ASM-SHS
Follow-up	ASM-FU	Peak Flow Meter	ASM-PF	Nutrition	ASM-N
Home Management	ASM-HM	Meter Dose Inhaler	ASM-MDI	Lifestyle Adaptation	ASM-LA
Literature	ASM-L	Spacer	ASM-SPA	Medications	ASM-M

REFERRALS: Flu shot annually, Pulmonary, Allergy, Tobacco Cessation, Home Nebulizer, Asthma specialist (if difficulty controlling asthma or if step 4 care is required; consider if step 3)

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