DoD/VA Key Elements of the Asthma Clinical Practice Guideline

Initial Diagnosis:

- Consider asthma in the differential diagnosis of any patient who presents with persistent respiratory problems
- Use spirometry to help make the diagnosis for children over 6 years-old
- Use trials of asthma medication to determine response to asthma therapy as an aid to diagnosis

Follow-up Visits/Long Term Asthma Management

- Classify asthma severity
  - Use NHLBI standards (mild intermittent: mild, moderate, and severe persistent)
  - Use objective measures of airways obstruction (peak flow, spirometry) to determine asthma severity
  - Use patient report of symptoms to help classify asthma severity
- Treat patient based on asthma severity classification
  - Provide/adjust quick reliever and long-term controller medications to attain optimal control of the patient's asthma
  - Long term controller medications are needed for mild persistent, moderate persistent and severe persistent asthma
- Educate patients concerning their asthma
  - Educate patients about the role of reliever and controller medications
  - Educate appropriate patients on how to self-monitor their asthma with a peak flow meter
  - Educate patients on signs/symptoms of worsening asthma
  - Educate patients on when and how to contact their primary care manager (PCM)
  - Provide a written action plan
- Preventive maintenance/trigger avoidance
  - Assess triggers and institute environmental controls when indicated
  - Vaccinate against influenza
  - Provide smoking cessation information when appropriate
- Provide follow-up on regular basis and ensure that the patient has a PCM

Emergency Management of Asthma Exacerbations:

- Use objective measures to assess airways obstruction/ exacerbation severity
- Pulse oximetry
- Peak flow or FEV_1
- Treat promptly with $beta_2$-agonists and corticosteroids
- Assess response to therapy using objective measures as well as clinical exam
- Discharge patient with appropriate education, written instructions, and follow-up

Telephone Triage:

- Assess the severity of the asthma exacerbation
- Patients with severe exacerbations should NOT be managed at home
- Review the patient's action plan and set up appropriate follow-up

August 2000

Table A. Step-Care Approach for Prescribing Asthma Medications Based on Severity–Adult

Severity Level	Signs/Symptoms	Nocturnal Symptoms	Lung Function	Drug Therapy
Mild Intermittent (493.00x1)*	• Symptoms ≤ 2 times/week • Exacerbations brief • Asymptomatic/normal PEF between exacerbations	≤ 2 times/month	FEV_1 or PEF ≥ 80% predicted PEF variability < 20%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Usually no daily medication needed
Mild Persistent (493.00x2)	• Symptoms > 2 times/week but < 1 time/day • Exacerbations can affect activity	> 2 times/month	FEV_1 or PEF ≥ 80% predicted PEF variability 20–30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (LOW dose) • May also consider theophyline SR, leukotriene modifier, cromolyn, or nedocromil • For patients with ASA sensitive asthma, consider using leukotriene modifiers
Moderate Persistent (493.00x3)	• Symptoms daily • Exacerbations ≥ 2 times/week and affect activity • Daily use of quick relief medications	> 1 time/week	FEV_1 or PEF ≥ 60% < 80% predicted PEF variability > 30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (MEDIUM dose) *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and inhaled long-acting $beta_2$-agonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and theophyline • Consider referral
Severe Persistent (493.00x4)	• Symptoms continuous • Limited physical activity • Exacerbations frequent	Frequent	FEV_1 or PEF < 60% predicted PEF variability > 30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (HIGH dose) and inhaled long-acting $beta_2$-agonist *or* • Inhaled corticosteroid (HIGH dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (HIGH dose) and theophyline • Oral corticosteroids may be indicated • Consider referral
(493.11)	Asthma with status asthmaticus			

* *ICD-9 Code*

Proposed Asthma Metrics

Percentage of asthma visits with documented asthma severity level.

Percentage of patients with persistent asthma who are prescribed long-term controllers.

Percentage of asthmatics 6 and over with spirometry in past 12 months.

Percentage of patients with persistent asthma with written action plan documented in the past 12 months.

MEDICATION TABLE–Adult and Children Age 6 Years and Over:
Estimated Comparative Daily Dosages for Inhaled Corticosteroids

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 15; Management of Asthma: Annotations (A2a) Page 18

Drug	Low-Dose	Medium-Dose	High-Dose
Beclomethasone dipropionate 42 mcg/puff 84 mcg/puff	168 to 504 mcg (4 to 12 puffs) (2 to 6 puffs)	504 to 840 mcg (12 to 20 puffs) (6 - 10 puffs)	> 840 mcg (> 20 puffs) (> 10 puffs)
Budesonide Turbuhaler 200 mcg/dose	200 - 400 mcg (1 - 2 inhalations)	400-600 mcg (2 - 3 inhalations)	>600 mcg (> 3 inhalations)
Flunisolide 250 mcg/puff	500 - 1,000 mcg (2 to 4 puffs)	1,000 - 2,000 mcg (4 to 8 puffs)	> 2,000 mcg (> 8 puffs)
Fluticasone MDI: 44, 110, 220 mcg/puff Dry powder inhaler (DPI): 50, 100, 250 mcg/puff	88 - 264 mcg	264 - 660 mcg	> 660 mcg (> 6 inhalations - 100 mcg) or (>2 inhalations - 250 mcg)
Triamcinolone acetonide 100 mcg/puff	400 - 1,000 mcg (4 to 10 puffs)	1,000 - 2,000 mcg (10 to 20 puffs)	> 2,000 mcg (> 20 puffs)

TABLE: Leukotriene Modifiers

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 16

Drug	Dosage Form	Dose	Age Approval Use	LFT Required
Montelukast	5 mg tab 10 mg tab	Children (6 - 14 yrs) 5 mg qhs Adults (> 14 yrs) 10 mg qhs	6 yrs	
Zafirlukast	20 mg tabs	20 mg bid (Take on empty stomach)	12 yrs	
Zileuton	600 mg tabs	600 mg qid	12 yrs	Baseline or periodic (e.g., q month x 3 months) and then (e.g., q 2 - 3 months x 1 year)

MEDICATION TABLE–Adult and Children Age 6 Years and Over: (cont.)

Medication Doses (Adapted from the NAEPP EPR - 2 1997)

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A3a) Page 8

Medications	Children's Dose (over 6 years)	Comments
Inhaled short-acting beta$_2$-agonists		
Albuterol:	4 to 8 puffs every 20 minutes (or 24 puffs per hour) then	As effective as nebulized therapy if patient is able to
Metered dose inhaler (MDI)	1 - 4 hours as needed	coordinate inhalation maneuver
(90 mcg/puff) with spacer/holding chamber	2.5 mg to 5 mg every 20 minutes for 3 doses, then 2.5	
Nebulizer solution:	to 10 mg every 1 - 4 hours as needed or 10 - 30 mg/hour	Only selective beta$_2$-agonists are recommended. For optimal
(5 mg/ml)	continuously	delivery, dilute aerosols to minimum of 4 ml at gas flow of 6 to 8 L/minute
Systemic (subcutaneous) beta$_2$-agonists		
Epinephrine: 1:1000	0.3 - 0.5 mg every 20 minutes for 3 doses subcutaneously	No proven advantage of systemic therapy over aerosol. May
(1 mg/ml)		be hazardous in patients with coronary artery disease.
Anticholinergics		
Ipratropium bromide:		
MDI (18 mcg/ml)	4 - 8 puffs as necessary	Dose delivered from MDI is low and has not been studied in asthma exacerbations.
Nebulizer solution:		
(0.25 mg/ml; 0.5 mg/vial)	0.5 mg every 30 minutes for 3 doses then every 2 to 4 hours as needed	May mix in same nebulizer with albuterol. Should not be used as first line therapy; may be added to beta$_2$-agonist therapy.
Corticosteroids		
Prednisone	120 - 240 mg/day in 3 or 4 divided doses for 48 hours,	For outpatient "burst," use 40 - 60 mg/day (approximately 2
Methylprednisolone	then 60 - 80 mg/day until PEF reaches 60% of predicted	mg/kg/day) in single or two divided doses for 3 - 10 days
Prednisolone	value or personal best. (See Discussion)	(See Discussion)

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  - Educate patients on when and how to contact their primary care manager (PCM)
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- Pulse oximetry
- Peak flow or FEV_1
- Treat promptly with $beta_2$-agonists and corticosteroids
- Assess response to therapy using objective measures as well as clinical exam
- Discharge patient with appropriate education, written instructions, and follow-up

Telephone Triage:

- Assess the severity of the asthma exacerbation
- Patients with severe exacerbations should NOT be managed at home
- Review the patient's action plan and set up appropriate follow-up

August 2000

Table A. Step-Care Approach for Prescribing Asthma Medications Based on Severity–Pediatric

Severity Level	Signs/Symptoms	Nocturnal Symptoms	Drug Therapy
Mild Intermittent (493.00x1)*	• Symptoms ≤ 2 times/week • Exacerbations brief • Asymptomatic/normal PEF between exacerbations	≤ 2 times/month	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Usually no daily medication needed
Mild Persistent (493.00x2)	• Symptoms > 2 times/week but < 1 time/day • Exacerbations can affect activity	> 2 times/month	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (LOW dose) • May also consider theophyline SR, leukotriene modifier, cromolyn, or nedocromil • For patients with ASA sensitive asthma, consider using leukotriene modifiers
Moderate Persistent (493.00x3)	• Symptoms daily • Exacerbations ≥ 2 times/week and affect activity • Daily use of quick relief medications	> 1 time/week	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (MEDIUM dose) *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and inhaled long-acting beta$_2$-agonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and theophyline • Consider referral
Severe Persistent (493.00x4)	• Symptoms continuous • Limited physical activity • Exacerbations frequent	Frequent	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (HIGH dose) and inhaled long-acting beta$_2$-agonist *or* • Inhaled corticosteroid (HIGH dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (HIGH dose) and theophyline • Oral corticosteroids may be indicated • Consider referral
(493.11)	Asthma with status asthmaticus		

** ICD-9 Code*

Proposed Asthma Metrics

Percentage of asthma visits with documented asthma severity level.

Percentage of patients with persistent asthma who are prescribed long-term controllers.

Percentage of patients with persistent asthma with written action plan documented in the past 12 months.

MEDICATION TABLE–PEDIATRIC (Children Under 6 Years Old Who Cannot Perform Spirometry)

Estimated Comparative Daily Dosages for Inhaled Corticosteroids

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1p) Page 10; Management of Asthma: Annotations (A2p) Page 14

Drug	Low-Dose	Medium-Dose	High-Dose
Beclomethasone dipropionate 42 mcg/puff 84 mcg/puff	84 to 336 mcg 2 to 8 puffs 1 to 4 puffs	336 to 672 mcg 8 to 16 puffs 4 - 8 puffs	> 672 mcg > 16 puffs > 8 puffs
Budesonide Turbuhaler	100 - 200 mcg 1 inhalation	200 - 400 mcg 1 to 2 inhalations	> 400 mcg > 2 inhalations
Flunisolide 250 mcg/puff	500 - 750 mcg 2 to 3 puffs	750 - 1250 mcg 4 to 5 puffs	1250 mcg > 5 puffs
Fluticasone MDI: 44, 110, 220 mcg/puff DPI: (dried powder inhaler): 50, 100, 250 mcg/puff	88 - 176 mcg	176 - 440 mcg	> 440 mcg
Triamcinolone Acetonide 100 mcg/puff	400 - 800 mcg 4 to 8 puffs	800 - 1200 mcg 8 to 12 puffs	1200 mcg > 12 puffs

TABLE: Leukotriene Modifiers

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 16

Drug	Dosage Form	Dose	Age Approval Use
Montelukast	4 mg chewable tablet	Children (2 - 5 yrs) 4 mg qhs	≥ 2 yrs

MEDICATION TABLE–PEDIATRIC (Children Under 6 Years Old Who Cannot Perform Spirometry) cont.

Medications Doses (Adapted from the NAEPP EPR - 2 1997)

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A3p) Page 7

Medications	Children's Dose	Comments
Inhaled short-acting beta$_2$-agonists		
Albuterol: MDI (90 mcg/puff) with spacer/holding chamber	4 to 8 puffs every 20 minutes x 3 doses then 1 - 4 hours as necessary	As effective as nebulized therapy if patient is able to coordinate inhalation maneuver
Nebulizer solution: (5 mg/ml)	0.15 mg/kg (maximum dose 2.5 mg) every 20 minutes for 3 doses, then 0.15 - 0.3 mg/kg up to 10 mg every 1 - 4 hours when necessary or up to 0.5 mg/kg/hr continuously by nebulizer	Only selective beta$_2$-agonists are recommended. For optimal delivery, dilute aerosols to minimum of 4 ml at gas flow of 6 to 8 L/minute

Medications Doses (Adapted from the NAEPP EPR - 2 1997)

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A3p) Page 7

Medications	Children's Dose	Comments
Systemic (subcutaneous) beta-agonists		
Epinephrine: 1:1000 (1 mg/ml)	0.01 mg/kg up to 0.3 - 0.5 mg every 30 minutes x 3 doses subcutaneously	No proven advantage of systemic therapy over aerosol. May be hazardous in patients with coronary artery disease.
Terbutaline (1mg/ml)	0.25 mg every 20 minutes x 3	
Anticholinergics		
Ipratropium bromide: MDI (18 mcg/ml)	4 - 8 puffs as necessary	Dose delivered from MDI is low and has not been studied in asthma exacerbations.
Nebulizer solution: (0.25 mg/ml; 0.5 mg/vial)	0.25 - 0.5 mg every 20 minutes x 3 doses then every 2 to 6 hours	May mix in same nebulizer with albuterol. Should not be used as first line therapy; may be added to beta$_2$-agonist therapy.
Corticosteroids **Prednisone** **Methylprednisolone** **Prednisolone**	1 mg/kg every 6 hours x 48 hours, then 1 - 2 mg/kg/day with maximum of 60 mg/day For outpatient "burst": 2 mg/kg/day Maximum 60 mg/day x 3 - 10 days	For outpatient "burst," use 20 - 60 mg/day (approximately 2 mg/kg/day) in single or two divided doses for 3 - 10 days (See Discussion)