STANFORD COORDINATED CARE

ASTHMA MANAGEMENT PROTOCOL
MEDICATION THERAPY MANAGEMENT SERVICES

Related Documents: Asthma Planned Visit Protocol for Care Coordinators
Asthma Action Plan (English and Spanish)

I. PURPOSE

To establish guidelines for the collaborative management of patients with a diagnosis of asthma who are not adequately controlled and to define the roles and responsibilities of the collaborating clinical pharmacist and pharmacy resident following this protocol.

II. PROCEDURE

The clinical pharmacist or pharmacy resident, under the supervision of the clinical pharmacist, may make changes in inhaled short/long-acting beta-agonists, inhaled corticosteroids, inhaled cromolyn and nedocromil, and combination therapy of these inhaled agents (see Appendix). The clinical pharmacist and pharmacy resident, under this protocol, are authorized to initiate therapy, adjust dosages, change medication and authorize refills to the listed agents. All modifications to therapy must follow the detailed protocol and will be documented in the medical record.

Medication Therapy Management NOT covered in protocol:

- Nebulizer solutions, systemic beta-agonists and corticosteroids, methylxanthines, and leukotriene modifiers
- Conditions other than asthma
- If patient exhibits signs of respiratory distress with PEFs or if the patient symptoms are felt to be severe (acute exacerbation requiring nebulizer treatment and/or prednisone).

III. PROTOCOL

Initial Visit Protocol

The patient's medical record will be reviewed and the following information will be gathered and discussed during the initial visit using the form in Appendix 1:

- Complete medication history regarding asthma therapy and any medications which could affect asthma (e.g., beta blockers, ASA, NSAIDS)
- Asthma history: treatments, hospitalizations, ER/urgent care visits, intubations secondary to asthma in the past year
- Assessment of asthma symptoms (cough, wheeze, SOB, chest tightness), frequency of daytime symptoms and nighttime symptoms, early morning symptoms that do not respond within 15 minutes of short-acting beta-2 agonist, symptoms with exertion
- Review or order spirometry, if not done at diagnosis
- Assess and classify severity of asthma (Appendix 3)
- Asthma medications will be initiated, discontinued or adjusted as needed (Appendix 4, 5, 6, and 7)
- Assess social history, characteristics of home, work/environmental exposure, functional status
- Identify asthma triggers and educate on avoidance
- Assess and educate inhaler technique and compliance

- Provide patients with a peak flow meter/diary (or a prescription for a peak flow meter) to determine personal best
    - Personal best = best value from 2 weeks of PEF values when symptoms controlled, excluding outliers
    - Once the personal best has been established, the patient will be instructed to monitor every morning.
        - If the patient PEFs are typically <80% personal best, they will be instructed to monitor more frequently
    - If the patient is not compliant with PEF monitoring to determine personal best, the population average for their age and height will be used.
- Develop an individualized asthma action plan with written instructions for patients to take home (follow protocol in Appendix 9)
- Follow-up within 1-4 weeks following initial visit
- General guidelines to refer patient back to primary physician:
    - Patient exhibits signs of respiratory distress with PEFs or symptoms are felt to be severe (acute exacerbation requiring nebulizer treatment and/or prednisone)
    - Patient presents to appointment with a recent life-threatening exacerbation
    - Patient is not meeting goals after 3-6 months of therapy or sooner if deemed necessary
    - Asthma complicated by other medical or psychosocial conditions

Follow-up Visit Protocol

Follow-up visits will be jointly established between the clinical pharmacist or pharmacy resident. Follow-up appointments will be scheduled approximately every 1-6 months depending on severity of symptoms. The number of follow-up visits will be determined by the clinical pharmacist and pharmacy resident. Appendix 2 will be used to gather information for follow-up visits.

Severity	Regular follow-up visit
Mild Intermittent	6-12 months
Mild Persistent	6 months
Moderate Persistent	3 months
Severe Persistent	1-2 months or as needed to establish control

Assess at follow-up:

- Obtain an updated medication history, including both asthma and non-asthma medications
- Frequency of signs and symptoms of asthma, daytime, nighttime, morning symptoms not responsive in 15 minutes to short acting beta-agonist
- History of asthma exacerbations
- Pharmacotherapy: effectiveness, adverse effects, compliance
    - Asthma medications will be initiated, discontinued or adjusted as needed according to guidelines (Appendix 4, 5, 6, 7, and 8)
- Review and reinforce environmental control strategies/trigger avoidance
- Demonstrate and/or reinforce inhaler/spacer/peak flow meter technique
- Obtain PEF in clinic and review PEF record from patient, if available, for personal best, and set up patient's zones based on PEF values taken for 2-3 weeks to create an asthma action plan
- If the patient fails to bring in the PEF record, then an action plan will be created using the population average for their age and height
- If the patient's asthma is never under good control and personal best cannot be determined, then an action plan will be created using the population average for their age and height
- When developing action plans, home treatment with oral steroids will be included in plan following discussion and recommendation of patient's primary physician
- General guidelines to refer patient back to primary physician:
    - Patient exhibits signs of respiratory distress with PEFs or symptoms are felt to be severe (acute exacerbation requiring nebulizer treatment and/or prednisone)
    - Patient presents to appointment with a recent life-threatening exacerbation
    - Patient is not meeting goals after 3-6 months of therapy or sooner if deemed necessary
    - Asthma complicated by other medical or psychosocial conditions

APPENDIX 1: Initial Visit

ASTHMA HISTORY WORK UP

1. What worries you most about your asthma?
   _____
   _____

2. What do you want to accomplish at this visit?
   _____
   _____

3. Symptoms: cough wheezing shortness of breath chest tightness
   Frequency (past 2-4 weeks):
   Daytime: ≤ 2x/week > 2 x/week but not daily Daily Throughout the day

   Nighttime: ≤ 2x/month 3-4x/month >1x/week but not nightly Often 7x/week

   Morning symptoms that don't respond to rescue inhaler within 15 minutes? YES / NO

   Pattern: Spring Summer Fall Winter Any time of year

   Triggers (circle all that apply):
   - outdoors (i.e. pollen)
   - indoors (i.e. dust mites, mold)
   - cold air /humid air
   - emotions (i.e. fear, anger, hard crying or laughing)
   - strong odors
   - occupation (weekday only symptoms, not on weekends)
   - animal dander (cat/dog)
   - exercise/physical activity
   - smoke
   - medications (beta-blockers, ASA, NSAIDS)
   - foods (i.e. sulfites-processed potatoes, shrimp, beer, wine, dried fruit)
   - others_____

4. Characteristics of home (circle all that apply):
   carpeting old home/mold a lot of upholstery/stuffed furniture

   humidifier wood-burning stove/fireplace stuffed animals on sleeping area

5. Does anyone smoke in the home (tobacco, other inhaled substances that produce fumes)? YES / NO

6. Do you smoke? YES/ NO If yes, how much per day?_____

7. Are you willing to quit at this time? YES / NO

8. Workplace characteristics that may interfere with compliance_____
   _____

9. Have you ever gone to the emergency department for an asthma attack? YES / NO
   If yes, how many times in the last 6 months?
   _____

10. Have you ever been hospitalized for asthma? YES / NO
    How many times? _____ Intubated? YES / NO

11. How many days of work have you missed in the past 3 months due to asthma?
    _____

12. Does your asthma limit your activities? YES / NO If yes, how?
    _____
    _____

13. Have you used any medications that help you breathe better? YES / NO
    Name of medication (inhalers/pills/prescriptions/OTC/herbal):_____

14. What other medication have you used for asthma?
    _____

15. On average, how many times a day do you need to use your "quick-relief" inhaler (albuterol, Ventolin, Proventil, ProAir or Maxair)?
    _____

    How many puffs do you use each time? 1 2 >2
    How many inhalers (canisters) of this medicine have you gone through in the past month?
    _____

16. Has your asthma medicine caused you any problems? YES / NO
    If yes, what problems? shakiness nervousness bad taste sore throat cough
    upset stomach fast heartbeat other_____
    Which medication caused this problem? _____

17. Are there any other factors that may affect your ability or desire to take your medications as directed?
    _____
18. What do you expect from treatment?
    _____

APPENDIX 2: Follow-up visit

ASTHMA FOLLOW-UP WORK UP

1. How have you been since your last visit:
   - Has your asthma been any worse? YES / NO
   - Any changes in home or work environment? YES / NO (ie. smoke, new pet)
   - Any exacerbations? YES / NO
     ER visits? YES / NO Hospitalized? YES / NO Intubated? YES / NO
   - Missed work due to asthma? YES / NO
     If yes, how much? _____
   - Have you missed any doses of your medications? YES / NO
     If yes, how much? _____ How often? _____
     Why? _____
   - How and when are you taking your asthma medications? _____
     _____
     _____
     _____
     _____
   - Has your asthma medicine caused you any problems? YES / NO
     - If yes, (circle) shakiness nervousness bad taste sore throat cough
       upset stomach fast heartbeat other_____
     - Which medication caused this problem? _____
   - What questions do you have about the action plan? _____
     _____

2. **In the past 2 weeks:**
   - Has your peak flow value gone below 80% of your personal best? YES / NO
   - How many days have you used your quick-relief medicine? _____
   - Has your asthma limited your activities? YES / NO
     If yes, how? _____

3. Describe for me how you know when to call your doctor or go to the hospital for asthma care?
   _____
   _____
   _____

APPENDIX 3: **Asthma Classification Scheme: based on clinical features before treatment ***

	Symptoms**	Nighttime Symtoms	Lung Function***
Step 6: Severe Asthma	• Symptoms throughout the day • SABA use: Several times/day	Often 7 times/week	• FEV1 < 60% predicted • FEV1/FVC < 75%
Step 5: Severe Persistent Asthma	• Symptoms throughout the day • SABA use: several times/day	Often 7 times/week	• FEV1 <60% predicted • FEV1/FVC < 75%
Step 4: Severe Persistent Asthma	• Symptoms throughout the day • Limited physical activity • Frequent exacerbations • SABA use: several times/day	Often 7 times/week	• FEV_1 <60% • FEV1/FVC <75%
Step 3: Moderate Persistent	• Daily symptoms • Daily use of short-acting inhaled beta-agonist • Exacerbations affect activity • Exacerbations $\geq$ 2 times/week; may last days • SABA use: Daily	> 1 time/week	• FEV_1 60-80% of personal best • PEFR variability $\geq$ 30%
Step 2: Mild Persistent	• Symptoms > 2 times/week but < 1 time/day • Exacerbations may affect activity • SABA use: >2 days/week, no more than once per day	3-4 times /month	• FEV_1 or PEFR $\geq$ 80% of personal best • PEFR variability 20-30%
Step 1: Intermittent Asthma	• Symptoms $\leq$ 2 days/week • Asymptomatic and normal PEF between exacerbations • Exacerbations brief (from a few hours to a few days); intensity may vary • SABA use: $\leq$or days/week	$\leq$ 2 times/month	• FEV_1 or PEFR $\geq$ 80% of personal best • PEFR variability $\leq$ 20%

*****The presence of one of the features of severity is sufficient to place a patient in that category. An individual should be assigned to the most severe grade in which any feature occurs. The characteristics noted in this figure are general and may overlap because asthma is highly variable. Furthermore, an individual's classification may change over time.

**Patients at any level of severity can have mild, moderate, or severe exacerbations. Some patients with intermittent asthma experience severe and life-threatening exacerbations separated by long periods of normal lung function and no symptoms.

***PEF is % of personal best. FEV1 is % of predicted.

APPENDIX 4: Stepwise Approach for Managing Asthma in Adults

Step 6: Severe Persistent Asthma	• **Preferred:** • High dose ICS plus LABA plus oral corticosteroid • AND • Consider: omalizumab (in those with allergies)
Step 5: Severe Persistent Asthma	• **Preferred:** • High dose ICS plus LABA • AND • Consider: omalizumab (in those with allergies)
Step 4: Severe Persistent Asthma	• **Preferred:** • Medium dose ICS plus LABA • **Alternative:** • Medium dose ICS plus either LTRA, theophylline, zileuton
Step 3: Moderate Persistent Asthma	• **Preferred:** • Low dose ICS plus LABA OR • Medium dose ICS • **Alternatives:** • Low dose ICS plus either LTRA, theophylline, or zileuton
Step 2: Mild Persistent Asthma	• **Preferred treatment:** • Low does ICS • **Alternatives:** • LTRA, nedocromil, or theophylline
Step 1: Mild Intermittent Asthma	• SABA as needed
ALL PATIENTS	• SABA 2-4 puffs prn

Step Down: Review treatment every 1-6 months. If control is sustained for $\geq$ 3 months, a gradual step reduction in treatment may be attempted.
Step Up: If control not achieved, consider step up in treatment. First review medication technique, adherence, and environmental control (avoidance of allergens or other factors that contribute to asthma severity). Use of short-acting bronchodilators > 2 times/week (mild intermittent) or daily/increasing use (persistent asthma) may indicate the need for step-up therapy or initiate maintenance therapy.

EDUCATION:

- Teach basic facts about asthma. Teach self-management, including use of a peak flow meter.
- Teach about controlling environmental factors to avoid exposure to known allergens and irritants.
- Review and teach inhaler/spacer techniques.
- Discuss role of medications.
- Develop a written action plan for when and how to take rescue actions. (See attachment)
- Review and update self-management plan periodically.

APPENDIX 5: Comparative Daily Dosages of Inhaled Corticosteroids in Adults

Drug	Low Dose	Medium Dose	High Dose
Beclomethasone HFA (QVAR) 40 mcg/puff 80 mcg/puff	80-240 mcg	>240-480 mcg	>480 mcg
Budesonide DPI (Pulmicort) 90 mcg/puff 180 mcg/puff 200 mcg/puff	180-600 mcg	>600-1200 mcg	>1200 mcg
Flunisolide (AeroBid) 250 mcg/puff	500-1000 mcg	>1000-2000 mcg	>2000 mcg
Fluticasone HFA (Flovent) 44 mcg/puff 110 mcg/puff 220 mcg/puff	88-264 mcg	>264-440 mcg	>440 mcg
Mometasone Furoate DPI (Asmanex): 220 mcg/puff	220 mcg	440 mcg	>440

Notes:

- The most important determinant of appropriate dosing is the clinical pharmacist's and pharmacy resident's judgment of the patient's response to therapy.
- The clinical pharmacist and pharmacy resident will monitor the patient's response on several clinical parameters and adjust the dose accordingly.
- The stepwise approach to therapy emphasizes that once control of asthma is achieved, the dose of medication should be carefully titrated to the minimum dose required to maintain control, thus reducing the potential for adverse effect.

APPENDIX 6: Usual Adult Dosages for Quick-relief Medications

Drug	Dose	Comments
Albuterol for nebulization* : 2.5mg/3ml (0.083%)	2.5 in 3 ml of saline 3-4 times/day prn	*May double dose for mild exacerbations.* *May mix with cromolyn or ipratropium nebulizer solutions.*
Albuterol HFA (Proventil, ProAir, Ventolin) 90 mcg/puff	2 puffs 5 – 30 minutes before exercise 2 puffs q4-6 hours prn	*May double dose for mild exacerbations.*
Pirbuterol (Maxair): 200 mcg/puff	2 puffs TID-QID prn	*May double dose for mild exacerbations.*
Levalbuterol for nebulization (Xopenex):* 0.31 mg/3ml 0.63 mg/3ml 1.25mg/3ml	0.63 mg to 1.25mg TID	
Levalbuterol HFA (Xopenex HFA): 45 mcg/puff	1-2 puffs q4-6 hours prn	
Anticholinergics		
Ipratropium MDI (Atrovent): 18 mcg/puff **For nebulization*** 0.25mg/ml (0.025%)	2-3 puffs q 6 hrs, max dose of 12 puffs per 24 hours 0.25-0.5mg q 6 hrs	*Evidence is lacking for anticholinergic producing added benefit to beta-2 agonists in long-term asthma therapy.*
Tiotropium (Spiriva) 18mcg/capsule	Inhale the contents of 1 capsule daily	
*Systemic Corticosteroids**		
Methylprednisolone 2, 4, 8, 16, 32 mg	Short course "burst": 40-60 mg/day as single or 2 divided doses for 3-10 days	*Short course or "burst" are effective for establishing control when initiating therapy or during a period of gradual deterioration.*
Prednisolone 5mg tab, 5mg/5ml, 15mg/5ml		
Prednisone 1, 2.5, 5, 10, 20, 25 mg tabs; 5mg/ml; 5mg/5ml		

* The clinical pharmacist and pharmacy resident will carry out asthma treatment order made by the physician based on the recommendation(s) made.

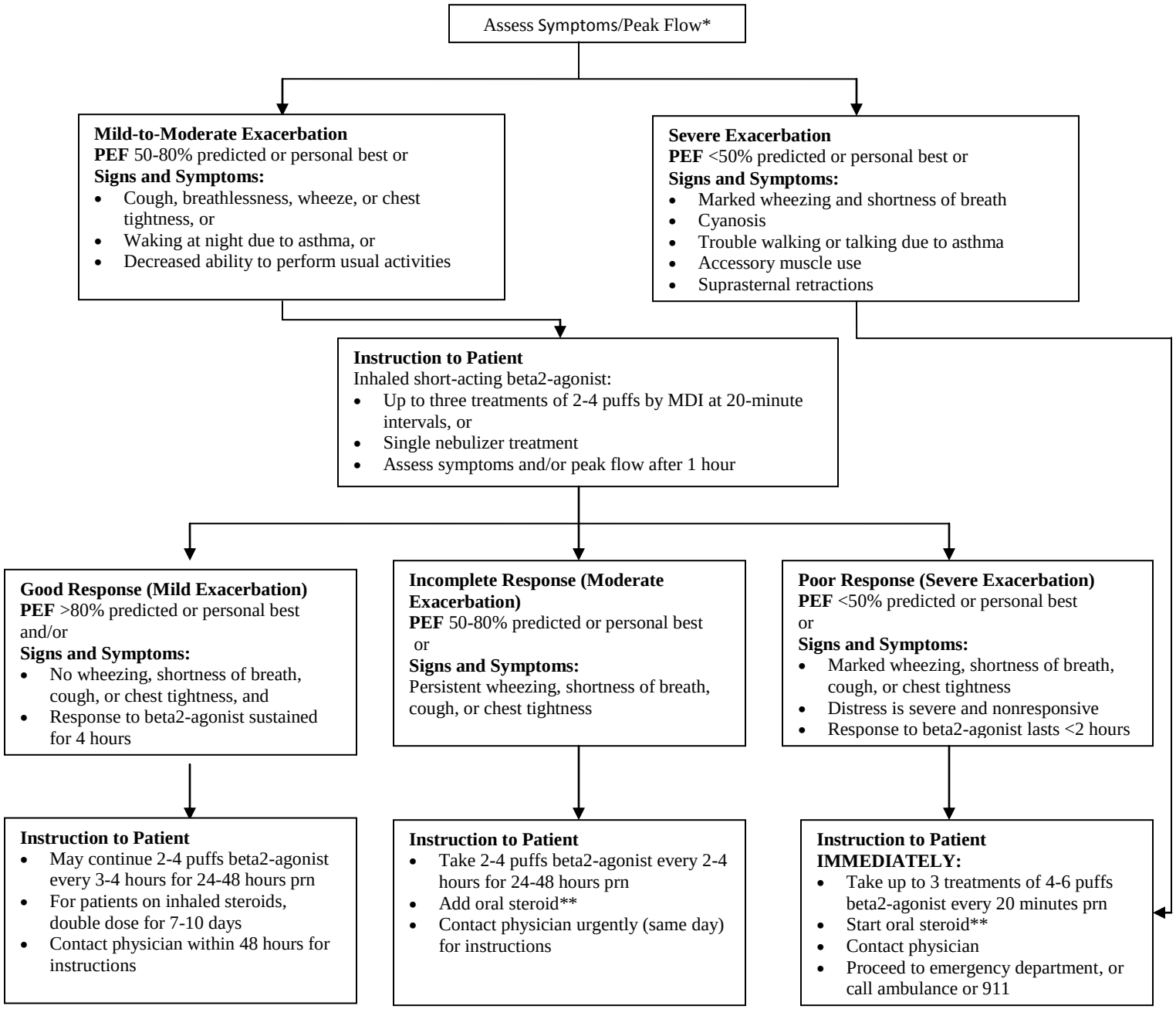
APPENDIX 8: Usual Adult Dosages for Long-Term Medications

Drug	Dose	Comments
Cromolyn and Nedocromil*		
Cromolyn MDI (Intal): 800 mcg/puff **For nebulization:** 20mg/ampule	2-4 puffs tid-qid 1 ampule tid-qid	*One dose prior to exercise or allergen exposure provides effective prophylaxis for 1-2 hours*
Nedocromil (Tilade): 1.75mg/puff	2-4 puffs bid-qid	
Long Acting Beta-2 Agonists*		
Salmeterol DPI (Serevent): 50 mcg/blister	1 inhalation q 12 hours	
Formoterol DPI (Foradil): 12 mcg/dose(single use capsule by inhalation)	1 capsule by inhalation BID	
Fluticasone/salmeterol DPI (Advair Diskus) : 100/50 mcg 250/50mcg 500/50mcg **Advair HFA:** 45/21 mcg 115/21 mcg 230/21 mcg	1 puff BID, 12 hours apart 2 puffs BID, 12 hours apart	*FDA approved for children 4 years of age and older*
Sustained-Release Albuterol tablet* 4 mg/tablet	4mg q 12 hours	
Methylxanthines*		
Theophylline Liquid, sustain-release tablets, capsules	Starting dose 10mg/kg/day up to 300mg max; usual max 800mg/day	*Adjust dosage to achieve serum concentration of 5-15 mcg/ml at a steady state (at least 48 hours on same dosage).*
Leukotriene Modifiers*		
Montelukast (Singulair): 4mg granules, 10mg tablet 4 mg , 5mg chewable tablet	10mg qhs	
Zafirlukast (Accolate): 10mg, 20mg tablet	40mg daily (20mg bid)	*Administration with meals decreases bioavailability; take at least 1 hour before or 2 hours after meals.*
Zileuton (Zyflo): 600mg CR tablet	2,400mg daily (one 600 mg table, qid)	*Monitor hepatic enzymes (ALT)*

* The clinical pharmacist and pharmacy resident will carry out asthma treatment order made by the physician based on the recommendation(s) made.

APPENDIX 9: Management of Asthma Exacerbations: Home Treatment Protocol

Give patients **Asthma Action Plan (available to print from SharePoint)**



*Patients at high risk for asthma-related death should receive immediate clinical attention after initial treatment. More intensive therapy may be required.

**Oral steroid dosages: 40-60mg, single or 2 divided doses for 3-10 days per physician recommendation.

Asthma Action Plan:

References:

1. Expert Panel Report 3, "Guidelines for the Diagnosis and Mangement of Asthma," Clinical Practice Guidelines, National Institutes of Health, National Heart, Lung, and Blood Institute, NIH Publication No. 08-4051. Available at http://www.nhlbi.nib.gov/guidelines/asthma/asthgdln.htm

2. Lexicomp Drug Information Handbook. Lacy CF, Armstrong LL, Goldman MP, Lance LL. Drug Information Handbook, 20th ed. Hudson, Ohio, Lexi-Comp, Inc.; 2011

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