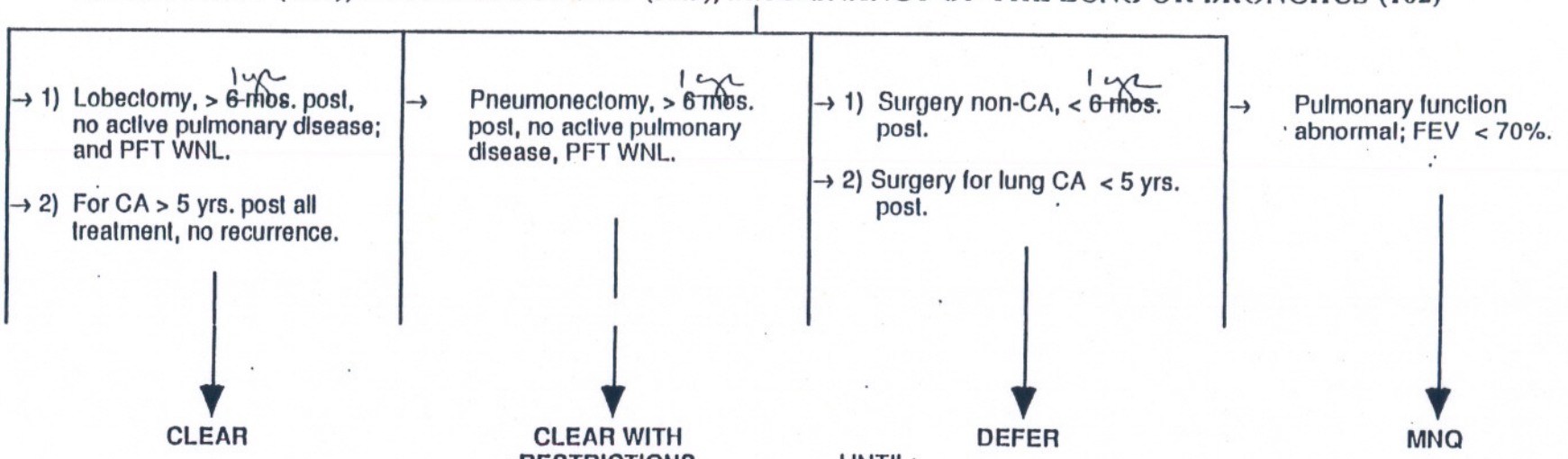
ASTHMA (493.9): Childhood (493), Exercise Induced, Others

	CLEAR	CLEAR WITH RESTRICTIONS	MRB/MED ADVISOR	DEFER	MNQ
CRITERIA	1) Childhood Asthma, no recurrence since age 13. 2) Bronchospasm secondary to specific chemical/occupational irritant. 3) Asthmatic bronchitis or secondary to URI exclusively. 4) SOB/wheezing resolved w/antihistamines 5) OTC Bronchodilator (Primatene) in past, asymptomatic at least 1 yr. 6) History, PEFR monitoring X 2 wks and methacholine test all negative for airway disease.	→ 1) Meets all 4 criteria for mild asthma (below), stable for 3 months. or Methacholine challenge w/ PC 20>20 mg/ml	1) Non seasonal bronchospasm (pet allergies) 2) Urgent Dr. visits in last 5 yrs. 3) Exercise induced asthma	1) > 2 episodes/wk of symptoms 2) > 2 episodes/wk of nocturnal asthma 3) 30 day PEFR < 80% of predicted 4) Incomplete response to bronchodilators 5) Cough or wheezing present btwn MDI use 6) Theodure use only, last serum level < 10 mcg/ml 7) theophylline use only, level 10-20 8) OTC bronchodilator currently or w/in 1 yr. 9) Exercise tolerance reduced despite adequate inhaled steroids. 10) Need for systemic steroids in last 5 yrs.	1) Asthma or bronchodilat irreversible lu disease (emphysema COPD, lobec
ACTION					
RESTRICTIONS/DEFER	3) Needs Drs' diagnosis	1) Mild asthma criteria: a) < 3 episodes/wk reading beta agonist (bronchodilator) b) < 3 episodes/wk of nocturnal asthma c) Baseline spirometry WNL except for evidence of obstructive airway Dx. or 30 day PEFR > 80% of predicted, < 20% variation d) All of above w/ complete response to bronchodilators	1) Distinguish isolated allergies (which can be cleared) from an underlying asthmatic condition. 3) Drs/ Hx supporting diagnosis. Needs 6-8 min of sustained exercise with return of FEV, w/in 20 min; clear.	1-5) Meets criteria for mild asthma 6) d/c meds and monitor response X 1 month. 7) Controlled w/ MDIs, stable X 3 mnths meets criteria for mild asthma 8) Physician addresses problem, must meet criteria for mild asthma or d/c therapy 9-10) Period of 5 yrs during which applicant not more severe than restrict column	
RATIONALE	Methacholine challenge can be used in the differential diagnosis of asthma severity or for excluding it.				

SURGICAL PROCEDURES
LOBECTOMY (32.4), PNEUMONECTOMY (32.5), MALIGNANCY OF THE LUNG OR BRONCHUS (162)



RATIONALE (Also see reason for surgery in guidelines).

Cancer of the lung will occur within the first few years. Cure rates are still poor (< 10%).

MEDICAL INFORMATION NEEDED: Generic information, pulmonary function studies; activity limitations including altitude restrictions, if any.

10/18/93

for $20 in US funds to NHLBI Information Center, PO Box 10305, Bethesda, MD 20824-0105. The NHLBI Web site also has the full document at www.nhlbi.nih.gov/nhlbi/nhlbi.htm. Click on "New and Special Items" then scroll down to the February 21, 1997 entries to locate the guidelines. You will need the Adobe Acrobat reader to view or print the document; it can also be downloaded from the NHLBI Web site. If you would like to see the 7-page table of contents, we've put it on our FaxBACK system to save you the trouble of having to download the entire document. Ask for document #130423.)

The 1997 Expert Panel Report II: Guidelines for the Diagnosis and Management of Asthma

On February 24, 1997, in association with the American Association of Allergy, Asthma, and Immunology meeting, the NHLBI National Asthma Education and Prevention Program introduced the update to its expert panel Guidelines for the Diagnosis and Management of Asthma (termed the Expert Panel Report II). As with the previous report, this document will provide health professionals with a blueprint for managing asthma. Currently, the full document can be downloaded from the NHLBI's Web site and will become available in the next few months. A number of key new aspects and differences from the first report published in 1991 are outlined below.

Meeting parents' and families' expectations and satisfaction with asthma care has been added as a major goal of therapy, and patient education has been brought to the forefront of all aspects of patient care. Developing a true partnership with the patient and teaching guided self-management is considered to be a primary goal. Examples of questions for obtaining quality-of-life information have been added. Criteria for referral to asthma specialists have also been provided. It is recommended that all patients receive written actions plans for treating exacerbations at home. Peak flow monitoring has been better defined and is recommended only for those patients with moderate-to-severe asthma, although it is suggested that even patients with mild asthma may benefit from peak flow monitoring during exacerbations. Finally, recommendations for reducing exposure to factors that contribute to the severity of asthma (i.e., smoking, allergens, drugs, and additives) are made.

A key change in the pharmacologic therapy is the addition of the added category of mild persistent asthma to the mild intermittent, moderate persistent. and severe persistent categories. Drugs are no longer classified as either anti-inflammatory or bronchodilators, but as "long-term control" and "quick-relief" medications. Long-term controllers to be used for the chronic prophylaxis of asthma include cromolyn, nedocromil, inhaled steroids, theophylline, long-acting beta-2 agonists, the leukotriene D4 antagonists, and the 5-lipoxygenase inhibitor. Quick-relief medications to be used for reversal of acute exacerbations include: short-acting inhaled beta-2 agonists, systemic corticosteroids, and ipratropium. While stepwise therapy is still advocated, the concept of beginning patients at a higher step to gain control, then reduce therapy to the minimum required for control has been introduced. Therapy for Step 1 Mild Intermittent continues to be short-acting inhaled beta-2 agonists as needed. Step 2 Mild Persistent requires a long-term controller (cromolyn or nedocromil, particularly in children, and low-dose inhaled corticosteroids preferred) plus short-acting inhaled beta-2 agonists as needed. Theophylline and the leukotriene modifiers are second-line agents for this stage. Step 3 Moderate Persistent can be treated with medium-dose inhaled corticosteroids or the addition of a long-acting bronchodilator (salmeterol preferred) or both, as well as short-acting inhaled beta-2 agonists as needed. Severe Persistent asthma (step 4) should be treated with high-dose inhaled corticosteroids, long-acting bronchodilators, and possibly systemic corticosteroids. The panel has provided a table giving generally equivalent dosages of the various inhaled corticosteroids, recognizing that the preparations are neither equivalent on a microgram basis nor on a puff basis. The mainstay of the treatment of acute exacerbations continues to be higher dose inhaled, short-acting selective beta-2 agonists, and systemic corticosteroids. Theophylline is no longer recommended in this setting. Inhaled ipratropium may be of value in some patients; all other therapies are of unproven efficacy.

PHARMACIST'S LETTER

PRESCRIBER'S LETTER

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control. This is illustrated in figures 3-4a and 3-4b. Figures 3-5a and 3-5d present usual medication dosages for therapy. Because asthma is a chronic inflammatory disorder of the airways with recurrent exacerbations, therapy for persistent asthma must emphasize efforts to suppress inflammation over the long term and prevent exacerbations. Recommendations in the stepwise approach to therapy are based on the Expert Panel's review of the literature (see component 3-Medications) and the Expert Panel's experience and opinion.

Gaining Control of Asthma

The clinician must judge individual patient needs and circumstances to determine at what step to initiate therapy. There are two appropriate approaches to gaining control of asthma:

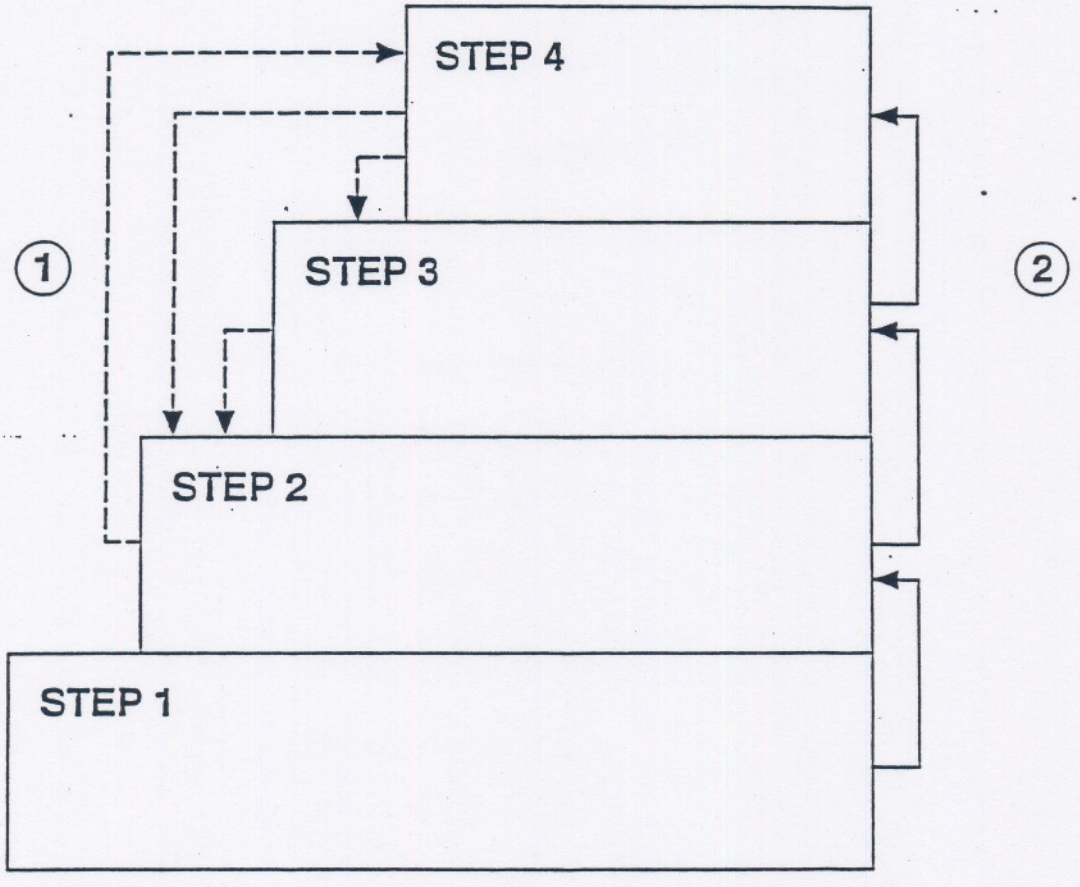
- Start treatment at the step appropriate to the severity of the patient's disease at the time of evaluation and gradually step up if control is not achieved.

OR

- At the onset, administer therapy at a level higher than the patient's step of severity to gain rapid control. This can be accomplished by either a short course of systemic corticosteroids (see figure 3-5a) along with inhaled corticosteroids or initiating a medium-to-high dose of inhaled corticosteroids. Once control is gained, step down the therapy.

The two approaches are illustrated by the solid and broken lines in the following diagram.

Two Approaches To Gaining Control of Asthma: (1) Start With High-Dose Therapy and Step Down or (2) Gradually Step Up Therapy



The more aggressive approach of gaining prompt control with a higher level of therapy is preferred, in the opinion of the Expert Panel. At present, there are no studies directly comparing the two approaches—the traditional step-up care (low dose to high) vs. step-down care (initial high dose to low). However, there is evidence supporting a more aggressive initial approach. First, asthma symptoms and altered pulmonary function are related to the level of ongoing airway inflammation. Suppression of airway inflammation is more likely to occur with higher doses of corticosteroids. Furthermore, studies indicate that the dose of inhaled or systemic corticosteroids can be reduced and the clinical benefits sustained once the disease is controlled (Haahtela et al. 1994; Agertoft and Pedersen 1994). A preliminary observation in a retrospective study of children suggests that initiating inhaled corticosteroids early in the course of the disease results in better clinical benefit and less accumulated corticosteroid dose over the long term (Agertoft and Pedersen 1994). Therefore, it is conceivable that a more aggressive approach in initial therapy will more rapidly suppress airway inflammation, restore pulmonary function, and allow for eventual asthma control at lower doses of anti-inflammatory therapy.

Figure 3-4b. Stepwise Approach for Managing Asthma in Adults and Children Older Than 5 Years of Age: Treatment

Preferred treatments are in bold print.

	Long-Term Control	Quick Relief	Education
STEP 4 Severe Persistent	Daily medications: ■ **Anti-inflammatory: inhaled corticosteroid (high dose) AND** ■ **Long-acting bronchodilator: either long-acting inhaled beta$_2$-agonist, sustained-release theophylline, or long-acting beta$_2$-agonist tablets AND** ■ **Corticosteroid tablets or syrup long term (2 mg/kg/day, generally do not exceed 60 mg per day).**	■ **Short-acting bronchodilator: inhaled beta$_2$-agonists as needed for symptoms.** ■ **Intensity of treatment will depend on severity of exacerbation; see component 3-Managing Exacerbations.** ■ **Use of short-acting inhaled beta$_2$-agonists on a daily basis, or increasing use, indicates the need for additional long-term-control therapy.**	Steps 2 and 3 actions plus ■ Refer to individual edu counseling
STEP 3 Moderate Persistent	Daily medication: ■ **Either** — **Anti-inflammatory: inhaled corticosteroid (medium dose)** OR — **Inhaled corticosteroid (low-medium dose) and add a long-acting bronchodilator, especially for nighttime symptoms: either long-acting inhaled beta$_2$-agonist, sustained-release theophylline, or long-acting beta$_2$-agonist tablets.** ■ **If needed** — **Anti-inflammatory: inhaled corticosteroids (medium-high dose) AND** — **Long-acting bronchodilator, especially for nighttime symptoms; either long-acting inhaled beta$_2$-agonist, sustained-release theophylline, or long-acting beta$_2$-agonist tablets.**	■ **Short-acting bronchodilator: inhaled beta$_2$-agonists as needed for symptoms.** ■ **Intensity of treatment will depend on severity of exacerbation; see component 3-Managing Exacerbations.** ■ **Use of short-acting inhaled beta$_2$-agonists on a daily basis, or increasing use, indicates the need for additional long-term-control therapy.**	Step 1 actions plus: ■ Teach self-monitoring ■ Refer to group educati ■ Review and update sel plan
STEP 2 Mild Persistent	One daily medication: ■ **Anti-inflammatory: either inhaled corticosteroid (low doses) or cromolyn or nedocromil (children usually begin with a trial of cromolyn or nedocromil).** ■ **Sustained-release theophylline to serum concentration of 5-15 mcg/mL is an alternative, but not preferred, therapy. Zafirlukast or zileuton may also be considered for patients ≥12 years of age, although their position in therapy is not fully established.**	■ **Short-acting bronchodilator: inhaled beta$_2$-agonists as needed for symptoms.** ■ **Intensity of treatment will depend on severity of exacerbation; see component 3-Managing Exacerbations.** ■ **Use of short-acting inhaled beta$_2$-agonists on a daily basis, or increasing use, indicates the need for additional long-term-control therapy.**	

(Continued on next page)

Figure 3-4b. Stepwise Approach for Managing Asthma in Adults and Children Older Than 5 Years of Age: Treatment (continued)

Preferred treatments are in bold print.

	Long-Term Control	Quick Relief	Education
STEP 1 Mild Intermittent	■ No daily medication needed.	■ Short-acting bronchodilator: **inhaled beta$_2$-agonists** as needed for symptoms. ■ Intensity of treatment will depend on severity of exacerbation; see component 3-Managing Exacerbations. ■ Use of short-acting inhaled beta $_2$-agonists more than 2 times a week may indicate the need to initiate long-term-control therapy.	■ Teach basic facts about asth ■ Teach inhaler/spacer/holdi technique ■ Discuss roles of medicatior ■ Develop self-management p ■ Develop action plan for wh to take rescue actions, espe patients with a history of se exacerbations ■ Discuss appropriate enviror control measures to avoid e known allergens and irritan (See component 4.)

↓ Step down

Review treatment every 1 to 6 months; a gradual stepwise reduction in treatment may be possible.

↑ Step up

If control is not maintained, consider step up. First, review patient medication technique, adherence, and environmental control (avoidance of allergens or oth that contribute to asthma severity).

NOTE:
- **The stepwise approach presents general guidelines to assist clinical decisionmaking; it is not intended to be a specific prescription. Asthma is highly variable; clinician should tailor specific medication plans to the needs and circumstances of individual patients.**
- **Gain control as quickly as possible; then decrease treatment to the least medication necessary to maintain control. Gaining control may be accomplished by either starting treatr the step most appropriate to the initial severity of the condition or starting at a higher level of therapy (e.g., a course of systemic corticosteroids or higher dose of inhaled corticosteroids).**
- **A rescue course of systemic corticosteroids may be needed at any time and at any step.**
- **Some patients with intermittent asthma experience severe and life-threatening exacerbations separated by long periods of normal lung function and no symptoms. This may be especially common with exacerbations provoked by respiratory infections. A short course of systemic corticosteroids is recommended.**
- **At each step, patients should control their environment to avoid or control factors that make their asthma worse (e.g., allergens, irritants); this requires specific diagnosis and education.**

Figure 3-6. Stepwise Approach for Managing Infants and Young Children (5 Years of Age and Younger) With Acute or Chronic Asthma Sympto

	Long-Term Control	Quick Relief
STEP 4 **Severe Persistent**	■ Daily anti-inflammatory medicine -- High-dose inhaled corticosteroid with spacer/holding chamber and face mask -- If needed, add systemic corticosteroids 2 mg/kg/day and reduce to lowest daily or alternate-day dose that stabilizes symptoms	■ Bronchodilator as needed for symptoms (see step 1) up to 3 times a day
STEP 3 **Moderate Persistent**	■ Daily anti-inflammatory medication. Either: -- Medium-dose inhaled corticosteroid with spacer/holding chamber and face mask OR, once control is established: -- Medium-dose inhaled corticosteroid and nedocromil OR -- Medium-dose inhaled corticosteroid and long-acting bronchodilator (theophylline)	■ Bronchodilator as needed for symptoms (see step 1) up to 3 times a day
STEP 2 **Mild Persistent**	■ Daily anti-inflammatory medication. Either: -- Cromolyn (nebulizer is preferred; or MDI) or nedocromil (MDI only) tid-qid -- Infants and young children usually begin with a trial of cromolyn or nedocromil OR -- Low-dose inhaled corticosteroid with spacer/holding chamber and face mask	■ Bronchodilator as needed for symptoms (see step 1)
STEP 1 **Mild Intermittent**	■ No daily medication needed.	■ Bronchodilator as needed for symptoms <2 times a week. Intensity of treatment will dep severity of exacerbation (see component 3-Managing Exacerbations). Either: -- Inhaled short-acting beta $_2$-agonist by nebulizer or face mask and spacer/holding ch OR -- Oral beta$_2$-agonist for symptoms ■ With viral respiratory infection: -- Bronchodilator q 4-6 hours up to 24 hours (longer with physician consult) but, in g more than once every 6 weeks -- Consider systemic corticosteroid if - Current exacerbation is severe OR - Patient has history of previous severe exacerbations

NOTES:

- The stepwise approach presents guidelines to assist clinical decisionmaking. Asthma is highly variable; clinicians should tailor specific medication plans to the needs and circumstances of individual patients.
- Gain control as quickly as possible; then decrease treatment to the least medication necessary to maintain control. Gaining control may be accomplished by either starting treatment at the step most appropriate to the initial severity of their condition or by starting at a higher level of therapy (e.g., a course of systemic corticosteroids or higher dose of inhaled corticosteroids).
- A rescue course of systemic corticosteroid (prednisolone) may be needed at any time and step.
- In general, use of short-acting beta $_2$-agonist on a daily basis indicates the need for additional long-term-control therapy.
- It is important to remember that there are very few studies on asthma therapy for infants.
- Consultation with an asthma specialist is *recommended* for patients with moderate or severe persistent asthma in this age group. Consultation should be *considered* for all patients with mild persistent asthma.

Step down
Review treatment every 1 to 6 months. If control is sustained for at least 3 months, a gradual stepwise reduction in treatment may be possible.

Step up
If control is not achieved, consider step up. But first: re patient medication technique, adherence, and environme control (avoidance of allergens or other precipitant facto

ADULTS

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

CHILDREN

Drug	Low Dose	Medium Dose	High Dose
Beclomethasone dipropionate 42 mcg/puff 84 mcg/puff	84-336 mcg (2-8 puffs)	336-672 mcg (8-16 puffs)	>672 mcg (>16 puffs)
Budesonide Turbuhaler 200 mcg/dose	100-200 mcg	200-400 mcg (1-2 inhalations — 200 mcg)	>400 mcg (>2 inhalations — 200 mcg)
Flunisolide 250 mcg/puff	500-750 mcg (2-3 puffs)	1,000-1,250 mcg (4-5 puffs)	>1,250 mcg (>5 puffs)
Fluticasone MDI: 44, 110, 220 mcg/puff DPI: 50, 100, 250 mcg/dose	88-176 mcg (2-4 puffs — 44 mcg) (2-4 inhalations — 50 mcg)	176-440 mcg (4-10 puffs — 44 mcg) or (2-4 puffs — 110 mcg) (2-4 inhalations — 100 mcg)	>440 mcg (>4 puffs — 110 mcg) (>4 inhalations — 100 mcg)
Triamcinolone acetonide 100 mcg/puff	400-800 mcg (4-8 puffs)	800-1,200 mcg (8-12 puffs)	>1,200 mcg (>12 puffs)

NOTES:

- **The most important determinant of appropriate dosing is the clinician's judgment of the patient's response to therapy.** The clinician must 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.
- See figure 3-5c for an explanation of the rationale used for the comparative dosages. The reference point for the range in the dosages for children is data on the safety of inhaled corticosteroids in children, which, in general, suggest that the dose ranges are equivalent to beclomethasone dipropionate 200–400 mcg/day (low dose), 400–800 mcg/day (medium dose), and >800 mcg/day (high dose).
- Some dosages may be outside package labeling.
- Metered-dose inhaler (MDI) dosages are expressed as the actuater dose (the amount of drug leaving the actuater and delivered to the patient), which is the labeling required in the United States. This is different from the dosage expressed as the valve dose (the amount of drug leaving the valve, all of which is not available to the patient), which is used in many European countries and in some of the scientific literature. Dry powder inhaler (DPI) doses (e.g., Turbuhaler) are expressed as the amount of drug in the inhaler following activation.

ASTHMA SELF-MANAGEMENT PLAN FOR _____

(Name)

YOUR TREATMENT GOALS

- ☐ Be free from severe symptoms day and night, including sleeping through the night
- ☐ Have the best possible lung function
- ☐ Be able to participate fully in any activities of your choice
- ☐ Not miss work or school because of asthma symptoms
- ☐ Not need emergency visits or hospitalizations for asthma
- ☐ Use asthma medications to control asthma with as few side effects as possible

Add personal goals here: _____

_____

_____

YOUR DAILY MEDICATIONS

Daily Medication	How Much To Take	When To Take It

RECORD DAILY SELF-MONITORING ACTIONS in the asthma diary your doctor gives you.

Peak flow: At least every morning when you wake up, before taking your medication, measure your peak flow and record it in your diary. Bring these records to your next appointment with your doctor.

Symptoms: Note if you had asthma symptoms (shortness of breath, wheezing, chest tightness, or cough) and rate how severe they were during the day or night: mild, moderate, severe.

Use of your quick-relief inhaler (bronchodilator): Keep a record of the number of puffs you needed to use each day or night to control your symptoms.

Actual use of daily medications

Activity restriction

This plan is provided as an example to clinicians.