

Clinical Practice Guideline
Outpatient Management of ASTHMA in Children and Adults 2007
 Contra Costa Health Plan and Contra Costa Regional Medical Center

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CCHP/CCRMC 2006 Clinical Practice Guideline
Outpatient Management of Asthma in Children and Adults

Clinical Practice Guideline
Outpatient Management of ASTHMA in Children and Adults 2007

Contra Costa Health Plan/Contra Costa Regional Medical Center
 (This is meant as a guide and not meant to replace clinical judgment.)

DIAGNOSIS: Based on medical history, physical exam, pulmonary function tests & other lab results.			
ASTHMA: A chronic inflammatory disease of airways with Preventable and Reversible Symptoms			
A ssess	SYMPTOMS: Wheezing, breathlessness, cough (productive or dry), chest discomfort.		
	ASTHMA TRIGGERS: Exercise, infections, environment, medications, food, allergens		
	PATTERNS	Perennial vs. Seasonal	Episodic vs. Continual
	<ul style="list-style-type: none">▪ Number of symptoms /episodes per week.▪ Number of nocturnal symptoms per month.▪ Test Results: Pulmonary Function Tests (PFT) and Peak Expiratory Flow (PEF).		
ESTABLISH DIAGNOSIS			
History: ER visits, hospitalizations, medication use, lung function, and peak flow.			
Clinical Testing: Spirometry/PFT's, allergy testing, X-rays, blood tests.			
S everity	ASSESS AND CLASSIFY - Four Categories of Severity ¹¹		
	Mild Intermittent	Mild Persistent	Moderate Persistent
T reatment	MATCH TREATMENT WITH ASTHMA SEVERITY		
	<ul style="list-style-type: none">▪ First Line Controller = Inhaled Corticosteroids (ICS) for all cases of <u>persistent</u> asthma. May <u>consider</u> Leukotriene Antagonists when unable to use ICS.▪ Add On to First Line ICS controller monotherapy:▪ Inhaled long-acting beta₂-agonists, Leukotriene Antagonists, Cromolyn, Nedocromil.▪ Pregnancy: Use FEV₁ and Ultrasound to assess. Symptoms alone are unreliable. Budesonide preferred Inhaled Corticosteroid.▪ Influenza Vaccine: Recommended for patients with persistent asthma.▪ Immunotherapy: An option for patients with significant allergic triggers.		
H ealthy Lifestyle	SMOKING CESSATION COUNSELING: Counsel and treat all who smoke with established cessation strategies. Refer to 1-800-NOBUTTS (662 - 8887)		
	EXERCISE: Recommended for people with controlled/stable asthma to maintain cardiovascular fitness and prevent obesity. Effective treatments available for exercise-induced asthma.		
M onitoring	PATIENT EDUCATION AND SELF-MANAGEMENT		
	Interactive training that teaches basic skills, simplifies the regimen, and provides reinforcement should include: <ul style="list-style-type: none">▪ Self-monitoring of symptoms or peak flow.▪ Regular review of treatment with medical practitioner.▪ Written action plans based on monitoring results (symptoms or peak flow).▪ May refer to CCHP Asthma program (925) 313-6651 or Toll Free (877) 313-6905		
A ction Plan	CREATE, UPDATE and REVIEW Action Plan with patient regularly.		

Asthma Guideline Update 2007

- We all have more patients with asthma.
- We have **room to improve** in use of controller medications in **persistent** asthma.

HEDIS Medi-Cal Asthma Measure		
Use of Controller Meds in Persistent Asthma		
* Methodology changed for 2005		
Measurement Year	CCHP	Medi-Cal Average
2004	60 %	62 %
2005	82 %	84 %

Contra Costa Health Plan (CCHP) and Contra Costa Regional Medical Center Network (CCRMC) are sending you the 2007 Asthma guidelines. Contra Costa Health Plan's Community Provider Network (CPN) providers also receive the full text of the guidelines. CCRMC providers may access the text on the Contra Costa Health Services intranet (type "http://cchs" into web browser, select Site, select Library, select Clinical Guidelines). CPN providers and the general public may access the text on the Internet at: http://www.cchealth.org/health_plan/providers.php

Key Changes

- **Diagnosis in Infants and Young Children** – A simple and reliable clinical decision tool identifies infants and young children at high risk of developing asthma who are candidates for corticosteroids.
- **Inhaled Corticosteroids (ICS)** – Preferred controller for all ages.
- **Allergy Referrals** – Avoid Beta-blockers and consider prescribing an Epinephrine injector to patients receiving allergy injections. Omalizumab (Xolair) available solely through referral to allergist for cases of asthma not controlled by other medications.
- **Pregnancy** – Symptoms less reliable so PFT's and ultrasound are recommended as part of the initial assessment to establish dates. The preferred Controller medication is Budesonide (Pulmicort), although may continue other ICS if already established prior to pregnancy.
- **Long-Acting Beta₂-Agonists** – Only use **after** other controllers. Only use in conjunction with ICS/Inhaled Corticosteroids.
- **On November 18, 2005, the U.S. Food and Drug Administration (FDA) notified manufacturers of Advair Diskus, Foradil Aerolizer, and Serevent Diskus to update their existing product labels with new warnings and to provide a Medication Guide. This guide was to alert health care professionals and patients that these medicines may increase the chance of severe asthma episodes and/or death when those episodes occur. All of these products contain long-acting beta₂-adrenergic agonists (LABA). Even though LABAs decrease the frequency of asthma episodes, these medicines may make asthma episodes more severe when they occur. A Medication Guide with information about these risks will be given to patients when a prescription for a LABA is filled or refilled.**

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The Core Elements of ASTHMA Care	
A ssess	Symptoms, Triggers, Patterns, Severity, ER visits, hospitalizations, and consider objective testing.
S everity	Four categories: Mild Intermittent, Mild Persistent, Moderate Persistent, and Severe Persistent.
T reatment	Match Treatment to Severity. Use First Line Controller (=Inhaled Corticosteroids) for Persistent Asthma.
H ealthy Lifestyle	Smoking cessation for patients and home contacts. Exercise to maintain fitness and prevent/manage obesity.
M onitoring	Patient training to learn basic skills, Peak Flow or Symptoms to monitor Severity, and utilize the Case Manager program.
A ction Plan	Create, update and review plan with patient.

Introduction: How These Guidelines Were Developed

Asthma is highly prevalent in Contra Costa County. Asthma admissions in Contra Costa County total nearly 4000 hospital days per year. Pittsburgh, parts of Concord, and West Contra Costa County have asthma rates above the Healthy People 2010 target of 11 admissions per 10,000 population.¹ African Americans in Contra Costa County have more than twice the target rate of admission.²

The National Institute of Health: National Heart Lung and Blood Institute panel of experts—the National Asthma Education and Prevention Program (NAEPP)—defined asthma as an inflammatory disease of the airways in the NAEPP Expert Panel Report 2 (EPR-2) in 1997 (NIH Publication 97-4051).³ The majority of the EPR-2 was “based on the opinion of the Expert Panel”.

In 2002 the NAEPP Expert Panel issued an Update on Selected Topics 2002, using an evidence-based methodology to make clear, weighted recommendations on the basis of well-designed studies for selected portions of the 1997 guidelines.⁴

Contra Costa Health Plan (CCHP) and the Contra Costa Regional Medical Center/Clinics (CCRMC) took a pragmatic approach to guideline development. We began with NAEPP’s EPR-2, the EPR Update on Selected Topics 2002, current evidence based asthma guidelines and reviews of asthma topics.^{5, 6, 7, 8} Evidence in children allows us to merge the CCHP/CCRMC Guideline for the Diagnosis and Management of Asthma in Adults and Adolescents (1999) and the Guideline for the Diagnosis and Management of Asthma in Children and Adolescents (2003) into one updated guideline. We have used an outline format to show the strength of scientific evidence for each recommendation.

These revised guidelines will provide a common framework and toolkit for medical decision-making by CCRMC staff and CCHP’s Community Provider Network (CPN), and CCRMC and CCHP’s case management and Asthma Disease Management Program staff. We hope these guidelines are useful to providers at the point of care and will contribute to our patients’ quality of life.

EVIDENCE BASIS KEY FOR RECOMMENDATIONS		
A	Evidence Based	There is strong scientific evidence for the recommendation from large well-controlled studies.
B	Evidence Based	There is evidence for the recommendation from small or inadequately controlled studies.
C	Consensus	The recommendation is derived from expert opinion based on some literature (case studies etc.).
D	No Evidence	There is no evidence to support this intervention.
E	Evidence of Harm	There is evidence of possible harm from this intervention.

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INTENDED AUDIENCE

- Primary Care and Public Health providers in Family Medicine, Internal Medicine and Pediatrics (MD, DO, NP, PA).
- Nurses, nurse educators and health educators.
- Allergists, Obstetrician/Gynecologists, Pulmonologists.
- Patients with asthma and their caregivers.

TARGET POPULATION

Adults, adolescents and children with Asthma, Reactive Airway Disease or chronic cough.

GOALS

- Increase recognition of asthma as a chronic disease with preventable symptoms.
- Improve patients' asthma self-management skills.
- Improve the quality of life for patients with asthma.
- Improve asthma care by CCRMC and CPN providers.

THE ASTHMA CLINICAL GUIDELINES GROUP

The Asthma Clinical Guidelines Group consists of CCRMC and CPN primary care providers and specialists. This guideline was sent out in draft form to CCHP's Quality Council members and appropriate CPN specialists, all CCRMC primary care providers as well as CCRMC Allergists, Obstetrics/Gynecologists, and Pulmonologists for comment.

Participants include:

- Troy Kaji, MD, Medical Consultant to CCHP Department of Quality Management, Martinez and Department of Family Medicine, Contra Costa Health Services, Richmond.
- Cynthia Ashbrook, MD, Allergy Clinic, CCRMC, Martinez.
- Guenter Hofstadler, MD, Department of Pediatrics, CCRMC, Martinez
- Karen Hardy, MD, Director - Bay Area Pediatric Pulmonary, Children's Hospital Oakland, and California Pacific Medical Center, San Francisco.

DEFINITIONS

PEF: Peak Expiratory Flow	PFT: Pulmonary Function Test
FEV: Forced Expiratory Volume	ICS: Inhaled Corticosteroids
FEV1: Forced Expiratory Volume in 1 second	LABA: Long-acting beta ₂ -agonists
LTRA: Leukotriene antagonists.	EPR Update 2002: NAEPP Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma—Update on Selected Topics 2002. National Asthma Education and Prevention Program (NAEPP) of the National Institutes of Health (NIH) National Heart, Lung and Blood Institute (NHLBI).
EPR2: Expert Panel Report 2 of the National Asthma Education and Prevention Program (NAEPP) of the National Institutes of Health (NIH) National Heart, Lung and Blood Institute (NHLBI).	

DIAGNOSIS

Asthma is a chronic inflammatory disease of the airways. The diagnosis is clinically determined from the patient's symptoms over time. Objective tests, such as spirometry/ Pulmonary Function Testing (PFT) can confirm the diagnosis. NAEPP advises pulmonary function testing in all asthmatics, especially those with severe asthma, based on expert consensus. Many clinicians manage patients effectively without PFTs. PFTs help when the patient fails to improve adequately, the diagnosis is in doubt, or either patient or provider wishes a quantitative picture of the disease process.

Consensus (C)⁹

ASSESSMENT and CLASSIFICATION SYSTEM

Classification determines the strategy of pharmacotherapy and management. Specific pharmacotherapies are supported by excellent to good evidence (A&B), while the management strategy is based on expert opinion – Consensus (C).

Treatment Aim and Algorithm

Maintain control of asthma with a minimum dose of medication to minimize side effects. Algorithms that incorporate a stepwise approach to therapy, which matches treatment intensity to illness severity, are one way to achieve this aim. We have attached the NIH algorithm because it is the most widely known algorithm.

Consensus (C)^{10,11}

Start One Step Higher in Classification System

Classification systems usually reflect the practitioner's best judgment of disease severity, based on the definitions. On the basis of expert opinion (C) rather than evidence, the NAEPP advises starting treatment one step higher than the patient's classification to rapidly get poorly controlled asthmatics under control. Use a course of systemic corticosteroids or higher dose of inhaled corticosteroids—followed by a taper once their symptoms are under control.

Consensus (C)¹²

Tailor Therapy to Patient Circumstances

The stepwise framework assists clinical decision-making, but cannot be a specific prescription. Asthma is highly variable. Practitioners must use clinical judgment to tailor specific medication plans to the needs and circumstances of individual patients.

Outpatient Management of Asthma in Children and Adults

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.

Consensus (C)**Minimize Use of Short-Acting Beta₂-Agonists**

Measures of over reliance on beta₂-agonists are: daily use, increasing use, lack of expected effect, or use of approximately one canister a month even if not using daily. Over reliance indicates inadequate control of asthma and the need to start or intensify controller therapy.

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NIH/NAEPP Treatment Algorithm				
Class Severity Clinical Features Before Treatment or Adequate Control			Medications Required to Maintain Long-Term Control	
	CLASSIFY	Day Symptoms	PREFERRED TREATMENT	ALTERNATIVES
		Night Symptoms		
		FEV – PEF		
STEP 4	SEVERE PERSISTENT	Day: Continual	High-dose Inhaled Corticosteroids (ICS) WITH Long-Acting inhaled Beta ₂ -Agonists	AND, if needed: Corticosteroid tablets or syrup long term (2mg/kg/day, generally not to exceed 60mg per day). Make repeated attempts to reduce systemic corticosteroids and maintain with high-dose inhaled corticosteroids.
		Night: Frequent		
		FEV ₁ or PEF: ≤ 60%		
STEP 3	MODERATE PERSISTENT	Day: Daily	Low-dose ICS and Long-Acting inhaled Beta ₂ -Agonists OR Medium dose ICS	Alternative: Low-dose inhaled corticosteroids and either leukotriene receptor antagonist or theophylline. If needed (especially in recurring severe exacerbations): -Medium-dose inhaled corticosteroids and long-acting beta ₂ -agonists.
		Night: > 1 night per week		
		FEV ₁ or PEF: > 60% or < 80%		
STEP 2	MILD PERSISTENT	Day: > 2 per week, but less than once per day	Low-dose Inhaled Corticosteroids	Alternative treatments (alphabetical): <ul style="list-style-type: none">▪ Cromolyn,▪ Leukotriene modifier,▪ Nedocromil, OR sustained release theophylline to serum concentration 5-15 mcg/ml
		Night: > 2 nights per month		
		FEV ₁ or PEF: ≥ 80%		
STEP 1	MILD INTERMITTENT	Day: ≤ 2 days per week	NO DAILY MEDICATION NEEDED	Severe exacerbations may occur, separated by long periods of normal lung function and no symptoms. FOR SEVERE EXACERBATIONS, a short course of systemic corticosteroids is recommended.
		Night: ≤ 2 nights per month		
		FEV ₁ or PEF: Not needed		
Step Down (Decreasing Severity) Review treatment every 1 to 6 months; a gradual stepwise reduction in treatment may be possible.			Step Up (Increasing Severity) If control is not maintained, consider step up. First, review patient medication technique, adherence, and environmental control (avoidance of allergens or other factors that contribute to asthma severity).	

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TABLE 1: ADULTS
Estimated Comparative Daily Dosages for Inhaled Corticosteroids

Drug	Low-Dose	Medium-Dose	High-Dose
Beclomethasone HFA* 40 mcg/puff (MDI) – QVAR 40* 80 mcg/puff (MDI) – QVAR 80*	80-240 mcg 2 – 6 puffs 1 - 3 puffs	240-480 mcg 6 - 12 puffs 3 - 6 puffs	> 480 mcg > 12 puffs > 6 puffs
Budesonide: Pulmicort Turbuhaler 200 mcg/inhalation (DPI)	200-600 mcg 1 - 3 inhalations	600-1,200 mcg 3 - 6 inhalations	> 1,200 mcg > 6 inhalations
Flunisolide: Aerobid, Aerobid-M 250 mcg/puff (MDI)	500-1,000 mcg 2 - 4 puffs	1,000-2,000 mcg 4 - 8 puffs	> 2,000 mcg > 8 puffs
Fluticasone: Flovent HFA* 44, 110, 220 mcg/puff (MDI)	88-264 mcg 2-6 puffs - 44 mcg 2 puffs - 110 mcg	264-660 mcg 2-6 puffs - 110 mcg	> 660 mcg > 6 puffs – 110 mcg > 3 puffs - 220 mcg
Mometasone: Asmanex Twisterhaler 220mcg/ spray (MDI)	220 mcg	440 mcg	880 mcg
Triamcinolone acetonide:- Azmecort 100 mcg/puff (MDI)	400-1,000 mcg 4 - 10 puffs	1,000-2,000 mcg 10 - 20 puffs	> 2,000 mcg > 20 puffs

TABLE 2: CHILDREN < 12
Estimated Comparative Daily Dosages for Inhaled Corticosteroids

Drug	Age (yrs)	Low-Dose	Medium-Dose	High-Dose
Beclomethasone HFA* 40 mcg/puff (MDI) – QVAR 40* 80 mcg/puff (MDI) – QVAR 80*	> 5	80-160 mcg 2 - 4 puffs 1 – 2 puffs	160-320 mcg 4 - 8 puffs 2 - 4 puffs	> 320 mcg > 8 puffs > 16 puffs
Budesonide: Pulmicort Turbuhaler 200 mcg/inhalation (DPI)	> 6	200-400 mcg 1 – 2 inhalations	400-800 mcg 2 - 4 inhalations	> 800 mcg > 4 inhalations
Budesonide: Pulmicort Respules Inhalation suspension 0.25, .5 mg/2 ml	1-8	0.25 mg Once Daily	0.5 mg Once daily	1.0 mg Once Daily
Flunisolide: Aerobid, Aerobid-M 250 mcg/puff (MDI)	> 6	500-750 mcg 2 - 3 puffs	1,000-1,250 mcg 4 - 5 puffs	>1,250 mcg > 5 puffs
Fluticasone: Flovent HFA* 44, 110, 220 mcg/puff (MDI)	4-11	88-176 mcg	176-440 mcg	>440 mcg
Triamcinolone acetonide: Azmecort 100 mcg/puff (MDI)	> 6	400-800 mcg 4 - 8 puffs	800 – 1,200 mcg 8 - 12 puffs	>1,200 mcg > 12 puffs

*CCHP Formulary item	Note: Spacers and Peak Flow Meters are covered by CCHP		
MDI = metered dose inhaler	DPI = dry powder inhaler	HFA = hydrofluoralkane-based	

LONG TERM ASTHMA MANAGEMENT

PHARMACOLOGICAL THERAPY

Reliever Medications: Inhaled Short-Acting Beta₂-Agonist

Use inhaled short-acting beta₂-agonists by multi-dose inhaler or dry powder inhaler as needed for rescue therapy. Avoid routine short-acting beta₂-agonist use.

Evidence Based (A)¹³

Controller Medications: First Line Controller Therapy

In children aged preschool or above, with **recurrent wheezing episodes**, start Inhaled Corticosteroids in children at high risk for asthma according to the high-risk criteria given below. 76% of children who meet the criteria will have active asthma during the school years. 95% of children who do not meet the criteria will not having active asthma during school years.

Evidence Based (A)^{14, 15}

High Risk Criteria for Asthma in Young Children

- **Any wheezing in the first 3 years of life, PLUS:**
 - **One of two major criteria**
 - Parental history of health provider diagnosed asthma
 - OR**
 - Health provider diagnosed atopic dermatitis at age ≥ 2 years
- OR**
- **Two of the following minor criteria:**
 - Health provider diagnosed allergic rhinitis at age ≥ 2 years,
 - Wheezing apart from colds, or
 - Peripheral blood eosinophilia (≥ 4% eosinophils)

Start patients with persistent asthma (classes 2, 3, 4) on Inhaled Corticosteroids (ICS). Strong evidence shows that use of ICS achieves SUPERIOR CONTROL. The use of ICS at recommended doses is SAFE, without long-term clinically significant, or irreversible effects on vertical growth (height), bone mineral density, ocular toxicity, or suppression of adrenal/pituitary axis.

Evidence Based (A)^{16, 17, 18}

Note: Instruct patients using combination ICS/LABA products (Advair Diskus) **not to double the dose.**

Other second line controller medications—leukotriene antagonists (LTRAs such as Singulair), cromolyn, or nedocromil are less effective, and **NOT PREFERRED**. However, LTRAs are available for children as young as 2 years, and studies have demonstrated improved outcomes. (B)¹⁹ Leukotriene antagonists (LTRA) may be considered as an alternative treatment if patient circumstances warrant selection of oral treatment.

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Long-acting beta₂-agonists (LABAs) such as salmeterol, one of the active ingredients in Advair Diskus, may increase the risk of asthma-related death. According to the March 2006 FDA labeling changes²⁰, clinicians “should only prescribe Advair Diskus for patients not adequately controlled on other asthma controller medications (e.g. low- to medium-dose inhaled corticosteroids) or whose disease severity clearly warrants initiation of treatment with two maintenance therapies. . .”

Evidence Based (A)²¹

Controller Medications: Second Line Controller Therapy

An inhaled long-acting beta₂-agonist (LABA) may be added to low or medium dose inhaled corticosteroid (ICS) in patients whose persistent asthma is uncontrolled on an inhaled corticosteroid (ICS) alone.

Evidence Based (A)^{22, 24}

CAUTION: In the SMART study, LABAs in patients NOT on ICS were associated with higher mortality rate, especially in African Americans—possibly from a delay in seeking medical care. Because of this, LABAs carry a black box warning, and clinicians should use other controller medications first.

Evidence of Harm (E)²²

SPECIAL CONSIDERATIONS

Corticosteroids for Preventing Asthma Relapse

A short course of systemic corticosteroids after an acute exacerbation of asthma reduces relapses and decreases short-acting beta₂-agonist use. Intramuscular corticosteroids are as effective as oral administration. One study indicates that systemic steroids are more effective if given daily at 3PM.

Evidence Based (A)^{23, 24}

Initial Starting Dose of Inhaled Corticosteroid: High-Medium-Low

Starting with moderate dose ICS is equivalent to starting with high dose ICS and down-titrating. Initial moderate dose ICS is more effective than initial low dose ICS. However, even low-dose ICS reduce the risk of asthma death. **Instruct patients using combination ICS/LABA products (Advair) not to double the dose.** (See Tables 1 & 2)

Evidence Based (A)^{25 26}

Inhalers With Holding Chambers versus Nebulizers in Acute Asthma

Beta₂-agonist delivery by a metered dose inhaler plus a valved holding chamber/spacer (MDI+VHC) is as effective as nebulizer delivery, and in children may reduce the length of stay in the emergency room and pulse rate after treatment. Six sprays hourly of albuterol (MDI+VHC) in adults is safe and effective. Studies have shown that 4 to 10 puffs of albuterol (MDI+VHC) is equivalent to 2.5mg of albuterol delivered by nebulizer.

Evidence Based (B)^{27, 28, 29}

Antibiotics for Asthma Exacerbations are Not Recommended

In the absence of a condition that warrants antibiotics—for example, patients with fever and purulent sputum, pneumonia, or suspected bacterial sinusitis—antibiotics are **NOT RECOMMENDED** for the routine treatment of asthma exacerbations.

Evidence Based (A)³⁰

Drug Therapy for Nocturnal Asthma

Addition of a long-acting beta₂-agonist (LABA) to an inhaled corticosteroid (ICS) is recommended for control of persistent asthma with nighttime symptoms.

Evidence Based (A)³¹

CAUTION: In the SMART study, LABAs in patients **NOT** on ICS were associated with higher mortality rate, especially in African Americans—possibly from a delay in seeking medical care. Because of this, LABAs carry a black box warning, and clinicians should use other controller medications first.

Evidence of Harm (E)³²

GERD and Asthma

Gastroesophageal reflux (GERD) is a known trigger of asthma symptoms. Clinicians may consider a trial of anti-reflux therapy to decrease symptoms of nocturnal asthma, but so far a study in children with mild GERD failed to support this strategy.³³

No recommendation

Beta Blockers and Asthma

Beta-blockers are absolutely contraindicated in asthma patients undergoing immunotherapy. Beta-blockers are relatively contraindicated in asthma patients not receiving immunotherapy. In patients with mild to moderate asthma who require beta-blocker therapy, evidence supports the short-term use cardioselective beta-blockers. Avoid non-selective agents such as propranolol. Long-term safety (especially their impact during acute exacerbations) still needs to be established.

Evidence Based (B)³⁴

Drug Therapy for Rhinitis and Asthma

In patients with rhinitis and asthma, treatment of rhinitis is essential for good asthma control. Intranasal corticosteroids added to regular asthma therapy for rhinitis improves asthma control.

Evidence Based (B)³⁵

Exercise Induced Asthma

In a comparison of 24 trials in stable asthmatics over 6 years of age, short-acting beta₂-agonists provide the most effective protection against exercise-induced asthma, followed by mast cell stabilizers (nedocromil or cromolyn), followed by the anti-cholinergic agents (ipratropium bromide).

For those patients where pretreatment with inhaled short-acting beta₂-agonists (5-15 minutes prior to exercise) does not adequately prevent symptoms: Check inhaler technique and assess to ensure that any persistent asthma is being treated adequately with inhaled corticosteroids.

Addition of pre-exercise nedocromil (4.0 mg), high dose cromolyn (4.0 mg), a long-acting beta₂-agonist, or ipratropium bromide to inhaled corticosteroids is an option in people in whom short-acting beta₂-agonist (SABA) is ineffective or poorly tolerated.

Evidence Based (A) ^{36, 37, 39}

Pregnancy and Asthma –Initial Assessment and Monitoring

The NAEPP recommends PFTs as part of the initial assessment, and monthly checks of peak expiratory flow (with a peak flow meter), symptom frequency, nocturnal asthma, interference with activities, exacerbations, and medication use. The dyspnea of pregnancy is not associated with the chest tightness, wheezing, and airway obstruction characteristic of asthma. Patients with forced expiratory volume in one second (FEV₁) of 60-80 percent predicted are at increased risk of subsequent asthma morbidity during pregnancy, and patients with FEV₁ of less than 60 percent predicted are at even greater risk.

Women who have persistent asthma during pregnancy also may benefit from additional fetal surveillance in the form of ultrasound examinations and antenatal fetal testing. Because asthma has been associated with intrauterine growth retardation (IUGR) and preterm birth, it is useful to establish pregnancy dating accurately by first trimester ultrasound where possible. In the opinion of the NAEPP, the evaluation of fetal activity and growth by serial ultrasound examinations may be considered for (1) women who have suboptimally controlled asthma, (2) women with moderate to severe asthma (starting at 32 weeks), and (3) women after recovery from a severe asthma exacerbation.

Consensus (C) ³⁸

Pregnancy and Asthma: Inhaled Corticosteroids

Adequately controlled asthma is not associated with adverse maternal or fetal outcomes. Severe or uncontrolled asthma increases risks of perinatal mortality, intrauterine growth restriction, preterm birth, low birth weight, and may result in other complications. Inhaled Corticosteroids are still the preferred controller medication.

Budesonide is the preferred inhaled corticosteroid to initiate during pregnancy—the only category B corticosteroid—on the basis of safety outcomes in 5500 infants (vs. 810 for beclomethasone and 16 for triamcinolone). CCHP will approve prior authorizations for Budesonide during pregnancy.

If a patient is already well controlled on another inhaled corticosteroid, the risk of losing asthma control may exceed the theoretic benefit of switching to budesonide.

Evidence Based (A) ³⁹

Pregnancy and Asthma: Add-on Therapy

Long-acting beta₂-agonists are the preferred add-on therapy to low or medium dose ICS treatment. Leukotriene antagonists, mast cell stabilizers, and theophylline are second-line add-on therapies for asthma not responsive to preferred medications.

Evidence Based (A)⁴⁰

Pregnancy and Asthma: Oral Corticosteroids

Limit oral corticosteroids to regular use only in those with severe-persistent disease, and short-term bursts for asthma exacerbations.

Evidence Based (A)⁴¹

OTHER THERAPIES

Influenza Vaccine

Influenza vaccinations are safe. Although they do not prevent exacerbations of asthma,⁴² flu shots do reduce the frequency of influenza, prevent serious complications, and are therefore recommended for people with asthma.

Dosage recommendations vary according to age group. Among previously unvaccinated children aged <9 years, 2 doses administered >1 month apart are recommended for satisfactory antibody responses. If possible, the second dose should be administered before December. If a child aged <9 years receiving vaccine for the first time does not receive a second dose of vaccine within the same season, only 1 dose of vaccine should be administered the following season. Two doses are not required at that time.⁴³

Evidence Based (A)⁴⁴

Consensus (C)⁴⁵

Pneumococcal Vaccination

Very limited evidence from small, poorly done studies suggests slight benefits for patients with asthma from pneumococcal vaccination. Children currently receive pneumococcal conjugate vaccine as part of the routine immunization schedule. The 1997 Centers for Disease Control Advisory Committee on Immunization Practices noted: **“Asthma has not been associated with an increased risk for pneumococcal disease, unless it occurs with chronic bronchitis, emphysema, or long-term use of systemic corticosteroids.”**

Consensus (recommended only for these risk groups) (C)⁴⁶

No Evidence (D)⁴⁷

Immunotherapy

Specific immunotherapy is an option in patients with a significant allergic component to their asthma. Allergist treatment may reduce repeat emergency room visits.

Patients taking beta-adrenergic blocking agents may be at increased risk, because beta-receptor blockade can make treatment of anaphylaxis more difficult. **Beta-blockers are contraindicated during immunotherapy.**

Consensus (C)

Severe asthma uncontrolled by medications can reduce the ability of a patient to survive immunotherapy—stabilize patients prior to referral. Patients receiving immunotherapy should be prescribed epinephrine auto-injection devices.

Evidence Based (A)^{48, 49}

Anti-IgE Immunotherapy

Omalizumab (Xolair) is an anti-IgE recombinant humanized monoclonal antibody that binds to free IgE to prevent free IgE from attaching to mast cells. It is indicated in children and adults who have been treated with Inhaled Corticosteroids for one year who still have moderate to severe asthma, and effectively reduces emergency room visits and hospitalizations. Allergists give omalizumab by subcutaneous injection every 2-4 weeks. This has not been tested in young children.

Evidence Based (B)^{50, 51}

LIFESTYLE MODIFICATIONS

House Dust Mites

Chemical or physical methods of house dust mite removal currently lack evidence of benefit for control of asthma, apart from an intensive program of environmental intervention (see below).

Evidence Based (D)⁵²

Tobacco Exposure

Tobacco use and second hand exposure increase the risk of respiratory infections in smoking adults and exposed children. Assess for tobacco use or exposure. Encourage counseling and treatment. Refer to 1-800-NOBUTTS (662-8887).

Evidence Based (A)⁵³

Trigger Assessment and Intensive Environmental Intervention

An intensive home intervention to reduce environmental allergens and passive smoking for urban children with atopic asthma reduced the number of days the children experienced symptoms.

Evidence based (A)⁵⁴

Physical Training is Safe

Physical training neither worsens nor improves lung function, but can safely improve cardiovascular fitness. Adults and children need to exercise to stay healthy. Effective treatments exist for exercise induced asthma (see separate section on exercise induced asthma.)

Evidence Based (A)^{54, 55, 56, 55, 56}

Obesity and Asthma

Studies show an increased risk of dyspnea with increasing Body Mass Index (BMI), which suggests that obesity is associated with a higher risk of asthma. Weight reduction clearly reduces symptoms of dyspnea, and is recommended for people with moderate or severe obesity (Body Mass Index ≥ 30).

Evidence Based (C) ^{57 58 59}

Recommendations on Adherence, Patient Education, and Self-Management Adherence

Methods for Achieving Adherence in Patients with Asthma

Three components together improve outcomes: (1) Self-monitoring by either peak expiratory flow or symptoms, (2) regular medical review, and (3) a written action plan. Training programs that teach patients to adjust their medications using a written action plan appear to be more effective than other forms of self-management. Asthma education reduces symptoms⁶⁰ and readmissions.⁶¹

Evidence Based (A) ^{61, 62, 63, 64}

Assessing Adherence

Adherence is the term for how successfully a patient follows a plan of medical treatment. Asthma severity, ethnicity, culture, English language proficiency, age, and socioeconomic considerations may affect patients' descriptions of the condition, and their ability to self-manage the condition. This may directly affect patients' adherence to treatment.

At a minimum, an assessment of adherence to asthma drug therapy should include:

- Assessment of patient's understanding of the condition.
- Identification of self-efficacy (confidence that one can carry out treatment plan).
- Assessment of cultural health beliefs and health behaviors regarding asthma or disease management in general.
- Oral and written communication in the patient's primary language of preference.
- Explanation of the rationale behind maintenance therapy.

Evidence Based (B) ^{65, 66, 67}

Self-Reports Unreliable for Assessing Adherence

Self-reports, caregiver reports, or daily diaries are unreliable and are not recommended as stand-alone means for the assessment of adherence. Adherence is especially low for inhaled corticosteroids.^{68, 69, 70, 71} A review of pharmaceutical data is essential to assessing adherence.

Evidence Based (B) ⁷²

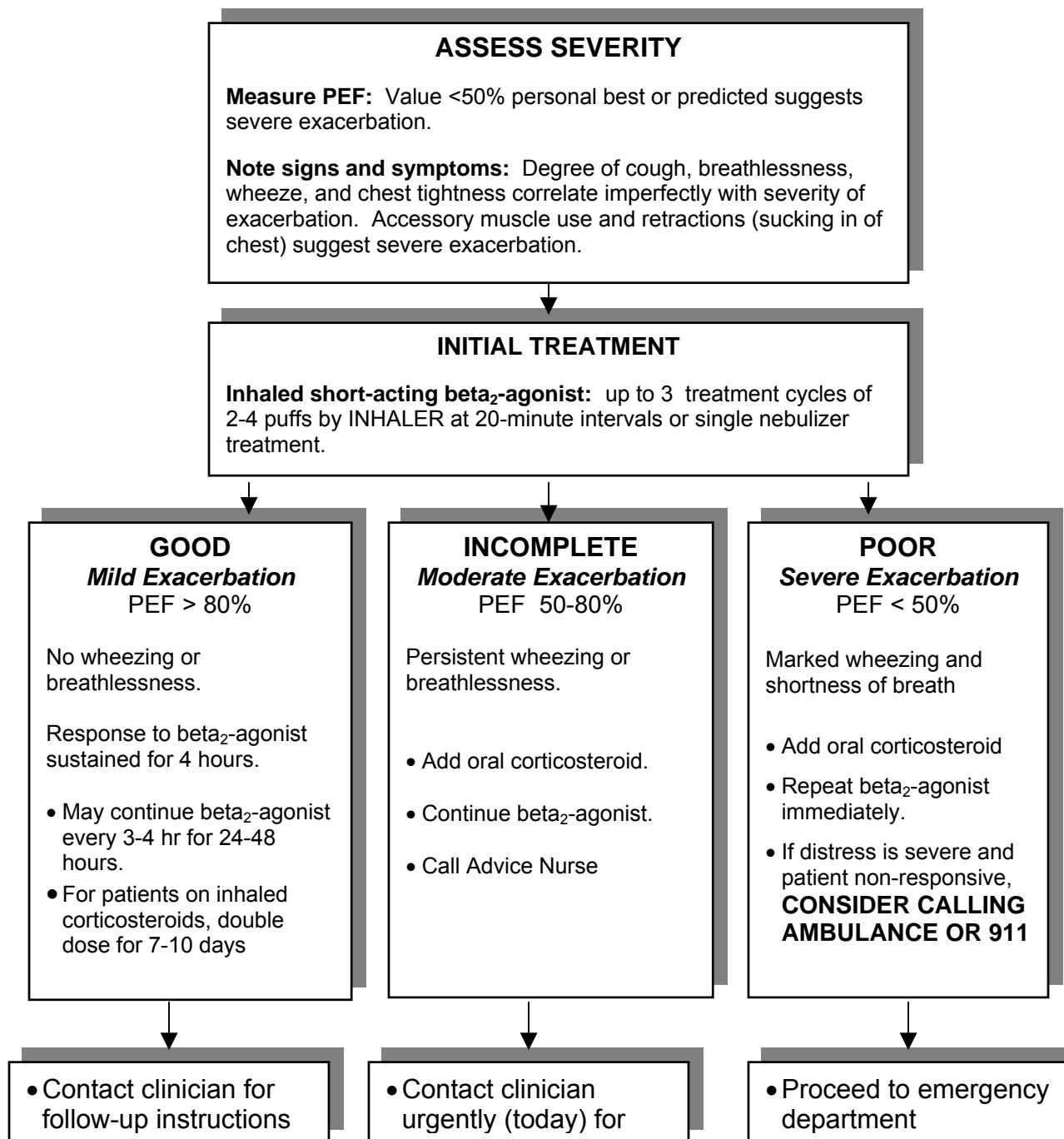
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Age Specific Differences for Asthma Treatment			
	AGES 0-4	AGES 5-12	AGES 12 to ADULT
DIAGNOSIS	Based on medical history, physical exam. Difficult to do Spirometry.	Based on medical history, physical exam, pulmonary function tests & other lab results.	Based on medical history, physical exam, pulmonary function tests & other lab results.
SYMPTOMS	Infants Observe for abdominal breathing, intercostal retractions, and nasal flaring.	Small children May complain of stomach hurting when they feel short of breath or have chest discomfort.	Teens May be reluctant to: <ul style="list-style-type: none"> • Admit they have symptoms. • Admit that they need help with the peak flow meter.
MONITOR GROWTH	Monitor growth of children on inhaled corticosteroids. First year of use: Inhaled corticosteroids may cause growth suppression during the first year of use.	Monitor growth of children on inhaled corticosteroids. First year of use: Inhaled corticosteroids may cause growth suppression during the first year of use.	Monitor growth on inhaled corticosteroids if under full adult height.

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Age Specific Differences for Asthma Treatment			
	AGES 0-4	AGES 5-12	AGES 12 to ADULT
PULMICORT (Budesonide)	<u>Pulmicort Respules (Nebulizer Form)</u> <ul style="list-style-type: none"> The only inhaled corticosteroid tested in children under 5. CCHP - Prior Authorization. 	<u>Pulmicort Turbuhaler</u> <ul style="list-style-type: none"> CCHP – Prior Authorization 	<u>Pulmicort Turbuhaler</u> <ul style="list-style-type: none"> CCHP – Prior Authorization
SINGULAIR	<ul style="list-style-type: none"> Available in chewable tablets – can be used for mild persistent asthma. Singulair does not require concomitant use of inhaled steroids. CCHP – Step Therapy applies. 	<ul style="list-style-type: none"> Available in chewable tablets – can be used for mild persistent asthma Singulair does not require concomitant use of inhaled steroids. CCHP – Step Therapy applies. 	CCHP – Step Therapy applies.
SPACERS (CCHP: Covers 1 spacer per year and available in CCRMC clinics) AND NEBULIZERS (CCHP requires prior authorization)	<ul style="list-style-type: none"> Cannot use an adult spacer. Needs a spacer with a mask. Some children do better with nebulizers. Cannot use breath- activated devices or discs. 	<u>Adult Spacer</u> Begin instruction at 5 years old. Use of a Beta ₂ -agonist with a spacer is as effective as a nebulizer ^{27, 28, 29} .	<ul style="list-style-type: none"> Encourage all patients to use a spacer. Instruct for correct inhaler/spacer technique.
PEAK FLOW METERS (CCHP: Covers one per year and available in CCRMC clinics)	<ul style="list-style-type: none"> Unable to use a peak flow meter. Action Plans need to be symptom based. 	<u>Peak Flow Instruction</u> <ul style="list-style-type: none"> Start at 5 years old. First few months: Readings may not be accurate until proficient.	Encourage daily use of Peak Flow Meters in patients with persistent symptoms.

Home Management of Asthma Exacerbations¹



¹Adapted from: The American Academy of Allergy, Asthma & Immunology, Inc. Pediatric Asthma: Promoting Best Practice. 2004. Page 86.

Healthy People 2010

Healthy People 2010 is a set of health objectives for the Nation to achieve over the first decade of the new century. It can be used by many different people, states, communities, professional organizations, and others to help them develop programs to improve health.

Healthy People 2010 builds on initiatives pursued over the past two decades. The 1979 Surgeon General's Report, *Healthy People*, and *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* both established national health objectives and served as the basis for the development of State and community plans. Like its predecessors, Healthy People 2010 was developed through a broad consultation process, built on the best scientific knowledge and designed to measure programs over time.

Healthy People 2010 Asthma Objectives

24-1. Reduce asthma deaths.

24-2. Reduce hospitalizations for asthma.

24-3. Reduce hospital emergency department visits for asthma.

24-4. Reduce activity limitations among persons with asthma.

24-5. (Developmental) reduce the number of school or work days missed by persons with asthma due to asthma.

24-6. Increase the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition.

Baseline: 6.4 percent of persons with asthma received formal patient education in 1998 (preliminary data; age adjusted to the year 2000 standard population).

Target: 30 percent.

24-7. (Developmental) increase the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP Guidelines.

24-7a. Persons with asthma who receive written asthma management plans from their health care provider.

24-7b. Persons with asthma with prescribed inhalers who receive instruction on how to use them properly.

24-7c. Persons with asthma who receive education about recognizing early signs and symptoms of asthma episodes and how to respond appropriately, including instruction on peak flow monitoring for those who use daily therapy.

- 24-7d. Persons with asthma who receive medication regimens that prevent the need for more than one canister of short-acting inhaled beta₂-agonists per month for relief of symptoms.
- 24-7e. Persons with asthma who receive follow-up medical care for long-term management of asthma after any hospitalization due to asthma.
- 24-7f. Persons with asthma who receive assistance with assessing and reducing exposure to environmental risk factors in their home, school, and work environments.
- 24-8. (Developmental) establish in at least 15 States a surveillance system for tracking asthma death, illness, disability, impact of occupational and environmental factors on asthma, access to medical care, and asthma management.**

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