Asthma is one of the most common chronic diseases, afflicting more than 7% of the population of the USA – numbers that have risen in the past decades. The American Lung Association estimates nearly 20 million Americans have asthma. Studies have estimated that the total costs associated with asthma (direct and indirect) exceed $10 billion annually in the USA. The prevalence and morbidity have increased, especially among children. Approximately 75% of persons with asthma are diagnosed before age 7.1

- Asthma can be classified as allergic (extrinsic) due to immune system reaction to inhaled allergens and non-allergic (intrinsic) which does not involve the immune system but is triggered by other factors such as stress, exercise, and cold or dry air. Both types are “characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation”.2,3 Another system recognizes four general types of asthma: 1) Exercise Induced; 2) Nocturnal; 3) Cough-Variant; and 4) Occupational.3 Current guidelines also suggest classification based on level of control versus level of severity with tiered broad categories: 1) controlled, 2) partly controlled, or 3) uncontrolled symptoms. Despite advances in understanding this disease, it remains a growing public health issue. Medical treatments are aimed at managing symptoms and reducing long-term risks. Complementary and alternative medicine (CAM) use is highly prevalent among those with asthma, even those using conventional treatments.4 Thirty to 70% of patients with asthma use CAM treatments, which is twice the national average for total CAM use in adults.5,6,7

There are various asthma management guidelines that have been established as this medical condition increases in prevalence. These include the "The National Asthma Education and Prevention Program: Expert Panel Report 3, Guidelines for the Diagnosis and Management of Asthma -- Full Report 2007",8 the Global Initiative for Asthma (GINA) most recently updated in
2014 (also endnote 3), and the National Heart, Lung, and Blood Institute’s National Asthma Education and Prevention Program Expert Panel Report 3, titled “Guidelines for the Diagnosis and Management of Asthma”. They all present similar clinical practice guidelines for the diagnosis and management of asthma (See Practitioner Resources below).

These management tools have organized recommendations for asthma care around four components considered essential to effective asthma management:

1) Measures of assessment and monitoring of symptoms and lung function, obtained by objective tests, physical examination, patient history, and patient report, to diagnose and assess the characteristics and severity of asthma and to monitor whether asthma control is achieved and maintained.
2) Education for a partnership between patient and clinician in asthma care.
3) Control of environmental factors (triggers) and comorbid conditions that affect asthma.
4) Pharmacologic therapy.

**Subjective Findings and History**

- History of episodic symptoms of shortness of breath (SOB), dyspnea on exertion (DOE), sensation of “tightness” when breathing; cough (dry or productive of mucoid or pale yellow sputum); may be complicated with acute exacerbations of severe breathlessness, chest tightness, and fatigue.
- “Classic triad of symptoms” is dyspnea, cough (often worse at night), and wheezing (high-pitched whistling sound, usually upon exhalation). Patient may report expirations more difficult than inspirations.
- Characteristic triggers maybe an exposure to environmental allergens or aggravated by stress, exercise, or an upper respiratory infection (URI).
- Possible history of prolonged URI and/or history of smoking in the adult or exposure to second-hand smoke (especially in children).
- May be a personal or family history of asthma, allergies, or other atopic disease
- Is a common complication of pregnancy.
- May be seen in young children as frequent URI with cough and wheezing.
- Infants may have trouble feeding and may grunt during suckling.
- Complications may include severe dyspnea, cyanosis, repeated respiratory infections, and death.

**Objective Findings**

- Audible (high-pitched) wheezing, cyanosis, difficult breathing, use of accessory muscles with respiration, increased pulse rate, cough, and anxiety.
- Tachypnea, tachycardia, and prolonged expiratory phase of respiration (decreased I:E Inspiration/Expiration ratio).
- Signs of an asthma exacerbation - diaphoresis, the “tripod position” (a seated position
with use of extended arms to support the upper chest), use of the accessory muscles of breathing (e.g., sternocleidomastoid) during inspiration and a pulsus paradoxus (greater than 12 mmHg fall in systolic blood pressure during inspiration).

- Pulmonary function testing (spirometry) may detect a decrease (obstruction) in peak expiratory flow rate (PEFR) or forced expiratory volume. Patient self-monitoring with a portable peak flow meter (available OTC) may aid early recognition of declining lung function.
- Have the patient perform some form of physical activity to increase the breathing rate and check for changes in lung capacity. In addition, bronchodilator (such as Albuterol) response test can be used for supporting diagnosis of asthma.
- Chronic asthma may show any of the previous findings with large amounts of thick mucus, barrel chest, chest x-ray (CXR) with signs of emphysema and/or hyperinflation.
- Physical findings may include nasal polyps, pale swollen nasal cavities, and concomitant atopic dermatitis.

**Differential Diagnoses (DDX)**

- Bronchitis, allergic rhinitis, bronchiolitis, bronchiectasis, foreign body aspiration, vocal cord dysfunction, pulmonary embolism, gastroesophageal reflux disease (GERD), panic disorder, sarcoidosis, chronic obstructive pulmonary disease (COPD), and left-ventricular heart failure.

**Chinese Medicine** - there are four syndromes for asthma:

- **Shi**
  - Type: Wind-cold – cough with thin sputum, shortness of breath with accompanying symptoms of fever, chills, sweating.
  - Tongue: white coating
  - Pulse: superficial

- **Phlegm**
  - Heat – Rapid and coarse breathing, stifling sensation in the chest, thick purulent sputum. Tongue: thick yellowish coating
  - Pulse: Rapid, rolling and forceful

- **Xu**
  - Type: Xu of the Lung – short and quick breathing, weak and low voice
  - Xu of the Kidney – dyspnea upon exertion, chills with cold extremities
  - Pulse: weak

**Labs/Tests/Imaging**

- Consider:
  - CBC with differential (to rule out infection, e.g. pneumonia, or anemia).
  - Consider CXR if persistent or suggestive of infection.
  - Arterial blood gases to assess PO2 and PCO2.
  - Exhaled nitric oxide (NO) levels.
  - Spirometry – Forced Expiratory Volume at 1 second (FEV1) and Forced Vital Capacity (FVC).
  - Bronchoprovocation testing and bronchodilator response.
Asthma Clinical Pathway

Assessment

- Full history and physical examination to assess degree of respiratory distress.
- Detect the presence of other comorbid or contributing conditions, e.g. allergic rhinitis, interstitial lung disease, cystic fibrosis, nasal polyps, COPD.
- In Chinese Medicine, clinical impressions should be correlated to history, complaints, and objective findings to differentiate syndromes according to TCM.

Asthma severity should be considered using the following three factors and can help practitioners decide on appropriate treatment options:

1. Reported symptoms over the previous two to four weeks.
2. Current level of lung function (FEV₁ and FEV₁/FVC values).
3. Number of exacerbations requiring oral glucocorticoids per year.

Severity can be broken down in a step-wise manner into intermittent vs. persistent asthma and this can be further classified into mild, moderate, and severe. As severity increases, so does risk. In general, more frequent and intense exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate greater disease severity. For treatment purposes, patients who have intermittent asthma who have had ≥2 exacerbations requiring oral systemic glucocorticoids in the past year may be considered the same as patients who have persistent asthma, even in the absence of impairment levels consistent with persistent asthma.

Components of severity, risk guidelines, and recommendations for pharmacological treatment are included here: [http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf](http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf)

Plan

Treatment plans will differ when treating acute cases verses chronic cases. It is essential to differentiate the degree of severity of symptomatology and the type of asthma (acute/chronic) before proceeding with treatment. (See Precautions and Contraindications)

Treatment Goals

- The goals of conventional treatment are two-fold: 1) reduction in impairment (intensity, frequency, and degree of symptoms) and 2) reduction in medical risk (of asthma exacerbations, suboptimal lung development (especially in children), loss of lung function over time (especially in adults), and adverse effects from asthma medications).9
- In addition - manage acute attacks safely. For chronic asthma, develop a treatment plan to minimize attacks, reduce bronchial inflammation, and limit long-term bronchial
hypertrophy and medical risks.

- Avoid and monitor for known triggers, such as dust mites, molds, furry animals, cockroaches, and pollens \(^10\), medications (NSAIDs or aspirin) or dietary sulfites.
- Reduce bronchial overgrowth, especially when inhaled steroids are being used (washing out mouth after use).

**Treatments**

**Integrative Approach:**

Nutritional(s):

- Assess food sensitivities and reactions\(^15\), reduce mucus-forming foods, \(^16\,17\) Consider antihistamine and mast-cell stabilizing therapies (quercetin, hesperidin, vitamin C\(^18\,19\)), vitamin B12 (topical)\(^20\), magnesium (inhaled or i.v. to reduce bronchospasm)\(^21\,22\), choline\(^23\), vitamin D\(^24\,25\,26\) improve digestive function, antioxidants\(^27\), fish oils\(^28\), and natural dietary immunomodulators. Probiotics early in life seems to have an important preventative role to play.\(^29\,30\,31\) Dietary changes.\(^32\)

Botanicals/Nutraceuticals:

- To tonify the lungs, bronchodilators, thin mucus secretions, nervines for sleep and muscle relaxation, reduce allergic response.\(^33\) Some mixed evidence exists for *Tylophora indica*, *Boswellia serrata*, *Coleus forskolli*, and *Petasites hybrids*, *Pinus pinaster* pine bark (Pycnogenol)\(^34\,35\,36\) Preliminary research has been done on propolis, but is not widely used due to frequent allergic reactions to the product. Eucalyptol and Lyprinol as anti-inflammatory.\(^37\,38\) Caffeine as an adjunct bronchodilator.\(^39\,40\)

Chinese Herbal Medicine:

Prescribe herbal treatment according to syndrome differentiation. Many times these patients can be very sensitive to herbs, foods or other medications so it may be prudent to prescribe herbal formulas conservatively until it is known how the patient is going to react to the medicine.\(^41\) Specific Chinese herbal formulas have been researched and have positive results.\(^42\,43\)

Homeopathy:

- Individualized prescribing. Staged approach, based on severity and acuteness of symptoms: acute remedy including concomitant symptoms, chronic constitutional remedy, antimiasmatic nosode, antigenic isotherapy. Attention to complementary remedies may improve outcome. Repeated-dose schedules may be preferred for acute cases, chronic patients on inhaled or systemic steroids, also to avoid homeopathic aggravation in stable chronic asthma.

Acupuncture:

- Acupuncture according to syndrome differentiation.
Acupuncture can be an effective adjunctive treatment for asthma. Points are chosen to soothe the asthma, resolve phlegm; reinforce, strengthen, and regulate LU and KI Qi, pacify the breathing, eliminate wind and cold, clear heat, and open the chest. Usually 10-15 points are selected at each session and patients are treated 2-3 times per week for 2-3 weeks. At the end of this first course, patients should begin to feel better and be able to give some objective measurement of progress (i.e. increased peak flows). Often a maintenance acupuncture program will be required to keep patients in remission.

There are several studies that suggest acupuncture when used adjunctive to usual medical care is beneficial when primarily evaluated using quality of life scales. The most recent and largest RCT suggests in addition to being beneficial, acupuncture is also a cost-effective treatment in patients with allergic bronchial asthma.

Chiropractic: There are many case reports of successful treatment with chiropractic care. Three randomized controlled studies showed benefit in subjective measures, such as quality of life, symptoms, and decreased bronchodilator use; however, the differences were not statistically significant between controls and treated groups.

Many chiropractors recommend movement therapies, e.g. yoga, and relaxation therapies for conditions such as asthma. Current research suggests early training on these therapies can be seen as a useful tool that can help prevent or manage certain health problems. More research is needed to determine the role and mechanism of these therapies for specific health conditions.

Massage Therapy: Massage therapy is contraindicated for acute bronchial asthma, but may prove to be an effective treatment for allergic and infectious bronchial asthma that is not acute. Massage to the shoulders, chest and upper back may reduce muscle spasms and improve breathing patterns. Vibrations and tapotement over the lungs and upper back may help loosen phlegm to relieve symptoms.

To relax muscles of the thoracic cage, massage and manipulation as indicated, teach emergency Bowen maneuvers, teach diaphragmatic breathing; postural drainage after acute has resolved. Exercise as tolerated. Yoga (mixed reviews, but increases QOL scores). Pranayama (derived
from yoga), the Buteyko breathing technique and the Papworth method\textsuperscript{71,72}, inspiratory muscle training (IM), mindfulness training\textsuperscript{73}, and muscular relaxation all have promising research.\textsuperscript{74,75,76,77,78,79,80,81,82,83,84,85}

**Hydrotherapy:** Steam inhalation when acute. Hot fomentation to chest, steam bath in chronic presentations.

**Craniosacral Therapy:** Used as an adjunct to conventional care.\textsuperscript{35}

**Salt Chamber Treatment:** Used as an adjunct to conventional care.\textsuperscript{86}

**Education:** Identification and avoidance of triggers including allergens, cold air, stress and dietary triggers.

**Lifestyle and Psychoemotional Counseling**
Breathing exercises and other exercise may be appropriate.

**Pharmaceuticals:**

- Ephedrine with careful monitoring.
- Inhaled corticosteroids treatment to reduce bronchial inflammation, long-acting beta-agonists. Low, medium, and high dose inhaled glucocorticoids.
- Theophylline (methylxanthine), leukotriene inhibitors, immunomodulators, mast-cell stabilizers, beta-2-selective adrenergic agonist,
- Oral systemic glucocorticoids and short acting beta agonists (SABA) should be made available for acute exacerbations.
- Epinephrine (Epi-pen) available for severe acute attack.

More high-quality, double-blinded, randomized, placebo-controlled studies on the safety and efficacy of phytotherapy and CAM treatment in asthma are needed.\textsuperscript{87} An integrative plan that promotes the use of both CAM and conventional prescription therapies addresses patient preferences, while also reducing the risk of an untoward event.\textsuperscript{88}

**Length of Treatment**
- Depends on response to treatment.
- Acute therapies should have results quickly, or referral to emergency department (ED) may be warranted to avoid patient experiencing respiratory distress.
- Patients generally require regular follow up until symptoms are resolved, and this may mean lifetime review.

**Referral Criteria**
An integrated multi-disciplinary approach to these patients is often used as a primary treatment plan as the combination of therapies enhances the efficacy of all treatment modalities.

Patients with chronic asthma with frequent acute attacks should be evaluated with regular pulmonary function tests and CXRs to determine the degree of hyperinflation and evaluated for
ongoing inflammatory processes. Patients who continue to use short acting beta agonists more than a few times a week or who are hospitalized for asthma symptoms are not well-controlled and should be referred for assessment.

Referral to a specialist (pulmonologist/allergist) or ED is appropriate if the patient’s condition does not get better, if they have frequent exacerbations, or if their condition worsens with treatment. Peak flow rate less than 80% of “personal best” indicates that current treatment is inadequate; less than 50% indicates need for immediate intervention to prevent complications.

**Precautions and Contraindications**

A patient with acute respiratory distress that does not resolve imminently should be referred to an ED for immediate emergency intervention.

**Resources for Clinicians**


Centers for Disease Control and Prevention (CDC) - [http://www.cdc.gov/asthma/](http://www.cdc.gov/asthma/)


**Resources for Patients**

The National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health provides leadership for a national program in diseases of the heart, blood vessels, lung, and blood; blood resources; and sleep disorders. [http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html)

**Clinical Pathway Feedback**

CHP desires to keep our clinical pathways customarily updated. If you wish to provide additional input, please click on the email address listed below and identify which clinical pathway you are referencing. Thank you for taking the time to give us your comments.

Clinical Services Department: [providers@chpgroup.com](mailto:providers@chpgroup.com)


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