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DHA TELEHEALTH CLINICAL GUIDELINES FOR VIRTUAL MANAGEMENT OF ASTHMA – 38

Version 2

Issue date: 21/02/2024

Effective date: 21/04/2024

Health Policies and Standards Department

Health Regulation Sector (2024)

INTRODUCTION

Health Regulation Sector (HRS) forms an integral part of Dubai Health Authority (DHA) and is mandated by DHA Law No. (14) of the year (2021) amending some clauses of law No. (6) of 2018 pertaining to the Dubai Health Authority (DHA), to undertake several functions including but not limited to:

- Developing regulation, policy, standards, guidelines to improve quality and patient safety and promote the growth and development of the health sector;
- Licensure and inspection of health facilities as well as healthcare professionals and ensuring compliance to best practice;
- Managing patient complaints and assuring patient and physician rights are upheld;
- Governing the use of narcotics, controlled and semi-controlled medications;
- Strengthening health tourism and assuring ongoing growth; and
- Assuring management of health informatics, e-health and promoting innovation.

The DHA Telehealth Clinical Guidelines aim to fulfil the following overarching DHA Strategic Priorities (2026):

- Pioneering Human-centered health system to promote trust, safety, quality and care for patients and their families.
- Make Dubai a lighthouse for healthcare governance, integration and regulation.

- Leading global efforts to combat epidemics and infectious diseases and prepare for disasters.
- Pioneering prevention efforts against non-communicable diseases.
- Become a global digital health hub.
- Foster healthcare education, research and innovation.

ACKNOWLEDGMENT

The Health Policy and Standards Department (HPSD) developed this Guideline in collaboration with Subject Matter Experts and would like to acknowledge and thank these health professionals for their dedication toward improving quality and safety of healthcare services in the Emirate of Dubai.

Health Regulation Sector

Dubai Health Authority

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EXECUTIVE SUMMARY

Telehealth is based on Evidence Based Practice (EBP) which is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence and guidelines from systematic research.

EBP is important because it aims to provide the most effective care virtually, with the aim of improving patient outcomes. As health professionals, part of providing a professional service is ensuring that practice is informed by the best available evidence.

This guideline is presented in the format comprising of clinical history/symptoms, differential diagnosis, investigations and management. Identification of 'Red Flags' or serious conditions associated with the disease is an essential part of this telehealth guideline as it aids the physician to manage patients safely and appropriately by referrals to ER, family physicians or specialists for a face to face management.

DEFINITIONS/ABBREVIATIONS

Virtual Clinical Assessment: Is the evaluation of the patient's medical condition virtually via telephone or video call consultations, which may include one or more of the following: patient medical history, physical examination and diagnostic investigations.

Patient: The person who receives the healthcare services or the medical investigation or treatment provided by a DHA licensed healthcare professional.

ABBREVIATIONS

CBC	:	Complete Blood Count
COPD	:	Chronic Obstructive Pulmonary Disease
DHA	:	Dubai Health Authority
EBP	:	Evidence Based Practice
ER	:	Emergency Room
FEV	:	Forced Expiratory Volume
FVC	:	Forced Vital Capacity
GERD	:	Gastroesophageal Reflux Disease
HRS	:	Health Regulation Sector
ICS	:	Inhaled Corticosteroid
LABA	:	Long-Acting Beta2 Agonist
LTRA	:	Leukotriene Receptor Antagonist

MART	:	Maintenance and Reliever Therapy
NSAIDs	:	Nonsteroidal Anti-inflammatory Drugs
PEF	:	Peak Expiratory Flow
SABA	:	Short-Acting Beta2 Agonist
URTI	:	Upper Respiratory Tract Infection

1. BACKGROUND

1.1. Epidemiology and etiology

1.1.1. Asthma is a common, chronic inflammatory disease of the airways. The incidence is highest in pre-school age children and adults aged 40 to 60 years.

1.1.2. Asthma occurs as a result of the interaction between environmental stimuli, which have more profound effects if exposure occurs at certain stages of immunological development in people with a genetic predisposition

1.2. Definition

1.2.1. While asthma is readily recognized in its classic presentation, with intermittent cough, wheeze, and shortness of breath brought on by characteristic triggers and relieved by bronchodilating medications, it is difficult to provide a definition that distinguishes asthma from similar and overlapping conditions.

1.2.2. The "classic" signs and symptoms of asthma are intermittent dyspnea, cough, and wheezing. Although typical of asthma, these symptoms are nonspecific, making it sometimes difficult to distinguish asthma from other respiratory diseases. The definitive diagnosis of asthma requires

the history or presence of respiratory symptoms consistent with asthma, combined with the demonstration of variable expiratory airflow obstruction.

1.2.3. Tools used in the diagnosis of asthma include history, physical examination (when applicable), pulmonary function testing, and other laboratory evaluations.

1.3. Causes

1.3.1. Common asthma triggers

a. House-dust mites, molds, furry animals
b. Animal danders (cats, dogs, horses)
c. Aeroallergens (pollens, moulds)
d. Perfumes, air fresheners and similar products
e. Passive exposure to tobacco smoke
f. Cigarette smoking
g. Maternal smoking
h. Viral upper respiratory infection
i. Cold air
j. Exercise
k. Aspirin and NSAIDs

l. Ingestion of sulfites or certain food dyes.

2. SCOPE

2.1. Telehealth services in DHA licensed Health Facilities.

3. PURPOSE

3.1. To support the implementation of Telehealth services for patients with complaints of Asthma in Dubai Health Authority (DHA) licensed Health Facilities

4. APPLICABILITY

4.1. DHA licensed physicians and health facilities providing Telehealth services.

4.2. Exclusion for Telehealth services are as follows

4.2.1. Emergency cases where immediate intervention or referral is required

4.2.2. Prescribe Narcotics, Controlled or Semi-Controlled medications`

5. CLINICAL SYMPTOMS/SYMPTOMS

5.1. Asthma is diagnosed before the age of 7 years in approximately 75% of cases. As a result, clinicians treating adolescents and adults will often encounter patients whose diagnosis of asthma was made years earlier. Many children experience a remission of asthma symptoms around the time of puberty, with potential recurrence years later.

5.2. Asthma may develop at any age, although new-onset asthma is less frequent in older adults compared to other age groups.

5.3. Occupational asthma, aspirin-sensitive asthma (aspirin-exacerbated respiratory disease), and eosinophilic asthma are distinct syndromes that typically have their onset in adulthood.

5.4. A pattern of respiratory symptoms that occur following exposure to triggers (eg, allergen, exercise, viral infection) and resolve with trigger avoidance or asthma medication is typical of asthma. Some patients will report all classic symptoms of asthma, while others may report only a few:

5.4.1. Wheeze (high-pitched whistling sound, usually upon exhalation)

5.4.2. Cough (often worse at night) – may be dry or productive of clear mucoid or pale-yellow sputum

5.4.3. Shortness of breath or difficulty breathing

5.4.4. Chest tightness, a band-like constriction, or the sensation of a heavy weight on the chest. In contrast, sharp chest pain is rarely used to describe the sensation of asthma.

5.5. Because the symptoms of asthma are also seen in several other respiratory diseases, it is difficult to be certain of the diagnosis of asthma based upon history alone. However, certain historical features heighten the probability of asthma:

5.5.1. Episodic symptoms – Asthmatic symptoms characteristically come and go, with a time course of hours to days, resolving spontaneously with

removal from the triggering stimulus or in response to anti-asthmatic medications. Patients with asthma may remain asymptomatic for long periods of time. Report of symptoms that occur or worsen at night is often a feature of asthma.

5.5.2. Work-related exposures - It is estimated that as many as 10% of cases of new-onset asthma in the adult are due to workplace-related exposures (occupational asthma) to known sensitizing agents.

5.5.3. Personal or family history of atopy – A strong family history of asthma and allergies or a personal history of atopic diseases (eg, atopic dermatitis, seasonal allergic rhinitis and conjunctivitis) favors a diagnosis of asthma in a patient with suggestive respiratory symptoms.

5.5.4. History of asthmatic symptoms as a child – As previously mentioned, recollection of childhood symptoms of chronic cough, nocturnal cough in the absence of respiratory infections, or a childhood diagnosis of "recurrent bronchitis" or "wheezy bronchitis" favors asthma, but may also be reported in someone with bronchiectasis or simply frequent childhood respiratory infections.

5.6. Certain historic features lessen the prior probability of asthma. These include:

5.6.1. Lack of improvement following anti-asthmatic medications – Patients who have tried an inhaled bronchodilator and obtained no relief of their symptoms are less likely to have asthma. Similarly, lack of dramatic improvement with a course of oral glucocorticoids suggests a diagnosis other than asthma.

5.6.2. Onset of symptoms after age 50 – In middle-aged and older patients, other respiratory and cardiovascular diseases with overlapping manifestations become the more likely explanation for these symptoms although the new onset of asthma remains a possibility.

5.6.3. Concomitant symptoms such as chest pain, lightheadedness, syncope, or palpitations suggest an alternate diagnosis such as pulmonary vascular disease, cardiomyopathy, early coronary artery disease, or pericardial disease.

5.6.4. History of cigarette smoking – In patients with more than 20 pack-years of cigarette smoking, the likely etiology of cough, wheeze, and shortness of breath shifts away from asthma toward chronic obstructive pulmonary disease, although the 2 diseases can co-exist.

6. DIAGNOSIS

6.1. There is no single symptom, sign or test that is diagnostic of asthma. Asthma is a clinical syndrome resulting in variable presentations and severity from a variety of different mechanisms.

6.2. Cardinal symptoms of asthma

6.2.1. The pathophysiology underlying the disease results in the 4 cardinal symptoms of asthma - cough, wheeze, chest tightness and dyspnea.

6.2.2. Symptoms can vary in their severity and some symptoms may be more marked than others.

6.2.3. Symptoms usually present and resolve over the course of hours to days, usually in response to exposure to triggers or infections of the respiratory tract. In practice it is difficult to identify allergens accurately.

6.2.4. When well, there are not usually any signs of asthma, but during an acute episode, the patient may have tachypnoea, tachycardia and widespread wheezing throughout both lung fields on chest auscultation.

6.2.5. In infants, the only or main symptom is usually a nocturnal cough that persists 2 to 3 weeks after a minor URTI or in the absence of any other symptoms.

6.3. Peak expiratory flow

6.3.1. In adults and children over the age of 8 years, the peak expiratory flow (PEF) will fall to levels below 80% of predicted or best ever and will usually return to normal with recovery from the episode.

6.3.2. Children aged 8 years or younger can rarely reliably use a PEF meter.

6.3.3. Patients with more severe asthma may never attain their predicted PEF levels, even when well or when receiving maximum therapy.

6.3.4. The diagnosis of asthma in patients who are able to use PEF meters can be made on the basis of the PEF falling to below 80% predicted or best ever with symptoms, and restoration of the PEF when well again.

7. RED FLAGS

7.1. Chest pain or possible cardiac symptoms (such as palpitations, leg swelling)

7.2. Sudden onset of breathing difficulty

7.3. Blue discolouration of the lips (cyanosis)

7.4. Unable to speak in sentences

7.5. Confusion

7.6. Agitation

7.7. Noisy breathing (stridor, audible wheeze, persistent cough)

7.8. History of prolonged immobility, trauma or previous complications with breathing

7.9. Onset of or worsening orthopnoea

7.10. Persistent breathing difficulty (status asthmaticus)

7.11. Previous near fatal asthma (Previous ventilation or respiratory acidosis)

8. DIFFERENTIAL DIAGNOSIS

8.1. Conditions causing similar symptoms — Alternative diagnoses that may cause cough, wheeze, or shortness of breath include the following:

8.1.1. Wheeze — Wheezing may be generated by luminal narrowing anywhere along the respiratory tract, including nares, pharynx, glottis, trachea, and bronchi. Inspiratory upper airway sounds, including stridor, are usually distinguishable from asthma. Expiratory wheezes emanating from the upper airway (eg, vocal cord dysfunction syndrome) are often readily audible without a stethoscope but sound distant on auscultation of the lower chest.

8.1.2. Cough — When persistent cough is the presenting complaint and lung function and chest radiograph are normal, the differential includes rhinitis or rhinosinusitis, gastroesophageal reflux disease (GERD), post-viral tussive syndrome, eosinophilic bronchitis, cough induced by angiotensin converting enzyme inhibitors, and infection with Bordetella pertussis ("whooping cough"). A chronic cough with mucoid sputum

production in a long-term cigarette smoker (generally more than 10 pack-years) points to a diagnosis of chronic bronchitis.

8.1.3. Dyspnea — Common causes that are in the differential of asthma in the adult are COPD, heart failure, pulmonary embolism, and sarcoidosis. Obesity can cause a pattern of dyspnea that mimics asthma.

8.2. In patients with asthma-like symptoms, the diagnostic considerations vary in part by age:

8.2.1. In adolescents and young to middle-aged adults, the principal considerations include recurrent bouts of bronchitis, bronchiolitis, bronchiectasis, paradoxical vocal cord motion, pulmonary embolism, GERD, panic disorder, and sarcoidosis.

8.2.2. In older-aged patients, especially cigarette smokers, additional considerations include COPD, left-ventricular heart failure, sarcoidosis, tumors involving central airways, and recurrent oropharyngeal aspiration.

8.3. Co-existent conditions — Certain illnesses commonly co-exist with asthma and may exacerbate its course.

8.3.1. Allergic rhinitis is present in most patients with allergic asthma and in at least 50% of those with non-allergic asthma. Post-nasal drip associated

with any form of chronic rhinitis or sinusitis can also worsen asthma symptoms.

8.3.2. Both obesity and GERD can mimic asthma and can worsen pre-existent asthma.

8.3.3. Patients with obesity and mild asthma may perceive more severe dyspnea.

9. INVESTIGATION

9.1. The laboratory evaluation of a patient with suspected asthma is predominantly focused on pulmonary function testing. Other laboratory studies, including chest radiography, blood tests, and tests for allergy, are useful in selected patients but cannot of themselves establish or refute a diagnosis of asthma.

9.1.1. Pulmonary function testing

a. Tests of airflow limitation are critical tools in the diagnosis of asthma. This will require a referral for a face to face consultation.

b. Spirometry — Spirometry, in which a maximal inhalation is followed by a rapid and forceful complete exhalation into a spirometer, includes measurement of forced expiratory volume in one second

(FEV_1) and forced vital capacity (FVC). These measurements provide information that is essential to the diagnosis of asthma.

c. Refer to APPENDIX 1 for the difference in the PFT between Bronchial Asthma and COPD.

9.1.2. Blood tests

a. No blood tests are available that can determine the presence or absence of asthma or gauge its severity.

b. Complete blood count (CBC) with differential white blood cell analysis to screen for eosinophilia or significant anemia may be helpful in certain cases.

c. Markedly elevated eosinophil percentages (>15%) or counts (>1500 eosinophils/microL) may be due to allergic asthma, but should prompt consideration of alternative or additional diagnoses, including parasitic infections (eg, Strongyloides), drug reactions, and syndromes of pulmonary infiltrates with eosinophilia.

d. Significant anemia can cause dyspnea that is unresponsive to asthma therapies and would require further evaluation to determine the causative process which will need a referral for a face to face consultation.

9.1.3. Serum alpha-1 antitrypsin level

a. For the lifelong non-smoker with persistent and irreversible airflow obstruction, a one-time measurement of the serum alpha-1 antitrypsin level is recommended to exclude emphysema due to homozygous alpha-1 antitrypsin deficiency, which is in the differential of chronic and largely irreversible airflow limitation

9.1.4. Tests for allergy

a. Allergy tests are not useful for the diagnosis of asthma, but they can be helpful to confirm sensitivity to suspected allergic triggers of respiratory symptoms and to guide on-going management of asthma.

b. Allergy testing is done in selected patients with a history of symptoms that occur upon exposure to particular aeroallergens, persistent symptoms and suspicion of exposure to relevant allergens in the home environment (eg, pet animals, dust, cockroaches, or mice), and/or moderate-to-severe asthma symptoms despite conventional therapies.

c. Peripheral blood eosinophil count mentioned above

d. Total serum immunoglobulin E (IgE) level

e. Tests for specific allergic sensitization, which include blood testing for specific IgE antibody to inhalant allergens and skin testing with extracts of inhalant allergens.

f. Measurement of total serum IgE levels is indicated in patients with moderate-to-severe persistent asthma when considering treatment with anti-IgE monoclonal antibody (omalizumab) or when allergic bronchopulmonary aspergillosis is suspected on the basis of eosinophilia, a positive skin test to aspergillus, or radiographic evidence of mucus plugging or central bronchiectasis. An elevated total IgE level may occur in the absence of asthma (eg, in allergic rhinitis or eczema), and allergic asthma may be present in the absence of an elevated total IgE level, which may not fully reflect the levels of mast cell-bound IgE in airway tissue. Very high total IgE levels (>1000 IU/mL) are typically found in persons with allergic bronchopulmonary aspergillosis, certain parasitic infections, and sometimes eczema

9.1.5. Imaging

a. In the absence of comorbid illness, the chest radiograph is almost always normal in patients with asthma. However, it is recommended

to obtain a chest radiograph for new-onset moderate-to-severe asthma in adults over age 40 to exclude the occasional alternative diagnosis that may mimic asthma (eg, the mediastinal mass with tracheal compression or heart failure).

b. Chest radiographs are routinely recommended when evaluating severe or "difficult-to-control" asthma and when co-morbid conditions (eg, allergic bronchopulmonary aspergillosis, eosinophilic pneumonia, or atelectasis due to mucus plugging) are suspected based on history, and/or other laboratory data.

c. In addition, chest radiography is indicated in patients presenting with features that are atypical for asthma, including any of the following:

- Fever
- Chronic purulent sputum production
- Persistently wheezing
- Hemoptysis
- Weight loss
- Clubbing

10. MANAGEMENT

10.1. Refer to APPENDIX 2 for the Virtual Management of Asthma Algorithm

10.2. The aims of asthma management are to recognize the disease, abolish all symptoms, restore best-possible lung function and allow the patient to lead a normal life untroubled by the disease or its management. Treatment is aimed at preventing exacerbations and protecting the lungs.

10.3. Allergen avoidance seems logical but even if allergens or triggers can be identified, it is seldom easy to avoid them completely. Avoidance of most pollens and dust is difficult, expensive, time-consuming and not often effective. However, avoidance of cigarette smoke should always be encouraged.

10.4. Annual influenza vaccination is recommended for all patients with asthma. There is excellent evidence of its efficacy in preventing life-threatening exacerbations of asthma, especially in children.

11. TREATMENT

11.1. All patients with asthma should have access to an inhaled short-acting bronchodilator, but its regular or frequent use should be seen as a marker of poorly controlled asthma.

11.2. Patients whose asthma is still poorly controlled despite good adherence and inhaler technique should switch to a regular combined inhaled steroid plus long-acting bronchodilator.

11.3. Children aged 8 or under, or strongly atopic patients of all ages, may benefit more from regular oral leukotriene antagonists in addition to their inhaled steroids.

11.4. The majority of patients will be controlled using these options, but the remaining 5 to 10% may need higher-dose inhaled steroids with regular long-acting inhaled bronchodilators or oral long-acting bronchodilators or oral theophylline.

11.5. Patients with stable asthma can cautiously step-down therapy slowly.

11.6. Always refer patients for a specialist opinion before starting long-term oral steroids. Acute exacerbations should be managed by aggressive use of frequent high-dose inhaled bronchodilators and, often, short courses of oral steroids and will require a referral for a face to face consultation.

11.7. Refer to APPENDIX 3 for Personalized Asthma Management Summary

11.8. Principles of pharmacological treatment

11.8.1. Take into account the possible reasons for uncontrolled asthma, before starting or adjusting medicines for asthma in adults, young people and children. These may include:

a. Alternative diagnoses

b. Lack of adherence

c. Suboptimal inhaler technique

d. Smoking (active or passive)

e. Occupational exposures

f. Psychosocial factors

g. Seasonal or environmental factors

11.8.2. After starting or adjusting medicines for asthma, review the response to treatment in 4 to 8 weeks.

11.8.3. If inhaled corticosteroid (ICS) maintenance therapy is needed, offer regular daily ICS rather than intermittent or 'when required' ICS therapy.

11.8.4. Adjust the dose of ICS maintenance therapy over time, aiming for the lowest dose required for effective asthma control.

11.8.5. Ensure that a person with asthma can use their inhaler device:

a. At any asthma review, either routine or unscheduled

b. Whenever a new type of device is supplied.

11.9. Pharmacological treatment pathway for adults (aged 17 and over)

11.9.1. Offer a short-acting beta$_2$ agonist (SABA) as reliever therapy to adults with newly diagnosed asthma.

11.9.2. For adults with asthma who have infrequent, short-lived wheeze and normal lung function, consider treatment with SABA reliever therapy alone.

11.9.3. Offer a low dose of an ICS as the first-line maintenance therapy to adults with:

a. Symptoms that clearly indicate the need for maintenance therapy (for example, asthma-related symptoms 3 times a week or more, or causing waking at night) or

b. Asthma that is uncontrolled with a SABA alone

11.10. If asthma is uncontrolled on a low dose of ICS as maintenance therapy and SABA, then referral for face to face consultation is recommended to offer the following:

11.10.1. Leukotriene receptor antagonist (LTRA) in addition to the ICS and review the response to treatment in 4 to 8 weeks.

11.10.2. If asthma is uncontrolled in adults on a low dose of ICS and an LTRA as maintenance therapy, a long-acting beta$_2$ agonist (LABA) in combination with the ICS can be given

11.10.3. If asthma is uncontrolled in adults on a low dose of ICS and a LABA, with or without an LTRA, as maintenance therapy, further treatment with MART regimen might be needed

11.10.4. If asthma is uncontrolled in adults on a MART regimen with a low maintenance ICS dose, with or without an LTRA, increasing the ICS to a moderate maintenance dose (either continuing on a MART regimen or

changing to a fixed-dose of an ICS and a LABA, with a SABA as a reliever therapy might be considered

11.11. MART

11.11.1. Maintenance and reliever therapy (MART) is a form of combined ICS and LABA treatment in which a single inhaler, containing both ICS and a fast-acting LABA, is used for both daily maintenance therapy and the relief of symptoms as required. MART is only available for ICS and LABA combinations in which the LABA has a fast-acting component (for example, formoterol).

12. REFERRAL CRITERIA

12.1. Referral Criteria to pulmonary specialist

12.1.1. Diagnosis of asthma is uncertain

12.1.2. Frequent exacerbations

12.1.3. Medication side effects are intolerable

12.1.4. Previous hospital admission especially if in the last year

12.1.5. Not responding to SABA and ICS medication

12.1.6. Non-concordance with treatment or monitoring

12.1.7. Comorbid conditions

12.1.8. Obesity or pregnancy

12.1.9. Patients with potential occupational triggers

12.1.10. Patients in whom psychosocial or psychiatric problems are interfering with asthma management

12.1.11. Chest pain or possible cardiac symptoms

12.1.12. Sudden onset of breathing difficulty

12.1.13. Blue discolouration of the lips (cyanosis), unable to speak in sentences, confusion or agitation

12.1.14. Noisy breathing (stridor, audible wheeze, persistent cough)

12.1.15. History of prolonged immobility, trauma or previous complications with breathing

12.1.16. Onset of or worsening orthopnoea

12.1.17. Status asthmaticus

12.1.18. Previous near fatal asthma (Previous ventilation or respiratory acidosis)

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APPENDICES

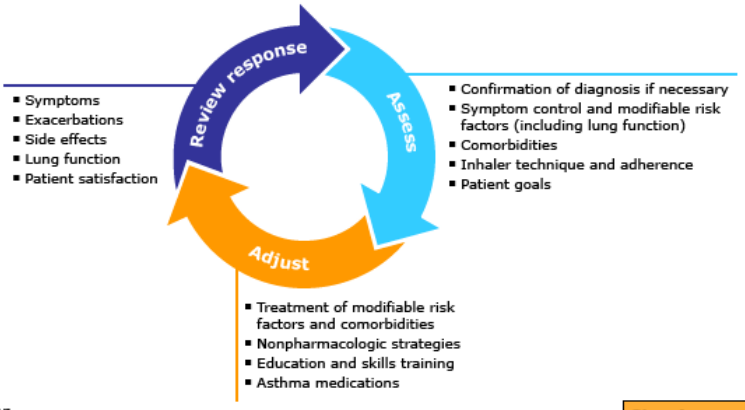
APPENDIX 1 – DIFFERENCE IN THE PFT BETWEEN BRONCHIAL ASTHMA AND COPD

Confirm or Preclude COPD or Asthma with Spirometry		
Spirometry	**COPD**	**Asthma**
VC	Reduced	Nearly normal
FEV1	Reduced	Reduced in attack
FVC (or FEV6)	Reduced	Nearly normal
FEV1 Ratio (of VC/FVC/FEV6)	Reduced anytime	Reduced in attack
FEV1 as % of predicted (or SDS*)	<LLN	Reduced in attack
Bronchodilator reversibility	A little	Marked if in attack
Serial spirometry	Progressive deterioration	Constant or erratic
Home monitoring	Use for alerts	Use for variability
Peak Flow measurement	Not useful	As above
Peak Inspiratory Flow measurement	Not useful	Not useful

* SDS = Standard Deviation Score. In comparing your test subject to a 'normal population' using SDS or LLN (Lower Limit of Normality) is preferred to percent of predicted because the latter gives false negatives for younger people and false positives for older people.

APPENDIX 2 – PERSONALIZED ASTHMA MANAGEMENT

Personalized asthma management:
Assess, adjust, review response



Asthma medication options:
Adjust treatment up and down for individual patient needs

	Step 1	Step 2	Step 3	Step 4	Step 5
Preferred controller to prevent exacerbations and control symptoms	As-needed low-dose ICS-formoterol*	Daily low-dose ICS, or as-needed low-dose ICS-formoterol*	Low-dose ICS-LABA	Medium-dose ICS-LABA	High-dose ICS-LABA Refer for phenotypic assessment ± add-on therapy (eg, tiotropium, anti-IgE, anti-IL5/5R, anti-IL4R)
Other controller options	*Low-dose ICS taken whenever SABA is taken¶*	*Low-dose ICS taken whenever SABA is taken¶, or LTRA*	*Medium-dose ICS, or low-dose ICS + LTRAΔ*	*High-dose ICS, add-on tiotropium, or add-on LTRAΔ*	*Add low-dose OCS, but consider side effects*
Preferred reliever	As-needed low-dose ICS-formoterol*		As-needed low-dose ICS-formoterol◇		
Other reliever option	*As-needed SABA*				

APPENDIX 3 - VIRTUAL MANAGEMENT OF ASTHMA ALGORITHM