At-A-Glance Outpatient Management Reference for Chronic Obstructive Pulmonary Disease (COPD)

BASED ON THE GLOBAL STRATEGY FOR DIAGNOSIS, MANAGEMENT AND PREVENTION OF COPD GLOBAL INITIATIVE FOR CHRONIC OBSTRUCTIVE LUNG DISEASE (GOLD) UPDATED 2014

Please refer to the GOLD Report (updated 2014) at www.goldcopd.org

DIAGNOSING COPD

A diagnosis of COPD should be considered in any individual who has dyspnea, chronic cough or sputum production, and a history of exposure to risk factors for the disease, especially cigarette smoking.

Table 1. Key Indicators for Considering a Diagnosis of COPD

Consider COPD, and perform spirometry, if any of these indicators are present in an individual over age 40. These indicators are not diagnostic themselves, but the presence of multiple key indicators increases the probability of a diagnosis of COPD. Spirometry is required to establish a diagnosis of COPD.

Dyspnea that is: Progressive (worsens over time).
Characteristically worse with exercise.
Persistent.

Chronic cough: May be intermittent and may be unproductive.

Chronic sputum production:
Any pattern of chronic sputum production may indicate COPD.

History of exposure to risk factors:
Tobacco smoke (including popular local preparations).
Smoke from home cooking and heating fuels.
Occupational dusts and chemicals.

Family history of COPD

Spirometry is required to make a clinical diagnosis of COPD; the presence of a postbronchodilator $FEV_1/FVC < 0.70$ confirms the presence of persistent airflow limitation and thus of COPD. All health care workers who care for COPD patients should have access to spirometry.

ASSESSMENT OF COPD

The goals of COPD assessment are to determine the severity of the disease, its impact on patient's health status, and the risk of future events (exacerbations, hospital admissions, death) in order to guide therapy. Assess the following aspects of the disease separately:

- Symptoms
- Degree of airflow limitation (using spirometry)
- Risk of exacerbations
- Comorbidities

Assess Symptoms: Validated questionnaires such as the COPD Assessment Test (CAT) or the Clinical COPD Questionnaire (CCQ) are recommended for a comprehensive assessment of symptoms. The modified British Medical Research Council (mMRC) scale provides only an assessment of breathlessness.

Table 2. Classification of Severity of Airflow Limitation in COPD (Based on Post-Bronchodilator FEV_1)

	In patients with FEV1/FVC < 0.70:	
GOLD 1:	Mild	$FEV_1 \geq 80\%$ predicted
GOLD 2:	Moderate	$50\% \leq FEV_1 < 80\%$ predicted
GOLD 3:	Severe	$30\% \leq FEV_1 < 50\%$ predicted
GOLD 4:	Very Severe	$FEV_1 < 30\%$ predicted

Assess Degree of Airflow Limitation Using Spirometry: Table 2 provides the classification of airflow limitation severity in COPD.

Assess Risk of Exacerbations: An exacerbation of COPD is defined as *an acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication.* The best predictor of having frequent exacerbations (2 or more per year) is a history of previous treated events; the risk of exacerbations also increases as airflow limitation worsens. Hospitalization for a COPD exacerbation is associated with a poor prognosis with increased risk of death.

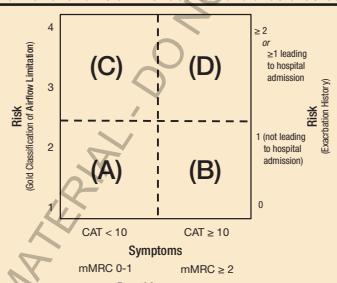
Assess Comorbidities: Cardiovascular diseases, osteoporosis, depression and anxiety, skeletal muscle dysfunction, metabolic syndrome, and lung cancer among other diseases occur frequently in COPD patients. These comorbid conditions may influence mortality and hospitalizations, and should be looked for routinely and treated appropriately.

Combined Assessement of COPD: Table 3 provides a rubric for combining these assessments to improve management of COPD.

- **Symptoms:**
  Less Symptoms (mMRC 0-1 or CAT < 10): patient is (A) or (C)
  More Symptoms (mMRC ≥ 2 or CAT ≥ 10): patient is (B) or (D)
- **Airflow Limitation:**
  Low Risk (GOLD 1 or 2): patient is (A) or (B)
  High Risk (GOLD 3 or 4): patient is (C) or (D)
- **Exacerbations:**
  Low Risk: ≤ 1 per year *and* no hospitalization for exacerbation: patient is (A) or (B)
  High Risk: ≥ 2 per year *or* ≥ 1 with hospitalization: patient is (C) or (D)

Table 3. Combined Assessment of COPD

*When assessing risk, choose the **highest risk** according to GOLD grade or exacerbation history. (One or more hospitalizations for COPD exacerbations should be considered high risk.)*



Patient	Characteristic	Spirometric Classification	Exacerbations per year	CAT	mMRC
A	Low Risk Less Symptoms	GOLD 1-2	≤ 1	< 10	0-1
B	Low Risk More Symptoms	GOLD 1-2	≤ 1	≥ 10	≥ 2
C	High Risk Less Symptoms	GOLD 3-4	≥ 2	< 10	0-1
D	High Risk More Symptoms	GOLD 3-4	≥ 2	≥ 10	≥ 2

MANAGEMENT OF STABLE COPD

Once COPD has been diagnosed, effective management should be based on an individualized assessment of current symptoms and future risks:

- Relieve symptoms
- Improve exercise tolerance
- Improve health status

→ **REDUCE SYMPTOMS**

and

- Prevent disease progression
- Prevent and treat exacerbations
- Reduce mortality

→ **REDUCE RISK**

These goals should be reached with minimal side effects from treatment, a particular challenge in COPD patients because they commonly have comorbidities that also need to be carefully identified and treated.

Bronchodilators – Recommendations:

- For both beta$_2$-agonists and anticholinergics, long-acting formulations are preferred over short-acting formulations.
- The combined use of short- or long-acting beta$_2$-agonists and anticholinergics may be considered if symptoms are not improved with single agents.
- Based on efficacy and side effects, inhaled bronchodilators are preferred over oral bronchodilators.
- Based on evidence of relatively low efficacy and greater side effects, treatment with theophylline is not recommended unless other bronchodilators are not available or unaffordable for long-term treatment.

Corticosteroids and Phosphodiesterase-4 Inhibitors – Recommendations

- There is no evidence to recommend a short-term therapeutic trial with oral corticosteroids in patients with COPD to identify those who will respond to inhaled corticosteroids or other medications.
- Long-term treatment with inhaled corticosteroids is recommended for patients with severe and very severe airflow limitation and for patients with frequent exacerbations that are not adequately controlled by long-acting bronchodilators.
- Long-term monotherapy with oral corticosteroids is not recommended in COPD.
- Long-term monotherapy with inhaled corticosteroids is not recommended in COPD because it is less effective than the combination of inhaled corticosteroids with long-acting beta2-agonists.
- Long-term treatment containing inhaled corticosteroids should not be prescribed outside their indications, due to the risk of pneumonia and the possibility of a slightly increased risk of fractures following long-term-term exposure.
- The phosphodiesterase-4 inhibitor roflumilast may also be used to reduce exacerbations for patients with chronic bronchitis, severe and very severe airflow limitation, and frequent exacerbations that are not adequately controlled by long-acting bronchodilators.

**Medications in each box are mentioned in alphabetical order and therefore not necessarily in order of preference.*

***Medications in this column can be used alone or in combination with other options in the First and Alternative Choice columns*

Glossary:
SA: short-acting
LA: long-acting
ICS: inhaled corticosteroid
PDE-4: phosphodiesterase-4
prn: when necessary

Table 4: Pharmacologic Therapy for Stable COPD*

Patient Group	RECOMMENDED FIRST CHOICE	ALTERNATIVE CHOICE	OTHER POSSIBLE TREATMENTS**
A	SA anticholinergic prn *or* SA beta$_2$-agonist prn	LA anticholinergic *or* LA beta$_2$-agonist *or* SA beta$_2$-agonist and SA anticholinergic	Theophylline
B	LA anticholinergic *or* LA beta$_2$-agonist	LA anticholinergic and LA beta$_2$-agonist	SA beta$_2$-agonist *and/or* SA anticholinergic Theophylline
C	ICS + LA beta$_2$-agonist *or* LA anticholinergic	LA anticholinergic and LA beta$_2$-agonist *or* LA anticholinergic and PDE-4 Inhibitor *or* LA beta$_2$-agonist and PDE-4 Inhibitor	SA beta$_2$-agonist and/or SA anticholinergic Theophylline
D	ICS + LA beta$_2$-agonist *and/or* LA anticholinergic	ICS + LA beta$_2$-agonist and LA anticholinergic *or* ICS + LA beta$_2$-agonist and PDE-4 inhibitor *or* LA anticholinergic and LA beta$_2$-agonist *or* LA anticholinergic and PDE-4 inhibitor	Carbocysteine SA beta$_2$-agonist *and/or* SA anticholinergic Theophylline

Table 5. Formulations and Typical Doses of COPD Medications*

Drug	Inhaler (µg)	Solution for Nebulizer (mg/ml)	Oral	Vials for Injection (mg)	Duration of Action (hours)
Beta$_2$-agonists					
Short-acting					
Fenoterol	100-200 (MDI)	1	0.05% (Syrup)		4-6
Levalbuterol	45-90 (MDI)	0.21, 0.42			6-8
Salbutamol (albuterol)	100, 200 (MDI & DPI)	5	5 mg (Pill), 0.024%(Syrup)	0.1, 0.5	4-6
Terbutaline	400, 500 (DPI)		2.5, 5 mg (Pill)		4-6
Long-acting					
Formoterol	4.5-12 (MDI & DPI)	0.01¶			12
Arformoterol		0.0075			12
Indacaterol	75-300 (DPI)				24
Salmeterol	25-50 (MDI & DPI)				12
Tulobuterol			2 mg (transdermal)		24
Anticholinergics					
Short-acting					
Ipratropium bromide	20, 40 (MDI)	0.25-0.5			6-8
Oxitropium bromide	100 (MDI)	1.5			7-9
Long-acting					
Aclidinium bromide	322 (DPI)				12
Glycopyrronium bromide	44 (DPI)				24
Tiotropium	18 (DPI), 5 (SMI)				24
Combination short-acting beta$_2$-agonists plus anticholinergic in one inhaler					
Fenoterol/Ipratropium	200/80 (MDI)	1.25/0.5			6-8
Salbutamol/Ipratropium	100/20 (SMI)				6-8
Combination long-acting beta$_2$-agonist plus anticholinergic in one inhaler					
Indacaterol/ glycopyrronium	85/43 (DPI)				24
Vilanterol/umeclidinium	25/62.5 (DPI)				24
Methylxanthines					
Aminophylline			200-600 mg (Pill)	240	Variable, up to 24
Theophylline (SR)			100-600 mg (Pill)		Variable, up to 24
Inhaled corticosteroids					
Beclomethasone	50-400 (MDI & DPI)	0.2-0.4			
Budesonide	100, 200, 400 (DPI)	0.20. 0.25, 0.5			
Fluticasone	50-500 (MDI & DPI)				
Combination long-acting beta$_2$-agonists plus corticosteroids in one inhaler					
Formoterol/Budesonide	4.5/160 (MDI) 9/320 (DPI)				
Formoterol/mometasone	10/200, 10/400 (MDI)				
Salmeterol/Fluticasone	50/100, 250, 500 (DPI) 25/50, 125, 250 (MDI)				
Vilanterol/Fluticasone furoate	25/100 (DPI)				
Systemic corticosteroids					
Prednisone			5-60 mg (Pill)		
Methyl-prednisolone			4, 8, 16 mg (Pill)		
Phosphodiesterase-4 inhibitors					
Roflumilast			500 mcg (Pill)		24

MDI=metered dose inhaler; DPI=dry powder inhaler; SMI=soft mist inhaler
*Not all formulations are available in all countries; in some countries, other formulations may be available.
¶Formoterol nebulized solution is based on the unit dose vial containing 20 mcg in a volume of 2.0 ml

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GOLD 2014 source documents are at www.goldcopd.org