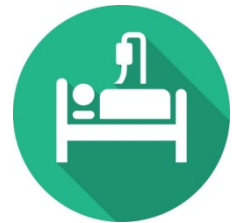


# CLINICAL PATHWAY

## Acute Medicine



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## Chronic Obstructive Pulmonary Disease

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**CHRISTIANA CARE**  
HEALTH SYSTEM

# Chronic Obstructive Pulmonary Disease

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## THE CHRISTIANA CARE WAY

We serve our neighbors as respectful, expert, caring partners in their health. We do this by creating innovative, effective, affordable systems of care that our neighbors value.



CHRISTIANA CARE  
HEALTH SYSTEM

# INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a term used to describe lung diseases that include emphysema, chronic bronchitis, refractory (non-reversible) asthma, and some forms of bronchiectasis. This disease is characterized by increasing breathlessness. Christiana Care has established a COPD pathway to optimize care delivery and focus on the most effective clinical and transitional elements, setting our patients, families and providers up for success in managing this disease most effectively. Using ICD-10 codes, COPD admissions accounted for 6,928 admissions in 2017 or 12% of the total annual admission volume.

## Scope of this Pathway

The pathway scope starts on presentation for possible inpatient admission at Christiana Hospital. Patients identified suffering from an exacerbation of COPD will initiate a series of clinical and care management pathways. Specified order sets will be triggered based on clinician order, COPD tags, or fulfillment of other clinical/diagnostic criteria. These plans will be embedded within standard workflows for providers and are aimed at directing best practice care delivery with consistency. Any patient previously admitted for COPD and at high risk for readmission will be seen by a COPD case manager who will focus on facilitating evidence based care delivery, helping the caregivers and patient/families navigate our health care delivery system. Their COPD case manager will work to prepare the patient for a smooth discharge, which will include all transitional care elements.

# Pathway Contacts

The content of this pathway is developed and maintained by the Acute Medicine Service Line of Christiana Care Health System. Questions or feedback about the content may be directed to:

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# Diagnosis and Staging of COPD

COPD disease severity is best assessed by combining the following aspects:

- Degree of airflow limitation based on spirometry limitations:
  - » 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.
- Risk of Exacerbations
  - » 2 or more treated events within the past year.
- Symptoms
  - » Assessed by the modified Medical Research Council (mMRC) Dyspnea Scale [Table 1].
  - » Assessed by the COPD Assessment Test (CAT) [Table 2]
- 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.

**TABLE 1: mMRC BREATHLESSNESS SCALE**

GRADE	DEGREE OF BREATHLESSNESS RELATED TO ACTIVITIES (MRC)
1	Not troubled by breathless except on strenuous exercise.
2	Short of breath when hurrying on a level or when walking up a slight hill.
3	Walks slower than most people on the level, stops after a mile or so, or stops after 15 minutes walking at own pace.
4	Stops for breath after walking 100 yards, or after a few minutes on level ground
5	Too breathless to leave the house, or breathless when dressing/undressing.

**TABLE 2: CAT SCALE**

Score	DEGREE OF BREATHLESSNESS RELATED TO ACTIVITIES (CAT)
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Name:  Today's Date:



**How is your COPD? Take the COPD Assessment Test (CAT)**

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

If you wish to complete the questionnaire by hand on paper, [please click here](#) and then print the questionnaire.  
 If you complete the questionnaire on-line, for each question below, click your mouse to place a mark (X) in the box that best describes you currently.

Example: I am very happy (0)  (1) (2) (3) (4) (5) I am sad

Question	Score
I never cough (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I cough all the time	2
I have no phlegm (mucus) in my chest at all (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) My chest is full of phlegm (mucus)	2
My chest does not feel tight at all (0) <input checked="" type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) My chest feels very tight	1
When I walk up a hill or one flight of stairs I am not breathless (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) When I walk up a hill or one flight of stairs I am very breathless	2
I am not limited doing any activities at home (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I am very limited doing activities at home	2
I am confident leaving my home despite my lung condition (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I am not at all confident leaving my home because of my lung condition	2

I sleep soundly (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I don't sleep soundly because of my lung condition	2
I have lots of energy (0) <input type="radio"/> (1) <input checked="" type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I have no energy at all	2
<b>CLICK TO GET YOUR TOTAL SCORE!</b>	
	<b>15</b>

➔ Make sure you print your CAT before visiting your healthcare professional!

<http://www.catestonline.org/english/indexEN.htm>

**TABLE 3: COMBINED ASSESSMENT OF COPD RISK**

PATIENT RISK	SPIROMETRY CLASSIFICATION	EXACERBATIONS PER YEAR	MRC/CAT
A-Low Risk/Less Symptoms	GOLD 1-2	≤1	0-1 / <10
B-Low Risk/More Symptoms	GOLD 1-2	≤1	≥2 / > or = 10
C-High Risk/Less Symptoms	GOLD 3-4	≤2	0-1 / <10
D-High Risk/More Symptoms	GOLD 3-4	≤2	≥2 / > or = 10

# Management of COPD Exacerbations

- A COPD exacerbation represents an acute/subacute event that is characterized by a worsening of the patient’s respiratory symptoms. Generally, this impacts daily activities and leads to a change in treatment plan.

- The most common causes for exacerbations appear to be viral and bacterial infections of the tracheobronchial tree.
- Treatment goals are aimed at minimizing the impact of the current exacerbation and to prevent the development of subsequent exacerbations.
- Short-acting inhaled beta<sub>2</sub> –agonists (SABA's), with or without short-acting anticholinergics, are the preferred bronchodilators for treatment of an exacerbation. They often require increased dosage or frequency.
- Systemic corticosteroids and antibiotics can shorten recovery time, improve lung function, reduce length of hospitalizations, and minimize the risk of treatment failure.
- Smoking cessation, vaccinations, pulmonary rehabilitation and proper use of medications are non-pharmacologic measures that can prevent COPD exacerbations.
- Maintenance therapy with long acting bronchodilators should be initiated as soon as possible before hospital discharge.
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival.

## Initial Assessment

- Review baseline PFTs, specifically FEV<sub>1</sub>.
- Previous exacerbations, hospitalization, ED visits.
- Measure pulse oximetry.
- Consider ABG/VBG if concerns for hypoventilation.



- Consider chest X-ray to identify alternative or concomitant conditions.
- Consider EKG.

## **Assess risk factors for poor outcomes that suggest hospitalization required**

### **Pre-Morbid Factors**

- Severe underlying COPD (FEV1 <50% of predicted).
- Frequent previous exacerbations or hospitalizations (more than 3/year).
- Presence of comorbid conditions.
- Antibiotic use within the last 3 months.
- Advanced age.

### **Clinical Signs**

- Use of accessory respiratory muscles.
- Hemodynamic instability.
- Evidence of right heart failure.
- Reduced consciousness.
- Uncontrolled arrhythmias.

### **Consider Hospitalization If:**

Significant risk factors for poor outcome, anticipated need for ventilator support, and/or poor home support for care needs

## **Outpatient Management and Care**

If criteria for hospitalization are not met, patient may be discharged home with the following as applicable:

- Instructions for increased inhaled medication therapy
- Oral steroids for 5-7 days
- Antibiotics if increased purulence or volume of sputum
- Assurance of adequate home medications and delivery equipment
- Instructions for follow up with health care provider in 5-7 days
- Patients at risk of having an exacerbation of COPD should be given self-management education, tools, and clear instructions to promote prompt attention to the symptoms of an exacerbation.
- Patients should be encouraged to respond promptly to the symptoms of an exacerbation by:
  - » Starting oral corticosteroid therapy if their increased breathlessness interferes with activities of daily living.
  - » Starting antibiotic therapy if their sputum is purulent.
  - » Increase their bronchodilator therapy to control their symptoms.
  - » These should be outlined in an Action Plan.

Patients given self-management plans should be advised to contact a healthcare professional if they do not improve.

## Inpatient Management

### Antibiotics

- Antibiotics should be used to treat exacerbations of COPD associated with increased sputum purulence and/or volume.
- Patients with exacerbations without more purulent sputum do not need antibiotic therapy unless there is consolidation on a chest radiograph or clinical signs of pneumonia.
- Initial empiric antibiotic treatment should include a PO beta-lactam derivative,

macrolide, or a tetracycline.

- Considerations for pseudomonas risk factors, local resistance patterns, and other infections such as pneumonia may further guide antibiotic choices.

## Vaccinations

- All patients with COPD should receive Pneumonia and Influenza vaccinations unless medically contraindicated.

## Corticosteroids

- Corticosteroids are recommended if baseline FEV1 is less than 50% of predicted and should be considered for most patients admitted with exacerbation.
- May shorten recovery time, improve FEV1, and improve hypoxemia.
- Oral steroids should be administered unless there is barrier to PO administration.
- Initial dose: Prednisone 40-60 mg (or equivalent).
- Titration: Reduce over 5 to 7 days. There is no advantage to prolonged courses over 7 days except in select circumstances.

## Inhaled Medications

- During exacerbations, inhaled short-acting beta2 agonists (SABA s) with or without short-acting muscarinic agonists (SAMA) should be administered with increased dose and/or frequency.
- All SABA's show equal efficacy-there is no significant clinical benefit related to bronchodilation or tachycardia between SABA's.
- Maintenance therapy with long acting bronchodilators should be initiated as soon as possible before hospital discharge.

## Smoking Cessation & Nicotine Replacement Therapy

- Smoking cessation is an important component of effective COPD treatment.
- Encourage COPD patients to stop smoking, and identify barriers to successful cessation.
- If patient is an active smoker, administer Nicotine Replacement Therapy (NRT) if medical conditions allow.
- Order inpatient smoking cessation counseling as well as outpatient follow-up if available.
- Ask about the willingness to quit smoking and provide direct referral to Delaware Quitline: (1-866-409-1858).

## Oxygen and Ventilation Support

- All patients should have intermittent or continuous pulse oximetry administered based on clinical condition. ABG's may be necessary in certain patients for oxygen assessment.
- Administer oxygen to maintain oxygen levels per oxygen protocol or individualized for patient specific levels.
- Non-Invasive Ventilation (NIV) should be used as the treatment of choice for acute and/or persistent hypercapnic ventilatory failure during exacerbations despite optimal medical therapy.
- NIV should be delivered in a dedicated setting with staff who have been trained in its application and have experience with use.
- Careful monitoring is required for those on NIV for acute respiratory failure with clearly outlined plans for escalation to invasive support if required.
- O<sub>2</sub> determination studies for home O<sub>2</sub> needs should be completed within 48 hours of expected discharge.

## Monitoring in the Hospital

- Patients' recovery should be monitored by regular clinical assessment of their symptoms.
- This includes regular assessments of dyspnea scores and ability to titrate

inhaled medications by respiratory therapy.

- Functional capacity assessment by nursing and physical therapy.
- Intermittent arterial blood gas measurements should be used to monitor the recovery of patients with respiratory failure who are hypercapnic or acidotic, until they are stable.
- End Tidal CO<sub>2</sub> (ETCO<sub>2</sub>) may have a role for ongoing assessment.
- Daily monitoring of PEF or FEV<sub>1</sub> should not be performed routinely to monitor recovery.

## Palliative Care

Palliative care should be considered in patients with severe COPD associated with:

- Frequent exacerbations and hospitalization.
- Acute respiratory failure requiring invasive mechanical ventilation.
- Progressive symptoms of dyspnea with significant impairment of ADLs.
- Development of cor pulmonale.

Goals should include:

- Minimize symptoms, which can include severe cough and breathlessness.
- Assess for associated anxiety and depression.
- Education in breathing techniques and pulmonary rehabilitation.
- Discuss disease prognosis and progression.
- Clarify goals of care.
- Encourage completion of Advance Directives and a DMOST form.

# Discharge from the Hospital

## Criteria for Discharge

- Inhaled short-acting beta2 -agonist therapy is required no more frequently than every 4 hrs.
- If previously ambulatory, patient is able to walk across room.
- Dyspnea does not prevent adequate eating or sleep.
- Clinically stable for 12-24 hrs, including gas exchange parameters.
- Patient demonstrates understanding on correct medication use.
- Assessment for durable medical equipment such as oxygen and NIV have been completed and arrangements completed.
- Patients re-established on their optimal maintenance bronchodilator therapy before discharge, based on their disease severity scoring.

## Discharge Checklist

Should be completed prior to patient discharge

- Evaluate medication administration, patient understanding and review side effects.
- Evaluate medication affordability and access, modify as necessary if appropriate alternatives are available.
- Schedule follow-up appointment with PCP or Pulmonologist within 7-14 days.
- Arrangements for follow-up and home care (such as visiting nurse, oxygen delivery, nebulizer, NIV, etc).
- COPD education.
- Completion of a COPD self-management Action Plan. (See *COPD Stoplight tool*, p 4)

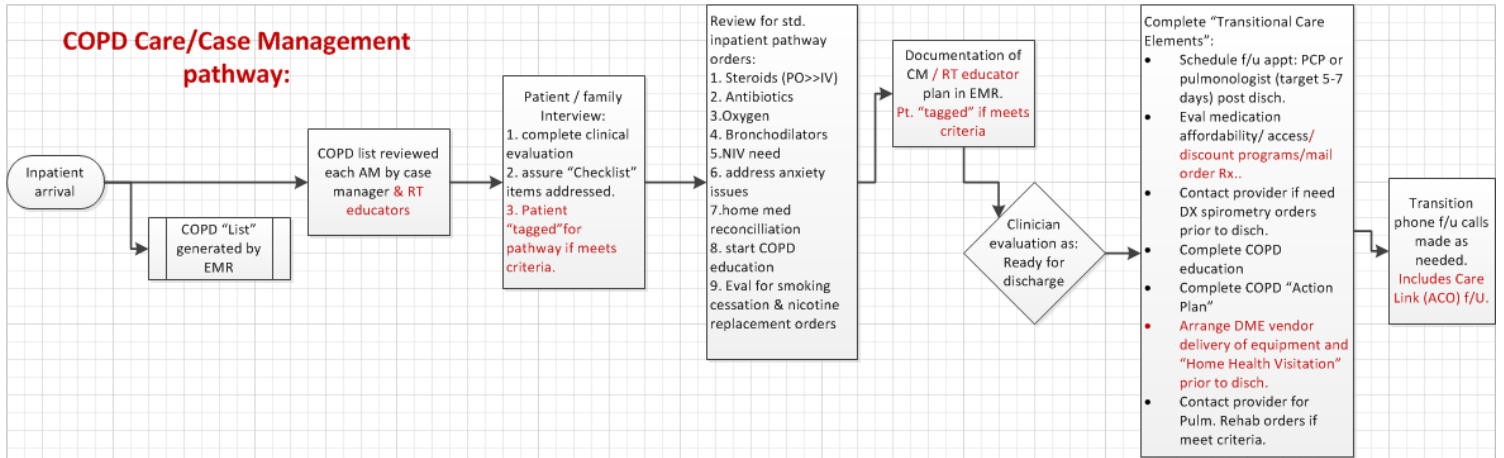
- If spirometry not known to be completed within the last year, arrange for outpatient spirometry.
- Place Pulmonary Rehabilitation order if criteria met.

## Criteria for Pulmonary Rehabilitation

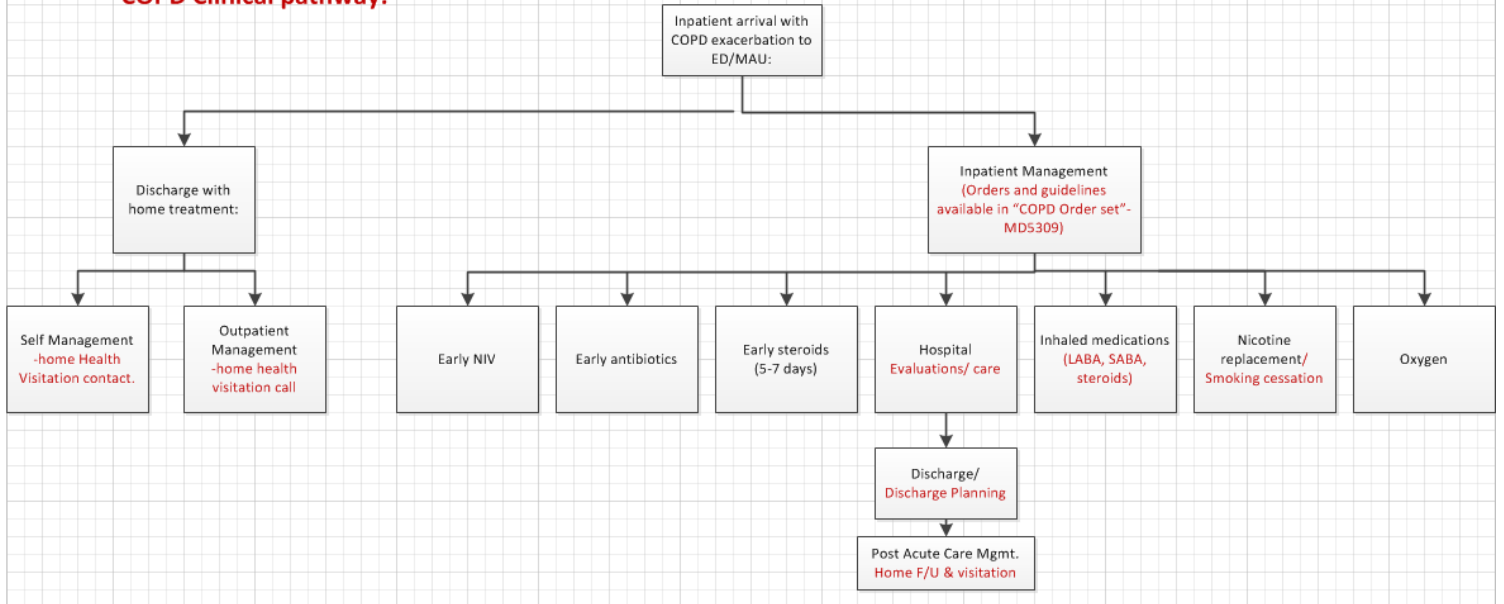
- Outpatient pulmonary rehabilitation should be considered for all patients with COPD who have dyspnea or other respiratory related symptoms. This includes reduced tolerance to exercise and restricted activities of daily living.
  - Spirometry is required indicating obstructive disease.
  - Pulmonary rehabilitation is beneficial for patients with early stage COPD with symptoms as well as advanced stage patients.
  - Both active smokers and non-smokers derive benefit from rehabilitation.
  - Inpatients with acute exacerbations may not have physical tolerance to participate in pulmonary rehab, but would benefit as outpatient.

# PATHWAY ALGORITHMS

## COPD Care/Case Management pathway:



## COPD Clinical pathway:





## PATIENT EDUCATION MATERIALS



<http://www.copdfoundation.org/> The COPD Foundation has been established to speed innovations which will make treatments more effective and affordable, undertake initiatives that result in expanded services for COPD patients, and improve the lives of patients with COPD and related disorders through research and education that will lead to prevention and someday a cure for this disease.

## CLINICAL EDUCATION MATERIALS



<http://www.goldcopd.org/> The Global Initiative for Chronic Obstructive Lung Disease (GOLD) works with health care professionals and public health officials to raise awareness of Chronic Obstructive Pulmonary Disease (COPD) and to improve prevention and treatment of this lung disease for patients around the world.



[Doctot GOLD COPD Strategy](#) for iPhone provides the GOLD strategy for assessing and treating COPD in a user-friendly and easily navigable format with interactive tables and charts. Physicians can easily record patient answers to questions about symptoms and functional status, and the app automatically generates and categorizes the patient's score on the Combined Assessment of COPD Scale.

## REFERENCES

- <http://www.goldcopd.org>
- <http://pathways.nice.org.uk/pathways/chronic-obstructive-pulmonary-disease>
- American Thoracic Society COPD statements
- 2018 Gold Pocket Guide: <https://goldcopd.org/gold-reports/>

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