Chronic Cough... and a bit about COPD

Rob Aaronson MD, FACP, FCCP, FAASM
Pulmonary Associates of Southern Arizona
Director of Medical Education, TMC
Clinical Professor of Medicine, U of A
Clinical Associate Professor,
Midwestern and A.T. Still Universities
DISCLOSURE

I have no financial relationships that might constitute a conflict of interest.
“The art of medicine is amusing the patient while nature cures the disease.”

- Voltaire
Classification

Acute cough
~ maximum of 3 weeks

Subacute cough
~ 3 to 8 weeks

Chronic Cough
~ more than 8 weeks

De Blasio et al. Cough 2011, 7:7
Why is cough important?... To society:

- Most common reason to consult a PCP
- Antitussive drug sales USA >$4 billion/yr
- Chronic cough (>8wk): 12% population
- 10-38% of out-patients referrals
HRQOL: The LCQ

Physical
- Chest pains
- Sputum
- Tired
- Paints/fumes
- Sleep
- Frequency
- Hoarse Voice
- Energy

Psychological
- Embarrassed
- Anxious
- In control
- Frustrated
- Fed up
- Serious illness
- Other people

Social
- Conversation
- Annoy family
- Job
- Enjoyment

Birring S et al, Thorax 2003; 58:339-343
**Cough frequency & QOL**

![Graph showing the relationship between cough frequency and LCQ scores. The graph indicates a negative correlation (r = -0.6) with more severe cough frequency corresponding to lower LCQ scores.](image)

Birring et al, Resp Med 2006; 100:1105-9
Depressive symptoms in chronic cough

Dicpinigaitis P et al, Chest 2006; 130:1839
## Adverse impact of chronic cough

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worried about serious illness</td>
<td>77%</td>
</tr>
<tr>
<td>Concerned something is wrong</td>
<td>72%</td>
</tr>
<tr>
<td>Frequent nausea</td>
<td>56%</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>54%</td>
</tr>
<tr>
<td>Others think something is wrong with me</td>
<td>53%</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>49%</td>
</tr>
<tr>
<td>Self-consciousness</td>
<td>46%</td>
</tr>
<tr>
<td>Difficulty speaking on the telephone</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Urine incontinence</strong></td>
<td><strong>30%</strong></td>
</tr>
<tr>
<td>Absence from work</td>
<td>11%</td>
</tr>
</tbody>
</table>

Cough Reflex: Afferent pathway

- Trigeminal, Superior laryngeal nerve (SLN) and Vagus nerves are major afferent pathways.

- Stimuli arise from:
  - Ear (Arnold’s nerve)
  - Pharynx
  - Larynx (SLN)
  - Tracheobronchial tree
  - Heart
  - Pericardium
  - Esophagus

FIGURE I. Cough Receptors involved in the normal cough mechanism. (From Irwin RS, et al., Cough: A comprehensive review. Arch Intern Med. 1977; 137:1186-91)
ACE-Inhibitors:
“Déjà vu all over again” (-Yogi Berra)

- Roughly 10% of individuals treated with ACE inhibitors
- May be more common in women and Asians (50%)
- Accumulation of bradykinins and Substance P.
- Maybe also accumulation of bronchoconstrictive thromboxane
- Onset usually 1-2 weeks, but may be delayed (6-12 months)
- Usually resolves in about a week, but may take months
“In patients with chronic cough and a normal CXR finding who are nonsmokers and are not receiving therapy with an ACE inhibitor, the diagnostic approach should focus on the detection and treatment of UACS (formerly called PNDS), asthma, NAEB, or GERD, alone or in combination.

This approach is most likely to result in a high rate of success in achieving cough resolution.”
Causes of Chronic Cough (90-95%)

- Upper airway cough syndrome (UACS)
- Asthma
- Gastroesophageal reflux (GERD)
- Nonasthmatic eosinophilic bronchitis (NEAB)

92-100% immunocompetent non-smokers with normal chest X-ray
Upper Airway Cough Syndrome

- “Post-nasal drip syndrome (PNDS) plus”
- Most common cause in adults
- May also be associated with
  - Wheeze
  - Dyspnea
UACS: Myriad of rhinosinus conditions

- PNDS
- Allergic rhinitis
- Nonallergic rhinitis
  - Vasomotor rhinitis
  - Nonallergic rhinitis with eosinophilia (NARES)
  - Occupational
  - Postinfectious
  - Pregnancy
  - Rhinitis medicamentosa (topical decongestant overuse)
- Sinusitis (bacterial and fungal)
Upper Airway Cough Syndrome

- History:
  - Need to frequently clear throat
  - Tickle in throat
  - Sensation of dripping into throat
  - Nasal symptoms

- Physical Exam:
  - Secretions in nose or oropharynx
  - Cobblestone of mucosa
Treatment

• Oral (1\textsuperscript{st} generation) antihistamine/decongestant x 3-5 weeks

• +/- Intranasal decongestant for maximum of 5 days: e.g. oxymetazoline 2 sprays each nostril bid x 3 days only

• Antibiotics selectively, for sinusitis

• Can often convert to more standard/less expensive/more convenient therapy (newer antihistamine alone, nasal CS, allergy shots)
Asthma

- **Second** most common cause of cough in adults
- Clues that chronic cough is due to asthma:
  - Episodic wheezing, dyspnea, cold or exercise induced
  - Reversible airflow obstruction
  - Bronchial hyperresponsiveness (test only if needed)
- “Confirmed” by resolution of cough with asthma treatment
Cough Variant Asthma

• 30-60% of patients presenting with chronic cough that was due to asthma had cough as their ONLY symptom

• Clues:
  - nocturnal cough, exercise induced, after allergen exposure

• Bronchoprovocation test: positive
  • Negative test exclude asthma but does not rule out steroid-responsive cough (NAEB)
ASTHMA/Cough Variant Asthma

Treatment

- Inhaled corticosteroid
- ICS/LABA combination > 8 weeks
- Leukotriene receptor antagonist
GERD-associated cough

Two mechanisms:

- Distal esophageal acid stimulates vagus nerve
- Laryngopharyngeal reflux (LPR)
  - Microaspiration of esophageal contents into the laryngopharynx and tracheobronchial tree
  - No heartburn
  - Usually when upright
GERD

- Suspect GERD when...
  - Heartburn or
  - Sour taste in mouth (Waterbrash)
  - Globus or tickle (LPV)

- Reflux can be demonstrated by:
  - 24-hour pH-impedance monitoring
  - Barium x-ray

- Cough is only symptom in 40-75% of patients
GERD: Life-style modifications

- Stop smoking
- Avoid alcohol
- Lose weight
- Elevate HOB
- Small meals
- Avoid fatty/acidic foods
- Avoid caffeine
- Avoid - tight clothes, eating < 4 hrs pre-bed, recumbency 3 hrs post meal
Treatment

- Antacid therapy ≥ 2 months:
  - Proton pump inhibitor (high dose)
  - H2 blockers less effective

- Motility therapy:
  - Metoclopramide

Surgery is last resort
Non-Asthmatic Eosinophilic Bronchitis (NAEB)

- Eosinophilic airway inflammation WITHOUT variable airflow obstruction or airway hyperresponsiveness

- **Diagnostic tests:**
  - Spirometry: normal
  - Methacholine challenge: normal
  - Sputum or BAL eosinophilia: >3% eosinophils

- **Diagnostic/Therapeutic trial:**
  - Characteristically resistant to bronchodilator but responds to ICS
  - Confirmed diagnosis if responded to ICS, usually > 4 weeks
Other causes (5-10%)

- Bronchiectasis
- Bronchiolitis
- Bronchogenic carcinoma
- COPD
- Foreign body
- Interstitial Lung Disease
- Neuromuscular disease
- Pertussis
- Psychogenic cough (?)
- Sarcoidosis
- Tracheoesophageal fistula
- Tuberculosis
- Zenker diverticulum
- Chronic Cough
- Hypersensitivity syndrome
**Chronic Cough**

- Investigate and Treat
  - A cause of cough is suggested
  - History, examination, Chest X-ray
  - Smoking Angiotensin converting inhibitor
  - Discontinue

- Upper Airway Cough Syndrome (UACS)
  - Empiric treatment

- Asthma
  - Ideally evaluate (Spirometry, bronchodilator reversibility, bronchial provocation challenge) or empiric treatment

- Non-asthmatic eosinophilic bronchitis (NAEB)
  - Ideally evaluate for sputum eosinophilia or empiric treatment

- Gastroesophageal Reflux Disease (GERD)
  - Empiric treatment

  *For initial treatments see below*

- No response

**Inadequate response to optimal Rx**

**Further Investigations to consider:**
- 24h esophageal pH monitoring
- Endoscopic or Videofluoroscopic Swallow Evaluation
- Barium esophagram
- Sinus imaging
- High Resolution Chest Tomography
- Bronchoscopy
- Environmental Assessment
- Consider other rare causes

**Important General Considerations**
- Optimize therapy for each diagnosis
- Check compliance
- Due to possibility of multiple causes maintain all partially effective treatments

**Initial Treatments**
- **UACS-** Antihistamine/decongestant
- **Asthma-** Inhaled corticosteroids, Bronchodilators, Leukotriene-receptor antagonist
- **NAEB-** Inhaled corticosteroids
- **GERD-** Proton pump inhibitor, diet/lifestyle changes
Cough Suppression Physiotherapy

- **Education** (avoid triggers, no benefit of excessive cough)
- **Laryngeal hygiene** (reduce alcohol/caffeine, sips water, avoid mouth breathing, correct abnormal breathing pattern+ VCD)
- **Cough control** (chew sweets, forced swallow, huff, distraction)
- **Counselling** (reinforcement of techniques, modify behaviour, address adverse symptoms such as incontinence)

Patel A et al; Chronic Resp Dis 2011;8:253-8
Chronic Cough Hypersensitivity Syndrome
- “psychogenic cough”
- “tic cough”

- Laryngeal Sensory Neuropathy
- LN responsible for causing the sensation/urge to cough in affected patients

- SELSAP (Surface Evoked Laryngeal Sensory Action Potential)
- testing of the Superior Laryngeal Nerve

Gabapentin: randomised controlled trial

Full Treatment Period

p = 0.012

Gabapentin: randomised controlled trial

“Difficult to treat” unexplained chronic cough

AND NOW FOR SOMETHING COMPLETELY DIFFERENT
Is this the making of a 21st Century physician?
TREATMENT OPTIONS FOR COPD

- Self-Management Education and Smoking Cessation
- Bronchodilators
- Inhaled Corticosteroids
- Pulmonary Rehabilitation
- Oxygen
- Surgery

INCREASING SEVERITY
COPD: Treatments that **Improve Survival**

- **Quit smoking !!!!**

- Use oxygen continuously if:
  - pO2 < 55
  - P02 55 - 59 if polycythemia or pulmonary hypertension

- Lung Transplantation

- Lung Volume Reduction
  - If predominantly upper lobe and low exercise capacity

- Lung Cancer Screening
# BODE Index

| Variables and cutoff values for points 0 to 3 in the BODE index computation. |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| **Point on BODE index**         | 0               | 1               | 2               | 3               |
| **FEV₁ (% of predicted)**       | ≥65             | 50–64           | 36–49           | ≤35             |
| **Distance walked in 6 minutes (m)** | ≥350           | 250–349         | 150–249         | ≤149            |
| **Dyspnea scale score**         | 0–1             | 2               | 3               | 4               |
| **Body mass index measure**     | >21             | ≤21             | —               | —               |

*Values range from 0 (best) to 10 (worst)
Source: Adapted from the Body-mass Index, Airflow Obstruction, Dyspnea, and Exercise Capacity Index in Chronic Obstructive Pulmonary Disease*²

### APPROXIMATE 4 YEAR SURVIVAL INTERPRETATION

- **0-2 Points:** 80%
- **3-4 Points:** 67%
- **5-6 Points:** 57%
- **7-10 Points:** 18%

Modified MRC Dyspnoea Scale (mMRC)

Grade 0: Breathless on strenuous exercise

Grade 1: Short of breath when hurrying or walking up a slight hill

Grade 2: Walk slower than others or stop when walking at own pace on level ground

Grade 3: Stop every 100m or after a few minutes

Grade 4: Too breathless to leave the house or breathless on washing/dressing

Am Rev Respir Dis;1987;135(6):1229-33
Lung Transplant Survival Rates

1 Month (96.85%)  
1 Year (87.47%)  
3 Years (68.23%)

About 55% at 5 years
Lung Transplantation for COPD: Candidacy

Usually 65 or younger, with progressive disease despite aggressive care, BODE 5-6 and:

- FEV1 < 25% of predicted (without reversibility)
- and/or
  - PaCO2 > 55 mmHg
  - Pulmonary Hypertension with progressive deterioration (cor pulmonale)
- Preference to patients with:
  - Elevated PaCO2, cor pulmonale and O2 dependence
Lung Cancer Screening

- National Lung Screening Trial (NLST)
- Low dose CT chest (LDCT)
- Roughly $1/5^{th}$ radiation of conventional CT
  - 15 Chest X-rays
  - 50 cross country flights
  - 6 months of natural background radiation
Lung Cancer Screening: CMS approved

- **96% of (+) LDCT findings prove NOT to be cancer**
- Reduces lung cancer mortality by 20%
  - 3 fewer deaths/1000 people screened
- Reduces all cause mortality by 6.7%

- Current recommendation = **Yearly** LDCT chest:
  - Age 55-77
  - 30 pack-years or more
  - Smoking within the past 15 years
Lung Volume Reduction Surgery (LVRS)
LVRS survival curves

A. Overall
- Upper lobe predominant
- Low exercise tolerance
  - Overall: RR = 0.85, P = 0.02
  - Medical vs. LVRS

B. Non-High Risk
- Upper lobe predominant
- High exercise tolerance
  - Overall: RR = 0.85, P = 0.02
  - Medical vs. LVRS

C. Upper lobe predominant
- Low exercise tolerance
  - Overall: RR = 0.85, P = 0.02
  - Medical vs. LVRS

D. Upper lobe predominant
- High exercise tolerance
  - Overall: RR = 0.85, P = 0.02
  - Medical vs. LVRS

<table>
<thead>
<tr>
<th>Table 2. Efficacy of Different Approaches to Decreasing Risk for Exacerbations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficacy</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Non-pharmacologic Interventions</strong></td>
</tr>
<tr>
<td>Smoking Cessation</td>
</tr>
<tr>
<td>Pulmonary Rehabilitation</td>
</tr>
<tr>
<td>Vaccination Against Pneumococcal and Influenza Virus Infection</td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
</tr>
<tr>
<td>LABA</td>
</tr>
<tr>
<td>LAMA</td>
</tr>
<tr>
<td>LABA + LAMA vs. Monotherapy</td>
</tr>
<tr>
<td>ICS Monotherapy</td>
</tr>
<tr>
<td>ICS + LABA vs ICS or LABA monotherapy</td>
</tr>
<tr>
<td>Triple Combination Therapy vs. Components</td>
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<tr>
<td><strong>Systemic Treatments</strong></td>
</tr>
<tr>
<td>Roflumilast</td>
</tr>
<tr>
<td>Macrolides/Quinolones</td>
</tr>
<tr>
<td>Statins</td>
</tr>
</tbody>
</table>

ICS = inhaled corticosteroid, LABA = long-acting β2 agonist LAMA = long-acting muscarinic antagonist
Currently FDA approved for COPD

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism of action</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiotropium</td>
<td>LAMA</td>
<td>Daily</td>
</tr>
<tr>
<td>Aclidinium</td>
<td>LAMA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Umeclidinium</td>
<td>LAMA</td>
<td>Daily</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Formoterol</td>
<td>LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Indacaterol</td>
<td>LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Olodaterol</td>
<td>LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Umeclidinium/vilanterol</td>
<td>LAMA/LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Salmeterol/fluticasone</td>
<td>ICS/LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Budesonide/formoterol</td>
<td>ICS/LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Fluticasone furoate/vilanterol</td>
<td>ICS/LABA</td>
<td>Daily</td>
</tr>
</tbody>
</table>
Global Initiative for Chronic Obstructive Lung Disease

PROGETTO MONDIALE BPCO
STRATEGIA GLOBALE PER LA DIAGNOSI, IL TRATTAMENTO E LA PREVENZIONE DELLA BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA

Revisione 2014
## GOLD staging of COPD

<table>
<thead>
<tr>
<th>Stage</th>
<th>Condition</th>
<th>FEV&lt;sub&gt;1&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Mild COPD</td>
<td>at least 80% of normal</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Moderate COPD</td>
<td>between 50% and 80% of normal</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Severe COPD</td>
<td>between 30% and 50% of normal</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Very Severe COPD</td>
<td>below 30% of normal</td>
</tr>
</tbody>
</table>
# Global Strategy for Diagnosis, Management and Prevention of COPD

## Assessment of COPD

<table>
<thead>
<tr>
<th>Assessment of COPD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess symptoms: CAT, mMRC</td>
<td></td>
</tr>
<tr>
<td>Assess degree of airflow limitation using spirometry</td>
<td></td>
</tr>
<tr>
<td>Assess risk of exacerbations</td>
<td></td>
</tr>
<tr>
<td>Assess comorbidities</td>
<td></td>
</tr>
</tbody>
</table>
Combined Assessment of COPD

Patient is now in one of four categories:

A: Less symptoms, low risk
B: More symptoms, low risk
C: Less symptoms, high risk
D: More symptoms, high risk

2014 Global Initiative for Chronic Obstructive Lung Disease
<table>
<thead>
<tr>
<th></th>
<th>Post-bronchodilator FEV₁</th>
<th>Exacerbations</th>
<th>Symptoms*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;50% of predicted</td>
<td>&lt;2 per year</td>
<td>Moderate</td>
</tr>
<tr>
<td>AND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOW RISK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP A</td>
<td>[low risk of exacerbation, less symptoms]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP B</td>
<td>[low risk of exacerbation, more symptoms]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;50% of predicted</td>
<td>≥2 per year</td>
<td>Severe</td>
</tr>
<tr>
<td>AND/OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIGH RISK</td>
<td></td>
<td></td>
<td>Severe</td>
</tr>
<tr>
<td>GROUP C</td>
<td>[high risk of exacerbation, less symptoms]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP D</td>
<td>[high risk of exacerbation, more symptoms]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pharmacologic Therapy
RECOMMENDED FIRST CHOICE

Exacerbations per year

GOLD 4

GOLD 3

GOLD 2

GOLD 1

mMRC 0-1
CAT < 10

mMRC ≥ 2
CAT ≥ 10

A

ICS + LABA
or
LAMA

SAMA prn
or
SABA prn

B

C

ICS + LABA
or
LAMA

ICS + LABA
and/or
LAMA

D

LABA
or
LAMA

LABA
and/or
LAMA
<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting β-agonist PRN</td>
<td>Long-acting β-agonist</td>
<td>Inhaled corticosteroid + long-acting β-agonist</td>
<td>Inhaled corticosteroid</td>
</tr>
<tr>
<td>OR</td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>Short-acting anticholinergic PRN</td>
<td>Long-acting anticholinergic</td>
<td>Long-acting anticholinergic</td>
<td>Inhaled corticosteroid + long-acting β-agonist + long-acting anticholinergic</td>
</tr>
</tbody>
</table>

*Add short-acting bronchodilators as rescue medication as needed*

Optional alternative therapies:
- **Group A**: [Short-acting β-agonist + short-acting anticholinergic] or [long-acting β-agonist] or [long-acting anticholinergic]
- **Group B**: [Long-acting β-agonist + long-acting anticholinergic]
- **Group C**: [Inhaled corticosteroid + long-acting anticholinergic] or [long-acting β-agonist + long-acting anticholinergic] or [long-acting β-agonist/long-acting anticholinergic + PDE4 inhibitor for chronic bronchitis]
- **Group D**: [PDE4 Inhibitor added to first line therapy for chronic bronchitis]
<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking cessation</td>
<td>Reduce occupational and environmental exposures</td>
<td>Exercise/physical therapy</td>
<td>Pulmonologist referral</td>
</tr>
<tr>
<td>Good nutrition</td>
<td>Influenza and pneumococcal vaccines</td>
<td>Pulmonary rehabilitation</td>
<td>Address end of life decision making</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consider surgery in selected patients</td>
</tr>
</tbody>
</table>
On the horizon.....
Endobronchial LVRS

Valves
Coils
Biologics (thrombin/fibrin)
Thermal ablation

Spiration

Membrane
Struts
Hub
Anchor pads
Anchor tips
Removal rod
Removal rod tip
Endobronchial Valves are delivered to the target airway via a delivery catheter placed through the working channel of the bronchoscope (Panel 1). Multiple valves are placed to completely isolate the diseased, hyperinflated target lobe.

Upon inspiration, the unidirectional valve at the center of the device blocks air from entering the target lobe (Panel 2).

Upon exhalation, air and fluids escape through the valve (Panel 3).

Art courtesy of the New England Journal of Medicine
Regenerative therapy for COPD?

- Inducing endogenous stem cells to proliferate and differentiate in situ
  - Retinoids (all-trans-retinoic acid)
  - Others...

- Adding differentiated stem cells
  - Stem cells differentiated to Type II pneumocytes in vitro
    - Embryonic stem cells
    - Autologous (mesenchymal) stem cells
      - Adverse effects: Sarcomas and Fibrosis
Use your own stem cells to promote healing from lung disease.

Stem cells can promote healing in the lungs and slow the progression of chronic lung disease. The procedure has no chance of rejection and is minimally invasive.

At the Lung Institute, we provide treatment for the following diseases:

- Chronic Obstructive Pulmonary Disease (COPD)
- Lung Diseases
THANK YOU
In Patients with FEV1/FVC < 0.70:

<table>
<thead>
<tr>
<th>Patient</th>
<th>Characteristic</th>
<th>Spirometric Classification</th>
<th>Exacerbations per year</th>
<th>mMRC</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Low Risk</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>0 - 1</td>
<td>&lt; 10</td>
</tr>
<tr>
<td></td>
<td>Less Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Low Risk</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
<tr>
<td></td>
<td>More Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>High Risk</td>
<td>GOLD 3-4</td>
<td>≥ 2</td>
<td>0 - 1</td>
<td>&lt; 10</td>
</tr>
<tr>
<td></td>
<td>Less Symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>High Risk</td>
<td>GOLD 3-4</td>
<td>≥ 2</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
<tr>
<td></td>
<td>More Symptoms</td>
<td></td>
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<table>
<thead>
<tr>
<th>Patient Group</th>
<th>RECOMMENDED FIRST CHANCE</th>
<th>ALTERNATIVE CHOICE</th>
<th>OTHER POSSIBLE TREATMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SA anticholinergic prn or SA beta2-agonist prn</td>
<td>LA anticholinergic or LA beta2-agonist</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LA anticholinergic or LA beta2-agonist</td>
<td>LA anticholinergic and LA beta2-agonist</td>
<td>SA beta2-agonist and/or SA anticholinergic</td>
</tr>
<tr>
<td>C</td>
<td>LA anticholinergic or ICS + LA beta2-agonist</td>
<td>LA anticholinergic and LA beta2-agonist or LA anticholinergic and PDE-4 Inhibitor or LA beta2-agonist and PDE-4 Inhibitor</td>
<td>SA beta2-agonist and/or SA anticholinergic</td>
</tr>
<tr>
<td>D</td>
<td>LA anticholinergic and/or ICS + LA beta2-agonist</td>
<td>LA anticholinergic and ICS + LA beta2-agonist or ICS + LA beta2-agonist and PDE-4 Inhibitor or LA anticholinergic and LA beta2-agonist or LA anticholinergic and PDE-4 Inhibitor</td>
<td>Carbocystine or SA beta2-agonist and/or SA anticholinergic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Theophylline</td>
</tr>
</tbody>
</table>

- FEV1: Forced Expiratory Volume in 1 second
- FVC: Forced Vital Capacity
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.

For each item below, place a mark (X) in the box that best describes you currently. Be sure to only select one response for each question.

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

I never cough 0 1 2 3 4 5 I cough all the time

I have no phlegm (mucus) in my chest at all 0 1 2 3 4 5 My chest is completely full of phlegm (mucus)

My chest does not feel tight at all 0 1 2 3 4 5 My chest feels very tight

When I walk up a hill or one flight of stairs I am not breathless 0 1 2 3 4 5 When I walk up a hill or one flight of stairs I am very breathless

I am not limited doing any activities at home 0 1 2 3 4 5 I am very limited doing activities at home

I am confident leaving my home despite my lung condition 0 1 2 3 4 5 I am not at all confident leaving my home because of my lung condition

I sleep soundly 0 1 2 3 4 5 I don't sleep soundly because of my lung condition

I have lots of energy 0 1 2 3 4 5 I have no energy at all

TOTAL SCORE

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