COPD

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Disclosures

- Hill-Rom, Inc.
- Integrated Diagnostics
- ResMed

Objectives

- Diagnose and characterize COPD
- Recognize symptoms and exacerbations
- Manage stable COPD patients
  - non-pharmacologic and
  - pharmacologic treatment
- Manage Acute Exacerbations of COPD

Guidelines

- GOLD
- ACP/ACCP/ATS/ERS
  - (American College of Physicians, American College of Chest Physicians, American Thoracic Society, European Respiratory Society)

My COPD Guidelines

- Make sure its COPD
- Make sure COPD fully explains the issues
- Eliminate/reduce exposures
- Vaccinate
- If symptoms/flares, treat with meds and rehab
- More symptoms/flares, more treatment
- If there are other problems, treat those too
- Consider surgery/procedures
- The best treatments are the ones patients can afford and are willing/able to use

Global Initiative for Chronic Obstructive Lung Disease

- 2017 Guidelines (4th major version)
- Others 2001, 2006, 2011
- International consensus
- Evidence based
  - A: RCTs; rich body of evidence
  - B: RCTs; important limitations
  - C: Non randomized and Observational studies
  - D: Panel judgement

COPD Definition: GOLD 2017

A common, preventable and treatable disease that is characterized by

persistent respiratory symptoms

and airflow limitation

that is due to airway and/or alveolar abnormalities

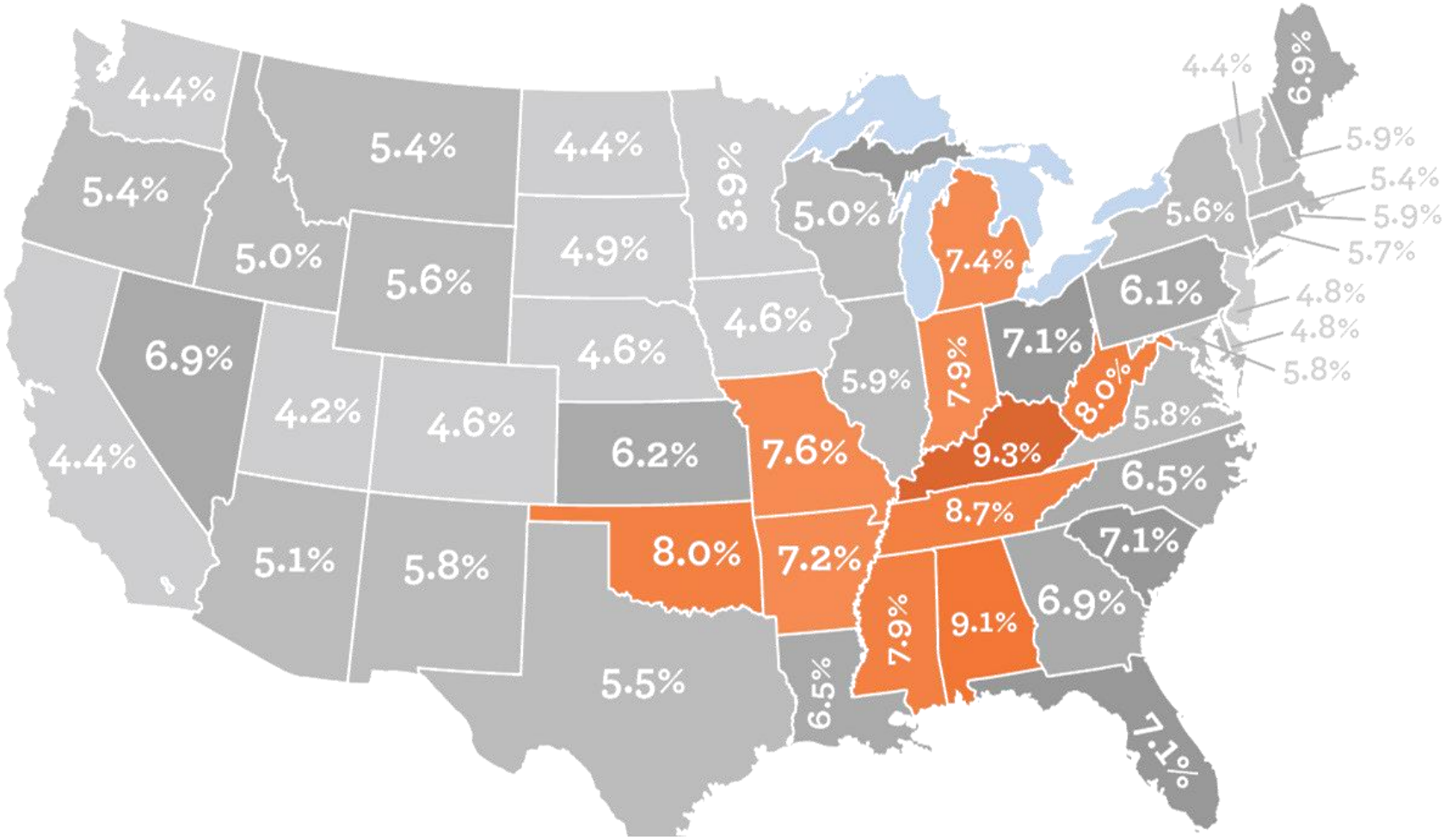
usually caused by a significant exposure to noxious particles or gases

Symptoms

- Dyspnea
- Cough
- Phlegm

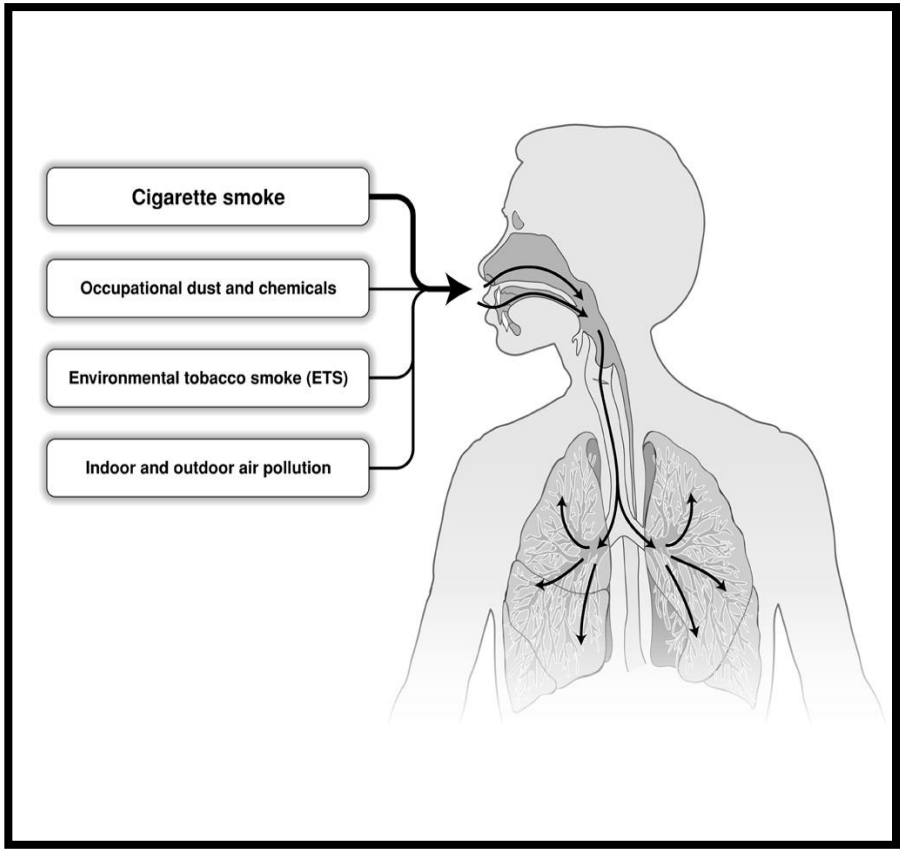
- Can’t breathe
- Can’t take a deep breath
- Wheeze

US COPD Prevalence: CDC BRFSS 2012

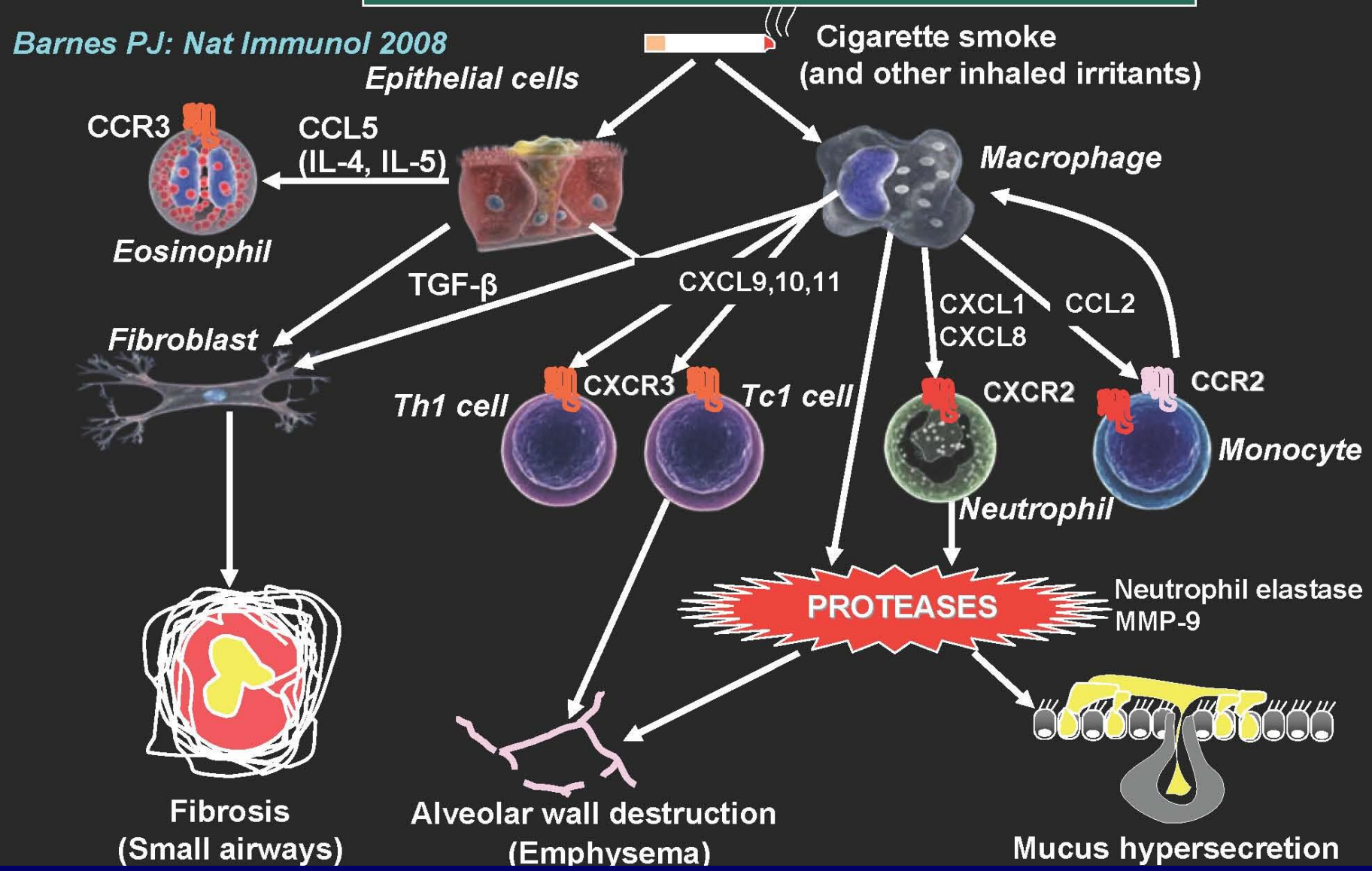


COPD Risk Factors

- Smoking
  - Most common cause, but as many of 1 out of 4 people with COPD never smoked
- Environmental / Occupational exposure
  - Chemicals, dusts, fumes
  - Secondhand smoke, pollutants, particulate matter, bio-mass fuels
- Genetic Factor
  - Alpha-1 antitrypsin (AAT) deficiency



CELLULAR MECHANISMS OF COPD



Professor Peter J. Barnes, MD
National Heart and Lung Institute, London UK

Diagnosis of COPD

SYMPTOMS

shortness of breath

chronic cough

sputum

EXPOSURE TO RISK FACTORS

tobacco

occupation

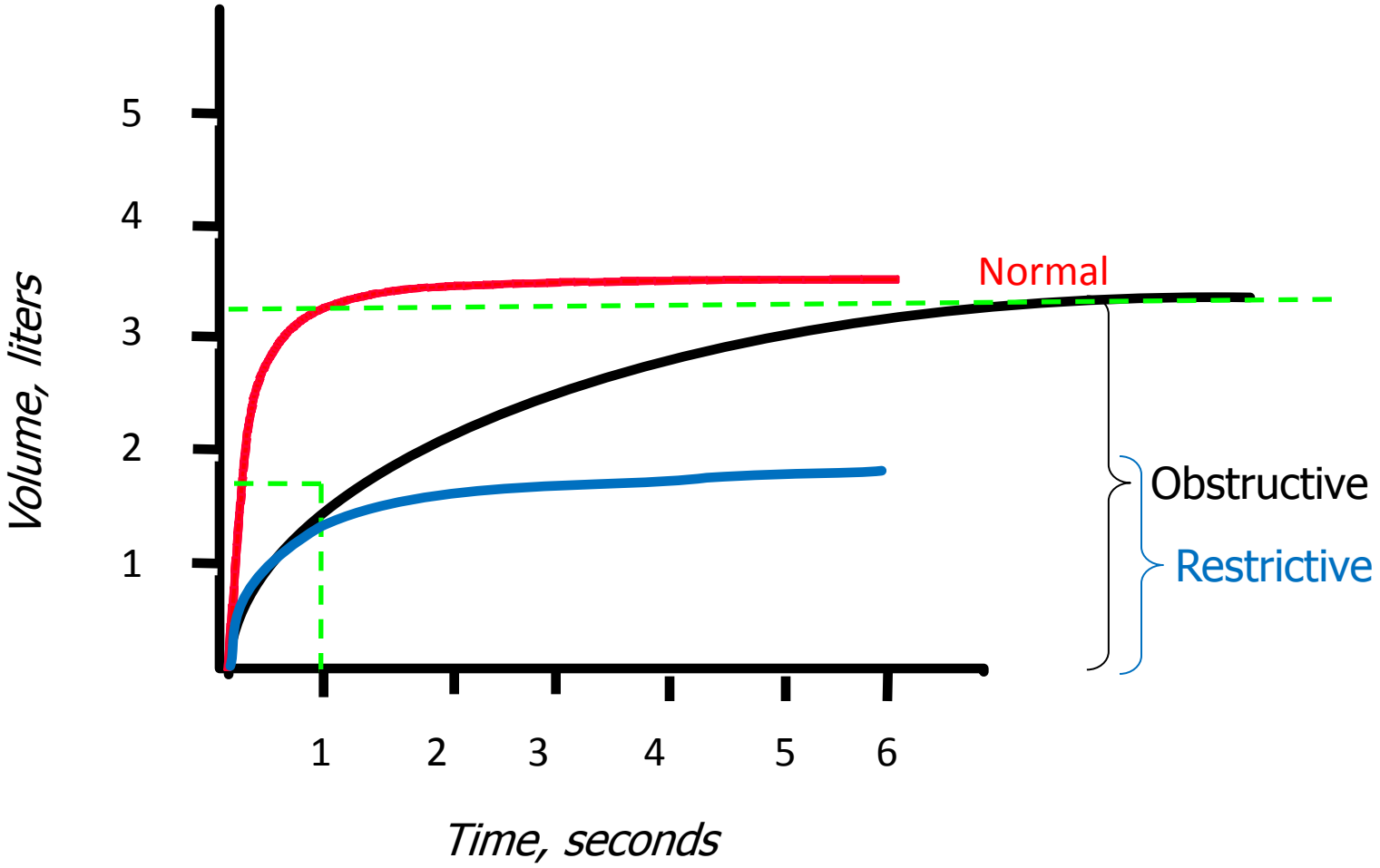
indoor/outdoor pollution

SPIROMETRY: Required to establish diagnosis

Spirometry

- Most reproducible and objective measurement of airflow limitation
- Non invasive
- Readily available
- Volume of air forcibly exhaled from maximum inspiration (FVC)
- Volume of air exhaled during 1st second (FEV1)
- Done before and after bronchodilator

Spirometry: Obstructive vs Restrictive Pattern

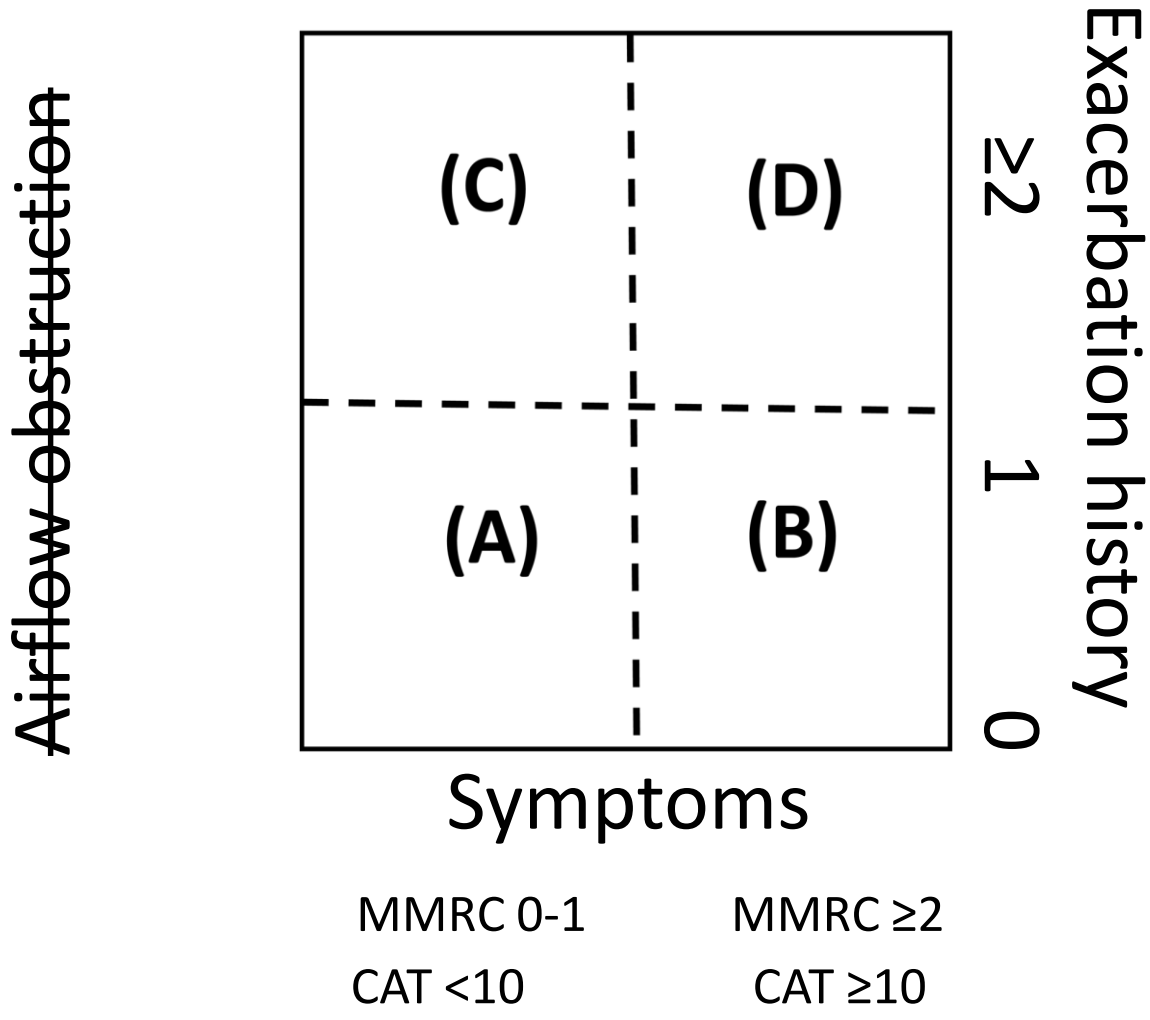


Spirometric criteria for airflow limitation

- FEV1/FVC <0.70
  - Small risk of misclassification
  - Overtreatment risk low given other clinical criteria for diagnosis and treatment
  - Simple for busy clinician
- LLN (lower limit of normal)
- Global lung initiative equations

GOLD ABCD categories

- Based upon symptoms and risk for exacerbations
- Lung function no longer used



GOLD guidelines, goldcopd.org, updated 2017.

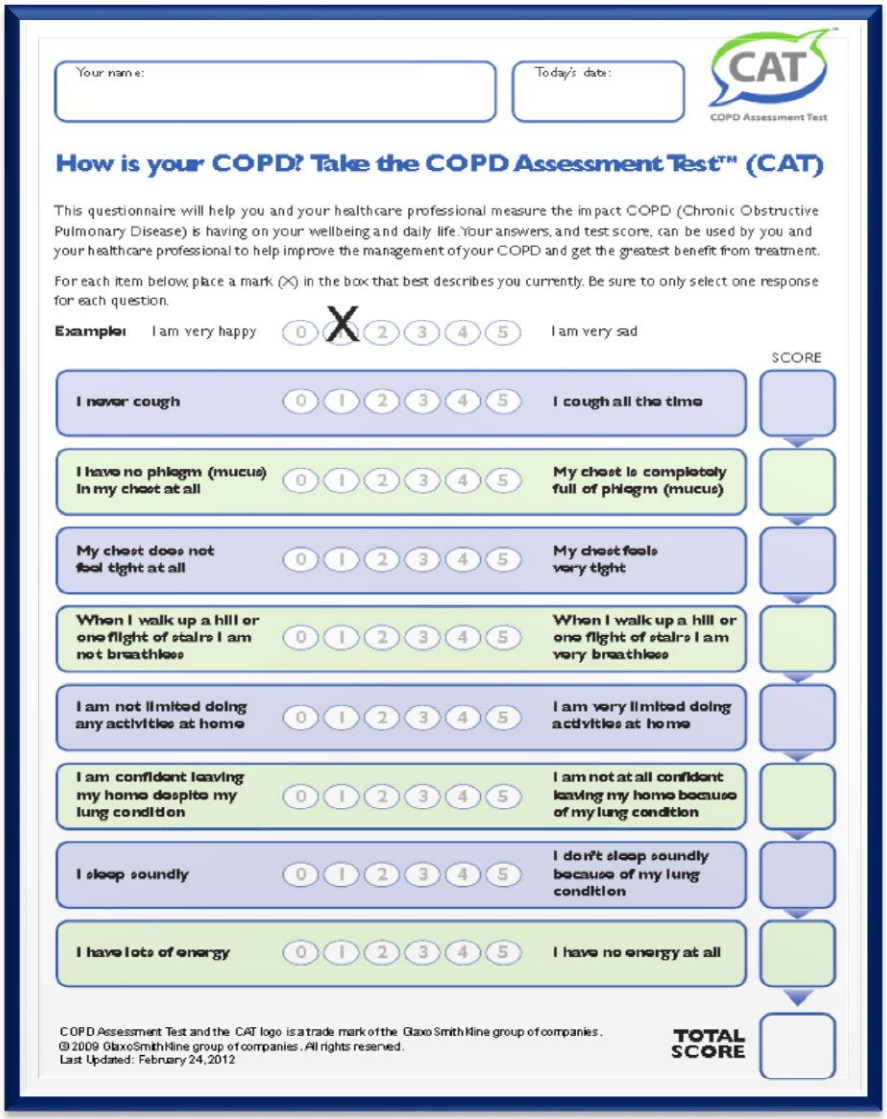
Modified Medical Research Council Questionnaire (MMRC)

Grade	Description of Breathlessness
0	I only get breathless with strenuous exercise
1	I get short of breath when hurrying on level ground or walking up a slight hill
2	On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace
3	I stop for breath after walking about 100 yards or after a few minutes on level ground
4	I am too breathless to leave the house or I am breathless when dressing

COPD assessment test

- 9 questions about symptoms (0-5):
  - Cough
  - Phlegm
  - Chest tightness
  - Breathlessness walking up a hill
  - Activity limitation
  - Confidence leaving home
  - Sleep
  - Energy

- GOLD symptoms >= 10



Your name:

Today's date:

CAT
COPD Assessment Test

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 2 3 4 5 I am very sad

			SCORE
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	

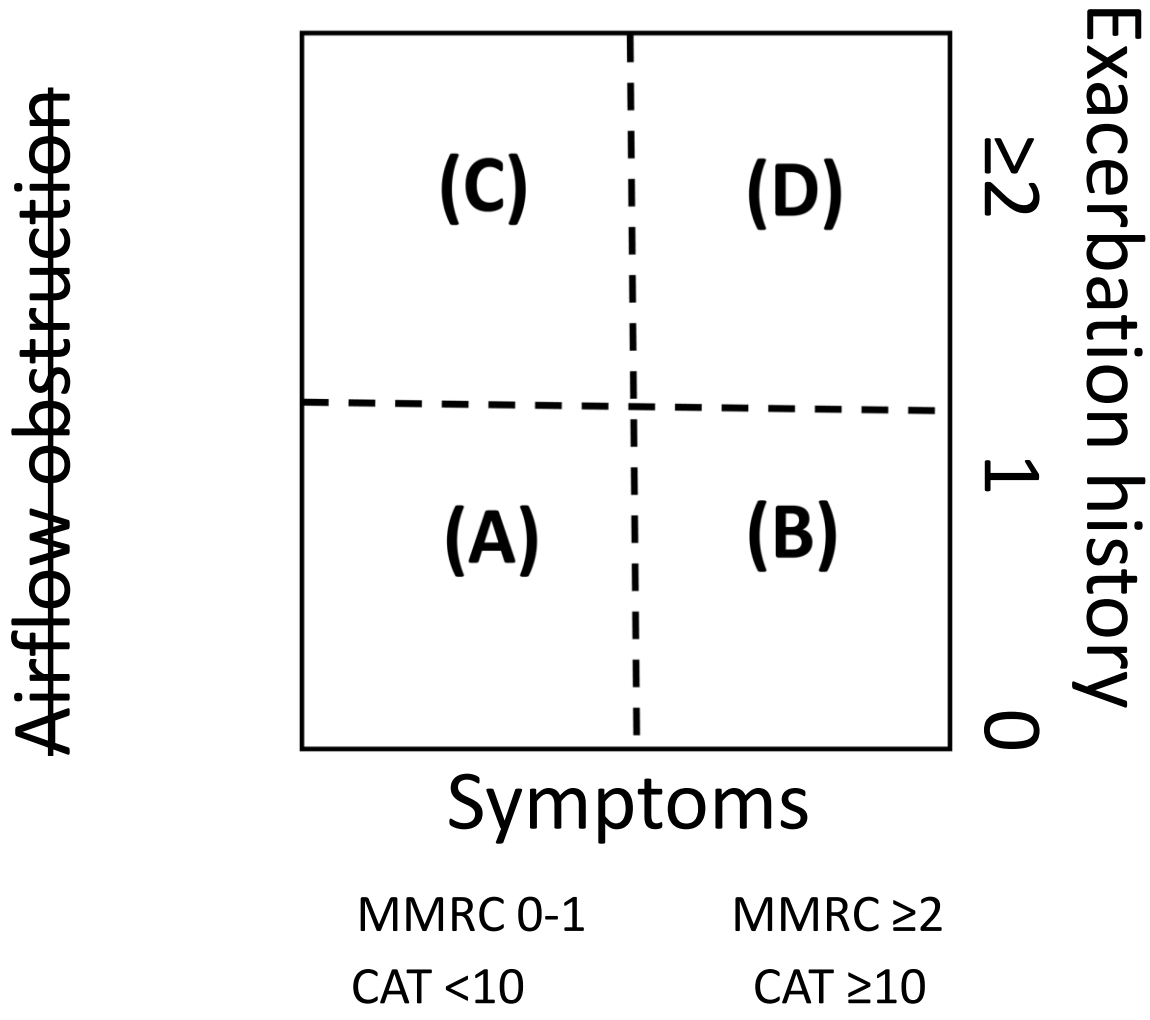
Last Updated: February 24, 2012

Assessment of exacerbation risk

- Acute worsening of respiratory symptoms that result in additional therapy
- 2 or more past year
- Use history, not FEV1
- Serum eosinophils may predict

GOLD ABCD categories

- Based upon symptoms and risk for exacerbations
- Lung function no longer used



GOLD guidelines, goldcopd.org, updated 2017.

Management of Stable COPD

- Based on individual assessment of symptoms and exacerbation risk
- Treat to:
  - Reduce symptoms
  - Minimize risk of future exacerbations

Non-pharmacologic Care

PATIENT GROUP	ESSENTIAL	RECOMMENDED	DEPEND ON LOCAL GUIDELINES
A	SMOKING CESSATION (include pharma treatment)	Physical activity	Flu vaccine Pneumococcal vaccine
B, C, D	Same as above plus Pulmonary Rehab	Same as above	Same as above

Identify and Reduce Exposure to Risk Factors

- Smoking cessation (Evidence A)
  - Counseling
  - Pharmacotherapies (NRT, varenicline, buproprion)
- Efficient ventilation, non-polluting cook stoves (Evidence B)
- Advise to avoid continued exposures to potential irritants (Evidence D)

Vaccines

- Influenza (Evidence A)
- Pneumococcal (PPSV23) < 65 yo, FEV1 <40% (Evidence B)
- Pneumococcal (PCV13) >=65 yo (Evidence B)

- I like to offer Pertussis as well

Oxygen
(Evidence A)

- PaO2 < 55 mmHg or SaO2 < 88%, or
- PaO2 < 60 mmHg with RHF or ⇧RBC
- Reassess in 60-90 days
- Don’t routinely treat lesser desats or exercise desat

Pulmonary Rehabilitation

- Tailored after evaluation
- Includes:
  - Exercise training
  - Education
  - Self management intervention targeting behavior change
- Typically 6-8 weeks +

Pulmonary Rehabilitation Benefits

- Improves dyspnea, health status and exercise tolerance in stable patients (Evidence A)
- Reduces hospitalization if recent exacerbation (<= 4 weeks) (Evidence B)

Interventional Therapy

- Lung Volume Reduction Surgery: Improved survival with upper lobe predominant emphysema and low exercise capacity after rehab (Evidence A)
- Bullectomy: Selected patients associated with improved dyspnea, lung function, exercise tolerance (Evidence C)
- Lung transplant: Very severe, selected. Improved QOL and functional capacity (Evidence C)
- Bronchoscopic valves and coils: Selected patients, advance emphysema; improves exercise, health status and lung function (Evidence B)

Medication terminology

- SABA: Short-acting $Beta_2$ Agonist
- SAMA: Short-acting Muscarinic Antagonist
  - AKA: Anticholinergic
- LABA: Long-acting $Beta_2$ Agonist
- LAMA: Long-acting Muscarinic Antagonist
- ICS: Inhaled Corticosteroid
- OCS: Oral Corticosteroid

Key points for inhaled drugs

- Choice based on access, cost, prescriber, patient ability and preference
- Essential to provide instructions and demonstration
- Re-check at each visit

Key points: Bronchodilators

- LABAs and LAMAs preferred over short acting, unless only occasional dyspnea (Evidence A)
- Start on 1 or 2 agents. Escalate to 2 if 1 is not enough (Evidence A)
- Inhaled not oral (Evidence A)
- Theophylline only if others not available or affordable (Evidence B)

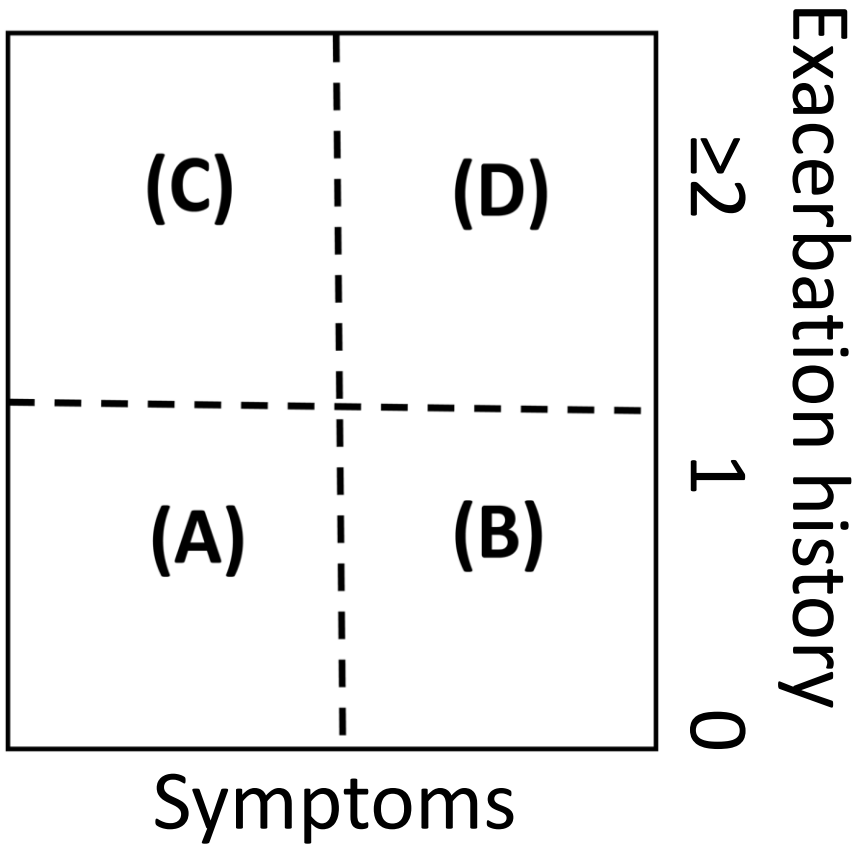
Key points: Anti-inflammatories

- ICS monotherapy not recommended (Evidence A)
- Consider ICS with LABA if exacerbations despite use of BD (Evidence A)
- Long term oral steroids not recommended (Evidence A)

Key points: Not recommended

- Antitussives (Evidence C)
- Drugs approved for PPH in patients with PH from COPD (Evidence B)
- Statin therapy to prevent exacerbations (Evidence A)

GOLD ABCD categories



GOLD guidelines, goldcopd.org, updated 2017.

Pharmacologic Therapy: Group A (Low symptoms, Low risk)

- Offer a bronchodilator
- Either short or long acting
- Continue if symptom benefit

Pharmacologic Therapy: Group B (High symptoms, Low risk)

- Start a bronchodilator
- Long acting superior to short acting
- Either LAMA or LABA
- If symptoms still, add other class
- If severe symptoms, can start on LAMA/LABA

Pharmacologic Therapy: Group C (Low symptoms, High risk)

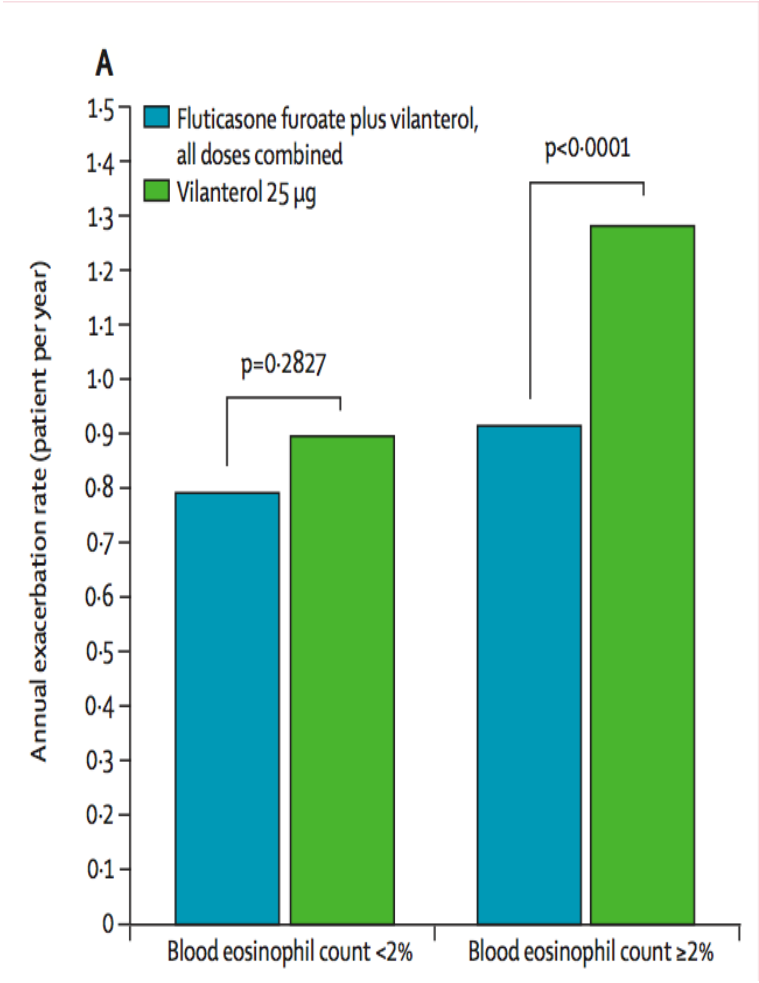
- Start a long acting bronchodilator
- LAMA preferred
- If exacerbations still:
  - LAMA/LABA, or
  - LABA/ICS
- Pneumonia risk in some with ICS

Pharmacologic Therapy: Group D (High symptoms, High risk)

- Start LABA/LAMA
- LABA/LAMA preferred over LABA/ICS (unless asthma overlap or serum eosinophils)
- If exacerbations still:
  - LABA/LAMA/ICS, or
  - LABA/LAMA
- If exacerbations on LABA/LAMA/ICS:
  - Roflumilast (FEV1 <50% and chronic bronchitis)
  - Macrolide (Azithromycin)

Eosinophilia and response to inhaled corticosteroids

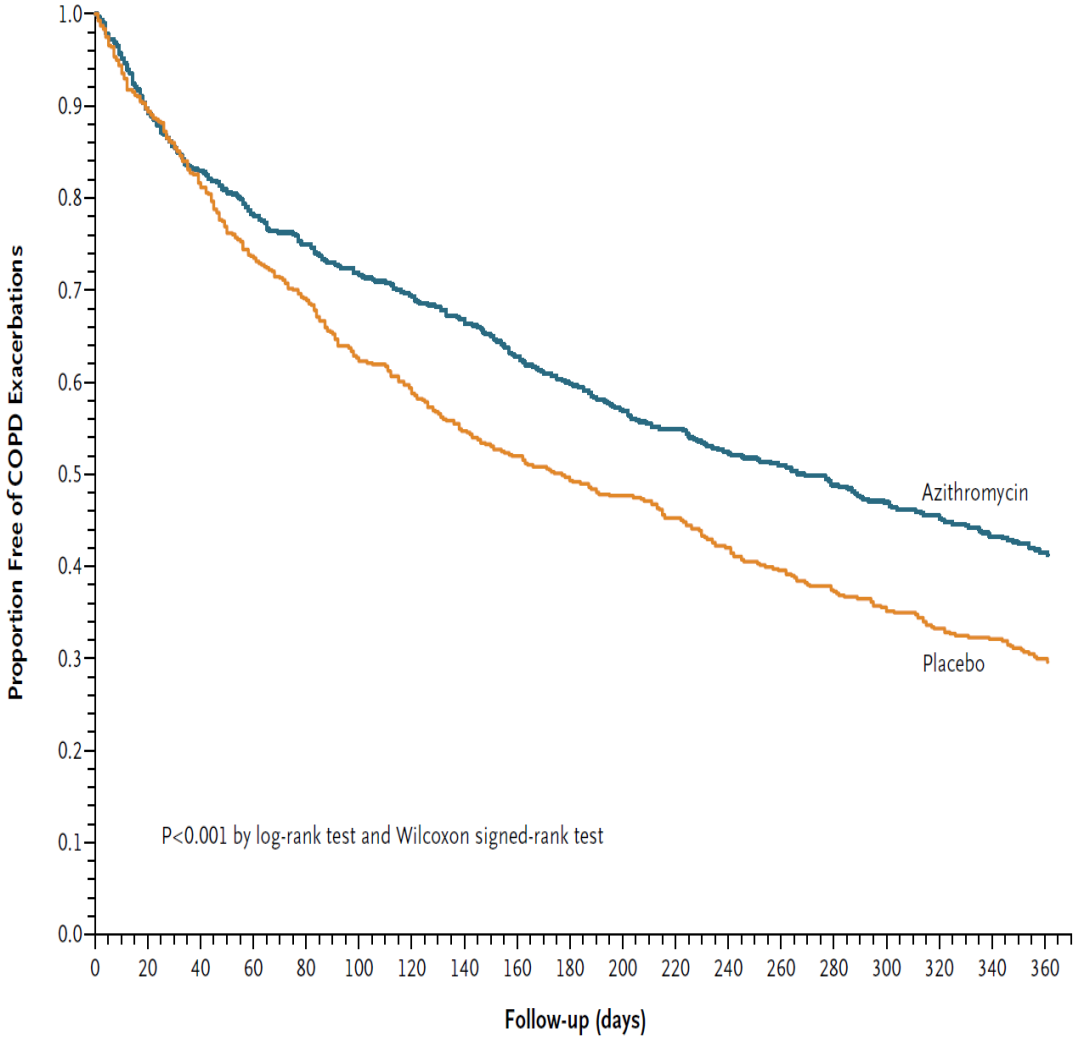
- Post-hoc analysis of data from 2 RCTs, including 3177 patients total
- Vilanterol alone vs varying doses of fluticasone
- Stratified by eosinophilia
- Significant reduction in exacerbations for all groups with ICS in the group with eosinophilia
- In vilanterol only group there was increase in rate of exacerbations with increasing eosinophil percentage



Pascoe et al. Lancet Respir Med, 2015. 3: 435-42

Azithromycin for “frequent exacerbators”

- Dose: 250mg daily
- RCT of 1,577 participants (enriched for exacerbations)
- Risk for exacerbation in azithro group lower vs placebo (HR 0.73)
- SGRQ score improved more in azithro group: 2.8 +/- 12.1



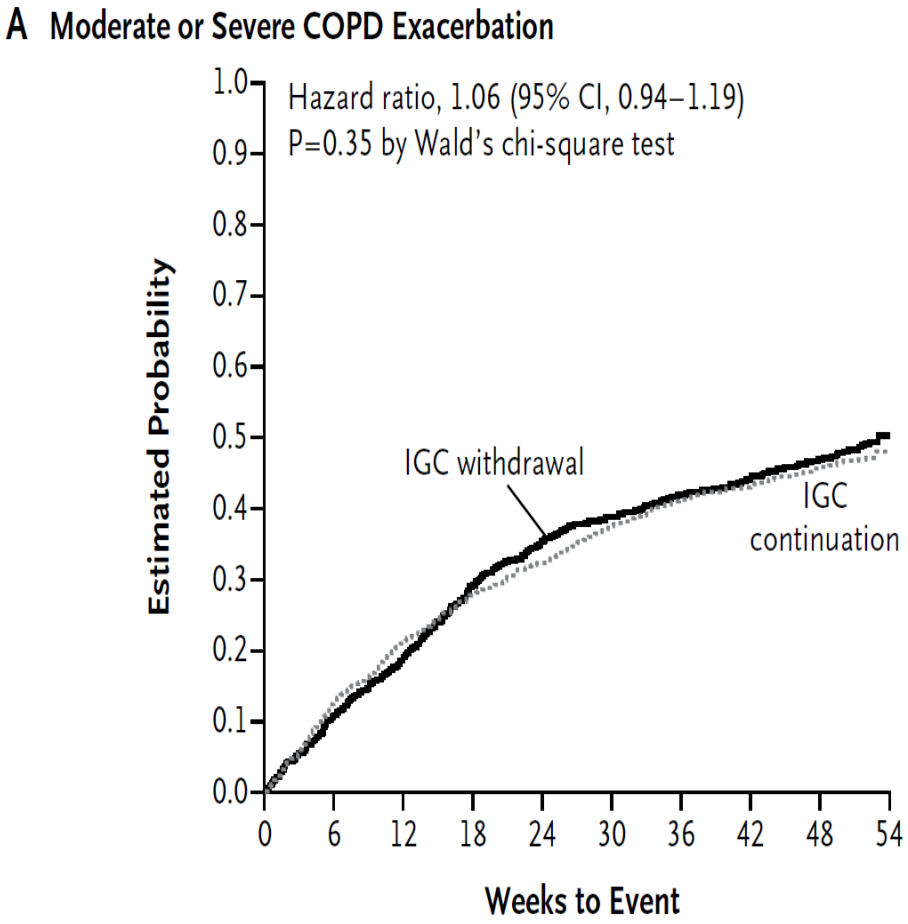
Albert et al, NEJM, 2011.

Titrate down when possible

- GOLD propose “a personalization of initiating and escalating/de-escalating treatment”
- “Only partially from evidence generated in randomized controlled trials.”

Withdrawal of ICS

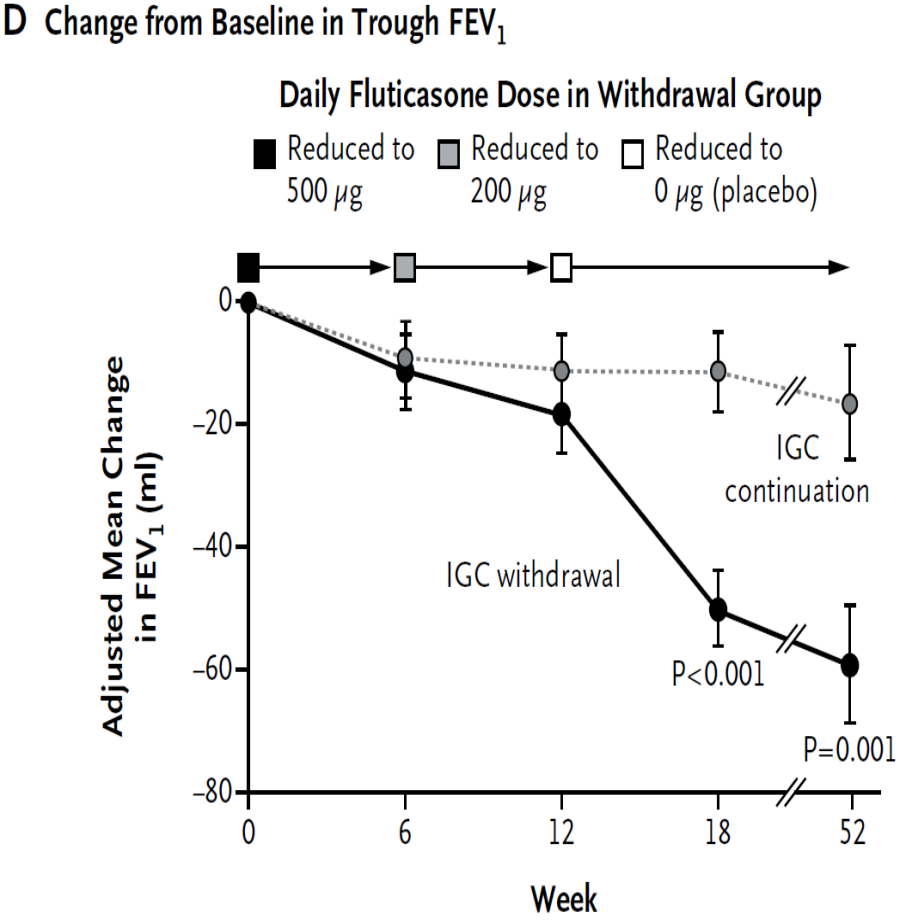
- 12- month RCT of 2,485 patients on “triple therapy”
- Moderate to severe COPD with exacerbation in past year
- Non-inferiority study, margin set at HR 1.20 (arbitrary)
- Non-inferiority met for primary outcome, HR 1.06 (0.94-1.19)



Magnussen et al. NEJM, 2015.

Withdrawal of ICS

- Some benefit noted for quality of life outcomes and lung function in group continuing ICS



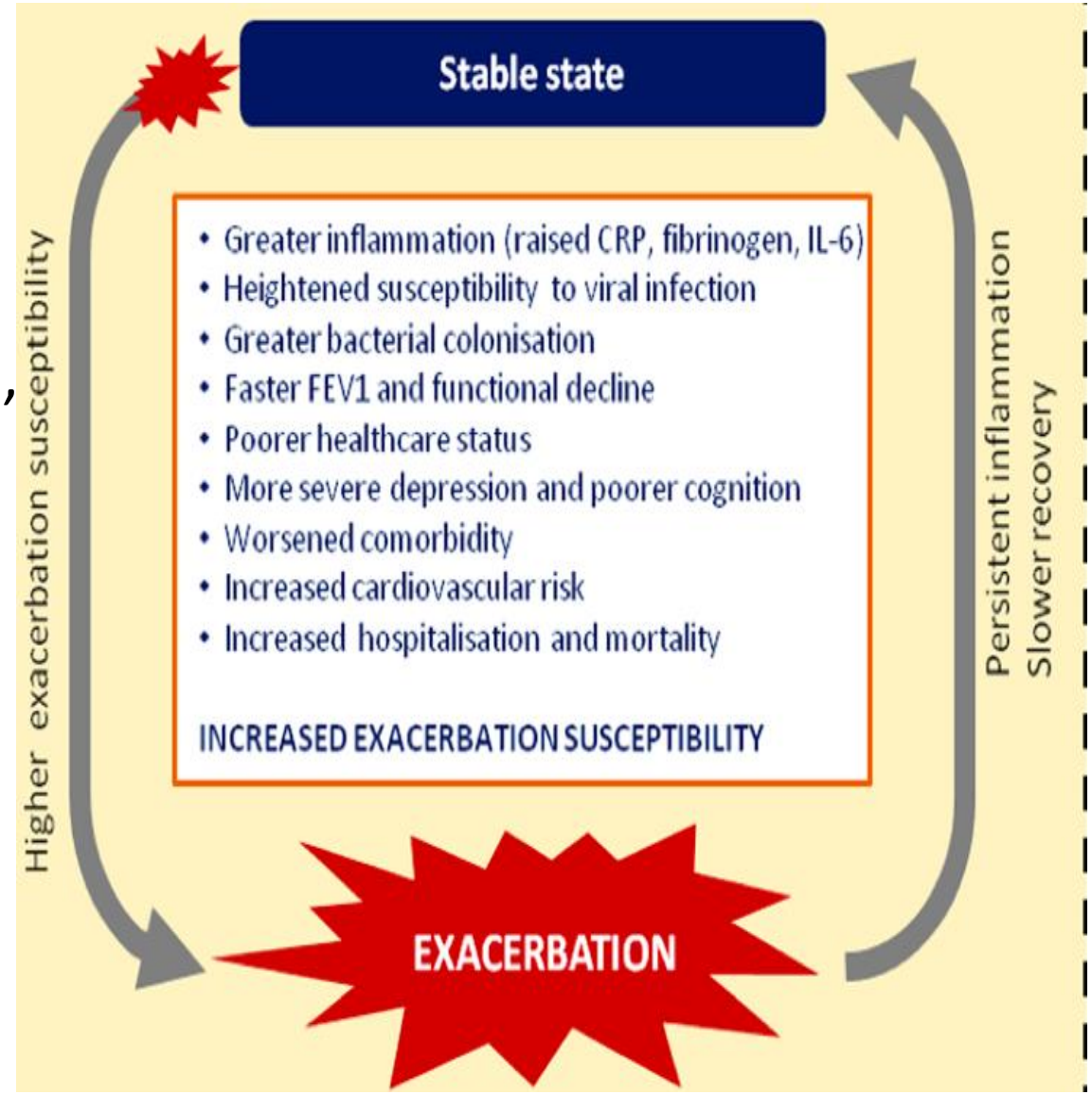
Magnussen et al. NEJM, 2015.

Management of Exacerbations

- Acute worsening of respiratory symptoms
- Goals are to minimize impact and prevent future events

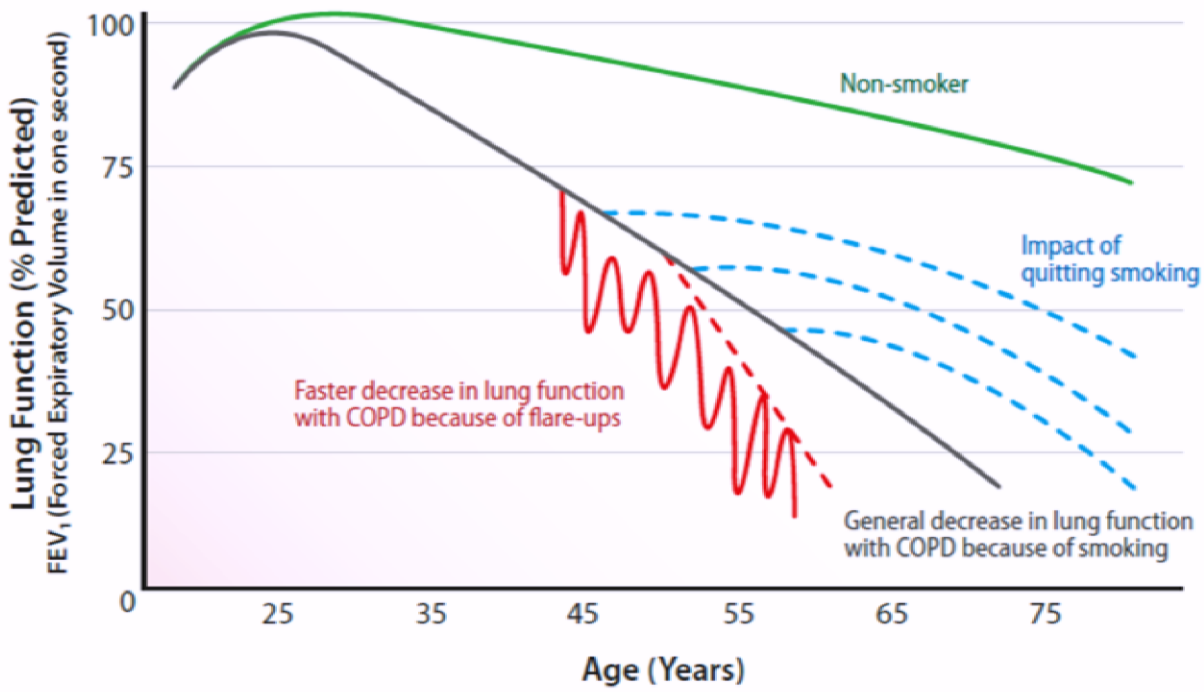
Frequent Exacerbator phenotype

- 2+ exacerbations per year
- Triggers for exacerbations: Bacteria, viruses, irritants
- Have higher burden of comorbidities, esp CV
- Outcomes:
  - Poorer QOL and health status
  - Faster FEV1 decline
  - More healthcare utilization
  - Higher mortality



Wedzicha JA et al. BMC Med. 2013 Aug 14;11:181

How Your Lung Function Changes as You Age



Modified by Mannino, D.M., MASAC Chair, COPD Foundation, 2011. Fletcher C, Peto R. 1977. The Natural History of Chronic Airflow Obstruction. BMJ1977;i:1645-8.
Wedzicha, J., Wilkinson, T. 2008. Impact of Chronic Obstructive Pulmonary Disease Exacerbations on Patients and Payers. American Thoracic Society 3:218-221.

Healthy Interactions

COPD FOUNDATION

Key Points: Management of Exacerbations

- SABA +/- SAMA initially (Evidence C)
- Systemic Corticosteroids improve lung function, shorten recovery and hospitalization (Evidence A)
  - 5-7 days Prednisone 40 mg
- Antibiotics can shorten recovery, reduce risk of relapse, treatment failure (Evidence B)
- Non-invasive ventilation for acute respiratory failure (Evidence A)

Bronchodilators

- No high quality RCT evidence
- MDI same as nebulized
- One puff every hour X 2-3
- Then every 2-4 hours
- Continue or start long acting agents

Systemic Corticosteroids

- Shorten recovery time and improve lung function and oxygenation
- Prednisone 40 mg X 5 days
- Oral same as IV

Antibiotics

- Still controversial
- Give if 2 or 3 of these:
  - Increased dyspnea
  - Increase sputum volume
  - **Sputum purulence**
- Treat 5-7 days
- Many choices of agent

Non-invasive Ventilation

- Indications
  - Respiratory acidosis
  - Severe dyspnea with signs of muscle fatigue and/or increased work of breathing
  - Refractory hypoxemia

COPD and Co-Morbidity

- Common to have other health conditions
- Look out for:
  - Cardiovascular disease
  - Depression and anxiety
  - Osteoporosis
  - Metabolic disorders
  - Lung Cancer
- Treat per other care guidelines
- Consider pharmacist input

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