

**COPD and the Management of  
Respiratory Disease in the Elderly**

**Eric G. Tangalos, MD, FACP, AGSF, CMD  
Professor of Medicine  
Mayo Clinic**

---

---

---

---

---

---

---

---

**Objectives**

- Evaluate interdisciplinary strategies to overcome common barriers that hinder the optimal management of COPD in health care settings
- Discuss the key components of a facility-wide approach to managing respiratory illness
- Implement the appropriate use of nebulizers, MDIs and oxygen for long-term care residents

---

---

---

---

---

---

---

---

**Age Related Pulmonary  
Alterations**

- Reduced airway size
- Shallow alveolar sacs
- Reduced chest wall compliance
- Intercostal muscle atrophy
- Reduction in diaphragmatic strength by 25%

---

---

---

---

---

---

---

---

### **Major Pulmonary Diseases in Older Persons**

- Asthma
- Chronic obstructive pulmonary disease
- Obstructive sleep apnea
- Idiopathic pulmonary fibrosis
- Pulmonary thromboembolism
- Pneumonia
- Lung cancer

---

---

---

---

---

---

---

---

### **Difficulties in Recognizing Respiratory Symptoms**

- A common misperception is that older people tend to overestimate or exaggerate respiratory symptoms—the opposite is more often true
- Older people often have more than one explanation for their problems:
  - Dyspnea, cough, and wheezing may overlap
  - The causes may include a combination of diseases such as asthma or emphysema, obstructive sleep apnea, heart failure, and GERD

---

---

---

---

---

---

---

---

### **Influenza The Vaccine is Still a Great Idea**

- Given yearly
  - Vaccine is a best prediction of what might be dominant virus for the coming season
- Nursing home rates of immunization
  - Residents 99%
  - Staff 80-98%
- AMDA recommends mandatory immunization for every long term care health worker with direct patient contact

---

---

---

---

---

---

---

---

### Influenza

- Antiviral treatment is recommended **as early as possible** for any patient with confirmed or suspected influenza who
  - Is hospitalized
  - Has severe, complicated, or progressive illness
  - Is at higher risk for influenza complications
    - THIS WOULD INCLUDE ALMOST EVERY NURSING HOME PATIENT

---

---

---

---

---

---

---

---

### Influenza

- Because influenza vaccination is not 100% effective in preventing influenza, a history of influenza vaccination does not rule out the possibility of influenza virus infection in an ill patient with clinical signs and symptoms compatible with influenza
- Treatment should not wait for laboratory confirmation of influenza

---

---

---

---

---

---

---

---

### Influenza Outbreaks

- For control of outbreaks in long-term care facilities and hospitals, CDC recommends antiviral chemoprophylaxis for a minimum of 2 weeks and up to 1 week after the most recent known case was identified

---

---

---

---

---

---

---

---

### Antiviral Agents

- Four licensed prescription influenza antiviral agents are available in the United States
  - amantadine
  - rimantadine
  - zanamivir
  - oseltamivir

---

---

---

---

---

---

---

### Antiviral Agents

- Zanamivir and oseltamivir are related antiviral medications in a class of medications known as neuraminidase inhibitors
  - These two medications are active against both influenza A and B viruses. They differ in pharmacokinetics, safety profiles, routes of administration, approved age groups, and recommended

---

---

---

---

---

---

---

### Antiviral Agents

- Amantadine and rimantadine are related antiviral drugs in a class of medications known as adamantanes
  - These medications are active against influenza A viruses but not influenza B viruses
  - In recent years, widespread adamantane resistance among influenza A (H3N2) virus strains has made this class of medications less useful clinically

---

---

---

---

---

---

---

### **Pneumoccal Vaccine The Sad Truths**

- Once in a lifetime is probably sufficient
  - If immunized prior to age 65 vaccine can be given again
- Most effective in patients up to age 75
- Significant loss in effectiveness past the age of 85

---

---

---

---

---

---

---

---

### **COPD Epidemiology**

- Affects ~15 million people in the US
- 4th most common cause of death after heart disease, cancer, and stroke
- Prevalence and mortality rate are increasing, especially in older people
- Morbidity and mortality from COPD accounts for more than \$15 billion per year in US medical care expenditures, mainly due to hospitalization

---

---

---

---

---

---

---

---

### **Dyspnea**

- Common causes to consider are COPD, cardiac disease, asthma, interstitial lung disease, and deconditioning
- Does not necessarily correlate with oxygenation or pulmonary function tests
- Thorough H & P can help tailor testing and empirical treatment choices
- The language a patient uses to describe dyspnea can be revealing
  - "Heavy" may imply cardiac dysfunction or deconditioning
  - "Tight" may imply angina or asthma

---

---

---

---

---

---

---

---

### Case Presentation

- Ninety one year old retired Mayo physician
  - Severe kyphosis
  - No other etiology established
    - Work up was extensive
    - Including subspecialty consultations

---

---

---

---

---

---

---

---

### Case Presentation

- Ninety one year old retired Mayo physician
  - Dyspnea with minimal exertion including talking
    - No dyspnea while at rest
  - No drop in oxygen saturation
  - No significant pulmonary function abnormalities
  - Normal diaphragmatic function

---

---

---

---

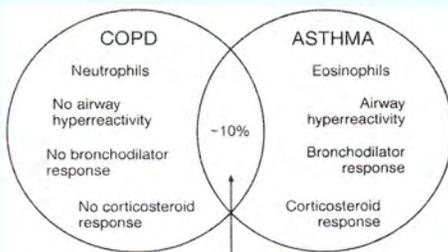
---

---

---

---

### Asthma vs. COPD



Barnes, P.J. Chest 117(2) Feb 2000; 105 (clinical)  
Jeffery PK. AJRCCM 2001; 164: 528-538 (pathological)

---

---

---

---

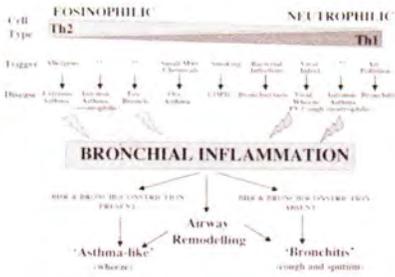
---

---

---

---

## Pathophysiologic Spectrum of Airway Inflammation



Wardlaw AJ et al. Clinical Science 2002;103:201-11

---

---

---

---

---

---

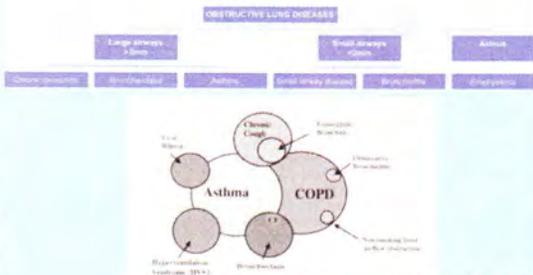
---

---

---

---

## Clinical Spectrum of Obstructive Airway Disorders



Wardlaw AJ et al. Clinical Science 2002; 103: 201-11

---

---

---

---

---

---

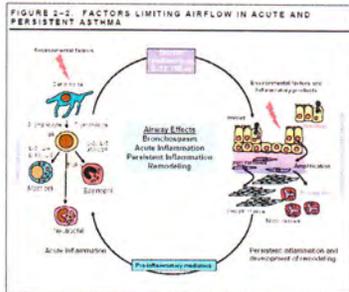
---

---

---

---

## Pathophysiology of Asthma



Trigger(s)  
Injury  
Inflammation  
acute  
chronic  
Remodeling

Source: Adapted from Wardlaw AJ et al. Clinical Science 2002; 103: 201-11. The illustration depicts the pathophysiology of asthma, showing the cycle between acute inflammation and persistent inflammation and development of remodeling.

---

---

---

---

---

---

---

---

---

---

### Co-Morbidities in COPD

- Cardiovascular risks/disease (30% of mortality)
- Muscle weakness and deconditioning (20-30%)
- Depression/anxiety (20-50%)
- Osteoporosis (10-30%)
- Anemia (10-15%)

---

---

---

---

---

---

---

### COPD Diagnosis

- Wheezing = best predictor of airflow limitation
  - Patients with obstructive airflow limitation are 36 times more likely to have wheezing than are patients without this problem
- Other predictors:
  - Barrel-shaped chest
  - Hyper-resonance on percussion
  - Forced expiratory time > 9 seconds measured during the clinical examination

---

---

---

---

---

---

---

### GOLD Guidelines for COPD

(1 of 2)

Key Factors for Considering a Diagnosis of COPD	
Dyspnea	Progressive or worsens over time Worse with exercise Persistent (present daily) Described as "increased effort to breathe," "heaviness," "air hunger," "gasping"
Chronic cough	May be intermittent and nonproductive
Sputum production	Any pattern of chronic sputum production can indicate COPD
Risk factors	Tobacco smoke Occupational dusts and chemicals Smoke from home cooking and heating fuel

---

---

---

---

---

---

---

## GOLD Guidelines for COPD (2 of 2)

### Spirometric Classification of COPD (FEV<sub>1</sub>/FVC < 70)\*

Mild	FEV <sub>1</sub> ≥ 80% predicted
Moderate	50% ≤ FEV <sub>1</sub> < 80% predicted
Severe	30% ≤ FEV <sub>1</sub> < 50% predicted
Very severe	FEV <sub>1</sub> < 30% predicted or FEV <sub>1</sub> < 50% predicted and chronic respiratory failure

\*The criterion FEV<sub>1</sub>/FVC < 70 may over-diagnose COPD in older, nonsmoking adults. Some experts recommend using FEV<sub>1</sub>/FVC < 65 after age 70, because the changes seen may be related to structural changes that occur in the airways with increasing age

---

---

---

---

---

---

---

---

## COPD in the Nursing Home

- No spirometry
- O<sub>2</sub> saturation valuable but not diagnostic
- History can be obtained
  - Smoking past
  - Wheezing symptoms
  - Shortness of breath at present

Zarowitz et al. Development and validation of a screening tool for COPD in nursing home residents. JGIM 2011;12:668-674.

---

---

---

---

---

---

---

---

## COPD in the Nursing Home

1. Does the resident have a greater than or equal to 19 pack-year smoking history?
2. Does the resident have shortness of breath at rest or on exertion?
3. Does the resident have a diagnosis of asthma?

A positive response to any one of the three is supportive of the diagnosis of COPD

---

---

---

---

---

---

---

---



### **Nebulizer vs MDI**

- Power requirements, higher drug dosing, and the costs of maintaining nebulizers and their peripheral equipment are particularly burdensome for patients in developing regions of the world

---

---

---

---

---

---

---

---

### **Pulmonary Rehabilitation**

- Acapella spirometer



---

---

---

---

---

---

---

---

### **Pulmonary Rehabilitation**

- Peak flow meter



---

---

---

---

---

---

---

---

## Reference

- A Comparison of Albuterol Administered by Metered-Dose Inhaler and Spacer With Albuterol by Nebulizer in Adults Presenting to an Urban Emergency Department With Acute Asthma
- Newman KB, Milne S, Hamilton C, Hall K
- Chest 2002, 121:1036-1041

---

---

---

---

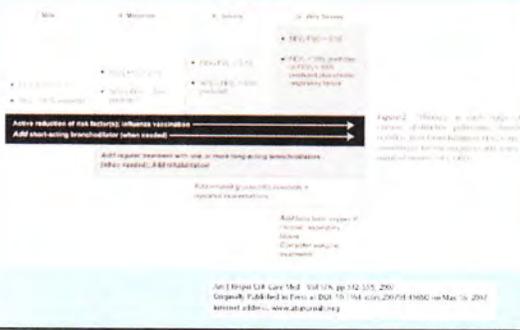
---

---

---

---

## GOLD Guidelines for Stable COPD




---

---

---

---

---

---

---

---

## COPD Pharmacotherapy

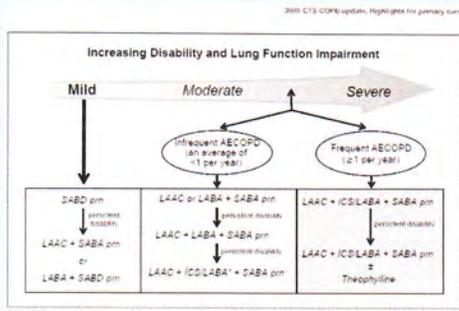


Figure 24. Pharmacotherapy for COPD pharmacotherapy. In: Global Strategy for the Diagnosis, Management, and Prevention of COPD. 2011. Available at: <http://www.goldcopd.org>

---

---

---

---

---

---

---

---

## Smoking Cessation Slows Decline in Lung Function at Any Age

The "FIVE A's"

From the Agency for Health Care Policy & Research

- Ask patients about use of tobacco at every visit
- Assess readiness to quit
- Advise patients to quit
- Assist patients in the quit attempt with aids such as a local cessation program and pharmacologic agents such as bupropion or nicotine replacement
- Arrange both a quit date and a follow-up visit or contact to discuss the quit attempt

---

---

---

---

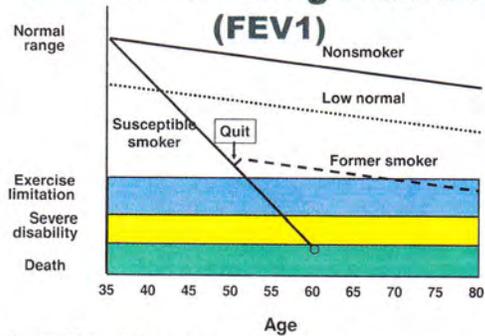
---

---

---

---

## Effects on Lung Function (FEV1)



Fletcher & Peto: *Br Med J* 1:1645, 1977  
Scanlon et al: *Am J Respir Crit Care Med* 161:381-90, 2000

---

---

---

---

---

---

---

---

## Written COPD Action Plan

Common Elements

- Prescriber and contact information
- Symptom Monitoring (Subjective)
- Medication Use
  - Controller and Rescue
  - Short burst steroid +/- antibiotic
- Other support: vaccination, oxygen, rehabilitation

---

---

---

---

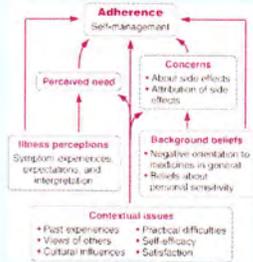
---

---

---

---

## Adherence & Patient-Provider Communication



Home R. Chest 2006; 130 (suppl): 65S-72S

**Table 2**  
Model for Communicating Evidence for Participatory Decision-Making

- Step 1** Understand the patient's and family members' responses and expectations.
- Step 2** Build partnerships using active listening, empathy, and pausing to check patient understanding.
- Step 3** Provide evidence, including a balanced discussion of uncertainties.
- Step 4** Present recommendations:
- Differentiate evidence-based recommendations from personal clinical experience or bias.
- Step 5** Check for understanding and agreement:
- Maintain an open door for patient questions.
  - Provide resources, as needed (brochures, printed handouts, etc.).
- Aschichynsky et al.

Epstein RM et al. JAMA 2004; 291: 2359-66

---

---

---

---

---

---

---

---

---

---

## Other Interventions for COPD

- Oxygen therapy
- Exercise training
- Respiratory therapy and education
- Treatment for major depression and anxiety
  - Present in 40% of COPD patients
  - Anxiety may lead patients to seek help in ER or be admitted to the hospital

---

---

---

---

---

---

---

---

---

---

## Challenges in O2 Therapy

- Medicare reimbursement, managed care providers
- Coverage for light-weight devices, liquid O2
  - Improved activity level, exercise tolerance, QOL, survival
- Use of O2 for exercise desaturation alone
- Nocturnal O2 for varying degrees of desaturation
- Cosmetic options with eyeglasses
- Portable and in-flight oxygen devices

---

---

---

---

---

---

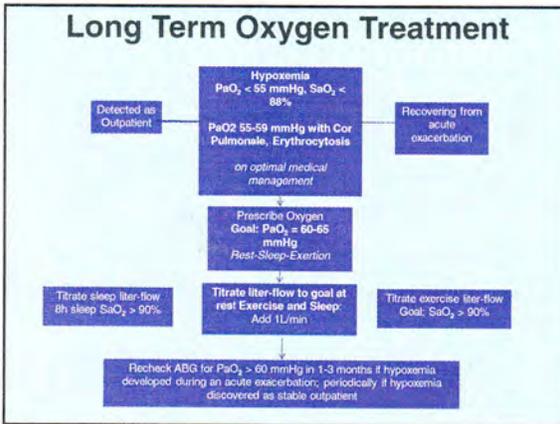
---

---

---

---

## Long Term Oxygen Treatment



---

---

---

---

---

---

---

---

## Chronic Cough

- Usually has a benign cause
- The most common causes are postnasal drip, asthma, and GERD
- A reasonable approach to treatment is empiric treatment for these conditions
- A combination of these conditions may contribute, so treatment for multiple causes may be warranted when single therapies are ineffective

---

---

---

---

---

---

---

---

## Wheezing

- Common causes include:
  - Asthma
  - Postnasal drip
- Pulmonary edema associated with heart failure may present as "cardiac asthma"
- Airway hyperresponsiveness from chronic bronchitis is not uncommon in older patients with a history of wheezing and sputum and tobacco use

---

---

---

---

---

---

---

---

### Asthma Epidemiology

- 5%–10% of people  $\geq 65$  meet the criteria for obstruction and bronchial hyperreactivity
- Asthma is under-recognized and under-treated in older adults
- 50% of all asthma deaths are in people  $\geq 65$

---

---

---

---

---

---

---

### Asthma Treatment

- ICS or other controller drugs, such as leukotriene receptor antagonists, are the mainstay of therapy
- Use the lowest effective dose
- $\beta$ -agonists should be used as needed as reliever medication
- Instruct in the proper use of PEF monitoring (because of the older person's decreased perception of bronchoconstriction)

---

---

---

---

---

---

---

### Commonly Used Inhaled Medications (1 of 3)

Class of Drug	Generic Name	Trade Name
$\beta$ -Agonists	Albuterol	Proventil
		Ventolin
	Levalbuterol	Xopenex HFA
	Formoterol*	Foradil
	Pirbuterol	Maxair
	Salmeterol	Serevent

\*Powder for oral inhalation

---

---

---

---

---

---

---

**Commonly Used Inhaled Medications  
(2 of 3)**

Class of Drug	Generic Name	Trade Name
Corticosteroids	Beclomethasone	Beclovent
		Vanceril
		QVAR
	Budesonide	Pulmicort
	Flunisolide	AeroBid
	Fluticasone	Flovent
	Triamcinolone	Azmacort

---

---

---

---

---

---

---

---

**Commonly Used Inhaled Medications  
(3 of 3)**

Class of Drug	Generic Name	Trade Name
Combination of ICS and long-acting $\beta$ -agonist	Fluticasone propionate and salmeterol	Advair
	Budesonide and formoterol	Symbicort
Others	Cromolyn	Intal
	Ipratropium	Atrovent
	Tiotropium*	Spiriva
	Nedocromil	Tilade
	Albuterol-ipratropium	Combivent

\*Powder for oral inhalation

---

---

---

---

---

---

---

---

**Nebulizer vs MDI**

- Nebulizers are preferred for patients with asthma or COPD if they are unable to master MDI technique despite repeated instruction
- Nebulizers are preferred for patients who have an extremely low inspiratory capacity or flow rate, cannot breath hold, or need high bronchodilator dosages

---

---

---

---

---

---

---

---

### Reference

- Statement on Home Care for Patients with Respiratory Disorders
- Official Statement of the American Thoracic Society
  - Approved by the ATS Board of Directors December 2005
- Am. J. Respir. Crit. Care Med 2005;171(12):1443-1464

---

---

---

---

---

---

---

### Obstructive Sleep Apnea

- Warrants high index of suspicion
- Life-threatening, yet potentially correctable
- Associated with
  - Stroke
  - Myocardial infarction
- Often undiagnosed and therefore untreated
- Three times increase in mortality

---

---

---

---

---

---

---

### Epworth Sleepiness Scale

- SITUATION FOR CHANCE OF DOZING
- Sitting and reading
  - Watching TV
  - Sitting inactive in a public place (as in a theater or a meeting)
  - As a passenger in a car for an hour without a break

---

---

---

---

---

---

---

### Epworth Sleepiness Scale

#### SITUATION FOR CHANCE OF DOZING

- Lying down to rest in the afternoon when circumstances permit
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in traffic

---

---

---

---

---

---

---

### Epworth Sleepiness Scale Scoring

USE THE FOLLOWING SCALE TO CHOOSE THE MOST APPROPRIATE NUMBER FOR EACH SITUATION:

- 0 = would never doze or sleep
- 1 = slight chance of dozing or sleeping
- 2 = moderate chance of dozing or sleeping
- 3 = high chance of dozing or sleeping

---

---

---

---

---

---

---

### Epworth Sleepiness Scale Key

- 1 – 6
  - Good sleep hygiene
- 7 – 8
  - Average score
- 9 and up
  - Problematic

---

---

---

---

---

---

---

### **Treatment Options for Sleep Apnea**

- Weight loss
- Avoidance of alcohol and sedatives
- Sleeping on one's side or upright
- Correction of metabolic disorders such as hypothyroidism
- Continuous positive airway pressure (CPAP) via a nasal mask

---

---

---

---

---

---

---

### **Rhinosinusitis**

- Approaches to diagnosis and treatment are the same regardless of age
- Can be acute, subacute or chronic
- Treat bacterial rhinosinusitis with analgesics, saline irrigation, and antibiotics if symptoms > 7 days or worsen
  - Early antibiotic treatment in mild disease can be harmful
- Chronic rhinosinusitis treated with topic agents and saline irrigation
- Allergic rhinosinusitis treated by avoidance of inciting allergens and/or topical nasal steroids

---

---

---

---

---

---

---

### **Pulmonary Embolism (1 of 2)**

- Incidence triples from age 65 to age 90
- Age >70 is a risk factor for missed diagnosis
- Blood gas is normal in 10%–20% of patients
- Diagnostic work-up is same as in younger patients
- 10% recurrence rate within 1 year

---

---

---

---

---

---

---

### **Pulmonary Embolism (1 of 2)**

- Anticoagulation is guided by the same principles as in younger adults
  - In older patients it may be even more important to achieve therapeutic levels of heparinization quickly
- Use of outpatient LMWH while achieving anticoagulation with warfarin is supported by well-designed trials
  - Allow overlap of ~1 to 3 days between heparinization and adequate warfarin therapy with INR target of 2 to 3
- In most cases, anticoagulant therapy should continue for at least 6 months

---

---

---

---

---

---

---

---

### **What Is Pulmonary Rehabilitation**

Evidence-based, multidisciplinary and comprehensive intervention for symptomatic patients with chronic respiratory diseases

Integrated into individualized treatment plan

Designed to reduce symptoms, optimize functional status, increase participation and reduce health care costs

ATS/ERS Statement on Pulmonary Rehabilitation, 2006  
Ries AL et al. Chest 2007; 131: 4-42  
ACCP/AACVPR Guidelines 2007

---

---

---

---

---

---

---

---

### **Rehabilitation Treatments**

- In the simplest of terms includes coaching and instruction in the proper use of inhalers, nebulizers and incentive spirometers
- Acapella Flutter Valve
  - The device is somewhat uncomfortable and hard to hold
  - Not at all a hands free device
  - Easy to take apart for cleaning and sterilization

---

---

---

---

---

---

---

---

**Pulmonary Rehabilitation Outcomes**

- Improved quality of life
- Improved confidence (self-efficacy)
- Reduced dyspnea and improved exercise tolerance
- Reduced hospitalization rate
- No effect on pulmonary function

---

---

---

---

---

---

---

**Common Roles of Respiratory Care**

- Pulmonary function testing (C-PFT)
- Medication delivery
  - (inhaled, nebulized, via ventilator)
- Oxygen
- Pulmonary rehabilitation
- CPAP/BiPAP and other assist devices

---

---

---

---

---

---

---

**Conclusions  
(1 of 2)**

- With age, there is a decline in forced vital capacity, FEV<sub>1</sub>, and PaO<sub>2</sub>, while the A-a gradient increases
- 5%–10% of people ≥65 years meet criteria for asthma
- The remaining likely have COPD
- Smoking cessation may slow the decline in lung function at any age

---

---

---

---

---

---

---

**Conclusions**  
**(2 of 2)**

- Influenza vaccination saves lives
- Mandatory vaccination is coming to a facility, hospital or clinic near you
- The use of nebulizer therapy requires an understanding of the devices, the cognitive ability of the resident and the dosing of administered drugs

---

---

---

---

---

---

---

---

---

---

---

---

---

---