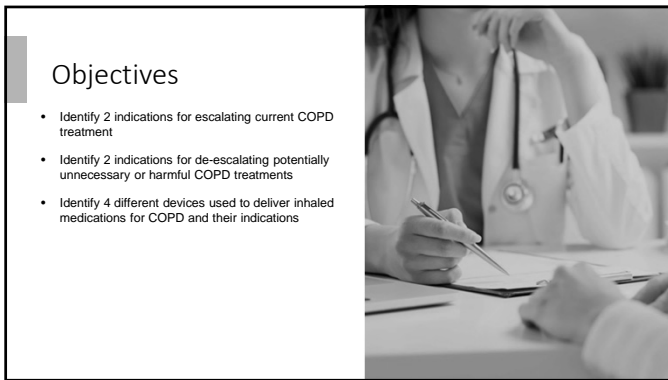
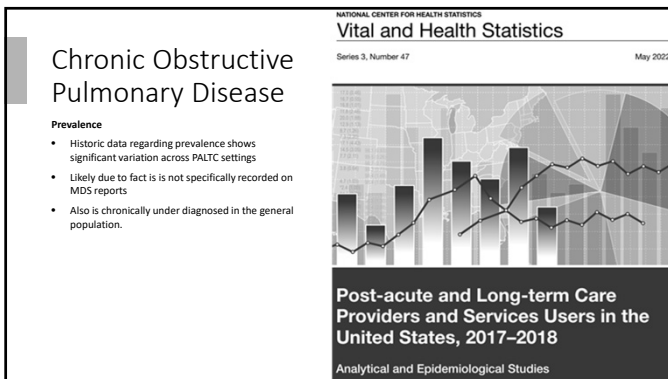


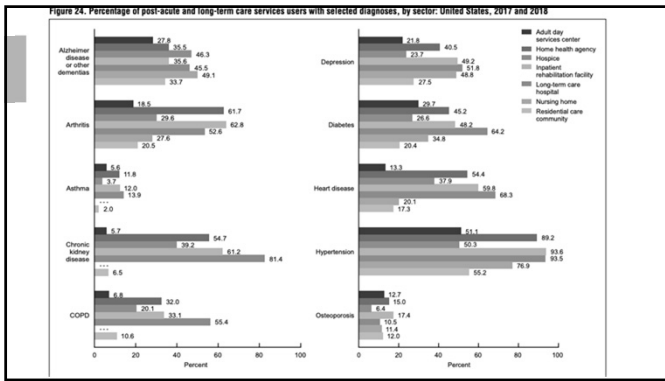
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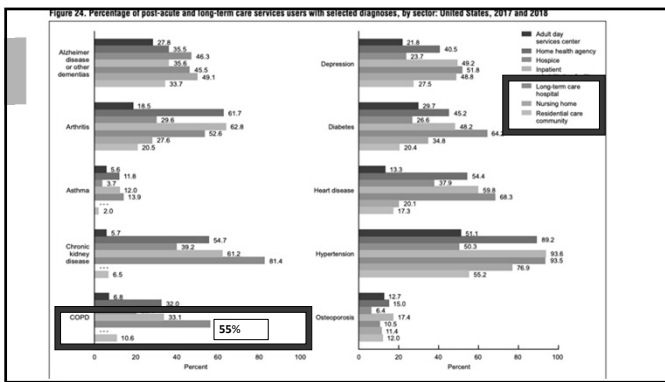
2



3



4



5

Chronic Obstructive Pulmonary Disease

Diagnosis

- History of tobacco use, second-hand smoke, or exposure to organic (e.g., wood) smoke
- Diagnosed by spirometry
FEV1/FVC Ratio

UPDATES


- ATS/ERS no longer recommend a fixed cutoff of FEV1/FVC ratio to diagnose COPD
- Recommend use of lower limit of normal
- Often well below former cutoff of 70%

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Chronic Obstructive Pulmonary Disease

Implications

- Older adults previously diagnosed with COPD no longer meet COPD diagnostic criteria
- This is meant to encourage further evaluation of dyspnea for patients who have borderline FEV1/FVC ratios




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Chronic Obstructive Pulmonary Disease

Recommendation

- For patients who are not improving with COPD treatment, consider a referral to a pulmonologist for spirometry



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Chronic Obstructive Pulmonary Disease

Assessment

- Severity of symptoms should be assessed AT LEAST annually
- Global Initiative for Chronic Obstructive Lung Disease (GOLD) Categories have been updated

Moderate or Severe Exacerbation History ≥2 or ≥1 leading to hospital admission 0 or 1 (not leading to hospital admission)		C	D
		A	B
		mMRC 0-1 CAT < 10	mMRC ≥ 2 CAT ≥ 10
Symptoms			

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Chronic Obstructive Pulmonary Disease

Assessment

- Severity of symptoms should be assessed AT LEAST annually
- Global Initiative for Chronic Obstructive Lung Disease (GOLD) Categories have been updated

EXACERBATION HISTORY
(PER YEAR)

≥ 2 moderate exacerbations or ≥ 1 leading to hospitalization

E

0 or 1 moderate exacerbations (not leading to hospitalization)

A

B

mMRC 0-1
CAT < 10

mMRC ≥ 2
CAT ≥ 10

SYMPTOMS

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Chronic Obstructive Pulmonary Disease

Assessment

- Severity of symptoms should be assessed AT LEAST annually
- Two validated patient-reported assessment tools
 - COPD Assessment Test (CAT)
 - Modified Medical Research Council Score (mMRC)

EXACERBATION HISTORY
(PER YEAR)

≥ 2 moderate exacerbations or ≥ 1 leading to hospitalization

E

0 or 1 moderate exacerbations (not leading to hospitalization)

A

B

mMRC 0-1
CAT < 10

mMRC ≥ 2
CAT ≥ 10

SYMPTOMS

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Chronic Obstructive Pulmonary Disease

Assessment

- Severity of symptoms should be assessed AT LEAST annually
- Two validated patient-reported assessment tools
 - COPD Assessment Test (CAT)
 - Modified Medical Research Council Score (mMRC)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your well-being 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 question.

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 I am very sad

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

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Chronic Obstructive Pulmonary Disease

Assessment

- Severity of symptoms should be assessed AT LEAST annually
- Two validated patient-reported assessment tools
 - COPD Assessment Test (CAT)
 - Modified Medical Research Council Score (mMRC)

mMRC Breathlessness Scale

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

Chris Stanton. The mMRC breathlessness scale. *Occup Med (Lond)* 2008;58(2): 226-227. doi:10.1093/occmed/kqn142, Table 1. By permission of Oxford University Press on behalf of the Society of Occupational Medicine.
A mMRC score of 1 or more suggests significant symptoms.

mMRC=modified Medical Research Council

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Research Report

Development of MDS-Based Predication Model for COPD Severity in Nursing Home Residents

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SAGE

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Table 3. Multivariate Multinomial Logit Regression on GOLD A to D Groups (Reference = GOLD A).

Independent variable	GOLD B		GOLD C		GOLD D	
	OR	95% CI	OR	95% CI	OR	95% CI
Sex						
Female	0.89	(0.26-3.01)	4.66	(0.34-120.58)	0.84	(0.21-3.30)
Male [ref]						
Age	0.98	(0.91-1.05)	1.00	(0.90-1.12)	0.96	(0.89-1.03)
BMI	1.01	(0.94-1.08)	0.95	(0.71-1.02)	0.95	(0.88-1.03)
Ever LABD use	4.15	(1.13-16.73)*	0.17	(0.06-0.66)	12.33	(3.81-43.74)*
Any diagnoses	5.79	(1.17-28.85)*	0.55	(0.03-9.02)	16.94	(3.18-92.74)*
Physician's long-term severity score	1.96	(0.95-4.04)	1.07	(0.69-1.67)	1.96	(0.97-3.95)*
Long-term ADL score	0.98	(0.84-1.15)	1.13	(0.86-1.48)	1.07	(0.90-1.27)
Bathing						
Independent, supervision, or limited assistance	0.48	(0.10-2.22)	10.88	(0.25-469.19)	0.17	(0.03-1.02)
Extensive assistance, total dependence, or did not occur [ref]						
Mobility assistance						
Non wheelchair dependent	0.21	(0.04-1.15)	0.12	(0.01-1.46)	0.12	(0.02-0.75)*
Wheelchair dependent [ref]						
Balance Table						
Steady or able to stabilize without assistance	0.54	(0.07-4.17)	0.27	(0.01-7.63)	1.12	(0.12-10.42)
Able to stabilize with assistance or did not occur [ref]						
Anemia	1.17	(0.36-3.85)	0.19	(0.02-1.84)	0.88	(0.23-3.32)
Coronary artery disease	0.53	(0.07-3.77)	5.05	(0.35-72.82)	0.36	(0.06-2.80)
Heart failure	1.27	(0.24-6.97)	8.92	(0.87-91.10)	2.46	(0.56-10.71)
Hypertension	2.03	(0.56-7.32)	16.54	(0.82-331.62)	2.32	(0.53-10.10)
Diabetes mellitus	1.40	(0.23-8.88)	0.59	(0.05-7.06)	2.23	(0.48-10.30)
Anxiety	2.13	(0.49-9.19)	1.17	(0.06-21.82)	2.67	(0.56-12.79)
Depression	0.65	(0.19-2.20)	0.06	(0.00-0.79)*	0.79	(0.20-3.13)

MDS variables mapped to GOLD group (reference = GOLD A) with multivariate multinomial logit model.
Abbreviations: ADL, activity of daily living; BMI, body mass index; CI, confidence interval; GOLD, Global Initiative for Chronic Obstructive Lung Disease; LABD, long-acting bronchodilator; MDS, Minimum Data Set; OR, odds ratio; PHQ-9, Patient Health Questionnaire-9; ref, reference category.
*Indicates significance versus GOLD A at p < 0.05.

PMID: 34963317

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Chronic Obstructive Pulmonary Disease

Assessment

- MDS Dyspnea Assessment can potentially replace either CAT or mMRC scales to establish a GOLD score of A or B/E
- Exacerbation history must be determined annually from clinical chart

EXACERBATION HISTORY (PER YEAR)	
≥ 2 moderate exacerbations or ≥ 1 leading to hospitalization	E
0 or 1 moderate exacerbations (not leading to hospitalization)	A B
mMRC 0-1 CAT < 10	mMRC ≥ 2 CAT ≥ 10
SYMPTOMS	

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Chronic Obstructive Pulmonary Disease

Assessment

- MDS Dyspnea Assessment can potentially replace either CAT or mMRC scales to establish a GOLD score of A or B/E
- Exacerbation history must be determined annually from clinical chart


EXACERBATION HISTORY (PER YEAR)	
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mMRC 0-1 CAT < 10	mMRC ≥ 2 CAT ≥ 10
SYMPTOMS	

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Chronic Obstructive Pulmonary Disease

Treatment

- Medication
 - Only about 25-35% of LTC residents with COPD receive a LAMA or LABA containing medication regimen
 - 40% of patients with 2 or more exacerbations in prior year were only on PRN albuterol
- Delivery Device
 - 25% have a nebulized form of medication available (usually only albuterol)



PMID: 23127147

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Chronic Obstructive Pulmonary Disease

Initial Pharmacological Treatment Figure 4.2

Treatment

- Medication
- LABA + LAMA is the preferred initial inhaled medication regimen for all patients with symptomatic COPD
 - Stiolto (Olodaterol + Tiotropium)***
 - Anoro (Vilanterol + Umeclidinium)***
 - Duaklir (Formoterol + Aclidinium)
 - Bevespi (Formoterol + Glycopyrrolate)

* - once daily

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What if Meds Don't Work

EXACERBATIONS

Selective Escalation

- Single Inhalers
 - Trelegy (fluticasone, umeclidinium, vilanterol)
 - Breztri (budesonide, glycopyrrolate, formoterol)
- Two Inhaler Therapy (ICS/LABA + Tiotropium)
 - Wixela/Advair (fluticasone + salmeterol)
 - Symbicort (budesonide + formoterol)
 - Dulera (mometasone + formoterol)

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What if Meds Don't Work?

DYSPNEA

- Consider switching inhaler device or molecules
- Implement or escalate non-pharmacologic treatment(s)
- Investigate (and treat) other causes of dyspnea

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Non-Pharmacologic Therapies

Non-Pharmacologic Management of COPD* Table 4.9

Patient Group	Essential	Recommended	Depending on Local Guidelines
A	Smoking Cessation (can include pharmacologic treatment)	Physical Activity	Flu Vaccination Pneumococcal Vaccination Pertussis Vaccination COVID-19 Vaccinations Shingles Vaccination
B and E	Smoking Cessation (can include pharmacologic treatment) Pulmonary Rehabilitation	Physical Activity	Flu Vaccination Pneumococcal Vaccination Pertussis Vaccination COVID-19 Vaccinations Shingles Vaccination

*Can include pharmacologic treatment

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Pulmonary Rehab in LTC

- Patients enrolled regardless of symptoms (only COPD dx)
- Excluded patients with CAD, CHF, MSK disorders, or “mentally challenged” (could not complete patient questionnaires with assistance)

Inpatient Pulmonary Rehabilitation Program in a Long-Term Care Facility

Short-Term Outcomes and Patient Satisfaction

ABSTRACT
The purpose of the current study was to evaluate short-term outcomes of inpatient pulmonary rehabilitation (PR) programs for older patients with chronic obstructive pulmonary disease (COPD). PR programs include management, exercise, nutrition counseling, and coping skills education programs, among other interventions. The current study used a parallel-group design with 21 participants evenly split by gender between the ages of 66 and 85. Effects of PR on functional outcomes (exercise capacity and perceived dyspnea on exertion level) had a statistically significant difference by the end of the program. Scores for health-related quality of life and subscales of symptoms, impact, and activity in participants younger than 65 were not statistically significant, whereas St. George's Respiratory Questionnaire scores for participants older than 65 showed a statistically significant improvement. Results showed that early PR is an effective intervention for the management of symptoms of COPD in older adults recovering from a COPD exacerbation. *Journal of Geriatric Physical Therapy*, 43(8), 44-52.

Disuse, resulting in compromised exercise tolerance capacity, prevented patients from completing questionnaires with or without system modifications, including and incorporating follow-up (Quinn et al., 2013), and decreased health-related quality of life (HRQL) (Popeo et al., 2009).

PMID: 26248143

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Pulmonary Rehab in LTC

- Intervention
- 3h/week x 6-8 weeks
- Exercise training
 - Walking
 - Cycling
- TENS
- Dyspnea management education
- Upper extremity weight training

Inpatient Pulmonary Rehabilitation Program in a Long-Term Care Facility

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PMID: 26248143

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Pulmonary Rehab in LTC

- Outcome
- Improved exercise tolerance (6 minute walk test)
 - 70% increase
- Improved symptom scores

Inpatient Pulmonary Rehabilitation Program in a Long-Term Care Facility
Short-Term Outcomes and Patient Satisfaction

ABSTRACT
The purpose of the current study was to evaluate short-term outcomes of inpatient pulmonary rehabilitation (PR) programs for older patients with chronic obstructive pulmonary disease (COPD). PR comprises medical management, exercise, smoking counseling, and coping skills education programs, among other interventions. The current study used a pretest-posttest design with 25 participants evenly split by gender between the ages of 65 and 95. Effects of PR on functional tolerance, exercise capacity, and perceived degree of exercise heat had statistically significant differences by the end of the program. Scores for health-related quality of life and reduction of symptoms, impact, and activity in participants younger than 65 were not statistically significant, whereas St. George's Respiratory Questionnaire scores for participants older than 65 showed a statistically significant improvement. Results showed that early PR is an effective intervention for the management of symptoms of COPD in older adults, accounting from a COPD exacerbation. *Journal of Geriatric Respiratory Diseases* 4(18): 194-202.

PMID: 26248143

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Medication Side-Effects


- LAMA and LABA Agents
- Increased risk of cardiac events (MI, CHF, tachycardia, arrythmia)
- However even among adults with advance stage heart failure, risks were low and there was a signal for survival benefit among patients on medication^a
- Inhaled Corticosteroid
- Increased risk of pneumonia, severe pneumonia, cataract, glaucoma and long bone fractures

a- Su VY, Yang YH, Perng DW, et al. Real-world effectiveness of medications on survival in patients with COPD-heart failure overlap. *Aging (Albany NY)*. 2019;11(11):3650-3667.

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Medication Side-Effects

- No reason to avoid LAMA/LABA inhaled medications in any patient population
- ICS should be used cautiously and de-escalated when appropriate




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Inhaler Devices

Metered Dose Inhaler

- **Advantages**
Can be used with a spacer
- **Disadvantages**
Need to generate sufficient force to activate
Must clean spacer appropriately


A photograph of an AeroChamber spacer, a cylindrical device used with metered-dose inhalers to improve medication delivery.

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Inhaler Devices

Dry Powder Inhaler

- **Advantages:**
Less Force to Activate
Breath Activated, Less temporal correlation
- **Disadvantages**
Must be held level after activation
Must generate sufficient inspiratory force to pull medication out of device


A photograph showing three different models of Dry Powder Inhalers (DPIs) arranged horizontally.

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Inhaler Devices

Soft Mist Inhaler

- **Advantages:**
No need to generate inspiratory force
Potentially more of a natural breathing position
- **Disadvantages**
Cannot be used with spacer

A photograph of a hand holding a Soft Mist Inhaler, showing the device's nozzle and the hand's grip.

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Inhaler Device

Nebulizer

- **Advantages**

No breathing coordination needed
 No need for patient to activate device
 No maximal inspiratory force

- **Disadvantages**

Requires machine or medical air
 Requires training to set up
 No medication combinations




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Inhaler Devices

Which to Choose


- Older adults and those with dementia can rarely perform correct technique without direct supervision and coaching
- Likely MDI with spacer is ideal first choice
- If patients have ongoing dyspnea then transition to nebulizer
- If ongoing exacerbations, optimize medications then transition to nebulizer



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Smoking Cessation


- Smoking cessation has survival benefits even if stopping after age 80
- Adults over 65 are less likely to smoke than younger adults (~9%)
- However, prevalence has not changed despite significant fall among younger adults
- Older adults less likely to stop smoking or attempt to stop smoking



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Smoking Cessation


- Older adults more likely than younger adults to successfully quit with nicotine replacement therapy alone
- Worth a trial among patients with concerns or contraindications to varenicline (Chantix)



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Summary

- COPD is extremely common among adults in nursing homes and often undertreated
- A mix of pharmacologic and non-pharmacologic therapies are effective in treating symptoms
- Overtreatment can have health consequences
- Choice of inhaler device matters a lot in this population



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University of Colorado Anschutz Medical Campus

THANK YOU

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