Online Supplement

Original Research
Accuracy, Usefulness, and Impact Variability of ChatGPT-4 for COPD Medication Management: A Modified Delphi Study

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Appendix

Appendix A: Questions and rationale

1. JH is a 62-year-old Hispanic female with a past medical history significant for Hypertension, Tobacco use, Hyperlipidemia, Diabetes, and Gout. Their current medication list includes Lisinopril 10mg daily, HCTZ 25 mg daily, Atorvastatin 80mg daily, Metformin ER 1000mg BID, Empagliflozin 25mg daily, and Allopurinol 300mg daily. They recently have been diagnosed with COPD and completed their initial spirometry (see below). Their primary care provider has consulted you to assist with managing their COPD.

Spirometry:

	Prebronchodilator			Postbronchodilator	
	Predicted	Measured	% Predicted	Measured	% Predicted
FVC	4.58	3.12	68	3.23	70
FEV_1	3.02	1.42	47	1.45	48
FEV_1/FVC		0.46		0.45	

   a. If JH's mMRC score is 3, CAT score is 22, and has a history of 1 exacerbation in the last year (did ***NOT*** required hospitalization) what COPD classification and initial group is this patient according to the 2024 GOLD Guidelines?

Rationale: According to the 2024 GOLD COPD Guidelines, this patient would be classified as GOLD 3/Severe based on their post-bronchodilator FEV_1 of 48% (FEV_1 >30% but < 50% predicted). He would be in Group B based on their symptoms (mMRC ≥ 1, CAT ≥ 10) and 1 moderate exacerbations.

   b. Based on JH's initial GOLD Assessment group, what medication regimen would be the most appropriate to treat their COPD?

Rationale: According to the 2024 GOLD COPD guidelines, all patients should be initiated on a short acting rescue inhaler for immediate symptoms relief. Based on the patient's ABE group of B they are indicated for LAMA + LABA, such as Albuterol + Olodaterol/Tiotropium (Stiolto). LAMA and SAMA which is not appropriate due to increase risk of anticholinergic side effects.

2. MN contacts the community pharmacy and asks about their inhalers and a potential adverse effect. MN states that they started a new inhaler about 1 month ago and have developed dry mouth and dry eyes. They are currently maintained on Albuterol + Umeclidenium (Incruse

Ellipta) + Olodaterol (Striverdi). Are these side effects caused by their inhalers? If so, which one is the most likely cause?

Rationale: Umeclidenium is a long-acting muscarinic antagonist with potential to have anticholinergic side effects (Anti-SLUD). These side effects of dry mouth and dry eyes are classic examples of anticholinergic side effects.

3. Which medication is the best recommendation to treat a patient living with GOLD Category 3B COPD?
   Rationale: Umeclidinium/vilanterol

4. A patient living with COPD presents to urgent care with worse-than-usual shortness of breath. The patient denies increased sputum production. However, they are able to produce a sputum sample in urgent care and it is translucent. Which pharmacotherapy plan would be most appropriate for this patient and which key counseling points would you provide?
   Rationale: Albuterol and ipratropium

5.

History of Present Illness: CH is a 59 year old white male who was consulted to the pharmacotherapy clinic by his primary care physician (PCP) for the assessment of his current COPD therapy. Today, he complains of "trouble breathing and being tired all of the time." He reports getting short of breath with activity and that he has difficulty keeping up with his wife when they are shopping. He is always concerned with finding places to sit down and rest while away from home. He was first diagnosed with COPD six months ago and was discharged after management of an exacerbation 2 weeks ago. He denies history of any other exacerbations. He denies muscle aches, chest pain, fever, or night sweats. Upon walking from the waiting room to the exam room, the patient was so short of breath that he had to rest. When taking the CAT Assessment, his score is 22. He currently takes a Combivent Respimat inhaler for his COPD. The prescription is for 1 puff four times daily as needed. However, he admits that he doesn't "always use my inhaler" as intended. When asked to demonstrate inhaler technique, the patient placed the inhaler in his mouth actuated the inhalation while exhaling, inhaled quickly and failed to hold breath. The patient then quickly inhaled a second time and held breath for 10 seconds before exhaling.
Past Medical History: Diabetes mellitus type 2, Diabetic neuropathy, Dyslipidemia, Hypertension, Chronic Obstructive Pulmonary Disease
Social History: Tobacco: 2 ppd x 35 years; Quit 9 years ago Alcohol: 1 drink ~ 3x/week Denies any illicit drug use

Allergies: NKDA

Current Medications:

Rx #	Rx Name and Strength	Quantity	Refill History	Directions	Prescriber
245876	Albuterol 100mcg/ Ipratropium 20mcg	30 day Supply	2 mo ago 6 mo ago	Inhale one puff by mouth four times daily prn	Smith
245870	Gabapentin 300mg	30 day supply	1 mo ago 2 mo ago 3 mo ago	Take one (1) capsule by mouth three times daily for nerve pain	Smith
245872	Glipizide 5mg	30 day supply	1 mo ago 2 mo ago 3 mo ago	Take one (1) tablet by mouth twice daily with food for diabetes	Smith
245871	Insulin NPH 100 U/mL	30 day supply	1 mo ago 2 mo ago 3 mo ago	Administer eight (8) units subcutaneously twice daily before meals for diabetes	Smith
245873	Metformin 500mg	30 day supply	1 mo ago 2 mo ago 3 mo ago	Take two (2) tablets by mouth twice daily for diabetes	Smith
245874	Simvastatin 80mg	30 day supply	1 mo ago 2 mo ago 3 mo ago	Take one-half (1/2) tablet by mouth every evening for cholesterol	Smith
245941	Lisinopril 5 mg	30 day supply	1 mo ago 2 mo ago 3 mo ago	Take one-half (1/2) tablet by mouth daily for blood pressure	Smith
OTC	Aspirin 81mg	100		Take one tablet daily	

Physical Exam

Vitals: Today BP 137/68 mmHg left arm sitting; HR 87 bpm; RR 22; O2 Saturation 95%

Ht: 69” TBW: 173lbs BMI: 25.6

(from physician visit last month)

General: Appears in respiratory and physical distress upon minimal exertion

HEENT (Head, eyes, ears, nose and throat): PERRLA (pupils equal round and reactive to light and accommodation), EOMI (extra ocular movements intacts), TM (tempanic membranes) intact

Neck: (-) JVD (jugular venous distention)

Cardiovascular: RRR (regular rate and rhythm); normal S1 and S2 sounds, no S3 or S4

Lungs: Diffuse bilateral inspiratory and expiratory wheezing, (-) rales and rhonchi

Gastrointestinal: Normal bowel sounds and movement

Abdomen: Soft, NT/ND (non-tender/non-distended)

Genitourinary: Unremarkable

Skin: Warm, dry

Neurological: Alert & Oriented x 3; CN (cranial nerves) II-XII intact

Spirometry					**Lung Volumes**			
6 months ago	Pred	Actual	% Pred			Pred	Actual	% Pred
FVC (L)	4.66	3.17	68		SVC (L)	4.66	3.08	66
FEV1 (L)	3.55	1.53	43		TLC (L)	6.79	7.66	113
FEV1/FVC (%)	76	48	64		RV (L)	2.15	4.57	213
FEV3/FVC (%)		72			RV/TLC (%)	32	60	187
FEF 25-75% (L/sec)	2.98	0.52	18		FRC (L)	3.5	6.9	197

Labs from last month

Lab	**Value**	**Units**	**Reference**		**Lab**	**Value**	**Units**	**Reference**
Na	138	meq/L	133-145		Glucose	242	mg/dL	70-110
K	4.2	meq/L	3.3-5		Urea	19	mg/dL	6-26

Cl	100	meq/L	96-108		Creatinine	1.0	mg/dL	0.6-1.5
CO2	31	meq/L	24-32		Est. GFR	76	mL/min	> 60
Ca	9.4	mg/dL	8.4-10.6					

Review of Systems:

- (+) shortness of breath with productive cough of clear sputum; (+) weakness and fatigue; (-) myalgia
- Denies any chest pain, fever, or night sweat

Based on this information, develop an assessment and plan to address this patient's COPD and related preventative care issues.

A:

1. **GOLD 3 Severe:** FEV1 between 30 – 49% predicted
2. **Patient Group E:** mMRC grade 2 OR 3 and 1 exacerbation requiring hospitalization; LAMA + LABA (preferably single inhaler therapy for convenience) OR LAMA + LABA + ICS if Eosinophils ≥ 300 indicated as initial therapy
3. **Non-adherence** to ipratropium/albuterol therapy which is not appropriate therapy based on exacerbation risk and symptoms.
4. **Inappropriate inhaler technique**

P: Remember to include recommendations, monitoring and education (pertinent drug and non-drug therapy) in your plan.

1. **Recommend LAMA + LABA combination**
2. **Change albuterol/ipratropium to albuterol MDI 2 puffs Q4-6 hrs prn.**
3. **Educate** patient on **appropriate inhaler technique, adherence** and potential adverse effects of therapy.
4. **Recommend annual influenza vaccine and pneumococcal (and shingles) if not previously vaccinated**
    a. Adults 19-64 years of age with certain chronic conditions (ie COPD, alcoholism, DM, HIV, etc):
        i. Give one dose of PCV15 or PCV20
            1. If PCV is used, then follow with a dose of PPSV23 after one year
            2. If PCV20 used, then PPSV23 NOT indicated
        ii. For those who only received PPSV23
            1. Give one dose of PCV15 or PCV20 (should be administered at least 1 year after most recent PPSV23 vaccine)
            2. Additional PPSV23 dose not recommended regardless if they received PCV15 or PCV20 because they already received it previously.
    b. ≥ 65 years: if never received pneumococcal vaccines/unknown history, then PCV15 or PCV20
        i. If PCV15 used, then follow with PPSV23 one year later
        ii. If PCV20 used, PPSV23 NOT indicated

5. **Pulmonary rehab**
6. **Pt to monitor symptoms and rescue inhaler use**
7. Recommend **follow-up** (time may vary here but must be reasonable). Annual spirometry.

Appendix B: Definitions and explanations of accuracy, usefulness, and impact variability

Accuracy		
0	**1**	**2**
Response is **poor** (not accurate with significant inaccuracies)	Response is **borderline** (partly accurate and inaccurate)	Response is **good** (completely accurate and error free)
Notes if needed:		

Usefulness		
0	**1**	**2**
Response is **not** useful	Response is **somewha**t useful	Response is **very** useful
Notes if needed:		

Impactful Variability between outputs		
0 High impact	**1 Moderate impact**	**2 Low impact**
Responses widely vary between outputs	Responses vary to some degree between outputs	Answers do not have impactful variability
Notes if needed:		