What Do Patients Value? Development of a Preference-Based Health Utility Score for Chronic Obstructive Pulmonary Disease (COPD)

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The COPD Discrete Choice Experiment (DCE)

The aim of this study was to evaluate the importance that 1050 COPD patients placed on their symptoms[1]. In the DCE patients were shown pairs of patient profiles based on the attributes and levels in **Figure 1** and had to choose which disease state they preferred to be.

As part of the DCE survey, patients also recorded their current COPD health state using the attributes and levels listed in **Figure 1**, completed an EQ-5D (3L) questionnaire on their general health and gave a self-rating on their COPD severity as mild, moderate, severe or very severe.

Calculating health utility scores from the DCE results

The statistical analysis of the DCE data produced preference weights for each level of each attribute. These were scaled so that they gave health utility weights that could be added to give a COPD health utility score for each patient based on their current COPD state of health as recorded in the DCE survey[2].The COPD health utility scores had face validity as can be seen in **Figure 2**, where boxplots show the decline in the score as self-perceived COPD severity increases.

Relationship between the COPD health utility score and EQ-5D (3L)

Figure 3 shows a plot of the EQ-5D (3L) score for each patient vs the COPD health utility score for the same patient. The Spearman correlation coefficient is low (0.52) for all patients and close to zero (0.06) for patients with a negative EQ-5D (3L) score.

Table 1. Incidence of comorbidities

Condition	Mild	Moderate	Severe	Very Severe
Anemia (%)	9	5	7	5
Mini-stroke (%)	5	4	4	3
Congestive Heart Failure (%)	10	6	7	12
Gastroesophageal reflux disease (%)	29	19	23	22
Malnutrition (%)	4	1	0	5
Osteoporosis (%)	14	13	20	19
Peptic Ulcer (%)	5	1	1	0
Vascular disease (%)	8	3	3	4
Rheumatological disease (%)	16	14	17	12
Mean EQ-5D-3L score	0.69	0.68	0.56	0.38
Mean COPD utility score	0.74	0.68	0.54	0.46
Sample size	116	563	297	74

Figure 2. COPD health utility score vs self-perceived COPD severity

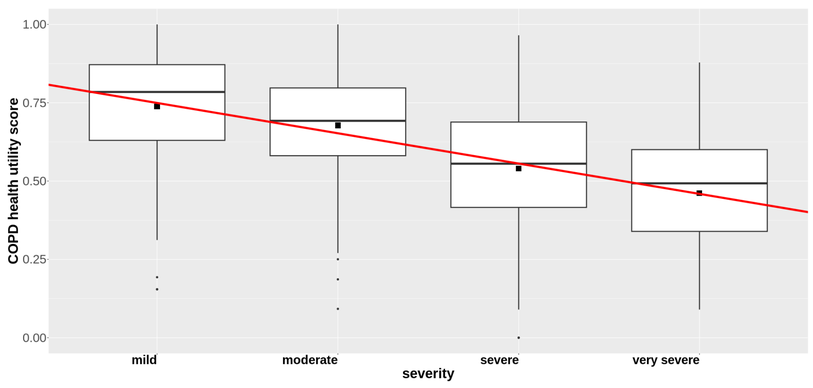

Figure 3. EQ-5D (3L) score vs COPD health utility score

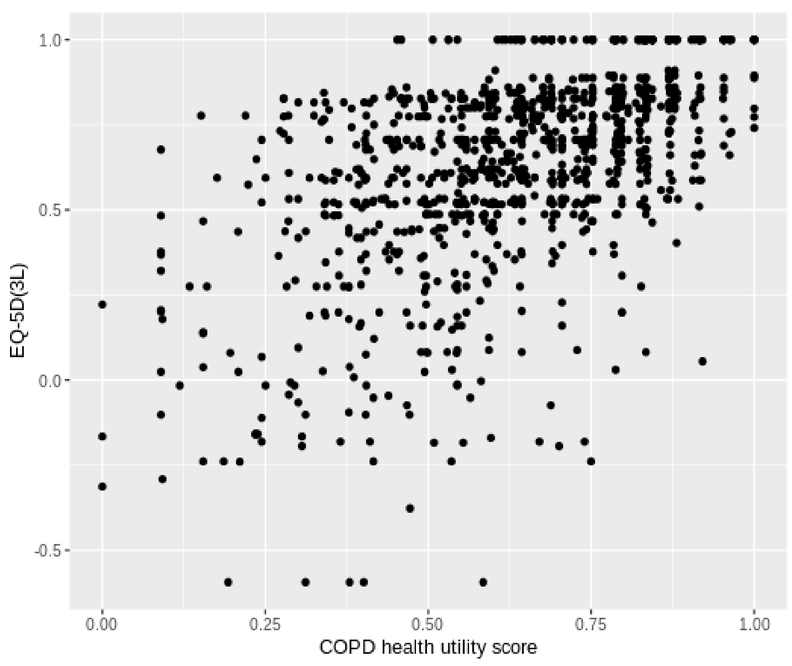

Figure 1. Attributes and Levels grid for the DCE

Attribute		Level 1	Level 2	Level 3	Level 4
Shortness of Breath	**During a typical day…**	**Shortness of breath** experienced during strenuous activity (e.g., **walking uphill/upstairs**)	**Shortness of breath** experienced during light activity (e.g., a **short walk** on level ground)	**Shortness of breath** experienced when **washing (e.g., taking a shower) or dressing**	Shortness of breath experienced at rest (e.g., when **sitting or lying down)**
Cough	**During a typical day…**	**Cough does not interrupt/ disturb any** usual activities	**Cough interrupts/disturbs some** usual activities	**Cough interrupts/disturbs most** usual activities	
Incontinence	**During a typical day…**	COPD symptoms **do not cause any urine leakage**	COPD symptoms are causing a **few drops of urine leakage**	COPD symptoms are causing urine leakage which makes **underwear wet**	
Mucus	**When waking up on a typical morning…**	It is **not at all difficult** to **bring up mucus**	It is **a little difficult** to **bring up mucus**	It is **very difficult** to **bring up mucus**	
Sleep	**When waking up on a typical morning…**	Feel **rested**	Feel **somewhat rested**	**Do not feel rested** at all	
Exacerbation	**During a typical year…**	**Never** experience any COPD flare-ups/exacerbations	Experience **one or more** COPD flare-ups/exacerbations that **require antibiotics or steroids**	Experience **one or more** COPD flare-ups / exacerbations that **require a hospital stay or visit**	

Table 2. Frequency of comorbidities vs self-perceived severity of COPD

Condition	EQ-5D-3L code = (11111)	EQ-5D-3L score < 0	EQ-5D-3L code = (33333)
	(%)	(%)	(%)
Anemia	2	30	50
Mini-stroke	4	16	25
Congestive Heart Failure	1	20	75
Gastroesop. reflux disease	10	40	58
Malnutrition	0	12	50
Osteoporosis	5	36	58
Peptic ulcer	1	16	50
Vascular disease	0	20	58
Rheumatol. disease	4	36	42
Mean EQ-5D-3L	0.994	-0.183	-0.323
Mean COPD health utility score	0.801	0.378	0.366
Sample size	114	50	12

Why does EQ-5D (3L) not reflect well the health of COPD patients?

- It may miss HR-QoL elements that are important to COPD patients.
- It might be influenced by other health issues that COPD patients have.

Table 1 shows the percentage of some comorbidities that are present in patients with EQ-5D (3L) code 11111 (best health state), with an EQ-5D (3L) score <0 (worse than death), and with code 33333 (worst possible health state). It can be seen that going from the best possible EQ-5D (3L) score (11111) to an EQ-5D (3L) of <0 or to worst EQ-5D (3L) score (33333), there is a large increase in the frequency of each comorbidity.

However, as **Table 2**, shows, self-perceived severity of COPD was not correlated with the presence of these comorbidities.

In Summary

- We have shown how **EQ-5D is greatly impacted by other comorbidities** (which are very prevalent in a disease like COPD; the average patient age in our study was 60.5 years).
- **A disease-specific utility measure, however, is less impacted by the comorbid conditions.**
- **The DCE-derived COPD health utility score had greater sensitivity** to show the impact of COPD on the QoL of these patients.
- **This approach could be important when evaluating effects of new COPD drugs**, to be able to focus in on the utility benefit derived specifically through improving their COPD.

References

1. Cook, N.S. et al. (2022). People living with moderate-to-severe COPD prefer improvement of daily symptoms over the improvement of exacerbations: a multicountry patient preference study. *ERJ Open Research*, **8**: 00686-2021.

2. Jones, B., Ryan, M., Cook, N.S. and Gutzwiller, F.S. (2023). Development of a disease-specific health utility score for Chronic Obstructive Pulmonary Disease from a Discrete Choice Experiment patient preference study. Submitted to the *International Journal of Technology Assessment in Health Care.*

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