

Supplementary Appendix A

Social media listening and Online Bulletin Board studies

- SML study was conducted to gather patients' perspectives on symptoms, diagnosis and comorbidities associated with COPD and its impact on patients' quality of life. A total of 849 posts on patient insights either by patients or caregivers were considered for the analysis, corresponding to 695 unique records. Of 734 mentions of symptoms, relief from cough (27%), mucus (25%) and SOB (21%) were found to be the most valuable aspects of disease management from the patients' perspectives.
- Online Communities in the UK and in the USA were used as a qualitative research tool to evaluate the effect of cough and mucus on COPD patients with persistent cough and excessive mucus. Twenty COPD patients (UK, n=10; USA, n=10) participated in the Online Communities. It was observed that cough and mucus disrupted COPD patients' lives at functional, emotional, social and economic levels. The study also indicated that symptoms in these patients has both proximal impact (e.g., tiredness) and distal impacts (e.g., low emotional well-being).
- The detailed findings from the qualitative online insight gathering approaches in COPD have been reported in their respective full publications[5, 15].

Supplementary Appendix B

Phase I: pilot testing

Qualitative interviews were conducted with 20 COPD patients across the five countries (USA [n=4], UK [n=3], France [n=5], Australia [n=3] and Japan [n=5]). Patients were aged between 66 to 73 years and 70% were male. All patients (n=20) understood the seven attributes; half the patients (n=10) had experienced incontinence, while all but one patient had experienced no impact on their independence due to COPD. Based on the responses from the qualitative interviews and guidance from NICE[16], one

illogical attribute (independence) was removed due to conceptual overlap and low relevance, and a full profile design with formatting enhancements was implemented to improve the understandability of certain attribute and level descriptions. The final A&L grid for the DCE comprised 6 attributes; 1 attribute (SOB) had 4 levels and the others (cough, mucus clearance effort, incontinence, sleep quality and exacerbation) had 3 levels (**Table 1**)

Table 1. Final attributes and levels grid

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 or dressing (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	
Urine leakage “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 production “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	
Feeling rested “When waking up on a typical morning...”	Feel rested	Feel somewhat rested	Do not feel rested at all	
COPD flare-ups/exacerbations “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	
COPD, chronic obstructive pulmonary disease				

Supplementary Appendix C

Figure 1: Correlations between severity variables

	Self-perceived severity	CAT score	COUS	COUI	SPUS	SPUI	Exacerbations
Self-perceived severity	1						
CATtotal	0.412	1					
COUS	-0.2532	-0.5806	1				
COUI	-0.3307	-0.7001	0.7734	1			
SPUS	-0.3258	-0.5141	0.6074	0.6601	1		
SPUI	-0.3724	-0.6226	0.6586	0.8674	0.7222	1	
Exacerbations	0.2744	0.346	-0.2818	-0.3937	-0.2443	-0.4042	1

CAT, COPD Assessment Test; CASA-Q, Cough and Sputum Assessment Questionnaire, including domains: COUS, Cough Symptoms; COUI, Cough impact; SPUS, Sputum symptoms; SPUI, Sputum impact; COPD, chronic obstructive pulmonary disease.