

SUPPLEMENTARY TABLES

Supplementary Table S1. Leicester Cough Questionnaire Item-Level Descriptive Statistics at Baseline and Week 4^a

| Measures | Baseline (N=253) | Week 4 (N=236) |
|-----------------|-----------------------------|---------------------------|
| Item 1 | | |
| Mean (SD) | 5.7 (1.6) | 6.4 (1.2) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 8 (3.2) | 3 (1.3) |
| Ceiling, n (%) | 118 (46.6) | 161 (68.2) |
| Item 2 | | |
| Mean (SD) | 4.3 (1.8) | 4.8 (1.8) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 18 (7.1) | 10 (4.2) |
| Ceiling, n (%) | 32 (12.6) | 53 (22.5) |
| Item 3 | | |
| Mean (SD) | 4.3 (1.8) | 5.3 (1.8) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 23 (9.1) | 8 (3.4) |
| Ceiling, n (%) | 34 (13.4) | 80 (33.9) |
| Item 4 | | |
| Mean (SD) | 3.2 (1.7) | 4.5 (1.8) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 44 (17.4) | 20 (8.5) |
| Ceiling, n (%) | 11 (4.3) | 38 (16.1) |
| Item 5 | | |
| Mean (SD) | 4.7 (1.8) | 5.6 (1.6) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 14 (5.5) | 5 (2.1) |
| Ceiling, n (%) | 50 (19.8) | 94 (39.8) |
| Item 6 | | |
| Mean (SD) | 4.4 (1.6) | 5.3 (1.6) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 16 (6.3) | 5 (2.1) |
| Ceiling, n (%) | 25 (9.9) | 75 (31.8) |
| Item 7 | | |
| Mean (SD) | 3.6 (1.5) | 4.9 (1.6) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 21 (8.3) | 10 (4.2) |
| Ceiling, n (%) | 10 (4.0) | 45 (19.1) |
| Item 8 | | |
| Mean (SD) | 4.7 (2.2) | 5.4 (2.0) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 29 (11.5) | 14 (5.9) |
| Ceiling, n (%) | 90 (35.6) | 115 (48.7) |
| Item 9 | | |
| Mean (SD) | 4.4 (1.9) | 5.4 (1.5) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 25 (9.9) | 6 (2.5) |
| Ceiling, n (%) | 45 (17.8) | 70 (29.7) |

| | | |
|----------------|------------|------------|
| Item 10 | | |
| Mean (SD) | 3.5 (1.3) | 4.3 (1.5) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 17 (6.7) | 12 (5.1) |
| Ceiling, n (%) | 5 (2.0) | 15 (6.4) |
| Item 11 | | |
| Mean (SD) | 3.2 (1.6) | 4.5 (1.9) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 45 (17.8) | 22 (9.3) |
| Ceiling, n (%) | 8 (3.2) | 39 (16.5) |
| Item 12 | | |
| Mean (SD) | 3.3 (1.8) | 4.7 (2.0) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 52 (20.6) | 19 (8.1) |
| Ceiling, n (%) | 16 (6.3) | 64 (27.1) |
| Item 13 | | |
| Mean (SD) | 4.9 (1.8) | 5.5 (1.7) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 11 (4.3) | 6 (2.5) |
| Ceiling, n (%) | 69 (27.3) | 102 (43.2) |
| Item 14 | | |
| Mean (SD) | 5.5 (1.9) | 6.1 (1.4) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 13 (5.1) | 3 (1.3) |
| Ceiling, n (%) | 115 (45.5) | 140 (59.3) |
| Item 15 | | |
| Mean (SD) | 3.3 (1.8) | 4.4 (2.0) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 54 (21.3) | 29 (12.3) |
| Ceiling, n (%) | 16 (6.3) | 41 (17.4) |
| Item 16 | | |
| Mean (SD) | 3.1 (1.4) | 4.2 (1.7) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 35 (13.8) | 12 (5.1) |
| Ceiling, n (%) | 1 (0.4) | 27 (11.4) |
| Item 17 | | |
| Mean (SD) | 3.1 (1.7) | 4.4 (1.9) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 52 (20.6) | 21 (8.9) |
| Ceiling, n (%) | 13 (5.1) | 45 (19.1) |
| Item 18 | | |
| Mean (SD) | 2.7 (1.8) | 3.9 (2.0) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 79 (31.2) | 35 (14.8) |
| Ceiling, n (%) | 17 (6.7) | 21 (8.9) |
| Item 19 | | |
| Mean (SD) | 3.8 (1.6) | 4.1 (1.7) |
| Range | 1.0, 7.0 | 1.0, 7.0 |
| Floor, n (%) | 21 (8.3) | 16 (6.8) |
| Ceiling, n (%) | 10 (4.0) | 12 (5.1) |

Floor = minimum response >25%; ceiling = maximum response >25%. ^aAll items range from 1 to 7.

Supplementary Table S2. Confirmatory Factor Loadings Using a 3-Factor Nonhierarchical Model of the LCQ at Baseline (N=253)

| LCQ item | Factor loadings |
|---|-----------------|
| Physical domain | |
| Item 1: Chest or stomach pains due to cough | 0.489 |
| Item 2: Bothered by sputum production with cough | 0.188 |
| Item 3: Tired because of cough | 0.684 |
| Item 9: Exposure to paint or fumes made me cough | 0.618 |
| Item 10: Cough disturbed sleep | 0.628 |
| Item 11: Coughing bouts per day | 0.718 |
| Item 14: Hoarse voice because of cough | 0.339 |
| Item 15: Had a lot of energy | 0.757 |
| Psychological domain | |
| Item 4: Felt in control of cough | 0.766 |
| Item 5: Felt embarrassed by cough | 0.648 |
| Item 6: Felt anxious by cough | 0.585 |
| Item 12: Felt frustrated by cough | 0.755 |
| Item 13: Felt fed up with cough | 0.462 |
| Item 16: Worried cough indicates serious illness | 0.701 |
| Item 17: Concerned other people think something is wrong because of cough | 0.684 |
| Social domain | |
| Item 7: Cough interfered with job or other daily tasks | 0.717 |
| Item 8: Cough interfered with overall enjoyment of life | 0.421 |
| Item 18: Cough interrupted conversation or telephone calls | 0.337 |
| Item 19: Cough annoyed partner, family, or friends | 0.333 |

$\chi^2(144) = 268.05$ ($P < 0.0001$); CFI = 0.929; RMSEA = 0.058 (90% CI: 0.047, 0.069); SRMR = 0.053. CFI, comparative-fit index; LCQ, Leicester Cough Questionnaire; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Supplementary Table S3. Test-Retest Reliability (Reproducibility) of LCQ Scores From Baseline to Week 4

| LCQ domains | Baseline, mean (SD) | Week 4, mean (SD) | Difference^a | P value | Pearson <i>r</i>^b | ICC |
|---|------------------------------------|----------------------------------|-------------------------------|----------------|-------------------------------------|------------|
| ≤10% change in awake cough frequency (n=32) | | | | | | |
| Total score | 12.1 (3.33) | 12.7 (3.21) | 0.7 | 0.1105 | 0.76 | 0.75 |
| Physical | 4.6 (1.04) | 4.7 (0.93) | 0.1 | 0.2045 | 0.84 | 0.83 |
| Psychological | 3.8 (1.28) | 4.0 (1.26) | 0.2 | 0.1188 | 0.77 | 0.76 |
| Social | 3.7 (1.38) | 4.0 (1.32) | 0.3 | 0.2391 | 0.52 | 0.51 |
| No change on PGIC (n=61) | | | | | | |
| Total score | 11.4 (2.75) | 11.9 (2.89) | 0.5 | 0.0273 | 0.80 | 0.79 |
| Physical | 4.5 (0.90) | 4.6 (0.87) | 0.1 | 0.1391 | 0.79 | 0.78 |
| Psychological | 3.5 (1.12) | 3.7 (1.14) | 0.2 | 0.0917 | 0.70 | 0.69 |
| Social | 3.3 (1.22) | 3.6 (1.28) | 0.2 | 0.1095 | 0.65 | 0.64 |

ICC, intraclass correlation coefficient; LCQ, Leicester Cough Questionnaire; PGIC, patient global impression of change.

^aDifference = Week 4 – baseline for daily score. ^bPearson's product-moment correlation.

Supplementary Table S4. Pearson Correlations Between LCQ Scores and Conceptually Related Measures

| | Total | Physical | Psychological | Social |
|--|--------------|-----------------|----------------------|---------------|
| LCQ score at Week 4^a | | | | |
| CSD | | | | |
| Total score | -0.76 | -0.69 | -0.69 | -0.73 |
| Frequency | -0.75 | -0.65 | -0.71 | -0.73 |
| Intensity | -0.74 | -0.69 | -0.68 | -0.71 |
| Disruption | -0.65 | -0.64 | -0.57 | -0.62 |
| Cough severity VAS | -0.70 | -0.60 | -0.65 | -0.69 |

CSD, Cough Severity Diary; LCQ, Leicester Cough Questionnaire; VAS, visual analog scale. ^aPearson correlation coefficients reported; all are $P < 0.0001$.

Supplementary Table S5. Pearson Correlations Between Change From Baseline in LCQ Total Score and Percentage Changes From Baseline in Awake and 24-Hour Objective Cough Frequency at Week 4 (n=228)

| | Percentage change in awake cough frequency^a | Percentage change in 24-hour cough frequency^a |
|--|---|---|
| Change in LCQ total score from baseline to Week 4 | -0.53 | -0.53 |

LCQ, Leicester Cough Questionnaire. ^aPearson correlation coefficients reported; both are $P < 0.0001$.

Supplementary Table S6. Known-Groups Validity for LCQ Score at Week 4 by CSD Total Score at Week 4 and Awake Cough Frequency at Baseline and Week 4

| LCQ domain | Tertile group 1 | | Tertile group 2 | | Tertile group 3 | | Overall F value | P value |
|---|-----------------|-------------|-----------------|-------------|-----------------|-------------|--------------------|---------|
| | N | Mean (SE) | N | Mean (SE) | N | Mean (SE) | | |
| CSD (Week 4) | | | | | | | | |
| Total score | 76 | 17.4 (0.32) | 75 | 14.9 (0.32) | 68 | 11.7 (0.34) | 74.68 | <0.0001 |
| Physical | 76 | 5.8 (0.09) | 75 | 5.2 (0.10) | 68 | 4.4 (0.10) | 50.43 | <0.0001 |
| Psychological | 76 | 5.8 (0.13) | 75 | 4.9 (0.13) | 68 | 3.7 (0.14) | 58.57 | <0.0001 |
| Social | 76 | 5.8 (0.13) | 75 | 4.7 (0.13) | 68 | 3.6 (0.14) | 67.44 | <0.0001 |
| Awake cough frequency (baseline) | | | | | | | | |
| Total score | 83 | 13.1 (0.31) | 84 | 11.2 (0.31) | 84 | 10.7 (0.31) | 16.12 | <0.0001 |
| Physical | 83 | 4.9 (0.11) | 84 | 4.4 (0.10) | 84 | 4.0 (0.10) | 16.35 | <0.0001 |
| Psychological | 83 | 4.2 (0.13) | 84 | 3.5 (0.13) | 84 | 3.4 (0.13) | 10.73 | <0.0001 |
| Social | 83 | 4.0 (0.13) | 84 | 3.3 (0.13) | 84 | 3.3 (0.13) | 11.20 | <0.0001 |
| Awake cough frequency (Week 4) | | | | | | | | |
| Total score | 76 | 16.8 (0.36) | 77 | 15.0 (0.36) | 76 | 12.1 (0.36) | 42.03 | <0.0001 |
| Physical | 76 | 5.7 (0.10) | 77 | 5.2 (0.10) | 76 | 4.5 (0.10) | 34.05 | <0.0001 |
| Psychological | 76 | 5.6 (0.14) | 77 | 4.9 (0.14) | 76 | 3.9 (0.14) | 34.94 | <0.0001 |
| Social | 76 | 5.5 (0.15) | 77 | 4.9 (0.15) | 76 | 3.7 (0.15) | 35.84 | <0.0001 |

CSD, Cough Severity Diary; LCQ, Leicester Cough Questionnaire.

Supplementary Table S7. Responsiveness of LCQ Scores: LCQ Domains From Baseline to Week 4 by PGIC Category

| PGIC score | N | Baseline, mean (SD) | Week 4, mean (SD) | Mean score change ^a | | Effect size ^b |
|-------------------|----|------------------------|----------------------|--------------------------------|------------|-----------------------------|
| | | | | Difference | Range | |
| LCQ physical | | | | | | |
| 1 or 2 | 87 | 4.4 (1.04) | 5.8 (0.82) | 1.4 | -1.4, 4.0 | 1.3 |
| 3 | 78 | 4.5 (0.97) | 5.0 (0.89) | 0.5 | -1.0, 2.4 | 0.5 |
| 4 | 61 | 4.5 (0.90) | 4.6 (0.87) | 0.1 | -1.1, 1.6 | 0.1 |
| 5 | 5 | 3.4 (0.68) | 3.3 (0.42) | -0.1 | -0.6, 0.8 | -0.1 |
| 6 or 7 | 4 | 4.8 (0.97) | 4.7 (1.49) | -0.2 | -1.0, 0.8 | -0.2 |
| LCQ psychological | | | | | | |
| 1 or 2 | 87 | 3.9 (1.19) | 5.9 (0.91) | 2.0 | -1.9, 4.7 | 1.7 |
| 3 | 78 | 3.8 (1.26) | 4.6 (1.13) | 0.9 | -1.3, 3.6 | 0.7 |
| 4 | 61 | 3.5 (1.12) | 3.7 (1.14) | 0.2 | -1.6, 2.9 | 0.2 |
| 5 | 5 | 3.2 (1.60) | 3.0 (1.54) | -0.1 | -0.7, 0.6 | -0.1 |
| 6 or 7 | 4 | 3.8 (1.38) | 3.0 (1.25) | -0.8 | -1.1, -0.1 | -0.6 |
| LCQ social | | | | | | |
| 1 or 2 | 87 | 3.7 (1.14) | 5.8 (1.03) | 2.2 | -2.5, 5.3 | 1.9 |
| 3 | 78 | 3.7 (1.18) | 4.6 (1.03) | 0.9 | -1.0, 3.0 | 0.8 |
| 4 | 61 | 3.3 (1.22) | 3.6 (1.28) | 0.2 | -3.0, 4.8 | 0.2 |
| 5 | 5 | 3.1 (1.68) | 2.8 (1.39) | -0.4 | -1.0, 0.3 | -0.2 |
| 6 or 7 | 4 | 4.1 (1.30) | 2.5 (1.32) | -1.6 | -2.0, -1.0 | -1.3 |

LCQ, Leicester Cough Questionnaire; PGIC, patient global impression of change. ^aCalculated as Week 4 – baseline.

^bCalculated as score difference/SD of baseline score.

Supplementary Table S8. Responsiveness of LCQ Total Score: ANCOVA With LCQ Total Score Change From Baseline to Week 4 by 24-Hour Objective Cough Frequency Change at Week 4

| 24-hour objective cough frequency change | N | LCQ total score change | | Overall F value |
|--|-----|-------------------------|--|-----------------|
| | | Least-squares mean (SE) | | |
| ≥30% reduction | | | | 55.08* |
| Responder | 126 | 4.3 (0.25) | | — |
| Nonresponder | 102 | 1.1 (0.28) | | — |
| ≥50% reduction | | | | 63.50* |
| Responder | 79 | 5.2 (0.31) | | — |
| Nonresponder | 149 | 1.6 (0.22) | | — |
| ≥70% reduction | | | | 56.17* |
| Responder | 50 | 5.9 (0.39) | | — |
| Nonresponder | 178 | 2.0 (0.21) | | — |
| ≥0.30 SD reduction | | | | 33.45* |
| Responder | 123 | 3.9 (0.27) | | — |
| Nonresponder | 105 | 1.6 (0.29) | | — |

ANCOVA, analysis of covariance; LCQ, Leicester Cough Questionnaire. * $P < 0.0001$.

Supplementary Table S9. ROC Curve Analysis for LCQ Total Score Thresholds Predictive of PGIC of 1 to 2 at Week 4

| LCQ score-change threshold | Sensitivity | Specificity | Positive predictive value | Negative predictive value | Youden index |
|-----------------------------------|--------------------|--------------------|----------------------------------|----------------------------------|---------------------|
| Total score | | | | | |
| ≥1.0 | 0.92 | 0.47 | 0.51 | 0.91 | 0.39 |
| ≥1.3 | 0.91 | 0.52 | 0.53 | 0.91 | 0.43 |
| ≥1.5 | 0.89 | 0.56 | 0.54 | 0.89 | 0.45 |
| ≥1.7 | 0.85 | 0.59 | 0.55 | 0.87 | 0.44 |
| ≥2.0 | 0.85 | 0.64 | 0.58 | 0.88 | 0.49 |
| ≥2.1 | 0.85 | 0.65 | 0.59 | 0.88 | 0.50 |
| ≥2.2 | 0.84 | 0.66 | 0.59 | 0.88 | 0.50 |
| ≥2.3 | 0.83 | 0.68 | 0.61 | 0.87 | 0.51 |
| ≥2.4 | 0.83 | 0.70 | 0.62 | 0.87 | 0.53 |
| ≥2.5 | 0.83 | 0.71 | 0.63 | 0.88 | 0.54 |
| ≥2.6 | 0.82 | 0.71 | 0.62 | 0.87 | 0.53 |
| ≥2.7 | 0.82 | 0.74 | 0.65 | 0.87 | 0.55 |
| ≥2.8 | 0.80 | 0.76 | 0.66 | 0.87 | 0.56 |
| ≥2.9 | 0.78 | 0.78 | 0.68 | 0.86 | 0.57 |
| ≥3.0 | 0.75 | 0.79 | 0.68 | 0.84 | 0.54 |

LCQ, Leicester Cough Questionnaire; PGIC, patient global impression of change; ROC, receiver operating characteristic.