**Reproducibility of Lung Clearance Index (LCI) in clinically stable adults with mild cystic fibrosis (CF)**

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**Background**

In order for lung clearance index (LCI) to be a clinically useful measurement, a better understanding is required of short-term variability. LCI-SEARCH is a longitudinal study in children and adults with CF, with LCI measured at each clinical review using a portable closed-circuit wash-in system (www.lci-search.com). Here we report initial LCI repeatability from the adult cohort.

**Methods**

LCI measurements were performed in triplicate using a closed-circuit wash-in method (Horsley et al. ERJ open). The most recent paired LCI measurements were included providing they were within 6 months of each other, the patient was deemed clinically stable by a physician and the patient scored <2 on a 4 point respiratory symptom score. Repeatability was assessed by Bland-Altman analysis.

**Results**

Of 40 CF adults, paired data were available on 21 (7 subjects had completed only 1 assessment, 1 withdrawn, 11 clinically unstable). These 21 subjects (14 male) completed a median of 5 LCI measurements each (range 2-11), a median of 84 (range 42-189) days apart. Mean age was 28yrs, mean FEV1 82% predicted, 11 pancreatic sufficient, 11 had never had pseudomonas infection.

Mean (SD) LCI at visit 1 was 8.68 (2.96) vs 8.73 (2.81) at visit 2 (p=ns). Median coefficient of variation for LCI was 3.9% (visit 1) and 4.2% (visit 2). Mean change in LCI between visits was 0.05 (1% of baseline LCI). Limits of agreement (LOA) were -1.1 (-13.7)% to 1.0 (11.6)% of baseline LCI. In this very mild cohort, 7 patients had normal LCI (<7); exclusion of these did not substantially alter LOA (-13.9 to 13.1%). There was greater variability in FRC: mean bias -1.5% of baseline (LOA 30 to -33%).

**Conclusions**

Even in this very mild cohort of CF adults, patients are frequently unwell or more symptomatic at routine review. Within-visit repeatability was good, and similar to previous reports. When clinically stable, LCI variability over a period of up to 6m was approximately +/-10%. Addition of more adult as well as paediatric data to this assessment will widen the applicability of these confidence intervals.