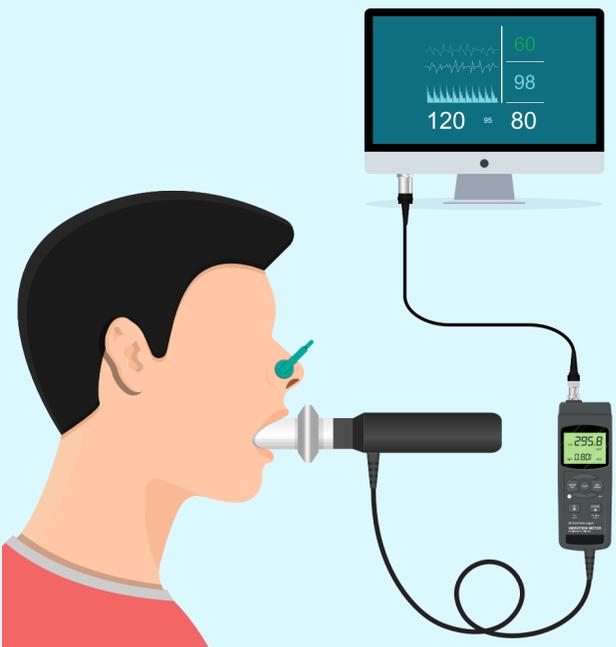


Fast and Simple CO₂-Based Measurement of Functional Residual Capacity (FRC)



Current measurements of FRC use sophisticated, expensive equipment and complex, time-consuming procedures

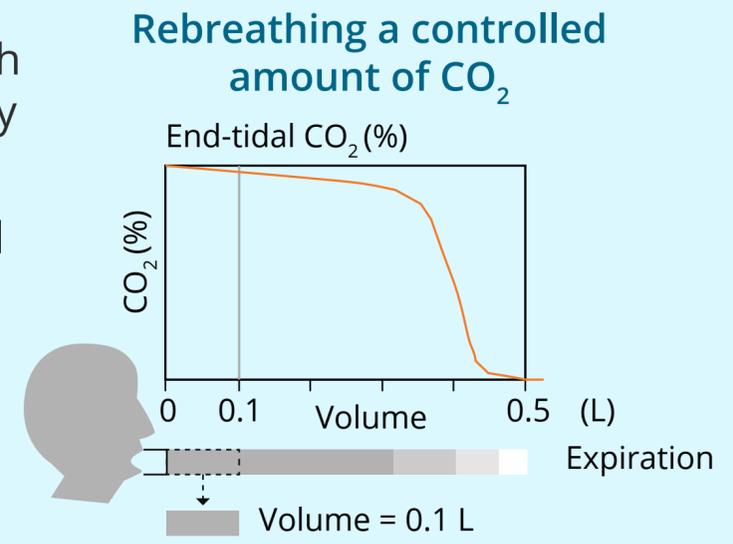
This study evaluates a new, simple method based on CO₂ rebreathing that can be used at the bedside and possibly also in out-of-hospital environments



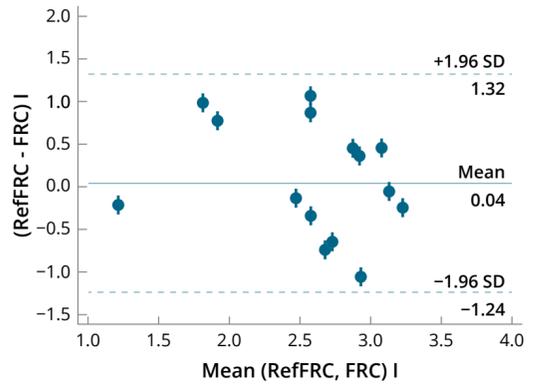
10 healthy adults
Reference FRC was measured with methane dilution + spirometry

CO₂ rebreathing test

- Rebreathe through tube with precisely known volume
- Measure end-tidal CO₂ rise (first two breaths)
- Calculate ELV and FRC

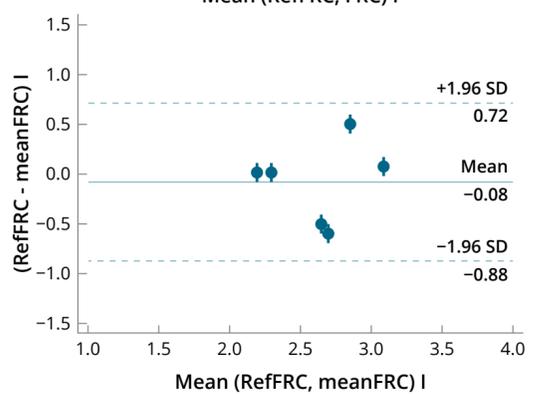


ELV: effective lung volume; SD: standard deviation; LoA: limits of agreement; PE: percentage error



FRC vs. RefFRC (single measurement)

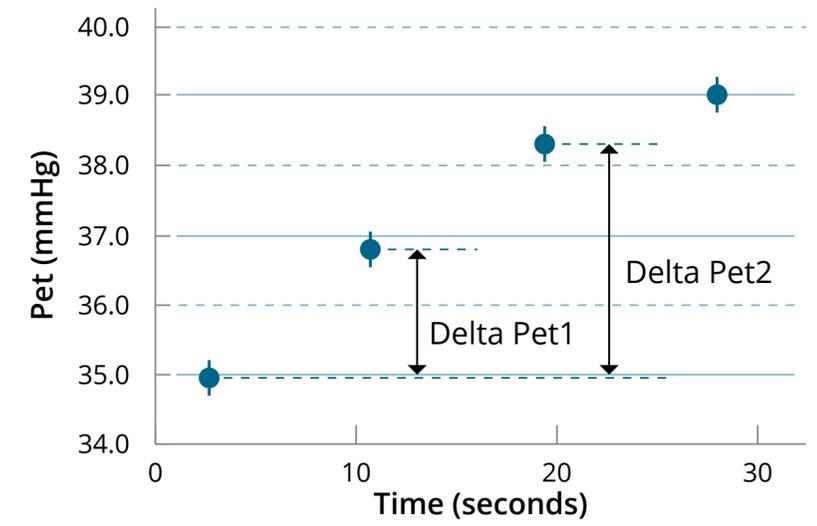
- Mean bias \approx 0.04 L
- LoA: +1.32 to -1.24 L
- PE = 0.54



Mean FRC (average of two measurements) compared to RefFRC

- Mean bias \approx -0.08 L
- LoA: +0.72 to -0.88 L
- PE = 0.23 (exchangeable with standard)

Rebreathing produces rising CO₂ partial pressure (Pet) with time



ELV is calculated from delta Pet1 and delta Pet2, and for healthy subjects FRC = 0.82 ELV

This new CO₂ rebreathing method provides FRC values in about a minute that are accurate and precise enough to be interchangeable with the reference method