Interpretation
Baseline z-scores are within ± 1.64 for FEV_1, FVC and FEV_1/FVC, all being above the LLN. These results are within normal limits.

Post BD demonstrates an increase in both FEV_1 and FVC, which by any criteria are significant.

Conclusion
Normal baseline spirometry with a significant response to Salbutamol via spacer, consistent with asthma.

A male aged 71 years with a standing height of 1.78 m was referred for bronchodilator assessment. Spirometry was performed before and after salbutamol MDI + spacer. The results were -

Index	Predicted	LLN	Baseline	Z-score	Post-BD	Z-score	%pred
FEV_1 (L)	3.04	2.22	1.89	-2.27	2.35	-1.40	62.1
FVC (L)	4.04	3.00	3.45	-0.93	3.91	-0.21	85.4
FEV_1/FVC (%)	76.5	63.2	54.8	-2.47	60.1	-1.97	

The %pred is the %predicted of the baseline values

Calculations

Percentage change from baseline:

FEV_1 = ((2.35 – 1.89) x 100) ÷ 1.89 = (0.46 x 100) ÷ 1.89 = 24.3%
FVC = ((3.91 – 3.45) x 100) ÷ 3.45 = (0.46 x 100) ÷ 3.45 = 13.3%

Percentage of Predicted

FEV_1 = ((2.35 – 1.89) x 100) ÷ 3.04 = (0.46 x 100) ÷ 3.04 = 15.1%
FVC = ((3.91 – 3.45) x 100) ÷ 4.04 = (0.46 x 100) ÷ 4.04 = 11.4%

Δz-score

Δ FEV_1 = -1.40 – (-2.27) = -1.40 + 2.27 = +0.87
Δ FVC = -0.21 – (-0.93) = -0.21 + 0.93 = +0.72

Interpretation
Baseline z-score for FEV_1 is below the LLN (z-score = -2.27), whilst FVC is within normal limits (z-score = -0.93). The FEV_1/FVC is reduced indicating the presence of airflow obstruction (z-score = -2.47).

Post BD demonstrates an increase in both FEV_1 and FVC, which by any criteria are significant. The change in z-score for FEV_1 is > +0.87 indicating a significant BD response. Similarly, the change in z-score for FVC is > +0.72 indicating a significant BD response and a likely reduction in hyperinflation.

Conclusion
Airflow obstruction, with significant reversibility to Salbutamol via spacer. Both FEV_1 and FVC have demonstrated a significant improvement.

5.7 Limitations of Assessing the BD Response

The following is a summary of the limitations of assessing the BD response in patients with respiratory disease. It is not a comprehensive list but serves to highlight important points.

- Individuals may vary in their response to BD; 20 –30% of responsive patients may respond to one agent but not to another.
- Expressing results in terms of % change after the delivery of an inhaled BD relates to the degree of baseline airway obstruction.
- Increases in FEV_1 or FVC of less than 8% or 150 mL is generally within the variability of the measurements and/or may represent normal reduction in vagally mediated bronchomotor tone.
- Failure to demonstrate a significant response to a single drug on one occasion does not preclude a clinical response and further assessment may be required, although the decision to treat patients is on clinical grounds rather than laboratory results.
- Results from patients not performing acceptable or reproducible manoeuvres should be interpreted with caution.
- BD response may need to be evaluated clinically in lieu of acceptable spirometry, e.g., the patient who coughs during baseline measurements may