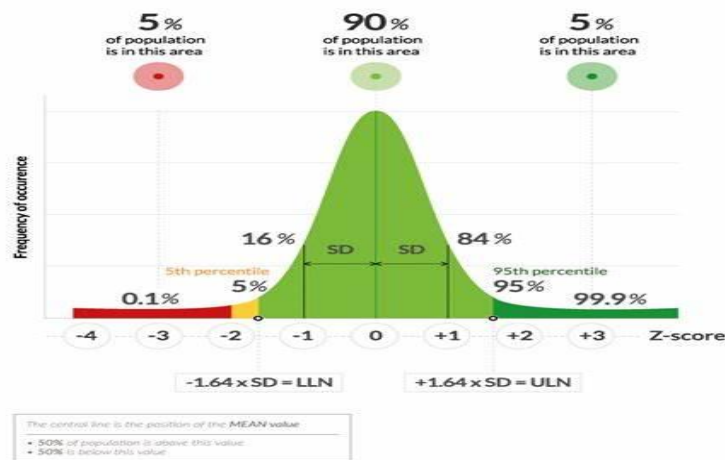


## Z-Scores spirometry interpretation:

**2012 Global Initiative using z-scores for spirometry interpretation:** The Z-score is calculated by the ratio of the difference between the measured value and that predicted with the residual standard deviation. This simple approach has reduced the false positive results found by the conventional limits of 80% compared to a predicted value or 0.70 in absolute value for the definition of bronchial obstruction that is still used. A spirometry value is considered low if it is more than -1.64 standard deviations from the predicted value (which is the same as the lower 5 percentile).



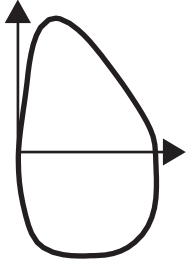
<https://www.spirometry.com/articoli-clinici/interpreting-results-with-gli-2012-using-z-score->

Obstruction	Grade	ATS/ERS 2005	Proposed
Mild	1	>70% pred	z-score $\geq$ -2
Moderate	2	60–69% pred	-2.5 $\leq$ z-score < -2
Moderately severe	3	50–59% pred	-3 $\leq$ z-score < -2.5
Severe	4	35–49% pred	-4 $\leq$ z-score < -3
Very severe	5	<35% pred	z-score < -4

Quanjer PH, Pretto JJ, Brazzale DJ, Boros PW. 'Grading the severity of airways obstruction: new wine in new bottles', Eur Respir J, 2014; 43: 505-512.

## Previous spirometry interpretation metrics:

### What is normal spirometry?



If the shape is normal,  
there is a range of normality.

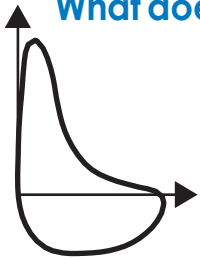
**FVC:** >80% predicted  
**FEV1:** >80% predicted  
**FEF25-75:** 65-100%  
**FEV1/FVC (FEV 1%):** Norms  
based on age +/-5% (of predicted).

#### FEV<sub>1</sub>/FVC:

5-19 yrs ≥ 85%  
20-39 yrs ≥ 80%  
40-59 yrs ≥ 75%  
60-80 yrs ≥ 70%

(NIH references)

### What does asthma look like?



Meets the following criteria:

1. Shape of the curve is concave.
2. FEV<sub>1</sub>/FVC (FEV1%) is decreased
3. FVC > FEV1 > FEF25-75
4. A 12% and at least 200 ml increase in FEV1 post bronchodilator treatment.

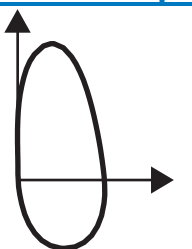
(obstructive/concave  
waveform)

For severity rating, the following criteria are suggested:

- **Mild:** 0.00 - 0.04\* or >80%
- **Moderate:** 0.05\* or 60 - 80%
- **Severe:** <0.05\* or <60%

\*Note: This value is sometimes expressed as a percent, but this different than the percent predicted.

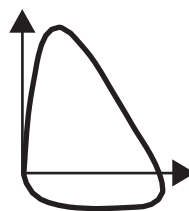
## Other flow patterns to look for



#### Restrictive

Possible causes:

- Obesity
- Pregnancy
- Kyphoscoliosis
- Pulmonary Fibrosis/ILD



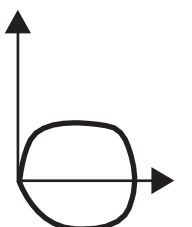
- Foreign body

#### Variable Extra thoracic Airway Obstruction

Causes:

- Paradoxical vocal cord dysfunction

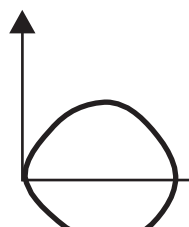
(flattening of inspiratory loop)



#### Fixed Large Airway Obstruction

Multiple causes:

- Glottic or tracheal stenosis
- Tracheal malacia
- Paratracheal/Intratracheal mass
- Vocal cord paralysis



#### Variable Intrathoracic Airway Obstruction

Possible causes:

- Movable mass lesion
- Malignancy

## The One Minute Interpretation ( applies to both methods of spirometry interpretation. )

Check five things:

1. **Is the entry data correct?**  
Check age, height, weight, sex and race
2. **Evaluate the quality of the blow**  
Good effort with rapid rise to peak flow? Is the curve smooth and reproducible?
3. **What is the shape?**  
Normal, obstructive, restrictive or mixed? Is the inspiratory loop cut off?
4. **Look at the percentages for the shape chosen**  
Mild, moderate, severe
5. **State your interpretation**  
e.g. "mild airway obstruction"