

# Guidelines for Spirograms of Quality

Spirometry is an effort-dependent test that requires careful instruction and the cooperation of the test subject. Inability to perform acceptable maneuvers may be due to poor subject motivation or failure to understand instructions. Physical impairment may also limit the subject's ability to perform spirometric maneuvers. These limitations do not preclude attempting spirometry but should be noted and taken into consideration when the results are interpreted.

Spirograms should meet the following criteria for

1. number of trials
2. acceptability
3. reproducibility.

The acceptability criteria should be applied before reproducibility is checked.

## 1. Number of trials

A minimum of 3 acceptable FVC maneuvers should be performed. If a subject is unable to perform a single acceptable maneuver after 8 attempts, testing may be discontinued. However, after additional instruction and demonstration, more maneuvers may be performed depending on the subject's clinical condition and tolerance.

## 2. Acceptability

### 2.1 Upstroke

A good 'start-of-test' includes an extrapolated volume of  $\leq 5\%$  of the FVC or 150 mL, whichever is greater; no hesitation or false start; a rapid start to rise time.

### 2.2 Peak

This should occur within the first 120 milliseconds.

### 2.3 Downstroke

The downstroke should be smooth, and have no artefacts, especially during the first second of the maneuver.

### 2.4 End

There should be no early termination of exhalation. A minimum exhalation time of 6 seconds is recommended, unless there is an obvious plateau of reasonable duration (ie, no volume change for at least 1 second) or the subject cannot or should not continue to exhale further.

No maneuver should be eliminated solely because of early termination. The FEV<sub>1</sub> from such maneuvers may be valid, and the volume expired may be an estimate of the true FVC, although the FEV<sub>1</sub>/FVC and FEF<sub>25-75%</sub> may be overestimated.

## 3. Reproducibility

The two largest FVC's from acceptable maneuvers should not vary by more than 150ml, and the two largest FEV<sub>1</sub>'s from acceptable maneuvers should not vary by more than 150ml.

Excerpted from AARC Clinical Practice Guideline, Spirometry, 1996 Update. Respir Care 1996; 41(7):629-636 by Dr Jim teWaterNaude