

10 steps to checking your spirometry result

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The 10-step process, outlined in the sidebar, of checking your spirometry result ensures that best practices for data validation, interpretation and record keeping are adhered to in the assessment of every spirometry test. This 10-part series briefly outlines each step, one-by-one.

Step 1: Calibration and patient data

Volume calibration / linearity check

The first step towards an accurate interpretation of a spirogram is to ensure that the spirometer was measuring correctly at the time that the subject was tested. Spirometrists should, at the minimum, conduct calibration checks for volume (volume calibration check) at different flow rates (linearity) daily, before the first test of the day, and after four hours or eight subjects. Pneumotach spirometers should be tested for linearity on each calibration check. If the spirometer calibration is not checked and documented, there is no proof that the equipment was measuring correctly when the subject was tested, causing doubt regarding the validity of the test results. All spirometers are to be checked using a validated three-litre syringe which needs to be certified annually and found to be within 15 ml of 3 000 ml.

Subject data

Subject demographics

Predicted values in spirometry are based on an individual's age, height and sex. They are also influenced by the choice of reference values and subject ethnicity. When the age, height, sex or race of the subject are entered incorrectly into the spirometer, the normal predicted values will be incorrect. These errors may go undetected if the person interpreting the report does not routinely check that these details are correctly entered.

Effects of entering sex incorrectly

As spirometry reference equations are sex-specific, men and women of the same age and height will have different lung functions. Men have a larger forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁) than women, by approximately 20%. If a subject is entered incorrectly as a male instead of female or vice versa, the predicted values will be either over- or under-estimated.

Effects of measuring or entering height incorrectly

The taller an individual is, the larger the lung volume and capacity. Like any other manual entry, height can be entered incorrectly. This can happen when the wrong unit of height is measured, e.g. inches versus cm, digits in the height number are incorrectly entered e.g. 157 cm versus 1.57 cm, or height and weight are entered in the wrong places. If height is measured incorrectly, e.g. the subject was not measured, was measured with his / her shoes on, was slouching, feet were not placed against the wall, etc., it can lead to incorrect calculation of predicted values.

Effects of entering age incorrectly

Volumes and flow rates increase until about age 20-25 years, and decline thereafter. A subject's date of birth (DOB) is usually used to determine his/her current age. This is a further opportunity for a manual entry error. Commonly, errors occur when today's date is entered instead of the subject's DOB, or the wrong decade for DOB is entered. These errors happen in every workplace, globally, on a regular basis. By checking our calibration and the subject data, we can correct any errors in data entry before interpreting the result.

10 steps to checking your spirometry

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