

PCRS-UK Protocols



Spirometry in COPD

This protocol has been developed specifically to be utilised by primary care nurses delivering respiratory care. It has also been produced in Microsoft Word™ format as a general guide only, to allow for local adaptation. It must be stressed that the use of all, or part, of this protocol must be sanctioned and approved by the appropriate authorised individual from the practice or primary care organisation in which it is to be used. The PCRS-UK is neither responsible or liable, directly or indirectly for any form of damage or injury caused as a result of information provided in this document.

Aim

To perform spirometry safely and effectively. *"For the diagnosis and assessment of COPD, airflow limitation is best measured by spirometry as this is the most widely available reproducible test of lung function"* GOLD guidelines, 2006.

Quality Control

- Only appropriately trained personnel to undertake this procedure
- Calibrate or verify the machine at the start of each session using a 1 or 3 litre calibration syringe and document reading

Patient Selection and Safety

Patients should be considered for spirometry as follows:

1. Patients with an unconfirmed diagnosis of COPD
2. Patients over 35 on bronchodilators with a significant smoking history (15 pack years or more) who have one or more of the following respiratory symptoms:
 - Chronic cough present intermittently or every day
 - Chronic sputum production
 - Dyspnoea progressive, persistent, worse on exercise, worse during respiratory infections
 - History of exposure to risk factors i.e. smoking, occupational dusts and chemicals
3. Patients must be clinically stable
4. Contraindications:
 - Haemoptysis of unknown origin
 - Acute disorders affecting test performance such as nausea and vomiting
 - Unstable angina
 - Untreated or uncontrolled hypertension
5. Patients must have no history in the last 3 months of the following:
 - myocardial infarction, CVA or pulmonary embolism
 - eye surgery or abdominal surgery
 - ruptured tympanic membrane
 - lung surgery
 - pneumothorax
6. Patients must be free from infection for 4 - 6 weeks
7. Patients must be given a spirometry patient information leaflet prior to their appointment; this will have information relating to the pre-test procedure (see overleaf)
8. The patient should be given a 40-minute appointment to allow time for a full assessment and reversibility testing if indicated

Undertaking Spirometry

- Calibrate or verify the spirometer regularly, according to the manufacturer's instructions, before each session
- Ensure the patient is relaxed and seated in chair with arms
- Record age, height and weight (for patients who are unable to stand - measure arm span and estimate height)
- Record race using ethnic correction factors

Adjusting Caucasian reference values to other ethnic groups. To apply these, multiply the FEV₁ and FVC by the factors below

Population	FEV ₁	FVC
Hong Kong Chinese	1.0	1.0
Japanese American	0.89	-
Polynesian	0.9	0.9
N Indian and Pakistani	0.9	0.9
S Indian, African	0.87	0.87

- Use single use disposable one way filter mouth piece, consider use of antibacterial filter
- Give patients clear instructions
- Use nose clips during Expiratory Relaxed Vital Capacity test
- Carry out relaxed Vital Capacity (VC) by asking patient to take a full inspiration and then to perform a full expiration in a steady manoeuvre
- 3 tests should be within 5% or 150mls (Note if patient leans forward place hand on shoulder to discourage as this will compromise the result)
- Carry out three Forced Vital Capacity (FVC) without nose clips by asking the patient to take full inspiration and to exhale fully using forced manoeuvre (2 blows should be within 5% or 150mls of each other)
- A maximum of 8 attempts is believed to be acceptable in any one session. If the patient is unable to perform the test, arrange a further appointment
- Consider exemption code for those patients unsuitable for spirometry
- Print out numerical and graphical spirometry results
- Document spirometry results (FEV₁, VC or FVC and FEV₁/VC or FEV₁/FVC ratio) using a template in the clinical system available (an example of this for EMIS can be ordered from the PCRS-UK - see <http://www.pcrs-uk.org/resources/audits.php> for more details)

- Photocopy the spirometry results (if possible scan into computer records as spirometry paper is photosensitive and will fade over time)
- Inform the patient of the results and alter treatment according to symptoms and spirometry findings (see COPD protocol).

Errors in Spirometry Testing

- Poor seal around mouthpiece
- Hesitation or false start
- Early termination on exhalation
- Poor intake of breath
- Poor forced expiratory effort
- Cough during procedure
- Incorrect data into the spirometer prior to testing

Infection Control

- Clean the spirometer according to manufacturer's instructions at the end of each spirometry clinic
- Document time and date of cleaning and document on record sheet attached to the spirometer

Maintenance

- Ensure annual service is carried out and document on service documentation sheet attached to spirometer.
- Carry out quality control check on machine weekly using a person with no known chest disease and document the result (this is done by performing a full spirometric manoeuvre, recording the result and ensuring the difference between the readings is always within a 5% variation)

Further Information

- PCRS-UK Opinion Sheet Number 1 – Spirometry – see http://www.pcrs-uk.org/resources/os1_spirometry.pdf
- Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations. A General Practice Airways Group (GPIAG) document, in association with the Association for Respiratory Technology & Physiology (ARTP) and Education for Health. *Prim Care Resp J* 2009;18(3):130-147 DOI: <http://dx.doi.org/10.4104/pcrj.2009.00054>

**Pre Test Procedure / Patient Information leaflet
LUNG FUNCTION TEST (SPIROMETRY)**

Your doctor or nurse has recommended that you have a spirometry test performed.
Please bring any inhalers you are currently using to your appointment.
If you are undertaking full reversibility (your doctor or nurse will explain prior to the test):

Prior to your Spirometry appointment you should not use the following inhalers

For hours.

If this is not possible, please tell your Doctor/Nurse

To improve the accuracy of the test please DO NOT:

- Smoke for 24 hours prior to the test
- Drink any alcohol for 4 hours before the test
- Eat a heavy meal for at least 2 hours prior to the test
- Do any vigorous exercise for 30 minutes prior to the test
- Wear tight clothing which would restrict your breathing

Please ensure you:

- Remove loose fitting dentures
- Remove chewing gum
- Ensure bladder is empty

Please inform the nurse at your appointment if you have had any of the following:

- Recent chest infection requiring antibiotics or steroids
- Heart attack in last 3 months
- Recent eye or other surgery
- Unstable angina
- Perforated ear drum
- Coughing up blood

If you have any questions about this procedure please call: INSERT CONTACT INFO

The PCRS-UK is not able to review or endorse any changes to this protocol.

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PCRS-UK wishes to acknowledge the support of Allen & Hanburys, the specialist respiratory division of GlaxoSmithKline, in the provision of an educational grant to support the nurse programme. The views expressed in this publication are not necessarily those of either the sponsors or the Primary Care Respiratory Society UK.