



PCRS Position Statement

Spirometry and lung function testing in primary care during the Covid 19 Pandemic

Spirometry, a test used to measure and monitor lung function, is an important component of the diagnosis, management and monitoring of respiratory conditions in primary care. Spirometry should be delivered and interpreted by healthcare professionals who have met the criteria and are included in the Association for Respiratory Technology & Physiology (ARTP) National Register of Certified Spirometry Professionals and Operators hosted by the Academy for Healthcare Science (AHCS). Whilst Covid 19 risks remain high, spirometry should only be carried out in primary care when the results will definitively inform or change a patient's management. For patients with asthma, spirometry should be reserved for those with intermediate probability; those with high clinical probability for asthma can be managed appropriately with a trial of treatment. For patients with suspected chronic obstructive pulmonary disease (COPD), a tentative diagnosis using peak expiratory flow rate (PEFR) diary monitoring can be made because a PEFR <75% predicted suggests a degree of airflow obstruction. Then with serial measurements over 2 weeks that do not vary but also remain low despite use of salbutamol for symptom relief, a clinical suspicion can be objectively supported. Confirmatory spirometry can be deferred until a later date. Ideally, patients for whom spirometry is judged to be necessary should be referred to a primary care network respiratory diagnostic service with expertise in the diagnosis of the most common respiratory conditions, asthma and COPD, and of less common respiratory disease and non-respiratory causes of respiratory-related symptoms.

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Background

Spirometry is a test used to measure lung volumes and air flow. Spirometry is an important component of the diagnosis and management (to inform treatment decision making) and monitoring of respiratory conditions in primary care including asthma and chronic obstructive pulmonary disease (COPD) as well as other restrictive respiratory conditions. High-quality diagnostic spirometry is essential to ensure patients receive the correct diagnosis so that management and treatment decisions can be made that avoid inappropriate and potentially harmful interventions and any potential delay to them receiving the right treatment.

Spirometry

Spirometry may be used to establish baseline lung function, for post-bronchodilator investigative testing to diagnose obstructive conditions, for monitoring of clinical progress and for reversibility testing to help differentiate asthma from COPD.

Equipment required to perform spirometry includes a spirometer that meets ISO standard 26783, one-way disposable mouthpieces and nose clips. Bacterial and viral filters should be used as standard for all patients whilst Covid 19 infection risks remains high. Equipment to record an accurate height is also necessary for the interpretation of spirometry results. For reversibility testing, a short-acting bronchodilator and a suitable means for delivery (spacer device or nebuliser) are also required. Spirometers should be calibrated, verified and maintained according to the manufacturer's instructions. Regular cleaning and maintenance are essential and should be carried out according to the manufacturer's instructions and in line with local and national guidance for infection control and equipment maintenance.

Common errors to watch out for when performing spirometry include:

- Poor seal around mouthpiece
- Hesitation or false start
- Early termination of exhalation: a 'short blow' which has not achieved the full forced vital capacity (FVC)
- Poor intake of breath
- Poor forced expiratory effort
- Cough during procedure
- Incorrect data entered into the spirometer prior to testing
- Spirometer not calibrated and verified

Portable spirometers are also now available and may be useful for patients who require self or home-monitoring such as those who have undergone lung transplantation.

Spirometry during the COVID-19 pandemic

Spirometry has the potential to increase the risk of transmission of viral infections, including COVID-19, through droplet or even aerosol formation. This presents a significant challenge for those administering such tests during the ongoing situation with COVID-19 and the appropriateness and diagnostic value of such tests should be carefully considered for patients presenting with respiratory symptoms. Where available, spirometry should be performed via referral to a primary care network respiratory diagnostic service with expertise in the diagnosis of the most common respiratory conditions, asthma and COPD, and of less common respiratory disease and non-respiratory causes of respiratory-related symptoms.¹ This approach has the potential to avoid the need for referral to hospital-based secondary care services and to ensure maximum safety for patients and healthcare professionals undertaking testing procedures such as spirometry.

¹ Baxter N. PCRS Diagnostic services framework. Available at: <https://www.pcrs-uk.org/resource/pcrs-diagnostic-service-specification>

The announcement of a Covid-19 pandemic in early 2020 saw a virtual halt on respiratory function testing in primary care, including spirometry, given the concerns around the potential for transmission of infections, including Covid-19. In August 2020, the Association for Respiratory Technology & Physiology (ARTP) issued revised guidance on recommencing physiological services including spirometry and other respiratory tests.² While these guidelines encompass secondary care services they do include important guidance for those performing respiratory function tests in the primary care setting. ARTP recommends that at the present time respiratory function tests should only be carried out when they will definitively inform or change a patient's management. Spirometry can be conducted in the primary care setting where available and while adhering to local infection control guidance and when due consideration has been given to the risk concerning the individual patient, the tests being performed and the environment in which it is done.

Spirometry for patients with asthma

For patients with suspected asthma, spirometry should, under normal circumstances, form part of the structured diagnostic clinical assessment alongside a detailed history, examination and review of the patient's clinical records. Given the potential for viral transmission, diagnostic spirometry should be reserved for those patients with an intermediate probability of asthma at the present time. Patients with a high probability of asthma following a structured clinical assessment can be appropriately managed with a trial of treatment and with peak flow diary monitoring in the home environment.³

Spirometry for patients with COPD

The diagnosis of chronic obstructive pulmonary disease (COPD) relies heavily on history⁴ but can only be formally diagnosed if fixed airflow obstruction without reversibility is demonstrated, unless diagnosed as emphysema on a computerised tomographic (CT) scan. A tentative diagnosis of COPD can be made based on a peak expiratory flow rate (PEFR) <75% predicted as this suggests a degree of airflow obstruction. This should be followed by serial measurements over 2 weeks and where variation is absent and the PEFR remains low despite the use of salbutamol for symptom relief, further evidence of COPD rather than asthma is provided. This position should be confirmed with spirometry when readily available and a clear record should be made in the patients notes that spirometric confirmation of obstruction without reversibility is required at a later date.

Contraindications to spirometry testing

There are a number of clinical situations under which spirometry should not be undertaken (absolute contraindication) and where the need for spirometry should be carefully considered (relative contraindication).⁵ Spirometry should not be undertaken for patients with active infections including AFB positive tuberculosis until the patient has received at least 2 weeks of treatment. Patients with conditions that may cause serious consequences to health if aggravated by the forced expiration required for spirometry including dissecting/unstable aortic aneurysm, pneumothorax, recent abdominal, thoracic, neuro or eye surgery. Spirometry should be avoided where possible for patients with suspected respiratory infection in the last 4–6 weeks that required antibiotics or steroids, those with undiagnosed chest symptoms (eg haemoptysis), patients with any condition which may be aggravated by the forced expiration required for spirometry including prior pneumothorax, history of myocardial infarction, stroke or embolism in the last 3 months, abdominal or eye surgery. The need for spirometry should also be carefully considered in patients with a

² ARTP Guidelines for recommencing physiological services during the Coronavirus Disease 2019 (COVID-19) endemic phase. Available at: https://www.artp.org.uk/write/MediaUploads/Standards/COVID19/ARTP_COVID-19_endemic_guidance_Vers_5.6_final.pdf. Accessed September 2020

³ Daines L, et al. Asthma guidelines in practice: A PCRS consensus. Available at: https://www.pcrs-uk.org/sites/pcrs-uk.org/files/AsthmaGuidelinesInPractice_FINAL_0.pdf.

⁴ NICE. Chronic obstructive pulmonary disease in over 16s: diagnosis and management. Available at: [nice.org.uk/guidance/ng115](https://www.nice.org.uk/guidance/ng115)

⁵ Graham BL, et al. Standardization of spirometry 2019 update. An official American Thoracic Society and European Respiratory Society Technical Statement. *Am J Respir Crit Care Med* 2019;200:e70-e88.

perforated ear drum, acute disorders such as nausea and vomiting and those with confusion or communication problems.

Knowledge and skills required to perform spirometry

Spirometry should be delivered and interpreted by healthcare professionals with an appropriate level of expertise and experience and who are assessed and certified as competent.⁶ The National Register of Certified Spirometry Professionals and Operators is the list of practitioners and operators who have demonstrated their competence in spirometry. To perform spirometry, healthcare professionals should attain the Foundation level of competency. To perform and interpret spirometry full competency must be attained. An additional level of competency allows for healthcare professionals to interpret but not perform spirometry.⁷

Since April 2020, the register has been managed and maintained by ARTP and hosted by the Academy for Healthcare Science (AHCS).⁸ However, all spirometry certification programmes have been suspended at this time due to the COVID-19 situation. Healthcare professionals undergoing the certification process and those due to re-certify have been given a 6-month extension and ARTP will be reviewing this in an ongoing manner during the ongoing COVID-19 pandemic. Further information on when the certification process will be restarted can be found on the ARTP website.⁹

⁶ Lawlor R. Fit to care: key knowledge skills and training for clinicians providing respiratory care. Available at: <https://www.pcrs-uk.org/sites/pcrs-uk.org/files/resources/2019-FitToCare.pdf>

⁷ ARTP. Training and development courses. Available at: <https://www.artp.org.uk/Training-Development>

⁸ ARTP. ARTP National Spirometry Register Announcement. Available at: <https://www.artp.org.uk/News/artp-national-spirometry-register-announcement>

⁹ ARTP. Spirometry certification. Available at: <https://www.artp.org.uk/spirometry-certification>

PCRS position

- Spirometry is an important component of the diagnosis and management (to inform treatment decision making) and monitoring of respiratory conditions in primary care including asthma and chronic obstructive pulmonary disease (COPD) as well as other restrictive respiratory conditions.
- Only patients with an intermediate probability of asthma should be considered for spirometry during the COVID-19 pandemic. Where spirometry is considered necessary this should ideally be performed via referral to a primary care network respiratory diagnostic service with expertise in the diagnosis of the most common respiratory conditions, asthma and COPD, and of less common respiratory disease and non-respiratory causes of respiratory-related symptoms.
- A tentative diagnosis of COPD can be made using PEFr diary monitoring. A PEFr <75% predicted suggests a degree of airflow obstruction and a serial measurement over 2 weeks that does not vary but also remains low despite use of salbutamol for symptom relief is supportive. Any tentative diagnosis of COPD should be confirmed with spirometry when readily available and a clear record should be made in the patients notes that spirometric confirmation of obstruction without reversibility is required at a later date.
- High-quality diagnostic spirometry is essential to ensure patients receive the correct diagnosis so that the right management and treatment decisions can be made.
- Spirometry should be delivered and interpreted by registered healthcare professionals with an appropriate level of expertise and experience.
- During the Covid pandemic spirometry should only be carried out in primary care when the results will definitively inform or change patient management.

Approved by PCRS Executive Policy Lead on Committee