

# Unit 59: Spirometry and Bronchodilator Response in Adults

<b>Level:</b>	<b>4</b>
<b>Unit type:</b>	<b>Optional (Respiratory Physiology)</b>
<b>Credit value:</b>	<b>10</b>
<b>Guided learning hours:</b>	<b>80</b>

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## Unit summary

In this unit, you will gain the understanding and skills needed to perform spirometry in order to achieve the quality-assured measurement of dynamic lung volumes. In addition, you will gain understanding and skills of bronchodilation and measure the response to bronchodilator tests safely and accurately. You will also be expected to contribute to the interpretation of technical data from individuals, and the generation of a technical report.

You will also be able to undertake routine maintenance, calibration and quality assurance procedures on equipment used. You will be expected to demonstrate your patient-centred professional and safe practice in the workplace.

## Unit assessment requirements

There are no specific assessment requirements for this unit. Please refer to the assessment strategy in *Annexe B*.

## Additional information

AC1.2 including knowledge of Fick's Law and partial pressure relating to how the lungs work.

LO2 includes in a range of individuals and produce a technical report in accordance with Standard Operating Procedures (SOPs).

LO3 and LO4 standard infection control procedures to be applied as per local and organisational policies

AC3.1 includes:

- obtaining verbal consent
- greeting the individual and checking their identification
- communicating with individuals in a way that respects their dignity, rights, privacy and confidentiality
- introducing self and own role
- reviewing the request form

- explaining the investigation to the individual in appropriate language, addressing any investigation-related questions
- providing information on how the individual will be informed of results
- evaluating the risks and benefits of undertaking the investigation
- gaining and documenting informed consent
- explaining the principles, guidance and law for gaining informed consent, including limits of consent
- obtaining and reviewing:
  - medication
  - smoking history
  - recent change in condition
  - any previous test results
- explaining potential special requirements of individuals referred for investigations
- treating the individual with respect, compassion and dignity
- acting on any special individual requirements, and if necessary, discussing with senior staff and carer e.g., learning disabilities
- identifying potential risks of using defective equipment for the investigation
- selecting the correct equipment
- the requirements for the investigation environment
- checking the equipment
- calibrating the equipment
- preparing the equipment
- explaining the principles of measurement for the range of equipment used
- identifying common faults
- taking remedial action
- the potential special needs of individuals referred for investigation and the relevant action required
- the measurements that may be required pre and post investigation
- measuring height and weight and other appropriate measurements in accordance with standardised procedures, adapting them where necessary
- the impact of incorrect positioning or non-cooperation of the individual, on the investigation and the results

AC3.4 includes:

- measuring:
  - Forced Expiratory Volume in One Second (FEV<sub>1</sub>)
  - Forced Vital Capacity (FVC)/Vital Capacity (VC)
  - Peak Expiratory Flow (PEF)

- Maximal Flow Volume Curves (MFVCs)
- identifying errors in individual's technique
- correcting errors in individual's technique
- providing reassurance to the individual
- allowing sufficient time to enable the individual to recover between, or from, the tests
- recording the results accurately in an appropriate format
- the relevance of investigations to referral request and differential diagnosis
- the importance of supporting individuals and encouraging them to perform within their capability
- how to distinguish between poor individual performance, technical faults and deterioration in clinical status
- the reasons a test may be stopped to maintain the safety of the individual
- recording the results in an appropriate format, documenting any technical comments that may influence the test outcome
- documenting any technical comments that may influence the test outcome.

AC3.5 includes:

- mode of action of common bronchodilators
- the Standard Operating Procedure (SOP) for bronchodilator response, including individual group directive (PGD) for administering bronchodilators
- authority required to administer bronchodilators as part of respiratory physiology investigations
- factors influencing the selection of bronchodilator and device
- common side effects of bronchodilators
- preparing the bronchodilator and device
- explaining the purpose and use of bronchodilators to the individual
- the factors that influence the effectiveness of administration that may impact on results.

AC3.6 includes:

- administering the bronchodilator
- documenting any technical comments that may influence the test outcome
- recording any results in an appropriate format

AC6.1 with respect to the reference ranges includes:

- calculation
- use
- limitations
- age-related variations
- the use of standard residuals (SRs/Z-scores)

AC 6.3 and 6.4 include:

- how to distinguish between poor individual performance, technical faults and deterioration in clinical status.

AC5.1 includes:

- safety testing
- routine maintenance.

## Learning outcomes and assessment criteria

To pass this unit, learners need to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet **in own area of work and in accordance with Standard Operating Procedures (SOPs)** to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the anatomy and physiology of the respiratory system and how this relates to normal function	1.1	Describe the structure of the respiratory system and explain how this aids its function			
		1.2	Describe the physiology of the respiratory system and explain how this aids its function			
		1.3	Explain the mechanics of breathing (respiration and gas exchange)			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
2	Understand the principles and application of spirometry (dynamic lung volumes measurement) in routine clinical practice in adults	2.1	Explain the pathogenesis of COPD			
		2.2	Explain the terms PEF, FEV <sub>1</sub> , FVC, VC, FEV <sub>1</sub> /FVC ratio, and FEF 25-75/MEF25-75			
		2.3	Explain the purpose of calculating reference values for spirometry and the limitations of the reference values used			
		2.4	Explain the clinical indications and contraindications for spirometry (dynamic lung volume measurement) in adults			
		2.5	Explain the clinical indications and contraindications for the use of bronchodilation in adults			
		2.6	Explain the mode of action of common bronchodilators			
		2.7	Explain the Standard Operating Procedure (SOP) for performing quality-assured spirometry (dynamic lung volumes) and bronchodilation			
		2.8	Explain the role of inhaled drug therapy in the management of respiratory disease			
		2.9	Explain how different devices work for measuring volume and flow			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.10	Explain the minimum standards and requirements for spirometers and why they are important			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Be able to prepare for the measurement of dynamic lung volumes and bronchodilator response	3.1	Demonstrate the preparation of the environment, equipment and individual for spirometry and bronchodilator response			
		3.2	Explain why it is importance that the individual follows pre-test instructions and the consequences of them not being followed			
		3.3	Outline the recommended guidelines for all procedures associated with spirometry and bronchodilator response			
		3.4	Demonstrate the measurement of spirometry in adults in accordance with recommended guidelines			
		3.5	Demonstrate how to administer a bronchodilator in accordance with recommended guidelines			
		3.6	Demonstrate the performance of post-bronchodilator measurements in accordance with recommended guidelines			
		3.7	Outline the indicators for repeating and reproducing quality-assured spirometry tests			
		3.8	Describe common technical errors in spirometry and the resulting recordings for each error			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to perform routine cleaning and decontamination procedures for equipment used for spirometry (dynamic lung volumes) and bronchodilation in adults	4.1	Evaluate the protocols for cleaning and decontaminating equipment used for spirometry and bronchodilation			
		4.2	Clean and decontaminate equipment to ensure it is ready for reuse			
		4.3	Keep accurate cleaning and decontamination records			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to perform routine maintenance, calibration and quality assurance processes on the equipment used to undertake spirometry in adults	5.1	Explain current safety standards underpinning the measurement of spirometry			
		5.2	Explain the requirements for accurate completion of equipment maintenance records			
		5.3	Perform routine maintenance on equipment and accurately complete equipment maintenance records			
		5.4	Explain the use and importance of volume and flow calibration/verification for dynamic lung volumes			
		5.5	Explain the use of physiological controls as part of the quality assurance procedures for dynamic lung volumes			
		5.6	Perform vital capacity (VC) measurements using a calibration syringe			
		5.7	Perform forced vital capacity (FVC), forced expiratory volume in one second (FEV <sub>1</sub> ) and peak expiratory flow (PEF) measurements on a physiological control			
		5.8	Explain the purpose of calibration logs			
		5.9	Explain the purpose of volume calibration verification at differing flow rates on one piece of equipment			
		5.10	Discuss the purpose of quality assurance in respiratory physiology testing			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.11	Explain the procedure to be followed in the event of identifying an issue of quality assurance			
6	Be able to contribute to the production of a technical report for spirometry (dynamic lung volumes) and bronchodilator response in adults	6.1	Explain the purpose of reference ranges and how normal values are calculated			
		6.2	Demonstrate the ability to use reference ranges for spirometry			
		6.3	Describe the typical patterns and results for dynamic lung volumes and bronchodilator response for common respiratory diseases			
		6.4	Produce a technical report for dynamic lung volumes, including the effect of bronchodilator therapy			

Learner name: \_\_\_\_\_

Date: \_\_\_\_\_

Learner signature: \_\_\_\_\_

Date: \_\_\_\_\_

Assessor signature: \_\_\_\_\_

Date: \_\_\_\_\_

Internal verifier signature: \_\_\_\_\_

Date: \_\_\_\_\_

*(if sampled)*