Spirometry Standards Document

National Spirometry Certification

Spirometry Standards Document	Spirometry
Purpose Statement	To outline the expectations for spirometry training providers and the minimum requirements candidates must meet to achieve **ARTP Spirometry Certification**
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Contents

1. Introduction

The following document describes the standards set by the **Association for Respiratory Technology and Physiology (ARTP)** as the provider of spirometry certification. It outlines the expectations for spirometry training providers and the minimum requirements candidates must meet to achieve **ARTP Spirometry Certification**.

2. Standards for Provision of Spirometry Training

To successfully achieve **ARTP Certification in Spirometry**, candidates must undertake both theoretical and practical skills training with a qualified provider. This could be with an external provider or within the normal workplace environment if there is the required experience in the workforce. The ARTP recommends that all training providers meet the minimum standards outlined here.

Candidates should be performing spirometry regularly in the workplace Regular exposure will put candidates in the best position to succeed in the Spirometry Certification, and ensure competency in gaining quality assured diagnostic spirometry results for patients.

2.1. Trainer Requirements

2.1.1. Training providers must have an in-depth understanding of the **ARTP Spirometry Certification** process to effectively guide and support candidates.

2.1.2. Trainers should hold a **minimum of the ARTP Full Certificate in Spirometry** (or equivalent) and maintain competency in performing and interpreting quality-assured diagnostic spirometry in clinical settings.

2.1.3. Trainers should possess a **recognised teaching or training qualification** relevant to healthcare.

2.1.4. The following maximum trainer-to-candidate ratios are recommended:

- For theoretical training, the student-teacher ratio should be up to **30:1**.
- For practical skills training, the ratio should be up to **5:1** to ensure adequate supervision.

2.1.5. Training providers must ensure candidates receive **ongoing support** via face-to-face workshops, email, virtual platforms, or telephone.

2.1.6. Trainers are encouraged to attend an **ARTP Spirometry Update session** at least bi-annually to stay informed of any changes in the certification process.

2.1.7. Please note that ARTP does not accredit trainers. It is the responsibility of training providers to ensure that their trainers meet the appropriate standards and qualifications to deliver high-quality spirometry education.

2.2. Course Duration

2.2.1. **Practical skills:** A minimum of **4.5 hours** of practical skills training is required, following the ratios mentioned above.

2.2.2. **Theoretical teaching:** Between **9-12 hours** of theoretical training is recommended, also following the stated ratios above.

2.2.3. Candidates should also engage in **self-study** using resources such as **distance learning tools** and **web-based platforms** to reach the necessary competency level for performing diagnostic spirometry.

2.3. Course Content

ARTP recommends that training courses cover the following areas to ensure candidates achieve **proficiency** in both **adult** and **paediatric** spirometry testing.

2.3.1. Training courses should ensure coverage of **appropriate content** for the role of the candidate (e.g., adult or paediatric spirometry).

2.3.2. Candidates focused on **paediatric-only** testing should have specific sections targeted towards **paediatric testing**.

2.3.3. **On completion of the training, candidates should demonstrate an understanding of the following areas:**

2.3.3.1. Basic Anatomy, Physiology, and Pathophysiology of the Respiratory System

- Anatomy and physiology of the respiratory system
- Pathophysiology of common respiratory disorders
- Lung growth and development, especially for paediatric candidates

2.3.3.2. Definitions of Spirometric Values

- **FEV_1**, **FVC**, **FEV_1/FVC**
- **PEF**, **$FEF_{25-75\%}$**
- **VC**
- Quality indicators such as **BEV, PEFT and FIVC**
- Ability to locate these values on the **volume-time curve** and **flow-volume loop**

2.3.3.3. Spirometer Use and Maintenance

- **Minimum recommendations** for spirometers
- Understanding **measurement principles** of spirometers
- Recognising **advantages and limitations** of different spirometer types
- Spirometer **cleaning** and **maintenance**, including fault detection and correction

2.3.3.4. Infection Control

- **Infection prevention** methods for spirometry, including **universal precautions**
- Importance of regular **cleaning** and the processes involved

2.3.3.5. Quality Control of Spirometers (Physical and Physiological)

- Performing **calibration verification** with an appropriate syringe
- Defining the purpose of **calibration** and **verification**
- Conducting **biological quality control** using a healthy subject
- Summarising equipment **quality control** requirements

2.3.3.6. Pre-Test Considerations, Indications, and Contraindications

As per **ARTP 2020** National guidelines and recommendations:

- Indications for spirometry testing
- Understanding **contraindications** to spirometry testing (relative and absolute)
- Importance of effective **communication** to optimise test results
- Providing appropriate **pre-test instructions** for subjects
- **Special considerations** when testing children

2.3.3.7. Reference Values

- Defining and explaining **reference values** in spirometry
- Factors influencing **reference values**
- Demonstrating a basic understanding of limitations of reference values
- Demonstrating the use of **Z-scores** and **Standardised Residuals**

2.3.3.8. Performance of Spirometry

Candidates must be able to:

- **Prepare the spirometer** for testing as per manufacturer's instructions
- Conduct accurate **height** and **weight measurements** and record findings accurately
- Apply **infection control procedures**
- Correctly **instruct** subjects on spirometer use
- Describe the **correct position** for spirometry
- Record **relevant subject information** (e.g., medication, smoking history)
- Record duration of smoking history (in pack years) and time of last cigarette if appropriate
- Ask **pre-test questions** and identify **contraindications**
- Explain the **spirometry testing procedure** to the subject
- **Demonstrate** and **coach** the subject during testing
- Obtain accurate spirometry results per **ARTP 2020 and National guidelines**
- Recognise **improperly performed manoeuvres** and advise corrective actions
- Document any relevant events that occur during the spirometric assessment
- Ensure **optimal effort** from paediatric subjects through incentives such as games

2.3.3.9. Assessment and Review of Spirometry Results

Candidates must be able to:

- Identify if results meet **acceptability / usability** and **repeatability** criteria according to the **ARTP 2020 Guidelines**
- Apply **quality grading** to individual FVC and FEV_1 measurements
- Select the **best values** from test results
- Compare results with **reference values**
- **Evaluate changes** in individual test Subjects
- Report **bronchodilator response**
- Recognise and describe **restrictive**, **obstructive and mixed patterns** on **volume-time** and **flow-volume curves**
- Record and report **comments** on the spirometry tests
- Understand how to **store electronic data**

3. Pre-Requisites for Spirometry Candidates

The **ARTP 2020 Spirometry Guidelines** recommend that candidates possess the following general knowledge and basic computer skills to ensure successful completion of the certification process. It is the candidate's responsibility to confirm that they meet these prerequisites before starting the course.

3.1. General Knowledge

3.1.1. Ability to perform basic mathematical operations, such as multiplication, division, handling decimals, and percentages.

3.1.2. Understanding and ability to calculate ratios.

3.1.3. Proficient use of a basic calculator to perform necessary calculations.

3.2. Basic PC Skills

3.2.1. Familiarity with basic computer operations, including navigating software programs required for spirometry testing.

3.2.2. Basic understanding of data entry, especially handling spirometry test data.

3.2.3. Ability to use drop-down menus and select appropriate options during spirometry test entries.

4. Levels of Spirometry Certification

The **ARTP** classifies spirometry certification into three levels:

1. **Full (Performing & Reporting)**,
2. **Performing Only**
3. **Reporting Only**

Certification can be obtained for adult testing, paediatric testing, or both. Further information for combined portfolios or top-up certifications is provided in **Section 9**.

4.1. Full (Performing & Reporting) Certification

This certification level assesses a candidate's competency in both performing and reporting quality-assured diagnostic spirometry. Candidates must complete:

4.1.1. A portfolio of evidence demonstrating proficiency in both spirometry performance and interpretation.

4.1.2. A **Multiple-Choice Question (MCQ) Examination** focused on the clinical reporting of spirometry results.

4.1.3. An **Objective Structured Clinical Examination (OSCE)** assessing practical competency.

4.2. Performing Only Certification

This certification assesses the competency of a candidate in performing spirometry without requiring clinical reporting. Candidates must complete:

4.2.1. A portfolio of evidence focused solely on the practical performance of spirometry.

4.2.2. An **OSCE** evaluating technical skills in spirometry.

4.3. Reporting Only Certification

This certification assesses a candidate's ability to interpret spirometry results. Candidates must complete:

4.3.1. A portfolio of evidence demonstrating clinical interpretation skills.

4.3.1. An **MCQ Examination** on spirometry result reporting and related clinical scenarios.

5. Registration Process

All applications for spirometry certification are completed online via the **ARTP spirometry portal.** Registration details and instructions for payment can be found at https://spirometry.artp.org.uk/portal

Candidates must provide personal details and select their preferred method of payment during registration. Group bookings are available as well as booking on behalf of candidates.

**Once enrolled candidates will be given access to all the resources available on the ARTP Spirometry portal, including templates, booking links, assessment forms and guidelines for exam preparation.*

6. Certification Registration Fee

The registration fee covers certification costs and the candidate's registration onto the **ARTP Spirometry Register** for the first year. The following fees apply:

Full (Performing & Reporting) Certification:	£250
Performing Only Certification:	£250
Reporting Only Certification:	£195
Joint Adult and Paediatric (Full) Certification:	£265
Joint Performing Only Certification:	£265
Joint Reporting Only Certification:	£210
Top-Up Paediatric after completing full Certification:	£195
Recertification portfolio:	£125

**Certificate fees may be revised or may be subject to change; prices were last updated in April 2023.*

7. Candidate Communication Information

7.1. Upon successful registration, candidates will receive an automated email booking confirmation.

7.2. Additional details, including access to the PebblePad e-portfolio system, will be sent on or around the 1st working day of the month of enrolment.

7.3. Candidates will receive a support guide within their portfolio to ensure candidates are familiar with navigating PebblePad and submitting their portfolios.

8. Spirometry Portfolio Overview

The **ARTP Spirometry Portfolio** is a key component of the certification process. Candidates must demonstrate their knowledge and skills through a series of tasks and evidence submissions.

8.1. Portfolio Requirements

8.1.1. The spirometry portfolio consists of **several sections**. The sections that must be completed will depend on the level of certification that the candidate has registered for.

8.1.2. All sections of the portfolio must be completed to the defined minimum standard.

8.1.3. Candidates must **provide evidence of competency for each required section**, which may involve uploading documents, answering questions, or completing specific tasks.

8.1.4. When answering questions, the candidate will be required to **write in the text boxes and tables** provided or the candidate may have the option to **upload a document or image**.

8.1.5. When completing sections requiring evidence of competence, an upload option is provided for each piece of evidence required.

8.1.6. The candidate will be able to **amend any part of their portfolio until it is submitted**; once submitted no further amendments can be made.

8.1.7. There are **two outcomes** to the portfolio:

- Pass
- Fail

8.1.8. Portfolios will be marked based on the quality of evidence provided, and feedback will be given for any sections needing improvement. In the case of a "Not yet achieved" being awarded, the portfolio will be referred back to the candidate with appropriate standardised feedback outlining the amendments that are required to achieve a pass.

8.1.9. Following an initial fail (not yet achieved), a **further two portfolio submissions are permitted** within the initial registration fee.

8.1.10. If additional submissions are required to complete the portfolio, **evidence of further training** which must be completed after the third unsuccessful attempt, must be submitted to ARTP within 6 months. An administration fee of £50 will be applied for each additional submission.

9. Portfolio Contents

Using the **PebblePad e-portfolio system**, candidates must provide information about their spirometry work.

9.1. Full, Performing and Reporting Portfolios

The Full and Performing portfolio is comprised of the following sections for both adults and paediatrics. Where differences arise, these will be highlighted.

9.1.1. Background Information (Full, Performing & Reporting Levels)

The background information section consists of **six standard components**. To successfully complete this section, the candidate must describe:

- The **range of tests** performed in their workplace
- The **frequency of testing** (weekly/monthly)
- The **types of subjects** tested
- The **staff groups responsible** for performing the tests

- The **location where the tests are conducted**
- The **referral methods** for lung function testing

9.1.2. Performance Criteria (Full & Performing Levels Only)

The candidate must demonstrate **adherence to safety standards and protocols** when performing spirometry. To complete this section successfully, the candidate is required to:

- Provide a **local protocol** for the performance of quality-assured diagnostic spirometry. This should be an uploaded procedure/policy document. References must be included.
- Answer **two subject safety questions** related to **contraindications** for spirometry and **pre-test instructions** for subjects.

9.1.3. Calibration & Verification (Full & Performing Levels Only)

The candidate must demonstrate an understanding of calibration and verification processes. To successfully complete this section, the candidate is required to:

- **Define calibration and verification**, explaining the difference between the two.
- Describe the **purpose of regular calibration or verification** and the process used in their workplace.
- Outline the **acceptable ranges for calibration/verification** and the **actions to be taken if calibration/verification fails.**
- Upload a **fully completed calibration or verification log** that meets validity requirements (further guidance is provided in Appendix 2).

9.1.4. Physiological Control (Full & Performing Levels Only)

The candidate must **explain the purpose of regular physiological quality control** and demonstrate its application. To complete this section, the candidate is required to:

- Describe the purpose of using a biological control person for quality assurance in spirometry services.
- Upload ten valid spirometry results from a single biological control person.
- Perform spirometry over a minimum 2-week and maximum 4-week period within the last 6 months.
- Tabulate and assess result variations (further guidance is available in Appendix 3).

9.1.5. Infection Control (Full & Performing Levels Only)

The candidate must demonstrate adherence to effective infection control procedures. To achieve this, the candidate must:

- Provide documentation detailing **spirometer cleaning procedures**, referencing manufacturers' guidelines.
- Submit documentation outlining **infection control procedures** followed when testing subjects with infectious diseases, with **appropriate references**.
- Submit a log of **cleaning on 10 separate days** (a template is available for download if needed).

9.1.6. Subject Tests (Full & Performing Levels Only)

- The candidate must provide evidence of competence in subject testing by uploading ten anonymised subject tests:
    - For the **Adult Portfolio**, all subjects must be aged **16 or older**.
    - For the **Paediatric Portfolio**, all subjects must be **under 16 years**, with **at least three younger than 10 years** old.
    - For the **Joint Adult & Paediatric portfolio**, **five** subjects must be **under 16 years**, with at least **one younger than 10 years old**.
    - For the **Top-Up portfolio**, **five subject** tests are required, all of whom must be **under 16 years**, with **at least one younger than 10 years** old.
- The candidate must have **performed the tests themselves**. It is not acceptable to submit tests performed by others.
- Only test results obtained within the **last 18 months** may be used.
- All results must meet **acceptability and repeatability criteria** (refer to Appendix 1).
    - Provide technical comments explaining how the test meets the criteria. This allows for focused feedback if the test does not meet the standard.
- **Bronchodilator Responsiveness Tests:** While bronchodilator responsiveness testing is NOT mandatory, if submitted, it will be assessed according to ARTP guidelines:
    - Both baseline and post bronchodilator spirometry tests must meet the acceptability and repeatability criteria outlined in Appendix 1
    - Post bronchodilator spirometry values should not show a reduction compared to baseline spirometry values (less than 150mls or less than 100mls if FVC is under 1L for VC, FVC, and FEV_1; and less than 40L/min or 0.67L/sec for PEF).
    - Candidates must submit baseline and post-bronchodilator results as part of a single test example; they cannot be used separately as two individual tests.
- **Quality Review of Test Reports:**
    - Test reports that do not meet criteria will be returned to the candidate with feedback, explaining the deficiencies.
    - To comply with professional standards (NMC, RCP, HCPC), all submitted results must be fully anonymized. This includes date of birth and any unique identifier produced by the spirometer. If there is a confidentiality breach, the portfolio will be returned in its entirety for revision, and the submission will be marked as a failed attempt.
    - Candidates must have performed the tests themselves and must not submit tests performed by others.

9.1.7. Problems Encountered During Testing (Full, Performing & Reporting Levels)

The candidate will be provided with **five technically unacceptable spirometry** test reports. They must review each and:

- Identify the **technical error**
- Explain **how to rectify it**

9.1.8. Declaration (Full, Performing & Reporting Levels)

- All candidates must download and complete a self-declaration form confirming that all work within the e-portfolio is their own.
- This should be signed in pen NOT electronic signature
- The declaration form must be countersigned by a Head of Service, Deputy Head, GP, Senior Nurse, Supervisor, or another senior staff member.

9.2. Top Up Portfolio (For Adding Paediatric Certification to an Adult Certificate):

To complete the Full/Performing Paediatric Top-Up portfolio, the following is required:

9.2.1. A **shortened portfolio**, which excludes background information and includes only five subject test uploads

9.2.2. A **condensed multiple-choice questionnaire (MCQ)** consisting of ten questions

9.3. Recertification Portfolio (For Audit Candidates or Lapsed Certificates):

The Recertification Portfolio requires the completion of the following:

9.3.1. A **shortened portfolio** that excludes background information and includes only five subject test uploads

9.3.2. A **condensed multiple-choice questionnaire (MCQ)** with ten questions

9.3.3. Every year 5% of the register are asked to take part in the audit. More information on this can be found here Audit | ARTP Spirometry

10. Multiple-Choice Question (MCQ) Examination

10.1. MCQ for the Full, Performing and Reporting Portfolios

The MCQ exam is mandatory for candidates pursuing the Full or Reporting level certificate.

10.1.1. The MCQ consists of 20 spirometry test reports, which may or may not include associated clinical information.

10.1.2. Candidates must complete the assessment under examination conditions, defined as within a set time limit, without access to reference materials, and under the supervision of a nominated invigilator. An invigilator form must be submitted to spirometry@artp.org.uk no later than 2 days before the scheduled MCQ exam date.

10.1.3. The exam has a time limit of 60 minutes.

10.1.4. Candidates must follow a pre-defined reporting strategy outlined in Appendix 4, which provides the guidelines for reporting the results of each question.

10.1.5. Candidates must demonstrate the ability to identify abnormal spirometry results using the lower limit of normal (LLN) and, in some cases, by applying Z-scores.

10.1.6. Candidates will also be required to grade the severity of airflow obstruction using Z-scores (for both adults and paediatrics) as per ARTP 2020 guidelines, and FEV_1 percent predicted using NICE 2010 guidelines (adults only).

10.1.7. A score of 14 out of 20 (70%) is required to pass the exam.

10.1.8. Candidates will be notified of their results immediately upon completion, and then officially via email within 5 working days of completing the assessment.

10.1.9. If a candidate does not achieve a pass, they will be given up to two further attempts within their initial registration fee to succeed. Each further attempt must be conducted on a separate day.

10.1.10. If additional attempts are needed, evidence of further training undertaken after the third unsuccessful attempt, must be submitted to ARTP within 6 months, along with an administration fee of £50 per additional attempt.

10.2. MCQ for Top-Up Certification

10.2.1. Candidates completing the Top-Up portfolio will take a shortened MCQ focused on their additional or optional modality.

10.2.2. To pass, candidates must correctly answer at least 7 out of 10 questions (70%).

10.2.3. The questions will pertain to the relevant population (adult or paediatric) and will cover both technical and clinical aspects of spirometry test data interpretation and test performance.

10.3. MCQ for Audit and Recertification candidates

10.3.1 Candidates completing the audit or the full recertification certification will take a shortened MCQ.

10.3.2 To pass candidates must correctly answer at least 7 out of 10 questions (70%) and they will be given 45 minutes to complete this assessment.

10.4. Special Requirements

10.4.1 Candidates who require additional time to complete their MCQ examination can apply using the special requirements form found at https://www.artp.org.uk/resources/special-requirements-form

11. The Objective Structured Clinical Examination (OSCE)

The **OSCE** is a mandatory assessment for candidates pursuing the **Full** or **Performing** certification levels. It is designed to assess both practical spirometry skills and theoretical knowledge.

11.1. OSCE for the Full/Performing Certificate

The **OSCE** consists of two components:

1. **Practical Assessment**
2. **Technical Viva**

Both components must be passed for successful completion of the **OSCE**.

11.2. Practical Assessment

The ARTP has transitioned to a **virtual OSCE format**. Candidates will complete the assessment using a cloud-based video conferencing platform such as Zoom or Microsoft Teams. **The link for the assessment will be sent by the assessor to the candidate.**

11.2.1. During the virtual session, the candidate will perform spirometry on a chosen volunteer to reflect their normal working practice

11.2.2. Candidates can view an instructional video demonstrating the process to familiarise themselves with the virtual format available here : https://youtu.be/P_ZIvExBI-g?si=0o1pNZDpMs3DWlBx

11.2.3. The practical component includes calibration/verification of the spirometer and the performance of quality-assured diagnostic spirometry on a patient.

11.2.4. Candidates will have 45 minutes to complete the whole assessment

11.2.5. If the candidate does not successfully complete an element of the practical assessment, follow-up questions will be asked to provide an opportunity to demonstrate competence in the area.

11.2.6. To pass the OSCE, candidates must successfully complete the practical assessment and the technical VIVA.

11.3. OSCE Process

Upon enrolling the candidate will be required to recruit a volunteer to act as a patient during the assessment. This individual should be free of respiratory disease and willing to be recorded. They will be required to sign a consent form and this should be sent to the assessor prior to the assessment date. The candidate will also be required to inform the assessor of the make and model of the spirometer that will be used in the assessment.

Upon completion of the assessment candidates will be required to share the results with the assessor. This can be done in one of three ways

1. Share the computer screen
2. Show the screen to the assessor
3. Email the assessor with the results

The candidate should inform the assessor prior to the date of the examination how they intend to share their results.

Before beginning the **OSCE**, the examiner will:

11.3.1. Introduce themselves and outline the structure of the assessment.

11.3.2. Explain the time allocated for each part and the specific details of the spirometer used.

11.3.3. Answer any questions the candidate may have before starting the assessment.

11.4. The Spirometer

Candidates will use the spirometer they use on a normal day to day basis in their own workplaces.

11.5. The Test Subject

For the virtual assessment, the candidate will "test" a colleague or subject of their choice, who will act as the subject. For detailed information on this process please see the OSCE guide for candidates and video available on the ARTP website.

11.6. Technical Viva

11.6.1. Candidates will have **10 minutes** to complete the technical viva.

11.6.2. The viva will include predefined questions based on the spirometry performed during the practical assessment or general questions regarding the technical aspects of spirometry.

11.7. Completion of the OSCE and Notification of Outcome

11.7.1. Upon completing the OSCE, candidates will be thanked for their participation.

11.7.2. Candidates will not receive their results immediately. Results will be added to their spirometry portal within **5 working days** communicated via email to check these results.

11.7.3. If the candidate does not achieve the required pass mark, structured feedback will be provided in their spirometry portal and they will be allowed one further attempt to pass within their initial registration fee.

11.7.4. Should the candidate require additional attempts after the second failure, they must submit evidence of further training within **6 months** and will incur a £50 administrative fee per additional attempt.

12. Certification Completion

12.1. Components to Certification

Spirometry certification is awarded when a candidate successfully completes all components of their registered certification level:

12.1.1. Performing Spirometry Certification requires completion of the **E-portfolio** and the **OSCE**.

12.1.2. Full Spirometry Certification requires completion of the **E-portfolio**, **MCQ**, and the **OSCE**.

12.1.3. Reporting Spirometry Certification requires completion of the **E-portfolio** and the **MCQ**.

12.2. Allowances for Failed Attempts

12.2.1. In the event of a failure at any stage of the certification process, candidates may make additional attempts to complete each stage.

12.2.2. The initial registration fee includes a maximum of:

- 3 portfolio submissions
- 3 MCQ attempts
- 2 OSCE attempts

12.2.3. If additional attempts are required, candidates must provide evidence of further training, completed after the final failed attempt. This evidence must be submitted to ARTP within 6 months, and an administration fee of £50 per additional attempt will apply.

12.2.4. Candidates pursuing full certification who do not successfully complete either the OSCE or MCQ may apply for a certification level change to "Performing" or "Reporting" only.

13. National Spirometry Register

13.1. Upon completing certification, candidates will automatically be added to the National Spirometry Register which can be found here - https://spirometry.artp.org.uk/register/

Their details will be searchable unless they have specifically requested not to be included in the searchable feature.

13.2. All data on the Register will be stored and managed in accordance with GDPR regulations.

13.3. The National Spirometry Register is now solely hosted by the ARTP.

13.4. Healthcare professionals listed on the Register are required to demonstrate ongoing competency and high standards of conduct, providing assurance to both employers and subjects.

13.5. The first year of registration on the Register is included in the spirometry certification registration fee for all new candidates.

13.6. To maintain registration, candidates must renew annually. The annual renewal fee is £40, payable to the ARTP.

14. Re-Accreditation of Spirometry Certification

14.1. Annual Audit

14.1.1. Association for Respiratory Technology and Physiology (ARTP) is required to conduct Continuing Professional Development (CPD) audits to re-accredit registrants in line with Professional Standards Authority (PSA) regulations. This audit occurs annually, with approximately 5% of spirometry registrants selected at random for review.

14.1.2. Candidates selected for audit must submit a portfolio of evidence demonstrating continued practice in quality-assured diagnostic spirometry. Those holding the Full or Reporting certificate are also required to complete an MCQ exam.

14.2. Assessments for the CPD Audit

14.2.1. Portfolio Exam

All candidates are required to submit a portfolio based on their certification level.

14.2.1.1. Portfolio for Full & Performing Certificate Holders

Candidates with a Full or Performing certificate must complete the following sections:

- **Syringe Verification:**
  - 10 syringe verifications
- **Physiological Control:**
  - 10 physiological results
  - Tabulated results including the calculation of mean values and the upper and lower limit range of 5% for SVC, FVC and FEV1 and 40l/min (0.67l/sec) for PEF.
- **Infection Control:**
  - Spirometry cleaning procedure
- **Subject Testing:**
  - **Adult Certification:**
    - 10 spirometry tests
  - **Paediatric Certification:**
    - 10 spirometry tests (all patients must be younger than 16 years old with at least 3 patients younger than 10 years old).
  - **Adult and Paediatric (Joint) Certification:**
    - 5 adult spirometry tests and 5 paediatric spirometry tests (5 patients must be younger than 16 years old with at least 1 younger than 10 years old).
- **Problems Encountered:**
  The candidate is provided with 5 problem spirometry tests and must identify the following:
  - Description of the problem

- Actions required to overcome the problem

- **Declaration:**
  The candidate must sign a declaration confirming the work is their own.

14.2.1.2. Portfolio for Reporting Certificate Holders

Candidates with a Reporting Certificate must complete the following sections:

- **Problems Encountered:**
  The candidate is provided with 5 problem spirometry tests and must identify the following:
  - Description of the problem
  - The implications for the subject's results
  - The solution
- **Declaration:**
  The candidate must sign a declaration confirming the work is their own.

14.2.2. Multiple-Choice Questionnaire (MCQ) Exam

Full and Reporting spirometry certificate holders are required to complete an MCQ exam, which consists of reporting on 20 spirometry test reports that may or may not include associated clinical information.

15. Extensions

15.1. All candidates are required to complete the certification process and submit all assessments within 9 months of registration.

15.2. In certain unforeseen circumstances, it may become difficult or impossible to meet the original deadline. In such cases, candidates may apply for an extension for either:

- 2 months
- 6 months

15.3. Candidates wishing to apply for an extension must complete the ARTP Extension Form via their spirometry portal. A guide on how to navigate to the extension section of the portal can be found at https://www.artp.org.uk/extension-request-form

15.4. 6-month extensions are granted only under exceptional circumstances, such as long-term illness or family bereavement. Supporting evidence, such as a sick note or a letter/email from a senior staff member, must be submitted with the application.

15.5. Maternity leave may qualify for a 12-month deferral upon submission of a MATB1 form.

15.6. All requests must be submitted to the ARTP Spirometry Administrator no later than two weeks before the candidate's deadline.

15.7. Each candidate is entitled to two extensions at no charge. Any additional requests will incur an administrative fee of £35 per request, granting an extra 6 months from the current deadline (not the payment date).

15.8. If a candidate has not completed their certification process after 2 years they will be contacted and removed from the process.

16. Complaints Process

16.1. If a candidate or any other person feels dissatisfied with any aspect of the ARTP Spirometry Certification process, they may submit a formal complaint in writing.

16.2. Complaints should be acknowledged by the ARTP Spirometry Administrator (spirometry@artp.org.uk) within 5 working days of receipt. The acknowledgement will include details of who is handling the complaint and an expected timeframe for a response. A copy of the ARTP complaints procedure will be attached.

16.3. Ideally, a definitive response should be provided within four weeks of receiving the complaint. If this is not possible, a progress report should be sent with an indication of when a full response will be provided.

16.4. Whether the complaint is upheld or not, the response should outline the steps taken to investigate the complaint, the conclusions of the investigation, and any actions resulting from it.

16.5. If the complainant is not satisfied with the initial resolution, they can request that the complaint be escalated for review at the ARTP Council level. At this stage, the ARTP President will review the case.

16.6. The request for Council-level review will be acknowledged within 5 working days, specifying who will handle the review and when the complainant can expect a reply.

16.7. The ARTP President may investigate the complaint personally or delegate the task to a senior representative. This may involve reviewing case documents and consulting the person who initially handled the complaint.

16.8. If the complaint involves a specific individual, that person will be informed and given the opportunity to respond.

16.9. The individual who managed the complaint at Stage One will be kept informed of the case's progress.

16.10. As with Stage One, the complainant should ideally receive a definitive response within four weeks. If delays occur, a progress update will be provided with a revised timeline for the final response.

16.11. Whether the complaint is upheld or not, the final response should outline the investigation process, its conclusions, and any resulting actions.

16.12. The decision at this stage is final unless the ARTP Council determines that external assistance is necessary for resolution.

16.13. External Review Stage

16.13.1. The complainant may escalate the issue to the Charity Commission at any stage.

16.13.2. Further information on complaints handled by the Charity Commission can be found on their website (https://www.gov.uk/government/publications/complaints-about-charities).

17. Appeals Process

17.1. If a candidate believes they have been unfairly assessed or under-graded in any aspect of their certification, they have the right to appeal the decision.

17.2. To submit an appeal, the candidate must send a written request to the ARTP Spirometry Administrator (spirometry@artp.org.uk) within two weeks of receiving their assessment outcome. The ARTP Spirometry Administrator will acknowledge receipt of the appeal within 5 working days, including a copy of the ARTP Appeals Procedure.

17.3. The appeal will be reviewed by the ARTP Spirometry Appeals Committee, which will consist of one or two members from the Executive Board or Education Committee, along with two independent members who are familiar with the process but are not involved with any ARTP committees. All members of the committee must have no direct involvement with the individual appeal case.

17.4. All relevant documentation will be reviewed, and a second assessor will re-evaluate the case following standard assessment procedures. As the OSCE is an observed assessment, the Appeals Committee may also contact both the candidate and the assessor for additional information before reaching a decision.

17.5. Candidates should receive a definitive reply within 8 weeks of submitting their appeal. If further time is required due to the complexity of the investigation, a progress update will be provided, indicating when a full response can be expected.

17.6. Whether the appeal is upheld or not, the response should outline the steps taken to investigate the appeal, the conclusions drawn, and any resulting actions.

18. Appendix 1: Acceptability and Repeatability Criteria (Adult & Paediatric)

For the purpose of **ARTP Spirometry Certification**, candidates submitting spirometry test reports (both subject and biological quality control) must adhere to the **acceptability** and **repeatability** criteria outlined in this appendix, in accordance with the **ARTP Statement on Pulmonary Function Testing 2020 Guidelines**. (Download the full guidelines here). Various aspects of the manoeuvre need to be considered to be sure the Subject has achieved the very best result.

1. Adults

A good quality acceptable blow in adults is determined by assessing the flow/volume and volume/time graphs and numerical values. All three graphs should be submitted; however, at a minimum, the **best graph** must be provided. A **minimum of three efforts** must be performed for both forced and relaxed manoeuvres, with results for all efforts provided (SVC, FEV_1, FVC, and PEF). The following acceptability criteria apply.

1.1. Acceptability Criteria (Adults)

There should be:

1.1.1. A **smooth unhesitating start** and **rapid rise** to a sharp peak flow to the test without hesitation as indicated by:

- A back-extrapolated volume ≤5% of FVC or ≤0.1L if FVC <2.0L
- PEF achieved within 0.15s / 150 ms. I.e. Peak Expiratory Flow Time (PEFT) within 0.15s / 150ms.

1.1.2. A **linear decline** to the point of FVC/RV. There should be:

- **No cough** within the first second of the manoeuvre, or any cough later that significantly affects the blow.
- **No leak** at the mouth
- **No obstruction** of the mouthpiece
- **No glottis closure** during the manoeuvre.

1.1.3. **No early termination.** Plateau in expiratory flow with less than 0.025L being expired over the last 1s of the test.

1.2.1. Evidence that the subject inhaled to full TLC at the start of the test. If the maximum forced expiratory manoeuvre is followed immediately by a full inspiration back to TLC and recorded as a single manoeuvre, then the Forced Inspiratory Vital Capacity (FIVC) must not exceed the FVC by more than 100mL or 5% of FVC, whichever is the greater. If FIVC exceeds FVC by more than this, then it suggests the blow was not started from TLC

All three graphs should be submitted; however, as a minimum, the **best graph** must be provided.

1.2. Repeatability Criteria (Adults)

Subjects must perform a minimum of three technically acceptable relaxed manoeuvres (VC / SVC) and three technically acceptable forced expiratory manoeuvres (FVC / FVL) before repeatability is assessed:

1.2.2. The difference between the highest to the second highest (technically acceptable) **FVC** should be ≤150mL. If the FVC is <1.00L, the difference between the two highest values should be ≤100mL.

1.2.3. The difference between the highest to the second highest (technically acceptable) **FEV_1** should be ≤150mL. If the FVC is <1.00L, the difference between the two highest FEV_1 values should be ≤100mL.

1.2.4. The difference between the highest to the second highest (technically acceptable) **SVC** should be ≤150mL.

1.2.5. The **PEF** values of the **3 best blows** (blows with acceptable FVCs and FEV_1s that have the highest sum of FVC and FEV_1) should be ≤40L/min (or ≤0.67l/s) of each other. i.e. the highest to the third highest PEF from the three best blows should be ≤40L/min (or ≤0.67l/s) of each other.

1.2.6. The highest technically acceptable **FVC should not exceed the highest technically acceptable SVC** by ≥ 150ml. *Explanation: The SVC and FVC should technically be similar in normal and restrictive disease states. There is no physiological reason for the FVC to be significantly >SVC, this only really occurs due to technical error underestimating the SVC unlike in obstructive patterns, where the FVC may be significantly reduced compared to the SVC due to significant dynamic airway compression during a forced effort.*

2. Paediatrics

A good quality acceptable blow in children is determined by assessing the flow/volume and volume/time graphs and numerical values. A minimum of three efforts of forced manoeuvres must be performed with the results of all efforts provided (FEV_1^*, FVC and PEF). The following acceptability criteria apply (SVCs are not conducted in children).

2.1. Acceptability Criteria (Children)

There should be:

2.1.1. A **smooth unhesitating start** and **rapid rise** to a sharp peak flow to the test without hesitation as indicated by:

- If >6 years old, back-extrapolated volume ≤5% of FVC or ≤0.1L, whichever is greater.
- If <6 years old, back-extrapolated volume ≤10% of FVC or ≤0.075L, whichever is greater.
- PEF achieved within 0.15s / 150 ms. I.e. Peak Expiratory Flow Time (PEFT) within 0.15s / 150ms.

2.1.2. A **linear decline** to the point of FVC/RV. There should be:

- **No cough** within the first second of the manoeuvre, or any cough later that significantly affects the blow.
- **No leak** at the mouth
- **No obstruction** of the mouthpiece
- **No glottis closure** during the manoeuvre.

2.1.3. No early termination. Visually determined plateau in expiratory flow, with the exception of preschool children, where rapid lung emptying may prevent a full plateau.

***Note:** FEV_1 should not be reported if the forced expiratory time is <1 second. Instead, **$FEV_{0.75}$** should be used.

2.2 Repeatability Criteria (Children)

Subjects must perform a minimum of three technically acceptable forced expiratory manoeuvres before repeatability is assessed. Children do not need to conduct slow vital capacity manoeuvres:

2.2.1. In school-aged children the difference between the highest to the second highest technically acceptable values for **FVC and FEV1** should be ≤100mL or 5% whichever is the greater value.

2.2.2. In preschool-aged children the difference between the highest to the second highest technically acceptable values for **FVC and FEV1** should be ≤100mL or 10% whichever is the greater value.

Technical comments on the acceptability and repeatability should always be included in the report, particularly when the technique is suboptimal.

Note: If the repeatability criteria are not achieved, then the manoeuvre can be repeated up to eight times, after which the probability of getting a better result is greatly reduced. If after all manoeuvres have been performed the above repeatability criteria have not been achieved, the results must not be rejected. The operator should label the results as not being repeatable allowing the interpreter to use the data accordingly. Poor repeatability means that the subject's results are not a reliable estimate of their best function, so a further test may yield a different result due to the inherent variability in the subject.

19. Appendix 2: Verification or Calibration Log

Candidates are required to provide evidence of regular **verification** and/or **calibration** of their spirometer. The evidence should include at least **20 calibration/verification logs**, performed regularly over a period of at least one month.

The log must include:

- **Test date**.
- **Volume measured**.
- The **difference** between the input value (3L) and the measured value, expressed as a percentage or volume.
- Indication of **pass or fail**.

All measurements must meet the acceptable standard of within **±3%** of the **3L syringe volume**, regardless of software programming or manufacturer's instructions, as older software may rely on outdated guidelines for verification checks.

Templates Available:

If candidates do not have their own recording method, they can download templates provided by ARTP for this purpose:

- **Template 1**: For recording **one verification measurement at one flow**.
- **Template 2**: For recording **three verification measurements at three different flows**, recommended unless the spirometer cannot perform at multiple flows.

(Download templates here).

20. Appendix 3: Recording and Tabulating Physiological Control Data

Clarification on Biological Calibration Standards

Obtaining Results

- The **subject** used for physiological control must be a healthy individual with **normal lung function**, free from any respiratory condition or illness that could impact spirometry results.
- The same **subject, equipment, and tester** must be used consistently throughout the testing period to ensure reliable data.
- At least **10 valid quality control spirometry results** must be provided. Each result must meet the **acceptability and repeatability** criteria outlined in Appendix 1 of this document.

Reporting and Analysing the Results

To monitor and assess **day-to-day variability**:

- **Mean Calculation:** Compute the mean value for SVC, FEV1, FVC, and PEF.

Acceptable Ranges:

- **For SVC, FEV_1, and FVC:** Determine the **5% upper and lower limits** from the mean value (**mean ± 5%**).
- **For PEF:** Calculate the upper and lower limits **as 40 L/min or 0.67 L/sec above and below the mean**.
- Any result falling outside the expected range must prompt immediate corrective actions. These actions, along with the results, must be documented and explained in detail.

Template Available:

A template for recording physiological control data can be downloaded here.

Prohibited practices

- The **subject must not exhibit any significant variability** in lung function over time or between tests due to **underlying health conditions, illness, or non-standardized testing protocols**.
- Only one subject can be used
- **Substitution of subjects, testers, or equipment during the testing period is not allowed** as it negates the process and compromises data reliability.
- Tests performed **without adherence to acceptability and repeatability criteria cannot be included** in the dataset.

- **Only one test per day is acceptable**; if multiple tests are performed on the same date, only the first result will be considered, and subsequent results will not be assessed. Therefore, **the 10 tests must be conducted on 10 different days**, spanning a **minimum of 2 weeks and a maximum of 4 weeks**, **within the last 6 months**.

Template for recording results

- To **maintain uniformity**, a template for recording physiological control data is available for download on the portfolio learning platform. The use of this template is strongly recommended to ensure all required information is accurately documented.
- The spirometry result uploaded to “Spirometry 1” in this section of the portfolio should match the results entered on the physiological control table for “Control Trace 1” and so on.

21. Appendix 4
Reporting Strategy for MCQ Examinations

Candidates taking the **MCQ examination** are expected to follow a consistent reporting strategy based on the **ARTP 2020 Spirometry Guidelines** and **NICE 2010 Guidelines for COPD**.

Key Reporting Guidelines:

- For **adults and paediatrics**, candidates should refer to the **Lower Limit of Normal (LLN)** and **Z-scores** to define normal, obstructive, restrictive, and mixed spirometry results.
- For **airflow obstruction severity**, candidates should refer to **FEV_1 Z-scores** and use the **ARTP 2020 guidance**. The following table is used to grade severity:

Z-score threshold	Severity Grade
<-1.64	Mild
<-2	Moderate
<-2.5	Moderately Severe
<-3	Severe
< -4	Very Severe

For example: an FEV_1 Z-score of **-1.82** is classified as **mild.**

* ***mild classification would include any FEV1 z-score ≥–2.***

Candidates are also expected to apply a range of recognized guidelines, including:

- **ARTP 2020 Pulmonary Function Testing Guidelines**.
- **ATS/ERS 2005 and 2019 Spirometry Guidelines**.

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