

**Association for Respiratory Technology and Physiology (ARTP) – Guidelines for
recommencing physiological services during the Coronavirus Disease 2019 (COVID-19)
endemic phase**

Version 5.1 (August 2020 Update)

ARTP COVID-19 Group

Executive summary

The role of respiratory and sleep diagnostics in the diagnosis, prevention and treatment of disease is widely known and it is of vital importance that diagnostic services are reintroduced to prevent delays in patient care.

This document provides essential advice and guidance on restoring respiratory physiological services during the COVID endemic phase and adds to the suite of COVID-19 information developed by ARTP and ratified by leading UK professional groups.

This document presents a risk mitigation approach to reinstating and maintaining services using a 3P's (patient, procedure, plant) methodology. This approach will allow local flexibility in the delivery of respiratory services without compromising the safety of patients and healthcare staff. Pre-screening of patients should always be undertaken to reduce risk and it is recommended that respiratory function tests (RFTs) should only be undertaken when it will definitively inform or change a patient's management.

It acknowledges that service delivery must be responsive to local and national lockdowns due to spikes in COVID-19 prevalence and provides a risk stratified approach to infection control for respiratory function testing and sleep diagnostics that can be stepped up or down dependant on local conditions. The document also considers what are termed 'Special Cases' and provides specific advice and recommendations for paediatric and community settings using the most recent evidence base.

This guidance should form the basis of local standard operating procedures, developed in conjunction with infection prevention and control teams, which facilitate rapid responses in an ever-evolving situation.

ARTP Guidelines for recommencing physiological services during the Coronavirus Disease 2019 (COVID-19) endemic phase

The COVID-19 pandemic significantly impacted UK respiratory physiology services and continues to constrain capability to deliver this important diagnostic service in the UK.

An initial surge in cases in Spring 2020, led to a dramatic reduction of most routine diagnostics as activity was redirected towards the provision of acute emergency care.

Now that there has been a reduction in both COVID-19 associated deaths and transmission rates, hospital Trusts are restoring most outpatient services, including respiratory and sleep physiological diagnostics.

Throughout this time, the ARTP COVID-19 group has acted to provide guidance on procedures and protocols relating to physiological testing of respiratory function and sleep services, both diagnostic and therapeutic in the UK. This guidance has been variably adopted nationally but acts to help clinical users discuss their operating procedures with their local clinical, infection control and governance leads.

This latest document from the group aims to provide updated guidance and practical advice that will help to:

- i. Address concerns regarding safety and precautionary steps when undertaking respiratory function testing (RFT).
- ii. Reduce the backlog of cancelled diagnostics/treatments in all respiratory physiological services.
- iii. Accommodate the increase in demand from primary care referrals that were reduced during UK lockdown.
- iv. Accommodate the increased burden on respiratory physiology services in the assessment (and possible monitoring) of patients who have survived COVID-19.
- v. Accommodate new ways of working given the limitations of the COVID-19 Endemic phase (see associated **ARTP COVID-19 Guidance on Innovative Services**).

This is an evolving area and innovative solutions are being trialled all the time. It is likely, therefore, that further, updated versions of this guidance will be developed and published over the coming years.

Safe delivery of RFT in clinical settings – important background considerations

KEY CONSIDERATIONS:

- 1) There is a long history of RFT being successfully delivered in both hospital and community settings. Robust governance structures are established in most Trusts to ensure patient and staff safety. High quality standard operating procedures (SOPS)

are the cornerstone of mitigating risk and reducing cross infection between staff and patients undergoing RFTs. This includes the need for rigorous enforcement of infection control and cleaning policies and the use of specialist viral and bacterial filters during exhalatory measurements. These steps continue to be important to reduce infection risk from not only potential COVID-19 infection but also from other airborne pathogens (e.g. Influenza).

- 2) The heightened risk associated with potential exposure to COVID-19, an entirely novel respiratory pathogen, mandates increased scrutiny over infection control issues for RFTs and it is vital that infection prevention and control (IPC) teams are empowered to oversee local procedures and ensure best practice is followed.
- 3) At the current time it is recommended that RFTs should only be undertaken when this will definitively inform or change a patient's management (i.e. they are 'need to know' and not 'nice to know'). This reduces any unnecessary risk exposure for patients and acknowledges and is cognisant of the current very limited capacity for testing and challenges currently faced by physiology services in the UK. It is also important that appropriate RFTs are selected – i.e. in non-obstructed individuals only spirometry and gas transfer.
- 4) Pre-screening considerations should always be undertaken to reduce risk. These will vary based on local policies but should align with national guidance and include the use of pre-attendance questionnaires (i.e. to rule out patients arriving for testing with COVID-19 symptoms) ± temperature checking. The approach should be in-line with local infection control procedures with the addition of pre-test point of care testing for COVID-19 prior to testing. The latter is recommended prior to any high-risk procedure being undertaken.
- 5) The risk of infection from a given RFT procedure is unlikely to be uniform. There is currently a paucity of definitive research in this area. However, individuals who perform expiratory manoeuvres and who have a productive cough, after a deep or forced airway manoeuvre, are likely to expose any individual in close proximity (i.e. the clinician performing the test) to a greater degree of risk. Moreover, RFT procedures that are repeatedly undertaken (e.g. bronchoprovocation testing), or transmit high volumes of aerosols (e.g. exercise testing), are intuitively more likely to increase the risk of transmission. Likewise, RFTs conducted in facilities with poor air circulation are, again, likely to be associated with a heightened risk for staff and any subsequent patients using that facility.
- 6) It is proposed that when RFTs are being considered in a clinical hospital facility the following three (P's) components of this activity are assessed and discussed with local infection control policy makers (Table 1)

Patient:

- Is there a history of cough-inducing lung disease or high risk of a deep airway sample being produced? If so, the procedure should be considered akin to an 'induced sputum procedure', and thus must be approached with a higher degree of caution.
- Whilst it is accepted that it can often be difficult to predict who may or may not cough during a procedure, individuals with a history of regular sputum production (e.g. individuals with bronchiectasis) should be classified in this category.
- Patients with distinct immune vulnerability (e.g. individuals post-transplant or are immunosuppressed) should also be considered at increased risk and thus procedures to protect them should be discussed with local clinical leads (e.g. local transplant team). This may include testing them at the start of a day or using a "cold" testing room if possible.

Procedure:

- In line with statements above, local infection protection and control SOPs should be followed for standard RFTs (i.e. spirometry, lung volumes and gas transfer) and during the COVID-19 pandemic this must include the provision of PPE.
- As outlined above, procedures requiring repeated measurements (e.g. bronchoprovocation testing), or that are associated with higher volumes of aerosol generation (e.g. cardiopulmonary exercise testing (CPET), must be considered 'higher risk' and require scrutiny regarding risk mitigation and protection for staff. This should be discussed with local IPC teams but it is recommended that patients should undergo point-of-care (POC) testing for COVID-19 prior to undertaking this type of procedure; i.e. POC testing on the day of the procedure with the result available prior to the procedure occurring.
- Low effort procedures that are not likely to cause coughing with deep expectoration (e.g. rate control exhalation during FeNO), should not be considered to be in a high-risk group.

Plant:

- The air circulation performance in a testing facility (i.e. how quickly air changes) is an important component of infection risk reduction. This should be measured for every room used for testing in any given facility and all reasonable efforts made to create an air change rate of at least 6 per hour to mitigate aerosol persistence in the environment.
- The use of fans should be discouraged since they probably disperse virus more than clear it from the room. Room air circulation is complex and appropriate engineers should be consulted regarding changing any airflows. (*Estates and Facilities Alert, EFA/2019/001 11 Jan 2019 Portable fans in health and social care facilities: risk of cross infection*).
- The use of appropriately placed Perspex screens can reduce the infection transmission between the patient and the operator during testing.

- Cleaning of any RFT facility should align with local IPC policy but, importantly, ensure that there is an increased provision of cleaning support for these facilities.
- The risk for an individual clinician undertaking RFT should be assessed by the local service leads and all efforts made to assess and reduce exposure risk. Nationwide policy indicates that individuals deemed to be at heightened risk of developing severe COVID-19 infection should not be undertaking or exposed to high risk procedures.

Table 1. Approach to assessing risks of undertaking Respiratory Function Testing

| | RISK | | |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <i>LOW</i> | <i>MODERATE</i> | <i>HIGH</i> |
| Procedure | Low exhalatory flow on filter system (e.g. FeNO), gas transfer measurement | Spirometry (acute and community Trusts). Full respiratory function testing (mouth pressures, lung volumes, etc.) | Procedures with raised potential to induce coughing (e.g. broncho-provocation testing), and those causing increased levels of patient ventilation (e.g. CPET) |
| Patient | Isolated ± COVID protected admission pathway | Pre-screened and COVID-19 point of care negative on the day prior to the procedure | Frequent sputum production, immunosuppressed. Do not test if COVID-19 suspected or swab test positive. |
| Plant | Negative pressure testing rooms. High rate of air changes in testing room(s). Use of HEPA air filtration Outside testing | Air changes per hour >6 but <12 in testing rooms still need regular cleaning and “fallow” periods. | Air changes per hour < 6 in testing rooms Mixed clinical traffic |

In the Event of Local Lockdown Circumstances

Where local lockdowns are instigated to control heightened levels of COVID-19 within communities, urgent consideration in conjunction with local IPC teams should be given to reduction of activity within such community areas until such time as the lockdown restrictions are lifted. Complete cessation of diagnostics is likely to lead to the risk of patients (without COVID-19) having a missed diagnosis for a serious condition (e.g. cancer, respiratory failure, etc.)

The COVID-19 Endemic phase is likely to continue for possibly 18-24 months, so there needs to be flexible approaches to delivering respiratory function and sleep diagnostics. Table 2 outlines a pragmatic approach which can be discussed locally with IPC colleagues.

Table 2. Escalation of Infection Control for Respiratory Function Testing & Sleep Diagnostics

| | Low Risk Stratification Proceed - Caution | High Risk Stratification Proceed - Greater Caution | Local/National Lockdown Proceed - Extreme Caution |
|-----------------------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------|
| PPE Mask Level* | Low (Type IIR) minimum | High (FFP3/Hood) | High (FFP3/Hood) |
| Patient throughput | Expanding | Stable & selective | Urgent only |
| Air changes >6/hr, etc. | Wherever reasonably practicable | Always | Always |
| Equipment cleaning | Routine | Routine | Before Each Patient |
| Floor cleaning | Once daily | Between patients if any coughing occurs | Between Patients |
| Innovative working | Expand with caution | Continue with heightened caution | Suspended |

* Assumes appropriate clothing (e.g. scrubs) and use of gloves ± face protection in line with local policies.

Special Cases

Whilst this guidance is aimed predominantly at adult respiratory function services based in acute hospitals, it is also applicable to paediatric services, community testing and has relevance to sleep apnoea and related services too.

Paediatric Services

Overall less than 5% of overall COVID-19 cases have occurred in children¹ and those who do contract the virus are much less likely to become badly affected compared to adults. In fact, most children exhibit mild or no symptoms.² Children are known to be major spreaders of common viruses, like flu, but their role in the transmission of COVID-19 is not fully understood. We do know that when children are symptomatic, they will spread the virus in similar quantities to adults, but it is unknown how infectious asymptomatic children are.¹

1. COVID-19 in children and the role of school settings in COVID-19 transmission. 6th August 2020. Stockholm: *European Centre for Disease Prevention and Control*.
2. Zhang L *et al.* What we know so far about coronavirus disease 2019 in children: A meta-analysis of 551 laboratory confirmed cases. *Pediatr Pulmonol* 2020 June 10.

The low prevalence of COVID-19 in children along with the low incidence of coughing during RFT's means some of the higher-level safety measures recommended in adult labs may not be required in the paediatric setting. However, as mentioned above, the transmission rate

of asymptomatic children is unknown therefore increased infection control procedures should still be adhered to in the paediatric lab.

The guidance for adults here is largely applicable to testing children too.

Community Lung Function

Most community respiratory function testing involves spirometry and FeNO mainly in adults; so much of this guidance is relevant in the primary care setting. There are several innovations that have been developed to help increase respiratory function testing in the community setting (see associated **ARTP COVID-19 Guidance on Innovative Services**).

Sleep Services

This document mainly refers to respiratory function testing where most of the diagnostics are not considered to be high risk aerosol generating activities. However, there may be circumstances where sleep studies in conjunction with definite AGPs such as CPAP and NIV may be required. Reference to the appropriate guidance for this can be found in details elsewhere (e.g. NHSE/I, BTS, OSA Alliance, etc.)

In conclusion, since COVID-19 as a new virus means we do not know how its spread will change in the winter months and whether or not there will be another national lockdown or a series of local lockdowns. For each respiratory function service, flexible plans based on this guidance need to be in place to enable rapid responses to changing local conditions.