NHS
Vale of York
Clinical Commissioning Group

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Clinical Guidance for Restarting Spirometry in Primary Care

Summary: Restarting Spirometry in Primary Care - June 2021

*This document should be read in conjunction with *"Risk minimisation in spirometry re-start" BTS/ARNS/PCRS ARTP*
https://www.artp.org.uk/write/MediaUploads/Standards/COVID19/ARTP_PCRS_spiro_re-start_FINAL2.pdf

Contents

Executive Summary

Respiratory Function testing has been paused in primary care due to concerns regards infection control. This has led to a diagnostic backlog while at the same time there is increasing demand due to complications caused by SARS-Cov2. It is therefore imperative that respiratory function testing is restarted in primary care to address this growing need. This paper written in conjunction with Humber Coast and Vale respiratory group summarises the current guidance so as to support primary care facilities, primary care networks and diagnostic hubs in restarting.

Introduction

The ongoing global pandemic of the new coronavirus strain SARS-Cov2 (Covid19) has led to rapid changes in delivery of health care so as to minimise spread of infection while maintaining essential medical therapeutics and diagnostics. Respiratory services in particular have been put under immense strain due to the mainly respiratory complications caused by Covid19. Respiratory diagnostics involving respiratory function testing (RFT) have been particularly difficult to continue, due to proposed droplet and airborne transmission of the virus (ARTP COVID19 GROUP, 2020). At present lung function testing is being undertaken in

secondary care with advanced infection control procedures. It has been mainly been paused in primary care due to recommendations from the ARTP/BTS highlighting difficulties managing infection control risks (ARTP/BTS, 26th May 2020). It is anticipated that demand will increase for lung function testing over the next year due to the backlog of diagnostics created by the pandemic and the additional burden of respiratory complications directly due to Covid19. This document has been created by the HCV respiratory group and intends to provide strategies so that primary care may look at restarting RFT safely in either an individual practice, PCN or locality setting.

Respiratory Function Testing and PPE Requirements: Aerosol Risk and Droplet Transmission

Considerable uncertainty exists about the whether or not RFT's are classified as an aerosol generating procedure (AGP). Since most RFT's have the potential to induce coughing and generate particles <5µm then it has been suggested that it be treated as an AGP until clear evidence to the contrary (ARTP COVID19 GROUP, 2020). FFP3 or equivalent respiratory protection should be considered or Type IIR (surgical) mask as a minimum (see current national guidance). Consideration needs to be given to the surrounding environment. Guidance on current PPE requirements for AGP procedures can be found at https://www.gov.uk/government/publications/covid-19-personal-protective-equipment-use-for-aerosol-generating-procedures.

Respiratory Function Testing: Environment

A considerable issue for primary care is providing an environment that is able to minimise the infection control risk from Covid19. A number of issues need to be considered:

Ventilation

Ventilation of rooms need to be adequate to allow dispersal of potential aerosols. The time needed between procedures is inverse to the amount of the ventilation of an area. After five air changes less than 1% of aerosol remains. Therefore In an isolated room with 10 – 12 changes of air per hour a time between procedure of 30 minutes reduces aerosol amounts to less than 1% of original (ARTP COVID19 GROUP, 2020). The average number of air changes in "normal" consultation and treatment rooms will vary largely but can be significantly increased by opening external doors and windows. Alternatively portable room ventilators can be used to guarantee a minimum number of air changes per hour for a particular room.

Calculating the ventilation of regular practice rooms requires technical expertise not readily available in primary care. It is possible that local hospital trusts may be able to provide estates support if requested. It has to be noted however that Covid19, has put considerable pressure on hospital estates departments and infection control services

Practical Interim solutions to ventilation may include:

- Performing Spirometry outside - This provides a simple solution to ventilation but health and safety and weather considerations need to be considered. A basic tented roof would protect against the elements.
- Specialised modular accommodation - This can be quickly sited and commissioned. There is currently modular accommodation available that provides guaranteed air changes and separates clinician and patient. This allows for safe performing of spirometry with minimal "fallow" time needed between patients sessions. A known example of this is currently the "Clinicabin".
- Spirometry at Home - Another alternative could involve performing tests in a patient's own home where aerosol generation would not provide additional viral exposure and infection risks. Consideration needs to be given to other household members and potential visitors if this option is chosen. Alternatively remote testing using telemetry might be an option.
- In-Car Spirometry testing – This involves performing the spirometry with the car windows up and clinician outside the car and may be a pragmatic option (ARTP, August 2020).
- Remote Spirometry – This uses devices that patients use on their own. The data is then sent to the clinician usually electronically.

Practices are encouraged to explore solutions and consult the the CCG infection control leads where they feel they have questions about spirometry models.

Surface and Room Decontamination

This must be done between cases. If RFT's are being performed outside then surfaces, (e.g table and chairs) should be decontaminated. 1000ppm chlorine solution should be used or an agreed alternative (Public Health England , August 2020). Decontamination advice can be found at: https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/.

A summary of cleaning solutions provided by the ARTP COVID19 group is included below.

Guidance on alternative cleaning solutions is listed below:

Cleaning COVID19 contaminated parts/devices related to lung function testing services.

WHO recommends cleaning procedures and biocidal agents effective against the COVID19 virus. The inactivation of coronaviruses by biocidal agents in suspension tests has been reported by Kampf et al. They report the following biocidal agents as being effective against COVID19, Table 4.

Table 4: (Detailed information is available from the Kampf et al paper. See Table II)

Biocidal agent	Concentration	Notes
Ethanol	78–95%	
2-propanol	70–100%	
Combination of 2-propanol with 1-propanol, & glutaraldehyde	2-propanol 45% 1-propanol 30% glutaraldehyde 0.5–2.5%	
Formaldehyde	0.7–1%	
Povidone iodine	0.23–7.5%	Readily inactivates coronavirus infectivity by approximately 4 $\log_{10}$ or more
Sodium hypochlorite	At least 0.21% to be effective.	

Hydrogen peroxide	0.5%	incubation time of 1 min.
Benzalkonium chloride	0.2% - 0.5% tested	Uncertain results - reject
Chlorhexidine digluconate	0.02%	Ineffective

A solution of 1:100 of 5% sodium hypochlorite results in a final concentration of 0.05%. Data with coronaviruses suggests that a concentration of 0.1% is effective in 1 minute. For the disinfection of small surfaces ethanol (62–71%; carrier tests) revealed a similar efficacy against coronavirus. A concentration of 70% ethanol is also recommended by the WHO for disinfecting small surfaces.

Practically this translates to the following guidance for the lung function department:

a. **Detergent/soap and water**
Soap and water are your first line of defence to remove the virus from surfaces. Soap interferes with the fats in the virus shell and lift the virus from surfaces and this is then rinsed off by water. (Of course, you also need to wash your hands when you come in from the shops and wash your food as normal.)

b. **Bleach**
The active ingredient in bleach, sodium hypochlorite, is very effective (Kampf et al, 2020) at killing the virus. There is a need to leave the bleach to work for 10-15 minutes, then give the surface a wipe with a clean cloth. The bleach works by destroying the ribonucleic acid (RNA) of the virus – which gives the blueprint for making more virus particles when a subject becomes infected.

c. **Alcohol based cleaning fluids**
Surgical spirit is mostly made up of ethanol which has been shown to kill coronaviruses in as little as 30 seconds. Like bleach, the alcohol destroys the protein and RNA that the virus is made up of.

(ARTP COVID19 GROUP, 2020)

Respiratory Function Testing: Covid19 Pre-screening

It was a general consensus of the HCV respiratory group that currently Covid-19 pre-screening does not prevent the need for taking full infection control precautions due to concerns about incubation periods and sensitivity of tests. Specifically concerns have been raised about the sensitivity of current Covid19 rapid diagnostic tests. If testing is readily available then it may still be appropriate however to require a negative test before proceeding

It is important that patients who are suspected or confirmed to have current Covid19 infection have their lung function testing deferred until the risk of infection has passed.

Respiratory Function Testing Types Available in Primary Care and infection control:

- Peak Expiratory Flow
- Fractional Exhaled Nitric Oxide
- Expiratory only Spirometry +- Reversibility
- Inspiratory/Expiratory Spirometry +- Reversibility (Not currently recommended in primary care)

The infection control risk varies depending on the type of test/device and risk of coughing and device contamination. Only a limited number of tests are generally done in primary care. Some tests such as peak flow can be done outside or in the patient's own home without physical face-to-face contact. Other tests need to be supervised and require variable clinical input. Individual single patient use meters should be used if available. All non-single patient use devices have risks of internal and external surface contamination. All mouthpieces, breathing tubes valves and manifolds needs to be replaced or cleaned between patients where possible. Certified in-line viral filters are also required (ARTP COVID19 GROUP, 2020). At present it was considered by the HCV respiratory group that "expiratory only" lung function testing should be done in primary care to reduce the risk of cross contamination.

Conclusion

It is imperative that respiratory function testing is restarted in primary care, as there is a need to address a backlog of testing and satisfy increasing demand directly related to Covid19. Respiratory function testing can be restarted safely if careful consideration is given to infection control procedures. This includes correct PPE, managing the environment, and preventing cross contamination of equipment. In the future RFTs may be provided on a locality hub basis. In the interim practices are encouraged to explore ways of reinstating respiratory function testing while implementing infection control policies.

Key Points

- Assume the procedure has the potential to generate aerosol contamination and apply the correct PPE protocols.
- Manage risks in the environment by choosing a location such as the patient's own home, performing outside or in a car, or by using a location with adequate ventilation for the time between patients.
- Consider the use of portable ventilation devices to give rooms the required ventilation.

- Consider stand-alone purpose built rooms for lung function testing.
- Use single patient use devices and perform remotely wherever possible.
- Use certified in-line viral filters and decontaminate the equipment as per local infection control guidelines or manufacturing guidelines.
- Maximise efficiencies by employing a hub model where appropriate for lung function testing.

Infection Control Contacts:
infectionprevention.control@nhs.net

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