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Staged Precautions for Pulmonary Diagnostic Testing During and After COVID-19 Pandemic in Ontario

Executive Summary

The Respiratory Therapy Society of Ontario (RTSO) recognizes the need for guidance for pulmonary diagnostic testing (PDT) during and after the COVID-19 pandemic in Ontario. RTSO also acknowledges that there is limited and emerging evidence surrounding the potential for exposure to COVID-19 by patients and clinicians during PDT.

As the Province moves through the various phases/stages of pandemic control, considerations must be made to ensure that patient and clinician safety is balanced with clinical benefit during these procedures. When there is a lack of clear evidence, the RTSO recommends that precautionary principles govern the decision-making process to optimize a safe approach and minimize the risk of disease spread.

The following document is intended to provide guidance for a staged approach for PDT in a variety of settings, taking local public health guidance and resources into consideration including:

1. Organizational Risk Assessment for Services and Test Capacity
2. COVID-19 Screening
3. Personal Protective Equipment (PPE)
4. Reconfigure Test Space and Patient Flow
5. Environmental Controls and Cleaning
6. Reorganize Test Scheduling

This document will be shared with RTSO membership and will be posted on the website. It may be updated as new evidence emerges.

We hope that this information will be helpful in providing a safe pulmonary diagnostic testing process for both patients and staff. Any feedback should be forwarded to the RTSO Office at office@rtso.ca.

Thank you,

RTSO Board of Directors

RTSO Leadership Committee

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Staged Precautions for Pulmonary Diagnostic Testing During and After COVID-19 Pandemic in Ontario

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Preamble

The Respiratory Society of Ontario (RTSO) is aware of the limited and emerging evidence surrounding the potential for exposure to COVID-19 by patients and clinicians during pulmonary diagnostic testing (PDT). As the Province moves through the various phases/stages of pandemic control, considerations must be made to ensure that patient and clinician safety is balanced with clinical benefit during these procedures. When there is a lack of clear evidence, the RTSO recommends that precautionary principles govern the decision-making process to optimize a safe approach and minimize the risk of disease spread.

The RTSO is committed to supporting evidence-based, safe respiratory interventions in all settings across the Province. We also recognize that PDT is performed by a variety of disciplines in a variety of settings. Consistent with our mission to endorse the interests of Ontario Respiratory Therapists, these considerations offer direction for safe practice in PDT during all phases of the COVID-19 pandemic.

The considerations for PDT throughout the various phases of the COVID-19 pandemic contained in this guidance document are found in the limited evidence available as of July 26, 2020, and will be subject to change as new evidence is published. The aim of this document is to provide a framework to engage discussion of opposing views and address potential gaps from the emerging practice recommendations from various groups such as the Canadian Thoracic Society (CTS), Canadian Society for Respiratory Therapists (CSRT), American Thoracic Society (ATS) and the European Respiratory Society (ERS). Practice considerations also aim to align with infection control recommendations from the Public Health Agency of Canada and Public Health Ontario. Appropriate and efficient practice depends on ongoing work to address the feasibility and practicality such guidelines place on practice settings.

COVID-19 concerns for lung function testing

The COVID-19 (SARS CoV-2) pandemic requires additional considerations while providing care because the virus is easily transmissible, not evident in asymptomatic or newly infected people with the potential for adverse health outcomes and exponential spread of the disease (Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee, 2020) (Ontario Ministry of Health, 2020). Information on the potential of COVID-19 transmission via aerosols produced by speaking, sneezing, or coughing is emerging (Chu, et al., 2020) (Xie, Li, Sun, & Liu, 2009) (Stadnytskyi, Bax, & Anfinrud, 2020) (Radonovich, 2018) (Morawska, et al., 2020) (Fennelly, 2020) (Kloompas, Baker, & Rhee, 2020) (Dhand & Li, 2020).

There is a concern that some lung function testing procedures are aerosol generating medical procedures (AGMP) or increase the risk of transmission from aerosols and droplets during testing. This makes it challenging to prepare testing space and clearly define the relative risk to operator, patient and physical testing environment (World Health Organization, 2014) (Ontario Agency for Health Protection and Promotion

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(Public Health Ontario), 2020) (Tran, Cimon, Severn, Pessoa-Silva, & Conly, 2011) (Seto, 2015) (Tellier, Li, Cowling, & Tang, 2019) (Boswell & Longstaff, 2020) (Judson & Munster, 2019).

Although COVID-19 transmission is primarily through droplet contact, PDT procedures often generate aerosols in the form of droplets. These may be produced and dispersed from the high minute ventilation and fast flow rates required for the measurements and fugitive emissions within indoor settings (European Respiratory Society, 2020) (McCormack, 2020) (A, 2020) (Dbouk T, 2020) (Stanojevic, et al., 2020) (Pasnick, et al., 2020). In addition, testing often results in coughing and with limited ability to distance operators and equipment from the patient. Close and prolonged contact during PDT contributes to transmission risk to the operator, patient, and shared surfaces (Public Health Agency of Canada, 2017) (Ontario Agency for Health Protection and Promotion, Provincial Infectious Diseases Advisory Committee, 2012).

It is not recommended to perform PDT on patients who are ill with or suspected of having COVID-19 (Public Health Agency of Canada, 2017). Scheduling and testing will require additional time to perform active screening for COVID-19, in addition to the current pre-test screening questions and to ensure physical distancing between appointments. In order to protect patients, operators, and staff during COVID-19 restrictions, enhanced disinfection routines, environmental controls and appropriate personal protective equipment (PPE) have been recommended for PDT (Public Health Agency of Canada, 2017) (Provincial Infectious Disease Advisory Committee, 2020)

Within Ontario, lung function procedures may be performed across the continuum of care. Examples include point of care tests (POCT) in primary care offices, asthma/COPD clinics, family health teams, emergency departments or as part of more comprehensive routines in hospital or private pulmonary function testing (PFT) labs. As more elective procedures and diagnostic testing resume, it is important that appropriate protective measures consider not only the adequate supply and stewardship of personal protective equipment but also the logistical controls of reconfiguring test space, the flow of patients, and environmental controls.

We endorse the following measures to be considered when developing plans for pulmonary diagnostic services:

1. Perform an organizational risk assessment to determine availability and prioritization of resources. Local prevalence of COVID-19 will dynamically affect operational capacity and level of safety precautions. As the levels of risk change, the safety precautions must align with the relative risk of transmission among staff, patients, and the community.

2. Perform screening for COVID-19 symptoms and contacts prior to scheduling and perform a Point of Care Risk Assessment (PCRA) prior to each test.

3. Review local personal protective equipment (PPE) requirements and supply to protect clinicians, patients, and visitors from COVID-19 transmission. Adequate supply, and the appropriate type of protection, needs to be accessible to different practice settings. All staff must be trained regarding proper donning and doffing of PPE.

4. Reconfigure test space, waiting areas, and clerical spaces to allow for physical distancing between patients and clinicians during testing and as the patients move through the system.

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5. Environmental controls and cleaning procedures must be adequate to minimize the risk of transmission of COVID-19 to patients and/or clinicians and in adherence to best practices.

6. Reorganize testing schedules to include the extra time required to perform the extra pre-test and post-test cleaning, decontamination, and PPE measures.

Implementation:

The following rationale and suggested processes are intended to guide the implementation of the considerations:

1. *Organizational Risk assessment for services and test capacity*

- The revised version of Directive #2, released by Dr. David Williams May 26, 2020 (Williams, 2020), calls for an organizational risk assessment when planning ramp-up of services. Ensure appropriate control measures are in place to prevent transmission of infection. Planning requires prioritization of resources to incorporate the additional safety and cleaning enhancements precautions. Test capacity and efficiency will be limited by the extra time required to incorporate the appropriate safety measures.

- Local COVID-19 prevalence will be different between communities. Hospital, Independent Health Facilities and primary care PFT labs should consult with local infectious disease control and public health authorities, where possible, when planning operational capacity. Appropriate safety considerations and available testing capacity will need to be evaluated and adjusted on an ongoing basis in response to changes in local COVID-19 prevalence and emerging evidence on the relative risks during pulmonary diagnostic procedures.

- During high COVID-19 prevalence, as determined by Public Health Ontario (PHO), Ministry of Health (MOH) and local authority, testing volumes will need to be reduced to minimize movement in the community and clinical settings. Exercise testing, nebulization, bronchoprovocation, and other procedures more likely to generate aerosols, may need to be deferred or reviewed with local infectious disease and other health authorities.

- During low COVID-19 prevalence, as determined by PHO, MOH and local authority, may allow for increased testing volumes. More procedures may be reintroduced but still require enhanced safety measures.

- Test capacity may also be affected by the availability of resources such as: trained staff operators, appropriate PPE supply, availability of bronchodilator medications, test equipment, and disinfection supplies.

- Consider the backlog of patients deferred during COVID-19 when planning testing priority and resources.

- Consider supply of short-acting bronchodilators during COVID-19, such as salbutamol MDI. Shortages may limit the ability to provide an assessment of bronchodilator response (BDR) or for use in other test protocols, such as bronchoprovocation tests.

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- Patients should be encouraged to bring their own bronchodilator medications and devices to testing, where appropriate, in order to provide the option for their use during test protocols.

2. *COVID-19 screening*

Review with local infection control to determine the need for COVID-19 testing.

- All patients are to be screened for COVID-19 symptoms, contact, and travel prior to scheduling testing (Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee, 2020). We recognize that it will be more difficult to screen and assess patients with pulmonary disease as symptoms are similar to COVID-19 infection. Work with local authorities when developing your screening tools.

- Patients who fail COVID-19 screening should have testing deferred and directed to the ordering provider or public health authority. It is not recommended to test patients who are suspected of having active COVID-19 infection.

- Patients who have been positive for COVID-19 may need to have lung function testing deferred. Consult with local authorities to determine the appropriate interval for testing after COVID-19 infection has resolved.

- Reorganize scheduling to provide extra time to carry out pre-screening during booking. Patients should be asked to attend their appointment alone when possible. If an essential visitor is required to attend testing, they will need to be screened for COVID-19 symptoms and contact.

- Staff operators should perform a Point of Care Risk Assessment (PCRA) for COVID-19 symptoms and contact exposure prior to beginning testing.

- Consider the patient flow through clinical areas in an effort to avoid close contact while arriving and departing.

3. *Personal Protective Equipment (PPE)*

- Appropriate PPE is intended to minimize transmission risk for both the patient and the operator due to the close and prolonged contact during PDT. PPE for PDT includes mask, face shield, gown, and gloves. Use of appropriate PPE will minimize risk to both operator and patients in the event that COVID-19 contact tracing is required after the appointment.

- An adequate supply of PPE should be available to protect the clinician and the patient/client from the transmission of COVID-19. If a supply issue exists, the optimal type of protection should be balanced with the capacity to provide services.

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- Staff must be familiar with appropriate donning and doffing of PPE as a breach in proper technique may be the source of transmission. If n95 masks are used ensure that staff are properly mask-fit tested.

- Ensure that appropriate space, laundry containers, supplies, and garbage bins are available to doff contaminated PPE properly.

- Health Canada recommends the use of non-medical masks for patients and visitors when minimum distancing is not possible. These are encouraged to be used by patients and essential visitors in registration/waiting rooms and test areas.

- Patients are to be instructed in proper respiratory etiquette (i.e., sneezing or coughing into a tissue), use of hand washing or hand sanitizer, and proper removal and application of face covering. Provide patients with tissues during testing to cover potential cough and encourage hand hygiene to be repeated after use. Passive educational materials may be helpful.

4. *Reconfigure Test Space and Patient Flow*

- Reconfiguring test space should include the removal of unnecessary equipment and supplies. Items that cannot be effectively cleaned and disinfected between each patient encounter may need to be covered.

- Testing space should allow only one patient test per room to avoid unnecessary contact.

- Consider barriers (e.g., Plexiglas) to help protect staff in reception and clinical spaces.

- Where possible, the patient should be asked to attend their test alone, to minimize numbers of persons in waiting and direct care spaces. If an essential visitor must attend with the patient, they will also need COVID-19 screening.

- Plan patient and staff flow to provide spacing between patient appointments and manage directional traffic to provide physical distancing in clinical and clerical spaces.

- When procedure-specific settle time is required, the test space should remain empty, with the doors closed, during the designated settle time. Charting and clerical duties may need to be performed in another space.

5. *Environmental Controls and Cleaning*

- Potential for droplet and aerosol will depend on testing procedures performed, review with local experts, and infection control when planning appropriate measures for the test procedures offered.

- A recognized key to the transmission of COVID-19, and droplet infections generally, is the dispersion of aerosols from an infected patient (Dhand & Li, 2020) (Jayaweera, Perera, & Manatunge, 2020)

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(Public Health Ontario, 2020).

- Transmission of infectious disease produced from infected patients may be produced from aerosols, defined as those droplets which are produced from breathing, talking, coughing, and sneezing.

- Clearance of droplets and aerosols from testing is dependent on the ventilation, air exchange, and air-purification measures within the test space. Suspended aerosol droplets will take time to deposit on contact surfaces or to be removed from the test space by the air exchange and purification measures. For example, a room with 12 air-exchanges per hour (ACH) will require 23 minutes to remove airborne contaminants by 99% (Ontario Agency for Health Protection and Promotion, Provincial Infectious Diseases Advisory Committee, 2012) (Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee, 2020).

- Perform an assessment to verify the HVAC system in testing space is operating as expected. Knowledge of the air-exchange per hour (ACH) and air purification measures will help guide the duration of aerosolization time (settle time) prior to completing the disinfection of contact surfaces before preparing for the next patient.

- Where ACH is not adequate, large scale air-purification, point of care air purification (e.g., HEPA with UVC self-clean) may help reduce settle time, where appropriate.

- If environmental conditions of test space change between patients, the test equipment may need to be recalibrated. An example is a change in ambient conditions from opening a window to ventilate the test space between patients.

- Enhanced cleaning and disinfection routines with appropriate agents are warranted to prevent transmission of COVID-19 from all shared surfaces, equipment, and clinical areas.

- Ensure the use of appropriate disinfection products and adhere to the required length of dry time for the product to effectively disinfect surfaces.

- Review manufacturer recommendations on disposing or decontaminating the test equipment between patients, such as flow sensors or patient circuits.

- Tests should always be done with a high specification bacterial/viral filter with proven efficiency.

- Medical aerosol delivery by small volume nebulizers (SVN), vibrating mesh or dosimeter, need to be used with high specification bacterial/viral filters or appropriate scavenging systems to avoid aerosolization to the test environment.

- Utilize single-use consumables where possible. Ensure reusable items are processed according to manufacturer and infection control guidelines.

6. *Reorganize test scheduling*

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- There will be a "new normal" for patient encounters as long as testing must consider COVID-19 safety precautions. This will limit testing efficiency and capacity for a speciality which is often not well integrated into electronic workflows and electronic medical records interfaces.

- Readjust booking to allow enough time to process patients and complete enhanced cleaning measures.

- Appointment time is particularly important as arrival outside of the expected interval may create unexpected crowding. If physical distancing is not possible, consider having patients wait in their vehicle until test space is ready to receive the patient directly.

- Consider staffing levels to support testing and patient triage.

Quick Check List:

Item	Notes
Complete organizational risk assessment:	• Local COVID-19 prevalence: consider consultation with infectious disease expert, public health expert and local IPAC • Expected operational capacity targets • Announcements: memos to community providers, other institutions • Supplies: PPE, medications, single-use devices • Staff: scheduling, retraining • Update pre-test screening. Add COVID-19 risk assessment questions
Prioritization plan:	• Referrals • Review which test procedures are to be available • Additional time between scheduled patients
Reorganize test space:	• Consider dedicated testing space, where possible • Remove clutter, cover items which cannot be moved or effectively disinfected • Consider barriers (plexiglass), where possible • Distancing: equipment, operator, patient belongings, essential visitor • Review HVAC system is functioning as expected: consider air-exchange, recirculation or direct ventilation • Air purification (HEPA): ensure optimal placement with respect to pattern of airflow
Waiting area	• Review walk-through flow in and out of clinical areas (registration, waiting area, clinical space, exit) • Re-arrange seating for physical distancing

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Hand Hygiene	• Appropriate alcohol based hand wash access (entrance, waiting area, test space) • Handwashing sink/hand towels

About the Respiratory Therapy Society of Ontario (RTSO)

The RTSO is a non-profit organization of professionals devoted to promote and advance the interests of Ontario Respiratory Therapists by creating opportunities for professional growth, advocacy, and research. We do this through strategic partnerships, professional collaboration, and leadership.

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RTSO Board of Directors, July 28, 2020

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