Winnipeg Regional Health Authority / Office régional de la santé de Winnipeg Caring for Health / À l'écoute de notre santé **PRIMARY HEALTH CARE AND REGIONAL RESPIRATORY THERAPY PRACTICE GUIDELINE**	**Practice Guideline:** Spirometry Testing - Adult	**Guideline Number** PCPG #16
	Approved By: Primary Care Service Area Leadership	**Pages:** Page 1 of 10
	Approval Date August 17, 2022	**Supersedes:** February 15, 2017

1. INTENT

1.1 To provide Spirometry guidance to align with evidence-informed testing and interpretation of results to address health promotion/disease prevention in Chronic Obstructive Pulmonary Disease, Asthma and Tobacco that is supported by Regional Respiratory Therapy.

1.2 To outline the required education, training and support (including RESPTREC ® - Spirometry Course and Regional Respiratory Therapy) to provide safe and accurate testing and interpretation, and ensure regular quality control that is aligned with the National Canadian Thoracic Society Spirometry in Primary Care guidelines.[1]

1.3 Spirometry testing in Primary Care clinics will:

- Strengthen accessibility for individuals and providers.
- Allow for screening of Chronic Obstructive Pulmonary Disease (COPD) and Asthma using evidence-informed practice.
- Reduce wait times for Spirometry to assist with reducing overall wait times for hospital-based pulmonary function labs by yielding more appropriate referrals.
- Support Primary care clinics that could provide Spirometry testing for individuals and connect patients to self-management group education (i.e., for tobacco, COPD and asthma[2,3]).

1.4 To outline reporting methods for case finding to determine if the individual could be referred to spirometry, using either of two tools: (1) Appendix A – Case Finding Approach for team consideration to Refer to Spirometry, and (2) EMR Practice Efficiency Indicator Cluster Reports by Clinic and by Primary Care Provider. These reporting methods can also be used to support clinic practice reflection and evaluation.

1.5 To provide consistent documentation and emphasize the value of completing the Spirometry Screening tool. This tool assists in ensuring the use of the Canadian Thoracic Society's five pre-screening questions and in the review of all relative contraindications for Spirometry before ordering Spirometry testing.[1]

1.6 To put in place standard processes for ongoing quality assurance, including the annual provision by Regional Respiratory Therapy of an Equipment Audit report and a Spirometry Testing Quality report.

2. DEFINITIONS

2.1 Spirometry is performed to objectively assess an individual's pulmonary function. It enables measuring the effect of disease on lung function, monitoring its course or the result of therapeutic interventions, and assessing preoperative risk prognosticating many pulmonary conditions. Patients with contraindications that would prevent testing in a primary care setting can be tested in a pulmonary function laboratory where there is access to resuscitation personnel and equipment.[1]

3. BACKGROUND

3.1 "Spirometry "is not controlled under medical services regulations and, therefore there are no legal restrictions on who can perform Spirometry testing. No provincial accreditation guidelines exist within Manitoba. Because Spirometry requires the very active participation of the patient, the technologist must have the skills and ability to proceed well beyond the usual level of patient interaction in medical tests and should have the basic life support training [1] as outlined in *PCOG 6 Emergency Response Training in the Primary Care Setting.*

3.2 Primary Care clinics should be aligned with the Canadian Thoracic Society and have identified the role of those who could conduct Spirometry as "Health Care Professionals whose formal training include studies in

the anatomy and physiology of the cardiorespiratory system, and who subsequently successfully completed a recognized training course, RESPTREC ® - Spirometry Course, endorsed by the Canadian Lung Association and the Canadian Thoracic Society".[1] All certification and mentoring components of the RESPTREC ® course must be fulfilled"

3.3 Primary Care Physicians, Nurse Practitioners and Physician Assistants who interpret Spirometry testing should complete a Spirometry course or specific training in Spirometry interpretation.[1]

4. GUIDELINES

4.1 EDUCATION AND TRAINING

4.1.1 EDUCATION AND TRAINING REQUIREMENTS TO CONDUCT SPIROMETRY TESTING:

Role	Eligible Health Care Professionals	Additional Training Requirements
Individuals **performing** spirometry testing	Health Care Professionals whose formal training includes studies in the anatomy and physiology of the cardiorespiratory system, and who subsequently successfully completed a recognized training course*	• Spirometry training course, endorsed by the Canadian Lung Association and the Canadian Thoracic Society which is offered by RESPTREC ® - Spirometry Course • Courses may have certification and mentoring components (i.e., demonstration of competence). All certification and mentoring components are to be completed.
Individuals **interpreting** results	Physicians, Physician Assistants and Nurse Practitioners	• Specific training course in the interpretation of spirometry results through workshops and online training.

*** Note:** Health professionals in some clinics have been providing spirometry testing for several years. It is recommended that these professionals take the training course. If clinics are confident in continuing to provide spirometry through experienced health professionals without the training, it is recommended that these professionals participate in the quality assurance process supported by Regional Respiratory Therapy (outlined in section 6 and Appendix C: Role of Primary Care Clinics, Regional Respiratory Therapy and the PHC program in Spirometry Testing and Quality Assurance). This process includes the provision of sample spirometry test results for review which enables feedback to health professionals and clinics to ensure high-quality results are being successfully obtained. Where samples are evaluated as not being up to ATS standards by the respiratory therapist, the tester will be required to complete required RESPTREC® education.

4.1.2 EDUCATIONAL RECOMMENDATIONS FOR TOBACCO, COPD AND ASTHMA

Type of Study Materials	Source Location
Self-Study Materials for Spirometry	Standardization of Spirometry 2019 Update. An Official American Thoracic Society and European Respiratory Society Technical Statement (atsjournals.org) Improving spirometry testing by understanding patient preferences (ersjournals.com)
Self-Study Materials for Asthma	Full article: Canadian Thoracic Society 2021 Guideline update: Diagnosis and management of asthma in preschoolers, children and adults (tandfonline.com)

Self-Study materials for COPD	CTS-COPD-Rx-2019-Guideline_Final.pdf (cts-sct.ca) Final_CTS-COVID-19_COPD-Position-Statement_Apr-8.pdf (cts-sct.ca) AECOPD-Executive-Summary-Online-First.pdf (cts-sct.ca) Managing-Dyspnea_COPD-2011.pdf (cts-sct.ca) Canadian Thoracic Society recommendations for management of chronic obstructive pulmonary disease - 2008 - update - highlights for primary care(cts-sct.ca) *The most recent guidelines from CTS are recommended if these self-study materials are updated after this Primary Care Practice Guideline is published.*
Self-Study materials for Tobacco	#PCPG12: Implementation of Tobacco Use and Dependence Appendix A - Stages of Change to Quit or Reduce Smoking Appendix B - Future and Current Value Terms (in EMR) Appendix C - Tobacco Reduction Cessation Entry into EMR Appendix D - Tobacco Assessment and Management (in EMR) Appendix D - Spirometry Screening Tool and Patient Handout (in EMR) Appendix E - Quick Reference Appendix F - CHA Program Descriptions

4.2 CONFIRMATION OF SUSPECTED COPD AND ASTHMA DIAGNOSIS

4.2.1 The Canadian Thoracic Society clinical guidelines for Asthma and Chronic Obstructive Pulmonary Disease (COPD) specify that spirometry should be used to diagnose both of these diseases. Given the burden of Asthma and COPD most individuals with these diseases will be diagnosed in a primary care setting.[1]**.Spirometry results are but one finding, and must be considered in the context of history, symptoms, and physical findings to make the diagnosis.** [1]

4.2.2 Asthma Diagnosis and Management

- Complete spirometry testing to diagnose Asthma if the patient **answers yes to any of the following questions**, as outlined by the Canadian Thoracic Society:[3]
  - Frequent episodes of breathlessness, chest tightness, wheezing or cough
  - Symptoms are worse at night and in the early morning
  - Symptoms develop with a viral respiratory tract infection, after exercise, or exposure to aero-allergens or irritants

- To confirm a self-reported diagnosis not accompanied by supporting spirometry results, ordering a spirometry test should also be considered.

- Complete spirometry testing at each follow-up appointment for those patients with a diagnosis of Asthma. The Canadian Asthma Consensus Guidelines (CACG) recommend, “Asthma control criteria should be assessed at each visit (level IV). Measurement of pulmonary function, preferably by spirometry, should be done regularly (level III) in adults and children 6 years of age and older.”[6]

4.2.3 COPD Diagnosis

Complete spirometry testing to diagnose COPD if the patient is a **current or former smoker and 40 years of age or greater, and answers yes to any of the following five questions**[5]

1. Do you cough regularly?
2. Do you cough up phlegm regularly?
3. Do even simple chores make you short of breath?
4. Do you wheeze when you exert yourself or at night?
5. Do you get frequent colds that persist longer than those of other people?

These screening questions are found in the See Spirometry Screening Tool and Patient Handout (in EMR).

- To confirm a self-reported diagnosis not accompanied by supporting spirometry results, ordering a spirometry test should also be considered.
- COPD management decisions should be made on an individual basis and should not be based exclusively on spirometry results but also on an assessment of severity of dyspnea scale and disability which are assessed by using the Medical Research Council dyspnea scale.

4.3 CASE FINDING APPROACH FOR (CURRENT AND FORMER) TOBACCO USERS AND UPPER RESPIRATORY CONDITIONS TO CONSIDER (RE) REFERRING TO SPIROMETRY

Primary Care clinics and staff providing spirometry testing are to conduct case finding to assist in identifying individuals appropriate for referral to spirometry using at least one of the two methods outlined below. Do you cough regularly

4.3.1 Case Finding Using the Manitoba Primary Care Quality Indicator [5]

Chronic Obstructive Pulmonary Disease at Risk Screening

Numerator	Enrolled patients 40 years of age or older without COPD who are current or former smokers and have been screened for symptoms consistent with COPD in the past 24 months
Denominator	Enrolled patients 40 years of age or older without COPD who are current or former smokers
RESULT	Percentage of enrolled patients 40 years of age and over without COPD who are current or former smokers and have been screened for symptoms consistent with COPD in the past 24 months

4.3.2 Case Finding Using the EMR

See Appendix A – Case Finding Approach for team consideration to Refer to Spirometry.

COPD Screening Using Spirometry: Enrolled patients 40 years of age or older who meet either of the following criteria:

- Have been diagnosed with COPD in the last 12 months but has not received spirometry
- Have not been diagnosed with COPD but are current or former smokers and have answered yes to one or more of the CTS Questionnaire and have received a Spirometry test in the last 24 months. See Manitoba Health - Primary Care Quality Indicators Guide for more information on primary care quality indicators and data extracts.[7]

The Clinic team is responsible to review and act on the PCQI indicator for COPD and Case Finding

reports using ICD 9 codes and establish a set interval(s). Tobacco Champions could assist in the screening and tobacco intervention.

NOTE: Episodes of acute bronchitis in a smoker may represent the first clinical representation of COPD – Spirometry should be obtained after the acute episode is resolved and the patient is clinically stable.[2]

4.4 CLINICIAN ROLE IN ASSISTING PROVIDERS TO ORDER SPIROMETRY

4.4.1 Process

- Identify patients through (1) case finding, or (2) identification of smokers at time of physical, or (3) report of respiratory symptoms at a clinic visit.
- Use Spirometry Screening Tool and Patient Handout (in EMR) and ask the listed COPD pre-screening questions of all current of former smokers over 40 or asthma pre-screening questions, as appropriate (see 4.2).
- Use Spirometry Screening Tool and Patient Handout (in EMR) to assess for contraindications (see 4.4.2 below for more information on indications and contraindications for spirometry and how to proceed when contraindications exist). Some clinics may choose to create a macro containing the pre-screening questions and checklist of contraindications.
- Order spirometry test – Using the Spirometry Screening Tool and Patient Handout, a referral form for hospital-based testing (for those clinics without an onsite or community based delivery option i.e., Walk In Connected Care Clinics, some ITDI sites, etc.), or by filling out a prescription (in the EMR or on a prescription pad):
    - Indicate the type of spirometry test being ordered (pre- and post-bronchodilator or pre-test only spirometry; see 4.4.2 below for information on when to do which type of test)
    - For EMR - if ordering pre- and post-bronchodilator spirometry a team member can create a prescription on behalf of a prescriber. Click on Create a Prescription on behalf of Physician / Nurse Practitioner. It is required that the prescribing provider sign the prescription for the use of Salbutamol (400 mcg).
    - The prescriber needs to also enter Salbutamol under Active Medications so that it can be administered by the tester.
- The Spirometry Screening Tool and Patient Handout (in EMR) asks the ordering provider whether the patient should withhold medications before the test, and, if so, precisely which medications should be withheld and for how long. It also includes an instruction sheet to be given to the patient.
- It is important to instruct any patient withholding medications that, if needed for symptom relief, a rescue inhaler should be used and the time of use noted so that it can be reported to the technologist conducting the test

4.4.2 Indications and Contraindications

- Potential risks associated with lung function testing primarily relate to the following: Maximal pressure generated in the thorax and their impact on abdominal and thoracic organs; venous return and systemic blood pressure; expansion of the chest wall and ling and active communicable disease that pose a risk to staff and other patients (i.e., tuberculosis). Spirometry and other forced expired manoeuvres will result in increased intrathoracic, intra-abdominal and intracranial pressures. Performing lung function tests can also be physically demanding for patients, thus increasing myocardial demand. This calls for prudence in patients with medical conditions that could be adversely affected by these physiological consequences. See Appendix B Spirometry Screening Tool and Patient Handout (in EMR) for relative contraindications for spirometry.

- Although there is no large scale registry documenting the incidence of adverse events following pulmonary function tests, such risks are likely to be minimal in most patients. Importantly, the potential risks associated with testing should also be weighed with the benefit of obtaining

information about lung function. When spirometry test is unlikely to be of real clinical benefit to a compromised patient, it should be postponed until the patient has recovered from surgery, an infection or, for example, pneumothorax, hypo- or hypertension, or unstable arrhythmias. Conversely, a dogmatic approach of refusal to test patients with any contraindication must be tempered. For cases in which the benefit of obtaining objective measures of lung function may outweigh the risk of testing, referral to a specialist should be considered.[1] For these patients, referral to a hospital pulmonary function lab for testing is encouraged.

4.4.3 Type of Spirometry test ordered

- Although pre-and post-bronchodilator spirometry testing is common for an initial visit, subsequent testing may not require post-bronchodilator testing, depending on the reason for ordering spirometry.[1]

  The decision to avoid bronchodilators before testing is dependent on the reason for the test. If the study is performed to diagnose an underlying lung condition, then avoiding bronchodilators is useful. In this case, the following medications should be withheld according to the schedule below[2];

  SABA: short-acting bronchodilators (i.e., salbutamol) should not be used within 4-6 hours of testing

  SAMA: short-acting muscarinic antagonists (i.e., ipratropium bromide) should not be used within 12 hours of testing.

  LABA: long-acting bronchodilators (i.e., Salmeterol, formoterol) should not be used within 24 hours of testing .
  Ultra-LABA (i.e., indacaterol, vilanterol, olodaterol) should not be used within 36 hours of testing

  LAMA: long-acting muscarinic antagonists (i.e., tiotropium, umeclidinium, or glycopyrronium) should not be used within 36-48 hours of testing

  Conversely, if the test is performed to determine a response to an existing therapeutic regimen, the ordering provider may choose not to withhold bronchodilator medications. The Spirometry Screening Tool and Patient Handout (in EMR) asks the ordering provider whether the patient should withhold medications before the test, and, if so, precisely which medications should be withheld and for how long.

4.5 CONSIDERATIONS IN THE PERFORMANCE OF SPIROMETRY TESTS

4.5.1 Spirometry testing should be performed in accordance with direction from Shared Health and WRHA Infection Prevention and Control Guidance for community. A point of care risk assessment (PCRA) is required before each test, and appropriate PPE is to be selected for the outpatient/primary Care setting.

4.5.2 Testers are to use disposable bacterial filters to reduce the risk of bioburden/contamination of equipment and setting.

4.5.3 The If conducting pre- and post-bronchodilator spirometry, verify a prescription is on file for 400 mcg Salbutamol by metered-dose-inhaler. Salbutamol (4 puffs of 100 mcg, totalling a 400 mcg dose) is administered during the performance of pre-post bronchodilator spirometry. For purposes of liability insurance coverage, protection of patients and protection of staff, the staff member conducting the test should ensure a prescription for Salbutamol has been signed before administering the drug.

- The lot number of the Salbutamol metered dose inhaler (MDI) should be recorded in case of a

drug recall. See Administered Medications- Administer and Edit for instructions on where to input the lot number when using the shared Community instance of Accuro.

- Discard Salbutamol after one-time dose is provided. Salbutamol can only be dispensed to patient if **both** of the following conditions are met: (1) Salbutamol has been previously ordered as a routine medication for the patient by the prescriber AND (2) If it is within the tester's professional scope of practice to be able to dispense under the Regulated Health Professions Act (i.e., Pharmacist). Registered Nurses are not able to dispense as per the Regulated Health Professions Act.

4.5.4 The individual conducting the test will ensure calibration has taken place, either by calibrating the spirometer or verifying in a Spirometer Quality Control Log to ensure that calibration or calibration checks have occurred following the manufacturer's directions (see 5.2 for additional guidelines around calibration).

4.5.5 Height, ethnicity, age and sex determine the spirometry reference values; weight is also required. Height and weight should be measured at time of testing, not based on patient's self-report. All of these should be recorded as part of the test report. In the presence of chest wall deformities or when height cannot be measured, arm span (middle fingertip to middle fingertip) can be used as an approximation of height.[1] Patient height and weight must be in metric (cm/kg) measurements to allow cross comparison. Global Lung Function Initiative (GLI) is recommended reference value. If spirometer does not have this option, the tester is to contact their RRT mentor.

4.5.6 It is recommended that the patient be seated in a chair with arms (to prevent falling sideways should syncope occur) without wheels and that can be adjusted so that the feet are flat on the floor. Testing may give rise to stress incontinence; therefore, appropriate precautions should take place.[1]

4.5.7 Details of the Tobacco history '***EMR Lifestyle Band'*** (or paper chart) should be updated and any recent illness that could influence the results should be recorded in the chart and on test.

4.5.8 The health professional conducting the spirometry test should review the relative contraindications at time of spirometry testing.

The individual conducting the test should record the name, dosage and last administration of any medication that may alter lung function on the result.

4.5.9 Testing should be fully explained to the patient and delaying the test should be strongly considered in the case of transient confusion occurs or absence of cooperation. A video demonstration of the test procedure is useful in educating patients on what is required of them in order to produce a useful test result. The following video has been recommended by Regional Respiratory Therapy: https://www.youtube.com/watch?v=lWHx31BquBA.

4.5.10 Procedures for spirometry testing should be conducted following current ATS guidelines.

4.5.11 Send test results for interpretation, along with any relevant comments to the identified interpreter.

4.6 CONSIDERATIONS IN THE INTERPRETATION OF SPIROMETRY RESULTS

4.6.1 The clinic or My Health Team conducting spirometry needs to establish a relationship with an individual qualified to read and interpret spirometry results (either an appropriate specialist or a physician, nurse practitioner or physician assistant who has taken additional training which includes

a course on interpretation of spirometry). If you need assistance in finding an appropriate individual, contact the Regional Respiratory Therapy program.

4.6.2 Negotiate the timeframe by which interpretation of results will be rendered back to the clinic (within 14 days normally, and within 30 days under extenuating circumstances such as vacation or illness). Negotiate the method through which test results and interpretation information will be sent back and forth.

4.6.3 Create an internal process for ensuring that each patient's results and interpretation are received by the ordering provider. This process should include tracking the length of time to render interpretation reports to the clinic.

5. EQUIPMENT AND SUPPLIES

5.1 Ordering a Spirometer

5.1.1 When ordering new spirometry equipment, review Nov 2016 Agreement #BE-129-MB-15 Portable Diagnostic Spirometers for WRHA, and order accordingly. See Spirolab spec sheet in Appendix D.

5.1.2 Spirometer shall meet required International Organization for Standardization (ISO) 26782 standards and have regular updates to software. This ensures reference values are current, and grading standards are met.

5.2 Materials to be Ordered and Ordering Procedures

5.2.1 Salbutamol (4 puffs of 100 mcg, totalling a 400 mcg dose) is administered during the performance of pre-post bronchodilator spirometry and needs to be ordered ahead of providing the test.

5.2.2 Several disposable supplies are required to perform spirometry testing:

- SPU Mouthpiece – specific type to order will vary depending on brand of spirometer
- SPU Low resistance filter
- SPU Nose clamps – SAP Material #215742
- Single patient use holding chamber for salbutamol administration if doing post-test – SAP Material #338215

5.2.3 Salbutamol and disposable supplies can be ordered following the regular procedures of the clinic or My Health Team. For example:

- WRHA operated or funded clinics order Salbutamol through the Health Sciences Centre Pharmacy and supplies through SAP
- My Health Teams clinicians or ITDI staff performing spirometry in fee-for services providers' offices follow the procedures in those clinics for requesting or ordering medications and supplies for use in tests
- My Health Team clinicians providing spirometry out of a WRHA operated or funded clinic are recommended to work out an agreement with that clinic to determine how Salbutamol and supplies will be ordered and paid for when prescribed for patients of fee for service practices

6. EVALUATION AND QUALITY ASSURANCE

6.1 Team Managers (or designate) are encouraged to run a site specific report using the EMR Practice Efficiency Indicator Cluster Reports (by Clinic, by Primary Care Provider) on a biannual basis (or more frequently if desired). See Appendix 1: Practice Efficiency Indicator Cluster Reports. A sample of the

output of these reports is also provided in Appendix A. Please note nothing similar exists for asthma screening at this time. A case finding approach using the EMR has also been developed (see Appendix A).

6.2 Clinics are requested to submit a record of the frequency that each tester is performing spirometry tests to Regional Respiratory Therapy (a Quarterly Spirometry Report form has been provided for this purpose – see Appendix F). In addition, staff are asked to submit 5 samples of spirometry results per month for the 3 months after they are trained and 5 samples per quarter thereafter. Spirometer Quality Control Logs are also requested to be submitted quarterly. Submissions may be done annually after the first year if quarterly samples are high-quality and if directed to change to annual submission by the respiratory therapist mentor. See Appendix E for a copy of the Spirometer Quality Control Log.

6.3 Regional Respiratory Therapy has agreed to provide an ongoing consulting role in support of expanded spirometry provision in primary care. See details in Appendix C: Role of Primary Care Clinics, Regional Respiratory Therapy and the PHC program in Spirometry Testing and Quality Assurance.

6.4 Calibration of the Spirometer

6.4.1 Spirometers must be calibrated . Calibration each day of use at low, medium and high flows. Filters should also be used for calibration as they are used in testing. This is to be carried out as per the manufacturer's instructions and the operators manual specific to each spirometer. Some spirometers come with a three-litre calibration syringe; others are self-calibrating but require calibration checks to sure the automatic calibration is working.

6.4.2 Once per month a syringe study is recommended to validate the measurements provided by the spirometer in addition to regular calibration.

6.4.3 Once per month testing of a physiologic control subject selected from a pool of two to three physiologic control subjects within the clinic is recommended to validate the physiologic measurements provided by the spirometer.

6.4.4 Clinics and staff conducting spirometry tests are required to keep a record of calibration or calibration checks of their spirometers. A Spirometer Quality Control Log for this purpose can be found in Appendix E.

6.5 Standardized Report

6.5.1 Patient result report shall comply with latest CTS/ATS standards and include (but not limited to):

- Lower levels of normal (LLN) if possible
- GLI reference values and metric measurements of patient height and weight
- All acceptable maneuvers within a testing session
- Operator comments

6.6 Bronchodilator Responsiveness Protocol (to be used for all pre/post BD testing)[6]

- Bronchodilator: Salbutamol MDI with aerochamber, 100 mcg per actuation
- Bronchodilator Dose: 400 mcg delivered as 4 MDI actuations of 100 mcg
- Method of administration: After gentle expiration, actuate salbutamol MDI at beginning of slow inhalation to TLC from aerochamber. Hold the breath for 5-10 seconds, then exhale. Four separate MDI actuations are delivered at 30 seconds intervals. This allows the dose to reset in the MDI. For patients who cannot hold their breath, a single actuation can be inhaled over 4-5 tidal breaths through the aerochamber. If a seal cannot be obtained on aerochamber mouthpiece, a face mask may be used.

- Wait time prior to post-bronchodilator testing maneuvers: 15 mins following administration of final MDI actuation

7. REFERENCES

1. Coates MD, B. Graham PhD, R. McFadden MD, C. McParland MD, D. Moosa BSc RRT CRE MA Sc, S. Provencher MD, MSc, Jeremy Road MD (2013) Spirometry in Primary Care, 20(1)13-21 https://cts-sct.ca/wp-content/uploads/2018/01/Spirometry-in-Primary-Care_CRJ-Jan-Feb-2013.pdf
2. Graham, B. Steenbruggen, I. Martin, R. et al. (2019) Standardization of Spirometry 2019 Update: An Official American Thoracic Society and European Respiratory Society Technical Statement. Am J Respir Crit Care Med Vol 200, Iss 8, pp e70–e88, Oct 15, 2019. https://www.atsjournals.org/doi/pdf/10.1164/rccm.201908-1590ST
3. M. Lougheed MD MSc1, Chair; C. Lemière MD2, S. D Dell MD3, F. Ducharme MD4, J. FitzGerald MD5, R. Leigh MD PhD6, C. Licskai MD7, B.Rowe MD MSc8, D. Bowie MD9, A. Becker MD10, L. Philippe Boulet MD11 (2010) Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults Can Respir J Vol 17 No 1 January/February 2010 15-24 http://www.respiratoryguidelines.ca/sites/all/files/cts_asthma_consensus_summary_2010.pdf
4. MD Lougheed, C Lemiere, FM Ducharme, et al; Canadian Thoracic Society Asthma Clinical Assembly. Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults. Can Respir J 2012;19(2):127-164.
5. Manitoba Health Quality Measurement Primary Care Quality Indicators v. 4.0 (retrieved June 2022) https://www.gov.mb.ca/health/primarycare/providers/pin/docs/indicator_guide.pdf
   Miller MR, Crapo R, Hankinson J, et al. SERIES ATS/ERS TASK FORCE: STANDARDISATION OF LUNG FUNCTION TESTING. Eur Respir J 2005; 26: 319–338. https://www.thoracic.org/statements/resources/pft/PFT2.pdf

8. APPENDICES

- APPENDIX A: Case Finding Approach for team consideration to Refer to Spirometry
- APPENDIX B: Spirometry Screening Tool and Patient Handout
- APPENDIX C: Role of Primary Care Clinics, Regional Respiratory Therapy and the PHC program in Spirometry Testing and Quality Assurance
- APPENDIX D: Spirolab spec sheet
- APPENDIX E: Quarterly Spirometry Report Form
- APPENDIX F: Spirometer Quality Control Log
- APPENDIX G: Spirometry Testing Workflow - ADULT

SCOPE: Applicable to all WRHA Primary Care Direct Operations Clinics (including Walk-In Connected Care Clinics at Access Winnipeg West, Access Fort Garry and McGregor), Interprofessional Team Demonstration Initiative (ITDI) and My Health Teams.

NOTE: While the Funded Community Health Agencies are out of scope of Primary Care Practice Guidelines, it is recommended the content and/or processes be adapted/adopted where applicable.

Questions regarding this or any other Primary Care Practice guideline should be directed to Primary Care Service Area Leadership