Thames Valley
Family Health Team

Medical Directive

Title:	**Pre and Post Bronchodilator Spirometry Testing and Treatment Initiation**	**Assigned Number**	**023**
Activation Date	**April 24, 2013**	**Review due by**	**December 2025**

Approval Signature & Date

Medical Director: _____ Date: March 6, 2023

Clinical Services Director: _____ Date: March 6, 2023

Order and/or Delegated Procedure:	**Appendix Attached:** ☐ **Yes** ☒ **No** **Title:**
Spirometry testing with or without an Inhaled B2 Agonist Medication.	
Recipient Patients:	**Appendix Attached:** ☒ **Yes** ☐ **No** **Title:** Appendix 2 - Authorizer Approval Form
All active patients (> 6 yo) of the Thames Valley Family Health Team physicians identified on the attached Authorizer Approval Form (Appendix 2) who require Spirometry.	
Authorized Implementers:	**Appendix Attached:** ☒ **Yes** ☐ **No** **Title:** Appendix 1 - Implementer Approval Form Appendix 8 - Implementer Performance Readiness Form

Thames Valley Family Health Team Respiratory Therapist (RT)*

* The implementer must receive orientation from the Educator with regards to the task. The implementer and Educator must sign the Implementer Performance Readiness Form (Appendix 8) after successful completion of the orientation. Following review of this directive, the Implementer Approval Form (Appendix 1) must be signed by the implementer indicating acceptance of this medical directive.

Thames Valley Family Health Team

Indications:	**Appendix Attached:** ☒ **Yes** ☐ **No** **Title:** Appendix 21 - American Thoracic Society (ATS) Clinical Practice Guidelines or best practice guidelines

Verbal consent from the patient or a substitute decision maker for the implementer to perform Spirometry.

As per RT guidelines:

1. Detect the presence or absence of lung disease
2. Quantify the severity of a known disease
3. Screening for high-risk occupations
4. Screening for early detection of COPD
5. Assess response to therapeutic interventions
6. Repeat spirometry as recommended by the American Thoracic Society (ATS) Clinical Practice Guidelines or best practice guidelines

Contraindications:

For Spirometry:

1. No verbal consent from patient or substitute decision maker
2. Age <6 years old
3. Acute disorders affecting performance (nausea, vomiting, dizziness)
4. Pneumothorax within 3 months
5. Hemoptysis
6. Recent abdominal or thoracic surgery
7. Recent Myocardial Infarction or unstable angina (forced expiratory maneuver may cause changes in blood pressure), or pulmonary embolus that has occurred in the last 3 months
8. Recent eye surgery that has occurred in the last 3 months (e.g., cataract removal)
9. Thoracic, abdominal, or cerebral aneurysms (danger of rupture due to increased thoracic pressure)
10. The following conditions may result in suboptimal lung function results: chest or abnormal pain of any cause, oral or facial pain exacerbated by a mouthpiece, stress incontinence, dementia or confused state
11. Presence or suspected active tuberculosis or other communicable respiratory disease.

For Administered Inhaled B2 Agonist:

1. No verbal consent from patient or substitute decision maker
2. Contraindications to salbutamol or terbutaline; hypersensitivity to salbutamol or terbutaline; or any component of the medication being administered
3. Tachyarrhythmia

Potential side effects of the Beta2 Agonist:

- Increased heart rate - palpitations
- Tremors of extremities (lasting approximately 30 minutes)
- Headaches
- Pneumothorax
- Syncope, dizziness, light-headedness
- Paroxysmal coughing
- Contraction of nosocomial infections
- Oxygen desaturation due to interruption of oxygen therapy
- Bronchospasm

Consent:	**Appendix Attached:** ☐ **Yes** ☒ **No** **Title:**

1. Patients > 6 yo of Thames Valley Family Health Team family physicians.
2. Implementer obtains verbal consent from patient or substitute decision-maker prior to implementation of testing.

Guidelines for Implementing the Order/Procedure:

Appendix Attached: ☒ **Yes** ☐ **No**

Title: Appendix 21 - American Thoracic Society (ATS) Clinical Practice Guidelines or best practice guidelines

Appendix 25 – How to Perform Post-Bronchodilator Testing

Appendix 26 – Further Testing

Appendix 27 – Initiating Treatment for Asthma and COPD

Patients who meet the INDICATIONS described above:

1. The patient will be advised that IF post bronchodilator testing is to be performed, the patient will be informed about the potential side effects.
2. Assess the patient's ability to perform Spirometry considering age and co-morbitities.

3. Obtain and document informed verbal consent. 4. Review contraindications. 5. Perform Spirometry as per Appendices 21 and 25. 6. Determine need for further testing as per Appendix 26. 7. Assess for allergies to medications and comorbidities that may be contraindications (Appendix 27). 8. Initiate treatment for new and established cases of COPD/asthma clearly identified on spirometry (Appendix 27).

Documentation and Communication:	**Appendix Attached:** ☐ **Yes** ☒ **No** **Title:**

1. Documentation in the patient's medical record needs to include name and number of the directive, name of the implementer (including credential) and name of the physician/authorizer responsible for the directive and the patient. 2. Information regarding implementation of the procedure and the patient's response should be documented in the patient's medical record, in accordance with standard documentation practice. 3. The implementer will notify the MRP or physician on call immediately in case of any medical complication or emergency during or following Spirometry.

Review and Quality Monitoring Guidelines:	**Appendix Attached:** ☐ **Yes** ☒ **No** **Title:**

1. The Directive remains in force until and unless amendment occurs. Review will occur biennially or if the following situations occur. In the case the Medical Director identifies the need to change the Medical Directive, at least one TVFHT member of the implementing discipline will be consulted. 2. At any such time that issues related to the use of this directive are identified, the team must act upon the concerns immediately by identifying these concerns to the Medical Director. The Medical Director will review these concerns and consult with at least one TVFHT member of the implementing discipline before necessary changes are made. 3. If new information becomes available between routine renewals, and particularly if this new information has implications for unexpected outcomes, the directive will be reviewed by the Medical Director and a minimum of one implementer.

Approving Physician(s)/Authorizer(s):	**Appendix Attached:** ☒ **Yes** ☐ **No** **Title:** Appendix 2 - Authorizer Approval Form

TVFHT Family Physician Authorizer Approval Form (Appendix 2)

Thames Valley
Family Health Team

Appendix 25 - Pre and Post Bronchodilator Spirometry Testing and Treatment Initiation

How to Perform Post-Bronchodilator Testing

Method:

1. The patient performs three acceptable tests as per ATS standards.
2. The bronchodilator is administered via metered dose inhalation using a disposable spacer device where appropriate:
    a. Salbutamol 100 mcg/puff – 4 puffs for adults and children >6 yrs of age, OR terbutaline 500 mcg/puff - 2 puffs for adults and children.
    b. A lower dose can be used if there is concern about any effect on the patient's heart rate or tremor.
3. Three additional acceptable tests are recorded > 10 minutes and up to 15 minutes later.
4. Post-bronchodilator testing will not always be performed despite referral due to medication taken prior to test, normal spirometry values, assessment of performer, etc.

If post-bronchodilator testing is to be performed, the patient should withhold the following medication:

Inhaled Bronchodilators

Short-acting beta-agonist (SABA)	4-6 hours
Short-acting Anticholinergics (SAMA)	12 hours
Long-acting beta2-agonist (LABA)	24 hours
eg. Formoterol or salmeterol	
Ultra long acting beta2 agonist	36 hours
eg. Indacaterol, vilanterol or oladaterol	
Long-acting muscarinic antagonist (LAMA)	
Eg. Tiotropium, Umeclidinium, Glycopyrronium, Aclidinium	36-48 hours

It is important to tell the patient that if they need to use their rescue inhaler for symptoms, they can do so and not withhold for the test.

Spirometry Instruction Sheet has the most up-to-date instructions and will be updated as new medications are released to the public.

Thames Valley
Family Health Team

Appendix 26: Pre and Post Bronchodilator Spirometry Testing and Treatment Initiation Further Testing

Full Screen Pulmonary Function Tests (with or without post-bronchodilator)

The implementer may initiate a referral/requisition for further testing after performing pre- and post- bronchodilator spirometry in the following situations:

Indications:

1. The patient's symptoms are suggestive of underlying lung disease, but results of spirometry testing are incongruent;
2. Spirometry testing indicates a combination of obstructive and restrictive disease, making interpretation more difficult;
3. Spirometry testing indicates moderate to severe restrictive disease not responsive to bronchodilator therapy.

Contraindications:

As per Spirometry Contraindications

Triaging to the Pulmonary Function Lab (with or without post-bronchodilator)

The implementer may initiate a referral/requisition for spirometry and/or pulmonary function testing to the community pulmonary function lab in the following situations:

Indications:

1. Spirometry is not being performed in an office setting during the time of the referral.
2. The Implementer will determine if a patient is more appropriate for a referral to the Pulmonary function lab based on patient assessment, and access times.

Contraindications:

As per Spirometry Contraindications

Thames Valley
Family Health Team

Appendix 27: Pre and Post Bronchodilator Spirometry Testing and Treatment Initiation

Initiating Treatment for Asthma and COPD

The implementer may initiate treatment for patients identified by pre- and post-bronchodilator spirometry, or pulmonary function testing, as having asthma or COPD.

Asthma

For new or established cases of asthma (as per CTS guidelines diagnostic criteria.

For children ages 6-11:

Symptoms < twice a month	Symptoms >= twice a month, but less than daily	Symptoms most days or wakes with asthma >= once/week
Initiate treatment with a low-dose Inhaled Corticosteroid (ICS) plus as needed (PRN) SABA. Initiate prescription for 1 inhaler and 1 repeat.	Initiate daily low dose inhaled corticosteroid (ICS) Initiate prescription for 1 inhaler and 1 repeat.	Initiate low dose ICS – LABA or medium dose ICS or very low dose ICS – formoterol Initiate prescription for 1 inhaler and 1 repeat.

For those >= 12 years of age:

Symptoms < 4 days/week	Symptoms most days, OR wakes with asthma >= once/week	Daily symptoms or severely uncontrolled asthma or an acute exacerbation
Initiate PRN ICS-formoterol and arrange follow-up with physician to assess treatment as well as follow up spirometry to assess lung function.	Initiate daily low dose ICS – formoterol	Initiate medium dose ICS – formoterol
Initiate prescription for 1 inhaler and 1 repeat.	Initiate prescription for 1 inhaler and 1 repeat.	Initiate prescription for 1 inhaler and 1 repeat

When adjusting to Yellow Zone medications follow the Lung Health Foundation's **Adjustment of Inhaled Controller Therapy of Asthma in the Yellow Zone** document.[9]

Medication Choices[1]

Medication	Dosage	Contraindications[2]
Short-Acting Beta Agonist (SABA)		
Salbutamol (Ventolin® pMDI 100mcg/dose)	1-2 puffs every 4 hours as needed up to 8 puffs/day	• Contraindications or hypersensitivity to medication or any component of the formulation • Tachyarrhythmia
Terbutaline (Bricanyl® Turbuhaler 0.5mg/dose)	1-2 inhalation as needed up to 4 times a day	
Inhaled Corticosteroids (ICS)		
Ciclesonide (Alvesco® pMDI 100, 200 mcg/dose) >6 years	1-2 puffs DAILY or BID Max dose 800mcg/day	• Contraindications or hypersensitivity to medication or any component of the formulation • Status asthmaticus • Close monitoring is warranted in patients with a change in vision or with a history of increased intraocular pressure, glaucoma, and/or cataracts
Fluticasone Furoate (Arnuity® Ellipta 100, 200mcg/dose) ≥ 12 years	1 puff DAILY Max dose 200mcg/day	
Fluticasone Propionate (Flovent® HFA pMDI 50, 125, 250mcg/dose) ≥ 1 year	Age 1-11 yrs: 50-125 mcg BID Age ≥12 yrs: 125-250 mcg BID Max dose 2000mcg/day 1-2 puffs BID Max dose 2400mcg/day	
Beclomethasone dipropionate (QVAR® pMDI 50,100 mcg/dose) >5 years old	1-2 puffs BID Max dose 800mcg/day	
Fluticasone Propionate (Flovent® Diskus 100, 250, 500mcg/dose) ≥ 4 years 2000mcg/day	100-250 mcg BID Max dose 2000mcg/day	
Budesonide (Pulmicort® Turbuhaler 100, 200, 400 mcg/dose) ≥ 6 years	1-2 puffs BID Max dose 2400mcg/day	
Beclomethasone dipropionate (QVAR® pMDI 50,100 mcg/dose) >5 years old	1-2 puffs BID Max dose 800mcg/day	

Inhaled Steroid/Long-Acting Beta Agonist (ICS/LABA)		
Budesonide + formoterol (Symbicort® Turbuhaler 100/6, 200/6mcg) >12 years old	1-2 puffs BID Max dose 1600mcg/day. (Can be used PRN in addition to BID up to 8 inhalations per day as per SMART dosing)	• Contraindications or hypersensitivity to medication or any component of the formulation (milk protein in Advair Diskus and other DPIs) • close monitoring is warranted in patients with a change in vision or with a history of increased intraocular pressure, glaucoma, and/or cataracts. • Tachyarrhythmia Status asthmaticus
Mometasone + formoterol (Zenhale® pMDI 100/5, 200/5 mcg)>12 years old	1-2 puffs BID Max dose 800mcg/day	
Fluticasone furoate + vilanterol (Breo® Ellipta 100/25, 200/25mcg) >18 years old	1 puff DAILY Max dose 200mcg/day	
Fluticasone propionate + salmeterol (Advair® Diskus/ Wixela® Inhub 100/50, 250/50, 500/50 mcg) >4 years old	1 puff BID Max dose of Salmeterol is 100mcg/day - increase dose of inhaler rather than number of puffs if escalating dose of diskus), Fluticasone max 2000mcg/day	
Fluticasone propionate + salmeterol (Advair® MDI 100/25, 200/25 mcg) >12 years old	2 puffs BID Max 100 mcg/d salmeterol, 2000mcg/d fluticasone	

[1] If patient is already on inhalers prior to spirometry/RT visit, RT to assess compliance and symptom relief patient has from inhalers.

[8] Gina Guidelines 2022 update

[9] **Adjustment of Inhaled Controller Therapy of Asthma in the Yellow Zone** document.

COPD

For new or established cases of COPD (as per GOLD 2023 recommendations), initiate treatment as per the following criteria:

GOLD Group A	0 or 1 moderate exacerbations (not leading to hospitalization) CAT <10, mMRC 0 (I only get breathless with strenuous exercise) or 1 (Dyspnea when hurrying or walking up a slight hill)	Initiate treatment with a bronchodilator SABA, SAMA, LABA, or LAMA
GOLD Group B	0 or 1 moderate exacerbations (not leading to hospitalization) CAT >=10, mMRC ≥ 2 (I walk slower than people of the same age on the level because of breathlessness, or I have to stop for a breath when walking at my own pace on the level)	Initiate treatment with a: LABA + LAMA
GOLD Group E	≥ 2 moderate exacerbations or ≥ 1 moderate exacerbation leading to hospitalization	Initiate treatment with a: LABA + LAMA* *(Consider LABA+LAMA+ICS if blood eosinophils ≥ 300)[2]

[1] If patient is already on inhalers prior to spirometry/RT visit, RT to assess compliance and symptom relief patient has from inhalers.

[2] If patient is on medication already listed above; as per GOLD 2023 and would be appropriate for “triple therapy” RT to either discuss treatment options with MD, and/or have patient follow up with MD to have medication treatment assessed.

[3] If patient already on inhalers, but not on correct COPD inhalers, RT to assess and prescribed as needed.

[4] this may include the distribution of one ICS, ICS/LABA, LAMA or LABA/LAMA sample if applicable and/or available

*moderate AECOPD = an event that requires prescribed antibiotic and/or oral corticosteroids

Medication Choices[1]

Medication	Dosage	Contraindications[2]
Short-Acting Beta Agonist (SABA)		
Salbutamol (Ventolin® pMDI 100mcg/dose) Terbutaline (Bricanyl® Turbuhaler 0.5mg/dose)	1-2 puffs every 4 hours as needed up to 8 puffs/day 1-2 inhalations as needed up to 4 times a day	• Contraindications or hypersensitivity to medication or any component of the formulation • Tachyarrhythmia
Long-Acting Muscarinic Antagonist (LAMA)		
Tiotropium (Spiriva® Handihaler 18mcg/capsule) Tiotropium (Spiriva® Respimat 2.5mcg/inhalation) Umeclidinium (Incruse® Ellipta 62.5mcg/puff)	1 capsule (18mcg) inhaled via HandiHaler once daily 2 inhalations once daily 1 puff once daily	• Glaucoma • Prostatic hyperplasia or bladder neck obstruction • Renal impairment
Aclidinium (Turdorza® Genuair 400mcg)	1 inhalation BID	• Narrow angle glaucoma • Urinary retention • Severe hypersensitivity to milk proteins

Glycopyrronium (Seebri® Breezhaler 50 mcg)	1 capsule (50 mcg) inhaled via Breezhaler DAILY	• Narrow angle glaucoma • Urinary retention • Severe hypersensitivity to milk proteins • Renal impairment

[1] The medications listed and approved for use in the medical directive do not represent the complete list of available options for pharmacotherapy.

[2] Contraindications may not be absolute but should be discussed with a physician before initiating treatment if any concerns.

[3] Medications to be ordered with one repeat. All other refills to be ordered through the physician or physician to give direct/verbal order for the RT to reorder.

[4] this may include the distribution of one ICS, ICS/LABA. LABA or LABA/LAMA sample if applicable and/or available

Thames Valley Family Health Team

COPD

Medication Choices[1,4]

Medication	Dosage	Contraindications[2]
Long-Acting Muscarinic Antagonist/Long-Acting Bata Agonist (LAMA/LABA Dual Bronchodilator)		
Tiotropium/Olodaterol (Inspiolto® Respimat 2.5/5 mcg)	2 inhalations once daily	• Contraindications or hypersensitivity to medication or any component of the formulation • Narrow angle glaucoma • Urinary retention • Severe hypersensitivity to milk proteins (dry powder inhalers only) • Renal impairment
Umeclidinium/Vilanterol (Anoro® Ellipta 62.5/25mcg)	1 puff once daily	
Aclidinium/Formoterol (Duaklir® Genuair 400mcg/12mcg)	1 puff BID	
Indacaterol/Glycopyrronium (Ultibro® Breezhaler 110mcg/50mcg)	1 capsule inhaled via Breezhaler once daily	

[1] The medications listed and approved for use in the medical directive do not represent the complete list of available options for pharmacotherapy.

[2] Contraindications may not be absolute, but should be discussed with a physician before initiating treatment, if any concerns

[3] Medications to be ordered with one repeat. All other refills to be ordered through the physician or physician to give verbal order for the RT to reorder.

[4] this may include the distribution on one sample of the ICS, ICS/LABA, LABA, or LAMA/LABA of applicable and/or available. RT will follow CRTO guidelines for dispensing medication: https://www.crto.on.ca/pdf/PPG/Dispensing.pdf

[5] COPD Assessment Test

[6] GOLD 2023 Guidelines – Global Initiative for COPD

[7] CTS Guidelines – Canadian Thoracic Society

[8] Gina Guidelines 2022 update