



RespiratoryPlus

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## Written Instructions Sheet – Methacholine Challenge Testing

*Adapted from the Raven Medical Management Inc., Pulmonary Function Diagnostics Quality Manual 2024*

Pulmonary Function Diagnostic (PFD) testing measures how well your lungs perform by assessing how much air your lungs can hold and how quickly you can move air in and out of your lungs; it may also be used to determine how well your lungs deliver oxygen to your bloodstream. These tests are ordered to identify issues with your lung health and can help diagnose medical conditions related to wheezing, cough, shortness of breath, or they may be ordered as a follow up to assess lung condition management. The purpose of a methacholine challenge test is to determine if you or your child's airways constrict abnormally when a small amount of irritant is inhaled.

Methacholine challenge testing, in particular helps in confirming or ruling out asthma when other tests or symptoms are inconclusive. It's particularly useful in diagnosing mild or atypical cases of asthma. It may also assist health professionals to monitor changes in airway responsiveness over time, allowing them to adjust treatment strategies accordingly.

Preparing for pulmonary testing is essential for maximizing the value of the results in your overall health planning and ensuring a safe experience. This information sheet outlines the steps and recommendations to prepare for your upcoming test.

### 1. Pre-Examination

Before any testing sessions, you will engage in an initial consultation with our team to discuss your condition(s), expectations, and any concerns you have about the upcoming test. This is an opportunity to share your complete medical history, including medications, allergies, and any relevant mental health conditions.

Medical professionals with specialized training help to establish a personalized plan based on your comfort level, medical history, and medical sensitivities to manage your respiratory health. During a respiratory assessment, certified respiratory professionals will educate you about proper inhaler techniques and your own specific lung condition to help you discover and achieve your health goals.

*This form of treatment is a medical service, and you will need to bring your healthcare card and photo identification to complete our registration process and ensure our compliance with the Health Information Act.*

### 2. Environmental Considerations

Challenge testing takes place in a controlled setting designed to optimize outcomes. RespiratoryPlus will ensure that the environment for the test is comfortable, safe, and conducive to performance.

- You should arrive **20 minutes** before your appointment and be prepared to spend about **60 minutes** performing this test.
- If you do not speak (or speak very little) English, please bring your adult interpreter with you to the session.

### 3. Physical Preparations

#### 3.1. Dietary Precautions

You should avoid having a large meal for at least **1 hour** before the appointment time to ensure that you can breathe easily and normally during the test.



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### 3.2. Activities to Avoid

- You should avoid vigorous exercise for at least **1 hour** before testing.
- Please refrain from smoking and/or vaping, and/or water pipe use, or from inhaling secondhand smoke for **two hours** prior to treatment to ensure that it does not affect your normal lung function or the key monitoring equipment.
- You should abstain from consuming alcohol or illicit substances for at least **8 hours** before testing.

### 3.3. Clothing

Wear comfortable clothing suitable for relaxation and ease of movement. **Please avoid wearing nail polish and/or artificial acrylic nails.**

### 3.4. Medication Withholding Recommendations

Medications that affect lung function and volumes should be withheld, if clinically feasible. If you take medication for your lung health, please **DO NOT** take it the day of the test unless you are short of breath and feel like you need to use the lung medicine. The length of time necessary to withhold various medications varies, please use this table to determine your medication withholding time:

Inhaled Medication	Minimum Withholding Time (hours)
Short-acting beta-agonists (SABA) (e.g. salbutamol, terbutaline)	6 hours
Long-acting beta-agonists (LABA) (e.g. salmeterol, formoterol, vilanterol)	36 hours
Ultra-long-acting beta-agonists (e.g. indacaterol, vilanterol, olodaterol)	48 hours
Short-acting anticholinergics (e.g. ipratropium (Atrovent))	12 hours
Long-acting anti-muscarinic (LAMA)/Long-acting anticholinergics (LAAC) (e.g. aclidinium, tiotropium, glycopyrronium, umeclidinium)	≥168 hours (7 days)
Cromones (e.g. Cromolyn sodium)	Do not withhold
Corticosteroids	Do not withhold
Oral Medication	Minimum Withholding Time (hours)
Liquid theophylline	12 Hours
Intermediate-acting theophylline	24 Hours
Long-acting theophylline	48 Hours
Leukotriene modifiers (e.g. montelukast)	Do not withhold
Antihistamines	Do not withhold
Corticosteroids	Do not withhold

*Where multiple tests are being performed, the **longer** withholding times are best practice.*

Our personnel are available to speak to if you need help determining whether or not your medicine is appropriate to take, or how long in advance of the test you should stop. Please bring your lung medicines with you to the appointment.

## 4. During the Test

Trust the RespiratoryPlus team and allow yourself to be confident and open to the testing procedure without resistance.

- Before the challenge, the technician will explain and demonstrate the test requirements to the patient including inhalation of the test solutions and performance of pulmonary function (PF) tests.
- The Technologist will coach you about what to do, to get the most accurate test. It is normal for the Technologist to use a louder tone of voice so that the instructions can be easily heard inside the machine.



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- You (or your child) will be asked to sit comfortably and wear a nose clip to ensure breathing occurs only through the mouth.
- You (or your child) will be asked to inhale a mist that contains different concentrations of a medication called methacholine. The mist is produced by a device called a nebulizer and inhaled through a mouthpiece.
  - Before the test begins, and after each period of inhalation, you or your child will be asked to blow forcefully into a spirometer, a device that measures how much air you can blow out and how fast.



- The Technologist will remain for the entire test.
- At any time if you need to use the washroom, let us know.

Feel free to communicate with the clinical team about any thoughts, emotions, or physical sensations experienced during the session.

#### 4.1. Patients Receiving Supplemental Oxygen

If you are receiving supplemental oxygen, additional procedures will be included in the performance of the test described above. Specifically, you can expect the technologist to obtain a baseline measurement of your oxygen saturation with the oxygen on. Then you will be asked, or assisted, to take the oxygen off to perform the testing maneuver. The technologist will continuously monitor your oxygen level via finger oximeter.

*Your oxygen tank is kept in close proximity in case of urgent use. When necessary, an oxygen tank from the RespiratoryPlus Laboratory is provided for the remainder of the visit. Oxygen flow will be titrated as per your needs.*

The Technologist will put the oxygen back on if any of the following occur: cyanosis, SpO<sub>2</sub> decreasing at a steady rate, or labored breathing. Once you have rested and your breathing and SpO<sub>2</sub> have stabilized, testing may be continued.

Once testing is completed, you will be put back onto your oxygen at the flow you normally use. You will be provided space to rest. The Technologist will ensure that your vitals have returned to normal before you will be allowed to leave the facility.

#### 4.2. Potential Risks and Discomforts

Overall, the benefits of pulmonary function testing for diagnosing, managing, and monitoring lung conditions typically outweigh the minimal risks associated with the tests, but it's important to understand the common, potential, and significant risks. RespiratoryPlus has prepared the following evidence respecting the potential risks and discomforts of the treatment:



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- This test does not cause an asthma attack, but the inhalation of aerosols may be associated with irritation and constriction of the airways with mild shortness of breath, cough, chest tightness, wheezing, chest soreness, or headache.
  - There is a very small possibility of severe narrowing of your airways. This could cause severe shortness of breath.
- Some individuals may feel dizzy or short of breath during the procedure due to forced exhalation.
- In the event that you are administered a bronchodilator as part of the treatment process or event response, you should be aware of the following potential complications:
  - Tachycardia: Increased heart rate can occur as a side effect of bronchodilators. This may lead to palpitations or discomfort.
  - Tremors: Some individuals may experience mild tremors or shakiness in their hands or other parts of the body.
  - Hypokalemia: In rare cases, bronchodilators might cause a decrease in blood potassium levels, leading to muscle weakness or irregular heartbeats.
  - Nausea or Vomiting: Certain individuals may experience gastrointestinal discomfort or nausea after bronchodilator use.
  - Headaches: Some patients may experience mild to moderate headaches as a result of the medication.
  - Hypertension: In some cases, bronchodilators can temporarily increase blood pressure.
  - Allergic Reactions: Though rare, allergic reactions such as skin rash, itching, or swelling may occur. Severe allergic reactions like anaphylaxis are extremely rare but should be mentioned.
  - Cough or Respiratory Irritation: Paradoxically, bronchodilators can sometimes cause a temporary increase in cough or irritation in the airways.
- Bronchial Challenge Testing is an emerging technology, and the risks associated with participating in this form of testing will be discussed with you to ensure that your informed consent is obtained and documented, before proceeding with the test.
- Given the nature of pulmonary function testing and the attention of the respiratory professional, it may not be possible to maintain a 2-meter distance between the respiratory therapist, the patient who is testing, and/or any potential third individual (e.g., translator, parent, etc.).
- Patients may show no prior signs of infection and become symptomatic during their visit to the facility if lung capacity is exacerbated to perform the test.
- There is a possibility your appointment may take longer than expected to arrange due to additional precautionary measures.
- There is potential for a shortage of PPE, hand sanitizer and Ventolin.

Most patients will not experience any adverse symptoms at all. These symptoms (if they occur) are normally mild, last for only a few minutes, and disappear with appropriate medical response. If you, or your child, experience any symptoms, you will be treated immediately. RespiratoryPlus will ensure that all medications or devices that may be required to treat you are readily available.

## 5. After the Test

The Technologist will let you know when the test is complete.

- Take all of the time you need to orient yourself.
- You may feel tired and need to rest, please let us know how you are feeling, and we will invest every effort in assisting you.



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- A report will be sent directly to your doctor within 1 week. Your doctor will share the results with you.
  - Talk to your doctor if you have any questions or concerns about the outcome of the test.

Preparing for a pulmonary function testing session involves mental, emotional, and physical considerations to ensure a safe and appropriate outcome. If you have any questions or need further guidance, please reach out to our team.

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*Thank you for trusting RespiratoryPlus to support you through your healing journey.*