

PROVOCHOLINE® (methacholine chloride)

ATS five-breath dosimeter method Dilution Sequence Protocol for The Provocholine® Challenge Test



Provocholine® 100 mg/vial (Canada DIN 02239656)

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Introduction

Dilution Sequence Protocol

- This dilution sequence is prepared according to the American Thoracic Society Guidelines for Methacholine and Exercise Challenge Testing – 1999 as per the five-breath dosimeter protocol.
- The following are step-by-step instructions to dilute a 100 mg vial of Provocholine® into the five (5) requisite concentrations for use in a bronchoprovocation challenge test
- **Please refer to the Package Insert for full instructions and safety precautions**
- Accurate sterile mixing is essential for the accuracy of the test results and to maintain patient safety
- Only trained individuals should mix and label Provocholine® solutions
- The following protocol is used to prepare Provocholine® solutions for testing a single patient only

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Important Notes

- Do not inhale powder during preparation of dilutions
- Do not handle Provocholine® if you have asthma or hay fever
- Provocholine® dilutions should be mixed by a pharmacist or other well-trained individual using sterile technique
- All vials should be labeled using the green labels provided, filling in the appropriate Lot Number, concentration, Diluent, preparation, initials of person preparing, and expiration dates.
- To reduce back pressure, vent vials with an extra needle as needed
- All dilutions should be made with:
 - 0.9% NaCl containing 0.4% phenol (pH 7.0)
 - Sterile USP Type I borosilicate glass vials
- When transferring solution from each vial (at least 2 mL) to a nebulizer use a sterile bacterial-retentive filter (porosity 0.22 µm)



Supplies Required

Supplies required for the dilution of a single (1) vial of Provocholine® 100 mg

Quantity	Description
1	100 mg/vial of Provocholine®
1	100 mL 0.9% NaCl with 0.4% Phenol (pH 7.0)
4	10 mL Sterile empty USP Type I borosilicate glass vials
2	10 mL Syringes*
2	20 Gauge, 1" Syringe Needles*
1	Millex GS 0.22 µm filter (Millipore)*
7	Alcohol Preparation Pads*
1 set	Green labels for vials (provided with Provocholine®)
X	Set of Directions
X	Provocholine® Dilution Sequence Check Sheet and Control Record
X	Package Insert for Provocholine®

*Quantity of supplies subject to facility protocol



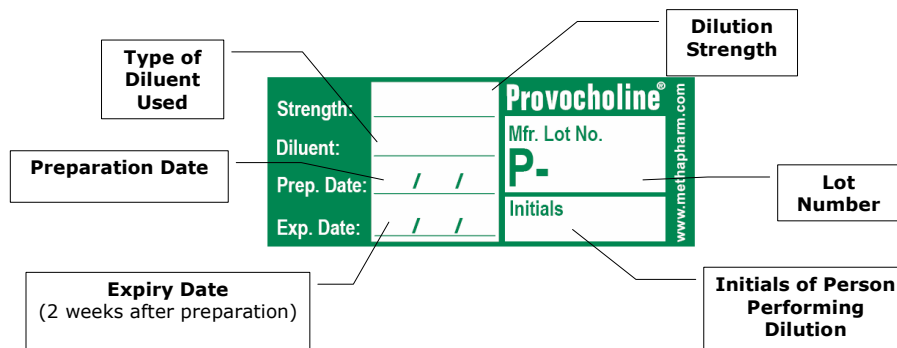
Overview of the Dilution Process

TAKE Provocholine® (Methacholine Chloride U.S.P. Powder for Inhalation)	ADD NaCl 0.9% with 0.4% phenol (Shake well!)	OBTAIN DILUTION	VIAL NAME
Provocholine® 100 mg	6.25 mL	16 mg/mL	VIAL A - 16 mg/mL
3 mL from vial A	9.0 mL	4 mg/mL	VIAL B - 4 mg/mL
3 mL from vial B	9.0 mL	1 mg/mL	VIAL C - 1 mg/mL
3 mL from vial C	9.0 mL	0.25 mg/mL	VIAL D - 0.25 mg/mL
3 mL from vial D	9.0 mL	0.0625 mg/mL	VIAL E - 0.0625 mg/mL



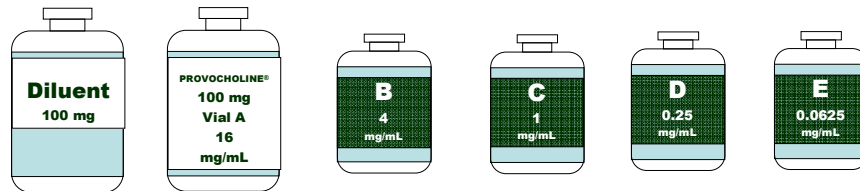
Getting Started – Green Labels

- Fill in all information on green labels provided
- Include 14 day expiration date on vials A - E

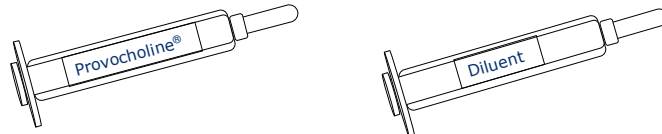


Getting Started

1. Attach green labels to sterile empty vials
2. Wipe down the plastic tops of the Sterile Empty vials, Provocholine®, and Saline vials with alcohol prep pads:

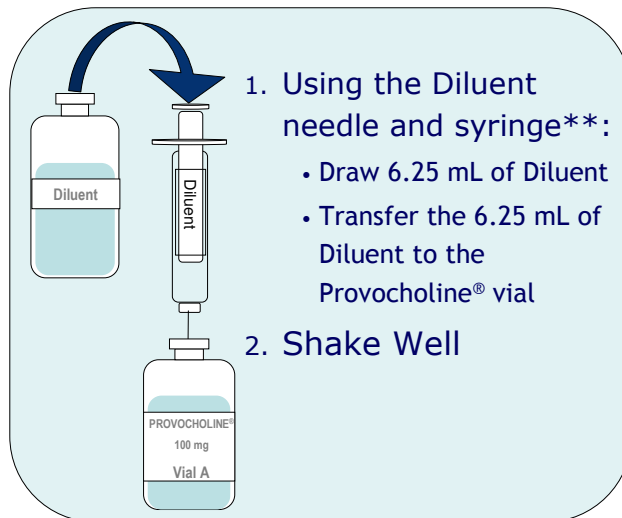


3. Label two (2) 10 mL syringes, (one for Provocholine® and one for Diluent) and attach needles to each



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Step I: Preparing Vial A - Provocholine® 16 mg/mL Solution

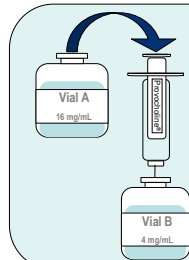


After Completing Step I:
Vial A contains 6.25 mL of Provocholine® solution @ 16 mg/mL

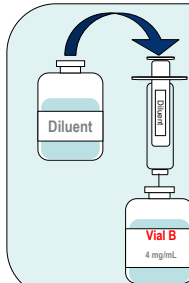
**Please note that the dilution in Step I requires that you draw 6.25 mL of Diluent, therefore you should use appropriately graduated syringes to accurately draw the Diluent (i.e. use an additional 1 mL syringe for Step I)

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Step II: Preparing Vial B - Provocholine® 4 mg/mL solution



1. Using the Provocholine® needle and syringe:
 - Draw 3 mL from Vial A
 - Transfer the 3 mL to Vial B



2. Using the Diluent needle and syringe:
 - Add 9 mL of Diluent to Vial B
2. Shake well

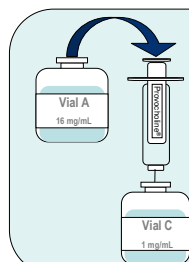
After Completing Step II:

Vial A contains 3.25 mL of Provocholine® solution @ 16 mg/mL

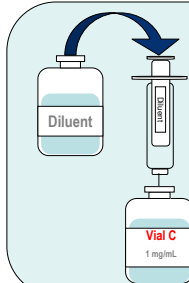
- and -

Vial B contains 12 mL of Provocholine® solution @ 4 mg/mL

Step III: Preparing Vial C - Provocholine® 1 mg/mL solution



1. Using the Provocholine® needle and syringe,
 - Draw 3 mL from Vial B
 - Transfer the 3 mL to Vial C



2. Using the Diluent needle and syringe:
 - Add 9 mL of Diluent to Vial C
3. Shake well

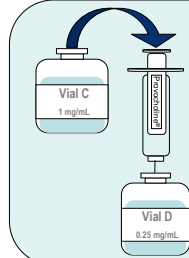
After Completing Step III:

Vial B contains 9 mL of Provocholine® solution @ 4 mg/mL

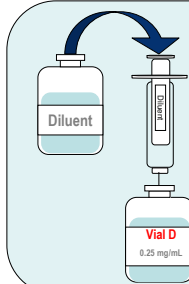
-and-

Vial C contains 12 mL of Provocholine® solution @ 1 mg/mL

Step IV: Preparing Vial D - Provocholine® 0.25 mg/mL solution



1. Using the Provocholine® needle and syringe:
 - Draw 3 mL from Vial C
 - Transfer the 3 mL to Vial D



2. Using the Diluent needle and syringe:
 - Add 9 mL of Diluent to Vial D
3. Shake well

After Completing Step IV:

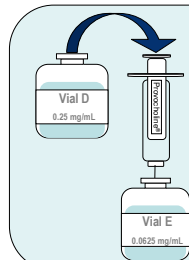
Vial C contains 9 mL of Provocholine® solution @ 1 mg/mL

-and-

Vial D contains 12 mL of Provocholine® solution @ 0.25 mg/mL

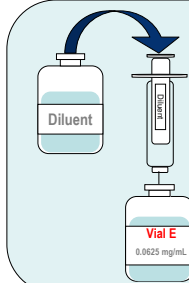


Step V: Preparing Vial E - Provocholine® 0.0625 mg/mL solution (Day of Test)



***Vial E must only be prepared on the day of the test**

1. Using the Provocholine® needle and syringe:
 - Draw 3 mL from Vial D,
 - Transfer the 3 mL to Vial E



2. Using the Diluent needle and syringe:
 - Add 9 mL of Diluent to Vial E
3. Shake well

After Completing Step V:

Vial D contains 9 mL of Provocholine® solution @ 0.25 mg/mL

-and-

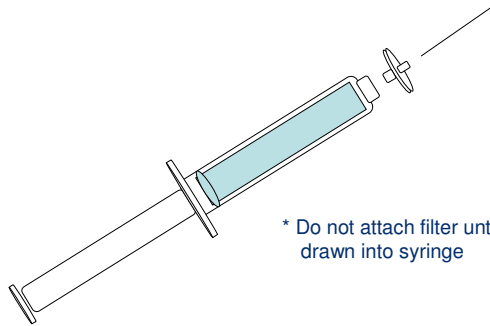
Vial E contains 12 mL of Provocholine® solution @ 0.0625 mg/mL



Final Step: Day of the Test

After Preparing Vial E:

- Aseptically attach a 0.22 µm bacterial retentive filter (Millex GS®) to a 10 mL syringe*
- Transfer all dilutions (in vials A through E) to nebuliser through the 0.22 µm bacterial retentive filter (Millex GS®)



* Do not attach filter until AFTER solution has been drawn into syringe

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Storage Instructions

- Dilutions A through D (16 mg/mL through 0.25 mg/mL) should be stored at 36° to 45°F (2° to 8°C) in a refrigerator for no more than 2 weeks
- Vial E (0.0625 mg/mL) must be prepared on the day of the challenge
- Unreconstituted powder should be stored at 59° to 86 °F (15° to 30°C)
- Freezing does not affect the stability of dilutions A through D (16 mg/mL through 0.25 mg/mL)

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Summary of Directions

Procedure:

1. Attach 2 needles to two (2), 10 mL syringes and label one for Provocholine® and one for Diluent.
2. Remove plastic cover from the Provocholine® and Diluent vials and line up all sterile empty vials.
3. Fill in information and attach green labels to the sterile empty vials.
4. Wipe off all plastic vial stoppers for Provocholine®, Diluent and sterile empty vials.
5. Using the Diluent needle and syringe, withdraw 6.25 mL of Diluent and insert into the Provocholine® 100mg vial. SHAKE WELL. This produces 6.25 mL of Provocholine® 16mg/mL also known as **VIAL A – 16 MG/ML.**
6. Using the Provocholine® needle and syringe, remove 3 mL from VIAL A and transfer to the vial labelled VIAL B – 4 MG/ML. Using the Diluent needle and syringe, add 9 mL of Diluent. Shake well. **THIS IS VIAL B – 4 MG/ML.**
7. Using the Provocholine® needle and syringe, remove 3 mL from VIAL B and transfer to the vial labelled VIAL C – 1 MG/ML. Using the Diluent needle and syringe, add 9 mL of Diluent. Shake well. **THIS IS VIAL C – 1 MG/ML.**
8. Using the Provocholine® needle and syringe, remove 3 mL from VIAL C, and transfer to the vial labelled VIAL D – 0.25 MG/ML. Using the Diluent needle and syringe, add 9 mL of Diluent. Shake well. **THIS IS VIAL D – 0.25 MG/ML.**
9. Using the Provocholine® needle and syringe, remove 3 mL from VIAL D – 0.25 MG/ML and transfer to the vial labelled VIAL E – 0.0625 MG/ML. Using the Diluent needle and syringe, add 9 mL of Diluent. Shake well. **THIS IS VIAL E – 0.0625 MG/ML.**

NOTE

- A sterile bacterial-retentive filter (porosity 0.22 µm) should be used when transferring a solution from each vial to a nebulizer.
- To avoid back pressure when injecting the contents of a syringe into a vial, you may wish to vent the vial with another needle.



Dilution Check Sheet and Control Record

PROVOCHOLINE® DILUTIONS FOR CHALLENGE TEST

Date: _____ Prepared by: _____ Checked by: _____

Provocholine® (see label on bottle): _____ Expiration Date: _____

Diluent: _____ Expiration Date: _____

0.22 micron Filter: _____ Expiration Date: _____

TAKE Provocholine® (Methacholine Chloride U.S.P. Powder for Inhalation)	ADD NaCl 0.9% with 0.4% phenol (Shake well!)	OBTAIN DILUTION	VIAL NAME	COMPLETED
Provocholine® 100 mg	6.25 mL	25 mg/mL	VIAL A - 16 mg/mL	
3 mL from vial A	9.0 mL	10 mg/mL	VIAL B - 4 mg/mL	
3 mL from vial B	9.0 mL	2.5 mg/mL	VIAL C - 1 mg/mL	
3 mL from vial C	9.0 mL	0.25 mg/mL	VIAL D - 0.25 mg/mL	
3 mL from vial D	9.0 mL	0.025 mg/mL	VIAL E - 0.0625 mg/mL	

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