

Provocholine[®]

(methacholine chloride)



Dilution Sequence Protocol

ATS “Long” – Doubling Doses

0.031

0.0625

0.125

0.25

0.5

1

2

4

8

16

Provocholine 1600 mg/vial (US NDC № 64281-016-01)

©Provocholine (methacholine chloride USP) powder for solution, for inhalation, is marketed in the United States, Canada and other countries. Provocholine is indicated for the diagnosis of bronchial airway hyperreactivity in subjects who do not have clinically apparent asthma. Provocholine is a bronchoconstrictor agent for diagnostic purposes only and should not be used as a therapeutic agent. Provocholine inhalation challenge should be performed only under the supervision of a physician trained in and thoroughly familiar with all aspects of the technique of methacholine challenge, all contraindications, warnings and precautions, and the management of respiratory distress. Emergency equipment and medication should be immediately available to treat acute respiratory distress. For complete prescribing information, please consult the Package Insert which is available for download at www.provocholine.com or on request by calling Methapharm Medical Information at 1-800-287-7686 | 519-751-3602 ext. 7804 or faxing us at 519-751-9149. You are encouraged to report negative side effects of prescription drugs to the FDA. Visit MedWatch or call 1-800-FDA(332)-1088. Provocholine is a registered trademark of Methapharm Inc. Copyright © Methapharm Inc. 2017.

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Specialty Pharmaceuticals

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Dilution Sequence Protocol

- This dilution sequence was prepared according to the Guidelines for Methacholine and Exercise Challenge Testing, published in 2000 by the American Thoracic Society. This protocol is commonly known as the “ATS Long,” and is available for download at <http://www.thoracic.org/statements/resources/pfet/methacholine1-21.pdf>.
- The following are step-by-step instructions on how to reconstitute a 1600 mg vial of Provocholine into the ten (10) requisite concentrations for use in a Provocholine challenge test.
- Please refer to the Provocholine package insert for full instructions and safety precautions.
- Precise 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.



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, filling in the appropriate lot number, concentration, diluent, preparation date, initials of person preparing, and expiration date.
- To reduce back pressure, vent vials with an extra needle as needed.
- All dilutions should be mixed in sterile USP Type I borosilicate glass vials.
- All dilutions should use one of the approved diluent options listed in your Provocholine package insert and use the same diluent throughout.



Supplies Required

Supplies required for the dilution of a single (1) vial of Provocholine 1600 mg

Quantity	Description
1	1600 mg vial of Provocholine
3	100 mL diluent*
10	50 mL sterile empty USP Type I borosilicate glass vials*
2	50 mL syringes*
2	20 Gauge, 1" syringe needles*
14	Alcohol preparation pads or swabs*
1	Set of directions
1	Provocholine Dilution Sequence Check Sheet and Control Record
1	Package Insert for Provocholine

* These supplies may require alternate quantities depending on your protocol.



Dilution Process

TAKE Provocholine	ADD Diluent (Shake well)	OBTAIN DILUTION	VIAL NAME
Provocholine 1600 mg	40 mL	40 mg/mL	Stock Solution* 40 mg/mL
20 mL from Stock Solution	30 mL	16 mg/mL	Vial A - 16 mg/mL
25 mL from Vial A	25 mL	8 mg/mL	Vial B - 8 mg/mL
25 mL from Vial B	25 mL	4 mg/mL	Vial C - 4 mg/mL
25 mL from Vial C	25 mL	2 mg/mL	Vial D - 2 mg/mL
25 mL from Vial D	25 mL	1 mg/mL	Vial E - 1 mg/mL
25 mL from Vial E	25 mL	0.5 mg/mL	Vial F - 0.5 mg/mL
25 mL from Vial F	25 mL	0.25 mg/mL	Vial G - 0.25 mg/mL
25 mL from Vial G	25 mL	0.125 mg/mL	Vial H - 0.125 mg/mL
25 mL from Vial H	25 mL	0.0625 mg/mL	Vial I - 0.0625 mg/mL
25 mL from Vial I	25 mL	0.031 mg/mL	Vial J - 0.031 mg/mL

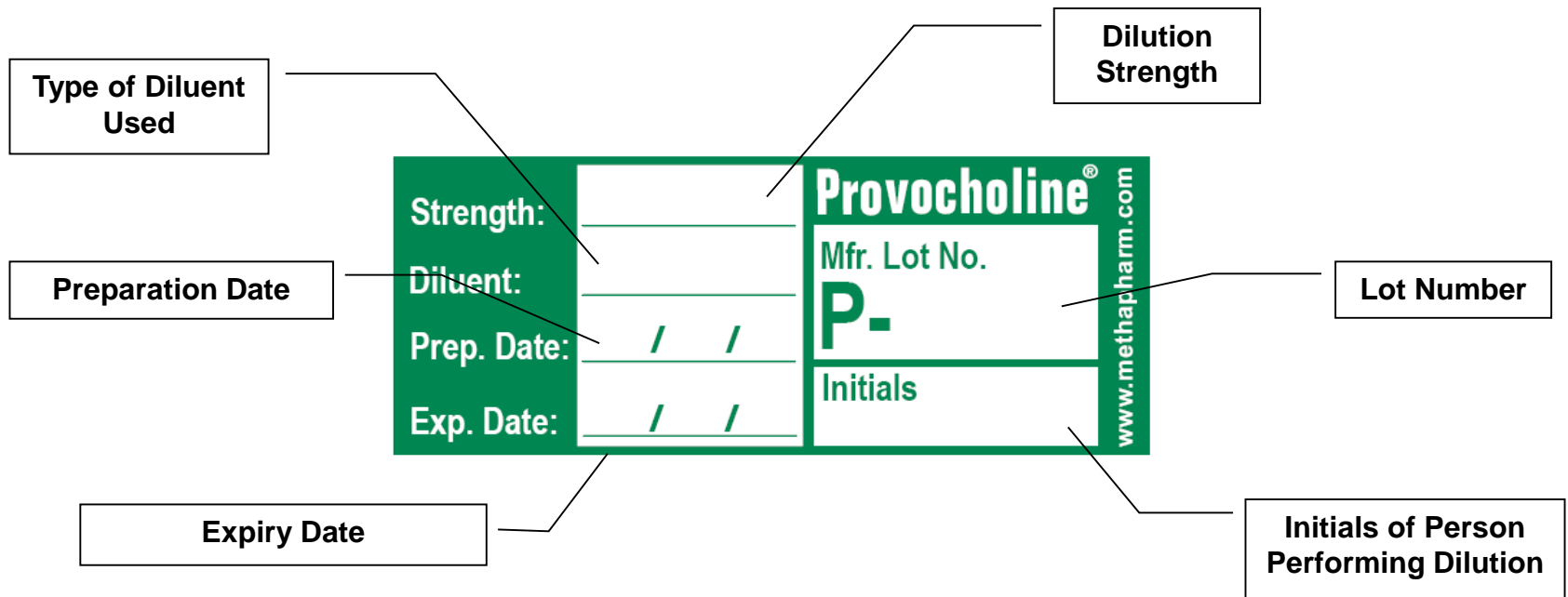
***DO NOT ADMINISTER STOCK SOLUTION TO PATIENTS.**

Provocholine[®]
[methacholine chloride]



Labeling

- Fill in **ALL** information on labels.
- Include **14 day expiration date** on vials A – J.

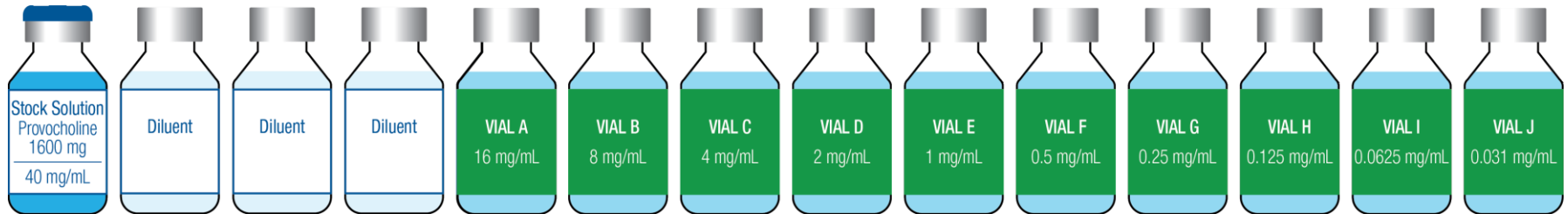


Dilution Process

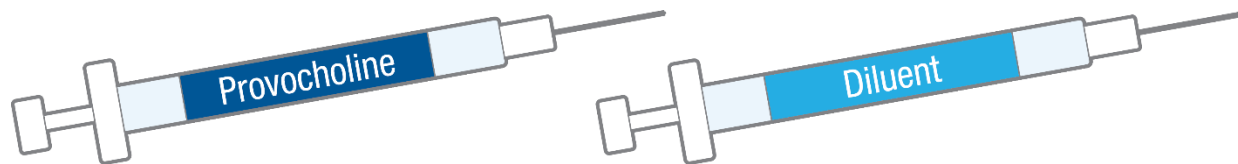


Getting Started

1. Attach labels to sterile empty vials.
2. Wipe down the stoppers of the Provocholine vial, diluent vials, and sterile empty vials with alcohol prep pads.



3. Label two (2) appropriately sized syringes (one for Provocholine, one for diluent), and attach needles to each.

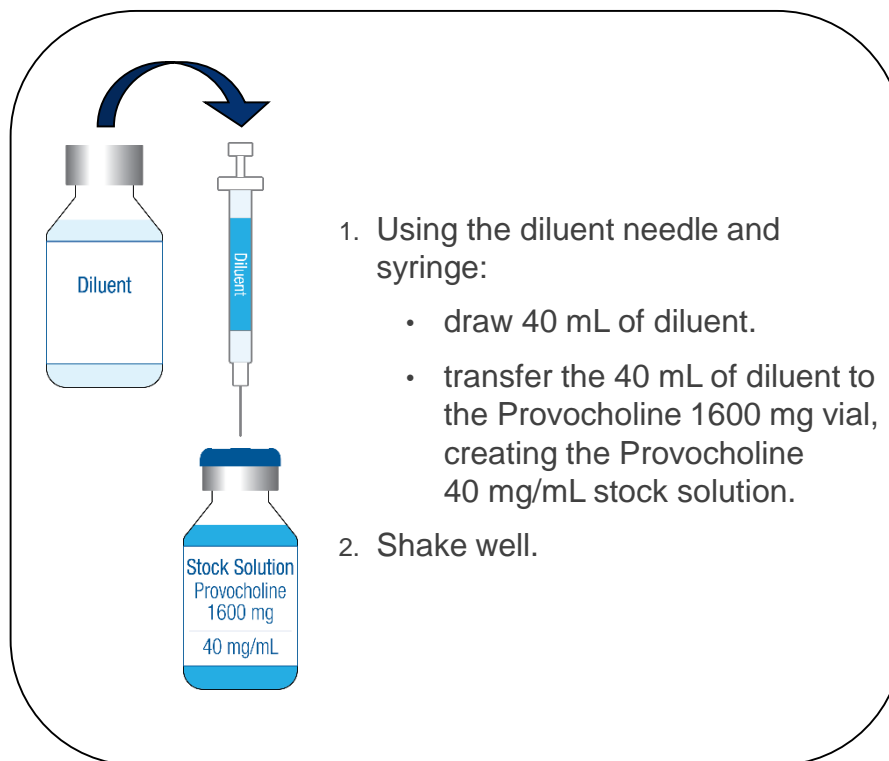


Dilution Process



Step 1: Preparing the Stock Solution

Provocholine 40 mg/mL Stock Solution



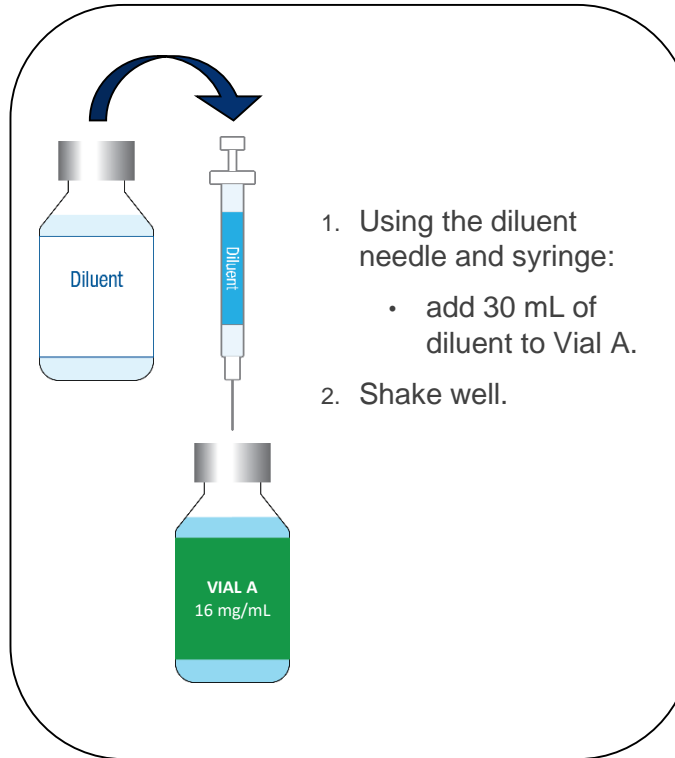
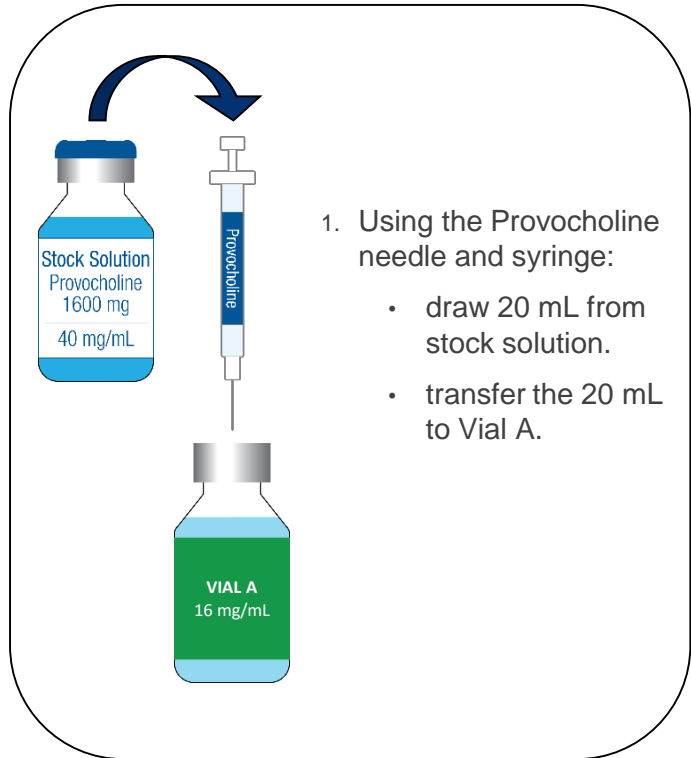
NOTE:

DO NOT ADMINISTER STOCK SOLUTION TO PATIENTS.

Dilution Process



Step 2: Preparing Vial A Provocholine 16 mg/mL Solution



After completing Step 2

Stock solution vial contains 20 mL of Provocholine solution at 40 mg/mL.

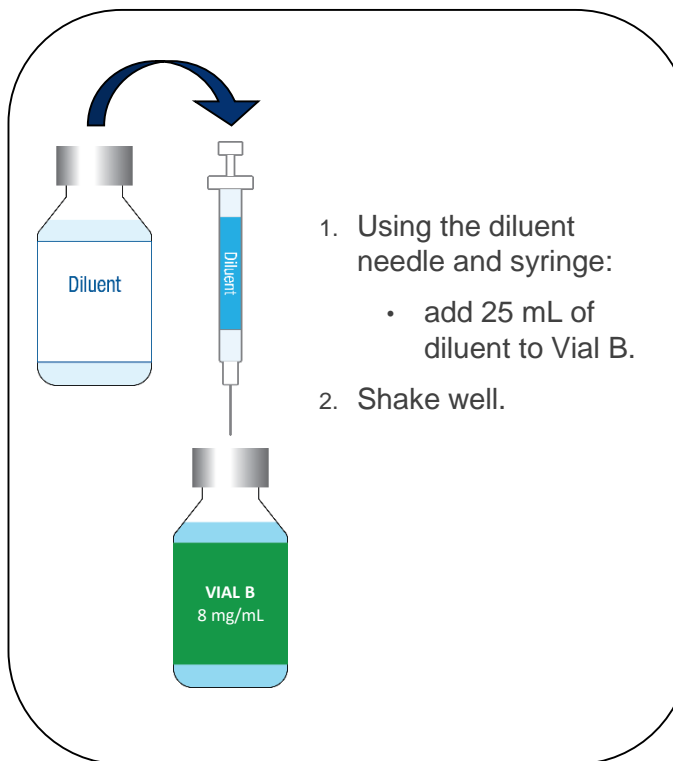
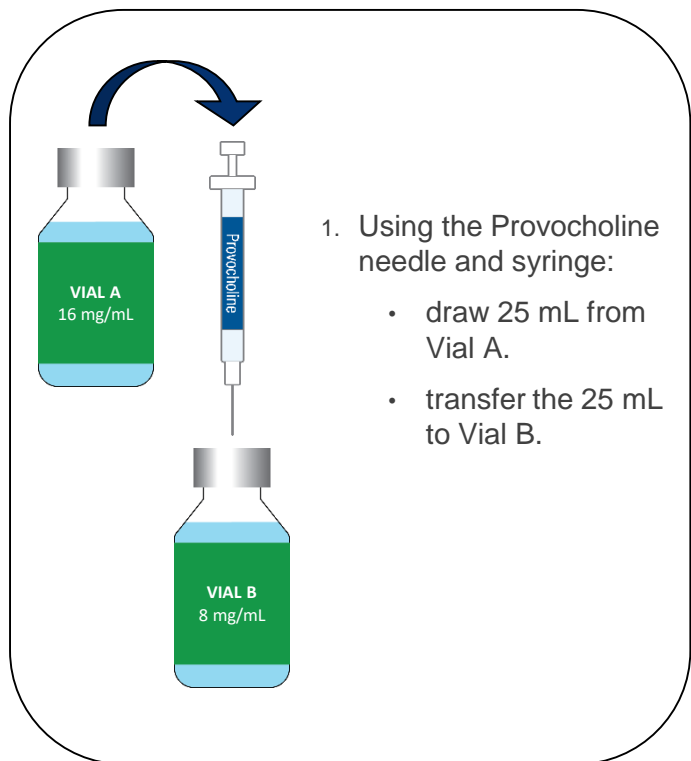
- AND -

Vial A contains 50 mL of Provocholine solution at 16 mg/mL.

Dilution Process



Step 3: Preparing Vial B Provocholine 8 mg/mL Solution



After completing Step 3

Vial A contains 25 mL of Provocholine solution at 16 mg/mL.

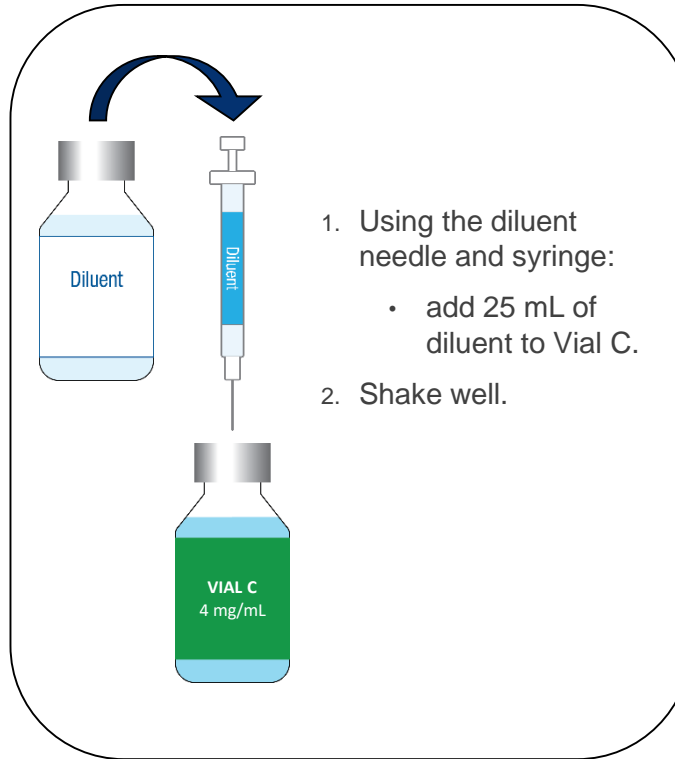
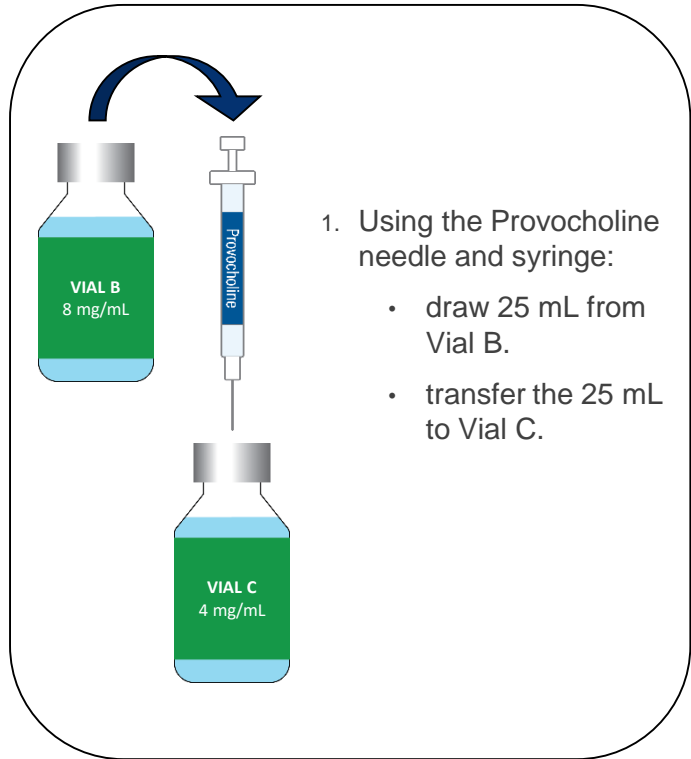
- AND -

Vial B contains 50 mL of Provocholine solution at 8 mg/mL.

Dilution Process



Step 4: Preparing Vial C Provocholine 4 mg/mL Solution



After completing Step 4

Vial B contains 25 mL of Provocholine solution at 8 mg/mL.

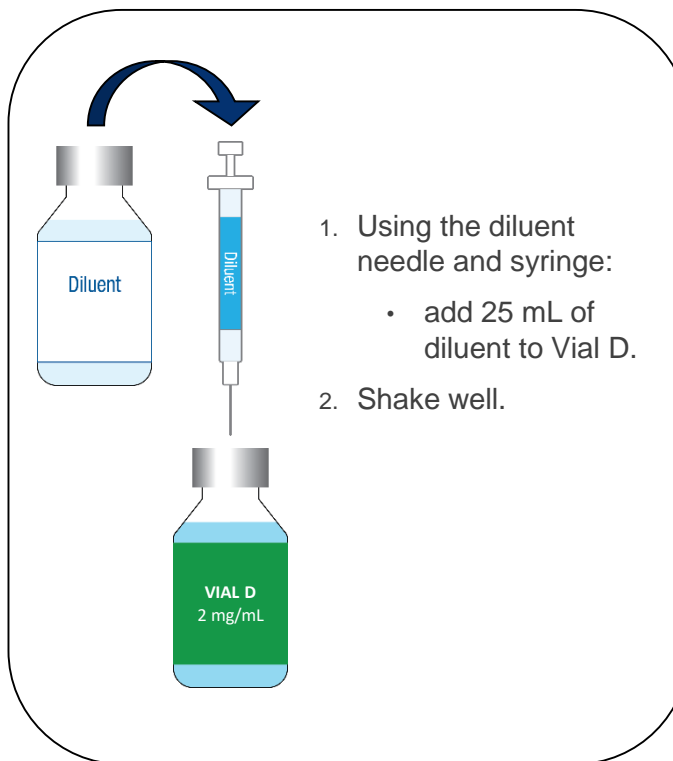
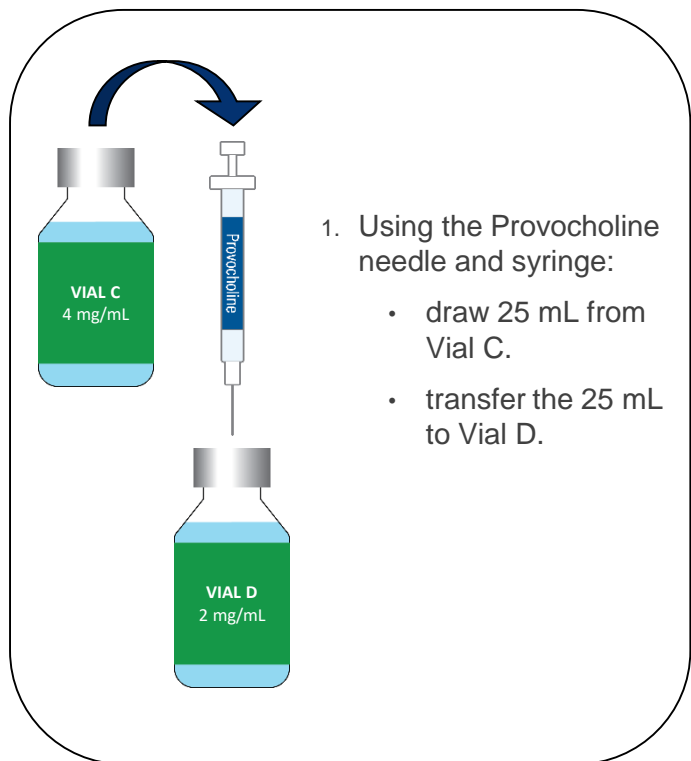
- AND -

Vial C contains 50 mL of Provocholine solution at 4 mg/mL.

Dilution Process



Step 5: Preparing Vial D Provocholine 2 mg/mL Solution



After completing Step 5

Vial C contains 25 mL of Provocholine solution at 4 mg/mL.

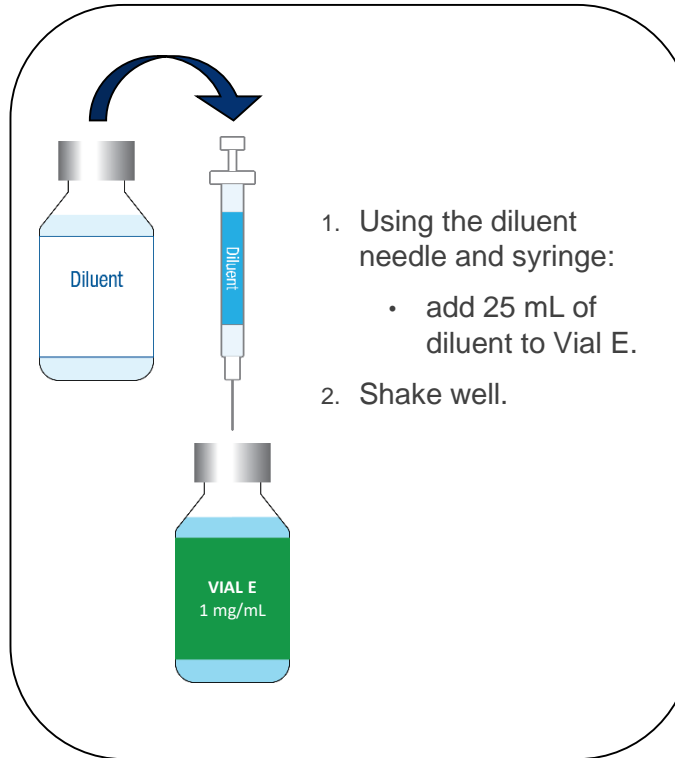
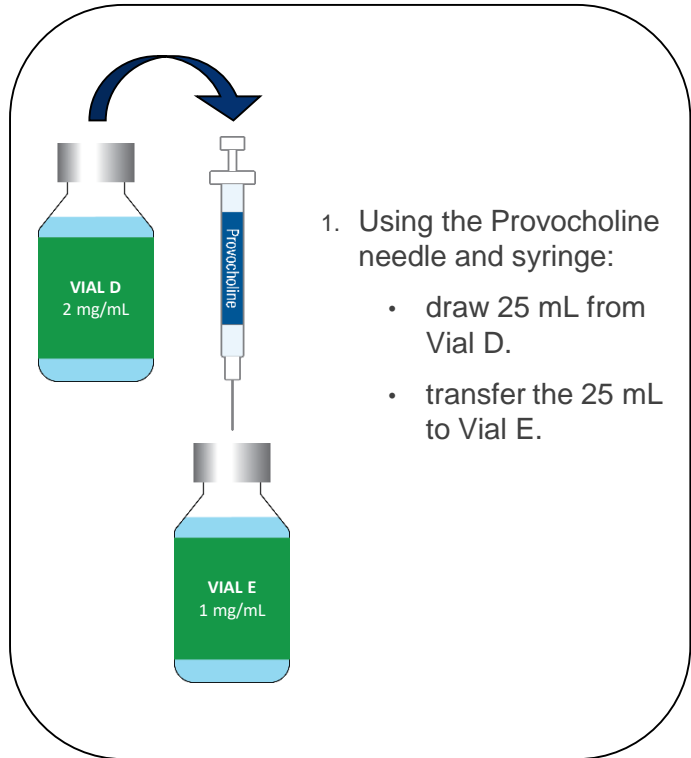
- AND -

Vial D contains 50 mL of Provocholine solution at 2 mg/mL.

Dilution Process



Step 6: Preparing Vial E Provocholine 1 mg/mL Solution



After completing Step 6

Vial D contains 25 mL of Provocholine solution at 2 mg/mL.

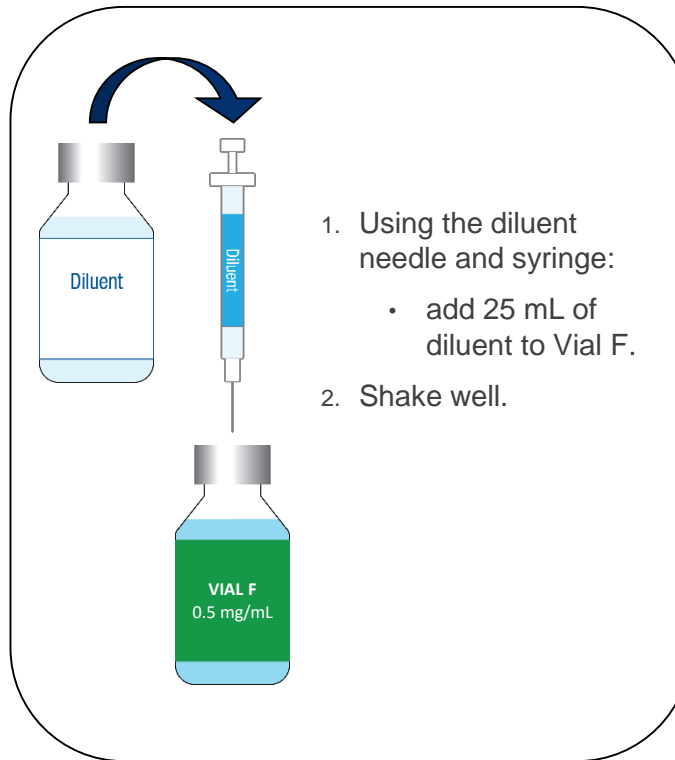
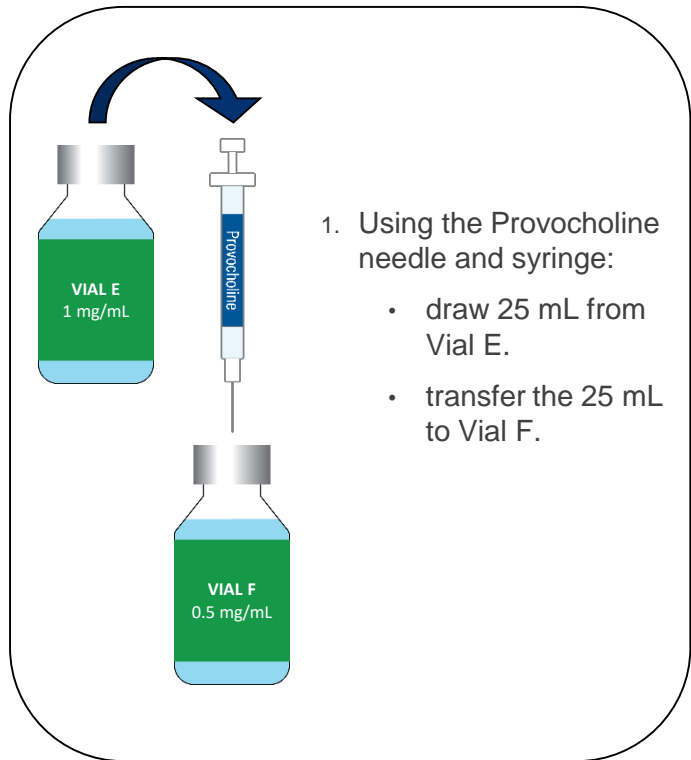
- AND -

Vial E contains 50 mL of Provocholine solution at 1 mg/mL.

Dilution Process



Step 7: Preparing Vial F Provocholine 0.5 mg/mL Solution



After completing Step 7

Vial E contains 25 mL of Provocholine solution at 1 mg/mL.

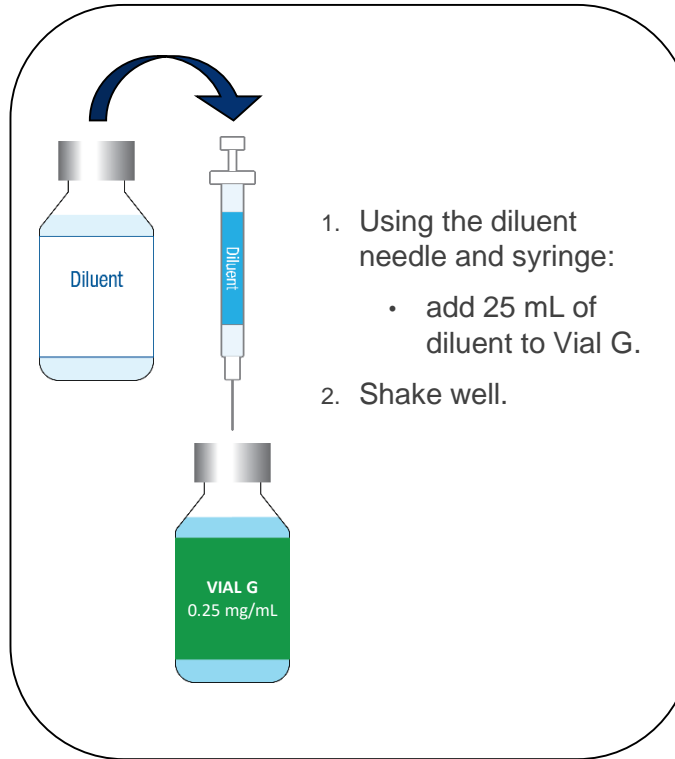
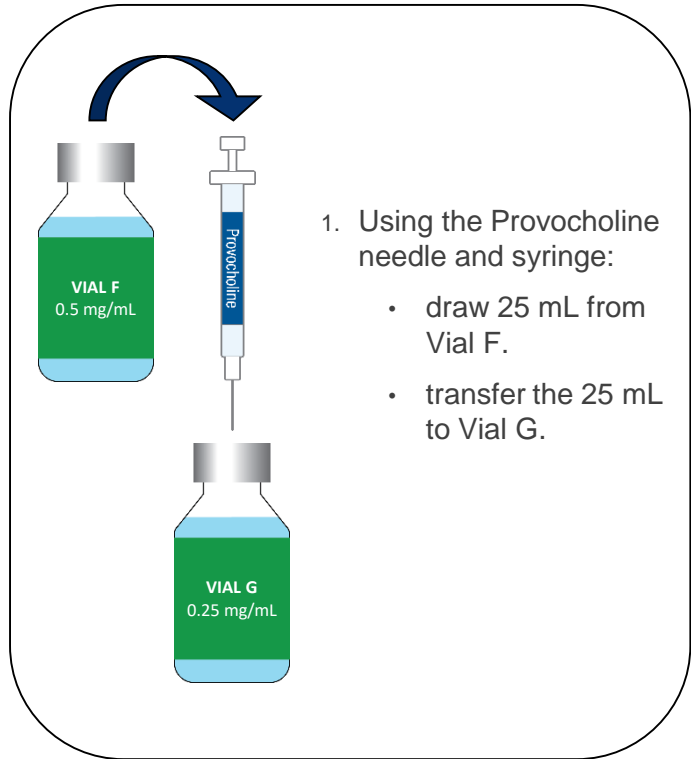
- AND -

Vial F contains 50 mL of Provocholine solution at 0.5 mg/mL.

Dilution Process



Step 8: Preparing Vial G Provocholine 0.25 mg/mL Solution



After completing Step 8

Vial F contains 25 mL of Provocholine solution at 0.5 mg/mL.

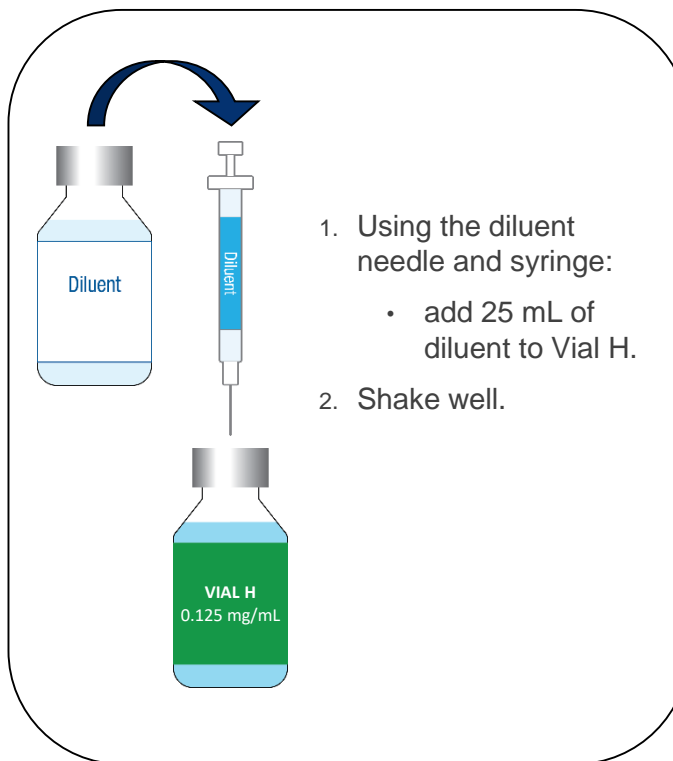
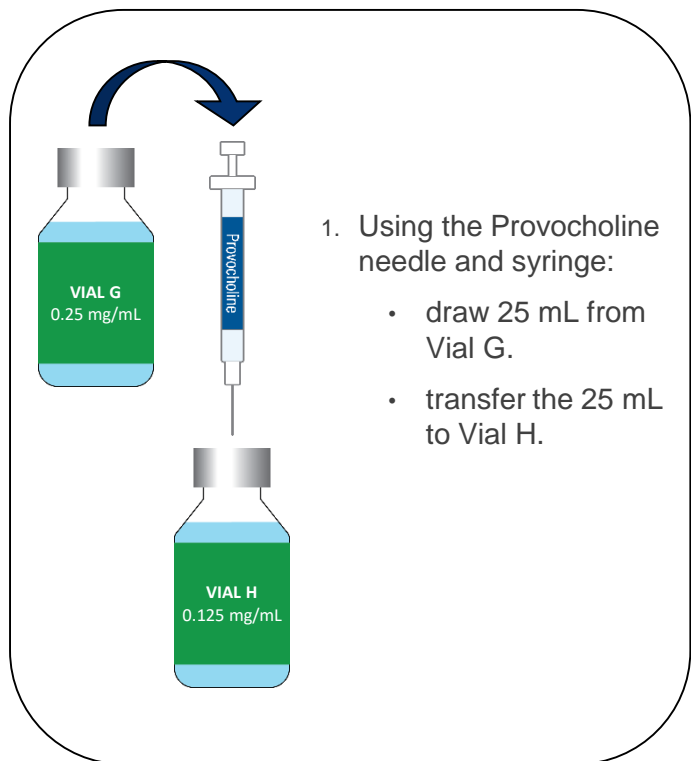
- AND -

Vial G contains 50 mL of Provocholine solution at 0.25 mg/mL.

Dilution Process



Step 9: Preparing Vial H Provocholine 0.125 mg/mL Solution



After completing Step 9

Vial G contains 25 mL of Provocholine solution at 0.25 mg/mL.

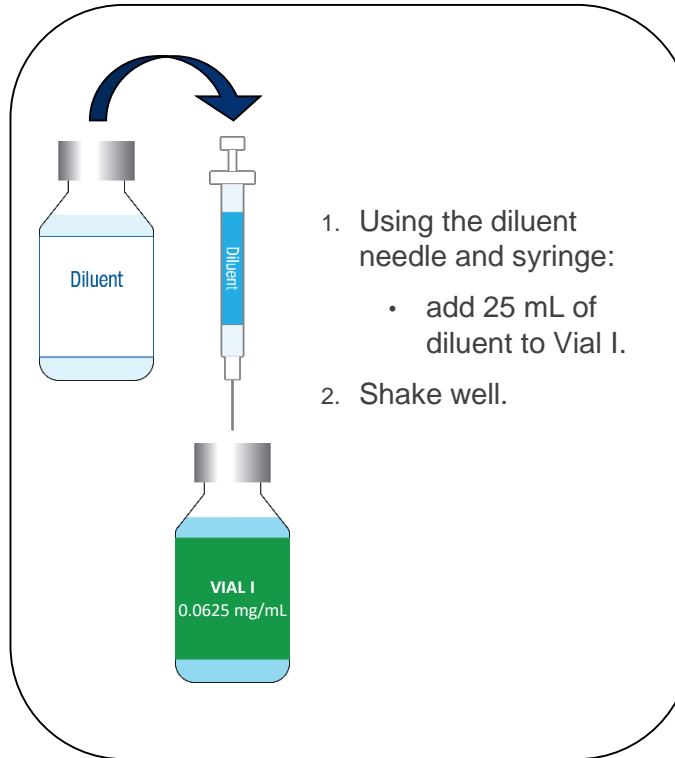
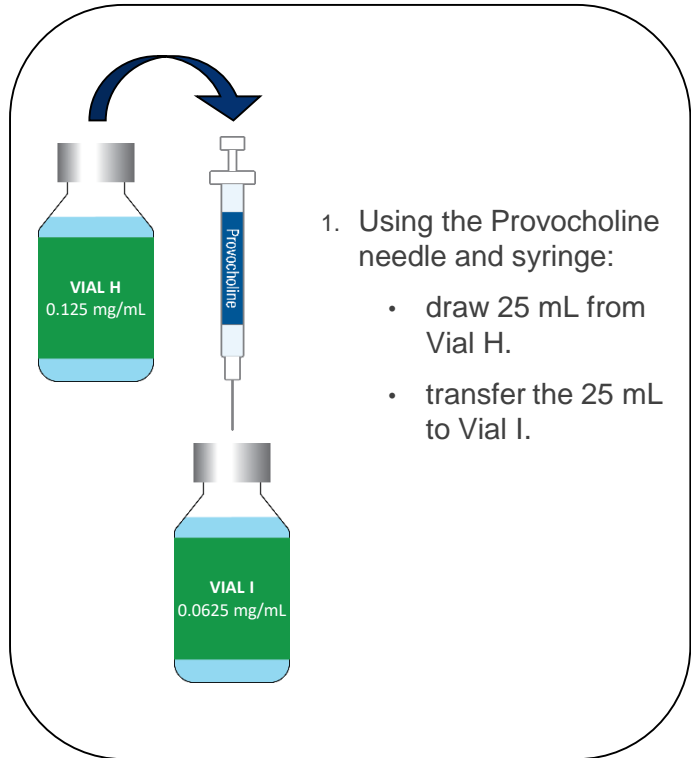
- AND -

Vial H contains 50 mL of Provocholine solution at 0.125 mg/mL.

Dilution Process



Step 10: Preparing Vial I Provocholine 0.0625 mg/mL Solution



After completing Step 10

Vial H contains 25 mL of Provocholine solution at 0.125 mg/mL.

- AND -

Vial I contains 50 mL of Provocholine solution at 0.0625 mg/mL.

Dilution Process



Step 11: Preparing Vial J Provocholine 0.031 mg/mL Solution

1. Using the Provocholine needle and syringe:

- draw 25 mL from Vial I.
- transfer the 25 mL to Vial J.

1. Using the diluent needle and syringe:

- add 25 mL of diluent to Vial J.

2. Shake well.

After completing Step 11

Vial I contains 25 mL of Provocholine solution at 0.0625 mg/mL.

- AND -

Vial J contains 50 mL of Provocholine solution at 0.031 mg/mL.

NOTE:

Transfer all dilutions (in vials A through J) to nebulizer through the 0.22 μ m sterile bacterial retentive filter (Millex GV®).*

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

Conclusion



Storage Instructions

- Provocholine powder should be stored at 59° to 86°F (15° to 30°C).
- Dilutions A through J (16 mg/mL through 0.031 mg/mL) should be stored at 36° to 46°F (2° to 8°C) in a refrigerator for no more than 2 weeks.
- Freezing does not affect the stability of dilutions A through J (16 mg/mL through 0.031 mg/mL).

Conclusion



Summary of Procedure

1. Attach two (2) needles to two (2) 50 mL syringes and label one (1) for Provocholine and one (1) for diluent.
2. Remove plastic covers from Provocholine and diluent vials; line up all sterile empty vials.
3. Fill in information and attach labels to the Provocholine and sterile empty vials.
4. Wipe down the stoppers of the Provocholine vial, diluent vials, and sterile empty vials with alcohol prep pads.
5. Using the diluent syringe, add 40 mL of diluent into the Provocholine 1600 mg vial, creating the **Provocholine 40 mg/mL Stock Solution**.
6. Using the Provocholine syringe, draw 20 mL from stock solution and transfer to Vial A. Using the diluent syringe, draw 30 mL of diluent and transfer to Vial A. Shake well. This becomes **VIAL A – 16 mg/mL**.
7. Using the Provocholine syringe, draw 25 mL from Vial A and transfer to Vial B. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial B. Shake well. This becomes **VIAL B – 8 mg/mL**.

Conclusion



Summary of Procedure

8. Using the Provocholine syringe, draw 25 mL from Vial B and transfer to Vial C. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial C. Shake well. This becomes **VIAL C – 4 mg/mL.**
9. Using the Provocholine syringe, draw 25 mL from Vial C and transfer to Vial D. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial D. Shake well. This becomes **VIAL D – 2 mg/mL.**
10. Using the Provocholine syringe, draw 25 mL from Vial D and transfer to Vial E. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial E. Shake well. This becomes **VIAL E – 1 mg/mL.**
11. Using the Provocholine syringe, draw 25 mL from Vial E and transfer to Vial F. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial F. Shake well. This becomes **VIAL F – 0.5 mg/mL.**
12. Using the Provocholine syringe, draw 25 mL from Vial F and transfer to Vial G. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial G. Shake well. This becomes **VIAL G – 0.25 mg/mL.**

Conclusion



Summary of Procedure

13. Using the Provocholine syringe, draw 25 mL from Vial G and transfer to Vial H. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial H. Shake well. This becomes **VIAL H – 0.125 mg/mL.**
14. Using the Provocholine syringe, draw 25 mL from Vial H and transfer to Vial I. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial I. Shake well. This becomes **VIAL I – 0.0625 mg/mL.**
15. Using the Provocholine syringe, draw 25 mL from Vial I and transfer to Vial J. Using the diluent syringe, draw 25 mL of diluent and transfer to Vial J. Shake well. This becomes **VIAL J – 0.031 mg/mL.**

Conclusion



Summary of Procedure

NOTE

- To reduce back pressure, vent vials with an extra needle as needed.
- Transfer all dilutions (in vials A through J) to nebulizer through the 0.22 µm sterile bacterial retentive filter (Millex GV®).*

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

Conclusion



Dilution Check Sheet and Control Record

PROVOCHOLINE DILUTIONS FOR CHALLENGE TESTING

Date: _____ Prepared by: _____ Checked by: _____

Provocholine (see label on vial) Lot Number: _____ Expiration Date: _____

Diluent _____ Lot Number: _____ Expiration Date: _____

TAKE Provocholine	ADD Diluent (Shake well)	OBTAIN DILUTION	VIAL NAME	INITIAL
Provocholine 1600 mg	40 mL	40 mg/mL	Stock Solution* – 40 mg/mL	
20 mL from Stock Solution	30 mL	16 mg/mL	Vial A – 16 mg/mL	
25 mL from Vial A	25 mL	8 mg/mL	Vial B – 8 mg/mL	
25 mL from Vial B	25 mL	4 mg/mL	Vial C – 4 mg/mL	
25 mL from Vial C	25 mL	2 mg/mL	Vial D – 2 mg/mL	
25 mL from Vial D	25 mL	1 mg/mL	Vial E – 1 mg/mL	
25 mL from Vial E	25 mL	0.5 mg/mL	Vial F – 0.5 mg/mL	
25 mL from Vial F	25 mL	0.25 mg/mL	Vial G – 0.25 mg/mL	
25 mL from Vial G	25 mL	0.125 mg/mL	Vial H – 0.125 mg/mL	
25 mL from Vial H	25 mL	0.0625 mg/mL	Vial I – 0.0625 mg/mL	
25 mL from Vial I	25 mL	0.031 mg/mL	Vial J – 0.031 mg/mL	

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[methacholine chloride]