

Provocholine[®]

(methacholine chloride)



Dilution Sequence Protocol

ATS “Short” – Quadrupling Doses

0.0625

0.25

1

4

16

Provocholine 100 mg/vial (US NDC № 64281-100-06)

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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 Short,” 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 100 mg vial of Provocholine into the five (5) 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 100 mg

Quantity	Description
1	100 mg vial of Provocholine
1	100 mL diluent
4	20 mL sterile empty USP Type I borosilicate glass vials
2	10 mL syringes*
2	20 Gauge, 1" syringe needles*
6	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.



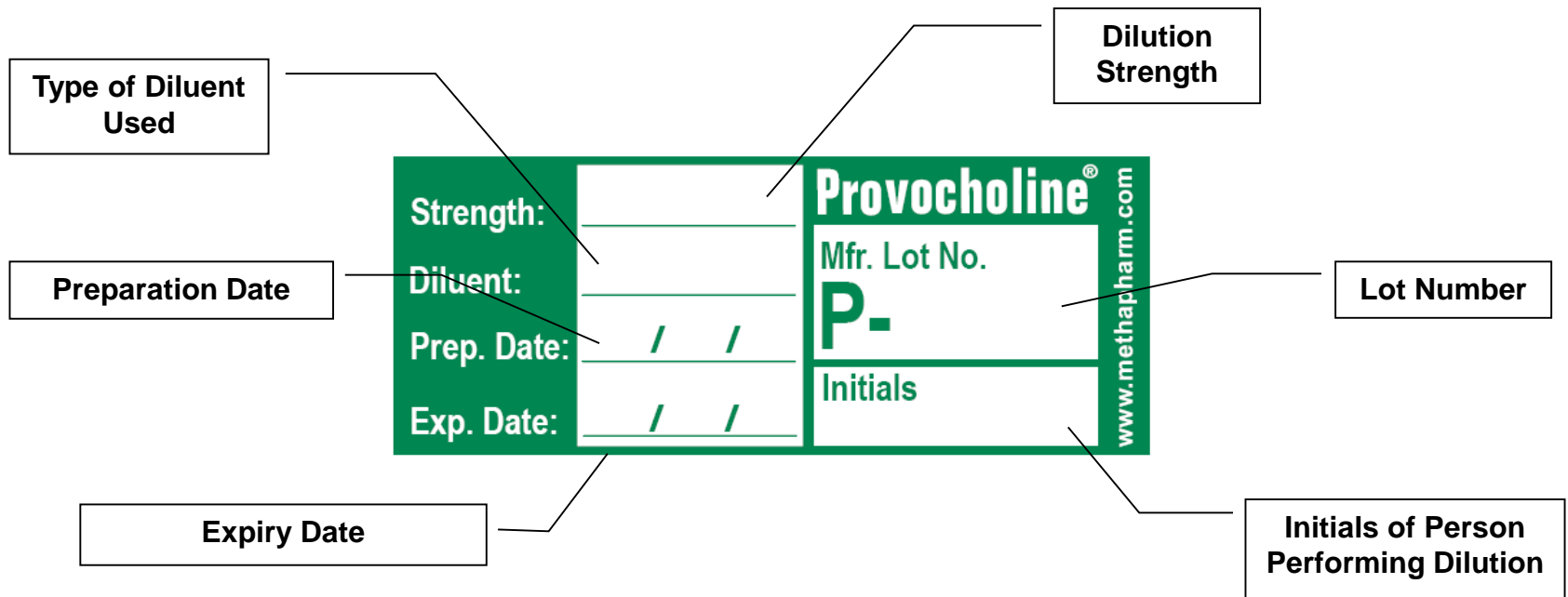
Dilution Process

TAKE Provocholine	ADD Diluent (Shake well)	OBTAIN DILUTION	VIAL NAME
Provocholine 100 mg	6.25 mL	16 mg/mL	Vial A 16 mg/mL
3 mL from Vial A	9 mL	4 mg/mL	Vial B 4 mg/mL
3 mL from Vial B	9 mL	1 mg/mL	Vial C 1 mg/mL
3 mL from Vial C	9 mL	0.25 mg/mL	Vial D 0.25 mg/mL
3 mL from Vial D	9 mL	0.0625 mg/mL	Vial E 0.0625 mg/mL



Labeling

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

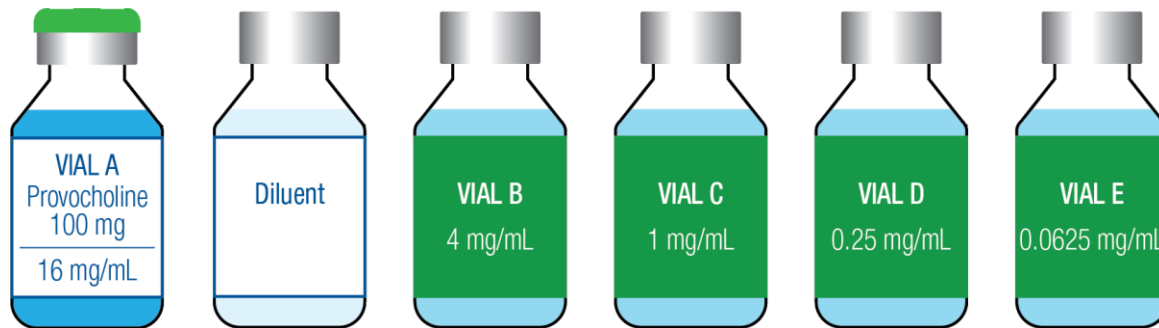


Dilution Process

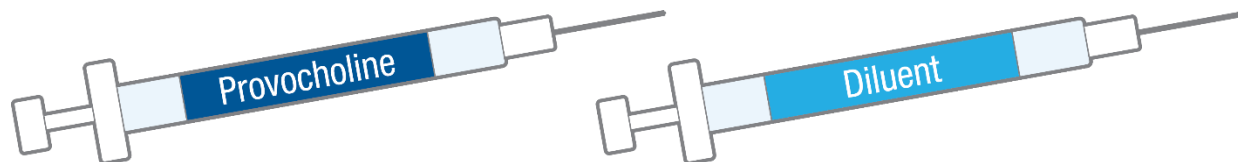


Getting Started

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



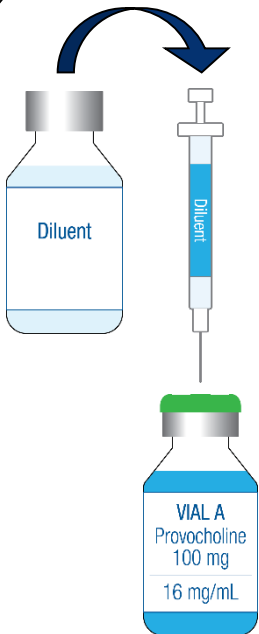
3. Label two (2) appropriately sized syringes (one for Provocholine, one for diluent), and attach needles to each.



Dilution Process



Step 1: Preparing Vial A Provocholine 16 mg/mL Solution



1. Using the diluent needle and syringe:
 - draw 6.25 mL of diluent.
 - transfer the 6.25 mL of diluent to the Provocholine 100 mg vial.
2. Shake well.

After completing Step 1

Vial A contains 6.25 mL of Provocholine solution at 16 mg/mL.

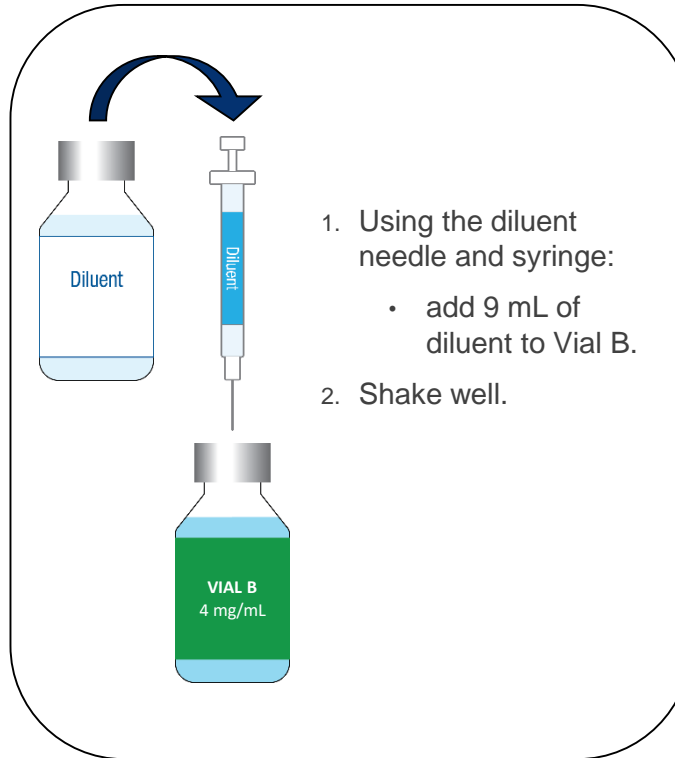
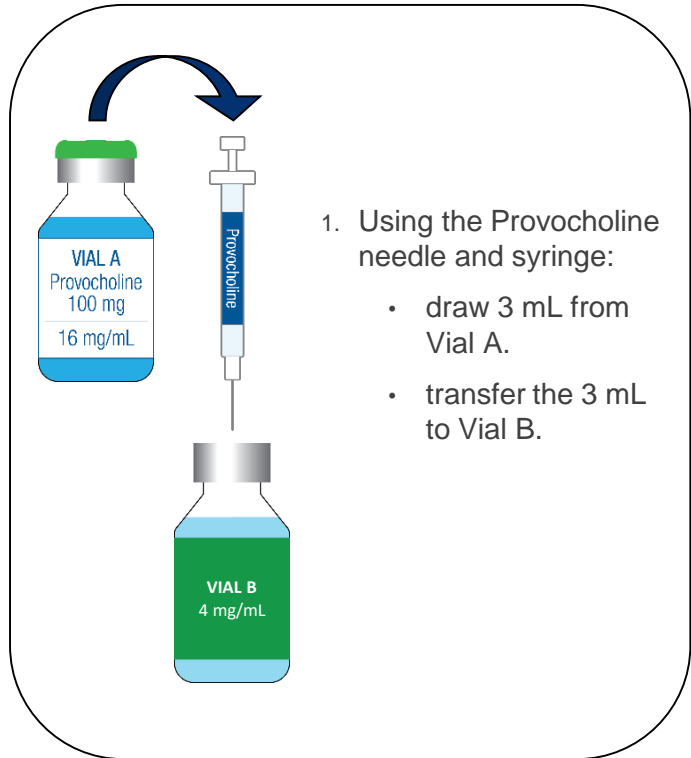
NOTE:

The dilution in Step 1 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 1).

Dilution Process



Step 2: Preparing Vial B Provocholine 4 mg/mL Solution



After completing Step 2

Vial A contains 3.25 mL of Provocholine solution at 16 mg/mL.

- AND -

Vial B contains 12 mL of Provocholine solution at 4 mg/mL.

Dilution Process



Step 3: 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.

1. Using the diluent needle and syringe:

- add 9 mL of diluent to Vial C.

2. Shake well.

After completing Step 3

Vial B contains 9 mL of Provocholine solution at 4 mg/mL.

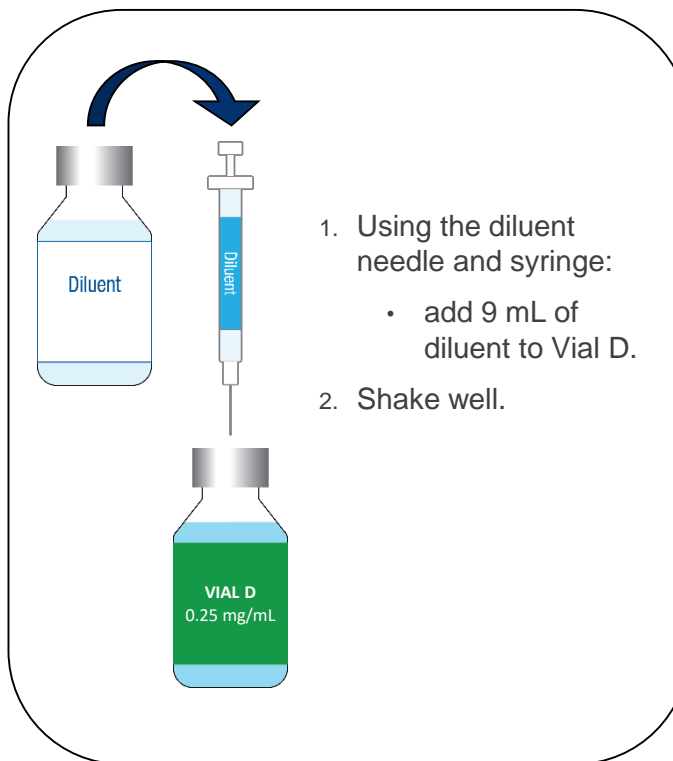
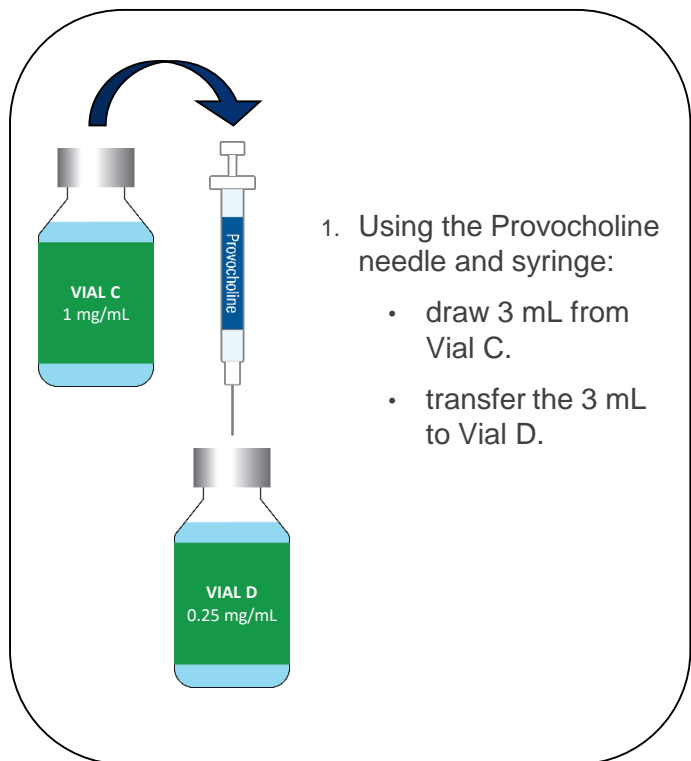
- AND -

Vial C contains 12 mL of Provocholine solution at 1 mg/mL.

Dilution Process



Step 4: Preparing Vial D Provocholine 0.25 mg/mL Solution



After completing Step 4

Vial C contains 9 mL of Provocholine solution at 1 mg/mL.

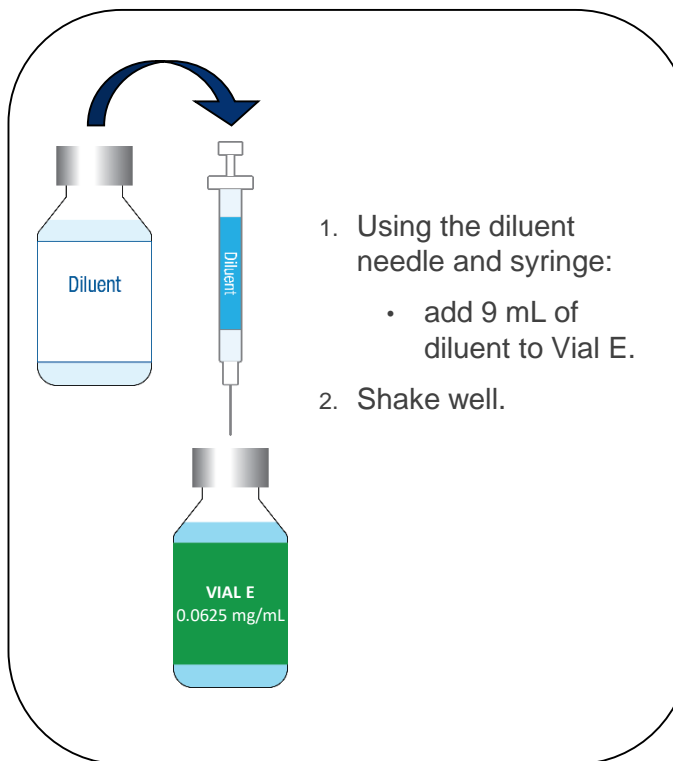
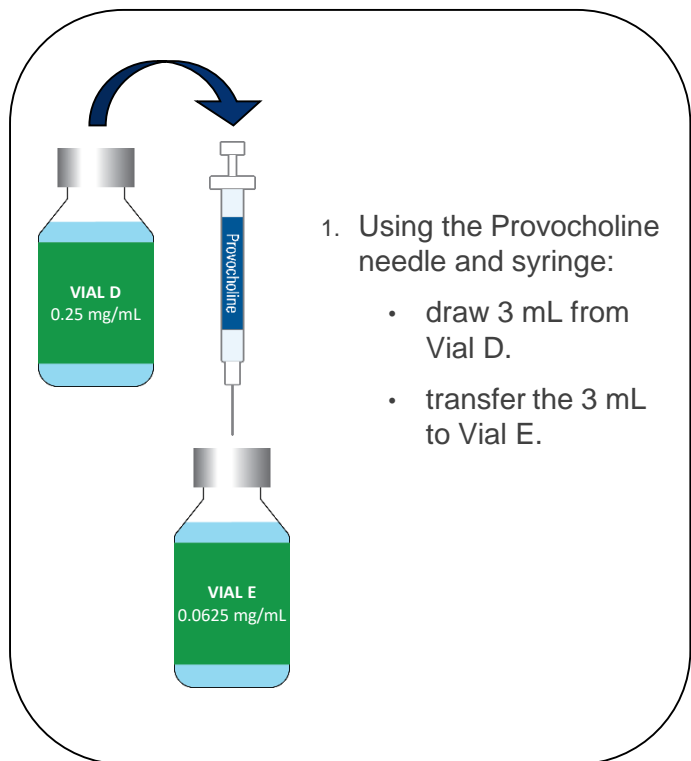
- AND -

Vial D contains 12 mL of Provocholine solution at 0.25 mg/mL.

Dilution Process



Step 5: Preparing Vial E Provocholine 0.0625 mg/mL Solution



After completing Step 5

Vial D contains 9 mL of Provocholine solution at 0.25 mg/mL.

- AND -

Vial E contains 12 mL of Provocholine solution at 0.0625 mg/mL.

NOTE:

Transfer all dilutions (in vials A through E) 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 E (16 mg/mL through 0.0625 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 E (16 mg/mL through 0.0625 mg/mL).

Conclusion



Summary of Procedure

1. Attach two (2) needles to two (2) 10 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 the sterile empty vials.
4. Wipe down the stoppers of the Provocholine vial, diluent vial, and sterile empty vials with alcohol prep pads.
5. Using the diluent syringe, add 6.25 mL of diluent into the Provocholine 100 mg vial. Shake well. This becomes **VIAL A – 16 mg/mL**.
6. Using the Provocholine syringe, draw 3 mL from Vial A and transfer to Vial B. Using the diluent syringe, draw 9 mL of diluent and transfer to Vial B. Shake well. This becomes **VIAL B – 4 mg/mL**.
7. Using the Provocholine syringe, draw 3 mL from Vial B and transfer to Vial C. Using the diluent syringe, draw 9 mL of diluent and transfer to Vial C. Shake well. This becomes **VIAL C – 1 mg/mL**.

Conclusion



Summary of Procedure

8. Using the Provocholine syringe, draw 3 mL from Vial C and transfer to Vial D. Using the diluent syringe, draw 9 mL of diluent and transfer to Vial D. Shake well. This becomes **VIAL D – 0.25 mg/mL.**
9. Using the Provocholine syringe, draw 3 mL from Vial D and transfer to Vial E. Using the diluent syringe, draw 9 mL of diluent and transfer to Vial E. Shake well. This becomes **VIAL E – 0.0625 mg/mL.**

NOTE

- To reduce back pressure, vent vials with an extra needle as needed.
- Transfer all dilutions (in vials A through E) 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 100 mg	6.25 mL	16 mg/mL	Vial A - 16 mg/mL	
3 mL from Vial A	9 mL	4 mg/mL	Vial B - 4 mg/mL	
3 mL from Vial B	9 mL	1 mg/mL	Vial C - 1 mg/mL	
3 mL from Vial C	9 mL	0.25 mg/mL	Vial D - 0.25 mg/mL	
3 mL from Vial D	9 mL	0.0625 mg/mL	Vial E - 0.0625 mg/mL	