

# SIBO Breath Test Options and Interpretation Guide

Breath testing is the most common testing method for small intestinal bacterial overgrowth (SIBO). It's non-invasive, safe, easy to perform from home, and relatively inexpensive. The breath test is effective since bacteria metabolize carbohydrates, including lactulose and glucose, resulting in the production of hydrogen and methane gas, which can be measured.

## TEST PREPARATION:

Specific preparation instructions are provided with each kit. The following are general guidelines:

- Do not take a breath test within 2 weeks of atypical diarrhea, antimicrobial medications or supplements, colonoscopy, or barium enema.
- Avoid all laxatives and high-dose vitamin C for 4 days prior.
- One to 2 days before: Avoid high-fiber and lactose-containing foods, condiments, spices, and herbs. Eat meat, fish, poultry, plain and steamed jasmine rice, eggs, clear meat broth (no bone broth), small amounts of fats and oils, salt and pepper, and weak black coffee and tea.
- Twenty-four hours before: Stop all non-essential medications.
- Twelve hours before: Avoid all food and drinks except water.
- Day of the test: Wake at least 1 hour before the test. Do not smoke or do vigorous exercise 1 hour before collection.

## PROCEDURE:

- Collect a baseline sample.
- Drink the substrate, either 50 g of glucose or 10 g of lactulose mixed in 120 to 200 mL of water.
  - The pediatric dose is 1 g of lactulose per kilogram of body weight for a maximum of 10 g.
  - Some tests do not recommend testing in people under 25 lb.
- Breath samples are then collected at specific time intervals for 2 to 3 hours, depending on the specific test used.

## PROBLEMS:

- There is no consensus on which substrate to use (glucose or lactulose).
- Opinions vary on how best to interpret the results.
  - North American Consensus

- QuinTron
- An optimum protocol for timing, collection, and method of administering is not agreed upon.
- Antimicrobial supplements or medications may affect results, varying recommendations.

## COMPARISON OF GLUCOSE AND LACTULOSE AS SUBSTRATES:

Substrate	Advantage	Disadvantage	Risk
Glucose	More specific	Greater risk of <i>false negative</i>	Under-treatment
Lactulose	More sensitive	Greater risk of <i>false positive</i>	Over-treatment

## TESTING CONSIDERATIONS:

- Should use a QuinTron machine or Novel 4-Gas device
- Should test at the very least hydrogen (H<sub>2</sub>) and methane (CH<sub>4</sub>) with the preference to add hydrogen sulfide (H<sub>2</sub>S) testing when warranted or available
- Should measure values over a 2- to 3-hour period
- Should advise the proper test diet

## TESTING OPTIONS:

- 1) Trio-smart breath test by Gemelli Biotech
  - The test measures H<sub>2</sub>, CH<sub>4</sub>, and H<sub>2</sub>S levels using a Novel 4-Gas device over 135 minutes.
    - Uses North American Consensus guidelines for interpretation of H<sub>2</sub> and CH<sub>4</sub>
    - Uses internal studies for H<sub>2</sub>S guidelines for interpretation of greater than or equal to 3 as a positive
  - Glucose substrate is provided in the kit.
  - Lactulose substrate needs to be prescribed by the practitioner at 10 g/15 mL solution to be picked up by the patient at their preferred pharmacy.
  
- 2) Genova Diagnostics breath test
  - Offers a 2- or 3-hour breath test option via QuinTron
    - Recommends a 3-hour breath test for those with slower gastrointestinal transit or constipation
  - Only measures H<sub>2</sub> and CH<sub>4</sub> gases
    - Uses North American Consensus guidelines for interpretation

- Lactulose and/or glucose included in the kits
- 3) NUNM (SIBO Center for Digestive Health) breath test
- Offers a 3-hour breath test via QuinTron
    - Not using North American Consensus reports; they are using QuinTron guidelines and research-based evidence in the literature to guide their interpretation recommendations
    - Normal results:
      - No increase of H<sub>2</sub> above 20 ppm within 120 minutes (of lactulose)
      - CH<sub>4</sub> never reaches greater than 12 ppm within 120 minutes (of lactulose)
  - Only measures H<sub>2</sub> and CH<sub>4</sub> gases
  - Lactulose and/or glucose included in the kits

## SIBO breath test interpretation criteria comparison:

Criteria	H <sub>2</sub> (Hydrogen)	CH <sub>4</sub> (Methane)	H <sub>2</sub> + CH <sub>4</sub>
QuinTron/NUNM	An increase of ≥20 ppm over the lowest preceding value within 120 min of lactulose	An increase of ≥12 ppm over the lowest preceding value within 120 min of lactulose	An increase of ≥15 ppm over the lowest preceding value within 120 min of lactulose
North American Consensus	An increase of ≥20 ppm at any point during the test within 90 min of lactulose or glucose	An increase of ≥10 ppm at any point during the test	N/A

### WHICH CRITERIA TO USE:

- This depends on your practice and preferences.
- If you're using more liberal criteria, there is an increased risk of false positives and over-treatment.
  - Risks: You could miss the actual underlying problem, and SIBO treatment can be expensive.
- If you're using more conservative criteria, there is an increased risk of false negatives and under-treatment.

Recommendation: Start with the North American Consensus and consider your patients' symptoms, history, and other lab results (if you have them) to help guide your decision of when to treat.

## **SPECIAL CONSIDERATIONS:**

- Higher risk of false positives:
  - Diarrhea/fast transit times
  - Young children (especially infants)
  - Crohn's disease, celiac disease
  - Laxatives, prokinetics, and other drugs that increase transit time
- Higher risk of false negatives
  - Constipation
  - Elderly
  - Gastroparesis, gastrointestinal motility disorders, intestinal pseudo-obstruction (i.e., things that decrease transit time)
  - Proton pump inhibitors, opiates, and other drugs that decrease transit time