Lactulose Breath Test

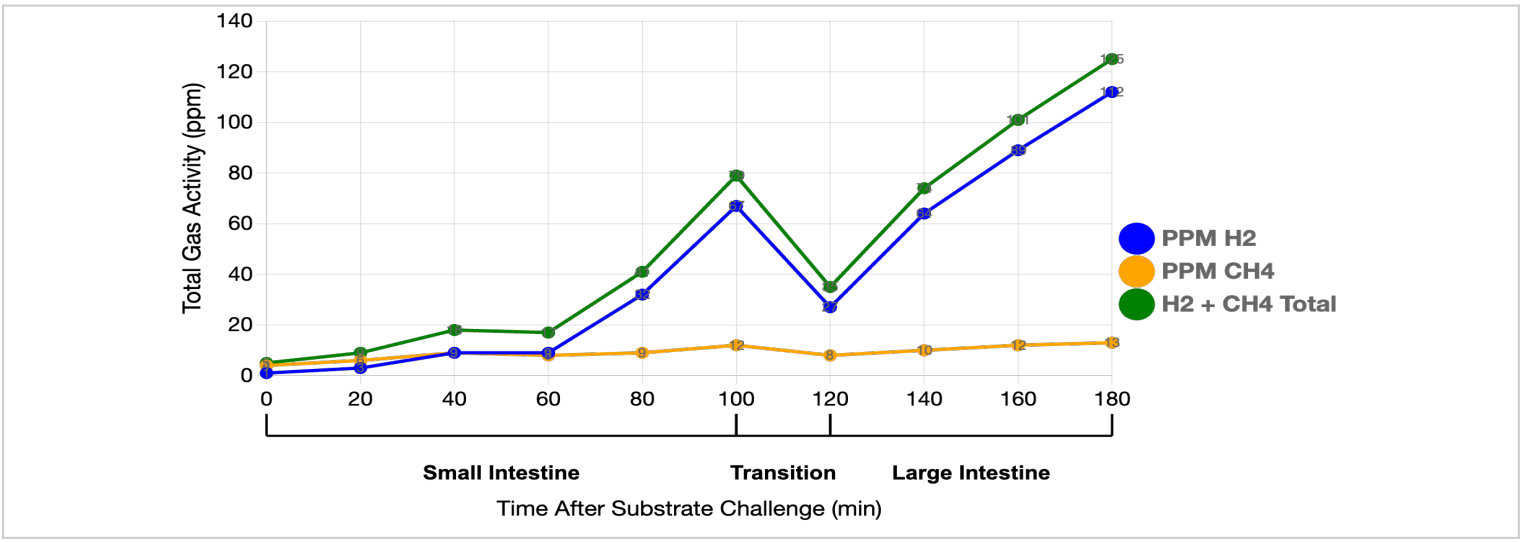
105 New England Place, Ste. 220
Stillwater, MN 55082
A Socialvite, Inc. Company

Patient	Sample Test	**Completed**	10/19/2024	**Ordering Practitioner**	NMS Stillwater
DOB	11/13/1981	**Received**	10/19/2024	**Clinic Name**	Something
Test ID	#000812	**Collected**	10/18/2024		

Diagnosis = Positive for Small Intestinal Bacterial Overgrowth (SIBO); ICD-10 A04.9

Hydrogen (H_2), Methane (CH_4), and Carbon Dioxide (CO_2) (ppm)

Sample	Time	ppm H_2	ppm CH_4	ppm H_2 + CH_4	% CO_2	Correction	Symptoms
# 0 - 0	08:00 AM	1	4	5	3.2	1.72	-
# 1 - 20	08:20 AM	3	6	9	3.6	1.53	-
# 2 - 40	08:40 AM	9	9	18	4	1.38	-
# 3 - 60	09:00 AM	9	8	17	3.7	1.49	-
# 4 - 80	09:20 AM	32	9	41	3.6	1.53	-
# 5 - 100	09:40 AM	67	12	79	4	1.38	Bloating
# 6 - 120	10:00 AM	27	8	35	3.2	1.72	-
# 7 - 140	10:20 AM	64	10	74	3.8	1.45	Bloating
# 8 - 160	10:40 AM	89	12	101	3.9	1.41	Bloating
# 9 - 180	11:00 AM	112	13	125	3.7	1.49	Bloating, Diarrhea



Evaluation for Hydrogen (H_2)	Evaluation for combined Hydrogen (H_2) & Methane (CH_4)	Evaluation for Methane (CH_4)
Hydrogen increase by 120 minutes	**Hydrogen + Methane increase by 120 minutes**	**A peak methane level by 120 minutes**
Result: 66 — Expected Value < 20 ppm	Result: 74 — Expected Value < 15 ppm	Result: 12 — Expected Value < 10 ppm
A rise ≥ 20 ppm within the first 120 minutes meets criteria for SIBO.	A rise ≥ 15 ppm within the first 120 minutes meets criteria for SIBO.	A peak methane level ≥ 10 ppm within the first 120 minutes meets criteria for SIBO.

Report interpretation and commentary are provided for educational purposes.

Diagnosis is ultimately the responsibility of the ordering healthcare practitioner and should be based on testing, medical history and clinical presentation.

SIBO Breath Test Interpretation Guidelines (Lactulose)

There is no universally accepted diagnostic criteria for SIBO; therefore, a diagnosis is the responsibility of your healthcare practitioner. Numerous published studies, consensus papers, and laboratory validations are used by clinicians to interpret breath test results. Laboratory diagnosis and commentary are provided to the practitioner for educational purposes and should not be interpreted as diagnostic.

Clinical Considerations

Falsely elevated findings may result from improper test preparation, residual fiber in the intestine due to delayed transit time, residual oropharyngeal (mouth and throat) bacteria, exposure to tobacco smoke, chewing gum, or sleeping during collection.

Falsely low findings may result from retesting too soon after antibiotic therapy or due to an overgrowth of hydrogen sulfide (H_2S) producing bacteria, which compete for available gut hydrogen. [1]

Baseline methane levels of $\geq$5 and $\geq$10 ppm can respectively predict excessive methane production with a specificity of 99.7% and 100%, with a sensitivity of 96.1% and 86.4%. [3]

Methane (CH_4) $\geq$3 ppm may be a cause of methane-induced constipation. [4,5]

Elevated baseline hydrogen levels after strictly following preparation guidelines can occur and may interfere with test interpretations. Based on a complete clinical picture, some healthcare practitioners may consider an elevated hydrogen baseline a positive test.

Quality Control

Neurovanna's quality control exceeds laboratory equipment manufacturer's recommendations with machinery calibrated after every 2 hours or 5th test run. Testing performed on a CLIA-waived QuinTron BreathTracker™ Digital MicroLyzer H+. A parallel measurement of carbon dioxide (CO_2) is obtained with each sample to allow for greater testing precision. All samples are processed using a CO_2 correction factor technique that reduces errors and improves interpretation.

References

1.) Rezaie A, Buresi M, Lembo A, et al. Hydrogen and Methane-Based Breath Testing in Gastrointestinal Disorders: The North American Consensus. The American Journal of Gastroenterology. May 2017;112(5):775-784.

2.) QuinTron validated criteria.

3.) Rezaie A, Chang B, Chua KS, et al. Accurate identification of excessive methane gas producers by a single fasting measurement of exhaled methane: a large-scale database analysis. Am J Gastroenterol. 2015;110:S684.

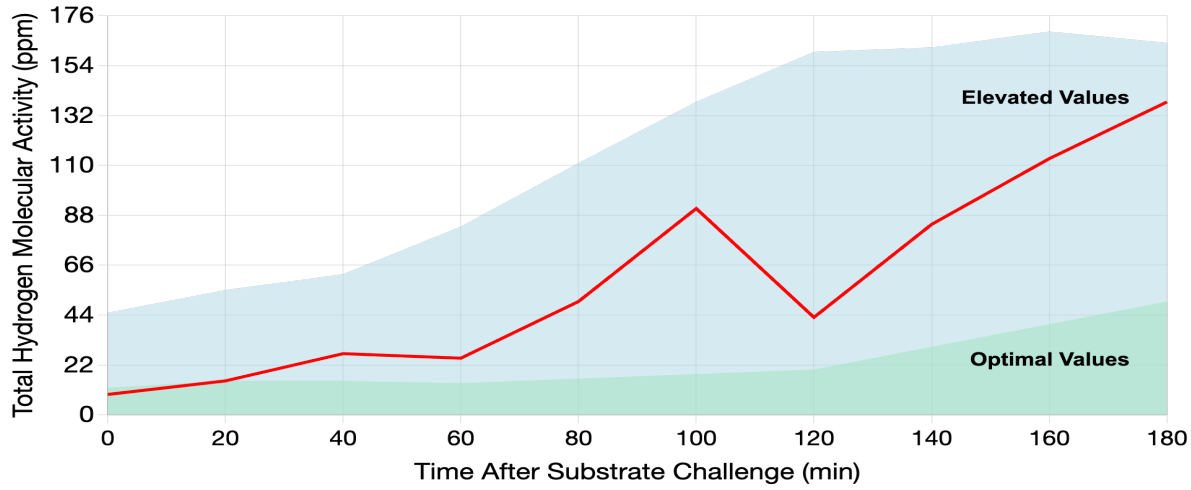
4.) Chatterjee S, Park S, Low K, Kong Y, Pimentel M. The degree of breath methane production in IBS correlates with the severity of constipation. Am J Gastroenterol. 2007 Apr;102(4):837-41.

5.) Kim G, et al. Methanobrevibacter smithii is the predominant methanogen in patients with constipation-predominant IBS and methane on breath. Dig Dis Sci. 2012 Dec;57(12):3213-8.

Total SIBO Bacterial Load™

Breath testing measures H_2 (consisting of 1 molecule of hydrogen) and CH_4 (consisting of 2 molecules of hydrogen). The Total SIBO Bacterial Load™ is the sum of molecular hydrogen gas activity for each collected breath specimen and is graphed out over time. Reference ranges represent 95% of the test population of both positive and negative SIBO.

- Allows for comparisons between normal and SIBO positive population
- Provides insight into bacterial activity within the large intestine
- May help predict greater chance of die-off treatment reactions



Sample	0	1	2	3	4	5	6	7	8	9
Patient Values	9	15	27	25	50	91	43	84	113	138
Optimal Bacterial Load	< 13	< 17	< 17	< 17	< 19	< 21	< 25	< 35	< 43	< 50

About Small Intestinal Bacterial Overgrowth

Small Intestinal Bacterial Overgrowth (SIBO) is defined as an excessive amount of bacteria in the small intestines. SIBO occurs when colonic bacteria, normally found in the large intestines, are found in large amounts in the small intestines. The increased bacterial load in the small intestine results in excessive fermentation and inflammation, leading to a variety of clinical complaints ranging from mild, non-specific symptoms such as abdominal pain, bloating, and flatulence (passing gas), to more severe symptoms such as malabsorption, fatty liver, and weight loss/gain. Symptoms of SIBO outside the GI include, but are not limited to: headaches, muscle pain, joint pain, neuropathic pain, and cognitive complaints including brain fog.

SIBO bacteria produce hydrogen (H_2) and methane (CH_4) gases as a result of disaccharide metabolism. These gases are measured during the lactulose breath test you completed. An accurate diagnosis of SIBO includes your breath test results, your presenting symptoms, diet, and response to treatments.

SIBO Treatment Options

Treatments revolve around minimizing bacterial growth while reducing/eliminating the amount of colonic bacteria (SIBO) in the small intestines. This is typically accomplished through a combination of dietary changes and antibiotics (herbal and/or prescriptive). Additional support for malnutrition, mucosal damage, and intestinal permeability may also be recommended by your practitioner. SIBO can be caused by improper digestion (achlorhydria, use of stomach acid blockers, food sensitivities, poor diet) or impairment of the migrating motor complex of the intestines as a result of another health condition (diabetes, autoimmune disorders, Parkinson's disease, etc.); additional medical workups may be needed.

Condition	SIBO Prevalence
Celiac disease	9-67%
Connective tissue disease	43-55%
Crohn's disease	25-88%
Diabetes	8-44%
Hypothyroidism	54%
Ulcerative colitis	81%
Chronic fatigue syndrome	81%
Fibromyalgia	93%
Irritable Bowel Syndrome	4-78%
Obesity	17-41%
Rosacea	46%
Muscular dystrophy	65%
Parkinson's disease	54%
Abdominal surgery	82%
Gastrectomy	63-78%

Reference: Grace E, Shaw C, Whelan K, Andreyev HJ. Review article: small intestinal bacterial overgrowth--prevalence, clinical features, current and developing diagnostic tests, and treatment. Aliment Pharmacol Ther. 2013 Oct;38(7):674-88.

Retesting

Retesting is recommended after SIBO treatment(s) to evaluate efficacy or in the future for potential recurrence. Your practitioner may recommend retesting immediately or after a washout period of time (typically 2-4 weeks).