PEDIATRIC HEALTH AND WELLNESS

Pediatric Gastrointestinal Distress

labcorp

GASTROINTESTINAL SCREENING, DIAGNOSIS, AND MANAGEMENT

Offering tests and services to support your pediatric patients from infancy to adulthood.

Labcorp's test menu includes various test options to help patients with recurrent Gastrointestinal (GI) distress. Advanced testing services and state-of-the-art technology enable clinicians to detect and define GI disease quickly and effectively.

In addition to abdominal pain, other common symptoms of GI distress may also be present, including the following[1]:

- Cramping/abdominal pain
- Joint pain/swelling
- Constipation
- Diarrhea
- Nausea/vomiting
- Blood in stool

Gastrointestinal screening, diagnosis, and management in pediatric patients

Gastrointestinal (GI) distress can involve multiple and very common symptoms often making diagnosis challenging. There are numerous triggers for GI distress including, but not limited to, food sensitivities/allergies, viral/bacterial infections, gastroesophageal reflux disease (GERD), celiac disease (CD), inflammatory bowel disease (IBD), and irritable bowel syndrome (IBS). Many symptoms of these conditions occur simultaneously, further complicating identification.

Viral agents, bacterial agents, parasitic agents, food allergies, and celiac disease

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Gastrointestinal Distress Testing

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Gastrointestinal Profile, Stool, PCR (183480)

Gastrointestinal disease can be caused by many infectious agents including bacteria, viruses, and parasites. Culture testing for bacteria will not identify viruses or parasites, while tests for parasites will not detect the viruses or bacteria. The Gastrointestinal Profile, Stool, PCR (183480) is a multiplexed nucleic acid test. It is intended for the simultaneous qualitative detection and identification of nucleic acids from multiple bacteria, viruses, and parasites obtained from specimens taken from individuals with signs and/or symptoms of gastrointestinal infection.

This profile rapidly and accurately detects 22 common gastrointestinal pathogens including viruses, bacteria, and parasites that cause infectious diarrhea.

Bacteria:
Campylobacter, Clostridium difficile toxin A/B, Plesiomonas shigelloides, Salmonella, Yersinia enterocolitica, Vibrio, including Vibrio Cholerae, Enteroaggregative E. coli (EAEC), Enteropathogenic E. coli (EPEC), Enterotoxigenic E. coli (ETEC) lt/st, Shiga-like toxin-producing E. coli (STEC) stx1/stx2,incl E.coli (EIEC), and Shigella/Enteroinvasive E. coli (EIEC)

Parasites:
Cryptosporidium, Cyclospora cayetanensis, Entamoeba histolytica, and Giardia lamblia

Viruses:
Adenovirus F 40/41, Astrovirus, Norovirus GI/GII, Rotavirus A, and Sapovirus

H pylori
H pylori infection is associated with the development of dyspeptic symptoms, peptic ulcer disease, and gastric malignancies.[3] Labcorp offers non-invasive means of testing for active H pylori infection in pediatric patients as recommended by the American College of Gastroenterology (ACG).[3]

Urease Breath Test, Pediatric (180840)
The Urea Breath Test (UBT) provides a non-invasive method to test for active H pylori infection in pediatric patients between the ages of 3 and 17. The UBT is a highly sensitive and specific assessment for H pylori infection in diagnosing active infection and confirming eradication after therapy.[3]

H pylori Stool Antigen (180764)
The H pylori Stool Antigen test establishes the presence and possible etiological role of H pylori in cases of chronic gastric ulcer, gastritis, duodenal ulcer, and dyspepsia. It may also be used to test for infection and/or as a means of confirming cure after therapy.[3]

Infectious Agents
In most cases of diarrhea, infectious disease agents, bacteria, or parasites are the root cause.[2] Along with routine tests for detection of these agents—stool cultures and parasite identification—Labcorp has introduced new profiles utilizing polymerase chain reaction (PCR) methodology to improve speed and testing versatility.

The progressive development of atopic allergy disease from childhood into adulthood is referred to by some researchers as the “atopic march”. Early intervention may help improve symptoms and reduce the chance of developing asthma in the future.[4]

Pediatric Allergies

Allergic Rhinitis/Atopic Dermatitis
Labcorp recognizes the importance of early diagnosis of atopic allergy in pediatric patients. Clinical studies have shown that young children with atopic dermatitis or allergic rhinitis have an increased tendency to develop asthma as they grow older.[4] Through a comprehensive allergy test portfolio, Labcorp can assist in providing care for the youngest of patients.

Food Allergy
As many as 15 million people in the US have food allergies.[5] From 1997 to 2007, the prevalence of food allergies increased by 18% for children less than 18 years of age.[6] According to a study released in 2013 by the Centers for Disease Control and Prevention, food allergies among children increased approximately 50% between 1997 and 2011.[5]

Appropriate diagnosis of food allergies is vital, as it can mean the difference between leading a life of constant vigilance versus a carefree, relaxed existence. It has been shown that eight base foods account for approximately 90% of food-related allergic reactions.[5] Currently, skin prick tests (SPTs) and/or serum tests for food-specific IgE antibodies are used to evaluate specific foods causing disorders and determine allergy diagnoses.[7]

According to the Board of American Academy of Allergy, Asthma and Immunology (AAAAI), food allergy must be considered in the differential diagnosis for chronic GI symptoms. It is therefore important to identify and separate food induced IgE-mediated reactions from other types of reactions to food.[7]

For more information

Visit **www.Labcorp.com.** Click on Test Menu and then Test Resources for a comprehensive listing including geographic allergens.

Common profiles at Labcorp include the allergy food profile and food component allergen testing.

Allergen Profile, Food (602989)
Clam, Milk, Shrimp, Codfish, Peanut, Soy Bean, Corn, Scallop, Walnut, Egg White, Sesame, Wheat

Allergen Profile, IgE (Pediatric) with Component Reflexes* (604771)		
Food	**Mold**	**Animal Dust**
Almond, Brazil Nut, Cashew Nut, Codfish, Egg White, Hazelnut, Macadamia nut, Milk, Peanut (whole), Pecan, Pistachio, Scallop, Seseme Seed, Shrimp, Soy Bean, Walnut, Wheat	C. herbarum Cockroach, German	Cat Dander D. farinae D. pteronyssinus Dog Dander Mouse Urine

* If reflex testing is performed, additional charges/CPT code(s) may apply.

Listed below are component reflex indicators:

- If milk IgE ≥0.35 kU/L, reflex tests α-lactalbumin, β-lactoglobulin, and casein will be added.
- If egg white IgE ≥03.5 kU/L, reflex tests ovalbumin and ovomucoid will be added.
- If IgE to Brazil nut, cashew nut, hazelnut (gilbert), peanut (whole), and/or walnut is 0.10 kU/L, reflex testing will be completed as follows:
  - Brazil nut: Ber e 1/ cashew nut: Ana o 3 / hazelnut (filbert): Cor a 1, Cor a 8, Cor a 9, and Cor a 14/ peanut (whole): Ara h 1, Ara h 2, Ara h 3, Ara h 6, Ara h 8, and Ara h 9/ walnut: Jug r 1 and Jug r 3

Celiac disease is estimated to affect 1 out of every 100 people, yet fewer than 17% of affected patients are diagnosed as having the disease.[8] Early diagnosis and lifelong treatment with a gluten-free diet are critical to relieve symptoms and reduce risk of complications such as secondary autoimmune disorders.[8]

Celiac Disease

Identifying patients with celiac gluten sensitivity can be challenging due to variable, non-specific symptoms and varying age of onset. Antibody and HLA genetic testing can be used to support a diagnosis of celiac disease. A positive small bowel biopsy also provides a definitive diagnosis.[8]

Labcorp provides a full-service offering to support physicians in the evaluation of patients with symptoms suggestive of celiac disease. Labcorp's services include the following.

- Antibody profile testing (individual tests and profiles)
- HLA (DQA/DQB) genotyping with relative risk assessment, including an option to reflex to antibody testing if HLA results are positive
- Celiac disease pathology (small bowel biopsy)
- Expert genetic consultation

Celiac Disease Antibody Testing
Celiac disease antibody tests can be used to screen patients with suspected disease or to monitor adherence and response to a gluten-free diet. Patients need to be on a gluten-containing diet for the antibody tests to be useful.[9] The celiac antibody screening tests most commonly used are tissue transglutaminase (tTG) IgA, endomysial (EMA) IgA, and deamidated gliadin peptide (DGP) IgA and IgG.[9]

Individuals with active celiac disease will have elevated levels of one or more specific CD antibodies. A positive antibody test is highly suggestive of celiac disease while a negative IgA antibody may not rule out celiac disease. IgA deficiency is common in individuals with celiac disease (2-3% compared to 1 /400 to 1/800 in the general population).[9] It is important to test total IgA to rule out IgA deficiency along with antibody testing in patients with a high probability of celiac disease.[9]

Per American College of Gastroenterology (ACG) guidelines, tTG IgA is the preferred single test for detection of celiac disease in individuals >2 years of age.[9]

When screening children under 2 years of age, it is preferable to combine the tTG IgA test with DGP (IgA and IgG).[9] For children under 2 years of age, tTG and EMA are less sensitive than later in life.[9] Antibody testing may fail to detect celiac disease due to a gluten-free diet or to IgA deficiency. The benefits of celiac disease antibody testing include:

- Non-invasive method to evaluate patients suspected of celiac disease
- Helps identify individuals for whom endoscopic biopsy confirmation would be useful[8]
- A positive antibody result is highly suggestive of celiac disease[8]
- Can detect silent celiac disease in relatives of patients with celiac disease[8]

Celiac Disease Genetic Testing
Identifing HLA-DQ2 or DQ8 is an important tool to assess celiac genetic risk and aid in excluding celiac diagnosis. HLA-DQ2 is found in more than 95% of celiac cases, HLA-DQ8 in approximately 5%, and half DQ2 in almost all remaining cases.[9] HLA-DQ2, HLA-DQ8 or half DQ2 are necessary for celiac disease to occur. A negative HLA DQ Association test result essentially excludes celiac disease as a diagnosis.[8] Although a positive HLA result is not diagnostic, it identifies predisposition for celiac disease. The HLA DQ Association test also provides a genetic risk assessment for CD.[9]

Celiac HLA DQ Association with Reflex to Celiac Antibodies (164019)
Provides genetic testing and screening for celiac antibodies in a single test order. Positive HLA results identify genetic predisposition and reflex to antibody testing to aid in the diagnosis of celiac disease. Negative HLA results essentially rule out celiac disease.[8]

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Estimated Celiac Risk from Associated HLA Genotypes[8]

HLA DQ2/DQ8 Genotype	Risk
DQ2+DQ8	1:7 (14.3%)
DQ2 alone	1:35 (2.9%)
DQ8 alone	1:89 (1.1%)
General population risk (genotype unknown)	1:100 (1%)
½ DQ2: DQB1*02	1:210 (0.5%)
½ DQ2: DQA1*05	1:1842 (0.05%)
No HLA-DQA/DQB susceptibility alleles	1:2518 (<0.04%)

This risk table is an excerpt from the complete table in the HLA DQ Association Report.

NOTE: Actual risk for celiac disease may be greater than shown in the table when there are symptoms of celiac disease, positive results from celiac antibody tests, positive intestinal biopsy, or if there is a family history of celiac disease.

Benefits of Celiac Disease Genetic Testing

- Accurate for celiac disease when the patient is on a gluten-free diet[8]
- Can effectively rule out celiac disease[8]
- Useful when diagnosis of celiac disease is unclear—ambiguous antibody or small bowel biopsy results, discrepancy between antibody and biopsy findings[8]
- Can help assess celiac disease risk in first-degree relatives of affected patients[9]
- Performed only once in a lifetime as HLA genetic test results do not change[8,10,11]

Celiac Genetic Counseling

Labcorp's celiac expertise extends beyond tests to include consultative services. Labcorp's scientific staff—including Dr Annette Taylor, a geneticist and recognized leader in the celiac field—can provide client consultations and are readily accessible to answer questions about test selection and results.

Labcorp Partners in Pediatric Care Program

Labcorp offers a comprehensive program with tests and services to help you care for your pediatric patients – from infancy to adulthood. Patient education and web-based systems offering information for both patients (Labcorp Patient™ portal) and physicians (Labcorp Link™) are the cornerstones of the Partners in Pediatric Care Program.

Pediatric-specific options with a focus on minimum samples, alternative samples, and age-specific reference ranges.

Be a Part of Labcorp's Partners in Pediatric Care Program

If you are interested in participating in this comprehensive program, go to **Labcorp.com/value-care-pediatrics** and complete the form.

Test Name	Test No.
Gastrointestinal Profile, Stool, PCR	**183480**
Stool Culture	**008144**
Ova and Parasites Examination	**008623**
H pylori	
Helicobacter pylori Urea Breath Test	**180836**
Helicobacter pylori Urea Breath Test, Pediatric	**180840**
Helicobacter pylori Stool Antigen	**180764**
Allergy	
Allergen Profile, Food	**602989**
Allergen Profile, IgE (Pediatric) with Component Reflexes*	**604771**
Allergen Profile Plus, IgE (Pediatric)	**602988**
Celiac Disease	
Celiac Antibodies tTG IgA and Total IgA with Reflex to tTG, IgG and DGP IgG	**164047**
Celiac Antibodies Profile tTG IgA, tTG IgG, DGP IgA, DGP IgG, and Total IgA (Suggested profile for children < 2 years old)	**164010**
Celiac Antibodies tTG IgA, EMA IgA, Total IgA, with Reflex to tTG IgG	**165142**
Celiac HLA DQ Association	**167082**
Celiac HLA DQ Association with Reflex to Celiac Antibodies tTG IgA, tTG IgG, DGP IgA, DGP IgG, and Total IgA	**164019**
Tissue Transglutaminase (tTG), IgA	**164640**
Tissue Transglutaminase (tTG), IgG	**164988**
Endomysial Antibody, IgA	**164996**
Immunoglobulin A, Quantitative	**001784**

For more celiac test options and the most current information regarding specimen requirements and CPT codes, please consult the online test menu at www.labcorp.com.

References

1. Dave, M. Abdominal (Belly) Pain in Children. Digestive Health and Nutrition in Children. https://childrensgimd.com/digestive-disorders-in-children/ abdominal-belly-pain-in-children/. Accessed December 6, 2017.
2. Bus SN, Leber A, Chapin K, Fey PD, Bankowski MJ, Jones MK, et al. Multicenter evaluation of the BioFire FilmArray gastrointestinal panel for etiologic diagnosis of infectious gastroenteritis. *J Clin Microbiol.* 2015;53(3):915-925.
3. Chey, WD. American College of Gastroenterology Guideline on the Management of Helicobacter pylori Infection. *Am J Gastroenterol*. 2007. 10.1111/j.1572-0241.
4. Zheng T, Yu J, Oh MH, Zhu Z. The Atopic March: Progression from Atopic Dermatitis to Allergy Rhinitis and Asthma. *Allergy Asthma Immunol Res*. 2011 April;3(2):67-73.
5. Food Allergy Facts and Statistics for the US. Food Allergy Research & Education. https://www.foodallergy.org/life-food-allergies/food-allergy-101/ facts-and-statistics Accessed February 20, 2018.
6. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Statistics. Food Allergy among U.S. Children: Trends in Prevalence and Hospitalizations. NCHS Data Brief: 10. Hyattsville, MD; October 2008.
7. Sicherer, SH, Teuber, S. Food allergy, dermatologic diseases, and anaphylaxis. Current approach to the diagnosis and management of adverse reactions to foods. *J Allergy Clin Immunol*. 2004; 1146-1150.
8. Taylor AK, Lebwohl B, Snyder C, and Green PHR. Celiac disease. In: Pagon RA et al. editors. GeneReviews [Internet]. Seattle (WA): University of Washington, Seattle; 1993-2017. 2008 Jul 3.
9. Rubio-Tapia A et al. ACG Clinical Guidelines: Diagnosis and Management of Celiac Disease. *Am J Gastroenterol*. 2013; 108:656-674
10. Hill ID et al. NASPGHAN clinical report on the diagnosis and treatment of gluten-related disorders. *JPGN*. 2016;63(1):156-165.
11. Guandalini S, Assiri A. Celiac disease: a review. *JAMA Pediatric*. 2014;168:272-278

For more information about Pediatric Health and Wellness and how it can benefit your patients, contact your Labcorp sales representative, or visit **Labcorp.com**

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