Laboratory Services Newsletter SUMMER 2018

Gastrointestinal Infection Array Testing

Why is multiplex molecular testing for gastrointestinal (GI) pathogens important?

The spectrum of pathogens that cause GI infections is quite broad and typically requires an assortment of classical detection methods (fecal examination, bacterial culture, and PCR testing) to identify the causative agent. Many of these classical methods suffer from variable specificity and sensitivity, and are often poorly utilized due to a lack of understanding of each method's intended use. Molecular testing is more sensitive and faster than conventional methods for detection of gastrointestinal pathogens.

Gastrointestinal Infection Array

The Gastrointestinal Infection Array tests for common gastrointestinal pathogens including 11 bacteria, 5 viruses, and 4 protozoa that cause infectious diarrhea. The GI Array is designed as a screening test for gastrointestinal infections where a rapid comprehensive answer is desired. **It is meant to be ordered in place of conventional testing such as routine stool culture, ova and parasite examinations, and antigen testing.**

Gastrointestinal Infection Array Analytes:

Bacterial	Diarrheagenic *E. Coli / Shigella*	Viruses	Protozoa
• *Campylobacter spp.(C. jejuni/ C.coli / C. upsaliensis)*	• Enterotoxigenic *E. coli* (ETEC)	• Adenovirus F 40/41	• *Cryptosporidium*
• *Clostridium difficile* (Toxin A/B)	• Shiga-like toxin-producing *E. coli* (STEC)	• Astrovirus	• *Cyclospora cayetanensis*
• *Plesiomonas shigelloides*	• *E. coli* 0157	• Norovirus GI/GII	• *Entamoeba histolytica*
• *Salmonella*	• *Shigella* / Enteroinvasive *E. coli* (EIEC)	• Rotavirus A	• *Giardia lamblia*
• *Vibrio (V. parahaemolyticus/ V. vulnificus)*		• Sapovirus	
• *Vibrio cholerae*			
• *Yersinia enterocolitica*			

Specimen Handling

For optimal GI Array testing, stool specimens should be collected in a Cary-Blair collection container with media, and transported to a Nationwide Children's Laboratory Service Center within 24 hours at room temperature or 72 hours refrigerated. Testing is performed 24/7 with a turn-around time estimated at 8 hours of receipt.

Result Reporting

- A result for all reported analytes will be provided as **Detected** or **Not Detected**.
- Positive results for *Plesiomonas, Vibrio, Salmonella/Shigella, and Yersinia* will result in a culture and susceptibilities if the bacterium is recovered.
- *Clostridium difficile* will not be reported on patients <3 years of age, because asymptomatic carriage in this age group is common.[1]
- Enteropathogenic *E. coli* (EPEC) and Enteroaggregative *E.coli* (EAEC) are part of the manufacturer's panel, but will not be reported due to high detection rates in pediatric patients, unclear significance, and concern for misattribution of disease associate with asymptomatic carriage.[2]

References:

(1) Schutze et. al. AAP. Clostridium difficile infection in infants and children. Pediatrics. 2013 131:196-200.

(2) Ardura et al. Hypothetical Impact of a Molecular Diagnostic for Pediatric Acute Gastroenteritis: The FilmArray GI Panel Hy-IMPACT Study. Presented at ASM Annual Meeting, 2015.

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IMPORTNAT TO KNOW

Gastrointestinal Infection Array Testing *continued*

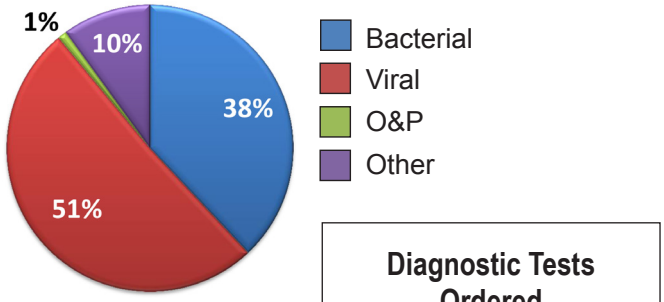
Additional Stool Testing

Conventional stool testing should **not** be ordered in addition to the GI Array testing. If a stool culture, O&P exam, or parasite/viral antigen tests are ordered with the GI Array, the panel test will be performed and not the individual assays.

The following lists of tests should be utilized as indicated with, or instead of, the GI Array test.

Test Name	*Aeromonas* Culture	*Shigella* Test of Cure	*C. difficile*	O&P Exam
Test code	AERMC	SHIGC	CDIFTN	OAP
Additional Testing	*Aeromonas* is not included in the array panel. If this bacterium is suspected, a separate culture order and specimen is required.	Array testing should NOT be used for test of cure.	For individual patients where only *C. difficile* is highly suspected, the GI Array should not be used. Order the single analyte *C. difficile* molecular test.	If the GI Array test is negative and the patient has recent travel history, or is immunocompromised.
Specimen Type	Stool in Cary-Blair media (can use same sample if within Transport/Stability requirements)	Stool in Cary-Blair media	Soft (nonforming) or liquid stool	Stool in Total-Fix collection container with media

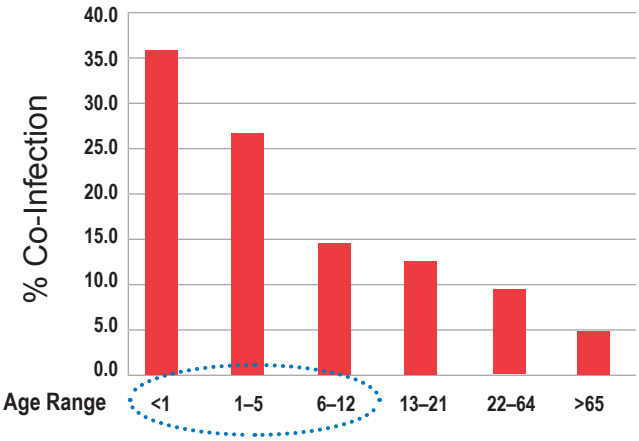
Infectious Agents of GI



Diagnostic Tests Ordered

4% Viral
43% Ova and Parasite
53% Bacterial

Film Array Trial: Co-Infections by Age



Conclusion:
There is a disconnect on what lab tests are ordered vs. what pathogens are causing infection.

Conclusion:
The pediatric population shows a much higher prevalence of co-infection.

For more information about GI Array testing, please contact Nationwide Children's Laboratory Client Services at (800) 934-6575.

IMPORTANT TO KNOW

Tick- and Mosquito-Bourne Diseases in Children

Although anyone can get tick- and mosquito-borne diseases, children spend a lot of time outdoors and are at particular risk. Two primary concerns in the Midwest are Lyme disease and West Nile.

Lyme Disease

Lyme disease is caused by a spirochete-shaped bacterium called *Borrelia burgdorferi*. The bacteria is commonly found in mice and is transmitted to humans by the bite of an infected black legged tick, *Ixodes scapularis*, also known as the deer tick. Incidence of Lyme disease has increased steadily, with more than 241 reported cases in Ohio in 2017. The onset of most Lyme disease cases is in late spring and summer.

- **Early Signs and Symptoms –** Signs and symptoms of Lyme disease may begin to manifest 3 to 30 days after a tick bite. In addition to flu-like symptoms of fever, chills, headache, fatigue, swollen lymph nodes and muscle and joint aches, the classic erythema migrans (EM) rash may appear.

  The rash occurs in approximately 70-80 percent of infections. It begins at the site of the tick bite an average of 7 days after the bite but may appear 3 to 30 days later. The rash expands gradually over a period of days, reaching up 12 inches across. Sometimes the inner ring begins to clear, resulting in the target or "bull's-eye" appearance. The rash may feel warm to the touch, but it is rarely itchy or painful.

- **Testing –** Lyme serology should be conducted if the epidemiology as well as signs and symptoms are consistent with possible Lyme disease.

  An enzyme-linked fluorescent immunoassay (ELFA) screens for antibodies to the *Borrelia burgdorferi* complex. The assay detects total antibody (IgG and IgM) to *Borrelia burgdorferi* complex in human serum and is intended for use as an aid in diagnosis of Lyme disease.

  Testing is not intended or indicated as a screening procedure for the general population, and it should be done only when exposure history or symptoms suggest Lyme disease.

La Crosse and West Nile, Arboviruses

The arboviruses are a group of viruses transmitted by arthropod vectors, particularly mosquitoes and ticks. The most commonly detected arboviruses in the United States belong to the following families: *Alphavirus* (Eastern equine encephalitis virus, Western equine encephalitis virus), *Flavivirus* (St. Louis encephalitis virus, West Nile Virus) and *Bunyavirus* (LaCrosse encephalitis virus). In the Midwest, most cases of arboviral infection occur from June through October, when arthropods are most active.

- **Symptoms –** The severity of symptoms of La Crosse virus and West Nile virus infection in humans ranges from asymptomatic to severe and requiring hospitalization. While both occur in people of all ages, La Crosse is more common than West Nile in children in the Midwest. Symptoms of La Crosse generally appear 5-15 days after infection and include fever, headache, nausea, vomiting, fatigue and lethargy. In severe cases, neurological symptoms, including seizures, hemiparesis and cognitive abnormalities may occur.

- **Testing –** La Crosse Virus or West Nile Virus Antibodies, IgG and IgM
  These tests are intended to be used as a means detecting La Crosse virus- or West West Nile virus-specific IgG and IgM in serum or spinal fluid specimens in which there is a clinical suspicion of infection. Because other members of the Flaviviridae family, such as St. Louis encephalitis virus, show extensive cross-reactivity with West Nile virus, serologic testing specific for all of these viruses should be considered.

For more information about testing for tick and mosquito bourne diseases in children, please contact Nationwide Children's Laboratory Client Services at (800) 934-6575.

INFORMATION TO KNOW

Are You Wasting too much Money and Time on Vaccines? CPP can help!

CPP (Children's Practicing Pediatricians) is an independent nonprofit medical association established in 1985 by pediatricians on the general medical staff of Nationwide Children's Hospital in Columbus, Ohio. With nearly 30 years of operating experience, CPP has become a preeminent "chamber of commerce" offering services and advocating on behalf of primary care physicians, including a vaccine group purchase program that supports all aspects of vaccine management.

Here's how CPP can help:

Discounts - CPP members receive Tier 1 pricing on vaccines that are purchased directly from the vaccine manufacturers Merck, Pfizer and Sanofi Pasteur. In addition, CPP provides a significant annual rebate to member practices based on purchases and market share requirements. CPP has also contracted with Sanofi Pasteur to provide discounts on flu vaccines, regardless of the presentation you prefer. CPP discounts can be accessed in addition to manufacturer specials and are not restricted to order size.

Education - CPP has over 30 years of providing valuable, timely and relevant educational resources to help make managing vaccines less complicated. The "Resources" section of our website houses everything from billing and coding webinars to vaccine inventory management tools. Members can also earn educational grants through CPP's Vaccine Storage Equipment Educational Program, to help offset the cost of investing in proper vaccine storage equipment, as well as CPP's 2nd Dose Program, to encourage examination of a practice's 2nd dose immunization rates for HPV, meningococcal ACWY, meningococcal B and/or adult pneumococcal.

Support - You are not alone. Leverage the knowledge and best practices of other CPP members to improve your vaccine services. The CPP Board is made up of practicing physicians who encounter the same issues you do in regards to vaccine management. Network and learn from others who have encountered similar issues and join together to make your voice heard when global changes are needed.

Easy - There are no catches with CPP and no cost to join, nor is there a penalty to leave our program. If you purchase vaccines from Merck, Pfizer and Sanofi Pasteur according to the program guidelines, you will receive the discounts and earn a rebate from CPP. It's that simple.

To get started, just provide us your Merck, Pfizer and Sanofi Pasteur account numbers and we will work to get your accounts linked to the CPP contracted pricing. If you don't have an account with a particular vendor, we can help you get one. You will continue to order directly through the vendors.

To sign up to become a member of CPP or to get more information, please contact us at 614-722-2145 or cpp@nationwidechildrens.org.

INFORMATION TO KNOW

School and Sport Physicals, Family History of Heart Disorders, Patients on ADHD Meds? Consider NCH Laboratory Services for your ECG Services!

Rely on the Nationwide Children's Hospital pediatric cardiology experts when referring your patients for an ECG. At Nationwide Children's Laboratory Services we offer the convenience of both ECG services and laboratory testing performed by exceptionally trained pediatric technicians.

- Pediatric ECG interpretations are different. They reduce false positives that may result from an adult ECG interpretation.
- ECG results in 2 – 3 business days.
- Walk-in services at 9 of our locations.

Laboratory Services locations near you that have ECG services:

Central Ohio Locations:

- Canal Winchester – 7901 Diley Road, Suite 150
- Dublin – 7450 Hospital Drive
- East Columbus – 6435 E. Broad Street
- Hilliard – 3955 Brown Park Drive
- Lewis Center – 7853 Pacer Drive
- Marysville – 100 Colemans Crossing Boulevard
- Westerville – 433 N. Cleveland Avenue

Other Ohio Locations:

- Mansfield – 680 Park Avenue W., Suite G05
  ECG services should be scheduled by calling (419) 528-1351
- Newark – 75 S. Terrace Avenue
- *Coming Soon* - Zanesville – 1166 Military Road, Suite 2B

Warm Weather Reminder

Now that summer has arrived, it is important that samples placed in a lockbox prior to transport to the laboratory be maintained at the appropriate temperature.

If refrigerated samples are stored in the lockbox, then a refrigerated cold pack should be placed in the lockbox to maintain the samples at the refrigerated temperature. ***The cold pack should not be frozen****, since you do not want refrigerated whole blood samples to freeze.*

Many laboratory tests performed require adequate refrigeration of specimens. By following this lockbox practice, you will help insure the integrity of the samples and ultimately obtain reliable laboratory results.

TEST UPDATES

Autoimmune Lymphoproliferatve Syndrome Panel

Laboratory Services now offers an ALPS (Autoimmune Lymphoproliferatve Syndrome) panel by flow Cytometry. This test will measure the percent of Double Negative T-Cell's (DNTC) that are positive for CD45RA/B220 and CD45RA/CD57+ to aid in the diagnosis of ALPS.

Autoimmune Lymphoproliferatve Syndrome Panel	
Test Code	ALPS
Specimen Types & volume	3mL purple top (EDTA) with a minimum volume of 1mL
Included Tests	%DNTC (CD45+/CD3+/TCRa/b+/CD4-/CD8-/CD56-) %CD45RA+/B220+ DNT cells %CD45RA+/B220- DNT cells %CD45RA+/CD57+ DNT cells
Transport/Stability	24 hours room temperature
Performed / Turnaround Time	Monday through Friday TAT - 1 day
Comments	Pathologist Consult will be issued

Heparin-Induced Thrombocytopenia

On April 25, 2018 the Heparin-Induced Thrombocytopenia (HIT) screen changed methodology from an ELISA PF4 Ab screen to the PIFA PF4 Ab screen. This new methodology will allow for a much faster turn around time of 1 hour, M-F day shift. Positive screen results should still be confirmed with Seratonin Release Assay (SRA). There will be no changes with ordering in EPIC.

Heparin-Induced Thrombocytopenia	
Test Code	HIT
Specimen Types & volume	1.8 mL Blue Citrate whole blood preferred 3 mL Purple EDTA whole blood acceptable
Included Tests	Heparin-Induced Thrombocytopenia Screen
Transport/Stability	Room Temp 2 hours Refrigerated 24 hours
Performed / Turnaround Time	Monday through Friday - day shift TAT - 1 hour
Comments	Testing is performed on whole blood samples. Please do not centrifuge. Samples that require testing off hours must be arranged with the Clinical Pathologists on-call.

TEST UPDATES

New Test Options for Products of Conception and Amniotic Fluid Specimens

Nationwide Children's Hospital Institute for Genomic Medicine (IGM) Clinical Laboratory recently added new ordering options for products of conception (POC) and amniotic fluid specimens. These test options were introduced to offer greater flexibility for providers to order necessary tests on these specimen types.

New Test Options for POC Specimens:

- POC/Tissue Aneuploidy Screen by FISH (Test Code: TISANEU)
- POC Microarray Analysis with 5-Cell Chromosome Analysis (Test Code: POCMA5C)

New Test Options for Amniotic Fluid Specimens:

- Amniotic Fluid 5-Cell Chromosome Analysis (Test Code: AF5CC)
- Prenatal Microarray Analysis with Parental Testing (Test Code: PMAPAR)
- Prenatal Microarray Analysis without Parental Testing (Test Code: PMANO)
- Prenatal Microarray Analysis without Parental Testing + 5-Cell Chromosome Analysis (Test Code: PMA5C)

Platelet Response, Aspirin using VerifyNow

Laboratory Services now offers **VerifyNow–Platelet Inhibition by Aspirin** testing. This qualitative test detects platelet activity by measuring in vitro platelet aggregation in a blood sample exposed to aspirin, using light transmittance. This test will replace TEG-platelet mapping. Patients on mechanical devices should have a pre-aspirin test performed to determine "iatrogenic" platelet activation to enable evaluation of medication effect (once started). This test should not be performed on patients taking GP IIb/IIIa inhibitors or NSAIDs. Results should be interpreted in conjunction with other laboratory and clinical data.

Platelet Response, Aspirin using VerifyNow	
Test Code	VNASP
Specimen Types & volume	Used only for Verify Now testing; Greiner Bio-One Sodium Citrate (blue top with white ring). These collection tubes, along with a required discard/waste tube and instructions, can be obtained from the Transfusion Service.
Transport/Stability	Whole blood - keep at room temp, do not centrifuge. Testing must be done within 4 hours of collection, and therefore will be a main campus collection only.
Performed / Turnaround Times	Sunday - Saturday TAT - 1 hour
Comments	Specimen must be hand-delivered to the Transfusion Service – **DO NOT send through the pneumatic tube system.**

For more information about these test updates, please contact Nationwide Children's Laboratory Client Services at (614) 722-5477 or (800) 934-6575.

NATIONWIDE CHILDREN'S

When your child needs a hospital, everything matters.℠

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How can Nationwide Children's Laboratory Services help your practice?

- Pediatric pathologist consults on lab results
- Wide acceptance of insurance plans
- Pediatric reference ranges
- Services to enhance the laboratory process in your practice
- Interface compatibility with provider EMR systems

If you would like to become a client or learn more information about Nationwide Children's Laboratory Services, contact us at (800) 934-6575 or visit our website at NationwideChildrens.org/Lab.

Would you like to receive the Nationwide Children's Laboratory Services Newsletter electronically? Please e-mail us at LaboratoryServices@NationwideChildrens.org and let us know!