Division of L&GM Laboratory & Genomic Medicine

Newsletter

Washington University in St. Louis School of Medicine

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New 4th Generation HIV Test

Effective October 13th BJH implemented a new testing algorithm for human immunodeficiency virus (HIV) diagnosis. With this new approach to testing, the "window period" for acute HIV diagnosis is reduced, and the turnaround time to reporting is shortened. This update in testing is consistent with the new CDC testing algorithm for the laboratory diagnosis of HIV infection (1). One of the major updates is a change from a 3rd generation to 4th generation HIV screen. The 4th generation assay simultaneously detects HIV-1 and HIV-2 IgG and/or IgM and the p24 antigen. The addition of p24 antigen detection helps reduce the window to a reactive screen by about 1 week relative to the 3rd generation screen, and shortens the window (5-7 days) after the appearance of detectable HIV RNA.

Specimens that are reactive in the 4th generation screen are then reflexed to a FDA approved in-house 2nd generation confirmatory immunoassay (Multispot HIV-1/HIV-2 Rapid Test) which can differentiate between HIV-1 and HIV-2 antibodies. The Multispot Test replaces the Western blot confirmation, which was a send out test to Mayo Medical Laboratories. If the Multispot test is reactive for HIV-1 antibody, non-reactive, or reactive for HIV-1 and HIV-2, then the specimen will reflex to quantitative HIV-1 viral load testing (send out test to Mayo Laboratories). See the accompanying figure (page 2) that shows the new testing algorithm for HIV diagnosis.

4th generation HIV testing will be available 24 hours a day, 7 days a week. Specimens should be collected in a pink top tube and results should be available within 4 hours. If you have questions regarding this new testing algorithm, please contact Adrain McClellan, Supervisor of Special Chemistry at 362-5009 or Boris Calderon, M.D., Assistant Medical Director of Serology and Immunology for BJH at calderon@wustl.edu.

(1) CDC Laboratory Testing for the Diagnosis of HIV Infection, June 27, 2014. (http://www.cdc.gov/hiv/pdf/HIVtestingAlgorithmRecommendation-Final.pdf). **.....continued page 2**

Each year the BJH laboratories perform…
45,000 Blood cultures
89,000 Blood type and screens
300,000 Basic metabolic panels
438,000 Complete blood counts

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New 4th Generation HIV Test

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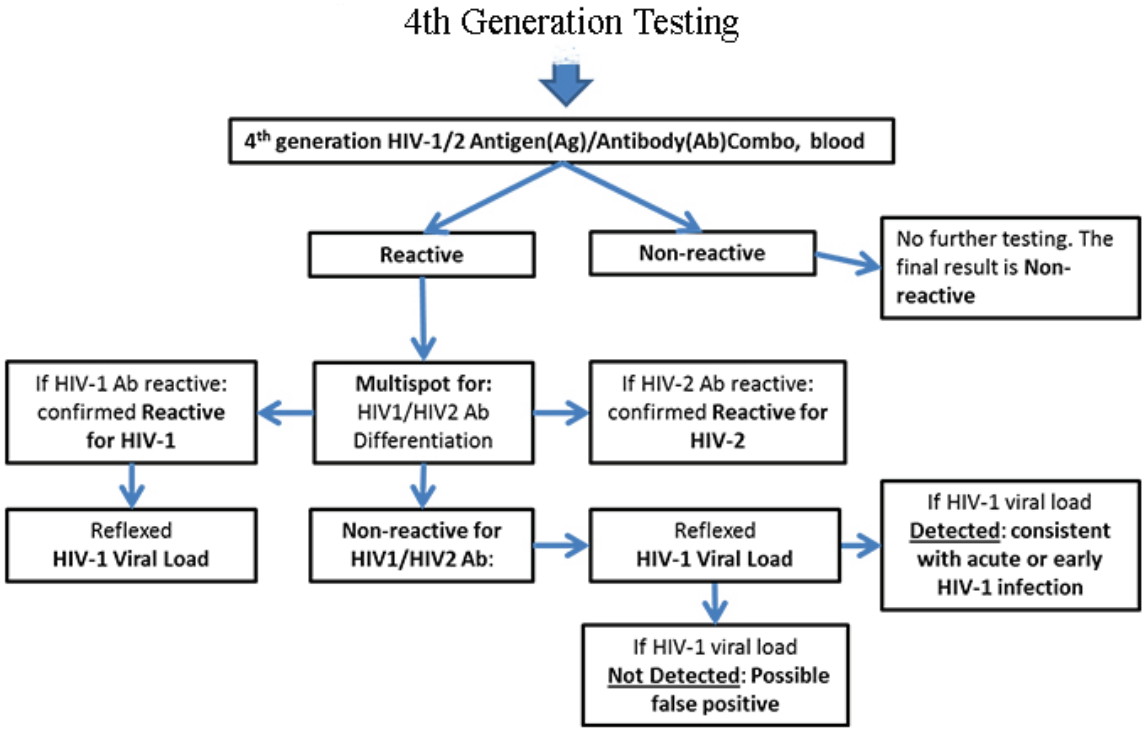


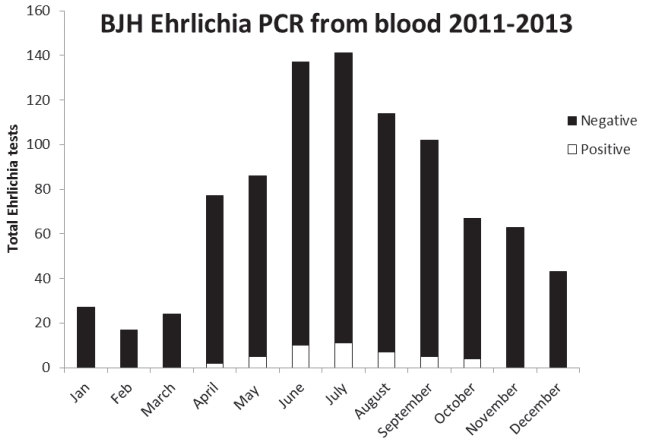
BJH HIV laboratory testing algorithm using 4th generation screen and Multispot confirmation.

News Bite: Update on Tick-borne Disease

The Lone Star Tick

Tick vectors are responsible for transmission of several infectious agents to animal and human hosts. In Missouri, the most frequently encountered tick is *Ambylomma americanum* (also known as the Lone Star Tick); this tick is also found throughout the southeastern and eastern United States. *A. americanum* is a vector for transmission of *Ehrlichia* spp., *Francisella tularensis*, and Heartland virus, but is not a competent vector for Lyme disease transmission, nor is Lyme disease commonly acquired in Missouri. Typically, Lyme should only be considered in patients with a travel history to upper Midwest and Northeastern states; acquisition in these regions accounts for 92% of Lyme disease cases.

Missouri is the state with the highest number of reported cases of *Ehrlichia chaffeensis,* accounting for 27% of all US cases in 2013 (http://www.cdc.gov mmwr/pdf/wk/mm6333md.pdf). Patients with ehrlichiosis can present with fever, malaise, myalgia, headache, and chills, and laboratory findings can include leukopenia, thrombocytopenia, and elevated AST and ALT. The Ehrlichia PCR assay, performed on whole blood, is the optimal test for the laboratory diagnosis of ehrlichiosis. The sensitivity for detection of *Ehrlichia* spp. is much higher for blood specimens relative to CSF specimens. Thus, testing of CSF specimens will only be performed on patients who have a positive Ehrlichia PCR on blood. Serology testing for .....**continued page 3**



Cumulative orders for Ehrlichia PCR on blood at BHJ between 2011-2013. Negative PCR results are indicated by black, while positive PCR results are indicated by white.

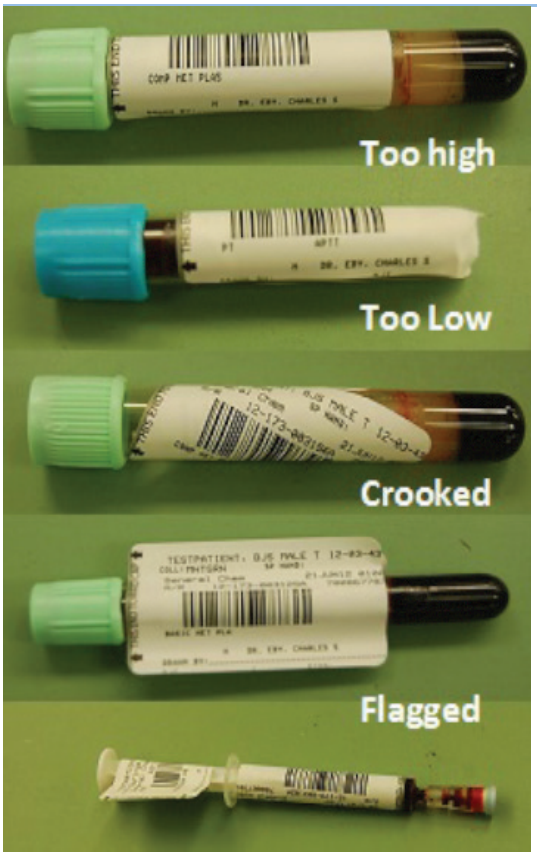
News Bite: Update on Tick-borne Disease...continued from page 2

ehrlichiosis is of limited utility given that 80% of patients are IgG negative in the acute phase of illness, and that the background seroprevalence in Missouri has been estimated to be approximately 9% (Marshall, G.S. et al. 2002. JAMA Pediatrics 156(2):166-170). See the accompanying figure for the total BJH Ehrlichia PCR assay requests from blood specimens from 2011-2013, with the positive and negative PCR results noted. All cases of Ehrlichia detected by PCR occurred in April through October.

In 2012, the CDC reported on a newly identified virus, Heartland virus, which was found in two individuals in N.W. Missouri with clinical symptoms consistent with ehrlichiosis, but a negative infectious workup (including negative testing for Ehrlichia). Subsequent studies indicated that *A. americanum* can carry Heartland virus, and additional cases have been identified in Tennessee and Oklahoma, in addition to subsequent reports in Missouri. A group of investigators at the CDC is currently recruiting patients suspected to have Heartland virus; laboratory testing will be performed on these patients by the CDC, including PCR on blood, and serology testing of acute and convalescent serum specimens. Testing for Heartland virus should be considered in patients that present with laboratory findings consistent with ehrlichiosis, but are negative for the Ehrlichia PCR assay and/or are not responding to standard treatment for ehrlichiosis. Please contact the microbiology resident on-call at: 747-1320, Option 3 for more information on this testing if needed.

If you are a physician, we are interested in how many of your medical decisions are based on laboratory testing. If you did not previously respond to this survey, please go to https://www.surveymonkey.com/s/NHPVHLD and answer two short questions. We will share our data in a future newsletter. Thank you!

Want to Improve the Turn Around Time of Tests You Order? Here's How....



Put your labels on correctly!

We estimate that 40% of the samples we receive in the laboratory come with the labels in the wrong position which requires us to remove the label and put it back on properly. This slows the time it takes us to deliver test results.

Here are some examples of good and bad labeling.

BAD

Placing too high, low, or crooked slows down the process because lables have to be removed/ repositioned to scan all barcodes.

Flagging labels slows down the process because the labels have to be removed to scan all barcodes. ..... **continued pg 4**

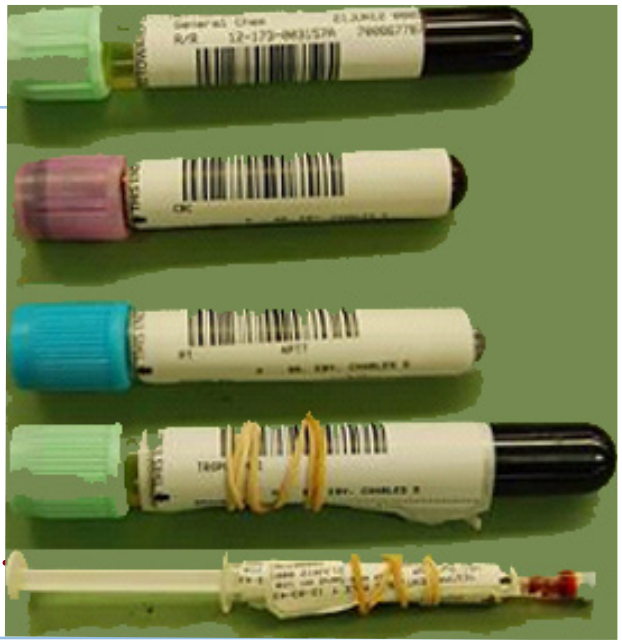
Want to Improve the Turn Around Time of Tests You Order? Here's How...continued from pg 3

GOOD

Attach barcode about 1/3 of an inch below the cap for Chemistry specimens (Green Top).

Place barcode immediately below cap for hematology specimens. (Blue & Purple Top)

Helpful Hints: Always fill blue top tubes completely.
If the patient has more than one label for the same specimen attach one directly to the tube and wrap the second label around with a rubber band.



LGM Receives Grant From CMS

Bronchiolitis obliterans syndrome (BOS), caused by chronic lung transplant allograft rejection, is associated with significant morbidity and mortality. When traditional therapy fails, extracorporeal photopheresis (ECP), an immune modulating therapy provided by the Transfusion Medicine section of the Division of Laboratory and Genomic Medicine (LGM), has been added as a rescue therapy.

A retrospective study of 60 patients within the BJH and Washington University (WU) lung transplant program revealed that use of a uniform protocol of ECP for post-transplant BOS led to a response in 80% of patients who had an average 80% reduction in the rate of decline of forced expiratory volume in one second (FEV1) when compared to pre-intervention rate of decline of FEV1 values. FEV1 values before ECP were associated with mortality and ECP had the greatest impact on those patients with more aggressive BOS disease at presentation.

Based on this study, U.S. Centers for Medicare and Medicaid Services (CMS) has approved a protocol for a prospective 15-center single-arm cohort registry as part of a CMS Evidence in Development Research Platform. One hundred sixty Medicare patients diagnosed with treatment-refractory progressive BOS are to receive a series of 24 ECP treatments. The primary endpoint of this project is to demonstrate a 50% reduction in the rate of decline of FEV1 using the patient's FEV1 rate of decline before the intervention as the baseline lung function.

CMS will reimburse providers for all ECP treatments for Medicare patients enrolled in this protocol. In addition, WU has received an unrestricted grant from a corporate sponsor to support the general oversight of the project utilizing a newly formed internal Academic Research Organization (ARO) based within WU's Mallinckrodt Institute of Radiology.

The following project leaders, their responsibilities, and their respective departmental affiliations are as follows:
George Despotis, MD (PI; Departments of Pathology & Immunology, and Anesthesiology)
Ramsey Hachem, MD (Lead Academic Investigator; Department of Medicine)
Edward Spitznagel, PhD (Project Biostatistician; Departments of Biostatistics and Mathematics)
Suresh Vedantham, MD (ARO co-director, Director of Clinical Coordinating Center; Department of Radiology)
Fred Prior, PhD (ARO co-director, Director of Data Coordinating Center; Department of Radiology).
This project is novel in that it will be a first for the CMS Evidence in Development Research Platform coupled with industry sponsored funding. In addition, it represents a new paradigm from an institutional perspective with respect to the development and utilization of an internal academic research organization along with collaboration of several departments.
within our institution.