

Member Laboratories:

Boulder Community Hospital
The Childrens Hospital
East Morgan County Hospital
Estes Park Medical Center
Longmont United Hospital
Mayo Medical Laboratories
McKee Medical Center
North Colorado Medical Center
Penrose St Francis Health System
Platte Valley Medical Center
Poudre Valley Hospital
Regional West Medical Center
Sterling Regional MedCenter
Yampa Valley Medical Center

Contact Us:

1-888-FLN-LABS
Fax (720) 876-0341
5588 South Parker Road, #188
Centennial, CO 80015

Billing Inquiries:

(866) 411-6952

*Frontline Laboratory
Network is a partnership
of local laboratories
working together to meet
the healthcare needs of
our communities.*

Newsletter for Medical Professionals

Volume 6, Issue 1

Fall 2006

The Real Advantages Of “Real-Time” Herpes Simplex Virus PCR

Herpes simplex virus is the most common cause of fatal sporadic encephalitis in the world, with an incidence of 1 and 3 per 100,000 per year. Approximately 90% of cases in adults and children outside the neonatal period are due to HSV-1; most neonatal infections are due to HSV-2. Untreated, HSV encephalitis is associated with a 70% mortality rate. Prompt recognition of positive cases and acyclovir treatment has dramatically increased survival to 20% or better and can reduce permanent brain injury. Likewise, rapid identification of HSV-negative cases with discontinuation of acyclovir and earlier discharge is cost-effective.

Diagnosis of HSV encephalitis requires carefully assessment of the constellation of clinical features, imaging studies, and laboratory data. Since clinical and radiologic findings associated with HSV can be non-specific, virus detection by the laboratory is key. In the past, brain biopsy was considered the gold standard. Detection of HSV DNA in CSF by PCR is now known to be very sensitive and specific, and has replaced biopsy as the non-invasive, reference method for making diagnostic decisions.

Since its introduction into the U.S. in 2003, “real-time” HSV PCR has supplanted earlier PCR assays. Since real-time PCR occurs in a closed tube, no post-amplification manipulations are required, greatly reducing opportunities for error. Detection occurs during the linear phase of amplification (hence the term “real-time”), so quantitative results can also be generated. Internal controls are typically included in each reaction to control for the presence of inhibitors. “Hot start” and “touch-down” pre-amplification steps can also be included to increase specificity. Some systems incorporate a melting curve or use differentially-labeled probes to identify HSV subtypes. Automated DNA extraction can be performed to minimize specimen-specimen contamination and ensure reproducibility. The real-time HSV PCR used at TCH incorporates most of these features, takes only 3.5 hours, and can detect 10 copies of HSV DNA per reaction.

Laboratories using real-time HSV PCR report that virus is detectable in CSF as early as a day after onset of clinical disease and is present on average for 4 days, although it may persist for up to 30 days even in acyclovir-treated patients. A repeat tap at or near the conclusion of IV acyclovir is recommended to document HSV DNA and CSF indices, with continued treatment recommended until PCR negativity is achieved. HSV PCR can be falsely-negative if the CSF is drawn too early in the course of disease, so a repeat tap is recommended if a strong suspicion of HSV encephalitis remains. In addition to testing CSF, HSV PCR of serum or plasma is helpful for diagnosis of neonatal HSV disease. Quantitative real-time HSV PCR of CSF and serum is being evaluated for prognostic value and to monitor response to treatment. Clearly over the past 3 years, real-time HSV PCR has become an important tool for rapid diagnosis and management of HSV encephalitis in all age groups.

Further Reading

1. Espy M. et al. 2006. Real-time PCR in clinical microbiology: Application for routine laboratory testing. Clin Micro Reviews 19:165-56.
2. Lyle P. et al. 2004. Evaluation of encephalitis in the toddler: what part of negative don't you understand? Current Opinion in Pediatrics 16:567-570.
3. Rand K. et al. 2005. Real-time polymerase chain reaction detection of herpes simplex virus in cerebrospinal fluid and cost savings from earlier hospital discharge. J Molec Diagnostics 7:511-14.
4. Whitley R. et al. 2005. Herpes simplex: Encephalitis in children and adolescents. Semin Pediatr Infect Dis 16:17-23.

Real Advantages of “Real-Time” Herpes Simplex Virus PCR cont.

“Real Time” Herpes Simplex Virus PCR is available locally at The Children’s Hospital in Denver.

Note: This article is submitted by Dr. Christine Robinson who received her Masters in Microbiology from Pennsylvania State University, a Ph.D. in Pathology from the University of Colorado Health Sciences Center, and molecular virology post-doctoral training at the University of Connecticut Health Sciences Center. She established the Virology Laboratory at The Children’s Hospital in Denver, coordinates the Microbiology and Virology Laboratory’s research, new test development, and outcomes programs, and has an abiding interest in molecular testing for infectious diseases.

Frequently Asked Questions

Q Is it safe to handle blood from a patient undergoing internal radiation therapy?

A Radiation amounts in blood vary greatly depending upon the type and dose of radiation given, time elapsed since the dose was given, decay rate of the isotope and the renal function of the patient. Generally speaking however, even at the highest doses, the amount of radiation in a blood sample is safe to handle, even for pregnant women. For safety concerns, Radiation Safety Officers can measure the amount of radiation emitted from specimens to reassure staff.

Q How does the lab determine the date of service for procedures requiring specimen collection over multiple days?

A The usual date of service is the date the specimen is collected, but when specimen collection is required over a period that spans two or more calendar days, then the date of service is defined as the date the LAST specimen was collected.

Q What is the difference between an Inpatient, Outpatient and a Non-patient?

A Hospital Inpatients are those admitted to the hospital and are discharged after two or more calendar days and are billed under Medicare Part A. Hospital Outpatients are admitted to the hospital as an outpatient and typically discharged before the end of the calendar day. A hospital Non-patient is registered as neither an inpatient or outpatient and the patient is not seen by hospital personnel. An example of a hospital non-patient is a patient who has his blood drawn at his physicians office and is then sent to the hospital for testing. Billing for hospital non-patients follows the same direct billing rules as those followed by commercial reference laboratories.

Q Can decorated phlebotomy needles really calm patients?

A Needle phobia can cause some children to become hysterical at the mere sight of a needle and can cause some adults to avoid medical care altogether. Researchers at the University of New Mexico’s Health Sciences Center believe that phlebotomy needles decorated with butterflies, flowers and smiley faces can interfere with an established link between the visual recognition of a perceived threat and the subsequent emotional response to that threat. Patients exposed to needles, syringes and IV bags decorated with musical notes, flowers and smiley faces reportedly highly favored the embellished medical devices. These decorated devices likely form a neurophysiological intervention that results in stimulation in areas of the brain that are not usually associated with fear, anxiety and aversion. Until decorated medical devices are available for mass production, a creatively placed sticker or two could help lower patient fear and anxiety.

How Safe Are Electronic Health Records?

To determine the real risk of electronic health records (EHRs) we need to first look at how safe our paper-based personal health information (PHI) is. Basically there are trade-offs. Part of the time paper-based systems can be locked in a room and we know where it’s at and who has looked at it there. People who don’t understand technology safeguards may fear all security will be lost with EHRs. When a medical record becomes electronic, it’s not locked in a room, but instead in a password-protected, encrypted network. Numerous people can view the same EHR at the same time in various locations, all controlled by regular auditing of the electronic system. What can’t be controlled however are hackers so constantly updating safety practices and procedures is a must. Is the risk worth it? Access to patient-centric personal care immediately took a front seat when Hurricane Katrina hit and clinicians needed immediate access to data. In the end it’s a matter of assessing the risk, determining that the risk is appropriate and at a level you can tolerate. Safety is a continuous improvement process that requires frequent safeguard improvements to protect PHI, both on paper or in a EHR.

Visit us at www.frontlinelabs.com

FLN is a **Preferred Provider** for the following health plans:

- Anthem (PPO, POS, Indemnity Plan)
- Great West Healthcare
- HMO Colorado
- HMS Colorado
- PacifiCare (HMO,PPO)
- United Healthcare



FLN Benefits

- Access to convenient patient service centers
- Transparent access to managed care
- True STAT testing
- Hospital trained phlebotomy experts for difficult collections
- Patient Service Centers open 24/7
- Unmatched turn around times
- Broad local testing menus
- Consolidated patient medical records regardless of site of service
- Same day testing
- Easy access to local consultation
- Friendly customer service
- After hours critical result notification
- Customized solutions based on your needs
- Specialized testing is referred to Mayo Medical Laboratories, reference laboratory for Mayo Clinic

