



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

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*Frontline Laboratory
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 our communities.*

Newsletter for Medical Professionals

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It's That Time of Year Again: West Nile Virus Returns

Infections due to West Nile Virus (WNV) began in the United States in 1999. Since then, there have been over 16,000 human infections and in excess of 660 deaths. West Nile Virus is a flavivirus in the Arbovirus group (arthropod borne viruses). Human infection results from a mosquito bite (*Aedes*, *Culex*, or *Anopheles*) of a mosquito which has previously fed on an infected bird, the primary host.

In humans, 80% of infections are asymptomatic. Twenty percent of infections are symptomatic with 19% consisting of West Nile Fever and only 1% of all infections resulting in neuroinvasive disease (meningitis, encephalitis, paralysis). During epidemics, case fatality rates have been 4-14% with deaths occurring in older and immunocompromised patients.

WNV testing consists of indirect and direct methods. The indirect methods identify the immunologic effects of WNV infection. The direct methods identify the RNA virus itself. Indirect methods include either serology for IgM and/or IgG to WNV using either ELISA or IFA or Plaque Reduction Neutralization Test (PRNT) for neutralizing antibody— a confirmatory test looking for >4-fold titer change for serum samples 2-3 weeks apart. Direct testing methods include either virus culture or NAT by RT-PCR for viral RNA.

During the seasonal summer months when WNV transmission occurs, patients presenting with symptoms of fever, chills, myalgia, headache, and rash could be considered candidates for testing. This is particularly true if they have had mosquito bites or have been in an area that is known to have mosquito-borne WNV transmission. For detecting WNV, CDC recommends serology. Testing for IGM can be done by either enzyme-linked immunosorbent assay (ELISA) or immunofluorescent assay (IFA). The performance of ELISA vs IFA for WNV-IGM detection is as follows:

Method	Sensitivity	Specificity
ELISA	89-95%	88-100%
IFA	72-96%	83-100%

The more commonly used method, ELISA, is what is performed locally by a Frontline Laboratory Network member, Penrose-St. Francis Laboratory. The Focus Technologies IgM Capture ELISA uses bound anti-human IgM to capture patient IgM. Recombinant WNV antigen and mouse monoclonal anti-flavivirus are added with horseradish peroxidase (HRP), resulting in a spectrophotometrically read optical density which is directly proportional to the amount of patient IgM to WNV.

Patient Population	Reactivity	Focus WNV ELISA	
		IgM	IgG
Meningoencephalitis (ME) Patients	WNV PRNT POS + ME symptoms	91% Sensitivity	97% Sensitivity
WNV samples for testing	Agreement with WNV PRNT positives	100% Sensitivity	36% Sensitivity
ME Patients	Agreement with CDC WNV ELISA NEG	99% Specificity	99% Specificity
Samples for non-WNV testing (e.g. HSV)	Agreement with CDC WNV ELISA NEG	99% Specificity	97% Spedificity

West Nile Virus continued...

Serum IgM is detectable 8 days after infection; IgG appears 21 days post-infection (after bite of an infected mosquito). A positive IgM antibody to WNV (reported as an IgM index value) is presumptive evidence of current or recent WNV or other flavivirus infection. In neuroinvasive WNV disease, IgM and serum and CSF are almost always detectable at the onset of symptoms. IgM persists for 1-2 months in the majority of infected people. In WNV encephalitis, IgM persists for 12 months in 36%. Therefore a positive IgM can reflect past rather than current infection.

False positive IgM serology can be produced by flaviviruses other than WNV, enterovirus infection, rheumatoid factor and a patient heterophile antibody. Serologic testing is performed on serum. Serum samples should be shipped refrigerated or frozen if transport will require more than 48 hours.

For the evaluation of possible neuroinvasive WNV, cerebrospinal fluid (CSF) can be evaluated by either indirect or direct testing methods. A nucleic acid amplification test (NAT) using reverse transcriptase polymerase chain reaction (RT-PCR) will detect WNV RNA if it is present in amounts greater than 50 copies/ml. The difficulty with direct testing is that by the time it is used in a patient's clinical course, the amount of virus present may have subsided to a level that the virus is no longer detectable. This is the reason that sensitivity of WNV NAT for confirmed neuroinvasive WNV is only 57%. In summary, a variety of tests are available for use in patients suspected of having WNV infection. For detecting WNV, serology for IgM and IgG, as recommended by CDC, are the best starting tests.

Note: This article is submitted by Dr. Tobias Kircher who is a 1976 graduate of Harvard Medical School and joined the pathology department at Penrose-St. Francis Health Services in 1983. His particular area of subspecialty interest in anatomic pathology is gastrointestinal and hepatobiliary diseases. He supervises the Microbiology section of the clinical laboratory.

Warning! Community Acquired MRSA On The Rise

Antibiotic-resistant staph infections are well known in hospital settings, but a newer, more virulent version is now frequently acquired outside hospitals in athletic and school settings. CA-MRSA (community-acquired methicillin-resistant staphylococcus aureus) infections are rising exponentially among children and high school and college athletes. The infections then spread from the athletes and children to their friends and families with whom they come into contact with something as simple as a "high five". CA-MRSA causes tiny skin irritations that look like spider or insect bites that turn into sores and abscesses or apple sized lumps that are accompanied by fever. The CDC says that CA-MRSA emerged in 1999 or 2000 but is just recently begun to spread widely. If CA-MRSA is not treated quickly, it can cause serious complications, ranging from bone disease to even death. To make matters worse, macho athletes often don't worry about skin lesions until they hurt or begin to look like a gunshot wound. CA-MRSA can be spread by turf burns or breaks in the skin which has athletic departments particularly concerned about athletes who share towels, take whirlpool baths together and may transfer the bacteria through abrasions or sores. To prevent the spread of CA-MRSA wash hands after working out in a gym or athletics and use an alcohol-based hand sanitizer regularly. All athletic equipment (including handlebars on bikes and treadmills in health clubs) should be cleaned frequently. After workouts or ball games take a shower whenever possible and do not go home with hands that might be contaminated. Thoroughly clean, disinfect and bandage all broken skin and don't share bars of soap, towels, razors or whirlpools. Complete culture, identification and sensitivity services are available through your local Frontline Laboratory Network hospital laboratory.

Managed Care Update

Great West Healthcare

Frontline Laboratory Network (FLN) is pleased to announce the addition of **Great West Healthcare** to the list of insurance plans for which FLN is a **Preferred Provider** for clinical laboratory services. This agreement includes all plans, effective August 1, 2006 for **Poudre Valley Health Systems, Estes Park Medical Center and Penrose St. Francis Health Systems**. Courier arrangements for specimens can be made directly through these FLN laboratories. For additional information on Great West Healthcare, please contact Provider Services at (888) 663-8081.

PacifiCare of Colorado

PacifiCare of Colorado has added **McKee Medical Center** as a **Preferred Provider** for clinical laboratory services through the FLN agreement for all PPO and HMO plans, including **Secure Horizons** effective June 1, 2006. McKee Medical Center joins **Boulder Community Hospital, Longmont United Hospital, Estes Park Medical Center and Poudre Valley Health Systems** as additional FLN laboratories who are Preferred Providers for PacifiCare members.

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

