Lab Dept:	**Serology**
Test Name:	**ARBOVIRUS ANTIBODY PANEL, IGG/IGM, BLOOD**

General Information

Lab Order Codes:	ARBS
Synonyms:	Encephalitis Antibody; Arbovirus Antibody; Encephalitis LaCrosse/California IgM Antibody; Encephalitis Eastern Equine IgM Antibody; Encephalitis St. Louis Equine IgM Antibody; Encephalitis Western Equine IgM Antibody, Encephalitis LaCrosse/California IgG Antibody; Encephalitis Eastern Equine IgG Antibody; Encephalitis St. Louis Equine IgG Antibody; Encephalitis Western Equine IgG Antibody
CPT Codes:	86651 x2 – Antibody; encephalitis, California 86652 x2 – Antibody; encephalitis, Eastern equine 86653 x2 – Antibody; encephalitis, St. Louis equine 86654 x2 – Antibody; encephalitis, Western equine
Test Includes:	IgM and IgG antibody determinations for 4 different encephalitis strains.

Logistics

Test Indications:	Useful for detecting antibodies to Eastern equine encephalitis virus, LaCrosse/California encephalitis virus, St. Louis equine encephalitis virus, and Western equine encephalitis, aiding a diagnosis arboviral encephalitis.
Lab Testing Sections:	Serology - Sendouts
Referred to:	Mayo Medical Laboratories (MML Test: 83267/ARBOP)
Phone Numbers:	MIN Lab: 612-813-6280 STP Lab: 651-220-6550
Test Availability:	Daily, 24 hours
Turnaround Time:	1 – 4 days, test set up Monday - Friday
Special Instructions:	N/A

Specimen

Specimen Type:	Blood

Container:	Red top tube
Draw Volume:	1.5 mL (Minimum: 0.5 mL) blood
Processed Volume:	0.5 mL (Minimum: 0.15 mL) serum
Collection:	Routine venipuncture
Special Processing:	Lab Staff: Centrifuge specimen, remove serum aliquot specimen into a screw-capped, sterile vial. Store and ship at refrigerated temperatures. Maintain sterility and forward promptly.
Patient Preparation:	None
Sample Rejection:	Specimens other than serum; gross hemolysis; mislabeled or unlabeled specimens

Interpretive

Reference Range:

IgG: <1:10

IgM: <1:10

Human infections caused by arboviruses are seasonal, from mid-summer to late summer. Typical geographic distributions are: Eastern Equine encephalitis virus from New England to Texas, California encephalitis virus in the north central states, St. Louis encephalitis virus throughout the southern, southwestern, and central states, and Western encephalitis throughout the western states.

Infections with arboviruses can occur at any age. The age distribution depends on the degree of exposure to the particular transmitting arthropod relating to age, sex, and occupational, vocational, and recreational habits of the individuals. Once humans have been infected, the severity of the host response may be influenced by age. WEE tends to produce the most severe clinical infections in young persons and SLE in older persons. Serious California (LaCrosse) virus infections primarily involve children, especially boys. Adult males exposed to California viruses have high prevalence rates of antibody but usually show no serious illness. Infection among males is primarily due to working conditions and sports activities taking place where the vector is present.

California (LaCrosse) virus: California (LaCrosse) virus is a member of bunyaviridae and is 1 of the arthropod-borne encephalitides. It is transmitted by various Aedes and Culex mosquitoes and is found in such intermediate hosts as the rabbit, squirrel, chipmunk, and field mouse. California meningoencephalitis is usually mild and occurs in late summer. Ninety percent of infections are seen in children less than 15 years of age, usually from rural areas. The incubation period is estimated to be 7 days and acute illness lasts 10 days or less in most instances. Typically, the first symptoms are nonspecific, last 1-3 days,

and are followed by the appearance of central nervous system (CNS) signs and symptoms such as stiff neck, lethargy, and seizures, which usually abate within 1 week. Symptomatic infection is almost never recognized in those over 18 years old. The most important sequelae of California virus encephalitis is epilepsy, which occurs in about 10% of children; almost always in patients who have had seizures during the acute illness. A few patients (estimated 2%) have persistent paresis. Learning disabilities or other objective cognitive deficits have been reported in a small proportion (no more than 2%) of patients. Learning performance and behavior of most recovered patients are not distinguishable from comparison groups in these same areas.

Eastern Equine Encephalitis: Eastern equine encephalitis (EEE) is within the alphavirus group. It is a low prevalence cause of human disease in the eastern and Gulf Coast states. EEE is maintained by a cycle of mosquito/wild bird transmission, peaking in the summer and early fall, when man may become an adventitious host. The most common clinically apparent manifestation is a mild undifferentiated febrile illness, usually with headache. CNS involvement is demonstrated in only a minority of infected individuals, it is more abrupt and more severe than with other arboviruses, with children being more susceptible to severe disease. Fatality rates are approximately 70%.

St. Louis Encephalitis: Areas of outbreaks of St. Louis encephalitis (SLE) since 1933 have involved the western United States, Texas, the Ohio-Mississippi Valley, and Florida. The vector of transmission is the mosquito. Peak incidence occurs in summer and early autumn**.** Disease onset is characterized by generalized malaise, fever, chills, headache, drowsiness, nausea, and sore throat or cough followed in 1-4 days by meningeal and neurologic signs. The severity of illness increases with advancing age; persons over 60 years have the highest frequency of encephalitis. Symptoms of irritability, sleeplessness, depression, memory loss, and headaches can last up to 3 years.

Western Equine Ecephalitits: The virus that causes western equine encephalitis (WEE) is widely distributed throughout the United States and Canada; disease occurs almost exclusively in the western states and Canadian provinces. The relative absence of the disease in the eastern United States probably reflects a paucity of the vector mosquito species, Culex tarsalis, and possibly a lower pathogenicity of local virus strains. The disease usually begins suddenly with malaise, fever, and headache, often with nausea and vomiting. Vertigo, photophobia, sore throat, respiratory symptoms, abdominal pain, and myalgia are also common. Over a few days, the headache intensifies; drowsiness and restlessness may merge into a coma in severe cases. In infants and children, the onset may be more abrupt than for adults. WEE should be suspected in any case of febrile CNS disease from an endemic area. Infants are highly susceptible to CNS disease and about 20% of cases are under 1 year of age. There is an excess of males with WEE clinical encephalitis, averaging about twice the number of infections detected in females. After recovery from the acute disease, patients may require from several months to 2 years to overcome the fatigue, headache, and irritability. Infants and children are at higher risk of permanent brain damage after recovery than adults.

Critical Values:	N/A
Limitations:	All results must be correlated with clinical history and other data available to the attending physician. Specimens drawn within the first 2 weeks after onset are variably negative for IgG antibody and should not be used to exclude the diagnosis of arboviral disease. If arboviral infection is suspected, a second specimen should be obtained and tested 10-21 days later. Since cross-reactivity with dengue fever virus does occur with St. Louis encephalitis antigens, and, therefore, cannot be differentiated further. The specific virus responsible for such a titer may be deduced by the travel history of the patient, along with available medical and epidemiological data, unless the virus can be isolated. Eastern equine encephalitis and Western equine encephalitis viruses show some cross-reactivity; however, antibody response to the infecting virus is typically at least 8-fold higher.
Methodology:	Immunofluorescence Assay (IFA)
References:	Mayo Medical Laboratories July 2013
Updates:	4/6/2004: Test moved from Minnesota Department of Health to Mayo Medical Laboratories forward to Focus Technologies. Note: Test expanded to test for both IgG and IgM antibodies. 11/23/2004: Test moved from MML forward to Focus Technologies to being performed internally at MML. Note changes in reference ranges previously listed as IgG: <1:16, IgM: <1:20, draw volume previously listed at 3.0 mL blood and turnaround time previously listed as 1-5 days.