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Arboviral Diseases, Neuroinvasive and Non-neuroinvasive  
2004 Case Definition  
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2004 Case Definition  
NOTE:  
A surveillance case definition is a set of uniform criteria used to define a disease for public health surveillance. Surveillance case definitions enable public health officials to classify and count cases consistently across reporting jurisdictions. Surveillance case definitions are not intended to be used by healthcare providers for making a clinical diagnosis or determining how to meet an individual patient’s health needs.  
CSTE Position Statement(s)  
04-ID-01  
09-ID-23  
09-ID-24  
09-ID-25  
09-ID-26  
09-ID-27  
09-ID-28  
Subtype(s)  
California serogroup virus diseases  
Chikungunya virus disease  
Eastern equine encephalitis virus disease  
Powassan virus disease  
St. Louis encephalitis virus disease  
West Nile virus disease  
Western equine encephalitis virus disease  
Clinical Description  
Arboviral infections may be asymptomatic or may result in febrile illnesses of variable severity sometimes associated with central nervous system (CNS) involvement. When the CNS is affected, clinical syndromes include aseptic meningitis, myelitis and encephalitis, which are clinically indistinguishable from similar syndromes caused by other viruses. Arboviral meningitis is usually characterized by fever, headache, stiff neck, and pleocytosis in cerebrospinal fluid. Arboviral myelitis is usually characterized by fever and acute bulbar or limb paresis or flaccid paralysis. Arboviral encephalitis is usually characterized by fever, headache, and altered mental status ranging from confusion to coma with or without additional signs of brain dysfunction. Less common neurological syndromes can include cranial and peripheral neuritis or other neuropathies, including Guillain-Barré syndrome.  
Non-neuroinvasive syndromes caused by these usually neurotropic arboviruses can rarely include myocarditis, pancreatitis, or hepatitis. In addition, they may cause febrile illnesses (e.g., West Nile fever [WNF]) that are non-localized, self-limited illnesses with headache, myalgias, arthralgias, and sometimes accompanied by skin rash or lymphadenopathy. Laboratory-confirmed arboviral illnesses lacking documented fever can occur, and overlap among the various clinical syndromes is common.  
Clinical Criteria  
Cases of arboviral disease are classified either as neuroinvasive or non-neuroinvasive, according to the following criteria:  
Neuroinvasive disease requires the presence of fever and at least one of the following, as documented by a physician and in the absence of a more likely clinical explanation:  
Acutely altered mental status (e.g., disorientation, obtundation, stupor, or coma),  
OR  
Other acute signs of central or peripheral neurologic dysfunction (e.g., paresis or paralysis, nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions, or abnormal movements),  
OR  
Pleocytosis (increased white blood cell concentration in cerebrospinal fluid [CSF]) associated with illness clinically compatible with meningitis (e.g., headache or stiff neck).  
Non-neuroinvasive disease requires, at minimum, the presence of documented fever, as measured by the patient or clinician, the absence of neuroinvasive disease (above), and the absence of a more likely clinical explanation for the illness. Involvement of non-neurological organs (e.g., heart, pancreas, liver) should be documented using standard clinical and laboratory criteria.  
Laboratory Criteria For Diagnosis  
Four-fold or greater virus-specific serum antibody titer,  
OR  
Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, cerebrospinal fluid (CSF), or other body fluid,  
OR  
Elevated virus-specific immunoglobulin (IgG) antibodies in the acute or convalescent serum specimen as measured by VN or HI, or IgG enzyme immunoassay (EIA),  
OR  
Virus-specific immunoglobulin M (IgM) antibodies demonstrated in serum by IgM antibody-capture enzyme immunoassay (EIA)  
Case Classification  
Probable  
Stable (less than or equal to a two-fold change) but elevated titer of virus-specific serum antibodies,  
OR  
Virus-specific serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or a later specimen  
Confirmed  
Four-fold or greater change in virus-specific serum antibody titer,  
OR  
Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, CSF, or other body fluid,  
OR  
Virus-specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody capture enzyme immunoassay (EIA),  
OR  
Virus-specific IgM antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or a later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition)  
Case Classification Comments  
A case must meet one or more of the above clinical criteria and one or more of the above laboratory criteria.  
Comments  
Serologic tests using antigens from a single arbovirus can be misleading. In some circumstances (e.g., in areas where two or more closely related arboviruses occur, or in imported Arboviral disease cases), it may be epidemiologically important to attempt to pinpoint the infecting virus by conducting cross-neutralization tests using an appropriate battery of closely related viruses. This is essential, for example, in determining that antibodies detected against St. Louis encephalitis virus are not the result of an infection with West Nile (or dengue) virus, or vice versa, in areas where both of these viruses occur. Because dengue fever and West Nile fever can be clinically indistinguishable, the importance of a recent travel history and appropriate serologic testing cannot be overemphasized. In some persons, West Nile virus-specific serum IgM antibody can wane slowly and be detectable for more than one year following infection. Therefore, in areas where West Nile virus has circulated in the recent past, the co-existence of West Nile virus-specific IgM antibody and illness in a given case may be coincidental and unrelated. In those areas, the testing of serially collected serum specimens assumes added importance.  
The seasonality of arboviral transmission is variable and depends on the geographic location of exposure, the specific cycles of viral transmission, and local climatic conditions. Reporting should be etiology-specific (see below; these six diseases are nationally notifiable to CDC):  
California serogroup virus disease (includes infections with the following viruses: California encephalitis, Jamestown Canyon, Keystone, La Crosse, Snowshoe hare, and Trivittatus)  
Eastern equine encephalitis virus disease  
St. Louis encephalitis virus disease  
Powassan virus disease  
West Nile virus disease  
Western equine encephalitis virus disease  
Due to the continued risk of unintentional or intentional introduction of exotic arboviruses into the United States (e.g., Venezuelan equine encephalitis virus), or the reemergence of indigenous epidemic arboviruses (e.g., St. Louis encephalitis and Western equine encephalitis viruses), physicians and local public health officials should maintain a high index of clinical suspicion for cases of potential exotic or unusual arboviral etiology, and consider early consultation with arboviral disease experts at state health departments and CDC.  
The 2004 case definition appearing on this page was re-published in the 2009 CSTE position statements: 09-ID-23, 09-ID-24, 09-ID-25, 09-ID-26, 09-ID-27, and 09-ID-28. Thus, the 2004 and 2010 versions of the case definition are identical.  
Related Case Definition(s)  
Arboviral Diseases, Neuroinvasive and Non-neuroinvasive | 2015 Case Definition  
Arboviral Diseases, Neuroinvasive and Non-neuroinvasive | 2014 Case Definition  
Arboviral Diseases, Neuroinvasive and Non-neuroinvasive | 2011 Case Definition  
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