Acute Encephalitis Syndrome AES Surveillance

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Japanese encephalitis

- JE is a mosquito borne viral encephalitis that occurs in temperate and tropical regions of Asia.
- Causal agent: Japanese encephalitis virus
- Arbovirus
  - Family Flaviviridae
  - Genus Flavivirus

  (JE, Dengue, West Nile, Yellow Fever)

- Leading cause of viral encephalitis in Asia.
- 30,000-50,000 cases reported annually to WHO esp. in children.
- High case fatality 20-30%
- 10,000-15,000 deaths estimated per year, thus JE is a major public health problem
- 50-70% of the survivors have significant neurologic sequelae
- Officially reported cases of JE greatly under-represented the true impact – incomplete surveillance in many affected areas
- Among control strategies- human vaccination- single most effective control measure

Geographic range of Japanese encephalitis

- MoT- through the bite of mosquito- *Culex tritaeniorhynchus*

- Maintained in a cycle of virus transmission between vertebrate amplifying hosts (e.g. pigs, heron, egrets) and several *Culex* mosquito species.

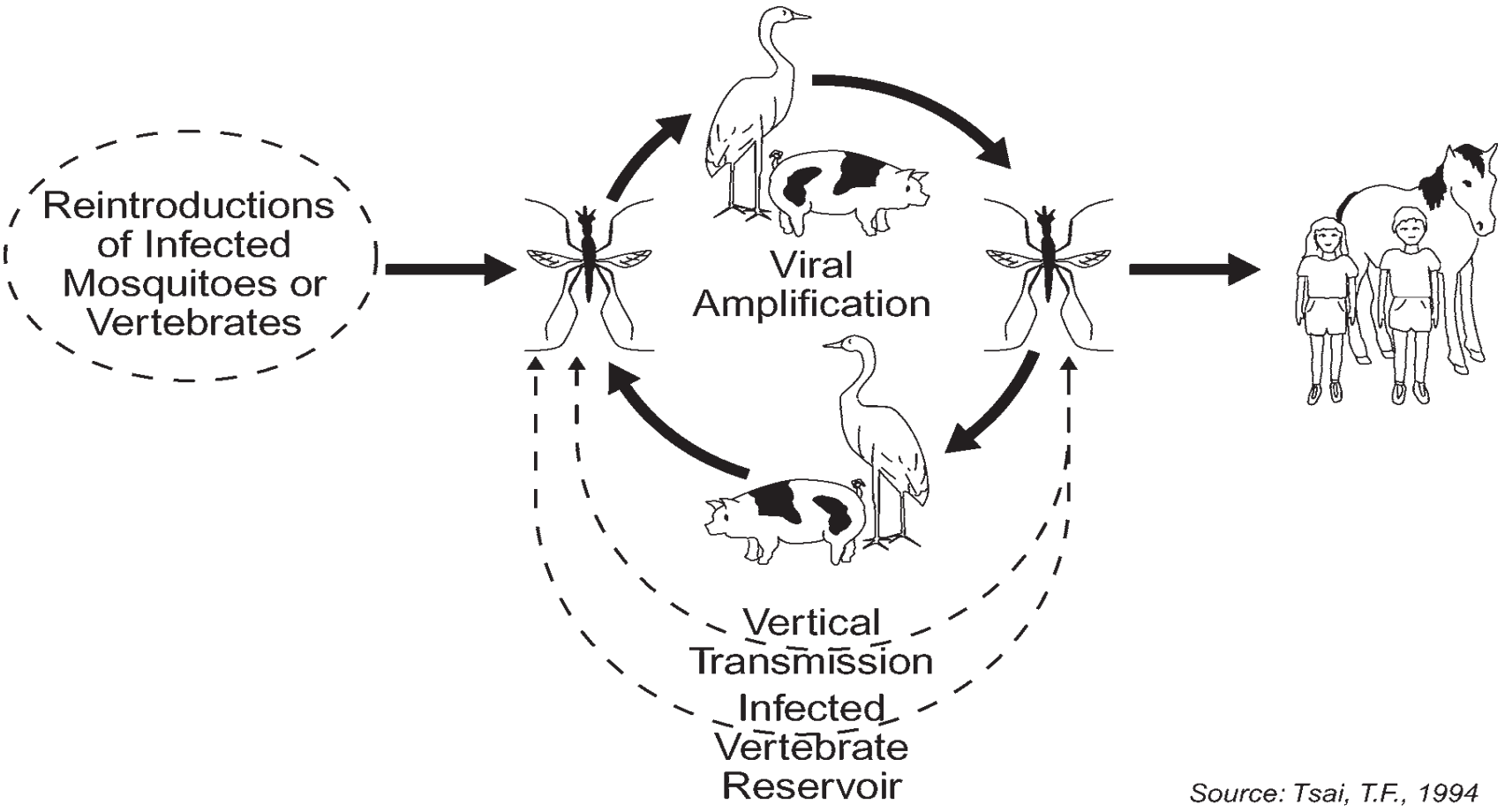
- Transmission to humans occurs in rural settings- agricultural practice where vectors can breed or infection to vertebrate hosts.

- Urban settings- potential for outbreak is low

Culex tritaeniorhynchus

- Principal vector for JE transmission
- Zoophilic
- Outdoor feeder after sunset
- Most abundant in summer
- During epidemics, up to 3% of mosquitoes infected with JEV

JE virus transmission cycle



Halstead. In: Vaccines (Eds. Plotkin et al.) 2004:919.

JE is primarily a rural disease

- Human JE infections occur primarily in rural areas
- Mosquitoes breed in rice fields often in close proximity to livestock
- These conditions also exist within or at the periphery of many Asian cities

Recommended types of Surveillance for JE

- JE surveillance should be conducted year-round
  - within the context of integrated disease surveillance
  - linked synergistically with similar surveillance activities such as those for acute flaccid paralysis (AFP) or meningitis.

***In all countries (at risk of JE)*:**

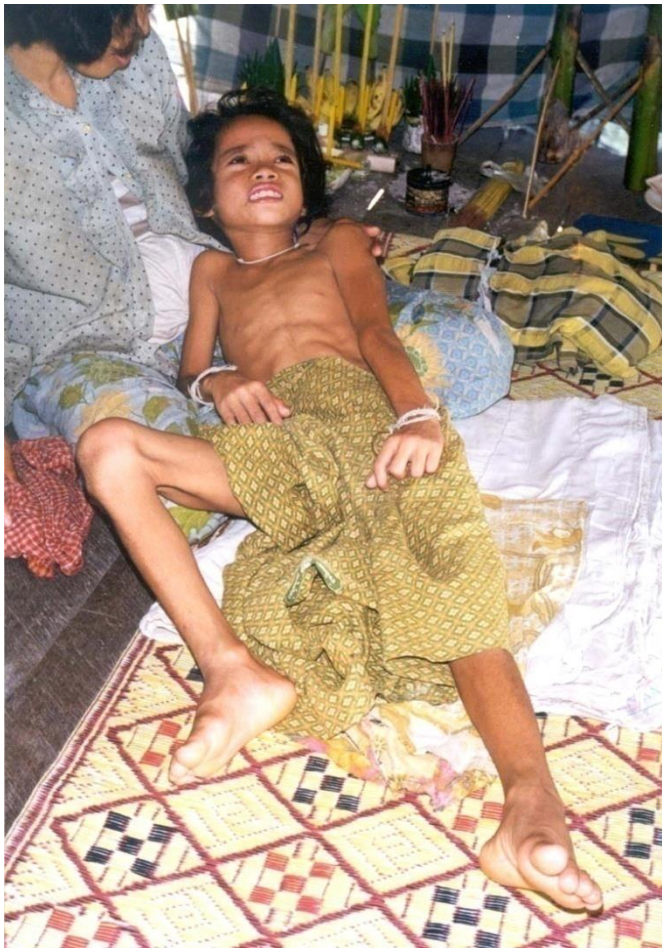
- Comprehensive syndromic surveillance for acute encephalitis syndrome (AES) with aggregate reporting
- In sentinel hospitals, surveillance should be case-based with specimens collected for laboratory confirmation.

In at risk countries where a high level of JE control has been achieved:

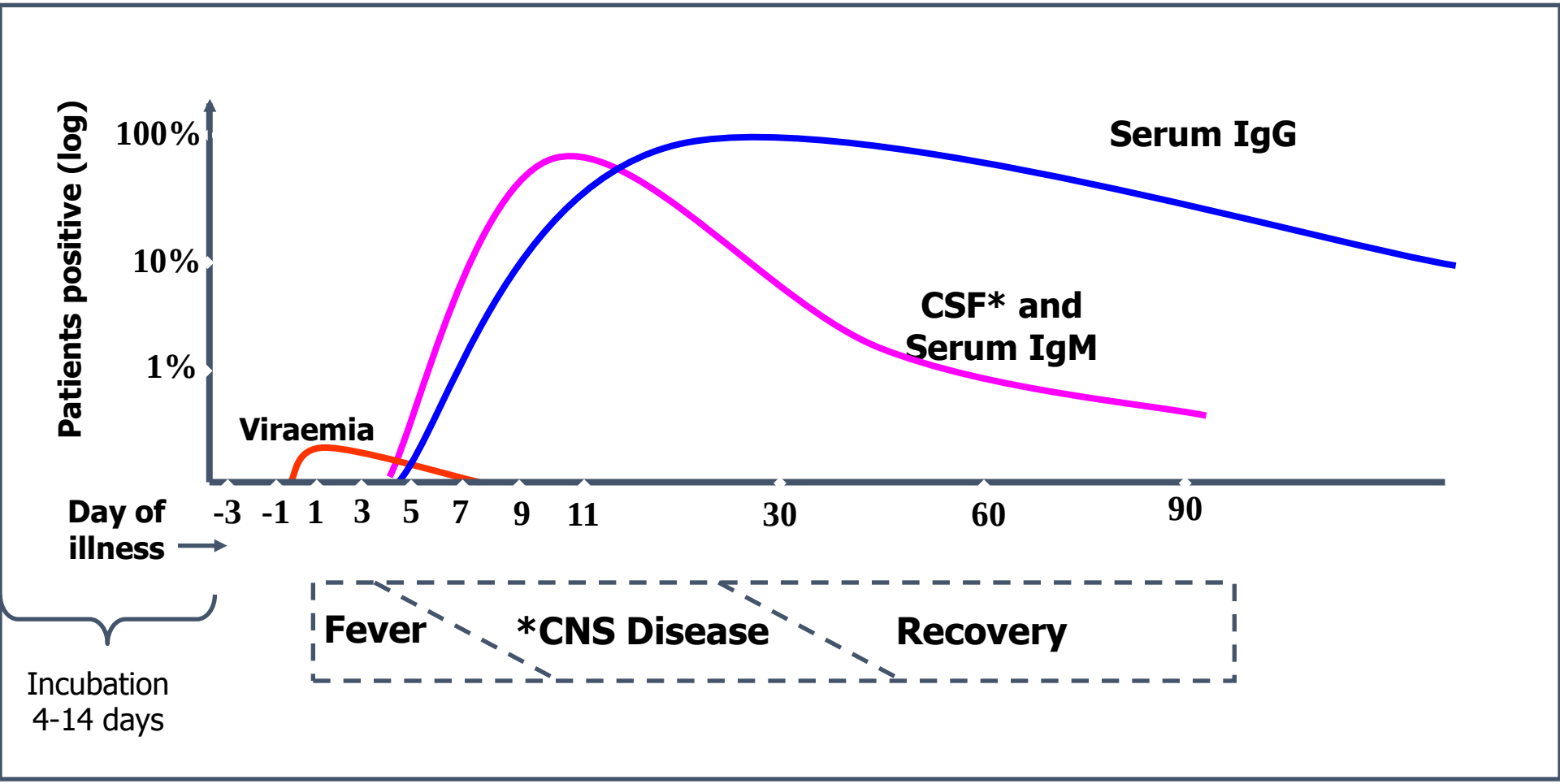
- Surveillance should be case-based throughout the country and include laboratory confirmation of all suspect cases

JE infection

- Asymptomatic
- Febrile illness
- Meningitis
- Myelitis
- Encephalitis- most common , indistinguishable from other AES



JE virus infection



After: Solomon et al BMJ 2003 326;865-9

WHO recommended case definition for suspect Acute Encephalitis Syndrome

Clinical case definition

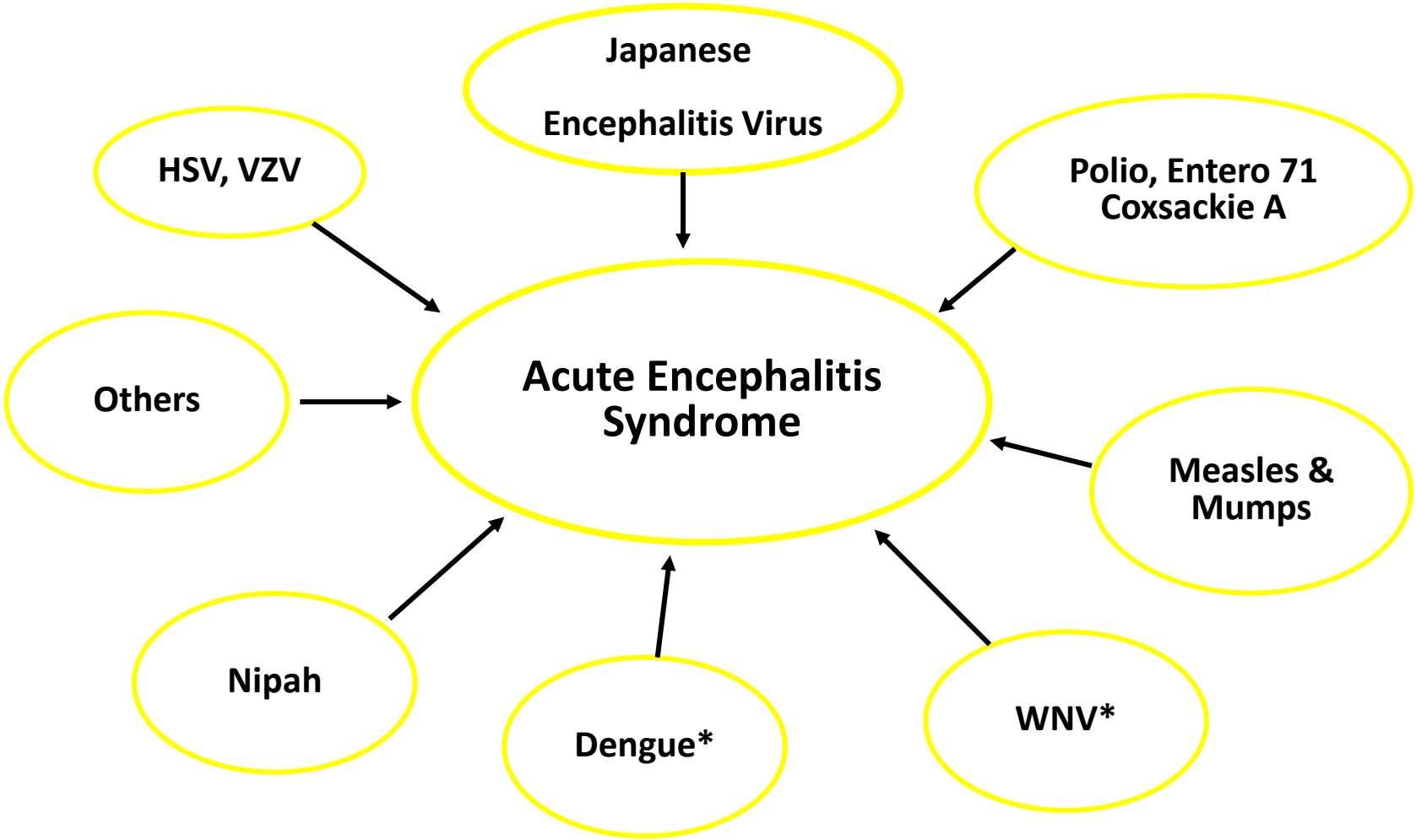
- Clinically, a case of acute encephalitis syndrome is defined as a person of any age, at any time of year with the acute onset of fever and a change in mental status (including symptoms such as confusion, disorientation, coma, or inability to talk) AND/OR new onset of seizures (excluding simple febrile seizures*). Other early clinical findings may include an increase in irritability, somnolence or abnormal behaviour greater than that seen with usual febrile illness.

* A simple febrile seizure is defined as a seizure that occurs in a child aged 6 months to less than 6 years old, whose only finding is fever and single generalized convulsion lasting less than 15 minutes, and who recovers consciousness within 60 minutes of the seizure.

AES

- Any time of the year
- Any age
- Any sex
- Acute onset
- Fever and change in mental status (confusion, disorientation, coma, inability to talk) AND/OR new onset of seizures
- Early clinical findings-increase irritability, somnolence or abnormal behavior more than usual febrile illness.

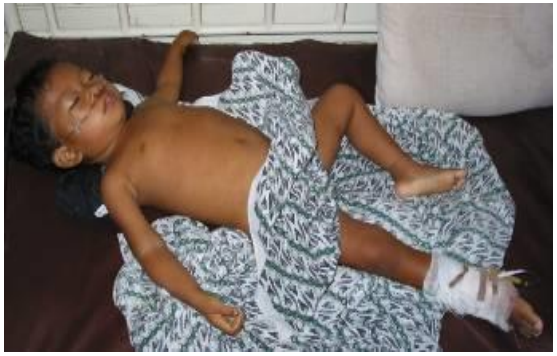
Multiple causal agents of AES



* Flaviviruses with antigenic cross reactivity with JE

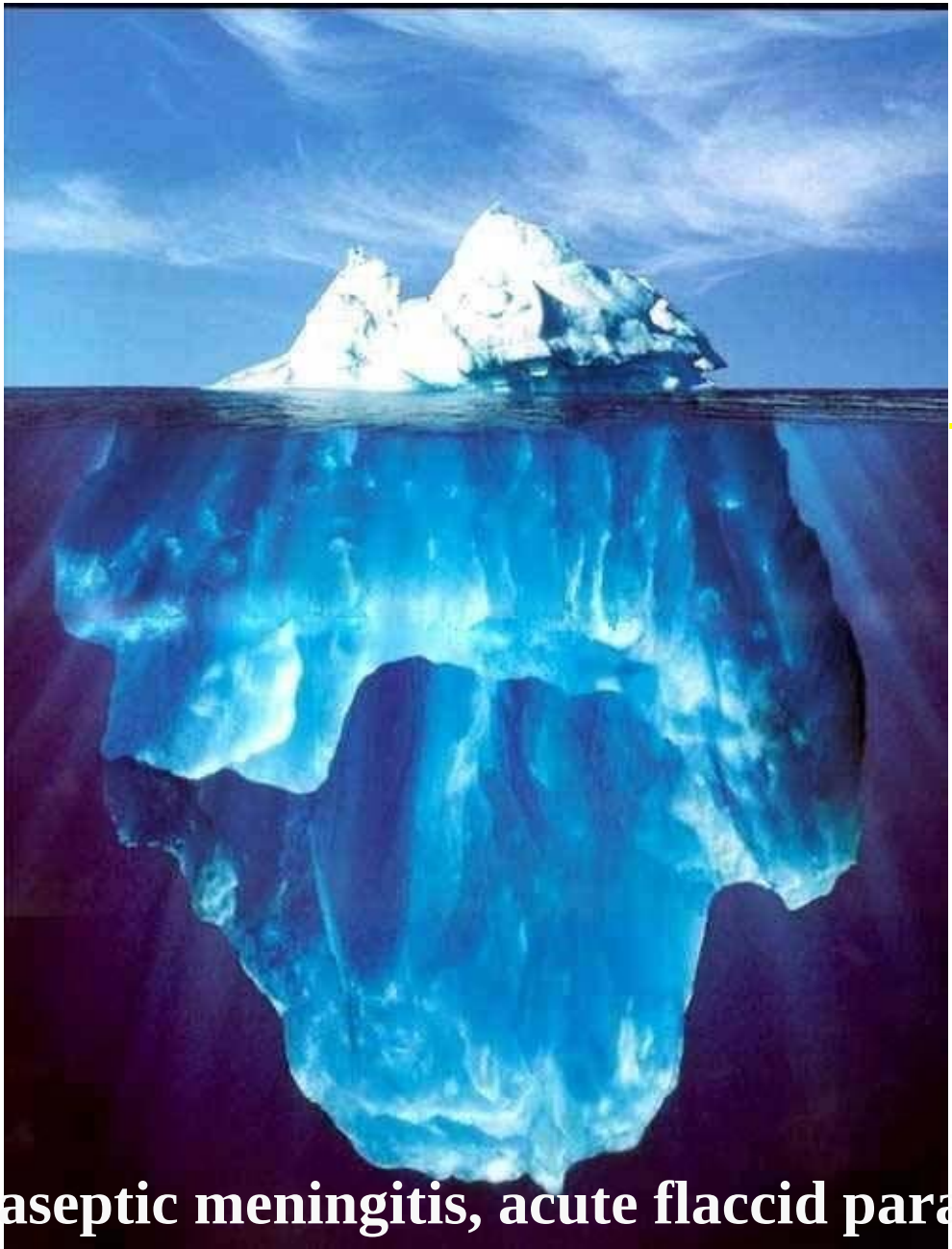
Clinical spectrum of JE virus infections

Neuroinvasive*



<1%

Asymptomatic infection or nonspecific febrile illness



99%

*Acute encephalitis, aseptic meningitis, acute flaccid paralysis

Specimens

- Serum for JE IgM detection and/or
- CSF for JE IgM detection

Specimen Collection

Serum

- A serum sample should be obtained at admission. Because it may not be positive in a JE-infected person, a second serum sample should be collected at discharge or on the 10th day of illness onset or at the time of death.

- Collect 5ml of blood in a sterile plain tube
- Label the tube with the patient's name, age, sex, outbreak ID number, specimen number, date of collection and specimen type.
- **If sample tubes are without label, we cannot do the testing.**
- Transport the whole blood specimen to NHL if it can reach within 24 hours.
- If it cannot reach NHL within 24 hours, do separation of serum

- Separate serum after clotting, and transfer into a new sterile bottle or microvial and send to NHL.
- To prevent insufficiency, collect 5 ml of blood or 2 ml of serum in a sterile bottle
- For outbreak, 5 cases enough.
- Before transport, in the hospital laboratory, they should be kept at 4-8°C.
- The specimens should be sent to NHL in cold box with laboratory request form.
- The serum/ blood samples should not be haemolysed samples (Prevent hemolysis of samples – narrow needle, rapid suction, rapid pushing blood out of syringe, wet container should not be used)

CSF

- The collection of CSF is an invasive technique that should only be performed by experienced personnel using appropriate equipment under aseptic conditions.

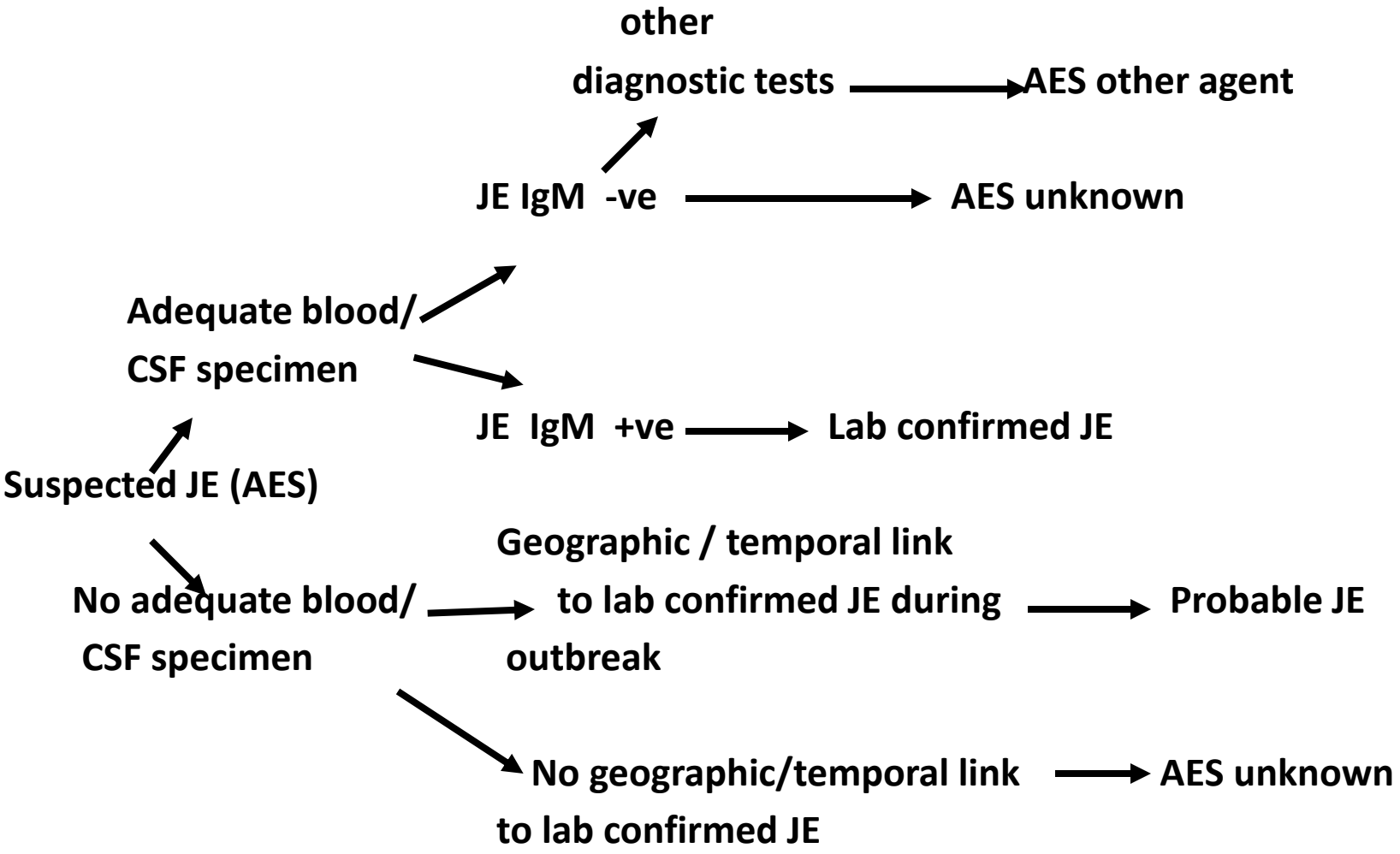
- The CSF can be aseptically divided into separate aliquots for examination for cells, biochemistry, microbiology and virology.

- For virological investigations, collect a minimum of 0.5ml of CSF in a dry, sterile, screw cap container.

- Before transport, in the hospital laboratory, they should be kept at 4-8°C.

- The specimens should be sent to NHL in cold box with laboratory request form.

Final classification scheme for AES cases



Case Classification

Suspected case: A case that meets the clinical definition for AES.

Suspected cases should be classified in one of the following four ways.

- Laboratory confirmed JE
- Probable JE
- AES –other agent
- AES-unknown

- **Laboratory confirmed JE**: A suspected case that has been lab confirmed as JE

- **Probable JE**: A suspected case that occurs in close geographic and temporal relationship to a laboratory confirmed JE, in context of an outbreak.

- **AES –other agent:** A suspected case in which diagnostic testing is performed and an etiologic agent other than JE virus is identified.

- **AES-unknown:** A suspected case in which no diagnostic testing is performed or in which testing was performed but no etiologic agent was identified or in which the test results were indeterminate.

Laboratory criteria for confirmation

Clinical signs of JE are indistinguishable from other causes of AES, lab confirmation is therefore essential for accurate diagnosis of JE.

1. Presence of JE virus specific IgM antibody in a single sample of CSF or serum detected by IgM capture ELISA
2. Detection of JE virus antigens in tissue by immunohistochemistry OR
3. Detection of JE virus genome in serum, plasma, blood, CSF or tissue by RT-PCR, OR
4. Isolation of JE virus in serum, plasma, blood, CSF or Tissue, OR
5. Detection of 4-fold rise in JE virus specific antibody by HI or PRNT – acute and convalescent (14 days apart)

Note:

- Majority of JE- asymptomatic. In areas that are highly endemic for JE, AES, due to other cause may show JE IgM present in serum. Thus for confirmation testing of CSF sample for all persons with AES recommended when feasible.
- Only the first 5-10 JE cases of an outbreak need be confirmed through lab testing.
- During periods of epidemic transmission of JE virus, lab confirmation of every case may not be necessary.

Data information required

- EPID No. - AES-MMR-01-01-16-001
- Name, Age , Sex
- State/Division/Township
- Source of specimen- hospital, clinic, active surveillance, outbreak, others (specify)
- Date of birth
- Date of onset of symptoms
- Clinical S/S
- H/o JE vaccination, date of last JE vaccination
- Sample type
- Date of collection
- Date of shipment
- Sample condition – good, hemolysed, turbid, Inadequate, poor

  good – not lysed, not leaking, ice maintained, adequate qty, documentation complete


Thank you for your kind attention