



Search [Home](#) | [Specialties](#) | [Resource Centers](#) | [Learning Centers](#) | [CME](#) | [Contributor Recruitment](#)



[Privacy Policy Changes](#)

December 6, 2006

[Articles](#) [Images](#) [CME](#) [Advanced Search](#) [Consumer Health](#) [Link to this site](#)

You are in: [eMedicine Specialties](#) > [Medicine, Ob/Gyn, Psychiatry, and Surgery](#) > [Infectious Diseases](#)

Japanese Encephalitis

Last Updated: June 16, 2005

Synonyms and related keywords: Japanese encephalitis virus, JEV, Japanese B encephalitis, summer encephalitis, culicine mosquitoes, *Culex tritaeniorhynchus*, *C tritaeniorhynchus*, viral encephalitis, flavivirus, *Culex* mosquitoes

Rate this Article
Email to a Colleague
Get CME/CE for article

AUTHOR INFORMATION	Section 1 of 10 Next >
Author Information Introduction Clinical Differentials Workup Treatment Medication Follow-up Miscellaneous Bibliography	

Author: **Alexander J Kallen, MD**, Instructor of Medicine, Department of Internal Medicine, Division of Outcomes Research, VA White River Junction, VT; Dartmouth Medical School
 Alexander J Kallen, MD, is a member of the following medical societies: [American College of Physicians](#), [American Medical Association](#), [American Society for Microbiology](#), [California Medical Association](#), and [Infectious Diseases Society of America](#)

Editor(s): **Klaus-Dieter Lessnau, MD, FCCP**, Clinical Assistant Professor of Medicine, New York University School of Medicine; Medical Director, Pulmonary Physiology Laboratory, Department of Medicine, Section of Pulmonary Medicine, Lenox Hill Hospital; **Francisco Talavera, PharmD, PhD**, Senior Pharmacy Editor, eMedicine; **Michael Stuart Bronze, MD**, Chairman, Professor, Department of Medicine, University of Oklahoma Health Science Center; **Eleftherios Mylonakis, MD, PhD**, Assistant Professor of Medicine, Harvard Medical School, Clinical Assistant in Medicine, Division of Infectious Disease, Massachusetts General Hospital; and **Burke A Cunha, MD, MACP**, Professor of Medicine, State University of New York at Stony Brook School of Medicine; Chief, Infectious Disease Division, Winthrop-University Hospital

[Disclosure](#)

A comprehensive resource on allergies & asthma. Online.

[FIND OUT MORE](#)

(Advertisement)

INTRODUCTION	Section 2 of 10 Back Top Next >
Author Information Introduction Clinical Differentials Workup Treatment Medication Follow-up Miscellaneous Bibliography	

Background: Japanese encephalitis virus (JEV) is a flaviviral (single-stranded RNA) neurologic infection closely related to St. Louis encephalitis and West Nile virus. The disease is spread throughout mostly rural areas of Asia by culicine mosquitoes, most often *Culex tritaeniorhynchus*. It is the most common form of viral encephalitis in Asia. Approximately 3 billion people currently live in areas endemic for Japanese encephalitis; these areas extend from Pakistan to maritime Siberia and Japan.

Quick Find

[Author Information](#)
[Introduction](#)
[Clinical](#)
[Differentials](#)
[Workup](#)
[Treatment](#)
[Medication](#)
[Follow-up](#)
[Miscellaneous](#)
[Bibliography](#)

[Click for related images.](#)

Related Articles

[California Encephalitis](#)
[Dengue Fever](#)
[Eastern Equine Encephalitis](#)
[Enteroviruses](#)
[Herpes Simplex](#)
[Malaria](#)
[Meningitis](#)
[St. Louis Encephalitis](#)
[Tuberculosis](#)
[Typhoid Fever](#)
[West Nile Encephalitis](#)

Continuing Education

CME available for this topic. Click [here](#) to take this CME.

Patient Education

[Brain and Nervous System Center](#)
[Encephalitis Overview](#)
[Encephalitis Causes](#)
[Encephalitis Symptoms](#)

[Encephalitis Treatment](#)

Pathophysiology: Japanese encephalitis is transmitted to humans via the bite of infected mosquitoes. The virus initially propagates at the site of the bite and in regional lymph nodes. Subsequently, viremia develops, leading to inflammatory changes in the heart, lungs, liver, and reticuloendothelial system. Most infections are cleared before the virus can invade the central nervous system (CNS), leading to subclinical disease. However, neurologic invasion can develop, possibly by growth of the virus across vascular endothelial cells, leading to involvement of large areas of the brain, including the thalamus, basal ganglia, brain stem, cerebellum, hippocampus, and cerebral cortex.

Frequency:

- **In the US:** Japanese encephalitis mostly occurs among military personnel, expatriates, and, rarely, in returning travelers. From 1978-1993, 12 cases occurred in the United States. The risk of symptomatic infection among travelers is estimated to be 1 case per 150,000 person-months in an endemic area. Outbreaks are rare in the US territories of Guam and Saipan.
- **Internationally:** Japanese encephalitis is a seasonal disease, with most cases occurring in temperate areas from June to September. Further south in subtropical areas, transmission begins as early as March and extends until October. Transmission may occur all year in some tropical areas (eg, Indonesia). Worldwide, approximately 35,000-50,000 symptomatic cases develop per year. Local incidence rates range from 1-10 cases per 100,000 persons but can reach more than 100 cases per 100,000 persons during outbreaks.

Mortality/Morbidity: Only 1 per 250 infections results in symptomatic disease. Mortality rates in places with intensive care capabilities are 5-10%. In less developed areas, mortality rates may exceed 35%. Worldwide, more than 10,000 reported deaths occur per year.

Approximately 33-50% of patients with symptomatic disease who survive have major neurologic sequelae at 1 year, including seizure disorders, motor or cranial nerve paresis, or movement disorders.

- Nearly 75% of symptomatic patients with JEV who are evaluated 5 years after the disease score lower than uninfected subjects on standardized tests.
- Previous dengue infection may be associated with decreased morbidity and mortality rates, possibly due to partial protection of cross-reacting antinflavivirus antibodies.
- Proven risk factors for death include demonstration of virus in the cerebral spinal fluid (CSF), low levels of immunoglobulin G (IgG)/immunoglobulin M (IgM) in CSF or serum, and a decreased sensorium.

Sex: The male-to-female ratio is 1.5:1 for symptomatic disease.

Age: Serologic evidence of infection in endemic rural areas is found in nearly all inhabitants by early adulthood. Most symptomatic infections in endemic areas occur in young children (aged 2-10 y) and elderly people. In infections in nonendemic areas, disease occurs in all age groups.

CLINICAL

Section 3 of 10 [\[Back Top Next\]](#)

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#)
[Miscellaneous](#) [Bibliography](#)

History:

- Patients have a history of mosquito exposure in an endemic area. The incubation period ranges from 4-14 days, which is followed by a prodrome of fever, headache, nausea, diarrhea, vomiting, and myalgia, which may last for several days.
- Altered mental status follows, which can range from mild confusion, to agitation, to overt coma. Seizures develop in 66% of people, most often in children, while headache and meningismus are more common in adults.
- Tremor or other involuntary movements are common, and mutism has been reported as a



(Advertisement)

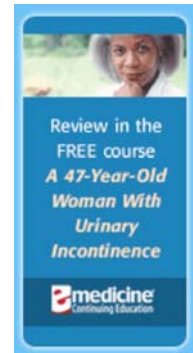
presenting symptom. A syndrome of acute flaccid paralysis has also been described. Fevers disappear by the second week, and choreoathetosis or extrapyramidal symptoms develop as the other neurologic symptoms disappear.

Physical:

- Neurologic signs are varied.
- Generalized weakness, hypertonia, and hyperreflexia (including presence of pathologic reflexes) are common.
- Papilledema develops in less than 10% of patients, and 33% have cranial nerve findings (eg, disconjugate gaze, cranial nerve palsies).
- Extrapyramidal signs frequently are observed, including masklike facies, tremor, rigidity, and choreoathetoid movements.
- In one study, central hyperpneic breathing and extrapyramidal signs were the best clinical predictors (41% sensitive, 81% specific) (Richman, 1997).

Causes:

- *Culex* mosquitoes, especially *C tritaeniorhynchus*, transmit Japanese encephalitis. They prefer to bite outdoors and are extremely active in the evening and night, the time for the greatest risk for infection.
- Mosquitoes breed in collections of water (eg, rice paddies), making the risk of infection higher in rural areas.
- Humans and other mammals (eg, horses) are dead-end hosts (low-grade, short-term viremia).
- Pigs and aquatic birds (eg, egrets, herons) serve as amplifying hosts because they have persistent high-grade viremia.
- Countries with epidemic or endemic JEV include the following:
 - Malaysia
 - Myanmar
 - Singapore
 - Philippines
 - Indonesia
 - China
 - Taiwan
 - Russia (maritime Siberia)
 - Bangladesh
 - Laos
 - Kampuchea
 - Thailand
 - Vietnam
 - India
 - Nepal (especially the Terai region)
 - Sri Lanka



- Korea
- Japan
- Two outbreaks occurred in Australia, the first in 1995 on islands in the Torres Strait and the second in 1998 on the Cape York Peninsula.

DIFFERENTIALS**Section 4 of 10** [[Back](#) [Top](#) [Next](#)]

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#)
[Miscellaneous](#) [Bibliography](#)

[California Encephalitis](#)
[Dengue Fever](#)
[Eastern Equine Encephalitis](#)
[Enteroviruses](#)
[Herpes Simplex](#)
[Malaria](#)
[Meningitis](#)
[St. Louis Encephalitis](#)
[Tuberculosis](#)
[Typhoid Fever](#)
[West Nile Encephalitis](#)

Other Problems to be Considered:

Nipah virus
Murray Valley encephalitis

WORKUP**Section 5 of 10** [[Back](#) [Top](#) [Next](#)]

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#) [Miscellaneous](#)
[Bibliography](#)

Lab Studies:

- Complete blood cell count
 - A CBC count often shows a nonspecific, modest leukocytosis in the first week of illness. A mild anemia also may be present.
 - Serum sodium may be depressed because of inappropriate antidiuretic hormone secretion.

Imaging Studies:

- Findings on imaging studies may further support the diagnosis.
- MRI and a CT scan often show bilateral thalamic lesions with hemorrhage. The basal ganglia, putamen, pons, spinal cord, and cerebellum also may show abnormalities.

Other Tests:

- EEG often reveals diffuse continuous delta slowing or diffuse delta pattern with spikes.
- A correlation does not exist between EEG changes and the severity of Japanese encephalitis or its outcome.

Procedures:

- Lumbar puncture
 - A lumbar puncture often is performed to rule out other causes of encephalitis.
 - The opening pressure usually is normal.

- CSF protein is mildly elevated in most cases. Between 10 and several hundred mononuclear white blood cells may be observed on cell count.
- Virus can be isolated from the blood during the first week of illness. The CSF rarely will yield virus, except in severe or fatal cases.
- IgM capture enzyme-linked immunoassay (ELISA) of serum or CSF is the standard diagnostic test for Japanese encephalitis. Sensitivity is nearly 100% when both serum and CSF are tested. False-negative results may occur if the samples are tested too early (eg, within first wk of illness).
- Some cross-reactivity may arise from other flaviviruses (eg, dengue and West Nile virus) and from Japanese encephalitis and yellow fever vaccinations.
- New IgM dot enzyme immunoassays for CSF and serum are portable, simple tests that compare favorably to the capture ELISA for field diagnosis (sensitivity 98.3%, specificity 99.2% when compared to capture ELISA as standard).

Histologic Findings: Changes are found in the thalamus, substantia nigra, brainstem, hippocampus, cerebellum, and spinal cord and include focal neuronal degeneration with diffuse and focal microglial proliferation and lymphocytic perivascular cuffing.

TREATMENT

Section 6 of 10 [Back Top Next]

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#) [Miscellaneous](#)
[Bibliography](#)

Medical Care:

- Therapy for symptomatic Japanese encephalitis infection is supportive. Patients often require feeding, airway management, and seizure control. No clearly effective antiviral agents exist.
- Anticonvulsants to control seizures, ventilation support, and feeding are the standard treatments.
- Mannitol is used to decrease intracranial pressure when needed.
- Steroids (eg, dexamethasone) have not been shown to offer benefit, based on current studies.
- One small study demonstrated some benefit from interferon alfa (Harinatsu, 1985). However, a recent randomized trial of interferon alpha-2a in children demonstrated no benefit in overall outcome at discharge or at 3 months after discharge (Solomon, 2003).

Surgical Care: Patients with evidence of elevated intracranial pressure may require invasive monitoring.

Consultations:

- Consider consultation with an infectious disease physician trained in tropical and travel medicine for all returning travelers with encephalitis.
 - Consultation with a neurologist may be required for assistance with management of neurologic sequelae.
 - Critical care specialists may be required for help with managing severely symptomatic patients in an intensive care setting.
 - Consultation with a neurosurgeon may be required to assist in managing patients with elevated intracranial pressure.



Advancing the Management of Cardiovascular and Metabolic Risk Factors: The Role of the Endocannabinoid System

CME TO GO

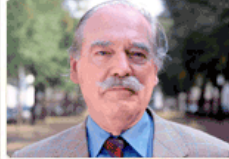
[Click Here](#) to download FREE cardiovascular and metabolic risk factors CME for your PDA!



FREE COURSE!

eMedicine invites you to take a series of **free, interactive, case-based** courses on the endocannabinoid (EC) system and the potential for multirisk management through its regulation.

A 62-YEAR-OLD MAN WITH A HISTORY OF HYPERTENSION



The first course describes the case of James H—, a 62-year-old white man who presents for a routine new patient examination. He has a long-standing history of hypertension. About a year ago, he underwent an urgent percutaneous coronary intervention (PCI) after experiencing angina. Since then, James has stopped smoking. He is able to go on walks with his wife but is somewhat limited by knee pain. (This activity is approved for AMA PRA Category 1 Credit.)

[REVIEW COURSE DETAILS >>](#)

[TAKE THIS COURSE NOW >>](#)

MEDICATION	Section 7 of 10 [Back Top Next] Author Information Introduction Clinical Differentials Workup Treatment Medication Follow-up Miscellaneous Bibliography
-------------------	---

The goals of pharmacotherapy are to reduce morbidity and to prevent complications.

Drug Category: *Osmotic diuretics* -- Mannitol is recommended by some experts to help reduce intracranial pressure. Mannitol induces diuresis, which increases serum osmotic concentration. In the brain, this causes water to flow from brain cells into vascular space, thereby decreasing intracranial pressure.

Drug Name	Mannitol (Osmitrol, Resectisol) -- Drug may be used to decrease intracranial pressure. May reduce subarachnoid space pressure by creating osmotic gradient between CSF in arachnoid space and plasma. Not for long-term use. Initially assess for adequate renal function by administering a test dose of 200 mg/kg IV over 3-5 min. It should produce a urine flow of at least 30-50 mL/h of urine over 2-3 h. In children, assess for adequate renal function by administering a test dose of 200 mg/kg IV over 3-5 min. It should produce a urine flow of at least 1 mL/h over 1-3 h.
Adult Dose	Adequate renal function: 1.5-2 g/kg IV (15%, 20%, or 25% solution) infused over 1 h
Pediatric Dose	<12 years: Not established; some experts recommend 1.5-2 g/kg IV (15% or 20% solution) infused over 1 h >12 years: Administer as in adults
Contraindications	Documented hypersensitivity; anuria; severe pulmonary congestion; progressive renal damage; severe dehydration; active intracranial bleeding; progressive heart failure
Interactions	May decrease serum lithium levels
Pregnancy	C - Safety for use during pregnancy has not been established.
Precautions	Carefully evaluate cardiovascular status before rapid administration of mannitol because a sudden increase in extracellular fluid may lead to fulminant CHF; avoid pseudoagglutination; when blood is administered simultaneously, add at least 20 mEq of sodium chloride to each liter of mannitol solution; do not administer electrolyte-free mannitol solutions with blood

FOLLOW-UP	Section 8 of 10 [Back Top Next] Author Information Introduction Clinical Differentials Workup Treatment Medication Follow-up Miscellaneous Bibliography
------------------	---

Further Inpatient Care:

- Follow patients' cases closely for complications, including bacterial infections (eg, pneumonia, urinary tract infections, decubitus ulcers).

Further Outpatient Care:

- Relapses rarely have been reported several months after recovery.
- Patients may require long-term care and rehabilitation for residual neurologic deficits, including seizures and movement disorders.

Deterrence/Prevention:

- The most important deterrent for people living in nonendemic areas is avoiding mosquito exposure, particularly at night.
- Strongly consider the use of bed nets while sleeping and mosquito repellents with DEET (diethyltoluamide) during times when risk of contact with infected mosquitos exists.
- Vaccination
 - Japanese Encephalitis-VAX has been available in the United States since 1992. The vaccine is produced by BIKEN (Osaka, Japan) and is distributed by Pasteur-Merieux-Connaught. It is a formalin-inactivated, mouse brain-derived vaccine that is approximately 100% immunogenic after 3 doses (2 doses are used in native populations in endemic areas).
 - The current dosing schedule for patients aged 3 years or older is 1.0 mL subcutaneously on days 0, 7, and 30 (0.5 mL in patients aged 1-2 y).
 - A schedule of 0, 7, and 14 days may be used if time does not permit the longer dosing interval. Patients on the shorter schedule tend to have lower titers at 2 and 6 months after immunization than do patients on the longer schedule, although seroconversion rates appear similar.
 - The need for booster doses is not clear but could be considered 36 months or longer after the third dose. A second possible option is to follow antibody titers and revaccinate once titers fall to less than 1:10.
 - Administer the last dose of vaccine at least 10 days prior to travel in an endemic area.
 - Mild adverse reactions are reported in as many as 20% of people; adverse reactions include local pain and redness, fever, gastrointestinal symptoms, headache, and myalgia. The incidence of reactions usually decreases with each subsequent dose. Hypersensitivity, including angioedema or urticaria, occurs in 0.6% of patients, with 2.6 per 100,000 vaccinees requiring hospitalization. The hypersensitivity reaction may occur as late as 10-14 days after the last dose. Due to the delayed hypersensitivity reaction, patients should have access to medical care for 10 days after the last dose. Patients with a history of allergies or urticaria may be at higher risk for adverse reactions.
 - Cases of encephalitis and other potentially vaccine-related neurologic symptoms have been reported. A study in Japan in the 1960s and 1970s found a rate of severe neurologic reactions to be 1-2.3 cases per million persons vaccinated. As yet, this association has not been definitively established. Passive surveillance in the United States in the 1990s of more than 800,000 doses revealed no reported neurologic sequelae
 - The vaccine is recommended for persons living in endemic and epidemic areas and for at-risk travelers planning extended trips to rural areas (arbitrarily defined as 30 d). Persons visiting areas with active epidemic Japanese encephalitis should be considered for vaccination even if their projected stay is less than 30 days. Vaccination for persons staying fewer than 30 days may be considered if they expect unprotected nighttime outdoor exposure in endemic areas.

Complications:

- Bacterial infections (eg, pneumonia, urinary tract infection) related to the supportive care of these patients are the most common complication.
- Patients from tropical areas where JEV is endemic also are at risk for infection from other tropical diseases (eg, malaria, typhoid fever, other parasitic infections).

Prognosis:

- Prognosis in symptomatic infections varies. A significant number of patients who survive acute Japanese encephalitis develop residual neurologic deficits.
- Disabilities may range from subtle changes in behavior to serious problems, including blindness, ataxia, weakness, and movement disorders.
- Serious residual neurologic problems developed in as many as 50% of symptomatic patients at 1-year follow-up visits. Case-mortality rates may range from 20-50%.

Patient Education:

- For excellent patient education resources, visit eMedicine's [Brain and Nervous System Center](#). Also, see eMedicine's patient education article [Encephalitis](#).

MISCELLANEOUS**Section 9 of 10** [\[Back Top Next\]](#)

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#) [Miscellaneous](#)
[Bibliography](#)

Medical/Legal Pitfalls:

- Be cautious of co-infection with other tropical disease (eg, tuberculosis, malaria).
- Because of the potential risk of angioedema, avoid the vaccine in pregnancy unless risk of infection is significant.
- Vaccinated patients should remain in an area where medical care is available for at least 10 days after receiving the vaccination because of the risk for respiratory compromise from angioedema.
- Use caution when vaccinating patients with a history of multiple allergies, urticaria, or angioedema because they may be at higher risk for adverse reactions.

Special Concerns:

- Infection in the first or second trimester of pregnancy may lead to fetal death. Infection in the third trimester, although not systematically evaluated, appears to be associated with a normal fetal outcome.

BIBLIOGRAPHY**Section 10 of 10** [\[Back Top\]](#)

[Author Information](#) [Introduction](#) [Clinical](#) [Differentials](#) [Workup](#) [Treatment](#) [Medication](#) [Follow-up](#) [Miscellaneous](#)
[Bibliography](#)

- Berg SW, Mitchell BS, Hanson RK, et al: Systemic reactions in U.S. Marine Corps personnel who received Japanese encephalitis vaccine. *Clin Infect Dis* 1997 Feb; 24(2): 265-6[[Medline](#)].
- Burke DS, Lorsomrudee W, Leake CJ, et al: Fatal outcome in Japanese encephalitis. *Am J Trop Med Hyg* 1985 Nov; 34(6): 1203-10[[Medline](#)].
- Centers for Disease Control and Prevention: Health Information for International Travel, 1999-2000.
- Defraites RF, Gambel JM, Hoke CH Jr, et al: Japanese encephalitis vaccine (inactivated, BIKEN) in U.S. soldiers: immunogenicity and safety of vaccine administered in two dosing regimens. *Am J Trop Med Hyg* 1999 Aug; 61(2): 288-93[[Medline](#)].
- Hanna JN, Ritchie SA, Phillips DA, et al: An outbreak of Japanese encephalitis in the Torres Strait, Australia, 1995. *Med J Aust* 1996 Sep 2; 165(5): 256-60[[Medline](#)].
- Hoke CH, Nisalak A, Sangawhipa N, et al: Protection against Japanese encephalitis by inactivated vaccines. *N Engl J Med* 1988 Sep 8; 319(10): 608-14[[Medline](#)].
- Hoke CH, Vaughn DW, Nisalak A, et al: Effect of high-dose dexamethasone on the outcome of acute encephalitis due to Japanese encephalitis virus. *J Infect Dis* 1992 Apr; 165(4): 631-7[[Medline](#)].
- Johnson RT, Intralawan P, Puapanwatton S: Japanese encephalitis: identification of inflammatory cells in cerebrospinal fluid. *Ann Neurol* 1986 Dec; 20(6): 691-5[[Medline](#)].
- Kalita J, Misra UK: EEG in Japanese encephalitis: a clinico-radiological correlation. *Electroencephalogr Clin Neurophysiol* 1998 Mar; 106(3): 238-43[[Medline](#)].
- Kumar S, Misra UK, Kalita J, et al: MRI in Japanese encephalitis. *Neuroradiology* 1997 Mar; 39(3): 180-4[[Medline](#)].
- Kuwayama M, Ito M, Takao S, et al: Japanese encephalitis virus in meningitis patients, Japan. *Emerg Infect Dis*

- 2005 Mar; 11(3): 471-3[[Medline](#)].
- Monath TP, Tsai TF: Flaviviruses. In: Clinical Virology. New York, NY: Churchill Livingstone; 1997: 1146-1155.
 - Paul WS, Moore PS, Karabatsos N, et al: Outbreak of Japanese encephalitis on the island of Saipan, 1990. J Infect Dis 1993 May; 167(5): 1053-8[[Medline](#)].
 - Poland JD, Cropp CB, Craven RB, Monath TP: Evaluation of the potency and safety of inactivated Japanese encephalitis vaccine in US inhabitants. J Infect Dis 1990 May; 161(5): 878-82[[Medline](#)].
 - Richman DD, Whitley RJ, Hayden FG: Clinical Virology. New York, NY: Churchill Livingstone; 1997.
 - Shlim DR, Solomon T: Japanese encephalitis vaccine for travelers: exploring the limits of risk. Clin Infect Dis 2002 Jul 15; 35(2): 183-8[[Medline](#)].
 - Solomon T, Thao LT, Dung NM, et al: Rapid diagnosis of Japanese encephalitis by using an immunoglobulin M dot enzyme immunoassay. J Clin Microbiol 1998 Jul; 36(7): 2030-4[[Medline](#)].
 - Solomon T: Recent advances in Japanese encephalitis. J Neurovirol 2003 Apr; 9(2): 274-83[[Medline](#)].
 - Solomon T, Dung NM, Wills B, et al: Interferon alfa-2a in Japanese encephalitis: a randomised double-blind placebo-controlled trial. Lancet 2003 Mar 8; 361(9360): 821-6[[Medline](#)].
 - Tsai TF, Chang GJ, Yu YX: Japanese Encephalitis Vaccines. In: Vaccines. 3rd ed. New York, NY: WB Saunders; 1999: 672-710.
 - World Health Organization: Japanese encephalitis vaccines. Wkly Epidemiol Rec 1998 Oct 30; 73(44): 337-44[[Medline](#)].

NOTE:

Medicine is a constantly changing science and not all therapies are clearly established. New research changes drug and treatment therapies daily. The authors, editors, and publisher of this journal have used their best efforts to provide information that is up-to-date and accurate and is generally accepted within medical standards at the time of publication. However, as medical science is constantly changing and human error is always possible, the authors, editors, and publisher or any other party involved with the publication of this article do not warrant the information in this article is accurate or complete, nor are they responsible for omissions or errors in the article or for the results of using this information. The reader should confirm the information in this article from other sources prior to use. In particular, all drug doses, indications, and contraindications should be confirmed in the package insert. [FULL DISCLAIMER](#)

[Japanese Encephalitis excerpt](#)

[About Us](#) | [Privacy](#) | [Terms of Use](#) | [Contact Us](#) | [Advertise](#) | [Institutional Subscribers](#)



We subscribe to the [HONcode principles](#) of the [Health On the Net Foundation](#)

© 1996-2006 by WebMD.
[All Rights Reserved.](#)

Privacy Policy Changes**Important Announcement:**

WebMD, Inc. ("WebMD Health"), a leader in online health information services to the medical professional community has acquired eMedicine. This acquisition was completed January 18, 2006. As we become more fully integrated, eMedicine users are now eligible to utilize the services available to physicians through WebMD Health's professional portals, including Medscape.com, theheart.org and Medsite.com. Your eMedicine account information will now be accessible to WebMD Health where it will be maintained in accordance with the WebMD Professional Services Privacy Policy. [Click here](#) to view the WebMD Professional Services Privacy Policy.

If you desire to remove your account information from WebMD Health, please send an email to PrivacyPolicyNotice@emedicine.com.

JAPANESE ENCEPHALITIS VACCINE

WHAT YOU NEED TO KNOW

1 What is Japanese encephalitis?

Japanese encephalitis (JE) is a serious infection caused by a virus. It occurs in certain rural parts of Asia.

Encephalitis means swelling of the brain. JE spreads through the bite of infected mosquitoes. It cannot spread directly from one person to another.

Japanese encephalitis can cause:

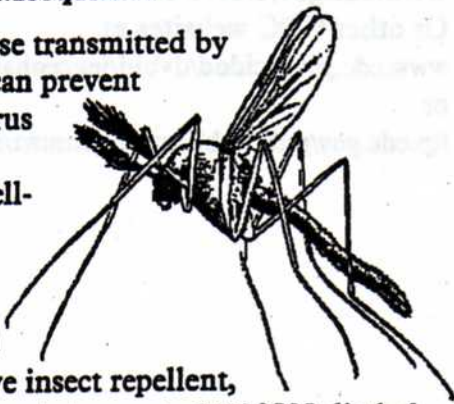
- Mild infections with fever and headache.
- Severe infections with encephalitis. About 1 in 4 of such cases results in death. Symptoms of more severe infection are headache, high fever, neck stiffness, stupor, disorientation, abnormal movements, occasional convulsions (especially in infants), coma, and paralysis.

2 How can I prevent Japanese encephalitis?

Protection from Mosquitoes

As with any disease transmitted by mosquitoes, you can prevent exposure to JE virus by:

- remaining in well-screened areas,
- wearing clothes that cover most of the body, and
- using an effective insect repellent, such as those containing up to 30% N,N-diethyl metatoluamide (DEET) on skin and clothing. Use of permethrin on clothing will also help prevent mosquito bites.



Japanese encephalitis Vaccine

Japanese encephalitis vaccine can prevent JE.

(NOTE: JE vaccine is not 100% effective and is not a substitute for mosquito precautions.)

3 Who should get Japanese encephalitis vaccine and when?

Who?

People who live or travel in certain rural parts of Asia should get the vaccine.

Laboratory workers at risk of exposure to JE virus should also be vaccinated.

When?

- Three doses of vaccine are given, with the 2nd dose given 7 days after the 1st and the 3rd dose given 30 days after the 1st.
- The third dose should be given at least 10 days before travel, to be sure the vaccine begins to protect and to allow for medical care if there are delayed side effects.
- A booster dose may be needed after 2 years.

Children 1 - 3 years of age get a smaller dose than older children and adults. Children younger than 1 year of age should not normally get the vaccine.

JE vaccine may be given at the same time as other vaccines.

4 Who should NOT get Japanese encephalitis vaccine?

- Anyone who has ever had a life-threatening reaction to mouse protein, thimerosal, or to a previous dose of JE vaccine.
- Tell your doctor if you:
 - have severe allergies, especially a history of allergic rash (hives) or wheezing after a wasp sting or taking medications,
 - are pregnant, or are a nursing mother,
 - will be traveling for fewer than 30 days, especially if you will be in major urban areas. (You may be at lower risk for Japanese encephalitis and not need the vaccine.)

5 What are the risks from Japanese encephalitis vaccine?

A vaccine, like any medicine, is capable of causing serious problems, such as severe allergic reactions. The risk of a vaccine causing serious harm, or death, is extremely small.

Mild Problems

- soreness, redness, or swelling where the shot was given (about 1 person in 5)
- fever
- headache
- muscle pain
- abdominal pain
- rash
- chills
- nausea/vomiting
- dizziness

(about 1 person in 10)

If these problems occur, they usually begin soon after the shot and last for a couple of days.

Moderate or Severe Problems

- Serious allergic reactions including rash; swelling of the hands and feet, face, or lips; and breathing difficulty. These have occurred within minutes to as long as 10 to 17 days after receiving the vaccine, usually about 48 hours after the vaccination. (About 60 per 10,000 people vaccinated have had allergic reactions to JE vaccine.)
- Other severe problems, such as seizures or nervous system problems, have been reported. These are rare (probably less than 1 per 50,000 people vaccinated).

6 What if there is a moderate or severe reaction?

What should I look for?

Look for any unusual conditions, such as high fever, allergic symptoms or neurologic problems that occur 1-30 days after vaccination. Signs of an allergic reaction can include difficulty breathing, hoarseness or wheezing, hives, swelling of extremities, face, or lips, paleness, weakness, a fast heart-beat, or dizziness within a few minutes up to two weeks after the shot.

What should I do?

- Call a doctor, or get the person to a doctor right away.
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given.
- Ask the clinic where you received the vaccine to save any left over vaccine and the vaccine vial, and record the lot number.
- Ask your doctor, nurse, or health department to report the reaction by filing a Vaccine Adverse Event Reporting System (VAERS) form. Or you can file this report through the VAERS website at www.vaers.hhs.gov, or by calling 1-800-822-7967.

VAERS does not provide medical advice.

7 How can I learn more?

- Ask your doctor or nurse. They can show you the vaccine package insert or suggest other sources of information.
- Call your local or state health department.
- Contact the Centers for Disease Control and Prevention (CDC):
 - Visit the CDC Travelers' Health website at www.cdc.gov/travel/diseases.htm
 - Or other CDC websites at www.cdc.gov/ncidod/dvbid/jencephalitis/index.htm or [ftp.cdc.gov/pub/Publications/mmwr/rr/tr4201.pdf](ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/tr4201.pdf)



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL IMMUNIZATION PROGRAM

Japanese Encephalitis Vaccine (5/11/05) Vaccine Information Statement