

Dengue

(Also Known as Dengue Fever,
Dengue Hemorrhagic Fever, and Breakbone Fever)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of dengue to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at <http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Dengue fever (DF) and dengue hemorrhagic fever (DHF) are caused by flaviviruses and include serotypes 1, 2, 3, and 4.

B. Clinical Description and Laboratory Diagnosis

DF is an acute viral illness characterized by sudden onset of fever, severe headache, eye pain, muscle and joint pain, and rash. Gastrointestinal (GI) upset and loss of appetite often occur. Swollen lymph nodes, petechiae, nosebleeds, and bleeding gums also occur frequently. Recovery is often associated with prolonged fatigue and depression.

DHF is a severe viral illness also characterized by sudden onset of fever as well as hemorrhage. DHF is associated with abnormal blood clotting, low platelet count (thrombocytopenia), and evidence of increased vascular permeability (plasma leaking through capillaries). Patients with GI bleeding have a greater likelihood of dying. Dengue shock syndrome includes more severe cases of DHF when patients also have life-threatening reduced blood pressure (hypotension). Fatalities associated with DF are rare. Case-fatality rates associated with DHF have reached 50% without treatment. With treatment, rates are much lower (1% to 2%).

C. Reservoirs

In tropical urban centers, the viruses that cause DF and DHF are maintained in humans and mosquitoes. In parts of Southeast Asia and West Africa, the viruses are maintained in monkeys and mosquitoes.

D. Mode of Transmission

DF and DHF viruses are transmitted to humans by infected mosquitoes, principally *Aedes aegypti*. Other *Aedes* species also play a role in transmission. These viruses are not transmitted directly from person to person.

E. Incubation Period

The incubation period is usually four to seven days, although it may range from three to 14 days.

F. Period of Communicability or Infectious Period

The diseases DF and DHF are not transmitted from person to person.

G. Epidemiology

In the past 20 years, dengue transmission and the frequency of dengue epidemics has increased greatly in most tropical countries of the American region. More than 2.5 billion persons now live in areas where they are at risk for infection. Attack rates associated with epidemics range between 1/1000 to 1/100,000 population. Infection rates (that is, proportion of the population that is infected, including persons who do not get severe symptoms or are not reported) can be five- to ten-fold greater. The case-fatality rates for DHF average about 5% worldwide, but can be kept as low as 1% with proper clinical management. Epidemics caused by all four virus serotypes have become progressively more frequent and larger in the past 25 years. As of 2004, dengue fever is endemic in most tropical countries of the South Pacific, Asia, the Caribbean, the Americas, and Africa. Additionally, most tropical urban centers in these regions have multiple dengue virus serotypes co-circulating (hyperendemicity), which increases dengue transmission and the risk of DHF. Future dengue incidence in specific locales cannot be predicted accurately, but a high level of dengue transmission is anticipated in all tropical areas of the world for the indefinite future. The incidence of the severe disease, DHF, has increased dramatically in Southeast Asia, the South Pacific, and the American tropics in the past 25 years, with major epidemics occurring in many countries every three to five years. The first major epidemic in the Americas occurred in Cuba in 1981, and a second major epidemic of DHF occurred in Venezuela in 1989–1990. Since then, outbreaks or sporadic cases, or both, of confirmed DHF have occurred in most tropical American countries. After an absence of 35 years, several autochthonous cases of DF occurred in southern Texas in 1980, 1986, 1995, 1997, 1998, and 1999, associated with imported cases and epidemic dengue in adjacent states in Mexico. After an absence of 56 years, a limited outbreak of DF occurred in Hawaii in 2001, associated with imported cases and epidemic dengue in the South Pacific. In the past few years, New Jersey has seen approximately ten to 15 travel-related cases.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CONFIRMED

Communicable Disease Service Manual

A clinically compatible case, AND

Isolation of dengue virus from serum and/or autopsy samples, OR

Demonstration of four-fold or greater rise or fall in reciprocal immunoglobulin G (IgG) or IgM antibody titers to one or more dengue virus antigens in paired serum samples, OR

Demonstration of dengue virus antigen in autopsy tissue or serum samples by immunochemistry or by viral nucleic acid detection methods.

PROBABLE

A clinically compatible case, AND

Demonstration of reciprocal IgG antibody titer equal to or greater than 1:1280, or positive IgM antibody test on a single acute or convalescent-phase serum specimen to one or more dengue virus antigens.

POSSIBLE

Not used.

B. Differences from Centers for Disease Control and Prevention (CDC) Case Definition

NJDHSS and CDC definitions are the same.

3 LABORATORY TESTING AVAILABLE

Laboratory diagnosis is based on serological tests and virus isolation. Haemagglutination-inhibiting antibodies techniques, complement fixation, enzyme-linked immunosorbent assay (ELISA), and neutralization tests are used. Virus can be isolated from the blood by inoculation of mosquitoes or cell cultures.

The Public Health and Environmental Laboratories (PHEL) do not provide testing of clinical specimens for dengue virus. However, arrangements can be made for sample testing by the CDC through the Infectious and Zoonotic Disease Program (IZDP) and PHEL.

4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To identify imported cases and better understand the epidemiology of endemic and epidemic DF and DHF
- To ensure that cases are appropriately contained and prevent the introduction of virus into native mosquito populations
- To identify locally acquired cases, if they occur, so that appropriate active surveillance and mosquito control interventions can be taken
- To provide travelers with appropriate preventive health information

B. Laboratory Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.6) stipulates that laboratories report (by telephone, by confidential fax, or over the Internet using the Communicable Disease Reporting and Surveillance System [CDRSS]) all cases of dengue to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain, at a minimum, the reporting laboratory's name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of the person tested; the test performed; the date of testing; the test results; and the healthcare provider's name and address.

C. Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.4) stipulates that healthcare providers report (by telephone, confidential fax, or in writing) all cases of dengue to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain the name of the disease; date of illness onset; and name, age, date of birth, race, ethnicity, home address, and telephone number of the person they are reporting. Additionally, name, address, institution, and telephone number of reporting official, and other information as may be required by NJDHSS concerning a specific disease, should be reported.

D. Health Officer Reporting

The New Jersey Administrative Code (NJAC 8:57-1.7) stipulates that each local health officer must report the occurrence of any case of dengue within 24 hours of receiving the report. A written or electronic copy should be sent to the NJDHSS IZDP.

5 CASE INVESTIGATION

A. Forms

It is requested that the local health officer complete a [CDS-1](#) reporting form by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient’s healthcare provider or the medical record.

B. Entry into CDRSS

The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of dengue fever cases. The “Tab” column includes the tabs which appear along the top of the CDRSS screen. The “Required Information” column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
Patient Info	Enter the disease name (“DENGUE FEVER”) patient demographic information, illness onset date, and the date the case was reported to the local health department (LHD). There are no subgroups for dengue fever.
Addresses	Enter any alternate address (e.g., rehabilitation facility). Use the Comments section in this screen to record any pertinent information about the alternate address (e.g., length of stay at rehabilitation facility). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
Clinical Status	Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient’s care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. If the patient died, date of death should be recorded under the Mortality section.

CDRSS Screen	Required Information
Signs/Symptoms	Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient’s illness. Also, information regarding the resolution of signs and symptoms should be entered.
Risk Factors	Enter complete information about risk factors (e.g., travel history) to facilitate study of dengue fever in New Jersey.
Laboratory Eval	Select “DENGUE VIRUS TOTAL ANTIBODY” for ELISA or Enzyme Immunoassay (EIA). In Test Result field select positive/reactive. Titers should be placed in the Value field. Select “DENGUE VIRUS IGM ANTIBODY” if ELISA/EIA is performed for IgM alone. In Test Result field select positive/reactive. Titers should be placed in the Value field. Select “DENGUE VIRUS IGG ANTIBODY” if ELISA/EIA is performed for IgG alone. In Test Result field select positive/reactive. Titers should be placed in the Value field. The Reference Range field should be completed for all ELISA/EIA testes. Specimen type, specimen collection date, test result, and, if applicable, test value should also be recorded.
Contact Tracing	Information regarding contacts is not required for this disease.
Case Comments	Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. NOTE: Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.
Epidemiology	Record name of and contact information for case investigators from other agencies (e.g., CDC, out-of-state health departments). Document communication between investigators in the Comments section.

CDRSS Screen	Required Information
<p>Case Classification Report Status</p>	<p>Case status options are: “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED,” “PROBABLE,” and “NOT A CASE” are the only appropriate options for classifying a case of dengue fever (see section 2A). <p>Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.” • Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.” • The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.” • “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff (see Section C below). <p>If a case is inappropriately entered (e.g., a case of diphtheria was erroneously entered as a case of dengue fever) the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of dengue fever simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

C. Other Reporting/Investigation Issues

1. Case report forms (CDS-1 and labs) DO NOT need to be mailed to NJDHSS as long as mandatory fields in CDRSS indicated in section B are completed.
2. Once LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDHSS will review the case. NJDHSS will approve the case by changing the report status to “DHSS APPROVED.” At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in “DHSS APPROVED,” you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.
3. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS and marked as not a case.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)

Because DF and DHF are not transmitted from person to person, there are no restrictions for case-patients or contacts of case-patients.

B. Protection of Contacts

There are no restrictions of contacts.

C. Managing Special Situations

1. Locally Acquired Case

As noted above in section 4A, a locally acquired case of dengue would be an unusual occurrence, as the *A. aegypti* mosquito has not become established in New Jersey. But if a local health officer determines during the course of an investigation that a patient does not have a recent travel history to an endemic country, environmental measures such as investigating local areas visited by the patient, in cooperation with state and county mosquito control agencies, to locate the focus of infection, and surveillance of other people for illness may be necessary. Additional mosquito control measures may be necessary if there is evidence that *A. albopictus* may have been responsible for a case of locally acquired dengue.

D. Preventive Measures

1. International Travel

Because epidemics of dengue can be extensive and may affect a high percentage of the population, travelers should avoid areas with ongoing epidemics. However, for those who do travel to endemic areas, it is recommended that

- Travelers protect themselves from mosquitoes by using insect repellents, wearing protective clothing, and using mosquito nets when rooms are not screened. Unlike other vectors, the *A. aegypti* mosquitoes bite during daytime hours.
- Recent travelers to endemic countries with acute onset of fever and other compatible symptoms should seek medical attention immediately.

Additional information regarding international travel and dengue can be found at [the CDC's Traveler's Health Office](#).

Additional Information

A *Dengue Fever Fact Sheet* can be obtained at the NJDHSS Web site at <http://www.state.nj.us/health/>.

Additional information can also be found on the CDC Web site at <http://www.cdc.gov/ncidod/dvbid/dengue/dengue-hcp.htm>.

References

- Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance. *MMWR Morb Mortal Wkly Rep.* 1997;46:RR-10.
- Chin J, ed. *Control of Communicable Diseases Manual*. 18th ed. Washington, DC: American Public Health Association; 2004.