Job Aid for Reviewing Clinical Medical Records for Dengue Cases

CONTENTS

Created by Joshua Wong, MD and Parmi Suchdev, MD MPH (dvo8@cdc.gov); Last updated October 9, 2024.

Audience: State or local arboviral surveillance coordinators investigating a dengue case.

Objective: This document serves as a job aid for public health professionals without a clinical background who are involved in dengue case investigations. Its purpose is to improve the accuracy of clinical syndrome classification by providing tips and suggestions on medical chart abstraction. This document provides instructions on locating relevant variables within medical records and interpreting these findings appropriately.

BACKGROUND

Types of Medical Records

History and Physical (H&P)—The H&P is the initial note written by a clinician and provides detailed information about the patient at presentation to care. A separate H&P will be written for each location where the patient presents, such as the Emergency Department, general ward admission, or transfer to the Intensive Care Unit (ICU).

Progress Notes—The progress notes are written daily by clinicians for each patient. They document the patient's clinical progression including a summary of vital signs, lab changes, and treatments provided on that specific day. These notes tend to have fewer details than the H&P or the Discharge Summary, focusing primarily on the pertinent changes for that day.

Discharge Summary, Transfer Summary, Death Summary—These notes are completed by inpatient clinicians when a patient leaves their service. They detail the course of their illness while on that service and are typically comprehensive. Note that Emergency department clinicians do not write discharge summaries but may provide "Patient Discharge Instructions" which are plain-language descriptions to help patients understand their condition, medications, required follow-up tests, outpatient follow-up plans.

Note for outpatient visits: Most outpatient notes are categorized as "Progress Notes." If the notes refer to a hospitalization for dengue, it is essential to obtain medical records from that hospitalization to ensure accurate case classification.

Categories of Information

Subjective—Anything reported by the patient is considered subjective, including all reported symptoms.

Objective—Anything directly observed or measured by medical professionals during physical exams, laboratory tests, imaging, or other diagnostic procedures is an objective finding. Signs are always objective.

Structure of Medical Records

Note: The structure of medical notes may vary, with some fields omitted or reordered. However, the following represents the typical format:

Chief Complaint (CC) or Identification (ID):

Briefly describes the patient and their reason for presenting to the ED, outpatient clinic, or for hospital admission.

History or Subjective:

- Included all patient-reported symptoms and, in an H&P, details the clinical course prior to hospital presentation.
  - Past Medical History (PMH)
  - Past Surgical History (PMH)
  - Medications
  - Allergies
  - Family History
  - Social History
  - Vaccination History
  - Travel History
- These fields are usually found in H&P's and describe basic patient information prior to presentation to the hospital. Different hospitals and clinics will group/report this information differently. "Travel History" (sometimes included in social history) and "Vaccination History" are particularly relevant for dengue case reporting, indicating location of infection and vaccination status.

Review of Systems

Documents yes/no responses to commonly asked symptoms not detailed in the history, with most marked "no" to indicate negative responses.

Vital Signs

Vital signs recorded by healthcare professionals

Physical Exam

Findings from the clinician's physical examination

Labs

- Includes standard lab results. Relevant labs for dengue include:
  - Complete Blood Count (CBC): Hematocrit, White Blood Cell count (WBC), platelet count
  - Complete Metabolic Panel (CMP) or Liver Function Tests (LFT's): AST, ALT
- Dengue-specific tests (PCR, NS1) are often considered specialized tests by smaller hospitals and clinics. These results, if not done by the hospital laboratory, might be mentioned in the clinician's assessment.

Imaging Studies

Findings from imaging exams (X-ray, ultrasound, MRI, CT) interpreted by a radiologist.

Special Studies

Results of objective tests that do not strictly fall under labs or imaging. These are rarely significant for dengue case investigations unless related to severe dengue manifestations.

Assessment and Plan (A/P) or Impression

Includes the clinician's diagnosis, often with supporting evidence from symptoms, exam findings, labs, and imaging. The section may also outline other possible conditions (differential diagnoses) and address additional patient issues relevant to the primary reason for hospitalization.

INTERPRETING FINDINGS

Table 1. Clinical Findings that Meet the Clinical Syndrome Classification of "Dengue-like Illness"

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Fever	• History/Subjective • Vital Signs • Assessment	• Hot/feeling hot • Warm to the touch • Pyrexia • Hyperthermia • Elevated temperature • Chills • Sweats	• Any patient report of a fever in the history/subjective field or assessment is a subjective finding and is a fever. • Any measured temperature ≥ 38° C (100.4° F) is an objective finding and is a fever.	• An objective, measured fever will be reported in the vital signs. • A patient-reported fever is a symptom and will usually be reported in the history/subjective field or described in the assessment. • Chills or rigors (shivering) may be used as a proxy for subjective fever.

Table 2. Non-warning Sign Clinical Findings that Meet the Clinical Syndrome Classification of "Dengue"

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Aches and Pains	History/Subjective			"Abdominal Pain" is a separate category and is considered a warning sign. See Table 2.
Retro-orbital pain	• History/Subjective • Assessment	• Eye pain • Pain behind the eyes • Orbital pain • Ocular pain • Retro-orbital headache • Facial pain, retro-orbital		The classic retro-orbital pain of dengue may be described in a variety of ways by the patient or clinician. Read carefully to see if it is described! "Photophobia" or pain with bright light in the eyes does not count as retro-orbital pain
Joint pain	• History/Subjective • Assessment	• Arthralgia • Polyarthralgia • Articular pain • Pain in joint		"Arthralgia" refers to the patient's experience of pain, but "arthritis" refers to objective evidence of joint inflammation seen on a physical exam or on imaging. Many clinicians (incorrectly) use them interchangeably, so consider that a report of "arthritis" may be referring to joint pain.
Muscle Pain	• History/Subjective • Assessment	• Myalgia • Muscle aches • Muscular pain		

Continued on next page

Table 2 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Rash	• History/Subjective • Physical Exam • Assessment	• Flushing • Exanthem • Viral exanthem • Skin eruption • Pruritic rash • Petechiae • Macular rash • Maculopapular rash • Morbilliform rash • Blanching rash	Any description in the physical exam other than "normal" or "WNL" is likely a rash, although not all will be due to dengue	Dengue can have a variety of skin findings at different time points in the evolution of the illness, and there are many other rashes that are not associated with dengue. Flushing (redness of the face, neck, or chest) can occur in the first days after fever onset. The typical rash associated with dengue is maculopapular or petechial and appears 3-5 days after the onset of fever. The rash described as "islands of white in a sea of red" can occur late in the disease course, typically during the convalescent phase. Reading the assessment will usually inform you as to whether the provider believes the rash to be due to dengue.
Tourniquet Test	• Physical Exam	• Hess test • Rumpel-leede test	Test is positive if a blood pressure cuff inflated midway between diastolic and systolic pressure for 2 minutes leaves ≥10 petechiae in a 1 square inch area.(1)	The tourniquet test is a physical exam that assess capillary fragility. It is rarely used in practice in the U.S. or other high-income settings.
Leukopenia	• Labs • Assessment	• Leukocytopenia • Decreased/low white blood cell count • Decreased/ low wbc's	A white blood cell count of <5,000/mm^3 at any point in the illness is considered leukopenia by the CDC case definition	Some laboratories consider leukopenia to be <4,000 WBC/mm^3 instead of CDC's slightly higher <5,000 definition. Therefore, counts <5,000 may not be flagged as out of range.
Nausea/Vomiting	• History/Subjective • Physical Exam • Assessment	Emesis		Any record of nausea or vomiting should be considered positive for nausea/vomiting.

Note on findings reportable in ArboNET, but not part of the dengue clinical syndrome classification:

Dengue presents like many other arboviral illnesses with general signs or symptoms. The following findings are NOT part of the 2015 Dengue Case Definition:

- Fatigue/Malaise
- Conjunctivitis/Red Eyes
- Diarrhea
- Arthritis
- Oral Ulcers

If the clinician reports these, please include them in your case report and transmit them into the appropriate variable in ArboNET, but be aware that they do NOT count towards the case definition nor the clinical syndrome classification.

Table 3. Warning Sign Clinical Findings that Meet the Clinical Syndrome Classification of "Dengue"

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Persistent Vomiting	• History/Subjective • Physical Exam • Assessment	Emesis		Vomiting ≥3 times within 24 hours is considered "persistent vomiting." Clinicians may not record the specific number of episodes of vomiting
Abdominal Pain or Tenderness	• History/Subjective • Physical Exam • Assessment	• Stomachache • Colic • Guarding • Acute abdomen	• Abdominal pain is a subjective finding and will be found in the history/subjective • Abdominal tenderness is an objective finding in the physical exam	Abdominal pain or tenderness is one of the most general complaints in medicine. In many cases, instead of writing "abdominal pain" clinicians will describe the location of the pain without stating "abdomen" with the understanding that the readers of the note will understand that it is in the abdomen. Examples of this are: epigastric pain, right upper quadrant pain, left upper quadrant pain , gastritis, umbilical pain, peri-umbilical pain, suprapubic pain, colic, diffuse gastric pain
Liver Enlargement >2 cm	• Physical Exam • Imaging • Assessment	• Hepatomegaly • Hepatosplenomegaly • Palpable liver	• An abnormally large liver on physical exam will be noted under the abdomen section • Ultrasound, CT, and MRI studies of the abdomen will typically measure the liver and may comment on enlargement in the interpretation	• Although clinicians can assess liver size during a physical exam, this is rarely performed and even less frequently documented in medical records. In general, any mention of an enlarged liver should be considered sufficient to meet the criteria for this finding. • The liver and spleen are often assessed and measured together, commonly noted as "hepatosplenomegaly." However, "splenomegaly" is only enlargement of the spleen and does not indicate enlargement of the liver.

Continued on next page

Table 3 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Increasing Hematocrit with decreasing platelet count	• Labs • Assessment	• Hemoconcentration • High/elevated/ increasing Hematocrit • High/elevated/ increasing Hemoglobin	• CDC defines elevated hematocrit as an increase of ≥**20%** from the individual's baseline value, or if the baseline value is not available, an increase above the normal range for the patient's age and sex (2) • Reference ranges for sex and age may vary from institution to institution, depending on the assay used. Lab reports typically include their ranges.	• Hemoglobin and hematocrit are both reported on complete blood counts (CBC's) and are measuring the same thing and thus used interchangeably, although we recommend that you look at hematocrit. • Although this finding is asking for a change in two different lab values, the focus on this finding should be on the increase in hematocrit/hemoglobin. If the clinician only notes an increase in the hematocrit/hemoglobin but does not mention the platelet count, this meets the criteria for this finding. • A low platelet count (thrombocytopenia) alone does not meet the criteria for this finding. • Hematocrit/hemoglobin varies by age, sex, and population (lower limit of normal is higher for populations living at high altitudes) and by the laboratory methodology used to provide this value. Look at the reference range provided in the laboratory report, if available or rely on the clinician's interpretation of this finding.

Table 4. Clinical Findings that Can Meet the Clinical Syndrome Classification of "Dengue" with warning signs or "Severe Dengue"

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Plasma Leakage (Extravascular Fluid Accumulation)	• Physical Exam • Imaging • Assessment			• Extravascular fluid accumulation is the end result of the pathophysiologic process of plasma leakage caused by increased vascular permeability from dengue viruses. • Extravascular fluid accumulation is a warning sign for dengue. If there is respiratory distress or hypovolemic shock as result of this extravascular fluid accumulation, it is considered severe dengue. • See below for tips on recognizing respiratory distress and hypovolemic shock in a medical record.
Hypoalbuminemia	• Labs • Assessment	• Low albumin	The cutoff for hypoalbuminemia is typically defined as a serum albumin < 3.5 g/dL. It is best to use local laboratory and aged-based cutoffs.	Albumin is a protein produced by the liver and is essential for maintaining oncotic pressure, which helps keep fluid within the blood vessels. Albumin levels typically fall as a result of plasma leakage.
Ascites	• Physical Exam • Imaging • Assessment		• The physical exam may report "shifting dullness" or "fluid wave" to note that the clinician did special maneuvers in their exam to assess for ascites • Ascites may be mentioned on ultrasound, CT, or MRI reports	Ascites is an objective finding and refers to the accumulation of fluid in the abdomen. A large volume of ascitic fluid will be visible upon a clinician's physical exam, but often small amounts of fluid (sometimes reported as "trace ascites") will be mentioned on radiology reports.

Continued on next page

Table 4 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Pleural Effusion	• Physical Exam • Imaging • Assessment		• The physical exam may report "dullness to percussion", "decreased tactile fremitus", "reduced breath sounds" to indicate that the clinician did special maneuvers in their exam to assess for fluid or consolidation • Pleural effusion may be mentioned on X-ray, ultrasound, CT, or MRI reports	Pleural effusion is an objective finding. As with ascites, a large volume will be found on physical exam, but small amounts of fluid ("trace pleural effusion") will be mentioned on radiology reports.
Pericardial Effusion	• Physical Exam • Imaging • Special Tests • Assessment		• The physical exam may report "muffled heart sounds" or "distant heart sounds" to suggest a pericardial effusion • Pericardial effusion will most likely be mentioned on an echocardiogram (or "echo") report, but can also be mentioned on CT or MRI reports	• Pericardial effusion is an objective finding and almost always confirmed with imaging of the heart by ultrasound which is called an echocardiogram or "echo." Depending on how it was performed it may be called a transthoracic echo (TTE) or a transesophageal echo (TEE). • Do not confused an electrocardiogram ("EKG" or "ECG") with an echo. An electrocardiogram is a special test where electrodes record the heart's electrical signals and do not typically report a pericardial effusion.
Bleeding	• History/Subjective • Physical Exam • Assessment			• Any bleeding is considered a warning sign for dengue. However, if an intervention is required due to the bleeding, such as administering IV fluids to replace lost blood volume or transfusing blood products, it is classified as severe dengue. • See below for tips on recognizing bleeding requiring intervention in a medical record.

Continued on next page

Table 4 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Gums	• History/Subjective • Physical Exam • Assessment	• Gingival bleeding • Oral bleeding		• Gingival bleeding is more likely to be reported by the patient and thus be found in the history/subjective part than it is to be found by the clinician on a physical exam. • In most cases, isolated bleeding from the gums does not require intervention and would be considered a warning sign but not severe dengue.
Nose	• History/Subjective • Physical Exam • Assessment	• Epistaxis • Hemorrhage from nose • Nosebleed		In most cases, isolated bleeding from the nose does not require intervention and would be considered a warning sign, but not severe dengue.
Urine/Kidney	• History/Subjective • Physical Exam • Assessment	• Gross hematuria • Macroscopic hematuria • Blood in urine		"Microscopic Hematuria" or a finding of red blood cells only on the laboratory tests of a urinalysis or urine dipstick does not meet the criteria for this finding. The clinician or patient must report visible blood in the urine to meet the criteria for this finding.
Vagina	• History/Subjective • Physical Exam • Assessment	• Menorrhagia • Metrorrhagia • Menometrorrhagia • Heavy menstrual bleeding		Rely on the clinician to report abnormal vaginal bleeding, as some patients will be on their periods and thus will have vaginal bleeding that is normal and expected.

Continued on next page

Table 4 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Gastrointestinal (GI) tract (vomit or stools)	• History/Subjective • Physical Exam • Labs/Special Tests • Assessment	• Hematemesis (blood in vomit) • Melena (black blood in stools) • Hematochezia (red blood in stools)	Stool guaiac tests are point-of-care tests that detect blood in the stool after doing a rectal exam. These results sometimes are recorded in the labs, but may also be only mentioned in the assessment.	• Report of blood in the vomit or in the stool is an extremely concerning patient described symptom. • In most cases, clinicians will initiate therapy with IV fluid for resuscitation and thus will be considered a case of severe dengue.

Tips for identifying hypovolemic shock (Compensated or Decompensated)

- Hypovolemic shock is a medical emergency that occurs when there is insufficient blood or fluid in the circulatory system to adequately oxygenate the body's vital organs. It can result from blood loss or loss of extracellular fluid, such as plasma leakage. Severe dengue can cause hypovolemic shock through hemorrhage/blood loss or plasma leakage. Plasma leakage, caused by the dengue virus, involves the leaking of protein-rich fluid from blood vessels into surrounding tissues.
- "Compensated Shock" occurs when blood volume is low, but the body compensates by maintaining blood pressure and organ perfusion through various physiologic mechanisms. Signs of compensated shock include a normal systolic blood pressure (the top number in a blood pressure) but a rising diastolic blood pressure (the lower number in a blood pressure), along with other signs that indicate volume status, such as high heart rate, weak pulses, cool extremities, delayed capillary refill, orthostatic hypotension, and low urine output.
- "Decompensated shock" occurs after compensated shock the circulatory system is unable to maintain adequate perfusion to the brain and other vital organs and is marked by a decrease in blood pressure (also called "hypotension") or a narrow pulse pressure (≤20 mm Hg). Pulse pressure is the difference between the systolic and diastolic pressure (i.e., pulse pressure = systolic pressure – diastolic pressure). Signs of organ failure include failure to produce urine ("oliguria" or "anuria"), change in mental status, and various clinical laboratory abnormalities (e.g., elevated liver function enzymes).
- Signs and symptoms that clinicians use to identify hypovolemic shock include low blood pressure, high heart rate, high respiratory rate, and weak pulses.
- Treatment typically involves rapid administration of IV fluids, known as "resuscitation" or a "bolus" of IV fluids, to restore blood volume.
- Hypovolemic shock will likely be noted by clinicians in the assessment, but may also be called "shock", "hypovolemia", or "volume depletion." Any documentation of interventions such as "resuscitation", "bolus" should prompt you to look for a diagnosis of hypovolemic shock or one of its synonyms.
- Cases of dengue that were treated for hypovolemic shock are classified as severe dengue.

Tips for identifying respiratory distress

- Respiratory distress refers to any difficulty breathing that is deemed clinically significant by the clinician. Since there are multiple mechanisms that can lead to respiratory distress and no single definitive definition, it is crucial to rely on the clinician's assessment to determine if a patient has respiratory distress due to extravascular fluid accumulation.
- Clinicians identify respiratory distress based on a patient's reported symptoms, such as difficulty breathing or shortness of breath (found in the subjective portion of the assessment). Physical exam findings indicating respiratory distress include low oxygen (O2) saturation, high respiratory rate, and abnormal findings in the oropharynx, lungs, chest, and skin. In severe cases, the need for intubation and mechanical ventilation may also be necessary to support the patient's breathing and maintain adequate oxygen levels. Laboratory findings can suggest causes or consequences of respiratory distress but are generally not the primary basis for determining its presence.
- Respiratory distress will likely be noted by the clinicians in the assessment but may also be called "Shortness of Breath (SOB)", "rapid respiratory rate", "tachypnea", "dyspnea",

"labored breathing", or "difficulty breathing." If any of these terms are noted, it should prompt consideration of a diagnosis of respiratory distress or a related term.

- Cases of dengue that have respiratory distress due to extravascular fluid accumulation are classified as severe dengue.

Tips for identifying bleeding requiring intervention

- While bleeding is common in hospitalized patients, dengue can cause clotting disorders that lead to significant blood loss. Bleeding from sites such as the gums, nose, or kidneys typically does not result in blood loss significant enough to require intervention and is usually considered a warning sign. Vaginal bleeding varies in severity and can range from requiring observation to blood transfusions. Gastrointestinal (GI) bleeding is generally serious and often necessitates intervention
- Symptoms that clinicians use to identify significant bleeding are described in Table 4.
- Significant bleeding is treated first by resuscitation by replacing blood volume with IV fluids as in hypovolemic shock (see "Tips for identifying hypovolemic shock"). While most bleeding episodes will require resuscitation with IV fluids, blood products are only transfused when the hemoglobin/hematocrit reach specific thresholds or when clinical judgment warrants immediate intervention due to a life-threatening bleed. In most cases, replacement of blood is done with "packed red blood cells (pRBC's)" which are measured in units (i.e., "1 unit of pRBC's", etc.).
- Low red blood cell counts, or "anemia", can be the result of a wide range of etiologies and should only be considered as part of the dengue case investigation if it was due to abnormal bleeding caused by dengue.
- Bleeding requiring transfusion will likely be documented by clinicians in the assessment but may also be described as "anemia due to blood loss" or "hemorrhage."
- Any cases with the interventions mentioned above should prompt further investigation for bleeding.
- All cases of dengue that have bleeding and require a transfusion are classified as severe dengue. Most cases of dengue that have bleeding and require IV fluids should be classified as severe dengue.

Table 5. Clinical Findings that Meet the Clinical Syndrome Classification of "Severe Dengue"

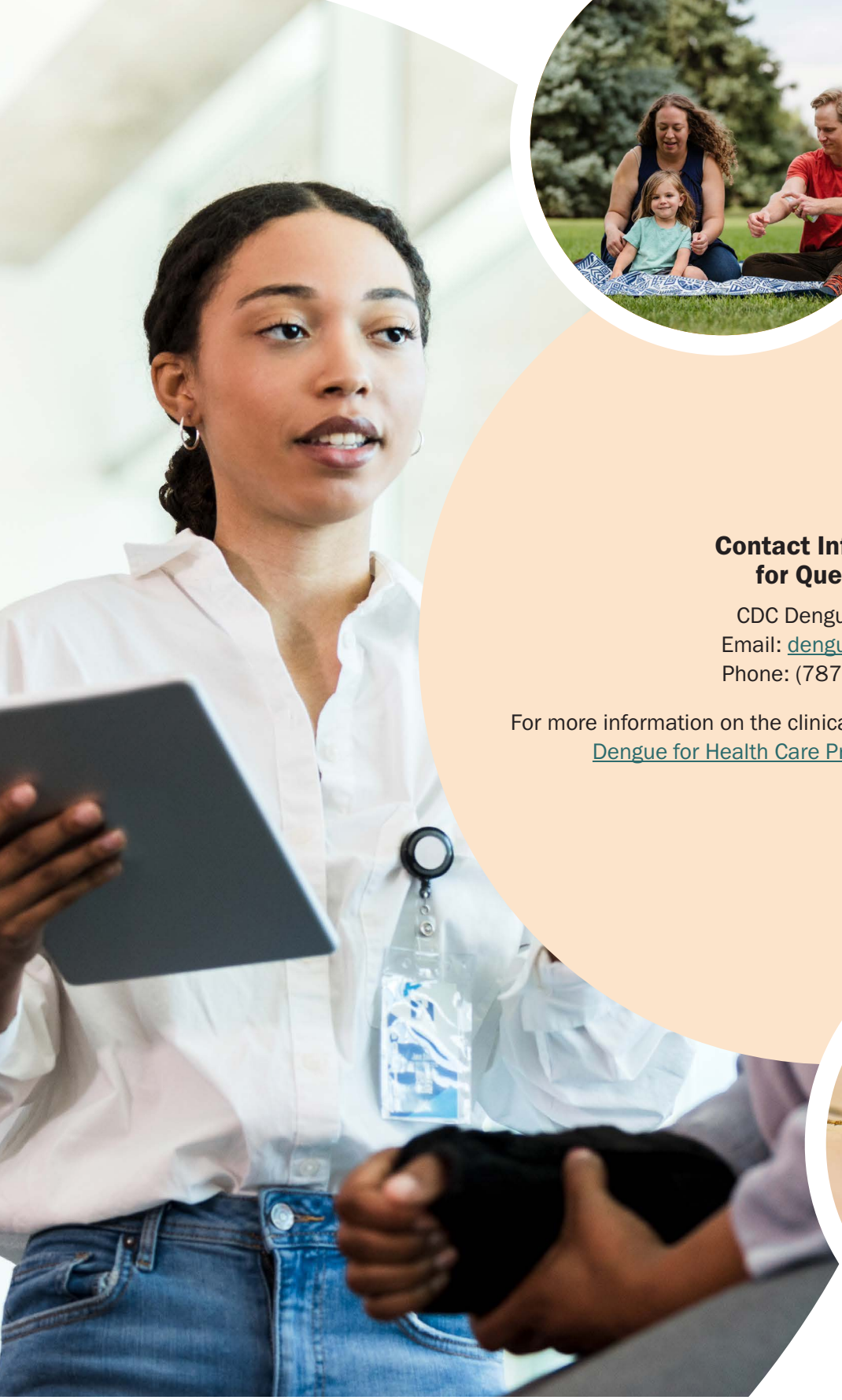
Severe Organ Involvement

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Elevated liver transaminases	• Labs • Assessment	• Hepatitis • Transaminitis	Aspartate aminotransferase (AST) or alanine aminotransferase (ALT) ≥**1,000** per liter (U/L)	
Impaired level of consciousness and/or diagnosis of encephalitis, encephalopathy, or meningitis	• History/subjective • Physical exam • Imaging • Labs • Assessment	• Altered mental status • Meningoencephalitis	Glasgow Coma Scale (GCS) score of 13–15 typically indicates mild impairment, score of 9–12 suggests moderate impairment, and a score of 8 or below indicates severe impairment	• Impaired level of consciousness and encephalopathy are clinical diagnoses based on findings from a neurologic and psychiatric exam. The Glasgow Coma Scale (GCS) is commonly used to assess a patient's level of consciousness. • Encephalitis and meningitis are diagnoses through clinical findings and abnormalities in cerebrospinal fluid (CSF) obtained by lumbar puncture (LP). Central nervous system (CNS) imaging studies may occasionally show abnormalities suggestive of meningitis or encephalitis but are not definitive for diagnosis. • Clinical signs such as "stiff neck," "ataxia," "seizures," and "paresis or paralysis" can be reported in ArboNET. While these signs provide supporting evidence of neurologic sequelae of dengue, they do not meet the classification criteria for severe dengue if present in isolation. • If you have a question about a unique case, call CDC Dengue Branch for further guidance and involvement.

Continued on next page

Table 5 continued

Finding	Where to find it	Might also be called	Interpretation	Notes/Tips
Heart involvement including myocarditis	• Labs • Imaging • Assessment	• Inflammatory cardiomyopathy • Perimyocarditis	Elevation of cardiac muscle enzymes (e.g., troponin T, troponin I, CK-MB) are required for a diagnosis of myocarditis	• Myocarditis or perimyocarditis require both elevated cardiac muscle enzyme elevation and symptoms such as chest pain or discomfort for diagnosis. • EKG's are routinely performed and interpreted by the clinician. • **Rely on the clinician's assessment to report myocarditis or other cardiac involvement related to dengue to meet the criteria for this finding.**
Other organ involvement including cholecystitis, pancreatitis, etc.	• History/subjective • Physical exam • Imaging • Labs • Assessment	N/A		• Although dengue can affect many organs based on a variety of pathophysiologic pathways, these cases are rare. • Involvement of multiple specialists (particularly infectious disease physicians) are typically required to make a diagnosis of dengue affecting other organs. • **Rely on the clinicians to report other organ involvement related to dengue to meet the criteria for this finding.** • If you have a question about a unique case, call CDC Dengue Branch for further guidance and involvement.



Contact Information for Questions

CDC Dengue Branch
Email: dengue@cdc.gov
Phone: (787)706-2399

For more information on the clinical aspects of dengue please visit:
Dengue for Health Care Providers | Dengue | CDC

References

1. Council of State and Territorial Epidemiologists. Revision of Case Definitions for National Notification of Dengue. In: Infectious Disease Committee, editor; 2014.
2. Dengue: guidelines for patient care in the Region of the Americas. Washington, D.C. : PAHO, 2016

354966-A