SUPPLEMENTAL INFORMATION

DENGUE KNOWLEDGE, ATTITUDES, AND PRACTICES
OF TEXAS PHYSICIANS, KEY, AND EXPLANATIONS

The purpose of this survey is to collect information from
clinicians in Texas about clinical knowledge, attitudes,
and practices regarding the management of patients with
dengue. The survey is a maximum of 27 questions long
and should take 15 minutes or less to complete. Results
from this survey will be used to tailor dengue training for
Texas clinicians.

Your participation is completely voluntary. If you decide
to take the survey, all questions except demographic ques-
tions must be answered to continue. No information will
be collected that will identify you directly, but it is theo-
retically possible that a combination of information might
be enough to identify some respondents. However, indi-
vidual responses will not be shared outside project staff,
and the results of this survey will be presented in sum-
mary form only. If you have any questions about the sur-
vey, please contact Jessica K. Adam at jessica.adam@
cdc.hhs.gov.

Your time is valuable. To thank you for completing our
survey, you will be eligible to enter a drawing for an
iPad Mini. There will be about a one in 2,000 chance of
winning. If you would like to be entered in the drawing,
please submit your e-mails at the end of the survey.

Thank you.

1. How many cases of dengue have you personally diag-
nosed during your career?
   a. 0
   b. 5 or less
   c. 6–10
   d. 11–20
   e. > 21 cases

2. Do you currently diagnose and treat patients?
   a. No, I do not. You may stop here, thank you for
      your participation.
   b. Yes, I currently see patients. **Please continue with
      the survey.**

3. Where do you see patients? **(Check all that apply)**
   a. Outpatient clinic or office
   b. Community health center
   c. Emergency department/urgent care
   d. Inpatient hospital ward
   e. Intensive care unit

4. How many years have you been in clinical practice?
   a. 5 years or less
   b. 6–10 years
   c. 11–15 years
   d. 16 or more years

5. Which county do you primarily practice in? ___________

6. What is your clinical training background?
   a. Medical doctor or doctor of osteopathic medicine
   b. Nurse practitioner
   c. Physician assistant

7. What is your specialty? **(Check all that apply)**
   a. General practice
   b. Family medicine
   c. Internal medicine
   d. Pediatrics
   e. Infectious disease
   f. Emergency medicine
   g. Hematology/oncology
   h. Obstetrics/gynecology
   i. Intensive care
   j. Other ___________

8. After being bitten by a mosquito infected with dengue
   virus, how long does it take someone to develop dengue
   illness?
   a. Less than 3 days after exposure
   b. Anytime 3–10 days after exposure
   c. As long as 3 weeks after exposure
   d. Anytime in the month after exposure

   b. Dengue illness can occur anytime 3–10 days after
      exposure.

9. What prevention messages should be given to patients
   to avoid dengue virus infection? **(Check all that apply)**
   a. Travelers to endemic areas should be offered vacci-
      nation
   b. Use mosquito repellent and wear long sleeves and
      pants for protection
   c. Avoid mosquitos during the peak feeding time at night
   d. If someone in the household is sick with dengue, take
      precautions so that a mosquito does not bite the
      infected person and then bite others in the household.

   b and d. Patients should be told to use repellent and
      wear long sleeves and pants for protection. Dengue virus
      can be spread when a mosquito feeds on someone who is
      ill with dengue or someone who has dengue virus in their
      blood and does not have symptoms. Dengue virus then
      replicates in the mosquito for about 1 week and then trans-
     mits the virus when it bites another person. Currently, there
      is no dengue vaccine. The mosquitos that transmit dengue
      virus reside in people’s homes and they feed primarily dur-
      ing day.

10. How should a clinician identify a patient with dengue at
    the time of presentation? **(Check all that apply)**
    a. Take a fever history to identify any reported fever
       within the past week
    b. Only consider dengue if the patient is febrile
       on presentation
c. Perform a complete blood count to look for hemo-
concentration, leukopenia, or thrombocytopenia
d. Ask about headache, retro-orbital pain, joint pain, 
rash, and muscle aches
e. Ask about vomiting, abdominal pain, bleeding, 
and lethargy
f. Only consider dengue if thrombocytopenia is 
present

a, c, d, and e are correct answers. Dengue is a dynamic 
disease and patients will not have fever if they present later 
in the disease course. Thrombocytopenia is typically not 
present early in the disease course (i.e., first 72 hours after 
disease onset).

11. Which of the following is the best early indicator of 
shock? (Choose one best answer)
   a. Hypotension
   b. Bradycardia
   c. Mental status changes
   d. Tachycardia in the absence of fever or delayed 
capillary refill

d. Dengue patients in the initial stage of shock develop 
tachycardia as a compensatory reaction to reduced blood 
volume and often demonstrate a normal systolic blood 
pressure with narrowing pulse pressure. This is called 
compensated shock. Tachycardia and delayed capillary 
refill is the best early indicator of shock. Later, as the 
blood pressure drops and the patient develops frank 
hypotensive shock, the patient will experience mental 
status changes. Bradycardia is a late finding in a patient 
with shock.

12. How can clinically significant plasma leakage be 
detected in a suspected dengue patient? (Check all 
that apply)
   a. Decreasing hematocrit
   b. Increasing hematocrit above 20% of baseline
   c. Decreasing platelet count
   d. Chest X-ray with lateral decubitus view to look for 
pleural effusion

B and D. Defervescence marks the critical phase of den-
gue, when clinically significant plasma leakage can occur. 
Pleural effusions and ascites may be detectable clinically 
and on chest X-ray and abdominal ultrasound. An increase 
in capillary permeability resulting in plasma leakage can be 
detected by an increasing hematocrit.

13. Which of the following are the correct criteria for 
sending a suspected dengue patient home? (Check all 
that apply)
   a. Passing urine at least once every 6 hours
   b. Has abdominal pain but no persistent vomiting
   c. Does not have coexisting conditions such as 
diabetes
   d. Has a pulse pressure less than 20
   e. Does not have any warning signs
   f. No hemoconcentration

A, C, E, and F are correct. Suspect dengue patients 
with warning signs for severe dengue should be closely 
monitored and not sent home. Abdominal pain is a warn-
ing sign for severe dengue. A patient with a narrow pulse 
pressure defined as a systolic blood pressure–diastolic 
blood pressure < 20 is in shock and should not be 
discharged home.

14. When do you expect a patient to develop clinically sig-
nificant plasma leakage? (Choose one best answer)
   a. During the first 3 days of illness while the patients is 
febrile
   b. Usually on days 3–7 of illness, around the time of 
defervescence
   c. Following a rapid increase in platelet count and 
progressive leukocytosis
   d. During the recovery phase
   b. Clinically significant plasma leakage occurs at the time 
of defervescence, which marks the start of the critical 
phase. Laboratory findings include a progressive drop in 
leukocytes from early in the clinical course and rapid fall in 
the platelet count that occurs around the time of defervescence.

15. When and under what circumstances should you tell a 
patient with suspected dengue to return to the clinic or 
present to local emergency department? (Check all 
that apply)
   a. Persistent vomiting
   b. Drowsiness or lethargy
   c. Hematemesis
   d. High fever (> 38°C)
a, b, and c are all warning signs for severe dengue. Sus-
pect dengue patients should be taught the warning signs 
and told to seek medical care if present. Fever is not a 
warning sign of severe dengue. Severe dengue develops 
after defervescence.

16) When do you expect a patient with dengue to develop 
thrombocytopenia? (Choose one best answer)
   a. In the first 3 days of the illness, while the patient 
is febrile
   b. During the recovery phase
   c. Thrombocytopenia is not seen in dengue
   d. Following progressive leukopenia, around the time of 
defervescence
   d. Thrombocytopenia is typically not present in the first 
few days of illness. Thrombocytopenia usually develops 
around the time of defervescence after the patient has 
become leukopenic.

17) Do you use corticosteroids (prednisone, methylprednis-
olone) to treat dengue?
   a. No, never. Go to next question
b. I have never seen a case of dengue
c. Yes. What are your criteria for using corticosteroids? (Check all that apply)
  1) All cases of suspected dengue admitted to the hospital
  2) All cases of suspected dengue with platelet count < 50,000
  3) All cases of suspected dengue with platelet count < 100,000
  4) Only for cases of severe dengue with severe bleeding
  5) Only for cases of severe dengue with severe plasma leakage
  6) Only for cases of severe dengue with severe organ involvement
  7) Other (please specify) ______________________

d. Dengue should be reported only if it is a locally acquired case
c. Dengue is a reportable disease in Texas and all clinically suspect and laboratory confirmed cases should be reported within 1 week regardless of whether it is a travel-associated case or a case without travel history.

21. Which medications should be offered to suspect dengue patients for the relief of discomfort? (Check all that apply)
   a. Ibuprofen or other nonsteroidal anti-inflammatory agents (NSAIDs)
   b. Acetaminophen
   c. Aspirin
   d. Corticosteroids (prednisone, methylprednisolone)

   b is correct; give acetaminophen for high fever or for muscle and joint pain. Avoid aspirin, ibuprofen, or other NSAIDs and steroids, as these drugs may aggravate gastritis or bleeding.

22. What is true about testing for dengue virus? (Choose one best answer)
   a. Absence of anti-dengue IgM antibodies rules out acute infection
   b. Anti-dengue IgM antibodies are first detectable in most patients on days 3–5 after illness onset
   c. No test exists to diagnose acute dengue virus infection before antibody production
   d. Anti-dengue IgG antibodies detected in days 1–3 after onset can be used to diagnose an acute dengue virus infection

   b is correct. Dengue virus genome can be detected by polymerase chain reaction from illness onset to about day 5. IgM antibodies first appear on days 3–5 of illness. In patients who have had dengue virus infection in the past, IgG is detectable for life so that anti-dengue IgG antibodies detected in the first few days after illness onset may represent past infection and cannot be used to diagnose an acute dengue virus infection. In patients with their first dengue virus infection, IgM is detectable first followed by IgG, which is present after the first week of illness.

23. When should intravenous (IV) crystalloids (i.e., Ringer’s lactate, normal saline) be given to suspected dengue patients? (Check all that apply)
   a. All cases regardless of clinical evidence of shock or hemoconcentration
   b. Hypotension, as initial fluid replacement therapy
   c. Significant clinical bleeding, as initial fluid replacement therapy
   d. Low hematocrit and persistent shock after initial IV fluids given
   e. High hematocrit, as initial fluid replacement therapy
   f. Tachycardia, delayed capillary refill, or low urine output as initial IV fluid therapy

   a, b, d, f, h, and i are warning signs of severe dengue. Liver enlargement > 2 cm is also a warning sign.
b, e, and f are correct. Crystalloids should be used as the initial fluid replacement for those with signs of compensated and decompensated shock. Ambulatory patients should be encouraged to take oral fluids or oral rehydration solution. Dengue patients should be given a blood transfusion if there is evidence of clinically significant bleeding or they have a low hematocrit and persistent shock after IV fluids are given.

24. When should blood transfusions (whole blood or packed red blood cells) be given for a patient suspected of having dengue? (Check all that apply)

a. Hypotension as a presenting symptom in a suspected dengue patient

b. Low platelet count without bleeding, shock, or hypotension

c. Significant clinical bleeding

d. Low hematocrit and persistent shock after a trial of IV crystalloids and/or colloids

e. Blood transfusions should never be given

c and d are correct. Blood transfusions should be given as soon as severe bleeding is suspected or a clinically significant bleed is recognized. A low hematocrit in a dengue patient with persistent shock after IV fluid resuscitation suggests severe bleeding. If severe bleeding is not suspected, initial fluid resuscitation should include IV crystalloids. Low platelet count is not an indication for giving a blood transfusion.