

TEACHING IMMUNIZATION

→ *for Medical Education*

REVISED BY

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HEPATITIS B PREVENTION

Small-Group Booklet



DEPARTMENT OF FAMILY MEDICINE
UNIVERSITY OF PITTSBURGH

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BACKGROUND ON THE MULTISTATION CLINICAL TEACHING SCENARIOS (MCTS) METHOD

The multistation clinical teaching scenarios were developed to encourage active small-group learning in a clinically relevant context with a modest amount of faculty time. The time commitment of both the facilitator and the student is typically 50 to 90 minutes, depending on the setting and goals. The MCTS teaching method may be readily used in medical pre-clinical and clinical years when students' or residents' time is limited. MCTS is well suited to objective-driven curricula. In the MCTS session, one facilitator can interact with groups ranging from 10 to 30 students or residents. The facilitator needs basic knowledge about the disease and immunization covered but does not need to be a content expert.

MCTS was developed at Harvard University to teach radiology.¹¹ Viewboxes were displayed around a room and small groups of students rotated between viewboxes. At each viewbox, a clinical history was given along with questions (e.g., What is the differential diagnosis?). W. Scott Schroth, MD, modified this approach to teach medical students during a primary care clerkship at George Washington University.¹² Students rotated between stations that consisted of microscopes (e.g., Gram stain and urine specimens), x-ray films, and brief histories. After all cases were completed, the facilitator led a discussion of the relevant teaching points. This approach was adapted by the authors for use with vaccine-preventable diseases.

Students and residents are assigned to small groups of 3 to 5 for an MCTS session. All of the small groups simultaneously address the first scenario. Each small group spends approximately 5 to 10 minutes attempting to solve the problem addressed in the scenario. The scenario is discussed in a large group. The facilitator calls on one of the small groups to present their answers, then the facilitator and large group discuss each small group's response to the scenario and summarize the teaching points. The facilitator should correct wrong answers and discuss the teaching points. Generally, the large-group discussion should not last more than 7 minutes per scenario. After the first scenario is discussed, each small group works on the second scenario. A large-group discussion follows. The process is repeated until all scenarios are completed or the allotted time expires.



SUGGESTED SCHEDULE FOR MCTS SESSION

1. Arrange chairs in groups of 3 to 5, and separate students or residents into small groups.
2. Distribute copies of the objectives from the *Hepatitis B Prevention Small-Group Booklet* along with a copy of the learning aids listed for the scenarios to each small-group member.
3. Review the objectives briefly, focusing on the primary objectives.
4. Instruct the residents or students to start the first scenario by having one member of each small group read the scenario aloud. Subsequently, each small group should work on answering the questions. Instruct them to divide the resource materials since each individual may not have time to read all of the materials. Also instruct them to stay on the same page so everyone is working on the same scenario. To answer the questions, the learners should use their previous knowledge and experience, the resource materials (suggested parts are listed), and the abstracts included in selected scenarios.
5. Convene as a large group after 5 to 10 minutes, depending on the complexity of the scenario. Select one group to present their answers to the questions. Critique their answers and discuss the teaching points for 5 to 7 minutes.
6. Repeat steps 4 and 5 for the remaining scenarios that you have selected.

HEPATITIS B NOMENCLATURE

HBV	Hepatitis B virus	Anti-HBs	Antibody to HBsAg
HBsAg	Hepatitis B surface antigen	Anti-HBe	Antibody to HBeAg
HBeAg	Hepatitis B e antigen	Anti-HBc	Antibody to HBcAg
HBcAg	Hepatitis B core antigen	IgM anti-HBc	IgM class antibody to HBcAg
HBIG	Hepatitis B immune globulin		

OTHER TERMINOLOGY

Commercial sex worker – used interchangeably with the word *prostitute*
 Injection-drug user – refers to persons who illegally use injectable drugs



PRIMARY OBJECTIVES

- **At the end of this session, the learner should be able to do the following:**
 1. Given a patient with jaundice, identify possible diagnoses and interpret hepatitis B serological tests.
 2. Predict the likely source of transmission, given the patient's behavioral, occupational, and environmental background.
 3. Explain the rationale for routine hepatitis B vaccination.
 4. Given a patient scenario, recommend vaccination based upon appropriate indications, such as occupation, international travel, and infection with the human immunodeficiency virus (HIV).
 5. Given an office setting, describe procedures to a) improve identification of persons needing vaccination, and b) increase timely compliance with the second and third doses.
 6. Recall contact tracing needs for an infected person, including appropriate screening tests.

SECONDARY OBJECTIVES

1. Appraise the risk of HBV infection for the patient's contacts, based upon the type of contact, incubation period, and period of communicability.
2. Explain the general epidemiology of reported cases, including the high infectiousness of the virus and the percentage of cases whose source is unknown.
3. Identify serious complications (e.g., fulminant hepatitis, cirrhosis, and hepatocellular carcinoma) and prophylaxis.
4. Explain the appropriate site (e.g., anterolateral thigh in infants and deltoid in adults), interval between doses, and rationale for not administering the vaccine intradermally or intragluteally.
5. Recall that dose varies by age and that the two vaccines available have different dosages for different populations.
6. Recall that the infant schedule and use of hepatitis B immune globulin depends on the hepatitis B surface antigen status of the mother.
7. Recognize patient fears about vaccination, including fear of HIV infection.
8. Discuss information on general vaccine safety and adverse events following vaccination.
9. Explain the rationale for the second and third doses.

SCENARIO ONE

Mr. Banks is a 41-year-old male who complains of fatigue, gray-colored stools, and cough. He has a 3-week history of gray-colored stools and a 3- to 7- day history of dark-colored urine. He complains of persistent nausea and vomiting after meals. His sclera are icteric. His liver is tender and palpable 4 fingerbreadths below the right costal margin.

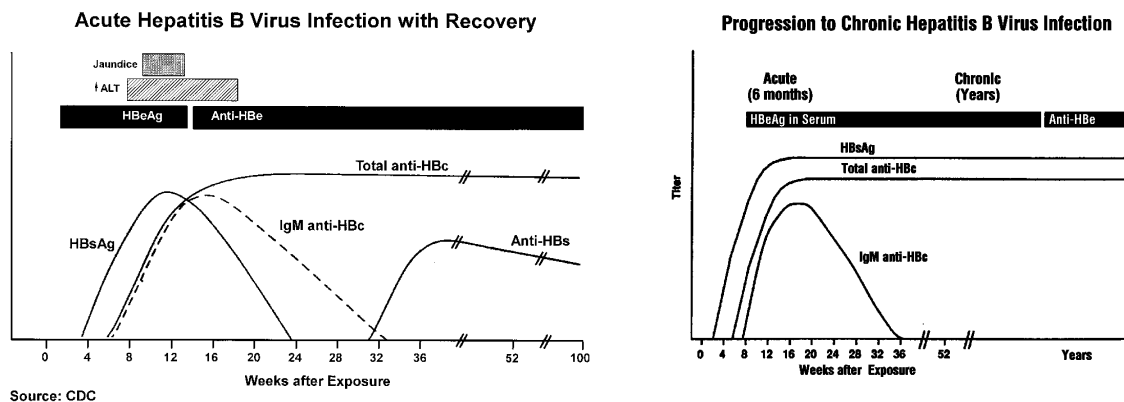
• **Laboratory Values**

- Total bilirubin, 5.8 mg/dL
- Direct bilirubin, 4.5 mg/dL
- AST (SGOT), 1,420 IU/L
- ALT (SGPT), 2,668 IU/L
- LDH, 867 mg/dL
- Alkaline phosphatase, 1,132 IU/L
- Total protein, 7.3 g/dL
- Albumin, 3.4 g/dL

IgM antibody to hepatitis A virus was negative but IgG was positive. Hepatitis B surface antigen (HBsAg) was present, as was IgM antibody to hepatitis B core antigen (anti-HBc). Hepatitis C ELISA was nonreactive. Abdominal CT revealed only hepatomegaly.

• **Learning Aids**

1. Top photo, on page 16 and graphs shown below



2. Hepatitis B in: Centers for Disease Control and Prevention. In *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 9th ed. Atlanta, GA: Center for Disease Control and Prevention, National Immunization Program; January 2006. See sections: Hepatitis B Virus, Clinical Features, Chronic HBV Infection, Laboratory Diagnosis (pp. 207 - 211). See link: <http://www.cdc.gov/nip/publications/pink/hepb.pdf>

• **Questions for Learners**

1. What are the possible differential diagnoses for his chief complaint (before serological test results are available)?
2. What do the liver function test results suggest?
3. How do you interpret his hepatitis test results? What is the pattern for a chronically infected individual? What is the pattern for a person who has recovered?
4. Which hepatitis tests should have been ordered?
5. How likely is he to become chronically infected with HBV?



Source: CDC



SCENARIO TWO

Jean recently noticed her skin turning yellow and appeared jaundiced on examination (see bottom photo, page 16). Her test result is positive for hepatitis B surface antigen (HBsAg) and IgM antibody to hepatitis B core antigen (IgM anti-HBc). She has a 3-year history of injection-drug use (IDU), including sharing of needles. Her HIV test result was negative. Her last IDU was 2 months ago. She is status-post laparotomy following multiple stab wounds 1 year ago, during which time she received a transfusion. She is sexually active with her boyfriend.

- **Learning Aids**

1. Hepatitis B in: Centers for Disease Control and Prevention. In *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 9th ed. Atlanta, GA: Center for Disease Control and Prevention, National Immunization Program; January 2006. See sections: Laboratory Diagnosis (pp. 209 - 211), Epidemiology (pp. 211 - 214), Vaccination Schedule and Use/Adults (pp. 221 - 223), Postexposure Management (pp. 226 - 228), Susceptible Sexual Partners of Persons with Acute or Chronic HBV Infection (p. 229).
<http://www.cdc.gov/nip/publications/pink/hepb.pdf>
2. Bottom photo, page 16.

- **Questions for Learners**

1. What was the most likely source of hepatitis?
2. What are the contact tracing needs? Does her case need to be reported?
3. What is the risk to Jean's boyfriend? What should be done for him?
4. What is the risk for those with whom Jean has shared needles? Given that she is willing to identify them if their names will be treated confidentially, what should be done for them?
5. Jean was hospitalized approximately one year ago for treatment of stab wounds. Should she have received hepatitis B vaccine then?



SCENARIO THREE

A nurse who started an IV on a jaundiced patient accidentally stuck herself with a needle contaminated by the patient's blood. She is frightened by the possibility of hepatitis. However, she is even more frightened by hepatitis B vaccine. She heard that it is manufactured from the plasma of persons who have been infected with HBV and is also concerned that she might get HIV from the vaccine.

- **Learning Aid**

1. Hepatitis B in: Centers for Disease Control and Prevention. In *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 9th ed. Atlanta, GA: Center for Disease Control and Prevention, National Immunization Program; January 2006. See sections: Hepatitis B Vaccine (pp. 215 - 218), Postexposure Management (pp. 226 - 228), Adverse Reactions Following Vaccination (pp. 229 - 230). <http://www.cdc.gov/nip/publications/pink/hepb.pdf>

- **Questions for Learners**

1. If the patient has acute or chronic HBV infection, what is the risk to the nurse? Is the nurse at risk for HBV infection from the needlestick?
2. How is hepatitis B vaccine currently produced?
3. Can hepatitis B vaccine transmit HIV? What are the vaccine's adverse events?
4. What should be done for the nurse?
5. What office procedures can be taken to help the nurse finish the hepatitis B vaccine series, since more than 1 dose will be needed?

**SCENARIO FOUR**

Ms. Lai is the sex contact of a person who is acutely infected with HBV. She is asymptomatic, but her hepatitis B surface antigen test and total anti-HBc test results are positive. Old medical records indicate that Ms. Lai tested positive 13 years ago, when she immigrated to the United States from Southeast Asia. She is pregnant and babysits for two infants. Dr. Thomas, the physician to whom she plans to take her child for well-child care, does not have privileges at the hospital where the infant will be born.

- **Learning Aid**

1. Hepatitis B in: Centers for Disease Control and Prevention. In *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 9th ed. Atlanta, GA: Center for Disease Control and Prevention, National Immunization Program; January 2006. See sections: Complications and Chronic HBV Infection (p. 209), Epidemiology (pp. 211 - 214), Vaccination Schedule and Use/Other Groups Who May Be Candidates for Hepatitis B Vaccine (pp. 223 - 224), Postexposure Management (pp. 226 - 228).
<http://www.cdc.gov/nip/publications/pink/hepb.pdf>

- **Questions for Learners**

1. Where was Ms. Lai most likely to have become infected with HBV?
2. What are the serious complications of her disease?
3. What is her child's risk for becoming infected with HBV at the time of delivery?
4. What should be done for her child following delivery? How soon should it be done? Where should the treatment be administered?
5. How likely is it that the records about the newborn's need for hepatitis B vaccine will be sent to the physician doing well-child care? How could this be facilitated?
6. What should be done for the two infants for whom she babysits?

SCENARIO FIVE

Dr. Thomas, a primary care physician, recently read a journal article that discussed the amount of suffering from hepatitis B in the United States. The article recommended a comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States. Dr. Thomas' practice is in a suburban area. Dr. Thomas wonders if this strategy is justified in a suburban practice.

• Learning Aids

1. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States. Recommendations of the Advisory Committee on Immunization Practices (ACIP). Part 1: Immunization of Infants, Children and Adolescents MMWR 2005; 54(No RR-16) p 1-30. See sections: Strategy to eliminate hepatitis B virus transmissions, Background: Clinical Features and Natural History of HBV Infection Epidemiology. <http://www.cdc.gov/mmwr/PDF/rr/rr5416.pdf>
2. Table on page 24.

• Questions for Learners

1. Is a comprehensive strategy justified? Why or why not? List reasons.
2. What are the components of such a strategy?

Hepatitis B and Other Selected Diseases of Children in the Years Before Vaccines Were Routinely Used

Disease	Year*	# of Cases	# of Deaths
Hepatitis B	1989	132,700	5,820†
<i>Haemophilus influenzae</i> type b (Invasive disease and meningitis)	1986	21,690	885
Paralytic poliomyelitis	1954	18,308	—
Measles	1964	458,083	380
Rubella	1970	57,686	—
Congenital rubella	1970	77	—

* Preceding major use of vaccine.

† Figure includes an estimated 320 deaths from acute HBV infection and an estimated 5,500 deaths from chronic HBV infection.

Adapted from West DJ, Margolis HS. Prevention of hepatitis B virus infection in the United States: a pediatric perspective. *Pediatr Infect Dis J* 1992;11:866-874. In Mahoney FJ, Burkholder BT, Matson CC. Prevention of hepatitis B virus infection. *American Family Physician* 1993;47(4):867.

**SCENARIO SIX**

Dr. Ruffa realizes the amount of suffering from hepatitis B in the United States and wants to help. However, Dr. Ruffa's practice consists almost entirely of adults; furthermore, Dr. Ruffa does not practice obstetrics.

- **Learning Aid**

1. Hepatitis B in: Centers for Disease Control and Prevention. In *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 9th ed. Atlanta, GA: Center for Disease Control and Prevention, National Immunization Program; January 2006. See sections: Hepatitis B Vaccine/Immunogenicity and Vaccine Efficacy (pp. 216 - 218), Vaccination Schedule and Use/Adults (pp. 221 - 223), Vaccination Schedule and Use/Other Groups Who May Be Candidates for Hepatitis B Vaccine (pp. 223 - 224).
<http://www.cdc.gov/nip/publications/pink/hepb.pdf>

- **Questions for Learners**

1. Who in Dr. Ruffa's practice should receive hepatitis B vaccine? (List)
2. How can Dr. Ruffa systematically identify which patients need hepatitis B vaccine?
3. How should hepatitis B vaccine be administered to adults?
4. What can Dr. Ruffa do to encourage compliance with the second and third doses of hepatitis B vaccine?
5. When should the second and third doses of hepatitis B vaccine be given if the schedule is interrupted?