

The Role of Healthcare Provider in Management Hepatitis B Patients

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Abstract: Hepatitis B is a disease that requires constant care. Infection is associated at all stages of life in all countries of the world, and a large percentage of people infected with hepatitis B have not been diagnosed while they are exposed to the risk of serious illness and death. This study sought to address the gap between the current and optimal diagnosis of hepatitis B in the primary care clinic, and to reveal the role What we play is caring for patients with this infection by nurses, laboratory specialists, and pharmacists who specialize in giving medications to patients with hepatitis B. introduction : Hepatitis B vaccine is a vaccine that ensures prevention of hepatitis B infection. The vaccine contains one of the virus's envelope proteins, which is the antigen found on the outer surface of the B virus (HBsAg). It is made by yeast cells, which contain the genetic code for HBsAg. A course consisting of (3) doses, the second to be taken at least one month after the first dose and the third to be taken six months after the first dose. The immune system then creates antibodies to HBsAg in the blood. Antibodies to HBsAg are known as anti-HBsAg.

Introduction : These antibodies and the immune system's memory provide immunity against hepatitis B infection. The first vaccine became available in 1981. There are a range of vaccines available on the market. Nowadays vaccines manufactured using genetic engineering technology are available, which means that they are produced by inserting the genetic unit of hepatitis B virus into known yeast where it is cultured, assembled, and purified. Hepatitis B infection cannot be caused by the vaccine. Popular brands available are Engerix-B (GSK), Elovac B (Human Biologicals Institute, A division of Indian Immunologicals Limited), Genevac B (Serum Institute), Shanvac B etc(50). .

All of these vaccinations are taken intramuscularly. His invention The invention of the vaccine began when virologist Alfred Prince realized in 1968 that the Australia antigen was part of the virus that causes hepatitis. Maurice Hellmann at Merck used three treatments (pepsin, urea, and formaldehyde) of blood serum with microfiltration to extract a product that could be used as a safe vaccine. It was previously licensed by the Food and Drug Administration (FDA) in 1981. It was not very successful in the markets because doctors knew that it was a product made from human blood serum. It was withdrawn from the market when Hellman's collaborators in 1986 succeeded in making the antigen in yeas(18)t.

This is the vaccine used to this day. Categories that are recommended to take the vaccine Children born to mothers with active hepatitis B infection are recommended to receive the vaccine to reduce the risk of transmission of hepatitis B virus infection from mother to child(39).

An international review of HBV health-care provider-to-patient transmissions in other countries in which the HBV DNA levels (viral load) of the providers were measured has determined that 4 x 10⁴ genome equivalents per ml (GE/ml) (roughly comparable to 8,000 international units (IU)/ml) was the lowest level of HBV DNA in any of several surgeons implicated in transmission of HBV to patients between 1992 and 2008 (9–15)(32).

This lowest measurement was taken >3 months after the suspected transmission event, so the relevance of the HBV DNA viral load to transmissibility is unclear. In general, those surgeons who transmitted HBV to patients appear to have had HBV DNA viral loads well above 105 GE/ml (or above 20,000 IU/ml) at the earliest time that viral load was tested after transmission(45).

However, the few studies conducted in nonhuman primates have reported different results regarding the correlation between HBV DNA levels in blood and infectivity. One study found a correlation (16), but another did not (17).

Diagnosis: Your doctor will examine you for any signs of liver damage, such as yellowing of the skin or abdominal pain. Tests that can help diagnose hepatitis B or its complications include: Blood tests. Blood tests detect indicators of hepatitis B virus in your body and tell your doctor whether it is chronic or acute. By performing a simple blood test, it can also determine whether you have immunity to infection with this virus. Liver ultrasound(40).

The extent of damage to the liver can be detected with a special type of ultrasound called transient elastography. Liver biopsy. Your doctor may take a small sample of your liver to examine it and determine the extent of damage to the liver. This procedure is called a liver biopsy, and the doctor inserts a thin needle through the skin and into the liver to take a tissue sample and examine it in the laboratory. Screening healthy people for hepatitis B infection Doctors sometimes test healthy people for hepatitis B infection; Because the liver may be damaged by the virus before it causes signs and symptoms to appear in the patient(33).

Talk to your doctor about getting tested for hepatitis B infection if:

- If you are a pregnant woman Living with someone who has hepatitis B Having sexual relations with several people Living with someone who has hepatitis B
- Men who have sex with men Having a history of sexually transmitted diseases Infection with HIV Conducting a liver enzyme test and showing abnormal and inexplicable results Dialysis procedure .
- Taking medications that suppress the immune system, such as medications used to prevent rejection of a transplanted organ after a transplant Illicit drug injection Entering prison Being born in a country where hepatitis B is common, including Asia, the Pacific Islands, Africa, and Eastern Europe.
- The parents or adopted children are from places where hepatitis B is common, such as Asia, the Pacific Islands, Africa, and Eastern Europe(17).

As soon as possible and within 48 hours of birth, newborns are vaccinated with the hepatitis B vaccine with the antigen on the envelope of the virus (HBsAg) and an injection of hepatitis B antibody (HBIG).

Many countries now routinely vaccinate infants against hepatitis B in countries with high rates of hepatitis B virus infection, and vaccination of newborns has not only reduced the risk of infection, but has also led to a marked reduction in liver cancer.

This has been reported in Taiwan where a nationwide hepatitis B vaccination program was implemented in 1984 and was associated with a decrease in the incidence of childhood liver cancer. In many areas, hepatitis B vaccination is also required for all health care officials and laboratory workers.

Some on-campus college housing units now require certification of vaccination as a prerequisite. In August 2008, an Australian couple went to trial after the New South Wales Supreme Court ordered them to be forced to vaccinate newborns against the disease. The Department of Social Services issued an order, considering what doctors say that the five-day-old child is at high risk of contracting this disease because his mother is a carrier of the disease. Parents believe (see Vaccine controversy) that the aluminum in a vaccine will cause more harm to the child than the disease itself(30).

Prevention Strategies :

-Standard Precautions :Strategies to promote patient safety and to prevent transmission of bloodborne viruses in health-care settings include hepatitis B vaccination of susceptible health-care personnel and the use of primary prevention (i.e., preventing exposures and therefore infection) by strict adherence to the tenets of standard (universal) infection control precautions, the use of safer devices (engineering controls), and the implementation of work practice controls (e.g., not recapping needles) to prevent injuries that confer risks for HBV transmission to patients and their providers. Public health officials in the United States base Standard Precautions on the premise that all blood and blood-containing body fluids are potentially infectious (3,4). Since 1996, CDC has specified the

routine use of Standard Precautions (38,39) that include use of protective equipment in appropriate circumstances, implementation of both work practice controls and engineering controls, and adherence to meticulous standards for cleaning and reusing patient care equipment. For example, double-gloving now is practiced widely, and the evidence to demonstrate the feasibility and efficacy of this and other interventions is extensive (40–44)(28).

Liver functions The liver performs many functions, including: Processing the nutrients absorbed by the intestines, and purifying the blood from toxic substances, drugs, alcohol and other harmful substances. Helping in the process of digesting fats, as the liver produces bile contained in the gallbladder. Production of cholesterol, blood-clotting substances, and some other proteins. The liver has a superior regenerative ability and can heal on its own by replacing or repairing damaged tissue. Healthy cells permanently take over and replace the damaged cells, or at least until the damage is repaired. However, the liver can become infected with a number of diseases that may cause severe or irreversible damage, including hepatitis B(39)..

Types of hepatitis B There are two types of hepatitis B: Acute hepatitis B: lasts less than 6 months. Chronic hepatitis B: lasts for at least 6 months. In cases of severe infection, the immune system is usually able to eliminate the virus from the body so that it is completely and completely recovered within a few months. The most common ways of infection The most common methods of transmission of hepatitis B virus infection in industrialized countries: Sexual relationship. Use of used needles and syringes. Being accidentally pricked by a contaminated needle. Transmission from mother to newborn. Symptoms of hepatitis B The majority of children and infants infected with hepatitis B have no signs or symptoms of the disease at all, and some adults do as well. Symptoms and signs usually appear about 12 weeks after infection, and may sometimes be mild, or severe and severe at other times. Symptoms include some or all of the signs listed below: Anorexia. Nausea and vomiting. General weakness and fatigue. Abdominal pain, especially in the liver area. Dark urine. Yellowing of the skin and the whites of the eyes (Jaundice). Joint pain. Causes and risk factors of hepatitis B Hepatitis B virus can infect anyone regardless of age, race, nationality, gender, or even sexual orientation. The cause of the disease Hepatitis B virus is transmitted through contact with blood or other fluids in the body of a person infected with hepatitis B virus(41).

Work Practice and Engineering Controls :

Parenteral exposures are mainly responsible for HBV transmission in health-care settings. Work practice modifications in the past 20 years have been important in mitigating such exposures. Examples of such modifications include the practice of not resheathing needles, the use of puncture-resistant needle and sharp object disposal containers, avoidance of unnecessary phlebotomies and other unnecessary needle and sharp object use, the use of ports and other needleless vascular access when practical or possible, and the avoidance of unnecessary intravenous catheters by using needleless or protected needle infusion systems(11).

Testing and Vaccination of Health-Care Providers :

Recommendations generated over the past 20 years, both in the United States and other developed countries, urge all health-care providers to know their HBV and other bloodborne virus infection status (21), especially if they are at risk for HBV infection (37,45). OSHA mandates that hepatitis B vaccine be made available to health-care providers who are susceptible to HBV infection and that they be urged to be vaccinated (Bloodborne Pathogens Standard [29 CFR 1910.1030 and 29 CFR 1910.030f]) These guidelines stipulate that the employer make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure and that postexposure evaluation and follow-up be provided to all employees who have an exposure incident(2).

Approximately 25% or more of medical and dental students (46,47) and many physicians, surgeons, and dentists in the United States have been born to mothers in or from countries in Asia (including India), Africa, and the Middle East with high and intermediate endemicity for HBV. CDC recommends that all health-care providers at risk for HBV infection be tested and that all those found to be susceptible should receive vaccine (37). Such testing is likely to detect chronically infected health-care providers and students. Recommendations to ensure safe practice of health-care providers identified as chronic carriers of HBV should have reasonable and feasible oversight by the relevant school, hospital, or other health-care facility(43).

At-risk groups The groups most at risk of infection are: A group of people who inject themselves with drugs intravenously and share the same needle and equipment with others. People who have unprotected sexual intercourse with an infected person. People who have sexual relations with more than one partner. People born in areas of the world where hepatitis B is widespread. Individuals who travel to such areas frequently. Women infected with hepatitis B transmit the disease to their newborns during childbirth. People with sexually transmitted diseases, such as gonorrhea or chlamydia. People with chronic kidney disease who undergo dialysis. Individuals who live in the same household as someone infected with hepatitis B. Those exposed to contact with human blood in the context of their work(31).

People who have received a blood donation. Complications of hepatitis B Hepatitis C causes the following complications: Severe liver failure that may require a liver transplant. Liver cancer. Liver cirrhosis, a condition in which the liver is permanently scarred. Hepatitis type D. Diagnosis of hepatitis B It is important that pregnant women undergo testing as soon as possible in order to ensure that they do not carry the virus. It is also important for anyone who has unprotected sexual intercourse with more than one partner to undergo testing to ensure that there is no liver disease, or who uses syringes to inject drugs, or who spends a long time in places where the hepatitis B virus is widespread. Diagnosis based on examinations Because many people infected with hepatitis B do not have any symptoms or signs, doctors diagnose hepatitis B virus through one or more blood tests(16).

These tests include: Hepatitis B virus surface antigen (HBsAg) test. Hepatitis B virus surface antigen (anti-HBs) test Hepatitis B core antigen (anti HBc) test Actions Taken Against HBV-Infected Health-Care Providers and Students CDC is aware of several recent instances in which HBV-infected persons have been threatened with dismissal or actually dismissed from surgical practice on the basis of their HBV infection, and others have had their acceptances to medical or dental schools rescinded or deferred because of their infection (Joan M. Block, Hepatitis B Foundation, Anna S. F. Lok, University of Michigan Medical Center, personal communications, 2011). Some of these instances have involved requirements that the infected provider, applicant, or student demonstrate undetectable HBV viral load or hepatitis B e-antigen negativity and, in at least one case, that this be demonstrated continuously by weekly testing. These actions might not be based on clear written guidance and procedures at the institutions involved (48,49).

Technical and Ethical Issues in Developing Recommendations :

Monitoring HBV DNA Level and Hepatitis B e Antigen (HBeAg) :

Whereas the 1991 recommendations assessed the infectivity of surgeons and others performing invasive procedures based on the presence of HBeAg, documented transmissions of HBV to patients from several HBeAg-negative surgeons (12,15,50) led to examination of correlations between HBeAg and HBV viral load. Some of these HBeAg-negative persons, despite high rates of viral replication, might harbor pre-core mutants of the virus: that is, loss of HBeAg expression might result from a single nucleotide substitution that results in a stop codon preventing transcription (51,52). Persons with such HBV strains who test HBeAg-negative might nonetheless be infectious (despite the mutation) and even have a high concentration of virions in their blood(34).

Recent guidelines from other bodies have recommended using HBV DNA serum levels in preference to HBeAg in determining infectivity. Several studies have documented numerous HBeAg-negative persons who have high circulating levels of HBV DNA, i.e., viral loads often 10⁵ IU/ml or more by various commercial assays: 78 HBeAg-negative Australian patients with median HBV DNA of 38,000 IU/ml (determined by the Siemens Versant HBV DNA 3.0 assay) (53); 48 HBeAg-negative Greek patients with a median HBV DNA of 76,000 IU/ml (by Roche Amplicor HBV-Monitor) (54); 165 HBeAg-negative Korean patients with a mean HBV DNA of 155,000 IU/ml (by Roche COBAS TaqMan) (55); and 47 HBeAg-negative Chinese patients with median HBV DNA blood levels of 960,000 copies/ml (about 200,000 IU/ml) (by PG Biotech [Shenzhen, China] PCR) (56). On the basis of these data, monitoring quantitative HBV DNA levels provides better information to serve as a predictive indicator of infectivity than is provided by monitoring HBeAg status alone(15).

Assessing a Safe Level of HBV DNA :

Review of information concerning six HBeAg-negative surgeons who had transmitted hepatitis B to patients and whose HBV DNA had been determined (using both Chiron Quantiplex Branched DNA assay and Roche Amplicor HBV DNA Monitor assay) showed the lowest value (at one laboratory) in one surgeon to be 40,000 copies/ml (approximately 8,000 IU/ml) (9). However, because this quantification was performed more than 3 months after the transmission had taken place, correlative relevance is uncertain(9).

In 2003, recommendations from the Netherlands set the level above which health-care providers should not be performing exposure prone procedures at HBV DNA levels 105 GE/ml or above (approximately 20,000 IU/ml). A larger European consortium set this restriction at HBV DNA levels ≥ 104 GE/ml (approximately 2,000 IU/ml) (33) for persons who are HBeAg-negative. In 2010, this latter threshold, without a requirement for e-antigen negativity, was adopted in the U.S. SHEA Guidelines (28). U.K. guidelines for HBV-infected providers who are HBeAg-negative require these providers to achieve or maintain HBV DNA levels of <103 GE/ml (less than approximately 200 IU/ml) (31,57)(47).

Although newer assays such as real-time polymerase chain reaction (PCR) tests are expected to reduce the level of detection for HBV DNA to 10–20 IU/ml, this level could be undetectable in some assays in use in the United States. The lower limit of detection for four assays currently in use are 200 IU/ml (qualitative assay); 30–350 IU/ml (branched DNA assay); 30 IU/ml (real-time PCR assay); and 10 IU/ml (real-time PCR assay). Thus, any requirement for demonstration of a viral load <200 IU/ml will need to specify the use of an assay (usually real-time PCR) that can detect loads well below that threshold(12).

Fluctuating HBV DNA Levels :

Persons who achieve and maintain HBV DNA blood concentrations below some designated threshold level or attain an undetectable level might have HBV DNA that is transiently elevated and detectable but not necessarily transmissible. Such instances might represent infrequent detections of virus at very low levels despite long-term suppression of virus on therapy (58) but also could represent, especially for persons taking older therapies, breakthrough of antiviral-drug resistant HBV (59). As assays become increasingly sensitive (newer ones can detect circulating HBV DNA down to 20–30 IU/ml), such transient elevations will be recognized increasingly and will trigger more frequent follow-up. If such an elevation in detectable HBV DNA represents not spontaneous fluctuation (sometimes referred to as a blip) but rather therapeutic drug failure (i.e., breakthrough), then appropriate change in therapy may be considered(5).

Specifying Exposure-Prone Procedures :

In general, three conditions are necessary for health-care personnel to pose a risk for bloodborne virus transmission to patients. First, the health-care provider must be sufficiently viremic (i.e., have infectious virus circulating in the bloodstream)(16).

Second, the health-care provider must have an injury (e.g., a puncture wound) or a condition (e.g., nonintact skin) that allows exposure to his/her blood or other infectious body fluids. Third, the provider's blood or infectious body fluid must come in direct contact with a patient's wound, traumatized tissue, mucous membranes, or similar portal of entry during an exposure-prone procedure. The vast majority of HBV-infected health-care personnel pose no risk for patients because they do not perform activities in which both the second and third conditions are met(36).

Beyond meeting these three basic conditions, defining exposure-prone invasive procedures that pose a risk for HBV transmission between infected provider and patient has been problematic in the development of all recommendations and guidelines; this process is made especially difficult by varying surgical techniques used by health-care providers doing the same procedure. More recent guidelines and published articles indicate that exposure-prone procedures can be defined broadly, and lists of potentially exposure-prone procedures have been developed (28,31,60). Principles cited are that exposure-prone procedures include those in which access for surgery is difficult (28) or those in which needlestick injuries are likely to occur (60), typically in very closed and unvisualized operating spaces in which double gloving and the skin integrity of the operator might be compromised (Box)(47).

Defining exposure-prone procedures in dentistry and oral surgery has been particularly difficult. Many intra-oral procedures (e.g., injection or scaling) occur in a confined cavity and might lead to injuries to the operator (61), so some institutions have considered these procedures to be exposure-prone. However, no transmission of HBV from a U.S. dentist to a patient has been reported since 1987, and no transmission has ever been reported from a dental or medical student. Thus, Category I Procedures (Box) include only major oral surgery, and do not include the procedures that medical and dental students or most dentists would be performing or assisting(7).

In addition to these lists of specific procedures, an institutional expert review panel convened to oversee an HBV-infected surgeon or other health-care provider performing exposure-prone procedures may consult the classification of such procedures (Box) for guidance. Given the variety of procedures, practices, and providers, each HBV-infected health-care provider performing potentially exposure-prone procedures will need individual consideration. However, this evaluation should not define exposure-prone procedures too broadly; the great majority of surgical and dental procedures have not been associated with the transmission of HBV(43).

Notification of Patients of HBV-Infected Health-Care Providers :

There is no clear justification for or benefit from routine notification of the HBV infection status of a health-care provider to his or her patient with the exception of instances in which an infected provider transmits HBV to one or more patients or documented instances in which a provider exposes a patient to a bloodborne infection. Routine mandatory disclosure might actually be counterproductive to public health, as providers and students might perceive that a positive test would lead to loss of practice or educational opportunities(21).

This misperception might lead to avoidance of HBV testing, of hepatitis B vaccination (if susceptible), of treatment and management (if infected), or of compliance with practice oversight from an expert panel (if infected and practicing exposure-prone procedures). In general, a requirement for disclosure is accepted to be an insurmountable barrier to practice and might limit patient and community access to quality medical care(43).

Other additional checks In people diagnosed with hepatitis B, the doctor may recommend tests to determine the severity of the infection and the health of the liver. These tests include: E antigen test. Liver enzymes test. Alpha fetoprotein test (AFP). Hepatitis B DNA test. Ultrasound imaging of the liver. Computed tomography (CT) Liver biopsy. Treatment of hepatitis B There is no cure for hepatitis B, but there is a vaccine that can prevent infection with it, and people who have been infected with this virus must take all necessary precautions in order to avoid transmitting the infection to other people. Methods of treating hepatitis C There are many methods depending on the severity of the infection and the period of exposure to the infection, as follows: 1. Treating hepatitis C immediately after exposure to the virus Getting an injection of hepatitis B immunoglobulin within 24 hours of exposure to the virus will prevent hepatitis B infection. 2. Pharmaceutical treatments In the case of infection with hepatitis B virus, there are very few treatments, and in certain cases when there are no symptoms and signs indicating liver damage, the doctor may recommend only observation and follow-up without treatment. In other cases, the doctor may recommend treatment with antiviral medications, and in serious cases, liver transplantation is resorted to. Doctors use five types of medications to treat hepatitis B: Interferon. Telbivudine. Lamivudine. Entecavir. Adefovir. Prevention of hepatitis B (31).

There are many ways to prevent hepatitis B infection, learn about them here:

1. Prevention by receiving vaccines .

There are several vaccines against hepatitis B, and these vaccines are usually received in three stages as follows:

- Dosage at age zero. Dosage at the age of one month. Dosage at the age of six months.
- But there are vaccines that can be obtained quickly in four stages.
- There is another vaccine that is received in two stages during adolescence between the ages of 11 and 15 years.
- These vaccines give those who receive them 90% protection, whether they are children or adults. These vaccines usually protect recipients from hepatitis B for at least 23 years, and these vaccines cannot cause hepatitis B.

Almost anyone can receive these vaccines, including children, the elderly, and even those with a weak immune system. As for children, they often receive this vaccination during the first year of their lives, specifically at the age of two months, at the age of four months, and at the age of nine months(22).

2. Measures to prevent hepatitis B virus Following the following measures will help prevent hepatitis B infection: Educating, gaining awareness and passing it on to others. Find out if anyone you have sexual relations with has hepatitis B. Use a rubber or polyurethane condom when having sexual intercourse. Use sterile needles and syringes. Consult a doctor before traveling outside the country. Be careful when handling blood samples in some countries. Conducting the necessary tests during pregnancy. 3. Ways to prevent transmission of infection to others People who have been diagnosed with hepatitis B virus can prevent transmission of the infection to other people by following these instructions: Only have safe sexual relations. Informing the other party of the fact that they are carriers of the hepatitis B virus. Do not share injections and needles with others(15).

Do not donate blood or organs. Do not share razors or toothbrushes with anyone. Infected pregnant women inform their doctor of the fact that they carry the hepatitis B virus. Alternative treatments In fact, natural treatments do not help solve the problem of hepatitis B, but some herbs may help alleviate the symptoms of the disease, the most important of which are: Dandelion. Muraya athcholia. Wormwood annual(45).

Ethical Considerations :

On July 18, 2011, the Consult Subcommittee of CDC's Public Health Ethics Committee reviewed these proposed recommendations. The reviewing team also included three external ethicists. The opinion of the Consult Subcommittee was that guidelines that allow providers with HBV to practice while requiring those doing exposure-prone procedures to be monitored to maintain low load strikes the right balance between protecting patients' interests and providers' rights. The Consult Subcommittee also noted that providers have an ethical and professional obligation to know their HBV status and to act on such knowledge accordingly (CDC Public Health Ethics Committee, personal communication, 2011). The Consult Subcommittee supported the new recommendation that mandatory disclosure of provider HBV status to patients was no longer warranted and that the 1991 recommendation for disclosure was discriminatory and unwarranted(5).

In addition, the Consult Subcommittee determined that there was no scientific or ethical basis for the restrictions that some medical and dental schools have placed on HBV-infected students and concluded that such restrictions were detrimental to the professions as well as to the individual students.

Guidance for Expert Review Panels at Institutions :

HBV infection in health-care providers and students who do not perform invasive exposure-prone procedures should be managed as a personal health issue and does not require special panel oversight. However, for providers who perform exposure-prone procedures, all recent guidelines advocate the constitution of an expert panel to provide oversight of the infected health-care provider's practice (6).

For HBV-infected providers performing exposure-prone procedures, expert review panels should evaluate the infected provider's clinical and viral burden status; assess his or her practices, procedures and techniques, experience, and adherence

to recommended surgical and dental technique; provide recommendations, counseling, and oversight of the provider's continued practice or study within the institution; and investigate and notify appropriate persons and authorities (e.g., risk management or, if need be, licensure boards) for suspected and documented breaches (62) in procedure or incidents resulting in patient exposure. The panel should reinforce the need for Standard Precautions (e.g., double gloving, regular glove changes, and use of blunt surgical needles). Panels may appropriately provide counseling about alternate procedures or specialty paths, especially for providers, students, residents, and others early in their careers, as long as this is not coercion or limitation (perceived or actual) of the provider or student(13).

The members of the expert review panel may be selected from, but should not necessarily be limited to, the following: one or more persons with expertise in the provider's specialty; infectious disease and hospital epidemiology specialists; liver disease specialists (gastroenterologists); the infected providers' occupational health, student health, or primary care physicians; ethicists; human resource professionals; hospital or school administrators; and legal counsel. Certain members of the panel should be familiar with issues relating to blood borne pathogens and their infectivity(27).

In instances when it is generally accepted (or thought) that a patient might have been exposed to the blood of an infected health-care provider, institutions should have in place a protocol for communicating to the patient that such an exposure might have occurred. The patient should receive appropriate follow-up including post-exposure vaccination or receipt of hepatitis B immune globulin and testing (i.e., similar to the reverse situation of prophylaxis for providers exposed to the blood of an HBV-infected patient)(39).

The confidentiality of the infected provider or student should be respected. Certain expert review panels might elect to consider cases without knowledge of the name of the infected provider or student. However, awareness of the infected provider's or student's identity might be unavoidable. In such cases, respect for the confidentiality of the person under review should be accorded as it is for any other patient(12).

Recommendations for Chronically HBV-Infected Health-Care Providers and Students

CDC recommends the following measures for the management of hepatitis B virus-infected health-care providers and students:

Practice Scope :

Chronic HBV infection in itself should not preclude the practice or study of medicine, surgery, dentistry, or allied health professions. Standard Precautions should be adhered to rigorously in all health-care settings for the protection of both patient and provider.

CDC discourages constraints that restrict chronically HBV-infected health-care providers and students from the practice or study of medicine, dentistry, or surgery, such as repeated demonstration of persistently nondetectable viral loads on a greater than semiannual frequency; prenotification of patients of the HBV-infection status of their care giver; mandatory antiviral therapy with no other option such as maintenance of low viral load without therapy; and forced change of practice, arbitrary exclusion from exposure-prone procedures, or any other restriction that essentially prohibits the health-care provider from practice or the student from study.

The Role of Healthcare Provider in Management Hepatitis B Patients:

Since publication of the 1991 CDC recommendations (1), CDC has accrued substantial information about HBV-infected health-care providers and students. Many interventions, including the adoption of Standard Precautions (formerly known as universal precautions) and double-gloving during invasive surgical procedures, have eliminated almost completely the very low risk for transmission of HBV (as well as hepatitis C virus [HCV] and human immunodeficiency virus) during exposure-prone procedures(6).

In developing these recommendations, CDC weighed the risk for HBV transmission based on the following: 1) documented cases of confirmed transmission of HBV from health-care providers to patients are rare (up to eight cases from one surgeon in the United States since 1994), 2) it has not been possible to conduct case-control or cohort studies that estimate the rate of such rare events, and 3) data are insufficient to quantify the strength-of-evidence or enable the grading of a recommendation (5).

Treatment to prevent hepatitis B virus infection after exposure If you know you have been exposed to hepatitis B:

virus, contact your doctor immediately. It's important to know whether you've received the hepatitis B vaccine, and your doctor also needs to know when you were exposed to the virus and what type of exposure. Injecting the infected person with immunoglobulin (an antibody) within 24 hours of exposure to the virus may help protect him from infection with hepatitis B virus(18)s.

Because this treatment only provides short-term protection, the infected person should also receive the hepatitis B vaccine at the same time. time, if he has not received the vaccine before(11).

Treatment of acute hepatitis B infection If your doctor finds that your hepatitis B infection is acute — meaning it will last a short time and go away on its own — treatment may not be necessary. Rather, your doctor may recommend rest, proper nutrition, and plenty of fluids, with close monitoring while your body fights the infection. In severe cases, it may be necessary to take antiviral drugs, or stay in the hospital to prevent complications. Treatment of chronic hepatitis B infection Most people diagnosed with chronic hepatitis B infection need to receive lifelong treatment(44).

The decision to receive treatment depends on several factors, including: whether the virus causes inflammation or scarring of the liver, and this scarring is also called "cirrhosis(14)."

Treatment helps reduce your risk of liver disease and prevents you from spreading the infection to others. Treatment methods for chronic hepatitis B include:

Antiviral medications. Several antiviral medications .

— such as entecavir (Baraclude), tenofovir (Viread), lamivudine (Epivir), adefovir (Hepsera) and telbivudine .

— can help fight the virus and slow its ability to damage the liver. These medications are taken orally(17).

The doctor may also recommend combining two of these medications or taking one of them with interferon to improve the response to treatment. Interferon injection. Interferon alfa-2b (Intron A) is a synthetic form of a substance that the body produces to fight infections.

It is mainly used to treat young men with hepatitis B who want to avoid long-term treatment, or women who may want to become pregnant within a few years after completing a limited course of treatment. Women should use contraception while receiving interferon therapy(35).

The use of interferon is prohibited during pregnancy. Side effects may include: nausea, vomiting, difficulty breathing, and depression. Liver transplant. If the liver is severely damaged, then a liver transplant can be resorted to. During a liver transplant, the surgeon removes the damaged liver and replaces it with a healthy liver. Most transplanted livers come from deceased donors, and a small number come from living donors who donate part of their liver(11).

A study in 2004 reported a significant increase in risk within 3 years of vaccination. Some of these studies have been criticized for methodological problems. This public controversy created doubts about hepatitis B vaccination. Therefore, childhood vaccination remains low in many countries. A 2007 study found that vaccination does not appear to increase the risk of a first case of MS in childhood. In 2009, a study was conducted linking the hepatitis B vaccine to the risk of central nervous system infections(37).

The hepatitis B vaccine was found to be generally safe. Overall, however, the Engerix -B vaccine appears to triple the risk of central nervous system infections in male infants. I should note that the Engerix-B vaccine contained thiomersal, as vaccines containing mercury as a preservative are being phased out at the request of the US Public Health Service(41).

The role of the health care provider, including laboratory specialists for hepatitis B patients:

Acute HBV infection generally presents after an incubation period of six weeks to several months with an onset of nonspecific symptoms that may include fever, malaise, anorexia and nausea, followed by the onset of jaundice, dark urine and pale stools. Approximately 25% to 40% of infected adults will be

symptomatic, and most will demonstrate elevations in ALT; however, infants, toddlers and immunosuppressed individuals may not manifest signs (eg, jaundice) or symptoms of infection. The management of acute infections is largely supportive unless fulminant hepatitis develops, in which case the patient should be referred to a liver specialist. Because the clinical features of acute hepatitis are very similar for HAV, HBV and HCV, testing for all three agents should be performed when working up an acute case. While the sexual transmission of HCV is rare, varying between zero to six cases per 1000 person-years (22), HAV that is typically spread by the fecal-oral route poses a clear risk to sexual partners. Figure Figure11 and Table Table22 outline the appropriate serological tests to investigate acute hepatitis.

HBsAg: If negative, acute HBV infection is ruled out (15).

If positive, the patient is infected with HBV. A repeat test after six months will determine if the infection has resolved or is chronic.

Anti-HBs:If negative, the patient has no apparent immunity to HBV (see section on measuring HBV immunity).

If positive, the patient is considered immune to HBV (either because of resolved infection or vaccination)(17).

Anti-HBc-immunoglobulin M:In rare cases, anti-HBc-immunoglobulin (Ig) M may be the only HBV marker detected during the early convalescence or 'window period' when the HBsAg and anti-HBs tests are negative. Because current tests for HBsAg are very sensitive, an anti-HBc-IgM that is typically positive with acute HBV infection is not generally required to diagnose active infection. Because some chronic HBV carriers remain anti-HBc-IgM positive for years, epidemiological information is necessary to confirm that the infection is indeed acute. A negative anti-HBc-IgM in the presence of a positive HBsAg suggests that the infection is likely chronic. For these reasons, routine testing for anti-HBc-IgM is not generally recommended to screen for acutely infected patients(13).

IgM class antibody to HAV:If the IgM class antibody to HAV (anti-HAV-IgM) is negative, HAV infection is ruled out in immunocompetent patients (15).

If positive, acute HAV infection is likely. As the anti-HAV-IgM may remain detectable for up to two years after infection in a small subset of patients, the history and clinical presentation must be considered in making an accurate diagnosis (15).

Anti-HCV:If the anti-HCV is negative, acute infection is ruled out in most immunocompetent individuals. Detection of seroconversion typically requires at least five to six weeks after acute infection. Acute infection can be confirmed or ruled out by either repeating the anti-HCV test within one to three months or by performing a qualitative HCV-RNA test. The qualitative HCV-RNA test is typically positive within two weeks after infection. If the patient is immunocompromised, a qualitative test for HCV-RNA may be required to confirm or rule out active infection (23).

If the anti-HCV is positive, the individual has been infected with HCV. Because most HCV infections lead to chronic infection (mean 75%, range 50% to 85%), the presence of anti-HCV is generally correlated with active infection. However, a qualitative test for HCV-RNA is currently required to confirm active HCV infection(36).

ALT:ALT is typically elevated in individuals with acute viral hepatitis (15).

ASSESSMENT OF HBV IMMUNE STATUS

Immunity to HBV is acquired from a resolved infection or from vaccination (Figure (Figure2).2). The HBV vaccine has been shown to induce protective immunity in 90% to 95% of vaccinees. Most vaccinees will have protective levels of anti-HBs for five to 10 years after vaccination, although the exact duration of immunity remains undefined. When anti-HBs levels have waned below the protective threshold of 10 mIU/mL, a booster dose of HBV vaccine has been shown to induce a strong anamnestic immune response in such individuals. It is therefore probable that protection from chronic HBV infection may last for decades and may well be lifelong (5).

The role of the healthcare provider of pharmacists in administering medications to hepatitis B patients:

Hepatitis B is a vaccine-preventable disease. Recent years have seen a decline in the number of acute and chronic hepatitis B infections in all countries, especially among children and young adults, primarily due to the widespread adoption of universal infant vaccination. Despite the widespread availability of hepatitis B vaccines, outbreaks continue to happen; the combination of the opioid epidemic and low vaccination rates among adults has been linked to a rise in the incidence of acute HBV infection. Hepatitis B disease continues to be a major public health priority. This liver disease chronically affects approximately 296 million and causes 820,000 deaths worldwide. In the United States alone, approximately 862,000 people are living with this chronic liver condition, but this number may not accurately represent all cases because up to two-thirds of individuals may be unaware of their infection, putting the number of infected individuals anywhere from 850,000 to 2.2 million.1-5(40).

Transmission and Risk Factors:

HBV can be transmitted to nonimmune individuals through percutaneous or mucosal exposure to infectious biological material, such as blood, semen, and saliva. It can survive in the environment for at least 7 days and is more infectious compared with HIV. The primary modes of transmission include sexual contact, transmission from hepatitis B surface antigen (HBsAg)-positive mothers to newborns during perinatal or vertical transmission, household transmission (particularly among children) through unnoticed parenteral exposure (likely through open cuts and sores) or through the sharing of toothbrushes, razors, or other medical equipment, and transmission through contaminated syringes or needles among individuals who inject drugs(19).

High-risk groups susceptible to HBV infection include individuals born in regions with intermediate or high prevalence, people who engage in drug injection, men who have sex with men, and individuals with HIV infection, as well as sexual partners, needle-sharing contacts, and household members of HBsAg-positive individuals, with the highest risk among unvaccinated children and sex partners of chronically infected HBV individuals.1(33).

Hepatitis B—A Rising Health Concern



Figure (2)

Screening: In March 2023, the CDC released revised guidelines concerning hepatitis B screening and testing. In these guidelines, the term “screening” pertains to the testing of individuals who are not known to have an elevated risk of being exposed to HBV and “testing” refers to the performance of serologic tests on individuals displaying symptoms or who have been identified as having an increased risk of HBV exposure. Screening is recommended for all adults aged 18 years and older at least once during their lifetime and for all pregnant women during each pregnancy, regardless of vaccination status and history of testing. Susceptible individuals with a history of risk for HBV infection, regardless of age (see TABLE 1), should be tested periodically while the risk persists. Also, anyone who is requesting HBV testing should receive it regardless of disclosure of risk.(37).

In addition to the rarity of surgery-related transmission of HBV since 1994 (one reported instance), the most recent case of HBV transmission from a U.S. dental health-care provider to patients was reported in 1987 (18,19). Since this event, certain infection control measures are thought to have contributed to the absence of detected transmissions; such measures include widespread vaccination of dental health-care professionals, universal glove use, and adherence to the tenets of the 1991 Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard (20). Since 1991, no transmission of HBV has been reported in the United States or other developed countries from primary care providers, clinicians, medical or dental students, residents, nurses, other health-care providers, or any others who would not normally perform exposure-prone procedures (21).

National Trends in Acute Hepatitis B Incidence and Prevalence

Symptomatic acute HBV infections in the United States, as reported through health departments to CDC, have declined approximately 85% from the early 1990s to 2009 (22), following the adoption of universal infant vaccination and catch-up vaccinations for children and adolescents (23). If declining trends continue, an ever-increasing proportion of patients receiving health care and their providers will be protected by receipt of hepatitis B vaccination(8)..

Patient-to-health-care provider transmission of HBV also has declined markedly. Reflecting this finding, the reported number of acute HBV infections among providers in the United States, not all of which reflect occupational exposure, decreased from approximately 10,000 in 1983 to approximately 400 in 2002 (24) and to approximately 100 by 2009 (22).

The role of the healthcare provider, including nursing, for patients with hepatitis B infection:2.1 Hepatitis B infection and medical treatment:

Hepatitis B (HB) is caused by the hepatitis B virus (HBV). Liver cirrhosis (LC) and hepatocellular carcinoma (HCC) are closely related to the occurrence and development of liver cirrhosis (LC) and hepatocellular carcinoma (HCC). 20% of chronic hepatitis b patients will develop cirrhosis of the liver. People with chronic HBV infection are 100 times more likely to develop HCC than others. HBV infection is worldwide distributed, among which Western Europe, North America and Australia are low-prevalence areas with hepatitis B surface antigen (HBsAg) carrying rate less than 2%. Eastern Europe, Japan, South America, North America and Mediterranean countries are the middle endemic areas; China, Southeast Asia and South Africa were highly prevalent (the HBsAg rate was about 10%)(16).

There are about 350 million chronic carriers of HBsAg worldwide, three-quarters of them in Asia. HBV infection causes between 500,000 and 1.2 million deaths worldwide each year, of which about 320,000 are caused by HCC(44).

China is a very high rate of HBV infection, about 60% of the people actually infected with HBV, 10% of the people are the carriers, up to 120 million. Currently, there are about 12 million hepatitis b patients with an annual incidence of 158/100,000. With the advent of HBV vaccine in 1982, the infection rate of HBV was greatly reduced, and the emergence of antiviral drugs also made some progress in the treatment of hepatitis b. However, the current situation of hepatitis b is still not optimistic, the number of existing hepatitis b patients and carriers is huge, facing the risk of developing cirrhosis and liver cancer, unfortunately, so far, there is no specific drug for HBV. Therefore, the treatment of hepatitis b will remain a serious problem for at least the next 50 years, and the search for more effective treatment is a major topic of medical research. (Suk & Dong ,2004.)(36).

The transmission way of second liver basically has 3: blood is transmitted; Vertical mother-to-child transmission; sexually transmitted. Second liver does not pass alimentary canal and respiratory tract transmission, so daily contact is like shake hands, hug, and work together, have a meal to wait won't be transmitted commonly by second liver virus. But if the friend that eats together with second liver patient has oral cavity ulcer to wait, have the contact of blood exposure with second liver patient, it is to can spread second liver virus possibly. Special reminder: dental filling, shaving, pedicure, medical instruments such as needles, oral equipment, endoscopy and other disinfection is not complete, but also easy to be ignored by the transmission of hepatitis b virus.(Chinese journal of infectious diseases, 2001)(11).

Antiviral medications: several antiviral medications — including entecavir, tenofovir, lamivudine, adefovir and telbivudine — can help fight the virus and slow its ability to damage your liver. Interferon injections: Interferon alfa-2b (Intron A) is a man-made version of a substance produced by the body to fight infection. It's used mainly for young people with hepatitis B who wish to avoid long-term treatment or women who might want to get pregnant within a few years, after completing a finite course of therapy. Interferon should not be used during pregnancy. Side effects may include nausea, vomiting, difficulty breathing and depression. (Mayo Clinic, 2017.)(38).

Nursing interventions:

A nursing Intervention is defined as “A single nursing action, treatment, procedure, activity, or service designed to achieve an outcome of a nursing or medical diagnosis for which the nurse is accountable” (Saba, 2007). A physician usually initiates the medical orders for patient services which are reviewed by the hospital admitting nurse. As part of the admission process the primary nurse interprets the medical orders and prepares nursing orders based not only on the medical orders, but also on the signs and symptoms, diagnoses, and other presenting problems together form the nursing plan of care (POC) which also includes the goals/expected outcomes that require the specific Nursing Interventions and Action Types to resolve (Saba, 2007)(16).

When nurses care for patients they follow the nursing process. This includes making a plan and setting goals for the patient.

Nursing interventions are the actual treatments and actions that are performed to help the patient to reach the goals that are set for them. The nurse uses his or her knowledge, experience and critical- thinking skills to decide which interventions will help the patient the most. (Lee&Mills, 2000.)(49).

Treatments for Chronic Hepatitis B Infection :

Medications for hepatitis B have been improving continually and are usually effective at reducing viral loads markedly or even to undetectable levels. Currently, seven therapeutic agents are approved by the Food and Drug Administration for the treatment of chronic hepatitis B, including two formulations of interferon (interferon alpha and pegylated interferon) and five nucleoside or nucleotide analogs (lamivudine, telbivudine, abacavir, entecavir, and tenofovir)(25).

Among the approved analogs, both entecavir and tenofovir have potent antiviral activity as well as very low rates of drug resistance. Treatment with these agents reduces HBV DNA levels to undetectable or nearly undetectable levels in most treated persons (25–27). Virtually all treated patients, even those few still receiving older agents (e.g., lamivudine), can expect to achieve a reduction of HBV DNA viral loads to very low levels within weeks or months of initiating therapy (25). The newer medications are effective in suppressing viral replication, and it is expected that they will be used for a newly identified HBV-infected health-care provider who is performing exposure-prone procedures and who has HBV virus levels above the threshold suggested in this report (1,000 IU/ml [i.e., about 5,000 genome equivalents (GE)/ml]) or as adopted by his or her institution's expert review panel. However, clinicians caring for infected health-care providers or students who are not performing

exposure-prone procedures and who are not subject to expert panel review should consider both the benefits and risks associated with life-long antiviral therapy for chronic HBV started at young ages (25).

Clinical trials Explore Mayo Clinic studies on new developments in treatments, medical interventions and tests used to prevent, treat and manage this health condition. Lifestyle and home remedies If you have hepatitis B, take steps to protect others from becoming infected with the virus. Make intercourse safer. If you have a lot of sex, tell your wife that you have hepatitis B virus and talk to her about the possibility of passing it on to her.

- Use a new latex condom for each intercourse, and remember that condoms reduce the possibility of transmission but do not completely prevent it.

- Have your wife take the tests. Every woman you have sex with should be tested for the virus. Your wife should also check that she is not infected with hepatitis B virus so that she does not infect others.

- If the test result is found to be positive, her condition must be evaluated to determine possible appropriate treatment.

-Do not share personal care items with others. Never share needles and syringes if you are taking intravenous medications.

-Do not share razors or toothbrushes with anyone, as these tools can carry traces of contaminated blood(48).

-Coping and support You can use the following suggestions to help you cope with the situation if you are diagnosed with hepatitis B infection:

- Learn about hepatitis B.

-You can start by looking at information provided by the Centers for Disease Control and Prevention. Stay connected with friends and family.

-You can't spread hepatitis B through casual contact, so don't hide away from those who want to help you. take care of yourself.

-Follow a healthy diet rich in fruits and vegetables, exercise regularly and get enough sleep.

-Make sure to take care of your liver. Avoid drinking alcohol and taking any prescription or over-the-counter medications without consulting your doctor.

-Be sure to get tested for hepatitis A and C.

-Get the hepatitis A vaccine if you have not had it before. Prepare for your appointment Usually the first step is to consult your family doctor(46)

-But in some cases, you may be referred immediately to a specialist. Doctors who specialize in treating hepatitis B include:

-Doctors who specialize in treating diseases of the digestive system (gastroenterologists) Doctors who specialize in treating liver diseases (hepatologists) Doctors who specialize in treating infectious diseases What you can do Here is some information to help you prepare for your appointment.

-Follow any instructions your doctor gives you before your appointment. When you make your appointment, ask if there's anything you need to do in advance, such as restrict your diet.

- Write down your symptoms, including any that may seem unrelated to the reason for which you scheduled the appointment.

-Write down your basic personal information, including any major stressors you've experienced or recent life changes.

- Make a list of all the medications, vitamins, and nutritional supplements you take. Take a family member or friend with you.

-Having someone with you may help you remember the information you receive. Write down the questions you want to ask your doctor(22).

- Basic questions about hepatitis B infection to ask include:

-What is the most likely cause of my symptoms or condition?

- Other than the most likely cause, what are other possible causes for my symptoms or condition?

-What tests do I need to have?

- Is my condition likely to be temporary or chronic?

Has hepatitis B led to liver damage or other complications, such as kidney problems?

-What is the optimal behavior?

-What are the alternatives to the primary treatment method you suggest?

-I have other health problems. How can I best deal with these problems?

- Are there restrictions I must adhere to?

-Should I consult a specialist? Should my family be tested for hepatitis B?

-How can I protect people around me from getting hepatitis B?

- Is there a specific medicine equivalent to the medicine you are prescribing for me? Are there any brochures or other literature I can get?

-What websites do you recommend visiting?

What to expect from your doctor Your doctor is likely to ask you a number of questions, including?

-When did symptoms start to appear?

-Have you ever had symptoms of jaundice, including yellow eyes or brown, clay-colored stools? Have you had previous vaccinations against hepatitis B?

-Are your symptoms continuous or occasional? How severe are your symptoms? What, if anything, improves your symptoms?

-What, if anything, worsens your symptoms?

-Have you ever had a blood transfusion?

- Do you take any injectable medications?



Figure (1)

Consistency with Other Guidelines :

Recommendations for the management of HBV-infected health-care providers and students have evolved in the United States and other developed countries (Table 1).

In 2010, the Society for Healthcare Epidemiology of America (SHEA) issued updated guidelines that recommended a process for ensuring safe clinical practice by HBV-infected health-care providers and students (28).

These separate guidelines classify many invasive procedures and list those associated with potentially increased risk for provider-to-patient blood exposures (Category III procedures, in the SHEA guidelines).

SHEA recommends restricting a provider's practice on the basis of the provider's HBV DNA blood levels and the conduct of certain invasive procedures considered exposure prone.

The SHEA guidelines also address the current therapeutic interventions that reduce the viral loads and the infectiousness of HBV-infected personnel. For providers practicing certain exposure-prone procedures, SHEA recommends that they maintain HBV blood levels $<10^4$ GE/ml, i.e., depending on the assay used, approximately 2,000 IU/ml (exposure prone, Category III) procedures, or cease surgery until they can reestablish a viral load level below that threshold(35).

Restrictions based on the provider's HBV DNA blood levels also exist in guidelines published by some European countries and Canada (Table 2) (21,29–36). No guidelines from any developed country recommend the systematic prohibition of invasive surgical or dental practices by qualified health-care providers whose chronic HBV infection is monitored(16).

The generally permissive principles delineated in the CDC 1991 recommendations also have been reiterated in recent Advisory Committee on Immunization Practices (ACIP) recommendations on immunization of health-care personnel in the United States for HBV infection (37). ACIP recommends that HBV-infected persons who perform highly exposure-prone procedures should be monitored by a panel of experts drawn from diverse disciplines and perspectives to ensure balanced recommendations. However, the ACIP recommendations do not require that HBV-infected persons who do not perform such procedures have their clinical duties restricted or managed by a special panel because of HBV infection alone.

Hepatitis B Vaccination and Screening :

All health-care providers and students should receive hepatitis B vaccine according to current CDC recommendations (37,45,63). Vaccination (3-dose series) should be followed by assessment of hepatitis B surface antibody to determine vaccination immunogenicity and, if necessary, revaccination. Health-care providers who do not have protective concentration of anti-HBs (>10 mIU/ml) after revaccination (i.e., after receiving a total of 6 doses) should be tested for HBsAg and anti-HBc to determine their infection status (37).

Prevaccination serologic testing is not indicated for most persons being vaccinated, except for those providers and students at increased risk for HBV infection (37), such as those born to mothers in or from endemic countries and sexually active men who have sex with men (64).

Providers who are performing exposure-prone procedures also should receive prevaccination testing for chronic HBV infection. Exposure of a patient to the blood of an HBV-infected health-care provider, in the performance of any procedure, should be handled with postexposure prophylaxis and testing of the patient in a manner similar to the reverse situation (i.e., prophylaxis for providers exposed to the blood of an HBV-infected patient) (65).

Expert Panel Oversight Not Needed:

Providers, residents, and medical and dental students with active HBV infection (i.e., those who are HBsAg-positive) who do not perform exposure-prone procedures but who practice non- or minimally invasive procedures (Category II, Box) should not be subject to any restrictions of their activities or study. They do not need to achieve low or undetectable levels of circulating HBV DNA, hepatitis e-antigen negativity, or have review and oversight by an expert review panel, as recommended for those performing exposure-prone procedures. However, they should receive medical care for their condition by clinicians, which might be in the setting of student or occupational health(7)

Expert Panel Oversight Recommended :

Surgeons, including oral surgeons, obstetrician/gynecologists, surgical residents, and others who perform exposure-prone procedures, i.e., those listed under Category I activities (Box), should fulfill the following criteria:

Consonant with the 1991 recommendations and Advisory Committee on Immunization Practices (ACIP) recommendations (37), their procedures should be guided by review of a duly constituted expert review panel with a balanced perspective (i.e., providers' and students' personal, occupational or student health physicians, infectious disease specialists, epidemiologists, ethicists and others as indicated above) regarding the procedures that they can perform and prospective oversight of their practice (28). Confidentiality of the health-care provider's or student's HBV serologic status should be maintained(13).

HBV-infected providers can conduct exposure-prone procedures if a low or undetectable HBV viral load is documented by regular testing at least every 6 months unless higher levels require more frequent testing; for example, as drug therapy is added or modified or testing is repeated to determine if elevations above a threshold are transient(41).

CDC recommends that an HBV level 1,000 IU/ml (5,000 GE/ml) or its equivalent is an appropriate threshold for a review panel to adopt. Monitoring should be conducted with an assay that can detect as low as 10–30 IU/ml, especially if the individual institutional expert review panel wishes to adopt a lower threshold(24).

Spontaneous fluctuations (blips) of HBV DNA levels and treatment failures might both present as higher-than-threshold (1,000 IU/ml; 5,000 GE/ml) values. This will require the HBV-infected provider to abstain from performing exposure-prone procedures, while subsequent retesting occurs, and if needed, modifications or additions to the health-care provider's drug therapy and other reasonable steps are taken(25).

Institutional Policies and Procedures :

Hospitals, medical and dental schools, and other institutions should have written policies and procedures for the identification and management of HBV-infected health-care providers, students, and school applicants. These policies should include the ability to identify and convene an expert review panel (see Guidance for Expert Review Panels) aware of these and other relevant guidelines and recommendations before considering the management of HBV-infected providers performing exposure-prone procedures(4).

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