

NWX-DISEASE CONTROL & PREVENTI (US)

**Moderator: Dale Babcock
September 9, 2015
11:00 am CT**

Coordinator: Good afternoon. And thank you for standing by. At this time all participants are in a listen-only mode. After the presentation we will conduct a question and answer session.

To ask a question, please press the Star 1 and please record your name. Today's conference is being recorded. If you have any objections, you may disconnect at this time. I would like to introduce your host for today's conference, Dr. Andrew Kroger. You may begin.

Dr. Andrew Kroger: Thank you very much. Welcome to Current Issues and Immunizations Net Conferences. I'm Andrew Kroger. I'm a Medical Officer in the Immunization Services Division of the National Center for Immunization and Respiratory Diseases -- or NCIRD -- at the CDC and I'll be your Moderator for today's session.

To participate in today's program, you need a telephone connection and a separate Internet connection. The learning objectives for the session are to describe an emerging immunization issue, to be able to list a recent

immunization recommendation made by the Advisory Committee on Immunization Practices -- or ACIP -- to locate resources relative to current immunization practice, and to obtain, assess, and apply patient information to determine the need for immunization.

Today is September 9, 2015 and today Dr. Candice Robinson -- a Medical Officer in the Communication and Education Branch in the Immunization Services Division in NCIRD of CDC will discuss Hepatitis B as presented in the CDC textbook Epidemiology and Prevention of Vaccine Preventable Diseases -- also known as the pink book -- who's 13th Edition was published this year.

A question and answer session will follow today's presentation. Please make a note of the following information. If you have technical trouble, please dial Star 0 on your telephone. If you'd like to ask a question -- when we get to that segment -- please press Star 1 on the phone.

Continuing Education Credit -- or CE Credit -- is available only through the CDC/ATSDR Training and Continuing Education Online system at www2a.cdc.gov/tceonline/. CE Credit for this session today expires on October 12, 2015.

CDC, our planners, and our presenters wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters.

Presentations will not include any discussion of the unlabeled use of a product or a product under investigational use with the exception of Dr. (Robinson)'s discussion of the use of Hepatitis B vaccine in a manner recommended by the

Advisory Committee on Immunization Practices, but not approved by the Food and Drug Administration.

CDC does not accept any commercial support. So now we'll turn the microphone over Candice. You may begin.

Dr. Candice Robinson: Thank you. Hepatitis B content can be found starting on Page 149 in the pink book. Epidemic jaundice was described by Hippocrates in the 5th Century BCE. The first recorded cases of serum hepatitis -- or hepatitis B -- are thought to be those that followed the administration of smallpox vaccine containing human lymph to shipyard workers in Germany in 1883.

In the early and middle parts of 20th Century, serum hepatitis was repeatedly observed following the use of contaminated needles and syringes. The role of blood as a vehicle for virus transmission was further emphasized in 1943 when Besson described jaundice that occurred in seven recipients of blood transfusion.

Australian antigen later called hepatitis B surface antigen (HBsAg) was first described in 1965. The Dane Particle -- which is the complete hepatitis B virion -- was identified in 1970. Identification of serologic markers for hepatitis B infection soon followed.

Hepatitis B virus (HBV) is a small double shelled virus in the family Hepadnaviridae. Other Hepadnaviridae include duck hepatitis virus, ground squirrel hepatitis virus, and woodchuck hepatitis virus.

The virus has a small circular DNA genome that is partially double stranded. HBV contains numerous antigenic components. Including HBsAg, Hepatitis B Core antigen (HBcAg), and Hepatitis B e antigen (HBeAg).

Humans are the only known host for HBV. Although some non-human primates have been infected in laboratory conditions. HBV is relatively resilient. And in some instances has been shown to remain infectious on environmental surfaces for more than seven days at room temperature.

An estimated 700,000 to 1.4 million persons in the United States have chronic HBV infection. Chronic infection is an even greater problem globally -- affecting approximately 240 million persons.

HBV infection is an established cause of acute and chronic hepatitis -- and cirrhosis. It is the cause of up to 50% of hepatocellular carcinomas. An estimated 786,000 persons worldwide die from HBV related liver disease each year.

Several well defined antigen-antibody systems are associated with HBV infection. HBsAg -- formally called Australia antigen or hepatitis associated antigen -- is an antigenic determinant found on the surface of the virus.

It also makes up subviral spherical and tubular particles. HBsAg can be identified in the serum 30 to 60 days after exposure to HBV and persists for variable periods.

HBsAg is not infectious. Only the complete virus -- or Dane particle -- is infectious. During replication, HBV produces HBsAg in excess of what is needed for production of Dane particles.

HBsAg is antigenically heterogeneous with a common antigen designated a and two pairs of mutually exclusive antigens -- d, y, w, and r. Resulting in four major subtypes -- adw, ayw, adr, and ayr.

The distribution of subtypes varies geographically. Because of the common “a” determinant, protection against one subtype appears to confer protection against the other subtypes. No differences in clinical features have been related to subtypes.

HBcAg is the protein core of HBV. HBcAg is not detectable in the serum by conventional techniques. But it can be detected in liver tissue of persons with acute or chronic HBV infection.

HBeAg -- a soluble protein -- is also contained in the core of HBV. HBeAg is detected in the serum of persons with high virus titers and indicates high infectivity.

Antibody to hepatitis B surface antigen (anti-HBs) develops during convalescence after acute HBV infection or following hepatitis B vaccination. The presence of anti-HBs indicates immunity to HBV.

Anti-HBs is sometimes referred to as hepatitis B surface antibody (HBsAb), but use of this term is discouraged because of potential confusion with HBsAg.

Antibody to hepatitis B core antigen (anti-HBc) indicates infection with hepatitis B at an undefined time in the past. IgM class antibody to Hepatitis B core antigen (IgM anti-HBc) indicates recent infection with HBV. Antibody to hepatitis B e antigen (anti-HBe) becomes detectable with HBeAg is lost, and is associated with low infectivity of serum.

The clinical course of acute hepatitis B is indistinguishable from that of other types of acute viral hepatitis. The incubation period ranges from 45 to 160 days, with an average of 120 days.

The preicteric or prodromal phase from initial symptoms to onset of jaundice usually lasts from 3 to 10 days. It is nonspecific and is characterized by insidious onset of malaise, anorexia, nausea, vomiting, right upper quadrant pain, fever, headache, skin rashes, arthralgia, and dark urine, beginning 1 to 2 days before the onset of jaundice.

The icteric phase is variable, but usually lasts from 1 to 3 weeks and is characterized by jaundice, light or gray stools, hepatic tenderness, and hepatomegaly. During convalescence, malaise and fatigue may persist for weeks or months. While jaundice, anorexia, and other symptoms disappear.

Clinical signs and symptoms occur more often in adults than in infants or children, who usually have an asymptomatic acute course. However, approximately 50% of adults who have acute infections are asymptomatic.

While most acute hepatitis B infections in adults result in complete recovery, fulminate hepatitis occurs in about 1 to 2% of acutely infected persons. About 200 to 300 Americans die of fulminate disease each year -- a case fatality rate of 63% to 93%.

Although the consequences of acute hepatitis B infection can be severe, most of the serious complications associated with HBV infections are due to chronic infections. Other possible complications include hospitalization, cirrhosis, hepatocellular carcinoma, and death.

This is a picture of a patient that presented with a distended abdomen due to a hepatoma resulting from chronic hepatitis B infection. Chronic infection is responsible for most HBV related morbidity and mortality. Including chronic hepatitis, cirrhosis, liver failure, and hepatocellular carcinoma.

Approximately 25% of persons with chronic HBV infections die prematurely from cirrhosis or liver cancer. Chronic active hepatitis develops in more than 25% of carriers, and often results in cirrhosis.

An estimated 3000 to 4000 persons die of hepatitis B related cirrhosis each year in the United States. An estimated 1000 to 1500 persons die each year in the United States of hepatitis B related liver cancer.

Persons with chronic infections are often asymptomatic and may not be aware that they are infected. However, they are capable of infecting others and have been referred to as carriers.

Perinatal transmission from mother to infant at birth is very efficient. If the mother is positive for both HBsAg and HBeAg, 70 to 90% of infants will become infected in the absence of post-exposure prophylaxis.

The risk of perinatal transmission is about 10% if the mother is positive only for HBsAg. As many as 90% of infants with hepatitis B infections will progress to chronic infection.

The proportion of patients with acute hepatitis B infection who progress to chronic infection varies with age and immune status. Approximately 5% of all acute hepatitis B infections progress to chronic infection. With the risk of chronic hepatitis B infection decreasing with age.

As stated before, as many as 90% of infants who acquire hepatitis B infection from their mothers at birth become chronically infected. Of children who become infected with hepatitis B between 1 year and 5 years of age, 30% to 50% become chronically infected. By adulthood the risk of acquiring chronic hepatitis B infection is approximately 5%.

Humans are the only known reservoir for HBV. No animal or insect hosts or vectors are known to exist. The virus is transmittal by parenteral or mucosal exposure to HBsAg positive body fluids from a person who has acute or chronic hepatitis B infection.

In the United States the most important routes of transmission are perinatal and sexual contact with an infected person. Persons with either acute or chronic HBV infection should be considered infectious any time that HBsAg is present in the blood.

When symptoms are present in persons with acute hepatitis B infection, HBsAg can be found in blood and bodily fluids for 1 to 2 months before and after the onset of symptoms.

The incidence of reported hepatitis B portrayed here with the short and long bars peaked in the mid-1980s with about 26,000 cases reported each year. Reported cases have declined since that time. And fell below 10,000 cases for the first time in 1996.

Declining cases during the 1980s and early 1990s is generally attributed to reduction of transmission among men who have sex with men and injection drug users as a result of HIV prevention efforts. During 1990 to 2004, incidence of acute hepatitis B in the United States declined 75%. The greatest

decline -- 94% -- occurred among children and adolescents, coincident with an increase in hepatitis B vaccine coverage.

A total of 350 cases of hepatitis B were reported in 2013. Before routine childhood hepatitis B vaccination was recommended, more than 80% of acute hepatitis B infections occurred among adults. Adolescents accounted for approximately 8% of infections.

And children and infants infected through perinatal transmission accounted for approximately 4% each. Perinatal transmission accounted for a disproportionate 24% of chronic infections.

In the United States in 2005 the highest incidents of acute Hepatitis B was among adults aged 25 through 45 years. Approximately 79% of persons with newly acquired hepatitis B infection was then known to engage in high risk sexual activity or injection drug use.

Other known exposures together accounted for approximately 5% of new infections. Approximately 16% of persons deny a specific risk factor for infection.

In 2013 with only 3050 cases reported to the CDC, only 22% of cases reported high risk behavior. Such behavior was not reported or not available for the remainder of the cases.

Risk for infection varies with occupation, lifestyle, or environment. Generally the highest risk for HBV infection is associated with lifestyles, occupations, or environments in which contact with blood from infected persons is frequent.

In addition, the prevalence of HBV markers for acute or chronic infection increases with increasing numbers of years of high risk behavior. For instance, an estimated 40% of injection drug users become infected with hepatitis B after one year of drug use. While more than 80% are infected after ten years.

A comprehensive strategy to eliminate HBV transmission was recommended in 1991. It includes perinatal testing of pregnant women for HBsAg to identify newborns who require immunoprophylaxis for prevention of perinatal infection, and to identify household contacts who should be vaccinated.

Routine vaccination of infants, vaccination of adolescents, and vaccination of adults at high risk for infection were also part of the prevention strategy. Recommendations to further enhance vaccination of adults at increased risk of HBV infection were published in 2011.

A plasma-derived vaccine was licensed in the United States in 1981. It was produced from HBsAg particles purified from the plasma of chronically infected humans.

The vaccine was safe and effective., but was not well accepted. Possibly because of unsubstantiated fears of transmission of live HBV or other blood borne pathogens.

This vaccine was removed from the U.S. market in 1992. The first recombinant Hepatitis B vaccine was licensed in the U.S. in 1986. Recombinant vaccine is produced by inserting a plasmid containing the gene for HBsAg into common baker's yeast.

Yeast cells then produce HBsAg -- which is harvested and purified. After three intramuscular doses of hepatitis B vaccine, more than 90% of healthy

adults and more than 95% of infants, children and adolescents develop adequate antibody responses. However, there is an age specific decline in immunogenicity.

Available data show that vaccine induced antibody levels decline with time. However, immune memory remains intact for more than 20 years following immunization. Both adults and children with declining antibody levels are still protected against significant HBV infection.

Chronic HBV infection has only rarely been documented among vaccine responders. For adults and children with normal immune status, booster doses of vaccine are not recommended. The need for booster doses after long intervals will continue to be assessed as additional information becomes available.

Hepatitis B vaccine is indicated for all children through 18 years of age beginning at birth. And for persons 19 years and older at increased risk of exposure because of behavior or occupation.

Hepatitis B vaccine is produced by two manufacturers in the United States. Merck which produces Recombivax HB and GlaxoSmithKline which produces Engerix-B. Both vaccines are available in both pediatric and adult formulations.

Although their antigen content differs, the two vaccines are interchangeable. Except for the two dose schedule for adolescents age 11 through 15 -- which we will discuss shortly. Only Merck's vaccine is approved for this schedule. Providers must always follow the manufactures dosage recommendations, which may vary by product.

Both the pediatric and adult formulations of Recombivax HB are approved for use in any age group. For example, the adult formulation of Recombivax HB may be used in children and adolescents. However, pediatric Engerix-B is approved for use only in children and adolescents younger than 20 years of age. The adult formulation of Engerix-B is not approved for use in infants and children, but may be used in both adolescents and adults.

Now we will discuss the hepatitis B vaccination schedule for infants, children, and adolescents. Infants born to women who are HBsAg positive are at extremely high risk of hepatitis B transmission and chronic hepatitis B infection.

Hepatitis B vaccination and one dose of hepatitis B immune globulin (HBIG) administered within 24 hours after birth, are 85 to 95% effective in preventing chronic hepatitis B infection. Hepatitis B vaccine administered alone beginning within 24 hours after birth is 70 to 95% effective in preventing perinatal hepatitis B infection.

The first dose of hepatitis B vaccine and HBIG should be given intramuscularly, and are recommended for administration within 12 hours of birth. The hepatitis B vaccine dose is given at the same time as HBIG, but at different sites.

The second and third vaccine dosage should be given 1 to 2 months and 6 months respectively after the first dose. To monitor the success of therapy, testing for HBsAg and anti-HBs is recommended 1 to 2 months after the final dose of vaccine, but not before nine months of age.

If the mother's HBsAg status is not known at the time of birth, hepatitis B vaccination of the infant should be initiated within 12 hours of birth.

HBIG given at birth does not interfere with immune response to hepatitis B vaccine -- or other vaccines administered at two months of age.

Preterm infants born to HBsAg positive women and women with unknown status must receive immunoprophalaxis with hepatitis B vaccine and HBIG within 12 hours of birth. See the section on post-exposure management for additional information.

Preterm infants weighing less than 2000 grams have a decreased response to Hepatitis B vaccine administered before one month of age. However, by chronologic age one month preterm infants -- regardless of initial birth weight or gestational age -- are as likely to respond as adequately as full term infants.

Preterm infants with low birth weight whose mothers are HBsAg negative can receive the first dose of hepatitis B vaccine series at chronologic age 1 month.

Preterm infants discharged from the hospital before chronologic age 1 month can receive hepatitis B vaccine at discharge if they are medically stable and have gained weight consistently. The full recommended dose should be used. Divided or reduced doses are not recommended.

Hepatitis B vaccination is recommended for all infants soon after birth and before hospital discharge. Infants and children younger than 11 years of age should receive 0.5 mL of pediatric or adult formulation Recombivax HB, or 0.5 mL of pediatric Engerix-B.

Primary vaccination consists of three intramuscular doses of vaccine. The usual schedule is 0, 1 to 2, and 6 to 18 months. Infants whose mothers are

HBsAg positive or whose HBsAg status is unknown should receive the last dose by six months of age.

Because the highest titers of anti-HBs are achieved when the last two doses of vaccine are spaced at least 4 months apart, schedules that achieve this spacing are preferable.

However, schedules with 2 month intervals between doses, which conform to schedules for other childhood vaccines, have been shown to produce good antibody responses, and may be appropriate in populations when it is difficult to insure that the infant will be brought back for all their vaccinations.

However, the third dose must be administered at least eight weeks after the second dose, and at least 16 weeks after the first dose. For infants the third does should not be given earlier than 24 weeks of age.

It is not necessary to add doses or restart the series if the interval between doses is longer than recommended. In 2002 the Food and Drug Administration approved PEDIARIX the first pentavalent -- or five component -- combination vaccine licensed in the United States.

PEDIARIX contains DTaP, hepatitis B, and inactivated polio vaccines. In prelicensure studies children who received these vaccine antigens together as PEDIARIX were at least as likely to develop the productive antibody level as those who received the vaccine separately. Their antibody titers were also at least as high.

The minimum age for the first dose of PEDIARIX is 5 weeks. So it cannot be used for the birth dose of the Hepatitis B series. PEDIARIX is approved for

the first three doses of the DTAP and IPV series -- which are usually given at about 2, 4, and 6 months of age.

It is not approved for the fourth or fifth doses of the DTAP or IPV series. However, PEDIARIX is approved for use through six years of age. A child who is behind schedule can still receive PEDIARIX as long as it is given for doses 1, 2, or 3 of the series and the child is younger than 7 years of age.

PEDIARIX may be used in infants whose mothers are HBsAg positive or whose HBsAg status is unknown. This is an off label ACIP recommendation.

Comvax or the combination Hepatitis B-Hib vaccine, has been removed from existing contracts and pricing programs as of earlier this year. It is also now listed on the FDA website as discontinued. Any unexpired vaccine that a provider may have in stock can still be administered as indicated.

Remember, the combination vaccine rule. The minimum intervals between doses of a combination vaccine are dictated by the single antigen with the longest minimum interval. Therefore, for PEDIARIX the minimum intervals are determined by the hepatitis B component.

Routine hepatitis B vaccination is recommended for all children and adolescents through age 18 years. All children not previously vaccinated with hepatitis B vaccine should be vaccinated at 11 or 12 years of age with the age appropriate dose of vaccine.

The vaccination schedule should be flexible, and should take into account the feasibility of delivering 3 doses of vaccine to this age group. Unvaccinated older adolescents should be vaccinated whenever possible.

The usual schedule for adolescents is 2 doses separated by no less than 4 weeks, and a third dose 4 to 6 months after the second dose. If an accelerated schedule is needed, the minimum interval between the first 4 doses is 4 weeks. The minimum interval between the second and third doses is 8 weeks.

However, the first and third doses should be separated by no less than 16 weeks. Doses given at less than these minimum intervals should not be counted and should be repeated.

In 1999 the Food and Drug Administration approved an alternative hepatitis B vaccination schedule for adolescents 11 through 15 years of age. This alternative schedule is for two 1mL doses of Recombivax HB separated by 4 to 6 months.

Seroconversion rates and post vaccination anti-HBs titers were similar using this schedule, and the standard schedule of three 0.5 mL doses of Recombivax HB.

This alternative schedule is approved only for adolescents 11 through 15 years of age, and for Merck's hepatitis B vaccine. The 2 dose schedule should be completed by the 16th birthday.

Now we'll discuss hepatitis B vaccination of adults. Hepatitis B vaccination is recommended for all unvaccinated adults at risk for HBV infection, and for all adults requesting protection from hepatitis B infection.

Acknowledgement of a specific risk factor should not be required for vaccination. Persons at risk for infection by sexual exposure include sex partners of HBsAg positive persons, sexually active persons who are not in a long term relationships, non-mutually monogamous relationships, persons

seeking evaluation or treatment for a sexually transmitted disease, and men who have sex with men.

Persons at risk for infection by percutaneous or mucosal exposures to blood include current or recent injection drug users, household contacts of HBsAg positive persons, residents and staff of facilities for developmentally disabled persons, healthcare and public safety workers with risk for exposure to blood or blood containing bodily fluids, and persons with end stage renal disease -- including predialysis, hemodialysis, peritoneal dialysis, and home dialysis patients.

Adults with diabetes mellitus are at increased risk of HBV infection. Probably because of breaches in infection control during assisted blood glucose monitoring.

In the last 10 years at least 15 outbreaks of HBV have been associated with providers failing to follow basic principles on infection control when assisting with blood glucose monitoring. Particularly in long term care settings.

In October 2011, the ACIP recommended that all previously unvaccinated adults 19 through 59 years of age with diabetes Type 1 or Type 2 be vaccinated against Hepatitis B as soon as possible after the diagnosis of diabetes is made.

ACIP also recommends that unvaccinated adults 60 years of age and older with diabetes may be vaccinated at the discretion of the treating clinician after assessing their risk and the likelihood of an adequate immune response to vaccination.

Other groups at risk include international travelers to regions with high or intermediate levels of endemic hepatitis B infection, long term travelers, and those who may engage in high risk behaviors or provide health care while traveling. Persons with HIV infection are also at increased risk.

In 2001 the Food and Drug Administration approved a combination hepatitis A and hepatitis B vaccine, Twinrix. Each dose of Twinrix contains hepatitis A vaccine equivalent to a pediatric dose of Havrix and HBsAg protein equivalent to an adult dose of Engerix-B.

The vaccine is administered in a 3 dose series at 0, 1, and 6 months. Appropriate spacing of the dosing must be maintained to assure long term protection from both vaccines.

The first and third doses of Twinrix should be separated by at least 6 months. The first and second doses should be separated by at least 4 weeks. And the second and third doses should be separated by at least 5 months.

In 2007 the FDA approved an alternative Twinrix schedule of doses at 0, 7, and 21 to 31 days. With a booster dose at 12 months after the first dose. It is not necessary to restart the series or add additional doses if the interval between doses is longer than the recommended interval.

Twinrix is approved for persons 18 years of age and older. It can be administered to persons in this age group for whom either Hepatitis A or Hepatitis B vaccines is recommended.

The decision to screen potential vaccine recipients for prior infection depends on the cost of vaccination, the cost of testing for susceptibility, and the expected prevalence of immune persons in the population being screened.

Prevaccination testing is recommended for all foreign born persons (including immigrants, refugees, asylum seekers, and internationally adopted children) born in Africa, Asia, the Pacific Islands, and other regions with endemic HBV infection.

Household, sex, and needle sharing contacts of persons with HBsAg positive persons, men who have sex with men, injection drug users, and certain persons receiving cytotoxic or immunosuppressive therapy.

Screening is usually cost effective and should be considered for groups with a high risk of HBV infection. Screening is usually not cost effective for groups with low expected prevalence of HBV serologic markers such as health care providers in their training years.

Serologic testing is not recommended before routine vaccination of infants, children, or adolescents. Testing for immunity follow vaccination is not recommended routinely, but should be considered for persons whose subsequent management depends on knowledge of their immune status such as chronic hemodialysis patients, other immunocompromised persons, and persons with HIV infection.

Testing is also recommended for sex partners of HBsAg positive persons. Post vaccination testing should be performed 1 to 2 months after completion of the vaccine series.

Infants born to HBsAg positive women should be tested for anti-HBs and HBsAg one to two months after completion of the final dose of the hepatitis B vaccination series and at least age 9 months. If HBsAg is not present and anti-HBs is present, children can be considered to be protected.

Health care personnel who have contact with blood or body fluids of patients who might be infected with HBV or who are at ongoing risk for injuries with sharp instruments or needle sticks should be routinely tested for antibody 1 to 2 months after completion of the 3 dose Hepatitis B vaccination series. Assuming they are not previously vaccinated.

Since 2002 the rates of reported exposure are highest among health care workers trainees and vary by occupation and job duties among non-trainee health care personnel. With risk being low for office based counseling and higher for health care personnel performing procedures.

All health care institutions should ensure health care personnel receive training to recognize and report exposures, have systems in place to facilitate reporting and post-exposure management, and have prophylaxis readily accessible for timely administration.

Persons who do not respond to the first series of hepatitis B vaccine should complete a second 3 dose vaccination series. The second vaccine series should be given on the usual 0, 1, 6 month schedule.

Health care personnel and others for whom post vaccination serologic testing is recommended should be retested 1 to 2 months after completion of the second vaccine series.

Fewer than 5% of persons receiving six doses of Hepatitis B vaccine administered by the appropriate schedule in the deltoid muscle fail to develop detectable anti-HBs.

One reason for persistent non-response to hepatitis B vaccine is chronic infection with HBV. Persons who fail to develop detectible anti-HBs after 6 doses should be tested for HBsAg.

Persons who are found to be HBsAg positive should be counseled accordingly. Persons who fail to respond to 2 appropriately administered 3 dose series and who are HBsAg negative should be considered susceptible to HBV infection and should be counseled regarding precautions to prevent hepatitis B infection and the need to obtain HBIG prophylaxis for any known or probable exposure to HBsAg positive blood.

We receive so many questions about people who received their hepatitis B series several years ago, were not tested for immunity after vaccination, and are now entering a health care profession and have tested negative for anti-HBs.

We have been recommending this strategy for quite a while on NIPINFO and in the pink book, but now it is published in a CDC MMWR. If this happens, administer a single dose of vaccine and then retest 1 to 2 months later.

If the person responded to the original series, their titer will rise to a positive level. If not, administer 2 more doses to complete a second series and retest 1 to 2 months after the last dose. If they still don't respond, no further doses are recommended, and they will need HBIG if they ever have an exposure.

The Immunization Action Coalition developed a job aide algorithm for these recommendations. If you are in employee health or occupational health, consider downloading a copy of the MMWR and the job aide.

Once a person has tested positive for the anti-HBs, no additional testing or booster doses are recommended. Provide the person with a copy of the laboratory results and advise that it be kept forever.

These are the recent guidelines for health care personnel evaluation for hepatitis B protection, both for those remotely vaccinated and for post-exposure management. These were published in 2013.

This table is contained within the MMWR document. It outlines the recommended post exposure management for health care personnel. Management varies based on hepatitis B status of the source patient, and vaccination and vaccination response status of the exposed worker. For more details, consult the MMWR.

Hepatitis B vaccination is contraindicated for persons with a history of hypersensitivity to yeast or any other vaccine component. Persons with a history of serious adverse events, such as anaphylaxis, after receipt of hepatitis vaccine should not receive additional doses.

As with other vaccines, vaccinations of persons with moderate or severe acute illness with or without fever should be deferred until illness resolves.

The most commonly reported reactions following hepatitis B vaccination are pain at the injection site and mild systemic complaints such as fatigue or headache. Severe systemic reactions are rare.

All of the ACIP recommendations can be found at the ACIP's hepatitis B recommendation webpage. Additional resources can be found in the CDC's hepatitis B infection and vaccination webpages. As well as through the Immunization Action Coalition and Vaccine Education Center websites.

I will now turn the session back over to Dr. Kroger.

Dr. Andrew Kroger: Thank you very much Dr. Robinson. We're going to move to a question and answer session. And while the queue fills I'm going to give you some information about continuing education. If you do have a question, please dial Star 1 to get in the queue for the Operator. Please be sure that your question is related to today's content.

We will have a recast of this program available on the Internet on our website at www.cdc.gov/vaccines/ed/ciinc. This will be available the week of September 14, 2015. The slides will be there as well the audio portion and other resource information.

For Continuing Education Credit go to www2a.cdc.gov/tceonline/. The course number for this program is E -- as in Edward -- C -- as in cat -- 2064-090915 (EC2064-090915). Note that 090915 is today's date. And that this course number is specific to today's course.

You will need this course number when completing CE requirements. You will also need the verification code which is HepB9 -- Hep B with no space. This also applies to today's program only.

So I'll repeat this verification code. H, E, P, B, 9, with no space. CE credit for this program expires October 12, 2015. I am going to repeat this information at the end of the question and answer period as well.

But let me now turn it over to the Operator. Please have our participants ask us questions they wish to ask. Operator?

Coordinator: All right. Thank you. And our first question comes from (Caller 1).

(Caller 1): Yes, can you hear me?

Dr. Andrew Kroger: Yes. We can hear you.

(Caller 1): I was wanting to know about the Hep B. When did that take change? We were having questions. Because we give a second series when we get those negative titers. Because that's what the CDC had recommended.

And now they're saying just give one booster and then titer again. And then if it's negative or positive, you know, give the other two. So when was that change made? It said it was new.

Dr. Candice Robinson: The guidelines that I'm reading from were published in the MMWR in 2013. In December 20 of 2013 you can go to the CDC Web site and search the archives for this document. I think the...

(Caller 1): You know I...

Dr. Candice Robinson:...question of 3 doses versus 1 dose depends upon whether or not you already have a documented history of vaccinations for that worker. So if you do have a documented history, then you would just give one dose and test titers.

If you do not have a documented history of vaccination -- so you have no evidence that they were vaccinated, written documentation -- then you would give 3 doses and then test the titer after the 3.

So it would depend upon whether or not the health care provider had documentation of previous vaccination or not.

(Caller 1): Okay. So you're saying we need to have that documentation that they had at least three.

Dr. Candice Robinson: Correct.

(Caller 1): Okay. Because we do titer all of our new hires. Well, we had pulled off in three of '15 the new health care personnel vaccination recommendations and it doesn't spell it out as well on here as that you do in the slide presentation. So the - I will pull that off and we will take that forward.

Dr. Candice Robinson: Definitely.

(Caller 1): So I appreciate it.

Dr. Andrew Kroger: Actually this is Dr. Kroger. Let me just chime in at the end. The pink book chapter did actually clear prior to the publication of those specific recommendations. So I definitely support and agree with the 2013 recommendations for vaccinating health care providers as well as other activities such as using HBIG in the context of an occupational exposure.

Use the 2013 CDC recommendations and that table. That is the source you should use. So we'll take the next question that's in the queue.

Coordinator: Question is from (Caller 2).

(Caller 2): Hello. This webinar is very timely for me. Because I have a question about a patient who tested positive HBsAg, but the rest of the Hep panel is negative.

It was - the patient's retested four weeks later with the same results -- including a negative surface antibody. Now she has documented two doses of Hep B vaccine on board.

So with this patient, would you vaccinate with the third dose? Or would you consider this patient a carrier?

Dr. Candice Robinson: So for this one specifically, first, if they have not completed their full series they should still complete their full series. There is no harm in them -- even if they were a carrier -- receiving that third and final dose of Hepatitis B vaccine.

(Caller 2): Okay.

Dr. Candice Robinson: So would definitely complete their vaccination series. After their vaccination series is completed, do titers again 1 to 2 months later. If you have further questions about this patient in particular, we ask that you send them to us at NIPINFO@cdc.gov. Sometimes we may need additional information to answer the questions better.

So if you have, more questions about that specific patient definitely email us at NIPINFO.

(Caller 2): So right now with the positive hepatitis surface antigen, would you look at her as being a carrier? Would I need to explain to her about the disease? Or I'm very confused about this and I've checked with a lot of people and they're not really sure how to handle this case.

Dr. Andrew Kroger: Yes. The pink book has several different scenarios. And that doesn't fit any of them.

(Caller 2): None of them...

Dr. Andrew Kroger: And so when that happens you kind of are stuck with needing to do the titers again. So I mean that's something that we can recommend that you do. The answer about...

(Caller 2): You mean after vaccination?

Dr. Andrew Kroger:...doing the vaccine...

(Caller 2): Because I repeated the titers already four weeks later and I came back with the exact same results. So do I give her the third dose and then recheck titers and then one to two months?

Dr. Andrew Kroger: And your titers were at - were 1 to 2 months after that dose?

(Caller 2): It was - I haven't given the third dose yet because...

Dr. Andrew Kroger: Right.

(Caller 2):...I wasn't sure what her status is.

Dr. Andrew Kroger: Yes. I mean you kind of have to decouple the decision to vaccinate and the decision to determine what's going on here in terms of the titers.

And so, what you should do is send your question to nipinfo and we can...

(Caller 2): Okay.

Dr. Andrew Kroger:...try to handle kind of what clinical scenario is probably going on here.

Because a lot of times there are other factors that are going on with particular patients. To do a case based question like this it's probably best through NIPINFO so we can send it to the right people that can actually interpret these laboratory results.

(Caller 2): Okay.

Dr. Andrew Kroger: And the context of other clinical issues as well. That's very, very relevant.

(Caller 2): Okay. All right. Thank you so much.

Dr. Andrew Kroger: You're welcome. And thank you for that question. We'll take the next question in the queue.

Coordinator: All right. The next question is from (Caller 3).

(Caller 3): Yes. Hi. I had a question about the virus being very long lasted out on the surface of places. And I'm just wondering it's kind of unusual for a virus to survive so long.

So two questions to that is, is it usually in a droplet form that it survives long?
Or is it because of its core that it's protected? And also what is the transmission rate based on fomites to people that might come in contact with this surface virus?

Dr. Candice Robinson: Yes. So the pink book doesn't go into more detail about why it lasts so long. I will say that it's for a certain bodily fluids that we really see HBV contained in.

So for example, some bodily fluids such as saliva -- although there is some maybe some antigen detected in that bodily fluid -- that fluid itself does not transmit the virus very well.

So for instance, you can't get HBV through kissing, sneezing, coughing, sharing eating utensils, drinking glasses, close contact, et cetera. So it only survives this long in the context of infectious body fluids.

Why it survives that long is an excellent question. And I'm sure there is more research and data behind it. But I don't have access to that information in front of me at this time.

(Caller 3): Okay, great. And just one other quick question as far as the testing and the hepatitis surface antigen for people that - so I guess what I'm asking is if someone - does the vaccine itself have a hepatitis surface antigen?

So would the vaccinated person also show that they have Hepatitis surface antigen? As well as the antibody? Or is it just a portion of the surface antigen that's made in the vaccine so you don't see that surface antigen?

Dr. Candice Robinson: So post vaccination, you can see the HBsAg transiently immediately following vaccination. I believe for around 18 days or so following vaccination you can find HBsAg in the serum of that person. So you can have that transiently following vaccination.

(Caller 3): Okay. So after a few years that you - it's unlikely to see that surface antigen and just see the surface antibody.

Dr. Candice Robinson: Correct. The surface antigen is generally transient lasting 18 - less than 21 days or so.

(Caller 3): Okay.

Dr. Candice Robinson: So after that time period you would not see that. It doesn't mean that person is infected with the virus during that period. It's just the transient positivity...

(Caller 3): Right.

Dr. Candice Robinson:...as a result of response to the vaccination.

(Caller 3): Okay, great. Thank you.

Dr. Candice Robinson: You're welcome.

Dr. Andrew Kroger: Thank you. We'll take the next question.

Coordinator: Question is from (Caller 4).

(Caller 4): Hi, I had - my question is regarding anyone who would have been vaccinated with three doses of hepatitis B vaccine. Are there any cases documented where any of those people with proper vaccination have gone on to actually develop hepatitis B?

Dr. Candice Robinson: So generally after three doses of your hepatitis B series you're protected from clinically significant disease. And like mentioned in the presentation there's been only very rare documentations of someone who has been protected by the three dose series going on to develop chronic hepatitis B.

Now that is to say that if they had the three dose series and responded. Of course most of the time, for the people who are at ongoing risk such as your health care providers, we would determine whether or not they responded.

And so if they had the three dose series and we know they responded to that series then in that case it would be very rare for them to go on to develop hepatitis B clinically significant disease. And even more rare for them to develop chronic hepatitis B.

(Caller 4): Okay. Thank you very much.

Dr. Andrew Kroger: Thank you. Why don't we take one last question? If there's one in the queue.

Coordinator: Okay. The next question is from (Caller 5).

(Caller 5): I have a question. I had my first series of my three hepatitis B in 1991. And then I started a new job at another health facility and they did another three and they did a titer one month later and I tested negative.

So I've had six doses of the hepatitis B and I have no antibodies. So I'm wondering what my next step should be. I do work in the health care field.

Dr. Candice Robinson: Sure. Since you've had six doses and did not respond, no further doses of vaccine would be indicated at this time. However, if you were to have an

occupational exposure -- you were to have a needle stick or a mucosal exposure to fluids from a patient who is HBsAg positive -- then you would require a post exposure prophylaxis with HBIG.

(Caller 5): Okay. So how would I - I mean how would I...

Dr. Candice Robinson: So...

(Caller 5): ...know if that patient was Hepatitis B positive?

Dr. Candice Robinson: What you should do is if you do have an occupational exposure to the bodily fluids through stick or mucosal exposure, consult with your hospital's occupational health team.

Just immediately after the stick. Make sure you let your manager know. And make sure they consult with occupational health. And they should be able to direct you on your next steps from there.

(Caller 5): Okay. Thank you.

Dr. Candice Robinson: You're welcome.

Dr. Andrew Kroger: Thank you very much. In the interest of time we're going to move on to some closing Continuing Education Credit information. So for CE Credits please go to www2a.cdc.gov/tceonline/. The course number is EC2064-090915.

Please note that 090915 is today's date. And that this code applies to today's program. The verification code is HepB9 -- with no space. So write this down. HepB9. CE Credit expires October 12, 2015.

For help with the online system -- which is available from 8:00 am to 4:00 pm Eastern Time -- please dial 1-800-41-TRAIN. This corresponds to the number 1-800-418-7246. Or you can email ce@cdc.gov.

You can email immunization questions to us if you did not get to ask them today at nipinfo@cdc.gov. And we'll try to respond to those as quickly as possible.

You can also call immunization questions at 1-800-CDC-INFO. That corresponds to 1-800-232-4636. At 8:00 am to 8:00 pm Eastern Time Monday through Friday.

Additional resources that you can use include the pink book. The website for the pink book is there at www.cdc.gov/vaccines/pubs/pinkbook/index.html. It is available online. Or you can purchase a hard copy. If you go to that site, there is a link for the Public Health Foundation Learning Resource Center.

Our CDC vaccine homepage is cdc.gov/vaccines/default.htm. Our resource guide for health care personnel which is entitled CDC Immunization Resources for You and Your Patients is listed at www.cdc.gov/vaccines/ed/downloads/imz-resources.pdf.

Follow us on Twitter for immunization news, information, and resources for private and public health care personnel. And that's [@cdcizlearn](https://twitter.com/cdcizlearn) on Twitter.

That concludes our program. I want to thank Dr. Candice Robinson for the presentation covering the topic in great detail and for answering all of the questions. Thank you very much. And have a great day from Atlanta. Goodbye.

Coordinator: Thank you. This completes today's conference. You may disconnect at this time.

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