Acute Hepatitis B Investigative Guidelines

September 2024

REPORT WITHIN 1 WORKING DAY

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To identify outbreaks and potential sources or sites of ongoing hepatitis B virus (HBV) transmission
2. To assess the risk of and to prevent on-going transmission of HBV
3. To educate people about how to reduce their risk of HBV
4. To identify additional cases of HBV
5. To better characterize the current epidemiology of HBV including the social, environmental, and behavioral context(s) for transmission
6. To identify communities and populations at elevated risk for HBV or severe outcomes from HBV which can inform efforts to support OHA's strategic goal of eliminating health inequities in Oregon by 2030

1.2 Laboratory and Clinician Reporting Requirements

Laboratories, physicians, and other persons providing health care are required to report confirmed or suspect cases to the Local Health Department (LHD) within one working day following identification or diagnosis. All positive tests must be reported by licensed laboratories within one working day.

1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but not suspect) cases (see definitions below) to the Oregon Public Health Division (PHD) Acute and Communicable Disease Prevention (ACDP) Section as soon as possible but no later than the end of the calendar week.
2. Begin follow-up investigation within one working day. Submit all required case data electronically including REALD and SOGI if available.
3. Recommend prophylaxis if indicated (e.g., hepatitis B immune globulin [HBIG] or vaccine) to contacts of confirmed and presumptive cases. See *§5.4 for guidance and timeline for administration.*

4. At time of initial report, and **upon receipt of new lab results for previously investigated cases**, verify the pregnancy status of confirmed and presumptive cases who are between the ages of 15-44 and have the potential for pregnancy (e.g. have a uterus, have not experienced menopause).
5. Confirmed and presumptive cases who are pregnant must be enrolled **with each pregnancy** into the Oregon Perinatal Hepatitis B Prevention Program (PHBPP). The case should be enrolled in the PHBPP within one calendar week of receiving the laboratory report. This includes creating a record of the pregnancy in the electronic communicable disease database (i.e. Orpheus).

2. THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Etiologic Agent

Hepatitis B virus (HBV) is a hepadnavirus that is one of several viruses known to cause hepatitis (liver inflammation) in humans. Until the 1970s, laboratory tests were not available to distinguish among these clinically similar infections, but HBV is now known to be completely unrelated to other viruses that cause hepatitis (such as hepatitis A, C, D, and E viruses).

2.2 Description of Illness

Exposure to HBV may result in transient or chronic infections, either of which can be asymptomatic. Onset is usually insidious (comes on slowly) with loss of appetite, vague abdominal discomfort, nausea, vomiting, and sometimes arthralgias (joint pain) and skin rash, often progressing to jaundice (yellow discoloration of the skin and eyes that may be most noticeable in the whites of the eyes). Liver enzyme levels are markedly elevated. Fever may be absent or mild. Although often more severe, hepatitis B cannot be reliably distinguished clinically from other viral hepatitis. Asymptomatic infections are common among children and adults; less than 10% of children and 30–50% of adults present with jaundice. (1)

The likelihood of becoming chronically infected is affected by age at infection. Approximately, 90% of infected infants and 30% of infected children age < 5 years become chronically infected compared with 2% to 6% of persons who become infected as adults. Chronic HBV hepatitis increases the risk of developing cirrhosis or liver cancer (15%-25%). (2) In the United States, the prevalence of people who are HBsAg-positive continues to remain low after the initial decline that followed the implementation of universal vaccination in 1992. In NHANES 2017 to 2020, the overall prevalence of HBV infection (anti-HBc) among persons 6 years and older in the US was 0.2%. Prevalence among foreign born residents was markedly higher (1.0%). (3)

2.3 Reservoirs

Humans are the reservoir for HBV. While relatively few infected persons become chronically infected, people with chronic infection are probably the most important sources of HBV transmission, because they are infectious indefinitely. Whereas people with an acute infection that resolves are only infectious for a few months. Efforts to

identify people who are chronically infected and to offer prophylaxis to their contacts is at least as important as follow-up directed towards people with acute infection.

2.4 Serologic Markers

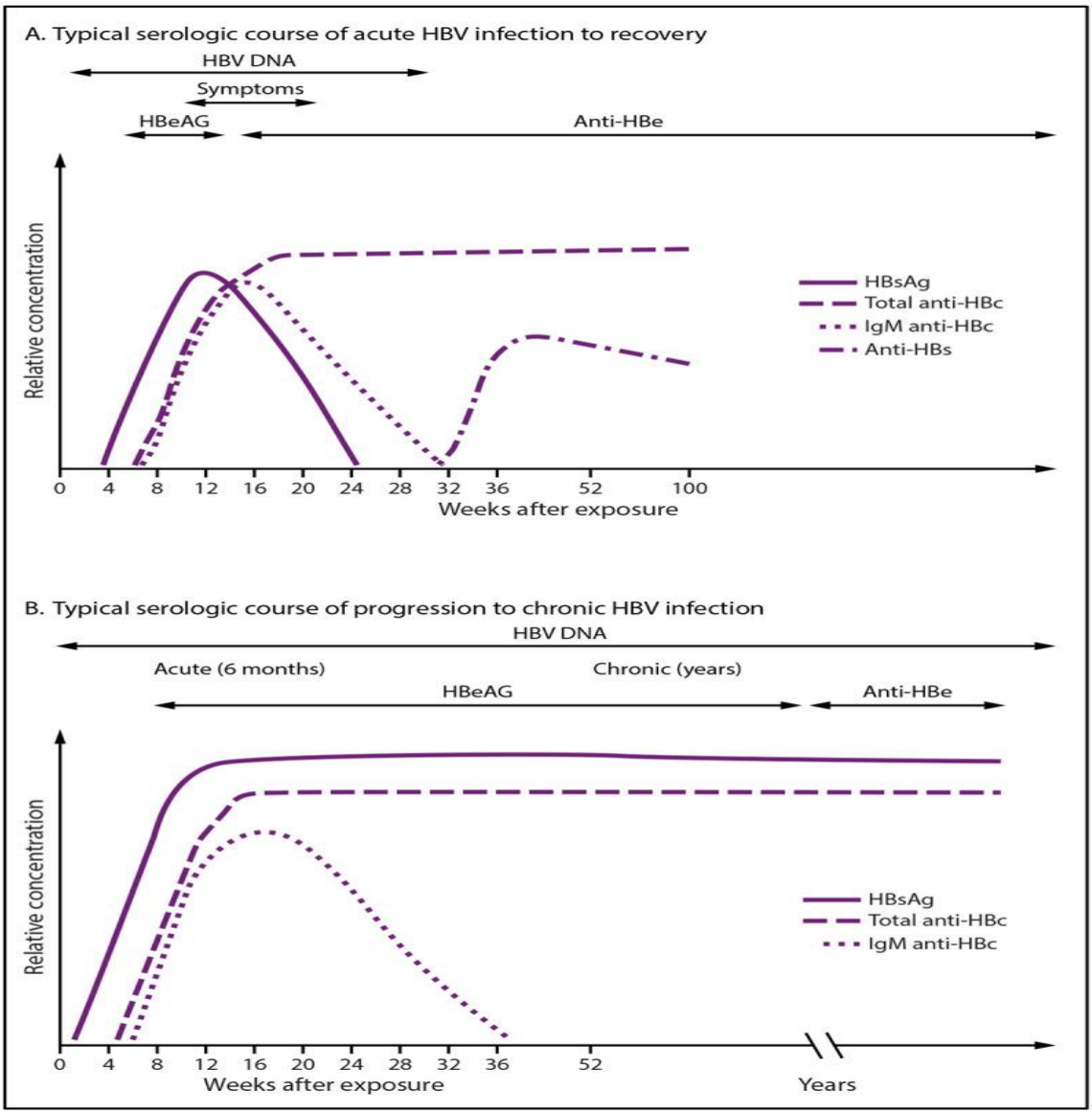
Serologic markers of HBV infection are identified by antigen and antibody assays and by nucleic acid amplification test (NAAT) for HBV DNA (i.e., PCR). The most common markers are shown in Table 1.

Table 1. Serological markers of hepatitis B

Marker	Abbreviation(s)	Significance/interpretation
Surface antigen	HBsAg	Marker of infectivity. Persists indefinitely in chronically infected persons.
Surface antibody	anti-HBs	Usually indicates the development of immunity, either from past infection or immunization. Most people who are chronically infected never develop anti-HBs (but if they do, they remain HBsAg positive as well). Anti-HBs levels may decline to undetectable levels over time (years), especially if their presence is the result of from immunization and not infection.
Viral DNA	HBV DNA/ HBV NAT	Marker of infectivity. Rises to high concentrations during incubation and falls with the onset of hepatic disease in transient infection. Detectable in about 50% of chronically infected persons, can be present when HBsAg is undetectable.
Core antibody (total)	anti-HBc total anti-HBc core anti-HBc	Marker of past infection. Generally, remains elevated for at least two years after transient infection and may remain elevated for life. Vaccination does not produce anti-HBc.
Core antibody (IgM)	IgM anti-HBc	Marker of infection in the recent past (usually <6 months).
e antigen	HBeAg	Marker of enhanced infectivity. Seen transiently in most infections and persists in some chronically infected persons indefinitely. HBeAg-positive individuals are 3-5x more infectious than HBeAg-negative counterparts. (4)
e antibody	HBeAb	Antibody to HBeAg

The timeline of marker appearance relative to exposure and subsequent illness in typical infections is illustrated in the figure below. Occasionally, in the later stages of clinical illness, a person will have neither HBsAg nor anti-HBs detectable in the blood. They may still be infectious, however, for 1–2 weeks during the window phase in the figure below.

Figure. Appearance of Serologic Markers in HBV Cases (Acute and Chronic)



Note. Figure reproduced from Conners EE, Panagiotakopoulos L, Hofmeister MG, et al. Screening and testing for hepatitis B virus infection: CDC Recommendations - United States, 2023. *MMWR Recomm Rep*. 2023;72(1):1-25.

2.5 Sources and Routes of Transmission

HBV is usually transmitted by contact with the blood, semen, or vaginal secretions of a person with infectious HBV (HBV DNA or HBsAg-positive). Because of the high concentration of virus in blood, an extremely small inoculum (exposure to a small amount of blood) is sufficient to transmit infection. The virus must be introduced through

broken skin or mucous membranes for infection to occur. HBV can remain viable on environmental surfaces for up to a week (e.g., in dried blood). (5)

The most common modes of transmission include: (5)

- Sharing of contaminated objects or contaminated equipment that may penetrate the skin. This could include hypodermic needles and other injection paraphernalia, razor blades, renal dialysis equipment, blood glucose monitoring equipment, and multiuse medication vials.
- Oral, anal, or vaginal sexual contact among people of any genders, particularly without the use of barrier methods, and sharing unsanitized sex toys.
- Perinatal transmission from an infected person to their child during pregnancy or childbirth. See OHA Investigative Guidelines for perinatal transmission at https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/REPORTINGCOMMUNICABLEDISEASE/REPORTINGGUIDELINES/Documents/hepbperi.pdf
- Needlestick or similar accidental injury.

The following routes of transmission are less common, but have been documented in the literature: (6)

- Transfusion, infusion or inoculation of blood or blood products from an infected person or plasma pool; however, in the US, all blood is routinely screened for HBV markers (HBsAg, HBV DNA and anti-HBc) before use, so this risk is now extremely low.
- Contact of infective fluid with a mucosal surface (e.g., a splash of blood to the mouth or eye).
- Contact of lacerated, scratched, or otherwise broken skin with blood or contaminated environmental surfaces (for example, countertops, blood-smear slides or specimen tubes in laboratories).
- An infected person biting another person or scratching another person with saliva-contaminated nails, leading to percutaneous introduction of virus to another person.

HBV may also be found in saliva and other body fluids. However, there are no known instances of HBV being transmitted in saliva alone, and breastfeeding is not a significant route of transmission. (1) While chimpanzees have been infected with HBV, and many animal species carry other hepadnaviruses, there is no documentation of HBV spreading from an animal to a person. HBV is highly transmissible, 100 times more so than HIV. (1)

2.6 Risk Dynamics

Any person can be infected with hepatitis B. However, people at certain life stages, with certain pre-existing conditions, or who engage in certain behaviors may be at greater risk of infection, severe disease, or becoming chronically infected with the virus.

In the United States, about 38.2% of HBV infections are attributed to sexual transmission. Sexually transmitted HBV infections remain a public health problem.(7) Incarceration is another risk, because incarcerated people have limited control over their environment and often encounter violence that can lead to exposure to body fluids.(8)The disproportionate incarceration of people living in poverty, Black/African American people, American Indian and Alaskan Native people, and people with disabilities means that these groups of people also have a disproportionate risk of being exposed to HBV.

Other less common risk factors include transfusion of blood products, foreign travel, and occupation exposures. Transmission via transfusion of blood products used to be common, but screening of the US blood supply has addressed this problem. Yet, some lower-income countries have not yet adopted these procedures, creating elevated risk for people who have received medical care in these environments. (1) Persons who require injections or intravenous medical treatment (e.g., glucose monitoring, dialysis, or cancer treatment) face the risk of transmission via medical equipment, particularly if they are assisted by others in these tasks. Travelers to countries in which HBV infection is of high or intermediate endemicity are at risk if they are exposed to blood in medical or disaster-relief activities, medical care that involves parenteral exposures, sexual activity, or drug use. Refugees, asylum-seekers, and internally displaced people are at elevated risk because of their disrupted access to vaccination and the elevated rates of gender-based violence they experience. (9) Finally, people whose work exposes them to body fluids in non-medical settings are at elevated risk. This could include people working in law enforcement, in facilities caring for people with developmental disabilities, or in other roles providing intimate care or encountering physical aggression in the workplace. Healthcare workers, even if they are vaccinated, are a potentially vulnerable population because of their exposures to needlestick injuries etc. (10) Another risky occupation, which may be less common in the US, is waste-picking or informal recycling. Much of this research was conducted in Brazil and Nigeria. (11)

In Oregon, the risks of household, perinatal, and sexual transmission may be elevated among people who have immigrated (foreign born) from, travel to, or have social connections with people from areas of higher prevalence. People who have lived or spent time in low-resource environments of high endemicity may encounter another layer of elevated risk, due to potential exposures such as re-use of medical equipment or lack of adequate sanitization equipment in low-resource communities. In endemic areas, transmission usually occurs during infancy, often leading to chronic infection. (12) By contrast, new cases in the US are generally among adults and resolve before turning into chronic disease. (13)
Risk factors such tattooing, piercing, or acupuncture are very low in Oregon as it can only occur if appropriate precautions are not used. (14)
People who inject drugs (PWID) and men who have sex with men (MSM) are also at higher risk of becoming chronically infected. (15)
In the US, data shows increased incidence of acute HBV infections and increased prevalence of chronic HBV infection among women of childbearing age in regions heavily affected by injection drug use. (16)

2.7 Incubation Period

The incubation period varies from 45 to 180 days but is usually between 60-90 days. It is possible, but rare, that the incubation period extends as long as six months. (1)

2.8 Period of Communicability

A person is infectious if HBsAg or HBV DNA is detectable in the blood. Viremia begins several weeks before the onset of symptoms and persists for several months (in most instances) or indefinitely for those with chronic HBV infection. A similar period of viremia occurs among asymptomatically infected individuals.

2.9 Treatment

During the acute phase, treatment is symptom-based supportive care. There are several antiviral medications available for people with chronic HBV infection. Persons who progress to chronic HBV infection need medical management to monitor the onset and progression of liver disease, assess need for treatment and screen for liver cancer.

3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES

3.1 Confirmed Case Definition

A confirmed case of acute hepatitis B is defined as a person who either:

1. Has one or more of the following laboratory confirmations of HBV:

a) Detection of HBsAg[†] **and** detection of IgM anti-HBc

OR

b) Detection of HBeAg **and** detection of IgM anti-HBc

OR

c) Detection of HBV DNA[††] **and** detection of IgM anti-HBc,

OR

d) Detection of HBsAg,[†] HBeAg, or HBV DNA within 12 months (365 days) of a negative HBsAg test result (i.e., HBsAg seroconversion).

2. Or who meets BOTH of the following clinical and laboratory criteria:

a) In the absence of a more likely, alternative diagnosis*, acute onset or new detection of at least one of the following clinical criteria:

- Jaundice,
- Total bilirubin ≥ 3.0mg/dL, or
- Elevated serum alanine aminotransferase (ALT) levels > 200 IU/L

AND

b) Detection of HBV surface antigen (HBsAg)[†] **and** IgM antibody to HBV core antigen (IgM anti-HBc) test not done or result not available, **OR**

Detection of HBV DNA[††] **and** IgM anti-HBc test not done or result not available.

* Alternative diagnoses may include evidence of acute liver disease due to other causes or advanced liver disease due to hepatitis B reactivation, pre-existing chronic HBV infection, other causes including alcohol exposure, other viral hepatitis, hemochromatosis, or conditions known to produce false positives of hepatitis B surface antigen, etc.

[†] If information on HBsAg test method is available and HBsAg confirmatory neutralization was performed as recommended, HBsAg positive by confirmatory neutralization. A positive qualitative HBsAg result with a negative HBsAg confirmatory neutralization result is not considered a detection of HBsAg.

[††] DNA detection by nucleic acid test, including qualitative, quantitative, or genotype testing

3.2 Presumptive Case Definition

A presumptive case must meet **all three** of the following conditions:

1. In the absence of a more likely, alternative diagnosis*, acute onset or new detection of at least one of the following clinical criteria:
   - Jaundice,
   - Total bilirubin ≥ 3.0mg/dL, **or**
   - Elevated serum alanine aminotransferase (ALT) levels > 200 IU/L
2. Detection of IgM anti-HBc **AND**
3. Negative or test not done for HBsAg, HBV DNA, or HBeAg.

* Alternative diagnoses may include evidence of acute liver disease due to other causes or advanced liver disease due to hepatitis B reactivation, pre-existing chronic HBV infection, other causes including alcohol exposure, other viral hepatitis, hemochromatosis, or conditions known to produce false positives of hepatitis B surface antigen, etc.

3.3 Suspect Case (not to be used)

These have been defined out of existence; suspect should not be used as a case classification.

3.4 Criteria to Distinguish a New Case of Acute or Chronic Hepatitis B from Reports or Notifications which Should Not be Enumerated as a New Case for Surveillance

A case of HBV infection classified as Perinatal HBV can be additionally enumerated as a confirmed case of chronic HBV infection if a positive HBV viral detection test (HBsAg, HBeAg, or HBV DNA) is obtained after the case is greater than 24 months of age.
A confirmed acute case of HBV infection may be additionally enumerated as a new confirmed chronic case of HBV infection if a positive HBV viral detection test is reported

6 months or longer after acute case onset or, if asymptomatic, after the initial positive test result.
An acute case of HBV infection should not have been previously enumerated as a case of either acute or chronic HBV infection.
A chronic case of HBV infection should not have been previously enumerated as a case of chronic HBV infection.

3.5 Services Available at the Oregon State Public Health Laboratories

The OSPHL offers serologic testing for HBsAg, anti-HBs, anti-HBc IgM, and anti-HBc Total (IgG and IgM). For complete information about specimen collection, handling, and transport, refer to the OSPHL Test Menu at www.healthoregon.org/labtests.

If the HBsAg result is reactive, confirmatory testing will be recommended and is not performed by OSPHL.

ROUTINE CASE INVESTIGATION

4.1 Confirming the Diagnosis

It is important to distinguish between acute hepatitis B virus (HBV) infection and chronic HBV infection. Try to get information from the ordering provider about presence/absence of symptoms, LFTs, and prior history. If the laboratory report notes that confirmatory testing has been ordered or is pending, try to obtain the confirmatory test results as negative results may not get reported automatically. A positive qualitative HBsAg result with a negative HBsAg confirmatory neutralization result is not considered a detection of HBsAg. It may also be helpful to check whether the person was recently vaccinated as people who receive hepatitis B vaccine might be transiently positive for HBsAg for up to 18 days post-vaccination. (17)

4.2 Identify the Source of Infection

Routine case investigation should include the documentation of case demographic, laboratory, and clinical data. Personal information should be collected based on people's self-reported identities and should include "REAL-D" and "SOGI" information.

Collect information about possible exposures, including high risk behavior, during the period 45-180 days before the onset of illness. **Emphasis should be placed on the 60-90 days before onset**. This should include:

- Close contact with any household member, sex partner, or acquaintance with recent hepatitis or chronic HBV infection (get names, phone numbers and addresses)
- Receipt of blood transfusion or other blood products
- History of dental or surgical care
- History of renal dialysis
- Use of shared needles
- Use of shared blood glucose monitor.
- History of tattooing, ear, or body piercing, or acupuncture[9]
- Needlestick or similar injury

- Accidental exposure of skin, eyes, mucous membranes, or a wound to the blood of another person
- Work in occupational settings with elevated risk of exposure (e.g., dental, laboratory, mortuary settings, facilities for developmentally disabled people)
- Residence in a facility for developmentally disabled people
- Incarceration
- Sexual contact with more than one person (in the past 180 days)
- Sexual contact with persons who have a recent history of injecting drugs
- Sharing un-sanitized sex toys.

4.3 Identify Potentially Exposed Persons (16)

- If case reports injection drug use, identify if case has shared needles with other persons in the past six weeks. Since 2009, there has been an increase in acute HBV infection in non-urban areas reporting injection drug use. (18)
- Identify persons with whom the case has had sexual contact from six weeks before onset to present. HBIG should be recommended for the sex partner(s) who shared semen, vaginal secretions, or blood (see *§5.4*). Partners whose most recent sexual contact is more than two weeks ago are unlikely to benefit from prophylaxis, but they should be informed of their potential exposure and encouraged to seek medical care should they develop signs or symptoms of hepatitis. Immunization is recommended for those who anticipate continued sexual contact with an infected person or with multiple partners, and use of barrier methods (condom, dental dam) should be recommended until vaccination is complete.
- Identify persons who may have been exposed within the past six weeks to potentially infectious body fluids by percutaneous or per mucosal means (e.g., needle sharing, body splashes). Those persons exposed within the last 7 days should receive HBIG if susceptible to HBV infection (see *§5.4*). Those exposed >7 days ago should be advised of their exposure and encouraged to seek medical care if they develop symptoms of hepatitis. Recommend hepatitis B immunization to those with occupational or ongoing risk of exposure (see *§5.4*).
- Identify if case resides in a prison or has a history of incarceration in the last 6 weeks. Although most acute HBV infections occur in the community, persons entering prisons are at higher risk of HBV infection.
- If the case is a dentist, surgeon, or other health care worker, evaluate the potential for exposing patients (see *§6.1*).
- If the case has donated blood or plasma in the 8 weeks before onset, see *§6.3*.
- If the patient is pregnant, see *§6.5*.

4.4 Environmental Evaluation

Usually, no environmental evaluation is needed unless transmission occurs in a dialysis center or health care facility by means of environmental surfaces or inanimate objects. If this type of transmission is suspected, contact ACDP's on-call epidemiologist (971.673.1111).

5. CONTROLLING FURTHER SPREAD

5.1 Education

Persons who are HBV DNA, HBsAg or HBeAg-positive should be instructed that their blood,-semen, vaginal secretions, and possibly saliva is infectious to others until the HBV DNA, HBsAg or HBeAg has cleared; typically, within two or three months. People who are chronically infected are usually infectious for life. (A few do lose measurable HBsAg over time).

In health care settings, close attention to standard precautions is important while a case is positive. Surfaces contaminated with saliva and blood should be cleaned and properly disinfected. Objects potentially contaminated with blood, semen, or vaginal secretions (e.g., drug paraphernalia, razors, sex toys, toothbrushes) should not be shared with other people. Contaminated sharps should be discarded in an approved sharps container.

It is especially risky for infected persons to share hypodermic needles with other people. Disposable needles should never be used more than once. While it is not recommended to reuse needles, flushing needles with water, then again with household bleach, then again with water up to three times may kill HBV or other viruses in the syringe.[10] Other drug paraphernalia such as pipe mouth pieces, cookers, cottons, rinse water, and tie-offs can also be a source of exposure if infected blood is present, even in small quantities.

Persons should be advised that the virus may be transmitted through vaginal and anal sexual contact. Patients should be counseled about abstinence, barrier methods, and other strategies for safer sex. Sex partners who are anti-HBc positive (from previous infection) are not at risk; vaccination has an estimated 95% efficacy and should be recommended to sex partners of cases.

People who could potentially get pregnant should be tested for HBV along with other communicable diseases (e.g. HIV, HCV, Syphilis) and be counseled about the risk of hepatitis B infection to infants who are birthed by people who are infected, and of the importance of prophylaxis for these newborns. If the case is pregnant, see *§6.5.*

Caregivers of persons with functional disabilities who have HBV infection should be alerted to the risk of exposure associated with behaviors such as biting and scratching.

Persons with acute HBV infections should be instructed to postpone non-emergency dental care and surgery until their viremia has cleared, which may be as long as 6 months. Should they require medical or dental care, they should notify involved personnel of their hepatitis B status.

5.2 Isolation and Work or Childcare Restrictions

Standard precautions are adequate to minimize the risk of further transmission. Hospitalized patients with acute or chronic HBV infections pose a minimal risk to staff or other patients, given the implementation of standard precautions and the appropriate pre-exposure use of hepatitis B vaccine.

If the case is a health care worker with potential for exposing patients, they should be discouraged from working until the acute clinical illness has resolved. Upon return to work, special precautions should be practiced until the worker is no longer infectious (see §6.1).

The risk of transmission of HBV in school or childcare settings is usually low and can be reduced through sound infection control procedures and environmental cleanliness. Generally, toiletry items that could be contaminated with blood or saliva should not be shared. Toys and other contaminated objects should be cleaned and disinfected as soon as possible to prevent transmission. Children in the communicable stages of hepatitis B infection may be excluded from attending school or childcare if, in the opinion of the local health officer, the child poses an unusually high risk to other children (e.g., exhibits uncontrollable biting or spitting). See Oregon Administrative Rule 333-019-0010.

5.3 Case Follow-up

A repeat test for HBV DNA, HBeAg or HBsAg should be obtained after six months to determine the clearance or continued presence of viremia. People who still test positive are chronically infected and should be counseled accordingly. Please refer to Orpheus data entry instructions for guidance on how to create a new chronic HBV case.

5.4 Prophylaxis (17)

Post-exposure prophylaxis (PEP): Passive immunization with HBIG and active immunization with hepatitis B vaccine may be used to prevent infection or modify illness due to infection with HBV. To be effective, HBIG must be given as soon as possible after exposure (preferably within 24 hours). Prophylaxis is unlikely to be beneficial if given 7 days after percutaneous exposure or 14 days after sexual exposure. The exposed person's prior history of hepatitis B infection, vaccination, and vaccine response status (if known) should always be considered, but treatment should not be unduly delayed while awaiting test results. See Table 2 for PEP recommendations for occupational exposures and Table 3 for non-occupational exposures. For information on how to obtain HBIG, please consult supplied immunoglobulin and other medications IGs guidelines.

Table 2. Recommended Post-exposure Prophylaxis for Occupational Exposure to Hepatitis B Virus (19)

Vaccination and antibody response status of exposed worker*	Treatment	
	Source is HBsAg positive or unknown / not available for testing	**Source is HBsAg negative**
Unvaccinated	Hepatitis B immune globulin (HBIG)† x 1 and initiate HepB vaccine series	Initiate HB vaccine series
Previously Vaccinated		
Known responder§	No treatment	No treatment
Known non-responder**	HBIG x 1 and initiate revaccination or HBIG x 2 one month apart¶	No treatment
Response unknown	Test exposed person for anti-HBs 1. If adequate, no treatment is necessary. 2. If inadequate, administer HBIG x 1 and initiate revaccination.	Test exposed person for anti-HBs 1. If adequate, no treatment is necessary. 2. If inadequate, initiate revaccination.

* Persons who have previously been infected with HBV are immune to reinfection and do not require post-exposure prophylaxis.
† Dose is 0.06 mL/kg intramuscularly.
§ A responder is a person with adequate levels of serum antibody to HBsAg (i.e., anti-HBs ≥10 mIU/mL).
** A non-responder is a person with inadequate levels of serum antibody to HBsAg (i.e., anti-HBs <10 mIU/mL).
¶ The option of giving one dose of HBIG and reinitiating the vaccine series is preferred for non-responders who have not completed a second 3-dose vaccine. For those who have not responded after completing two complete vaccine series, do not give additional doses of vaccine.

Table 3. Recommended Post-exposure Prophylaxis* for Non-occupational Exposure to Hepatitis B Virus** (20)

Exposure	Treatment	
	Unvaccinated person†	Previously vaccinated person§
HBsAg-positive source	Administer hepatitis B vaccine series and hepatitis B immune globulin (HBIG). HBIG dose is 0.06 mL/kg intramuscularly	Administer hepatitis B vaccine booster dose
Perinatal exposure to HBsAg-*positive* pregnant people or in infants weighing less than 2,000 grams to pregnant people with unknown HBsAg status	Initiate hepatitis B vaccine series and hepatitis B immune globulin (HBIG) within 12 hours of birth	Not applicable
HBsAg status unknown for source	Administer hepatitis B vaccine series	No treatment

*When indicated, immunoprophylaxis should be initiated as soon as possible, preferable within 24 hours. Studies are limited on the maximum interval after exposure during which postexposure prophylaxis is effective, but the interval is unlikely to exceed 7 days for percutaneous exposures or 14 days for sexual exposures. The hepatitis B vaccine series should be completed.
**Examples of such exposures include bites or needlesticks, mucosal exposures to HBsAg-positive blood or body fluids; sex or needle-sharing contact; or the victim of sexual assault/abuse.
† A person who is in the process of being vaccinated but who has not completed the vaccine series should complete the series and receive treatment as indicated.
§ A person who has written documentation of a complete hepatitis B vaccine series and who did not receive post-vaccination testing.

Pre-exposure prophylaxis using HBV vaccination:

Universal infant immunization has been recommended since early 1992. Universal hepatitis B vaccination is recommended for people 19 – 59 yo. Routine hepatitis B vaccination is also indicated for anyone at increased risk of infection because of medical history, living or working conditions, high-risk behaviors, or ongoing intimate contact with a person or persons who are chronically infected with HBV. Vaccination should be recommended to persons who are identified as being at risk during routine public contacts, in addition to those identified during an HBV case investigation. Vaccination is also recommended for nonsexual household contacts of acute HBV cases, especially children and adolescents. Questions about vaccine availability should be directed to the Oregon Immunization Program.

Pre-exposure prophylaxis using HBV vaccination is recommended for the following people: (21)

- All infants

- Persons aged < 19 years
- Adults aged 19-59 years
- Adults aged ≥60 with risk factors for hepatitis B:
    - Persons at risk for infection by sexual exposure
        - Sex partners of persons testing positive for HBsAg
        - Sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months)
        - Persons seeking evaluation or treatment for a sexually transmitted infection
        - Men who have sex with men
    - Persons at risk for infection by percutaneous or mucosal exposure to blood
        - Persons with current or recent injection drug use
        - Household contacts of persons testing positive for HBsAg
        - Residents and staff members of facilities for persons with developmental disabilities
        - Health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
        - Persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis, and persons who are predialysis
        - Persons with diabetes at the discretion of the treating clinician
    - Others
        - International travelers to countries with high or intermediate levels of endemic hepatitis B virus infection (HBsAg prevalence of ≥2%)
        - Persons with hepatitis C virus infection
        - Persons with chronic liver disease (including, but not limited to, persons with cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and an alanine aminotransferase or aspartate aminotransferase level greater than twice the upper limit of normal)
        - Persons with HIV infection
        - Persons who are incarcerated
        - Adults aged ≥60 without known risk factors for hepatitis B may receive hepatitis B vaccines

Interrupted vaccine schedules:

For all ages, when the HepB vaccine schedule is interrupted, the vaccine series does not need to be restarted. If the series is interrupted after the first dose, the second dose should be administered as soon as possible, and the second and third doses should be separated by an interval of at least 8 weeks. If only the third dose has been delayed, it should be administered as soon as possible. The final dose of vaccine must be administered at least 8 weeks after the second dose and should follow the first dose by at least 16 weeks; the minimum interval between the first and second doses is 4 weeks. Inadequate doses of Hep B vaccine or doses received after a shorter-than-recommended dosing interval should be readministered, using the correct dosage or schedule. Vaccine doses administered ≤4 days before the minimum interval or age are considered valid. Because of the

unique accelerated schedule for Twinrix, the 4-day guideline does not apply to the first 3 doses of this vaccine when administered on a 0-day, 7-day, 21–30-day, and 12-month schedule (new recommendation)

Occupational risks:

Persons with jobs that put them at risk for occupational exposures may be eligible for vaccination at their employer's expense. For more information, contact OR-OSHA.

Testing for Seroconversion:

Vaccinees with an ongoing risk should be tested for seroconversion 1-6 months after completion of the original 3-dose schedule. For perinatal exposures, see *§6.6*. (16) Post-vaccination serologic testing following a complete series of hepatitis B vaccination is recommended for specific populations, including:

- Infants birthed by a person who was HBsAg-positive or has an unknown HBsAg status
- Healthcare personnel and public safety workers at risk for blood or body fluid exposure
- People who require hemodialysis or may in the future
- People living with HIV
- Immunocompromised persons
- Sex partners of HBsAg-positive persons

Vaccination

Refer to the Oregon Health Authority Immunization Protocols (formerly Immunization Standing Orders) for the recommended hepatitis B vaccine doses and schedules:
https://www.oregon.gov/oha/ph/preventionwellness/vaccinesimmunization/immunizationproviderresources/pages/stdgordr.aspx)

6. MANAGING SPECIAL SITUATIONS

6.1 Case is a Health Care Worker

HBV-infected health care providers (HCPs) should not be prohibited from participating in patient-care activities solely on the basis of their HBV infection. Standard precautions should be adhered to rigorously in all healthcare settings for the protection of both patient and provider.

Additionally, HCPs who return to work prior to resolution of acute illness or who develop chronic infection and have titers of HBV DNA greater or equal to ≥ 1000 IUs should not perform Category III/exposure-prone procedures (see SHEA guidelines), such as open resuscitation efforts.

Current SHEA guidelines (22) suggest that HCPs living with HBV whose circulating viral loads can be consistently suppressed to <1000 IUs can perform category III/exposure-prone procedures, as long as the person:

1. Has not been previously identified as having transmitted infection to patients while on appropriate suppressive therapy;

2. Obtains advice from an oversight panel about recommended practices to minimize risk of exposure events;
3. Is followed by a personal physician who has expertise in the management of HBV infection and who is allowed by the HCP to participate in or communicate with the oversight panel about the individual's clinical status;
4. Is monitored on a periodic basis (e.g., every 6 months) to assure that the viral load remains <1000 IUs and
5. Signs a written agreement to follow the recommendations of the oversight panel.

6.2 Case is a Suspected Iatrogenic Infection

If two or more iatrogenic (healthcare-associated) cases occur in patients of the same dental or health care provider, residential care facility, or non-hospital health care facility (ie, dialysis center) and the cases have no other identified plausible source of infection, or if other circumstances suggest the possibility of iatrogenic infection, notify ACDP. Note that ACDP has prepared guidelines for investigations of HBV and HCV outbreaks in healthcare settings.

6.3 Case is a Recent Blood Donor

If the case has donated blood or plasma within the eight weeks prior to onset of symptoms, the agency that received the blood or plasma should be notified so that any unused product can be recalled.

6.4 Case is a Recent Transfusion Recipient

If transfused blood or blood products are suspected as the possible source of infection, the blood bank or other agency that provided the implicated lot should be notified so that aliquots of the blood still on hand, or the donors themselves, can be retested for HBsAg or tested for anti-HBc. Lot numbers for tracing are usually available through the blood bank at the hospital where the units were transfused.

6.5 Case is Pregnant or Has Just Given Birth

Pregnant women who are HBsAg-positive should be tested for HBV DNA. (16) Antiviral therapy to reduce perinatal transmission may be indicated when the HBV DNA level is >200 000 IU/mL. 23.

Preventing perinatal transmission is perhaps the most important part of case follow-up, and for this reason the Oregon Immunization Program has an official Perinatal Hepatitis B Prevention Program. Participation in this program is mandatory for local health departments. Case management activities and requirements for reporting these activities are described in detail in the Oregon Perinatal Hepatitis B Prevention Program Investigative Guidelines.

6.6 Case is Aged 24 Months or Less

Individuals born in the US, under or equal to the age of 24 months, and born to a gestational parent with documented evidence of hepatitis B infection should be reported using the Perinatal Hepatitis B Investigative Guidelines, unless there is evidence that exposure occurred via a non-perinatal mechanism (e.g., healthcare acquired).

LPHAs are required to complete perinatal hepatitis B case management for every infant contact born to a hepatitis B case. Every infant born to a hepatitis B case should be added to the case's (gestational parent's) disease report as a contact in Orpheus. Infants testing positive for hepatitis B following case management need to be reported to the Acute and Communicable Disease Prevention Section (ACDP) as soon as possible, but no later than the end of the calendar week of initial physician or laboratory report. HBsAg, HBeAg, or HBV DNA positive infants will become their own case in Orpheus. Refer to the chronic hepatitis B Investigative Guidelines for more information.

6.7 Possible Common-source Outbreak

Contact communicable disease epidemiologists at ACDP immediately at 971-673-1111. Note that ACDP has prepared guidelines for investigations of HBV outbreaks.

GLOSSARY OF TERMS

ALT/AST: These are both liver enzymes classified as serum aminotransferases or transaminases and are useful indicators of liver damage. Alanine aminotransferase is usually abbreviated as ALT (or SGOT) and is particularly sensitive for assessing liver damage secondary to hepatitis C infection. Aspartate aminotransferase is referred to as AST (or SGPT).
HBsAg: Hepatitis B surface antigen, a marker of replicating virus. It occurs as part of acute infection and persists in chronic infection. Its presence indicates that the patient is infectious.
HBeAg: Hepatitis B e antigen, a core protein exported from infected liver cells and a marker of high levels of infectivity. Similar to HBsAg, it occurs (albeit transiently) as part of acute infection and may persist in chronic HBV infection.
HBeAb: Hepatitis B e antibody is produced by the immune system temporarily during acute HBV infection and may persist in chronic infections. Spontaneous conversion from e antigen to e antibody (a change known as seroconversion) is a predictor of long-term clearance of HBV in patients undergoing antiviral therapy and indicates lower levels of HBV. People who are chronically positive for hepatitis B surface antigen can be positive for either HBeAg or anti-HBe but are less infectious when anti-HBe is present.
HBV DNA: Signifies active replication of the virus and indicates that the patient is infectious. It is usually measured to test for chronic infection, and the viral load may be used to decide whether treatment is war- ranted.
IgM Anti-HBc: IgM antibody to hepatitis B core antigen, indicative of recent infection with HBV. Antibody to core antigen only occurs following infection, not immunization.

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UPDATE LOG

August 2024 – Removed glossary terms not relevant to Acute Hepatitis B infection. Updated general epidemiology statistics of acute hepatitis B infection, including recent prevalence data. Added and updated hyperlinks to HBV resources. Made punctuation and grammar corrections to match OHA standards. Spelled out hepatitis A, B, C, D. Added signs and symptoms of hepatitis. Updated tests available at OSPHL. Revised position description to match 2023 CSTE updates. Updated for person centric language and health equity components. Reduce/summarize risk dynamics section. Updated language for pregnancy status. Updated instruction for case follow-up.Edited for visual and written clarity according to OHA recommendations, Vancouver style, parallel language to chronic IGs (Escutia, OBrien, Chakwin, Martin)

November 2023 – Added: first names for first mention of epidemiologist updating IG; more detail about steps for cleaning needles with bleach incidence data; discussion of risk for refugees, asylum-seekers, and internally displaced people; information about waste pickers; discussion of risk dynamics for MSM; reference to relevant OHA outbreak investigation guidelines; Table 2 of risk characteristics; sex toys and drug

paraphernalia as potentially contaminated object that might be shared among people, included dental dams as a barrier method in addition to condoms.
Updated for equity language, including adding “Risk Dynamics” section and reducing gendered and potentially stigmatizing language; new approval of PreHevbrio. Replaced graphs in Figure with more legible images, added citation. Revised section 6.6 for infant cases and 3.4 for distinguishing new cases. Replaced “non-A non-B” language with names of other viruses that have been identified. Deleted RIBA and signal cut-off ratio from glossary since they are no longer used or available.

February 2021 – Updated general epidemiology of acute hepatitis B; updated tests available at OSPHL; added new vaccine information; updated postvaccination serologic testing recommendations; updated perinatal hepatitis B program enrollment information; update pre-exposure prophylaxis groups. (Poissant, Thomas, Iguchi, Peters)

March 2018 – Added new testing recommendations for pregnant women; added additional groups to those who should be recommended to receive vaccine (e.g., all infants, persons with hepatitis C); added accelerated twinrix schedule; removed Comvax and added Heplisav-B to table 4; ensured consistent language with perinatal hep B and chronic hep B guidelines. (Poissant)

July 2016 – Applied new Word formatting. Updated post-exposure prophylaxis recommendations and estimated prevalence of HBsAg in the US. (Poissant)

October 2012 – Clarified section 4.1. All +anti-HBc IgM results require follow up to confirm the diagnosis. (Tasha Poissant)

January 2012 – Update case definition to reflect CDC/CSTE guidance. ALT levels must now be >100 IU/L and a +HBsAg is required. Asymptomatic seroconverters are now included in the confirmed case definition. (Tasha Poissant)

April 2011 – Continuing to update new acute-HBV-specific document adapted from previous hepatitis B guidelines. (Tasha Poissant and Grace Van Ness)

April 2009 – New acute-HBV-specific document adapted from previous hepatitis B guidelines.

May 2007 – D.2. Pre-exposure vaccination recommendations expanded to include non-sexual household contacts of acute HBV cases, especially children and adolescents, and household and sexual contacts of all HBsAg+ persons. Eliminated “indeterminate” case definition. Expanded the acute case definition to include +HBsAg results.

December 2006 – D.2. Pre-exposure vaccination recommendations expanded to include nonsexual household contacts of acute HBV cases, especially children and adolescents, and household and sexual contacts of all HBsAg+ persons.

Appendix 1. Process for classifying cases of hepatitis B as acute and chronic. (Available online: https://www.cdc.gov/hepatitis/statistics/surveillanceguidance/HepatitisB.htm#figure3-3)

Figure 3-3. Process for classifying cases of hepatitis B as acute and chronic

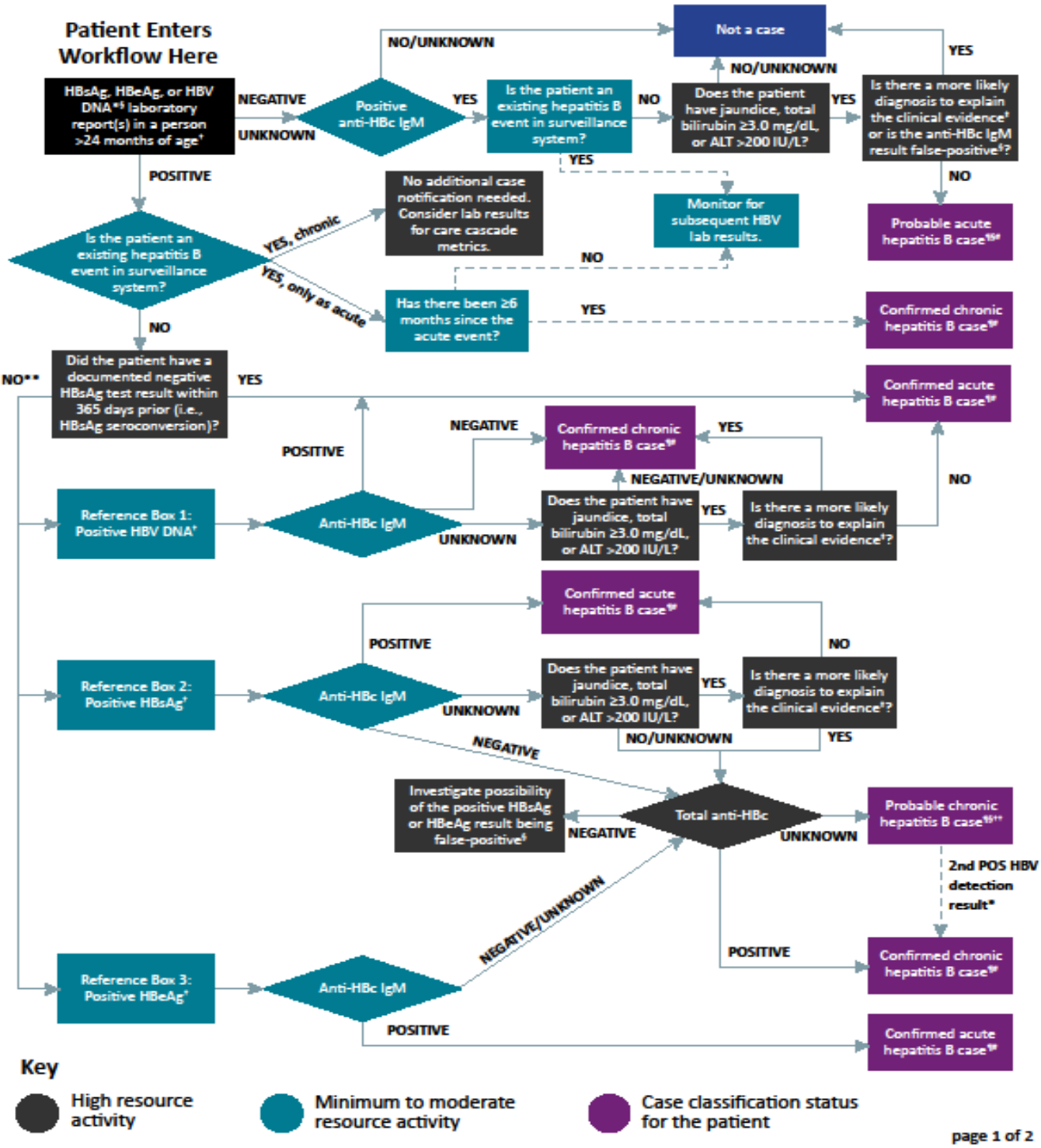

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Figure 3-3. Process for classifying cases of hepatitis B as acute and chronic

Footnotes

*For surveillance case classification, HBsAg, HBeAg, and HBV DNA results are considered HBV detection results. If HBsAg confirmatory neutralization results were received, HBsAg was positive by confirmatory neutralization. Nucleic acid testing for HBV DNA, including qualitative, quantitative, and genotype testing. An isolated positive hepatitis B 'e' antigen (HBeAg) test result should prompt further investigation into the hepatitis B surface antigen (HBsAg) and/or HBV DNA results. Negative HBeAg results and HBV DNA levels below the positive cutoff level do not confirm the absence of HBV infection.

†Children ≤24 months of age and born in the United States to a gestational parent with documented evidence of HBV infection should be classified and reported using the 2017 perinatal hepatitis B case definition unless there is evidence that exposure occurred via a non-perinatal mechanism (e.g., health care-acquired). Children ≤24 months of age whose mode of exposure is not perinatal should be classified under the 2024 acute or chronic hepatitis B case definitions. Surveillance programs should provide prevention programs with information on individuals who have positive test outcomes for post-test counseling and referral to treatment and care, as appropriate.

‡Alternative diagnoses may include evidence of acute liver disease due to other causes or advanced liver disease due to hepatitis B reactivation, pre-existing chronic hepatitis B, other causes including alcohol exposure, other viral hepatitis, hemochromatosis, etc. If there is documentation from the patient's health care provider explaining that the clinical evidence is due to another reason other than acute hepatitis B, the patient should not be evaluated under the acute hepatitis B case definition.

§If a false-positive result is suspected, jurisdictions should consider other available test results, such as the total anti-HBc result, to aid with interpretation. If results are determined to be false-positive, they should not be used to classify cases as confirmed or probable.

¶A new acute hepatitis B case is an incident case that has not been previously notified as an acute or chronic hepatitis B case. A new chronic hepatitis B case is an incident case that has not been previously notified as a chronic hepatitis B case.

§A probable acute hepatitis B case that is confirmed within the same reporting year (before the NNDSS close-out date) can be transmitted as an update to the same case, but if the case is confirmed following the initial reporting year, it should not be transmitted to NNDSS again. A probable chronic hepatitis B case that is confirmed within the same reporting year (before the NNDSS close-out date) can be transmitted as an update to the same case, but if the case is confirmed following the initial reporting year, it should not be transmitted to NNDSS again.

#A confirmed or probable acute hepatitis B case may be additionally enumerated as a new confirmed chronic hepatitis B case if a positive HBV viral detection test is reported ≥6 months after acute case onset, or if asymptomatic, after the initial positive test result (e.g., consider reactivation).

**Refer to the appropriate reference box based on the positive HBV detection test(s) received.

††Classify as confirmed chronic hepatitis B if ≥2 HBV detection results are positive (e.g., positive for both HBsAg and HBeAg, positive for HBsAg in two clinical specimens taken ≥6 months apart, or positive for HBeAg in two clinical specimens taken ≥6 months apart).