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## Hepatitis B Control

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## 1.0 INTRODUCTION

Hepatitis B virus (HBV) infection is transmitted through exposure to infectious blood and body fluids. It is most commonly acquired through sexual contact, injection drug use, and perinatal exposure from mother to infant.

## 2.0 GOALS

To reduce the annual incidence of hepatitis B virus infection reported in British Columbia by offering:

- A universal infant hepatitis B immunization program
- Immunization of all susceptible Grade 6 students
- Immunization of all individuals who are at high risk of becoming infected with HBV
- Immunization of close, non-immune contacts of persons who are acutely or chronically infected with HBV
- Universal screening of all pregnant women for HBsAg, and screening for hepatitis Be antigen for women who are HBsAg positive
- Assessment of the risk of infection for persons potentially exposed to HBV, and provision of post-exposure immunoprophylaxis as indicated
- Counselling for infected persons and their contacts

## 3.0 DEFINITIONS

### 3.1 Acute hepatitis B infection:

#### Confirmed case:

Presence of Hepatitis B surface antigen and IgM class antibody to Hepatitis B core antigen (HBsAg positive and anti-HBc IgM positive)

OR

Loss of HBsAg over a period of 6 months in the context of a compatible clinical history or probable exposure

OR

Acute clinical illness<sup>1</sup> and HBsAg positive (and anti-HAV negative and anti-HCV negative) when the test for IgM antibody to anti-HBc is not available

<sup>1</sup>Acute clinical illness is characterized by a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels.



**Probable case:**

Acute clinical illness in a client who is linked to a confirmed case

**3.2 Chronic hepatitis B infection:**

**Confirmed case:**

Persistence of HBsAg positivity for more than 6 months.

OR

Presence of HBsAg and anti-HBc IgG positive and anti-HBc-IgM negative.

**3.3 Hepatitis B infection of undetermined status:**

Presence of HBsAg with no other clinical or laboratory markers.

**3.4 Contact:**

An individual who has had exposure to potentially infectious blood or body fluids of an HBV infected person

Infective potential of blood or body fluids: blood contains the highest HBV titre of all bodily fluids and is the most important vehicle for transmission of infection. Semen and vaginal fluids have been implicated in sexual transmission. The following are considered potentially infectious: cerebrospinal, synovial, pleural, peritoneal, pericardial and amniotic fluids, and saliva. Feces, nasal secretions, sputum, sweat, tears, urine and vomitus are not considered potentially infectious, unless they contain blood. The risk of transmission from these fluids/materials is extremely low

**3.5 Percutaneous exposure:**

Contact through the skin with blood of an HBV infected person, for example, through needlestick or other sharps injury, tattooing, body piercing, electrolysis, or acupuncture.

Non-intact skin exposure: blood or body fluid comes into contact with a wound < 3 days old, or with skin having compromised integrity (e.g. dermatitis, abrasions, fresh cutaneous scratches, burns or other lesions).

For human bites, the clinical evaluation of risk must include the possibility that the person bitten and the person who inflicted the bite were exposed to bloodborne pathogens (i.e. there is blood in the mouth of the biter or in the wound of the person bitten).

**3.6 Mucosal exposure:** Contact of the mucous membrane lining body cavities of eyes, nose, mouth, vagina, rectum or urethra with blood or body fluid of an HBV infected person.



### 3.7 Perinatal exposure:

Infection of an infant at birth from an HBV infected mother. The likelihood of transmission of infection to the infant increases when the HBsAg positive mother is also hepatitis Be antigen positive.

## 4.0 CASE MANAGEMENT

- Confirm the diagnosis with the attending physician before contacting the client.
- For clients with a clinical presentation in the absence of available laboratory confirmation, discuss follow up with the Medical Health Officer (MHO) or delegate.
- Initiate a report in the Communicable Disease Surveillance System (CDSS) module of iPHIS.
- For an acute infection, obtain a history of risk factors/potential exposure for the six month period preceding serological diagnosis. Complete the Hepatitis B Enhanced Surveillance Report and submit to BCCDC Hepatitis Services.
- If risk factors indicate the possibility of a transfusion transmissible infection, (where client has been donor or recipient) follow the reporting process in the Transfusion Transmissible Infections chapter of the Communicable Disease Control Manual.
- Identify case contacts in the 6 months prior to onset of infection.
- Initiate appropriate immunoprophylaxis of contacts. Ascertain hepatitis B vaccination status and/or whether anti-HBs level has been previously determined. **Refer to Table 1: Post-Exposure Prophylaxis and Table 2: Hepatitis B Immune Globulin**
- Co-ordinate provision of hepatitis B vaccine and HBIG as required to all contacts
- Counsel case and contacts about minimizing further transmission of hepatitis B virus. Refer to section **6.0** entitled “**Health Teaching to Prevent Transmission of HBV.**”
- Arrange that a person with acute infection be retested at six months, to determine if they have become a chronic carrier. Report in iPHIS as chronic hepatitis B if this occurs, while maintaining the previous report of the acute infection.



## 5.0 HEPATITIS B POST- EXPOSURE MANAGEMENT

Distribution of HBIG is the responsibility of Canadian Blood Services. There may also be a designated depot for HBIG within a health region.

If an individual or a physician informs the health unit of percutaneous or mucosal exposure and needs to obtain HBIG and/or hepatitis B vaccine, the following steps are recommended:

- Obtain details of exposure
- Determine testing requirements (see Table 1) and eligibility for HBIG and hepatitis B vaccine. Ask exposed person's physician to arrange testing of exposed person's/source's blood as indicated. Refer to the guidelines for Blood and Body Fluid Exposure Management and use the Hlth 2339 and Hlth 2340 forms for testing and follow-up.
- When HBIG is indicated, contact Canadian Blood Services or designated depot for health region. Arrange with the physician and the exposed person for the provision and administration of HBIG and/or hepatitis B vaccine.



**TABLE 1: HEPATITIS B POST EXPOSURE PROPHYLAXIS**

Note: this table does not apply to immunocompromised persons; this group requires consultation with a physician specializing in infectious diseases.

Vaccination history of exposed person	Test exposed person for: HBsAg, anti-HBc & anti-HBs.	If source is HBsAg positive or tests positive within 48 hrs of exposure♣	If source is unknown/not tested/tests HBsAg negative within 48 hours of exposure♣	Post-exposure re-testing
Documented anti-HBs level (≥10 IU/L) on prior testing	Test for all three markers for medical-legal purposes	No action required.	No action required.	No action required.
Unvaccinated or  Known non-responder* to one course of Hep B vaccine	Test for all 3 markers  Test for all 3 markers	Give Hepatitis B Immune Globulin (HBIG)♣ and Hepatitis B vaccine series♥	Give Hep B vaccine series  Give 2 <sup>nd</sup> Hep B vaccine series	Re-test for HBsAg at 3 months & for all 3 markers at 6 & 12 months♦
Received 1 dose of Hep B vaccine, anti-HBs status unknown	Test for all 3 markers	Give HBIG & complete Hep B vaccine series.	Complete Hep B vaccine series.	Re-test for HBsAg at 3 months & for all 3 markers at 6 & 12 months♦
Received 2 doses of a 3 dose series of Hep B vaccine, anti-HBs status unknown	Test for all 3 markers. If anti-HBs is <10 IU/L, then→	Give HBIG & 3rd dose of Hep B vaccine. Repeat 3 <sup>rd</sup> dose if given too early in series.	Give 1 dose of Hep B vaccine & retest for anti-HBs in 4 wks; if <10 IU/L repeat series.	Re-test for HBsAg at 3 months & for all 3 markers at 6 & 12 months♦
	Test for all 3 markers. If anti-HBs is ≥ 10 IU/L, then→	Do not give HBIG. Complete Hep B vaccine series.	Do not give HBIG. Complete Hep B vaccine series.	No re-testing required.
Complete Hep B vaccination (2 or 3 dose series) and anti-HBs status unknown	Test for all 3 markers. If anti-HBs is <10 IU/L, then→	Give HBIG and 1 dose of vaccine.	1 dose Hep B vaccine & retest for anti-HBs in 4wks; if <10 IU/L complete second series.	Re-test for HBsAg at 3 months & for all 3 markers at 6 & 12 months♦
Known non-responder* after two courses of Hep B vaccine	Test for HBsAg & anti-HBc. Do not test for anti-HBs.	Give HBIG only & give another dose of HBIG in 1 mo.	No action required.	Re-test for HBsAg at 3 months & for HBsAg & anti-HBc at 6 & 12 months.

♣ Consensual adult sex with known STW or IDU is not an indication for HBIG, nor is a community acquired needlestick injury: the risk of transmission is low and the number needed to treat to prevent infection is extremely high. HBIG is indicated in the case of sexual assault.

• HBIG dose for all clients ≥ 8.3kg is 0.06ml/kg. Give HBIG as soon as possible, and no later than 14 days following an exposure. If the client presents >14 days following an exposure, give Hepatitis B vaccine only.

♥ Hepatitis B vaccine schedule is 0, 1 and 6 months for post-exposure prophylaxis.

\* A non-responder to a series of Hepatitis B vaccine is someone who demonstrates an anti-HBs level of < 10 UI/L, when measured 1 to 6 months post-vaccination.

♦ A second series of Hepatitis B vaccine is offered to non-responders when there has been percutaneous or mucosal exposure



TABLE 2: HEPATITIS B IMMUNE GLOBULIN

<b>HEPATITIS B IMMUNE GLOBULIN (HBIG)</b>	
TRADE NAME: BAYHEP B™(BAYER)	
<b>INDICATIONS</b>	<b>DOSAGE ♦</b>
1. Infant born to known HBsAg positive woman	1. Give HBIG 0.5 ml IM <b>immediately after birth</b> , along with first dose of hepatitis B vaccine series♣
2. Infant born to woman at high risk for hepatitis B infection (i.e. intravenous drug use, sex trade work) whose infectious status is unknown or negative (possible window period)	2. Give HBIG 0.5 ml IM <b>immediately after birth</b> , along with first dose of hepatitis B vaccine series♣
3. Household contact or primary caregiver of infant < 12 months of age has <b>acute</b> hepatitis B infection	3. Give HBIG and hepatitis B vaccine 0.06 ml/kg of body weight as required, considering the immune status of the infant and history of hepatitis B immunization. ♣♠
4. Percutaneous or mucosal exposure to HBsAg positive source.	4. Give HBIG 0.06 ml/kg of body weight and hepatitis B vaccine as required, considering the client's immune status and history of hepatitis B immunization. ♠
5. Sexual partner(s) of person with known <b>acute or chronic</b> hepatitis B infection	5. Give HBIG 0.06 ml/kg of body weight as soon as possible following <b>most recent</b> sexual exposure, along with hepatitis B vaccine series♠♥
<b>REINFORCEMENTS: An at-risk known non-responder to two series of vaccine requires 2 doses of HBIG one month apart</b>	<b>CONTRAINDICATIONS: None</b>

- ♦ There is no upper limit to the volume of HBIG that can be administered.
- ♣ There is **no** outer time limit for administering HBIG in infants <12 month's of age, when the infant's exposure to the known risk factor(s) is ongoing. For infants < 8.3 kg, give 0.5 ml HBIG.
- ♠ When HBIG is required, give **as soon as possible following exposure** and no later than 14 days after exposure. If client is identified > 14 days after exposure, give hepatitis B vaccine only. Refer to Hepatitis B Post-Exposure Prophylaxis table.
- ♥ For **steady, long term** sexual partners of chronic hepatitis B carriers, test for HBsAg, anti-HBc and anti-HBs to determine if client is susceptible and requires HBIG, or has been infected previously.



## 6.0 HEALTH TEACHING TO PREVENT TRANSMISSION OF HBV

### **Advise those infected with HBV to reduce transmission of infection to others by:**

- Not donating blood, semen, breastmilk, body organs or tissues;
- Not sharing toothbrushes, dental floss, razors, earrings or manicure equipment (articles that might have traces of blood);
- Keeping all open cuts and sores bandaged until healed;
- Discussing with sexual partner(s) the fact that you are infected with HBV. Inform sexual partners of the availability of hepatitis B vaccine. Protection from infection cannot be ensured until the vaccine series has been completed and a protective anti-HBs level demonstrated through testing. Use of latex condoms will reduce the risk of HBV transmission;
- Putting articles with blood on them (e.g. tampons, pads, Kleenex, dental floss and bandages) in a separate plastic bag before disposing into household garbage;
- Disposing of bloody sharp items (razor blades, needles etc) into a hard container, taped shut;
- Using bleach to clean up blood spills. Wet surfaces with 1 part bleach to 9 parts water and leave sitting for 10 minutes before wiping off;
- Not sharing drug snorting or smoking equipment such as straws or pipes, or injection equipment such as cookers, cotton, filters, water, syringes and needles;
- Avoiding pregnancy until HBsAg negative or identified as a chronic carrier;
- Advising your doctor, dentist, and anyone who might come into contact with your blood (such as those who do electrolysis, acupuncture, body piercing, and tattooing) that you are infected with HBV.

## 7.0 VACCINE ELIGIBILITY

Refer to the Immunization Manual, Section VII, Biological Products, for the pre- and post- exposure indications for individuals eligible for publicly-funded Hepatitis B vaccine.

## 8.0 SEROLOGIC TESTING FOR HEPATITIS B IN SPECIFIC GROUPS

### 8.1 **Pregnancy:**

All pregnant women should be routinely tested for HBsAg at the first prenatal visit. HBeAg testing, as a measure of infectivity, is done when the HBsAg test result is positive. If testing has not been done during pregnancy, it should be done at the time of delivery. Repeat testing prior to delivery may be considered for women with ongoing high-risk behaviour. **See Section X, Appendices, in the Immunization Program Manual for additional information.**





## 8.2 Adopted Children at High Risk:

Children adopted from countries, geographic regions or family situations in which there is a high prevalence of HBV infection should be screened for HBsAg. If the results are positive, the household contacts should be immunized, preferably before the adoption.

## 8.3 Pre-vaccination Testing:

- Testing for HBsAg, anti-HBc and anti-HBs is recommended for persons at high risk of having been infected (i.e. IDU, STW, and persons born in a country of high hepatitis B prevalence). Testing will assist in the medical management and contact follow-up of those individuals found to be infected, and prevent the mistaken belief that no risk is posed to others.
- Testing is indicated when students entering health care professions have been previously vaccinated, but their response to initial vaccination is unknown.

**8.4 Post-vaccination testing:** post-vaccination testing, when indicated, is done 1 month after (and no longer than 6 months after) completion of the vaccine series.

### Post vaccination testing is indicated for:

- Infants born to known HBsAg positive mother ♦
  - Infants with a mother, father, or primary caregiver at high risk for hepatitis B infection (e.g. intravenous drug use, sex trade worker)
  - Sexual partners of persons with acute or chronic hepatitis B infection
  - Household contacts of persons with acute or chronic hepatitis B infection
  - Individuals who have had a percutaneous or mucosal exposure to hepatitis B
  - Immunocompromised individuals who may be expected to have a lower seroconversion rate (e.g. end-stage renal disease clients, HIV, HSCT and solid organ transplant recipients)
  - Students in health care professions
  - Health care workers ♥
- ♦ Accountability mechanisms should be in place to ensure that every infant born to a hepatitis B infected mother receive HBIG and a full course of vaccine, as well as testing for serologic response to vaccine.
- ♥ It is the responsibility of the employer (through Occupation Health program) to implement testing and vaccination programs for health care workers. Those who fail to respond to a first series of hepatitis B vaccine should be offered a second series. Determination of inadequate antibody response after a second complete vaccine series will identify those who will need passive protection (i.e. HBIG) after potential exposure to hepatitis B. Health care workers are encouraged to keep a record of immunization and testing results.



## 9.0 BOOSTER DOSES AND RE-IMMUNIZATION

Routine booster doses in immunocompetent people are not needed, since protection has been shown to last for at least 15 years. While antibody wanes over time, immune memory persists. The absence of detectable anti-HBs in a person who previously demonstrated an adequate level of anti-HBs does not mean lack of protection.

**Non-responders to 1 course of hepatitis B vaccine (i.e. anti-HBs is < 10 IU/L):** An additional three dose series will produce a protective antibody response in 50% to 70% of otherwise healthy people who fail to show a response after the first series. Individuals who fail to respond to the 2<sup>nd</sup> three-dose vaccination series are unlikely to benefit from further immunization.

A second series of vaccine is provided free **ONLY** to the following:

- Infants born to HBsAg positive mothers
- Infants born to mothers at high risk of hepatitis B infection
- Clients with immunosuppressive disorders
- Dialysis/pre-dialysis clients (see Hepatitis B Vaccine Program for End Stage Renal Disease Clients, Immunization Program Manual, Section VII)
- Health care students
- Individuals who have had an exposure to hepatitis B virus and require immunoprophylaxis.



## 10.0 INTERPRETATION OF TESTING RESULTS

Factor to be tested	Term	Use
HBsAg	Hepatitis B surface antigen	Detection of acutely or chronically infected person
Anti-HBs	Antibody to HBsAg	Identification of resolved infection with HBV; determination of immunity after hepatitis B vaccination
Anti-HBc	Antibody to core antigen (HBcAg)	Identification of individuals with prior infection with HBV (not present after immunization).
Anti-HBc IgM	IgM class antibody to HBcAg	Indicates acute or recent infection with HBV; detectable for 4-6 months after infection.
HBeAg	Hepatitis B e Antigen	Identification of infected individuals at increased risk of transmitting HBV.
Anti-HBe	Antibody to HBeAg	Identification of infected individuals at lower risk for transmitting HBV.

HBsAg anti-HBc anti-HBs	negative negative negative	susceptible
HBsAg anti-HBc anti-HBs	negative negative positive (≥ 10 IU/L)	immune due to vaccination
HBsAg anti-HBc anti-HBs	negative positive positive (≥ 10 IU/L)	immune due to natural infection
HBsAg anti-HBc IgM anti-HBs	positive positive negative	acute infection
HBsAg anti-HBc anti-HBs	positive positive negative	chronic infection
HBsAg anti-HBc anti-HBs	negative positive negative	“isolated anti-core positive” four interpretations possible (see below)



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## 11.0 ISOLATED HEPATITIS B CORE ANTIBODY POSITIVE TEST RESULT (HBsAg negative, anti-HBc positive, anti-HBs negative)

There are four possible interpretations of this result:

- The client is in the “window phase” of an acute infection, between the disappearance of HBsAg and the appearance of anti-HBs. Assess re: clinical symptoms and risk factors for hepatitis B. To determine if this is an acute case, test for **anti-HBc IgM** if available, or repeat HBsAg test after several weeks. Consider as infectious to others and counsel accordingly. Provide HBIG and hepatitis B vaccine to contacts as needed.
- Results may represent chronic infection with HBsAg that is escaping detection. Consider the client to have a low level of infectivity, and provide hepatitis B vaccine to household and sexual contacts. Provide hepatitis B vaccine to the client to confirm chronic status, as indicated by undetectable anti-HBs at series completion.
- Results may represent a remote resolved infection with the decline of anti-HBs to levels that are undetectable. Individuals with resolved infections and sub-detectable anti-HBs would be expected to exhibit an anamnestic response to hepatitis B vaccine, with protective levels of antibody developing after a single dose of vaccine.
- This may be a false positive test result and the client is susceptible to hepatitis B and is not infectious to others. False positive individuals would be expected to develop detectable anti-HBs on the completion of a three dose series of hepatitis B vaccine.



## 12.0 AUTHORITY

Health Act 1983

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