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1.0 INTRODUCTION

1.1 Goals

To continue prevention and control measures of hepatitis B virus (HBV) infection reported in Yukon by offering:

- A universal infant hepatitis B immunization program for all children <19 yrs of age
- Immunization of all individuals who are at high risk of becoming infected with HBV (see Yukon Immunization Program Manual for complete list of individuals at high risk)
- 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
- Follow-up of infants born to mothers who are hepatitis B chronic carriers, to ensure infants are protected, and to identify infants that are infected with HBV. Including but not limited to ensuring immunizations are received on schedule and serology post completion of immunization series are drawn
- Assessment of the risk of infection for persons potentially exposed to HBV, and provision of post-exposure immunoprophylaxis as indicated
- Education and counselling for infected persons and their contacts

2.0 CLINICAL DESCRIPTION

Hepatitis B virus is a highly infectious vaccine preventable disease 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. When infection occurs as an adult, about 5 per cent will become chronically infected, while about 90 per cent of infants infected at birth will develop a chronic HBV infection (PHAC, 2013).

The onset of clinical illness is usually insidious, with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgia and rash, often progressing to jaundice. Fever may be absent or mild. Only a small proportion of acute HBV infections may be clinically recognized; less than 10 per cent of children and 30 to 50 per cent of adults with acute HBV infection show icteric (jaundice) disease. Severity ranges from unapparent cases detectable only by liver function tests to fulminating, fatal cases of acute hepatic necrosis. The case fatality rate is about one per cent.

3.0 EPIDEMIOLOGY

The regions of the world with the highest prevalence of infection are South-East Asia and Africa. Fortunately twenty years of use of Hepatitis B vaccine in some of these countries has drastically reduced the incidence of Hepatitis B.
In Canada, the epidemiology of HBV disease has been considerably modified since the mid-1990’s when the infant HBV program was implemented. In Yukon, HBV vaccine is provided free to high risk individuals as well as everyone less than 19 years of age. Some provinces and territories provide HBV vaccine coverage for high risk individuals although eligibility varies across the jurisdictions. Despite the success of these programs many may remain at risk of acquiring HBV.

Canada is considered an area of low endemicity. It is estimated that fewer than five per cent of residents have markers of past infection, and less than one per cent are HBsAg carriers. This will vary in different subgroups of the population according to the presence of the factors listed earlier and the vaccine coverage achieved (Canadian Immunization Guide 8th ed, 2012, Public Health Agency of Canada). National data on the incidence of Hepatitis B has only been collected for the past few years. This data placed the Canadian National rates for Hepatitis B (acute & chronic) at 5.5 per 100,000 in 2010 and 5.3 per 100,000 in 2011, with the highest rates reported in Alberta, Quebec and Yukon. The Yukon rates of Hepatitis B were 11.6 and 14.4 respectively. (PHAC, preliminary release, April 2012).

Acute HBV infection is limited in Yukon with only one case of acute HBV infection found in Yukon from 2006-2013; the case was not travel related and no risk factors or source of infection were identified. Chronic HBV has only been reportable in Yukon since 2010; since this time chronic HBV has been found to be much more common than acute, specifically in foreign-born Yukoners. Despite the lack of acute HBV cases the number of chronic cases has resulted in the average incidence of acute and chronic hepatitis B in Yukon between 2006 and 2013 being 6.7 cases per 100,000 population. Yukon’s incidence of Hepatitis B appears to have increased between 2006 and 2013, but the most likely cause of this is a change in reporting practices (chronic Hepatitis B in addition to acute Hepatitis B being reported). (YCDC, 2014, Yukon Communicable Disease Report: A Summary of Reportable Diseases 2014, unpublished)

4.0 CASE MANAGEMENT

Investigate all clinically identified and laboratory reports of Hepatitis B in one working day.

Cases of Hepatitis B will be reported to Yukon Communicable Disease Control in one working day. In the event that this occurs after hours or on the weekend report to the Chief Medical Officer of Health (CMOH) within the same time frame.
4.1 CASE DEFINITIONS

### Acute Case

<table>
<thead>
<tr>
<th>Case Definition</th>
<th>Reportable to YCDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Confirmed Case</strong></td>
<td>Hepatitis B surface antigen (HBsAg) and IgM to hepatitis B core antigen (anti-HBcIgM) positive in the context of a compatible clinical history or probable exposure OR Clearance of HBsAg in a person who was documented to be HBsAg positive within the past 6 months in the context of a compatible clinical history or probable exposure.</td>
</tr>
<tr>
<td><strong>Probable case</strong></td>
<td>Acute clinical illness in a person who is epidemiologically linked to a confirmed case</td>
</tr>
</tbody>
</table>

### Chronic Carrier

<table>
<thead>
<tr>
<th>Case Definition</th>
<th>Reportable to YCDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Confirmed Case</strong></td>
<td>HBsAg positive for more than six months OR Detection of HBsAg in the documented absence of anti-HBc IgM OR Detection of HBV DNA for more than 6 months</td>
</tr>
</tbody>
</table>

### Unspecified

<table>
<thead>
<tr>
<th>Case Definition</th>
<th>Reportable to YCDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Confirmed Case</strong></td>
<td>Does not fit the definition for either acute or chronic HBV infection AND HBsAg OR Detection of HBV DNA</td>
</tr>
</tbody>
</table>


2 Acute clinical illness is characterized by a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels (AST)

4.2 LABORATORY TESTING

In Yukon, samples for HBV serology are submitted to WGH Laboratory for shipping to BCCDC Laboratory for processing. PHSA Laboratories Serology Screening Requisition form needs to accompany any blood samples for Hepatitis B screening. Ensure all information required on the form is complete including the pertinent history and specific serological panel.
4.2.1 Significance of Serological Markers

HBsAg (surface antigen) indicates infection. Persistence of HBsAg for 6 months or more indicates chronic infection. However 50% of those with extended chronic infection will eventually clear HBsAg. By contrast those with resolving acute HBV will clear HBsAg several months after infection.

Anti-HBs (surface antibody) is a protective antibody produced by recovery from infection or in response to immunization. NOTE: There is a gap of several weeks to months between the disappearance of HBsAg and the appearance of Anti-HBs; during this period anti-HBc total is detectable as a marker of HBV infection.

Anti-HBc total (total core antibody-IgM and IgG) is a marker for past infection (IgG) or current infection (IgM).

Anti-HBc IgM (core antibody-IgM) appears early in acute HBV infection and persists for about 6 months. It may also be seen in chronic infection during flares of activity, so clinical/epidemiological correlation is required for interpretation.

HBeAg (e-antigen) is a marker of viral replication; its presence indicates high infectivity.

Anti-HBe (e-antibody) appears with recovery from acute infection. In chronic infection it is generally a marker of reduced viral reproduction (or replication) indicating a less infectious state.

(PHAC, 2013, The Primary Care Management of Hepatitis B- Quick Reference, Module 2: Approach to HBV screening and testing, Significance of HBV serological markers)
### 4.2.2 Interpretation of HBV Diagnostic Test Results

<table>
<thead>
<tr>
<th>HBsAg</th>
<th>anti-HBs</th>
<th>anti-HBc (total)</th>
<th>anti-HBc IgM</th>
<th>Interpretation and recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>Negative *</td>
<td>Negative</td>
<td>N/A</td>
<td>Susceptible Vaccinate</td>
</tr>
<tr>
<td>Negative</td>
<td>Positive†</td>
<td>Negative</td>
<td>N/A</td>
<td>Immune due to vaccination Counsel as outlined in Section 5</td>
</tr>
<tr>
<td>Negative</td>
<td>Positive‡</td>
<td>Positive</td>
<td>N/A</td>
<td>Immune due to previous infection Counsel as outlined in Section 5</td>
</tr>
<tr>
<td>Negative</td>
<td>Positive‡ (but not protective) &lt;10IU/L</td>
<td>Positive</td>
<td>N/A</td>
<td>Two possible interpretations See below and council as outlined in Section 5 For management see Appendix A</td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive§</td>
<td>Infected-acute infection Refer to ‘Case Management’ and counsel as outlined in section 5</td>
</tr>
<tr>
<td>Positive</td>
<td>Negative‡</td>
<td>Positive</td>
<td>Negative§</td>
<td>Infected-Chronic infection Refer to ‘Case Management’ and counsel as outlined in Section 5</td>
</tr>
<tr>
<td>Negative</td>
<td>Negative</td>
<td>Positive€</td>
<td>Negative</td>
<td>Four possible interpretations See below and counsel as outlined in Section 5 For management see Appendix B</td>
</tr>
</tbody>
</table>

* About 5-10% of people will not respond to the vaccine or else do not produce protective levels of antibody post-vaccination (i.e., ≥ 10 IU/ml).
† Levels of anti-HBs may decline over time and become undetectable.
‡ A small percentage of people with chronic infection will have both HBsAg and anti-HBs markers present. Even with positive HBsAg and anti-HBc IgM results, a compatible clinical history or probable exposure is necessary, because clients with chronic HBV infection may have a reactivation of disease activity and a corresponding rise in anti-HBc IgM. Another scenario is that they are seroconverting and are not considered to be immune.
§ Since anti-HBc IgM can be detected in acute HBV, this test may be helpful when acute infection is suspected. It may also reappear in a flare up of chronic infection. A recent review of a sample of anti-HBc IgM results found > 20 per cent of positive results were likely due to reactivation of chronic infection.³
€ On rare occasions, an isolated anti-HBc total will be the only detectable marker. Although there are four possible interpretations for this finding, it is more common in immunocompromised people and in those who are co-infected with HIV or HCV.

- In low prevalence populations this finding is most often a false positive result or a lab error. Repeat test if lab error is suspected.
- Less frequently this finding may reflect:
  - resolving acute infection before the appearance of anti-HBs or
  - natural immunity with undetectable anti-HBs due to decline in antibody titre over time
- Rarely, this finding may represent a chronic infection with undetectable HBsAg.
  - Consult a specialist for guidance.

³ PHAC, 2013, The Primary Care Management of Hepatitis B- Quick Reference, Module 3: Interpretation of HBV Diagnostic Test Results
4.3 CASE HISTORY

Hepatitis B is an infection which is not always easy to classify in terms of its stage. Hepatitis B is not a static infection. The staging of acuity or chronicity has many different patterns.

In order to properly interpret laboratory results consideration should be given to both clinical and epidemiological information along with laboratory information. Prior immunization history, risk factors and timing of sample collection relative to disease onset are all factors that must be considered in the interpretation of lab results for the purpose of confirming a diagnosis of Hepatitis B.

A person with acute infection should be retested at six months, to determine if they have become a chronic carrier.

4.3.1. Incubation and Communicability

The period of incubation for Hepatitis B ranges from 45 – 180 days with an average of 90 days.

Determine the period of communicability: all persons with a positive HBsAg are potentially infectious, and blood can be infectious for several weeks before the onset of clinical symptoms. The infectivity of chronically infected individuals varies from high (HBeAg positive) to modest (anti-HBe positive)

4.3.2 Clinical Manifestations

Acute HBV

Infants and children are rarely symptomatic; 30%-50% of adults are symptomatic. Symptoms tend to be insidious and many include malaise, fever, nausea, vomiting, anorexia, rash, arthralgia, dark urine and abdominal discomfort. Most will have elevated ALT/AST: a small proportion will develop acute icteric viral hepatitis.

Chronic HBV

A flare of chronic hepatitis B may present like acute HBV, and should be included in the differential diagnosis. Both acute and chronic HBV can also present as fulminant hepatitis. For more details see Primary Care Management of Hepatitis B- Quick Reference, PHAC, 2013
4.3.3 Confirmation of Diagnosis

For clients with a clinical presentation in the absence of available laboratory confirmation, discuss follow up with the CMOH.

Nurses employed by Community Nursing will confirm the diagnosis as per their scope of practice.

4.3.4 Collection of Surveillance

When a case of HBV is identified YCDC will provide the reporting provider the Reportable Disease Information/Hepatitis B Virus (HBV) form to be completed and returned to YCDC for all new cases.

If risk factors indicate the possibility of a transfusion-transmissible infection (where client has been donor or recipient), notify YCDC, who will then provide the appropriate forms to the health care provider for reporting to Canadian Blood Services.

4.4 Treatment of Chronic HBV

Treatment for those with chronic HBV infection in Yukon are managed by a referral to Yukon’s visiting Infectious Disease Physician. The criteria involved in the decision to treat person with chronic HBV include age, serial ALT and HBV DNA levels as well as severity of disease, with the goal of treatment to prevent progression and induce disease regression to minimize liver damage and its complications, including cirrhosis, liver failure, and hepatocellular carcinoma (PHAC, 2013). The presence of co-infections also plays a role in terms of treatment choices.

5.0 PATIENT EDUCATION AND COUNSELLING


Education should be tailored to fit the needs of the client and include education and counseling for pregnant women & infants, reducing the risk of liver damage, medications for patients with cirrhosis and strategies for living well with HBV. In general PHAC recommends the following as specific education applicable to all patients to reduce the risk of transmission:

- Inform HCP’s (e.g., dentist, physician, nurse) and other providers of personal services involved in piercing of the skin (e.g., acupuncturist, tattoo artist) of your infection.
• Do not donate blood, semen, organs or tissues;
• Do not share personal hygiene materials/ sharp instruments(e.g. razors, nail clippers toothbrushes, glucometers)
• Safely dispose of articles contaminated with blood (e.g., feminine hygiene products, dental floss, bandages, needles, broken glass)
• Cover all open cuts and sores until healed.
• Clean up blood spills with diluted bleach (9 parts water to 1 part bleach). Leave the solution on the surface for 10 minutes before wiping it away.
• If others must clean up blood spills, they should wear protective gloves and wash their hands thoroughly after removing them.
• Ensure sexual partner(s), household members and drug use partner(s) are tested and immunized if susceptible. Hepatitis B immunization is free for all susceptible contacts.
• Use latex condoms with all sexual partners until testing shows they are immune
• Do not share any equipment used to prepare, inject or inhale drugs (e.g., syringes/ needles, spoons, drug solutions, water, wash filters, cookers, pipes, straws, devices for snorting.

6.0 CONTACTS

Any individual who has had exposure to potentially infectious blood or body fluids of a HBV infected person. The incubation period for hepatitis B is 45 to 180 days, with an average of 90 days.

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 visible blood. The risk of transmission from these fluids/materials is extremely low. With breast milk there is a plausible risk of HBV transmission particularly if nipples are cracked or bleeding or if the mother is HBeAg positive.

6.1 Percutaneous Exposure

Contact through the skin with blood of a HBV infected person, for example through needle-stick or other sharps injury, tattooing, body piercing, electrolysis, or acupuncture.

Non-intact skin exposure: blood or body fluid comes into contact with a wound less than three 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 both the
person bitten and the person who inflicted the bite were exposed to blood-borne pathogens (i.e., there is blood in the mouth of the biter or in the wound of the person bitten).

6.2 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.

6.3 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 B e-antigen positive.

If maternal testing has not been conducted during pregnancy, it should be done at the time of delivery. If maternal HBV status is not available within 12 hours of delivery, serious consideration should be given to administering vaccine and HBIG while the results are pending, taking into account the mother’s risk factors and erring on the side of providing vaccine and HBIG if there is any suspicion that the mother could be infected.

When a mother is infected with HBV, testing of the infant for HBsAg and Anti-HBs is recommended one month after completion of the vaccine series to monitor the success of immunoprophylaxis. If HBsAg is found, the child is likely to become a chronic carrier. If an infant is negative for both HBsAg and Anti-HBs (i.e., a non-responder), additional doses up to a second full course of vaccine should be given, with repeated serologic testing for antibody response.

For further information on infants at high risk for Hepatitis B, perinatal protocols for Hepatitis B and a prophylaxis record for infants at high risk of Hepatitis B, see Yukon Immunization Program Manual, Section 5, Immunization of Special Populations, Infants at High Risk for Hepatitis B.

7.0 CONTACT IDENTIFICATION AND FOLLOW-UP

Identify case contacts in the six months prior to onset of infection. When the client is a newly identified chronic carrier and there is no determination of when acute infection occurred, identify contacts in the six months prior to chronic status being known.

Ascertain the contact’s hepatitis B immunization status and/or whether anti-HBs level has been previously determined then initiate appropriate immunoprophylaxis of contact. Co-ordinate provision of hepatitis B vaccine and HBIG as required to all contacts. Refer to Yukon Blood and Body Fluid Exposure Management, 2013, Table 1: Post-Exposure Prophylaxis and Table 2: Hepatitis B Immune Globulin, available online at http://www.hss.gov.yk.ca/pdf/blood_body_fluid_management.pdf
Refer to section 5.0 of this document for Specific Guidance for All Patients to Reduce the Risk of Transmission of HBV.

8.0 HEPATITIS B POST-EXPOSURE MANAGEMENT


Generally in order to determine if HBlg and/or hepatitis B vaccine is recommended the following steps are needed:

- Assess the risk of HBV transmission via obtaining details of exposure.
- See Table 1 in the Blood and Body Fluid Exposure Management to determine testing requirements and Table 4 to determine eligibility for HBlg and hepatitis B vaccine. Ask the exposed person’s physician/community nurse to arrange testing of exposed person’s and source’s blood as indicated.
- When indicated give HBlg as soon as possible, preferably within 48 hours of the exposure (percutaneous, permucosal or sexual).
- For percutaneous exposure, HBlg may be given up to seven days following the exposure. If the client presents > seven days following a percutaneous exposure, give Hepatitis B vaccine only.
- For permucosal or sexual exposures, HBlg may be given up to 14 days following the last exposure. If a client presents > 14 days following a permucosal or sexual exposure, give hepatitis B vaccine only.

HBlg is the responsibility of Canadian Blood Services. Once in Yukon, the distribution of HBlg to designated sites is coordinated by the Laboratory Services at Whitehorse General Hospital.

8.1 HOW TO ACCESS HBlg:

**Whitehorse:** With physician authorization, HBlg is requested and released from the Whitehorse General Hospital (WGH) Laboratory as required. Administration of HBlg can be done at WGH ER:

Whitehorse General Hospital Laboratory  
#5 Hospital Road  
Whitehorse, YT Y1A 3H7  
Telephone: (867) 393-8739  
Fax: (867) 393-8772

**Regular Hours:** Monday - Friday excluding holidays, 7:00 am to 11:30 am and 12:30 pm to 4:00 pm
After Hours: Please call Admitting and Discharge at (867) 393-8700 and ask that the on-call laboratory personnel be paged for the release of HBlg.

Communities Outside of Whitehorse

Arrangements for the timely administration of HBlg will be made on a case by case basis via Yukon Communicable Disease Control or the Chief Medical Officer of Health. Should HBlg not be stocked in the community requesting it, arrangements will be made by YCDC to have it provided from/to the most feasible location.

The following rural facilities each have a supply of HBlg:

Dawson City Hospital    Watson Lake Hospital    Old Crow Health Centre

9.0 VACCINE INDICATIONS

Refer to the Yukon Immunization Program Manual, Section 8, Biological Products, for the pre- and post-exposure indications for individuals eligible for publicly-funded Hepatitis B vaccine. For guidance on immunizing those with special immunization requirements (i.e. chronic kidney disease, pregnancy, immunosuppression) see Yukon Immunization Program Manual, Section 5, Immunization of Special Populations.

10.0 SEROLOGIC TESTING FOR HEPATITIS B IN SPECIFIC GROUPS

10.1 Routine diagnostic screening for HBV infection

In Yukon routine screening for HBV infection is recommended for the following groups:

Pregnant women

All pregnant women should be routinely tested for HBsAg at the first prenatal visit. 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 Perinatal Exposure, Section 5.0

Persons from countries HBV Endemic Countries

Screening for HBV infection is recommended for persons from high endemic countries. When a client who is a new immigrant from an HBV endemic country presents with a positive HBsAg and has no recent history of acute symptoms, the likelihood that this individual is a chronic carrier is high.

Many internationally adopted children come from high Hepatitis B endemic countries. Offer
hepatitis B vaccine to adoptive family members prior to the arrival of the adopted child. Screen the child for HBsAg, Anti-HBs, and anti-HBc; consider repeating these tests six months later (since the virus can have a long incubation period).


**High Risk Groups**

HBV screening is recommended for those with a history of the following: sexual partners of HBV infected individuals, past or current inhalation/injection drug use, high risk sexual activities (e.g., unprotected sex, multiple sexual partners) including past or current sex trade workers (STW).

**Persons with Chronic Liver Disease**

Screening for HBV is also recommended for those with chronic HVC infection and/or other chronic liver diseases.

**10.2 Post-vaccination testing**

Routine serology to determine protective status is NOT routinely recommended. Routine serology to determine protective status is recommended in the following situations:

- infants born to HbsAg mothers
- health care workers and public safety workers at high risk for continued percutaneous or mucosal exposure to blood or body fluids
- sex partners of person with chronic HBV infection
- those with the following conditions: chronic liver, chronic kidney and HIV infection

**11.0 BOOSTER DOSES AND RE-IMMUNIZATION**

Routine booster doses in immunocompetent people are not required, 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 indicate a lack of protection. Inadequate level of anti-HBs (less than 10 IU/L) drawn greater than 6 months after completion of the Hepatitis B immunization series does not indicate a lack of protection.

No further testing or immunization is required once there is demonstration of adequate level of anti-HBs (>10 IU/L).
If a primary Hep B immunization series has been completed and anti-HBs is < 10IU/L but is detectable, provide one dose of vaccine and retest anti-HBs four weeks later. If level is ≥ 10 following this dose, no further vaccine is required. When anti-HBs is <10 IU/L after this one dose, complete the second vaccine series and re-test 4 weeks after the last dose. Do not complete more than 2 complete Hepatitis B series. See Yukon Immunization Program Manual, Section 8, Biological Products, for full immunization recommendations.

Non-responders to one 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 per cent to 70 per cent of otherwise healthy people who fail to show a response after the first series. Individuals who fail to respond to the 2nd three-dose vaccination series are unlikely to benefit from further immunization. If appropriate, screening for HBV infection should occurred to rule out chronic infection as the cause of non-protective antibodies.

12.0 AUTHORITY


13.0 REFERENCES


British Columbia Center for Disease Control, (2009) Communicable Disease Control: Hepatitis B.


Centers for Disease Control and Prevention. (Revised February 2008). Epidemiology and Prevention of Vaccine-Preventable Diseases. (10th ed.) Atlanta, Georgia: Department of Health and Human Services, Centers for Disease Control and Prevention.


Public Health Agency of Canada (PHAC) (preliminary release, April 2012). Reported cases and rates of hepatitis B and hepatitis C in Canada by province/territory, 2010 and 2011.


PHAC (2013) Primary Care Management of Hepatitis B- Quick Reference


14.0 CONTACT INFORMATION

Yukon Communicable Disease Control
Hours: Monday-Friday (08:30 to 16:30)
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone: Local (867) 667-8323
Within Yukon 1-800-661-0408, ext. 8323
Fax: (867) 667-8349

Dr. Brendan E. Hanley MD CCFP (EM) MPH
Chief Medical Officer of Health, Yukon
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone: Office: (867) 456-6136
Cell: (867) 332-1160
Fax: (867) 667-8349

Whitehorse General Hospital
#5 Hospital Road, Whitehorse, YT Y1A 3H7
Telephone: (867) 393-8700
Fax: (867) 393-8772
WGH Laboratory telephone: (867) 393-8739
Appendix A  Algorithm For Management of Isolated Hepatitis B Core Antibody Positive Test Results (HBsAg negative, Anti-HBc positive, Anit-HBs positive but not protective)

Results:
1. HBsAg Θ
2. Anti-HBs ⊕ but non-protective (greater than 3.1 but less than 10 IU/L)
3. Anti-HBc ⊕

Interpretation: Resolved infection, old or recent.
May have been recently infectious. Counsel as such and initiate contact follow-up.

Test anti-HBcIgM

- Anti-HBcIgM Θ or not tested
- Anti-HBcIgM ⊕

Repeat all 3 tests in 2-4 weeks

- < 4-fold rise in anti-HBs
- 4-fold rise in anti-HBs

Interpretation: Resolved old infection, client immune to HBV. Advise client. No further follow-up.
Interpretation: Resolved recent infection, client immune to HBV. Further testing required to determine chronicity. Advise client.
Appendix B  Management of Isolated Hepatitis B Core Antibody Positive Test Results  
(HBsAg negative, Anti-HBc positive, Anit-HBs negative)

For all cases, consider as infectious to others until further information is available, and counsel accordingly.

Provide hepatitis B vaccine and/or HBIg to contacts as needed. Secondary testing as per algorithms, for anti-HBcIgM, or repeating initial tests can be done on the same sample, if available.

There are four possible interpretations of the “isolated core” result:

**Most often**, in low prevalence populations this finding is a false positive result or a lab error. Repeat test if lab error is suspected.

- 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.

**Less frequently**, this finding is a resolving acute infection before the appearance of anti-HBs or natural immunity with undetectable anti-HBs due to decline in antibody titre over time.

- The client may be 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 only if acute infection is suspected, based on history.

- 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.

**Rarely**, this finding may represent a chronic infection with undetectable HBsAg.

- 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. Consultation with an infectious disease specialist is recommended; HBV DNA may be recommended to verify infectivity.

**NOTE**: An isolated core result is found more frequently in individuals with HIV and/or HCV co-infection. Consider anti-HCV and HIV testing when there are risk factors for these infections.

See Algorithm on following page
Algorithm For Management Of Isolated Hepatitis B Anti-Core Antibody

Results:
1. HBsAg ☒
2. Anti-HBs ☒ (less than 3.1 IU/L)
3. Anti-HBc ☐

Interpretation: Consider infectious and counsel as such until further info collected. Initiate contact follow-up.

4 Possible interpretations:
- **most often**, in low prevalence populations this finding is a false positive result or a lab error. Repeat test if lab error is suspected.
- **Less frequently**, this finding is a resolving acute infection before the appearance of anti-HBs or natural immunity with undetectable anti-HBs due to decline in antibody titre over time
- **Rarely**, this finding may represent a chronic infection with undetectable HBsAg.

Test for anti-HBcIgM only if acute HBV infection suspected based on history *(see section 4.3)*

- Anti-HBcIgM ☒ or not tested
- Anti-HBcIgM ☐

Repeat HBsAg, anti-HBc and anti-HBs in two to four weeks.

- HBsAg ☒
- HBsAg ☒
- HBsAg ☐ Anti-HBs ☐ or < 10 IU/L

Interpretation: HBV positive and infectious. Repeat HBsAg in six months to assess chronicity.

Provide one dose vaccine, retest anti-HBs in four weeks.

- Anti-HBs protective (≥ 10 IU/L)
- Anti-HBs ☒ or < 10 IU/L

Interpretation: May be chronic infection with undetectable HBsAg (false negative). Consult a specialist for guidance. Advise client of chronic status.

Complete the vaccine series

- Anti-HBs protective (≥ 10 IU/L)
- Anti-HBs ☐ or < 10 IU/L

Interpretation: False ☐ anti-HBc or old, resolved infection. Client immune to HBV. No further testing.