Hepatitis B (HBV)

CHAPTER CONTENT

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The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of Hepatitis B see Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic.

1. CASE DEFINITION

Acute Hepatitis B

Confirmed Case

- A positive Hepatitis B surface antigen (HBsAg) or *Hepatitis B Virus* DNA (HB DNA), with a positive immunoglobulin M antibody to hepatitis B core antigen (anti-HBc IgM) 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 last 6 months in the context of a compatible clinical history or probable exposure

Probable case

- Acute clinical illness* in a person who is epidemiologically linked to a confirmed case (acute or chronic)

*Acute clinical illness is characterized by right upper quadrant abdominal discomfort, fatigue, fever, headache, anorexia, nausea, vomiting, malaise, abnormal liver biochemistry, jaundice, and dark urine.

Chronic Hepatitis B (Chronic Carrier)

Confirmed case

Laboratory confirmation of infection**:**

- Positive Hepatitis B surface antigen (HBsAg), Hepatitis B Virus DNA (HBV DNA), or Hepatitis B envelope-Antigen (HBeAg) for more than 6 months in the context of a compatible clinical history of probable exposure, ***OR***
- Negative Immunoglobulin M antibody to Hepatitis B core antigen (anti-HBc IgM) with either a positive HBsAg, HBV DNA, or HBeAg, ***OR***
- Positive total antibody to Hepatitis B core antigen (anti-HBc total) and HBV DNA and negative HBsAg and antibody to Hepatitis B surface antigen (anti-HBs).

Probable Chronic Carrier

Laboratory confirmation of infection:

- HBsAg positive in the context of compatible clinical history and/or appropriate epidemiologic exposure, e.g., self-reported history of hepatitis B, or born in hepatitis B endemic country.

Unspecified case

- Does not fit the criteria for Acute Case or Chronic Carrier ***AND*** is either:
  - HBsAg positive ***OR***
  - Detection of HBV DNA

Occult HBV

- Characterized by positive HBV DNA and presence of anti-HBc alone or with anti-HBs in the absence of HBsAg.

2. DIAGNOSIS

- Different serologic tests are used to determine if a person has an acute or chronic hepatitis B infection.
- The tests are:
  - HBsAg (hepatitis B surface antigen)
  - anti-HBc IgM (immunoglobulin (IgM) antibody to hepatitis B core antigen)
  - anti-HBc total (total antibody to hepatitis B core antigen)
  - HBV DNA
  - HBeAg (hepatitis B envelope antigen)
  - Anti-HBs (antibody to hepatitis B surface antigen)
- HBsAg is the first serological marker seen in HBV infection (acute or chronic) and can be
- detected in serum from 1-2 weeks to 11–12 weeks after exposure or indefinitely in chronic infections.
- HBsAg usually disappears in 4–6 months, with antibody to hepatitis B surface (anti-HBs), developing approximately 8 months after infection.
- Antibody to hepatitis B core (anti-HBc) indicates either current or past HBV infection.
- Testing for anti-HBc total includes the detection of both anti-HBc IgM and anti-HBc Ig.

- Anti-HBc total is usually the second serological marker to appear in acute infection and continues to be present indefinitely.
- Anti-HBc IgM is present in high titre in acute cases and usually disappears within six months.
    - It may be the only marker of infection during the 'window period', which is the time between when HBsAg disappears and anti-HBs appears.
- For information regarding Hepatitis B Diagnosis see Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic (Diagram 1) and Alberta Provincial Laboratory Guide to Services.
- For assistance with the interpretation of hepatitis B serological tests see: CDC Interpretation of Hepatitis B serological test results.
- For assistance with prenatal and newborn diagnosis see Annex A.

3. REPORTING

As set out in the *NWT Child and Family Services Act (Section 8)*, health care professionals have a legal duty to report suspected cases of child abuse, as it relates to reportable STIs, to the appropriate authority.

Health Care Professionals

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646 **immediately** after diagnosis is made or opinion is formed, ***AND***
- Complete and fax (867) 873-0442 the Hepatitis B and C - Case Investigation form and any other required information to the OCPHO within **24 hours.**
- **Immediately** report all outbreaks or suspect outbreaks by telephone to the OCPHO (867) 920-8646

Laboratories

- Report all positive results to the OCPHO by telephone (867) 920-8646 ***AND***
- Send all positive results to the OCPHO by fax 867-873-0442, **within 24 hours.**

4. OVERVIEW

For more information about hepatitis B:

- The Government of Canada: Canada/Primary Care Management of Hepatitis B-Quick Reference Guide
- Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic
- BC CDC: Hepatitis B
- Centres for Disease Control and Prevention: CDC/Hepatitis B
- World Health Organization: WHO/Hepatitis B
- NWT Department of Health and Social Services: NWT HBV Clinicians Desk Reference

Causative Agent

- The hepatitis B virus (HBV) is a DNA virus, in the hepadnavirus family.
- It consists of an inner nucleocapsid core (the hepatitis B core antigen [HBcAg]) which is surrounded by an outer lipoprotein coat containing the hepatitis B surface antigen (HBsAg).
- The virus primarily infects liver cells and causes both acute and chronic hepatitis B infection.

Clinical Presentation and Major Complications

- Information about Clinical Presentation and Major Complications can be found at Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic.

Transmission

- Transmission is through mucosal and percutaneous contact with infected blood and body fluids including, saliva, human milk, and tears but the most potentially infectious body
- fluids are blood, serum, semen, vaginal secretions, and cerebrospinal, pleural, synovial, peritoneal, pericardial and amniotic fluids.
- The principal routes of transmission are,
    - Sexual (e.g., vaginal, anal, or oral) this is the most common route in the NWT
    - Percutaneous (e.g. injection drug use, exposure to blood or body fluid),
    - Vertical (i.e., mother to infant during pregnancy or birth),
    - Horizontal (e.g., between household contacts through skin lesions or sharing of blood, contaminated toothbrushes, and razors)
- Infections also occur in settings of close personal contact through unrecognised exposure to infectious body fluids.
- HBV is stable on environmental surfaces for at least seven days and can therefore be transmitted indirectly via inanimate objects.
- In Canada, the risk of transmission from screened and donated blood, manufactured blood products, and transplanted organs is minimal due to donor screening and processing of blood products.
- For information on vertical transmission and transmission through breast milk see Annex A- NWT Hepatitis B prenatal & Newborn Flow Chart.
- HBV (acute and chronic) is a highly infectious vaccine-preventable, disease.
    - See NWT immunization schedule for immunization on Hepatitis B in the NWT.

Incubation Period

- The usual incubation period from time of exposure to onset of symptoms is 60-90 days but can extend to 45-180 days.
- Detection of HbsAg can occur as early as 2 weeks after exposure to as late as 9 months.
- Variations in incubation period are dependent on the viral load, host factors, and mode of transmission.

Clinical Guidance

- For patient specific clinical management consult your local healthcare professional, paediatrician, infectious disease specialist, NWT Clinical Practice Guidelines, or Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic.
- For pregnant mothers/infants with Hepatitis B is outlined in Primary Care Management of Hepatitis B (see also Annex A).

5. PUBLIC HEALTH MEASURES

Management of Case

- Assess HBV immunization status
    - For determination of protective levels of anti-HBs post disease or vaccination, follow reference from the laboratory that completes the test:
        - Stanton hospital reference for protective level of anti-HBs is **>12 IU/L**
- Screen for other sexually transmitted infection and blood-borne infections (STBBIs) such as gonorrhoea, syphilis, human papillomavirus (HPV), Human Immunodeficiency Virus (HIV), and hepatitis C (HCV).
- For all Hepatitis B cases, offer Hepatitis A Vaccination.
- Assess risk factors for acquisition of HBV including:
        - Travel or immigration history
        - Living with a known HBV carrier or case
        - Sexual contact history with a known HBV carrier or case
        - Practice of unsafe sex
        - Men who have sex with men (MSM)
        - Illicit Drug Use (IDU)/needle-sharing
        - Recent incarceration
        - Receipt of blood/tissue/organ prior to 1985
        - Receipt of blood/tissue/organ at any time from a developing country
        - Frequent receipt of blood or blood products
        - Skin piercing procedures such as tattooing, body piercing, acupuncture
        - Workplace exposure
        - Recent invasive medical or dental procedure including hemodialysis
    - If female determine pregnancy status.
    - Determine if case has donated blood, tissue, or organs.
    - Acute cases should be tested for HBsAG and anti-HBs at six months after the initial confirmatory lab to determine if the infection has resolved and to determine carrier state.
    - If the person is in the window period at six months, then re-test every six months until status has been determined.
    - Pregnant women should be tested more frequently if they will deliver within the six-month period to establish if post-exposure prophylaxis protocol of the newborn will be required.
- Provide education about modes of transmission and how to reduce the risk of infection to

others:

- Inform health care providers and others performing care which may pierce the skin (tattoo artist, piercing or acupuncturist) of infection so that they can take appropriate precautions.
- Do not donate blood, organs, semen, or tissues.
- Do not share personal hygiene items such as razors, nail clippers, toothbrushes, or glucometers.
- Safely dispose of blood contaminated articles such as feminine hygiene products, dental floss, bandages, needles, or broken glass.
- Cover all cuts and sores.
- Clean up blood and body fluid spills by first cleaning up the spill then disinfecting the area with a diluted bleach solution (9-parts water to 1-part bleach) leaving the bleach solution on the surface for 10 minutes before wiping away.
- Caution others to use PPE if cleaning up blood and body fluids.
- Practice safe sex with all partners until testing proves they are immune.
- Do not share any equipment used to prepare, inject, or inhale drugs.

- Offer routine vaccine and vaccines available for vaccine-preventable STBBIs such as, HPV and HAV: NWT Immunization schedule.
- Cases in hospital should be on routine infection, prevention, and control precautions according to the NWT Infection Prevention and Control Manual.

Management of Contacts

- Identify contacts in the 6 months prior to onset of symptoms or if asymptomatic identify contacts in the 6 months prior to date of diagnosis.
- Contacts include the following:
  - Infants and children born to a mother with acute or chronic HBV infection
  - Persons living in the same household with potential blood/body fluid exposure
  - Needle sharing partners
  - Persons who share personal care items (razors, toothbrushes etc.)
  - Short- and long-term sexual partners
  - Other persons with blood/body fluid exposures e.g. unprotected first aid
- The Office of the Chief Public Health Officer (OCPHO) will assist with contacts living out of the territory.
- Assess the immune status of contacts based on history of hepatitis B immunization or disease and by completing serology for HBsAG and anti-HBs.

Post Exposure Prophylaxis

- Consult with the OCPHO (867) 920-8646 before administering Post Exposure Prophylaxis.
- **Contacts who are shown to be immune do not** need post exposure prophylaxis (PEP) and are considered protected.

- Contacts who are shown not to have immunity should be considered for PEP based on risk status of the source, the characteristics of the exposed, and the exposure incident.

Immunization

- Hepatitis B vaccine provides 90% protection and is the most important PEP intervention.
- Hepatitis B Immunoglobulin (HBIG) can also be offered to provide rapid acting short-term passive immunity.
  - Consult OCPHO for guidance (867)-920-8646.
- Post Exposure Prophylaxis should be offered to susceptible individuals in the following circumstances
  - Infants born to a mother with acute or chronic Hepatitis B infection
  - Persons who have experiences a percutaneous or mucosal exposure
  - Persons who have experienced a household or sexual exposure

Post Exposure Prophylaxis for Different Exposure Types

Exposure Type	Immunization recommendations	Hepatitis B Immunoglobulin recommendation
Infants born to a mother with acute or chronic hepatitis B infection	Monovalent HB within 12 hours of birth Second dose of monovalent HB at one moth of age (for term infants) Third dose of monovalent HB (can be given as part of DTaP-HB-IPV-Hib vaccine) at 6 months of age (for term infants)	0.5 mL HBIg given IM within 12 hours after birth or up to a maximum of 7 days after birth
Percutaneous or mucosal exposure	Based on immunization and antibody status of the injured person and infectious source** Nonimmune persons who are expose to a low risk source should receive the first dose of the HBV Vaccine Whenever HBV Vaccine is given, the series should be completed according to the immunization schedule and	Based on immunization and antibody status of the injured person and infectious source.** If indicated, HBIg should be administered within 48 hours of exposure, but can be administered up to 7 days after exposure.

	the antibody response should be assessed 1-6 months after completion	The HBIg dose for older children and adults is 0.06 mL/kg given IM.
Sexual and Household	HB Vaccine series should be completed, and antibody response should be tested 1-6 months after completion	HBIg is not recommended for household contacts. Sexual contacts should receive one dose of HBIg within 48 hours of exposure but can be given up to 7 days after exposure. The HBIg dose for older children and adults is 0.06 mL/kg).

- **For detailed information on how to evaluate contacts, see: Canadian Immunization Guide-Hepatitis B Post Exposure Immunization, Tables 1 and 2
- For more details regarding Post Exposure Prophylaxis see
  - Alberta Guidelines for Post-Exposure Management and Prophylaxis
  - Hepatitis B Prenatal & Newborn Flow Chart
  - Canadian Immunization Guide
  - NWT Infection Prevention and Control Manual

Prevention:

- Infants and Children
  - Routine universal prenatal screening of all pregnant women for HBsAg in the first trimester
  - If testing was not done during pregnancy it should be done at time of delivery to inform post-exposure care of newborn
  - Screening for adopted children coming from hepatitis B endemic countries or high-risk family situations.
- Harm reduction efforts include not sharing drug use equipment (needles, syringes, cookers, filters, straws, or pipes).
- Ensure proper disposal of blood, fluid, organs, tissues, and contaminated articles from individuals with a Hepatitis B infection.
- Use latex condoms during sex to prevent HBV and other STBBI transmission.
- Screen individuals with multiple sexual patterns and/or a history of STIs.
- Vaccination
  - HBV is a vaccine-preventable disease
  - Vaccine for HBV is publicly funded in the NWT for infants, children, and adults and is 95-100% effective with an effect that lasts 30 years or more
  - Vaccine for HBV is offered according to the NWT Immunization Schedule
  - For more information on HBV vaccination follow guidance in the Canadian Immunization Guide

- Those with chronic renal disease and patients on dialysis may require high dose HB vaccine and yearly screening for anti-HBs

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

- Government of Canada: Hepatitis B and Hepatitis B - Get the Facts
- Centers for Disease Prevention and Control: https://www.cdc.gov/hepatitis/hbv/index.htm
- World Health Organization: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b
- Alberta Public Health Disease Management Guidelines: Hepatitis B Acute and Chronic

7. EPIDEMIOLOGY

- For more information on the epidemiology of hepatitis B in the Northwest Territories (NWT) see: Epidemiological Summary of Communicable Diseases HSS Professionals.

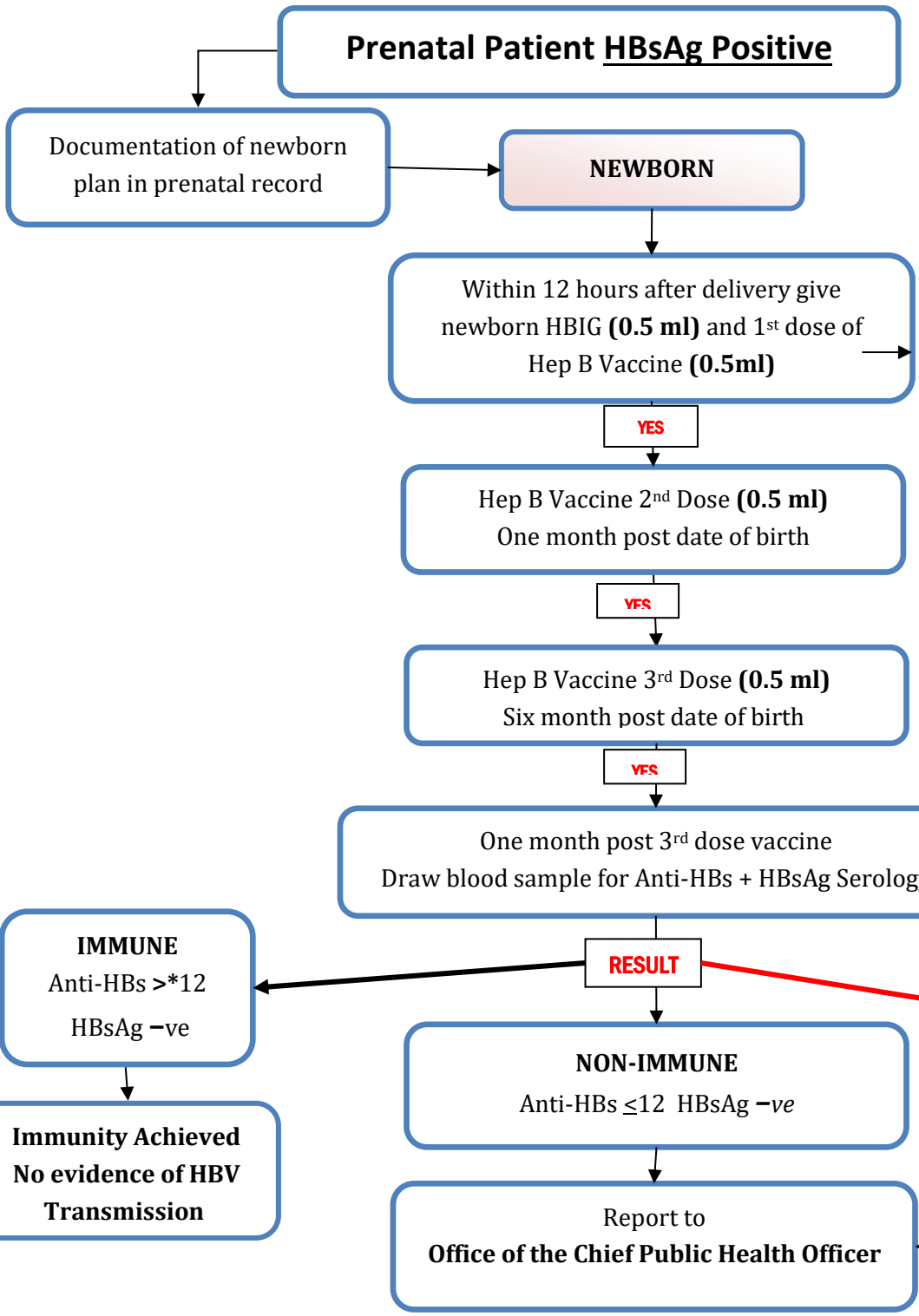
8. REFERENCES

Information for this chapter is based on Alberta's Public Health Disease Management Guidelines- Hepatitis B Acute and Chronic.

Additional resources for this chapter include:

1. The Canadian Immunization Guide, Hepatitis B: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-7-hepatitis-b-vaccine.html
2. Public Health Agency of Canada, National Case Definition: Hepatitis B. https://www.canada.ca/en/public-health/services/diseases/hepatitis-b/health-professionals/national-case-definition.html

ANNEX A: Hepatitis B Prenatal & Newborn Flow Chart



HEPATITIS B PRENATAL & NEWBORN FLOW CHART

***Always refer to specific "lab reference range" on report for interpretation.**