Hepatitis B

Case Definition

Confirmed Case

Laboratory confirmation of infection:

- Hepatitis B surface antigen (HBsAg) positive and immunoglobulin M (IgM) antibody to hepatitis B core antigen (anti-HBc) positive [1]

OR

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

OR

- Acute clinical illness [2] and HBsAg positive (and anti-HAV negative and anti-HCV negative) when the test for IgM antibody to anti-HBc is not available.

Probable Case

Acute clinical illness [2] in a person who is epidemiologically linked to a confirmed case.

[1] Anti-HBc-IgM can be positive in a reactive episode of chronic HBV carriers.
[2] Acute clinical illness is characterized by a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels.

Chronic Carrier (1) *(Provisional)*

Laboratory confirmation of infection with or without symptoms:

- Persistence of HBsAg positivity for more than 6 months

OR

- HBsAg positivity in a person who is immunoglogulin G (IgG) antibody to hepatitis B core antigen (anti-HBc-IgG) positive and immunoglobulin M (IgM) antibody to hepatitis B core antigen (anti-HBc-IgM) negative.

Reporting Requirements

1. Physicians/Health Practitioner and others

Physicians, health practitioners and others listed in Section 22 of the *Public Health Act* shall notify the MOH (or designate) in the prescribed form by mail, fax or electronic transfer within 48 hours (two days) about the following:

- all confirmed and probable cases, and
- chronic carriers (only women identified through prenatal screening).

2. Laboratories

All laboratories [including the Canadian Blood Services (CBS) Laboratory, insurance company laboratories, regional laboratories and the Provincial Laboratory of Public Health (PLPH)] shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:

- CMOH (or designate),
- MOH (or designate),
- attending/ordering physician, and
- individual donor (as per current CBS policy).

When reporting positive tests, laboratories shall include the:

- name of individual,
- date of birth,
- personal health number,
- address of the individual,
- phone number of the individual,
- date of test, and
- name of laboratory performing test.

3. Regional Health Authority

- The MOH (or designate) shall forward the preliminary NDR of all confirmed and probable cases, and prenatal chronic carriers to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- For out of region reports, the MOH (or designate) first notified shall notify the MOH (or designate) where the case resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
- For out of region contacts, the MOH (or designate) first notified shall notify the MOH (or designate) where the contact resides by mail, fax or electronic transfer including:
  - name,
  - date of birth,
  - personal health number, and
  - contact information i.e., address and phone number.
- For out of province and out of country case and/or contact reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
  - name,
  - date of birth,
  - out of province health care number,
  - out of province address and phone number,
  - attending physician (locally and out of province), and
  - positive laboratory report (faxed).

4. Additional Reporting Requirements

- Canadian Blood Services (CBS): All persons testing positive must be reported by the MOH (or designate) to CBS within two working days if they have ever had a history of donating or receiving blood in Canada. (J Hannon, personal communication, November 22, 2002)
  - A copy of the positive test result must accompany the report, and all information should be sent to Lookback/Traceback Coordinator, CBS:
    - for Red Deer north via confidential fax number (780) 433-1907 or phone (780) 431-8712.
    - for south of Red Deer via confidential fax number (403) 410-2797 or phone (403) 410-2708.
  - For donors the following information is required:
    - where and when donated blood,
    - all names (first and surnames) used, and
    - date of birth.
  - For blood recipients (when blood transfusion is the only risk factor identified), the following additional information is required:
    - year of transfusion, and
    - hospital of transfusion.
- Citizenship and Immigration Canada (CIC): There are currently no guidelines for immigrants as hepatitis B testing is not required as part of the immigration process. (B Gushulak, personal communication, February 2003)

Etiology

The hepatitis B virus (HBV) is a DNA virus, composed of a nucleocapsid core (HBcAg), surrounded by an outer lipoprotein coat containing the surface antigen (HBsAg). The distribution of subtypes varies geographically. There are multiple subtypes and because of the common "a" determinant, protection against one subtype appears to confer protection against the other subtypes. No differences in clinical features have been related to subtypes.

The third hepatitis B antigen, the "e" antigen (HBeAg), has been identified as a soluble antigen, whose sequences are a subset of those in the core antigen, but without cross-reactivity.

Clinical Presentation

Only a small proportion of acute hepatitis B cases may be clinically recognized. Less than 10% of children and 30%-50% of adult acute cases will have icteric disease. Hepatitis B in children is most often milder and often anicteric. In infants, this disease is typically asymptomatic.

In persons with clinical illness, the onset is usually insidious with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgias and rash, often progressing to jaundice. Fever may be absent or mild. Severity ranges from inapparent cases detectable only by liver function tests to fulminating, fatal cases of acute hepatic necrosis. The case-fatality rate in hospitalized patients is about 1% and is higher in those over 40 years of age.

Chronic HBV infection is found in 0.5% of North American adults and in 0.1%-20% of people from other parts of the world. Persons with chronic infection may or may not have a history of clinical hepatitis. About one-third have an elevated aminotransferase. Biopsy findings range from normal to chronic active hepatitis, with or without cirrhosis. The prognosis of the liver disease in such persons is variable.

Following acute HBV infection, the risk of developing chronic infection varies inversely with age. Infants infected with HBV at birth will have a 90% chance of becoming chronic HBV carriers. Twenty-five percent to 50% of children infected between one and five years of age and about 1%-10% of persons infected as older children and adults will become chronic HBV carriers.

Chronic HBV infection is also common in persons with immunodeficiency. An estimated 15%-25% of persons with chronic HBV infection will die prematurely of either cirrhosis or hepatocellular carcinoma (HCC). HBV may be the cause of up to 80% of all cases of HCC worldwide, second only to tobacco among known human carcinogens.

Diagnosis

Two serologic tests are commonly used to determine if a person is a chronic or acute case of hepatitis B. They are:

- hepatitis B surface antigen (HBsAg), and
- antibody to hepatitis B core antigen (anti-HBc).

Hepatitis B serological markers [2]

Marker	Indication
HBsAg+	Indicates current infection or chronic carrier; infectious.
Anti-HBs	Indicates immunity from disease or vaccine.
Anti-HBc+	Indicates a client who may have acute or chronic infection; lifelong marker indicative of past infection (not present after vaccine).
Anti-HBc IgM+	Indicates recent infection or acute infection (rare cases-chronic liver reactivation-discuss with physician).
HBeAg+	Indicates a client who is highly infectious and at increased risk for virus transmission.

HBsAg can be detected in the serum from several weeks before onset of symptoms to days, weeks or months after onset in acute cases but persists in chronic cases. In acute and chronic cases that resolve, HBsAg declines, disappears and is followed by the appearance of anti-HBs.

Anti-HBc appears at the onset of illness and persists indefinitely. Demonstration of anti-HBc in serum indicates either current or past HBV infection. IgM anti-HBc is present in high titre in acute cases and usually disappears within six months, although rarely, it can persist in chronic cases, thus a positive result may reliably diagnose

an acute case. In resolving cases, anti-HBc (IgM anti-HBc in acute cases) may be present while HBsAg and anti-HBs are both absent. This is known as the "window period".

Testing for hepatitis B DNA is not routinely performed but may be used to assess the degree of infectivity or to monitor the effectiveness of therapy.

Interpretation of serologic test results for HBV [3]

HBs Ag	IgM Anti-HBc	Total Anti-HBc	Anti-HBs	Interpretation
+	-	-	-	Early HBV infection before HBc response.
+	+	+	-	Early HBV infection. Because IgM anti-HBc is positive, the onset is within 6 months. IgG antibody usually appears shortly after IgM; therefore, both are usually positive when IgM is positive.
-	+	+	- or +	Recent acute HBV infection (within four to six months) with resolution; i.e., HBsAg has already disappeared. Anti-HBs usually appears within a few weeks or months of HBsAg disappearance.
+	-	+	-	HBV infection onset at least six months earlier because IgM anti-HBc has disappeared. Probable chronic HBV infection.
-	-	-	+	Response to hepatitis B vaccine. No evidence of infection.
-	-	+	+	Past HBV infection, recovered.

Epidemiology

Reservoir

Humans. Chimpanzees are susceptible, but an animal reservoir in nature has not been recognized. Infected pet monkeys have been documented.

Transmission [4]

The principal routes of transmission for HBV are percutaneous (injection drug use, exposure to blood or body fluid), sexual (heterosexual or MSM), vertical (mother to infant), and horizontal (between children and household contacts through skin lesions or sharing of blood-contaminated toothbrushes and razors). Infections also occur in settings of close personal contact through unrecognized contact with infectious bodily fluids. Because HBV is stable on environmental surfaces for up to and including seven days, indirect inoculation of HBV can also occur via inanimate objects.

Blood and all body fluids that are visibly contaminated with blood can transmit HBV. Semen, vaginal secretions, and saliva as well as other body fluids (pleural, amniotic, pericardial, peritoneal, synovial, and cerebrospinal) may contain the virus. Transmission from breast milk is unlikely. Feces, nasal secretions, sputum, sweat, tears, urine and vomitus are not implicated unless they are visibly contaminated with blood.

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.

Perinatal transmission is common in endemic areas of Southeast Asia and the Far East, especially when HBsAg carrier mothers are also HBeAg positive with high HBV DNA levels. Infection may also be transmitted between household members and between sexual partners, either homosexual or heterosexual, and in groups of toddler-aged children with high HBsAg carrier rates.

Communally used razors and toothbrushes have been implicated as occasional vehicles of HBV transmission causing percutaneous and mucosal inoculation. Fecal-oral or

vector-borne transmission has not been demonstrated. In about 35% of HBV infections no transmission source can be identified.

Incubation Period

The incubation period is 45 to 180 days, with an average of 60 to 90 days. It may be as short as two weeks to the appearance of HBsAg, and rarely as long as six to nine months. The variation is related in part to the amount of virus in the inoculum, the mode of transmission, and host factors.

Period of Communicability

The communicability is while HBsAg is present in blood and is highest during the acute phase of illness. Persons in the "window period" and those rare persons who are concurrently HBsAg and anti-HBs positive should be considered infectious. In the latter case, if HBsAg disappears and anti-HBs remains, persons can be considered non-infectious. The presence of "e" antigen or high levels of viral DNA indicate high virus titres and higher infectivity, while the presence of "e" antibody and low levels of viral DNA indicate reduced infectivity.

Host Susceptibility

Susceptibility is general. Protective immunity follows infection if antibody to HBsAg (anti-HBsAg) develops and HBsAg becomes negative. Persons with Down Syndrome, lymphoproliferative disease, HIV infection, and those on hemodialysis appear to be more likely to develop chronic infection.

Occurrence

General

Hepatitis B occurs worldwide and is endemic with little seasonal variation. In areas of Africa and Asia, widespread infection may occur in infancy and in childhood. In North America, infection is most common in young adults. In the United States and Canada, serologic evidence of previous infection varies depending on age and socioeconomic class. Overall, 5% of the adult population in the US has anti-HBc, and 0.5% is HBsAg positive. Among those from some areas of Asia, 10%-15% may be HBsAg positive.

In developed countries, exposure to HBV may be more common in certain groups. These include IDUs, people with multiple sexual partners, MSM, clients and staff in institutions for the developmentally disabled, employees in hemodialysis centres, and persons in certain healthcare and public safety occupations.

Percutaneous and permucosal exposure to blood or serous fluids are associated with occupationally acquired HBV infections. Surgeons, dentists, oral surgeons, pathologists, operating room and emergency room staff, and clinical laboratory workers who handle blood are at highest risk of exposure, however, the majority should be immune to infection if they have received hepatitis B vaccine.

Until 1985, recipients of blood products were at risk of contracting hepatitis B. In the many countries in which pre-transfusion screening of blood donors for HBsAg is required, and where pooled blood-clotting factors (especially antihemophilic factor) are processed to destroy the virus, this risk has been virtually eliminated. The risk is still present in many developing countries.

Contaminated and inadequately sterilized syringes and needles have resulted in outbreaks of hepatitis B among patients in clinics and physicians' offices. This has been a major mode of transmission worldwide. Occasionally, outbreaks have been traced to tattooing and acupuncture.

Transmission to patients from HBsAg positive healthcare workers has also been documented.

Canada [5, 6]

Acute hepatitis B has been reportable in Canada since 1969. From 1988 to 1996 an average of 2905 cases of acute hepatitis B were reported in Canada (range 2361-3378). In 1997, there was a significant decline in the number of reported cases and this decrease has continued in more recent years. From 1997 to 2000, an average of 1066 cases were reported (range 971-1277). This may be, in part, attributed to the introduction of universal hepatitis B immunization programs for preteens and teens in provinces/territories across Canada.

In Canada, the major risk factors associated with acute hepatitis B infection include IDU (34%) and heterosexual activities such as having multiple heterosexual partners (24%) and sex with HBV-infected individuals (12%). Drug snorting (2.4%), receipt of blood products (2.4%), male homosexual activity (7.3%), a hepatitis B carrier in the family (2.4%), association with an institution (2.4%), history of hospitalization (7.3%), and surgery (2.4%) or dental visit (2.4%) also account for a proportion of acute cases. In Canada, there is failure to identify any risk factor in about 27% of acute hepatitis B cases. For chronic hepatitis B cases, a high proportion report a history of blood transfusion (10%), body piercing (13.8%), and occupational blood contact (5%). In comparison with acute cases, a much smaller proportion of chronic carriers (11.2%) report IDU as a risk factor.

Alberta [6, 7]

Rates of acute hepatitis B disease in Alberta have been decreasing since 1993. This trend has continued with the exception 1998 when 102 cases were reported compared to 77 cases in the previous year.

From 1988 to 1996 the average rate of acute disease was 4.53 (range 3.09-5.54), averaging 118 cases per year (range 86-136). Universal hepatitis B immunization for grade five students was introduced in 1995. In the period 1997 to 2004, an average of 76 cases were reported annually (range 52-102), the rate decreasing to less than two cases per 100,000 population by 2004. In 1997, the rate of acute hepatitis B infection was approximately half the rate reported in 1988.

Males are reported more often than females. Prior to 1993, the highest incidence was reported in the 25 to 29 year age group. In 1993, the higher rate shifted to the 30 to 39 year age group. An average of three cases per year have been reported in children under the age of 15. IDU has been identified as significant risk factor in Alberta.

Key Investigation

Single Case/Household Cluster

- Contact the physician, if possible, before contacting the client to determine:
  - reason for the test,
  - possible source,
  - client symptoms,
  - relevant laboratory results e.g., LFT,
  - acute or chronic infection, and
  - if testing of relevant contacts has occurred.

- Assess risk factors for acquisition of hepatitis B infection including:
  - immigration from or travel to a known endemic country,
  - living with, or attending daycare with a known hepatitis B carrier,
  - having sexual contact with a known hepatitis B carrier,
  - practicing unsafe sex,
  - IDU/needle sharing,
  - recent incarceration,
  - receipt of blood/tissue/organ prior to 1985,
  - receipt of blood/tissue/organ at any time in a developing country,
  - frequent receipt of blood or blood products,
  - skin piercing procedures e.g., tattooing, body piercing, acupuncture,
  - workplace or non-occupational exposure,
  - recent invasive medical or dental procedures e.g., hemodialysis, and
  - resident or staff of institution for the developmentally challenged.
- Assess sexual relationships and unsafe sex practices.
- Ascertain co-infection with other BBPs.
- Determine hepatitis B immunization history.
- If female, determine pregnancy status.
- Determine donation of blood, tissue, or organs.
- Identify household and other intimate contacts of the case for potential blood exposure.
  - For acute cases, this should include all current significant contacts as well as those in the previous six months.
  - For chronic carriers, include current contacts as well as those within the last six months. This cutoff should be extended further back if contact was frequent and after infection developed (when this can be estimated).
  - Contacts include:
    - persons living in the household,
    - needle sharing partners,
    - persons who share personal care items e.g., razors, toothbrushes,
    - long term and short term sexual partners, and
    - persons with other blood or body fluid exposures e.g., unprotected first aid.

Control

Management of a Case

- Public health personnel should contact physicians to make them aware of usual public health follow-up such as:
  - acquisition of additional epidemiological information,
  - possibility for testing for infection with other BBPs,
  - possible referral to a medical liver specialist, and
  - follow-up of susceptible contacts.
- Provide education about the modes of transmission for the purpose of reducing infection risk to others.
- Promote a healthy lifestyle to minimize liver damage e.g., avoid intake of alcohol and hepatotoxic drugs, eating a well balanced diet, and having regular medical checkups.
- Provide information about community support agencies.
- Assess the need for hepatitis A vaccine as per the current Alberta Immunization Manual. Persons who are hepatitis B chronic carriers are eligible for provincially funded hepatitis A vaccine.
- Medical follow-up
  - Acute cases should be tested for both HBsAg and anti-HBs six months (but can be as soon as three months) after detection to assess whether a chronic carrier state has developed and to

determine the need for ongoing precautions described above.
- If the person is in the "window period" at six months, the individual should be retested at six-month intervals to determine if they have developed anti-HBs while HBsAg remains negative.
  - Pregnant women should be tested more frequently if they will deliver before the six-month interval to establish whether or not prophylaxis of the newborn will be required (i.e., HBIG and hepatitis B vaccine).

Treatment of a Case

- Details concerning treatment should be obtained in consultation with a hepatologist.

Management of Contacts [4]

- Assess for a history of prior hepatitis B immunization or disease.
  - Serology (HBsAg and anti-HBs) may be required to determine status.
  - Pre-vaccination serology is recommended for individuals who are:
    - persons at high risk of past infection,
    - individuals who may have antibody protection, e.g., children and family members who have immigrated from an endemic country*, and
    - household members who may have been previously immunized through a universal program (e.g., grade 5, 12 or Endemic Programs) prior to immunization.

*A current list of endemic countries is available at: http://www.who.int/emcdocuments/hepatitis/docs/whocdscsrlyo20022/disease/prevalence.html

  - Recommend follow-up based on results of serology.
    - If HBsAg positive, follow-up as a carrier.
    - If anti-HBs positive, client immune, thus no further follow-up.
    - If HBsAg negative and anti-HBs negative recommend:
      - HBIG, when indicated,
      - hepatitis B vaccine series, and
      - serology for HBsAg and anti-HBs at least four weeks but no later than six months after the completion of the hepatitis B vaccine series to ensure protective antibody levels.
  - Vaccinated persons who are non-responders (refer to the current Alberta Immunization Manual).
    - If after one series, anti-HBs is negative initiate a second series.
    - Offer post-vaccination serology after the fourth dose.
    - If negative anti-HBs, complete the series.
    - Offer post-vaccination serology.
    - If a significant exposure occurs after two series, offer two doses of HBIG one month apart.
- **Community exposures to blood and/or body fluids.**
  - Refer to the current *Alberta Health Standards for Non-Occupational Community Post-Exposure Follow-up and Prophylaxis of Bloodborne Pathogens* [8].
- **Significant contacts of an acute case**
  - Sexual contacts, needle sharing partners, or other blood/body fluid exposure in the past 14 days.
    - Arrange for immediate serology through the personal physician or MOH [or designate].
    - If the contact is susceptible (HBsAg negative, anti-HBs

negative), recommend HBIG and hepatitis B vaccine series.
    - Initiate hepatitis B vaccine series concurrently or as soon as possible after HBIG has been given.
        - ∇ Recommend post-vaccine serology.
- Sexual contacts, needle sharing partners or other blood/body fluid exposures occurring more than 14 days prior to case diagnosis (for adequate public health contact tracing, go back six months from onset date to identify contacts).
    - Recommend pre-vaccination serology. This should be done prior to, or at the time of the first dose of hepatitis B vaccine.
    - If the contact is susceptible, initiate a hepatitis B vaccine series,
        - ∇ Recommend post-vaccination serology.
- All other household contacts.
    - Recommend pre-vaccination serology.
    - If the contact is susceptible, initiate hepatitis B vaccine series.
        - ∇ Post-immunization serology is not required as the sero-conversion rate is usually 90% or more in healthy adults and 98% in children.
- Infants less than 12 months of age whose mother or primary caregiver is an acute case.
    - Infants born to mothers who have acute hepatitis B infection during the third trimester of pregnancy have a risk of up to 90% of acquiring the infection.
    - No pre-vaccination serology is required.
    - HBIG should be offered as soon as possible and within two weeks of last contact.
    - Initiate hepatitis B vaccine series.
    - If the infant has had two doses of vaccine, the infant should be presumed protected and HBIG is not required. The vaccine series should be completed as scheduled [9].
    - If the infant has had only one dose of vaccine, the second dose should be administered if the interval is appropriate, or HBIG administered if the immunization is not due. The vaccine series should be completed as scheduled [9].
    - Post-vaccination serology is not required.

- **Significant contacts of a chronic carrier**
    - Spouse or sexual partners.
        - Request pre-vaccination serology for HBsAg and anti-HBs.
        - If the contact is susceptible, initiate a hepatitis B vaccine series,
            - ∇ Recommend post-vaccination serology.
    - Newborns at birth when the mother is HBsAg positive, the father or other household members are HBsAg positive and will be the primary caregiver.
        - An infant infected with HBV in the first few months of life has a 90% risk of becoming a chronic carrier. The administration of HBIG and hepatitis B vaccine to the infant at appropriate times can prevent the development of the carrier state in 85%- 95% when born to an infected mother. Refer to Post-exposure Prophylaxis and Follow-up for

Infants of Carrier Mothers/ Caregivers table.
    - Pre-vaccination serology is not required.
    - HBIG and hepatitis B vaccine series should be given to all infants less than 12 months of age whose mother or primary caregiver is a chronic carrier.
  - Individuals 12 months and older:
    - Recommend pre-vaccination serology. This should be done prior to, or at the time of the first dose of hepatitis B vaccine.
    - If the contact is susceptible, initiate a hepatitis B vaccine series,
    - Recommend post-vaccination serology.
  - Other persons living in the household.
    - Recommend pre-vaccination serology.
    - If the contact is susceptible, initiate a hepatitis B vaccine series,
    - Recommend post-vaccination serology.

Preventive Measures

- All occupational exposures to potentially infectious material should be managed according to the OH&S guidelines for the workplace where the incident occurred, or their personal physician.
- Routinely screen for HBV:
  - adopted children from countries or family situations in which there is high prevalence of infection,
  - males or females with multiple sexual partners, or with a recent history of a sexually transmitted disease,
  - injection drug users,
  - blood donors, and
  - all donations of blood, blood products, tissues, organs, and semen.
- After a blood spill, removal of organic material must occur followed with appropriate disinfection (usually 1:10 dilution of household bleach) [10].
- Ensure adequate sterilization of instruments used in invasive procedures, including personal care services (e.g., ear/body piercing, tattooing).
- All pregnant women should be routinely tested for HBsAg at the first prenatal visit and repeat testing before delivery may be considered in uninfected and unimmunized women with continuing high-risk behavior to prevent the transmission of HBV to newborns [11].
  - In the case where a prenatal woman has not been screened, screening is recommended to occur as soon as possible, even if delivery has occurred.
    - The mother's lifestyle risks may be taken into consideration when assessing
    - When results can be obtained within 12 hours, the first dose of hepatitis B vaccine should be given, with the decision to give HBIG awaiting results.
    - When results will not be available within 12 hours, the first dose of vaccine should be given and administration of HBIG should be considered, taking into account the presence or absence of maternal risk factors for infection.
    - When hepatitis B vaccine is initiated the series should be completed regardless of maternal status.
- Universal immunization program for:
  - grade five students, and
  - persons born on or after January 1, 1981 who were eligible in a school program.

- Pre-exposure vaccine should be offered to the following groups as per the current Alberta Immunization Manual.
  - Healthcare and emergency service workers, and others with an occupational risk of exposure.
  - Others at increased risk including:
    - residents and staff of institutions for the developmentally disabled,
    - MSM especially those who practice unsafe sex,
    - heterosexual males and females with multiple sexual partners, or with a recent history of a sexually transmitted disease,
    - hemophiliacs and others receiving repeated infusions of blood or blood products,
    - hemodialysis patients,
    - inmates of long term correctional facilities,
    - populations or communities in which HBV is highly endemic,
    - children less than seven years of age whose families have immigrated to Canada from areas where there is a high prevalence of hepatitis B,
    - children in child care settings in which there is a known HBV infected child, and
    - persons with hepatitis C or other chronic liver disease.
- Post Immunization Serology [4]: Post immunization testing is recommended if it is important to ensure protection against a continual known or repeated potential exposure to HBV. This includes:
  - infants born to chronically infected mothers,
  - sexual partners and household contacts of chronic carriers, and
  - those who have been immunized because of occupational exposure).
  - HCW and students in healthcare disciplines,
    - Ideally, this testing should be done at least one month but no later than six months after the last dose of vaccine.
  - individuals who are immuno-compromised should be tested after vaccine series.
    - If antibody protection is not present the series should be repeated.
    - If antibody still not present the person should be counseled on the need for passive immunization after potential exposure to HBV.
  - Travellers to hepatitis B endemic countries should be advised to confirm their need for vaccine with the appropriate clinic before travelling and receiving the vaccine.
    - AHW does not fund hepatitis B vaccine for travellers.
  - Healthcare Workers
    - In any situation in which a worker is uncertain about the potential transmission risks or proper practices to minimize the risk to clients, he or she should consult with an employee health/infection control practitioner/patient safety group responsible for the quality of care for the clients [12].
    - To assess the risk of HBV transmission from HCWs (medical, dental, etc.) to persons receiving care, the "Alberta Expert Review Panel for Blood Borne Infections in Health Care Workers" will provide assessment services [13].
      - The panel will provide an evaluation for HCWs and their licensing authorities)

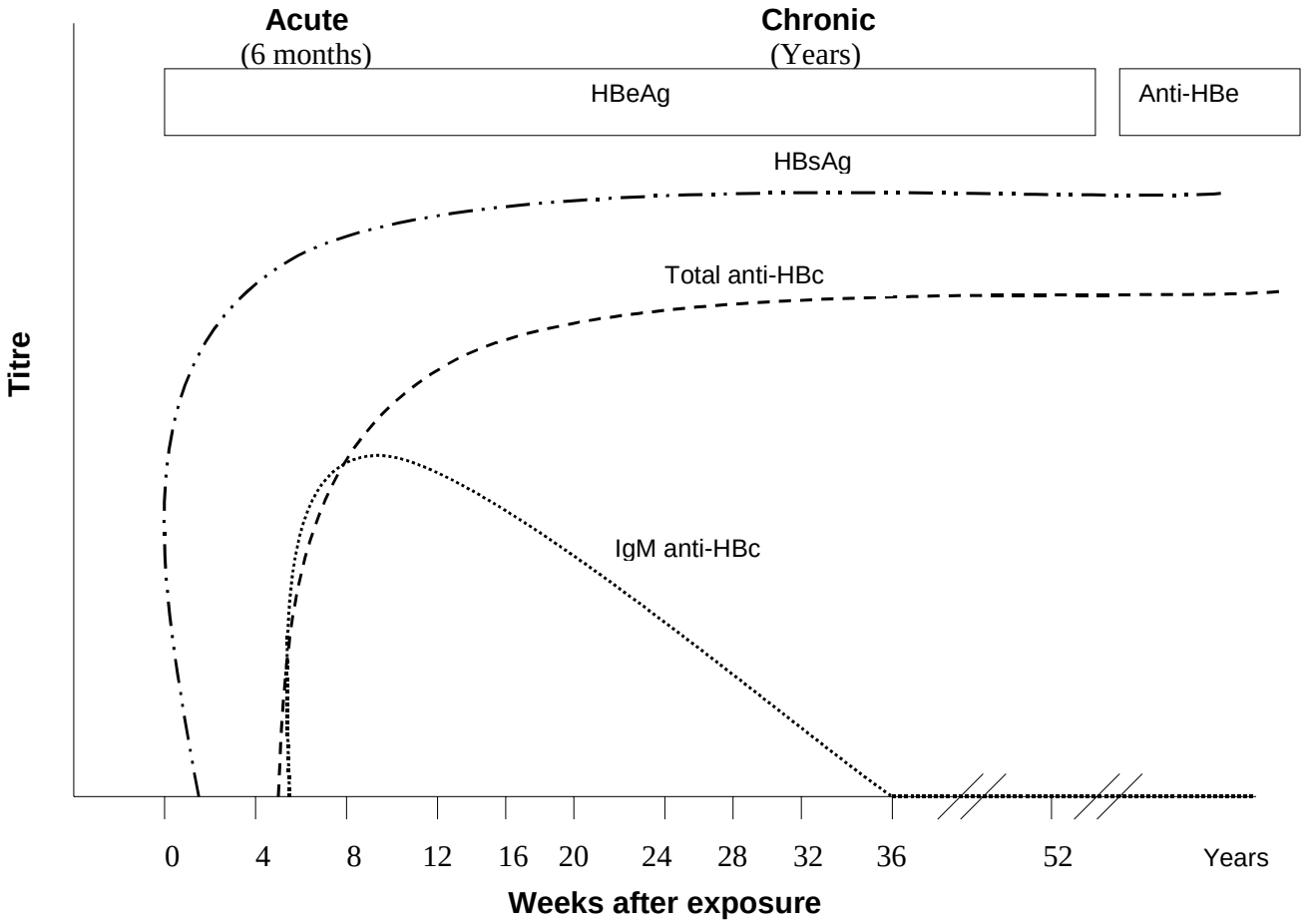
with BBPs who carry out exposure-prone procedures and counsel then on an individual and confidential basis concerning continued or modified professional practice and possible therapy that may alter infectivity.

- ∇ The panel will consider not only the health status of the HCW but also other fact including the specific services provided, adherence to infection control practice, and the HCWs skill and judgment.
- ∇ Location and type of practice may warrant consideration.

****Post-exposure Prophylaxis and Follow-up for Infants of Carrier Mothers/Caregivers**

Prophylaxis	Indication
HBIG	• The dose for newborns is 0.5 ml intramuscularly. • Ideally it should be given within 12 hours of birth, with efficacy decreasing significantly after 48 hours.
Hepatitis B vaccine	• Dose is 0.5 ml intramuscularly and should be given at the same time as HBIG, but in different sites. • Second and third doses given as per the current Alberta Immunization Manual. • Newborns born to hepatitis B infected mothers who weigh less than 2000 grams at birth should receive prophylaxis in the same way as other newborns, except that an additional dose of vaccine should be given two months after the third dose.
Follow-up	• Infants born to HBsAg positive mothers should be screened for antibody to hepatitis B surface antigen (anti-HBsAg). • As well, screen for hepatitis B surface antigen within one year of birth and following series of hepatitis B vaccine.

Characteristics of progression to chronic HBV infection



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