HEPATITIS B

Based on the MoH Communicable Diseases Manual 2012[1]

Associated Documents

Case Report Form:
K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Hepatitis B\FormsStdLttrs Quest\CRF_Hep B, C, NOS.pdf

Fact sheets:
English:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBfactSheet.pdf

Maori:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBFactSheetMaori.pdf

English and Maori (Ministry of Health)
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBEnglishMaoriMED0079.pdf

Tokelau:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepB_Won't_Get_Me_Tokelauan.pdf

Tonga:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepB_Won't_Get_Me_Tongan.pdf

Vietnamese:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepB_Won't_Get_Me_Vietnamese.pdf

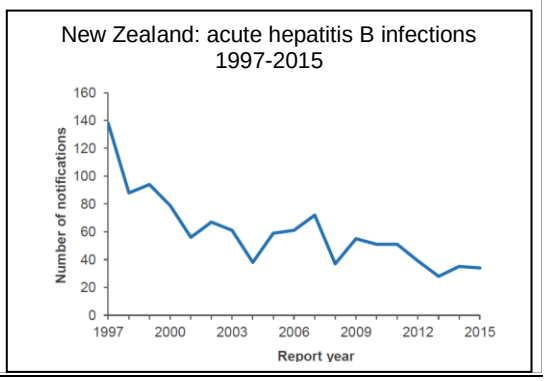
Hepatitis B Carrier fact sheet (Ministry of Health):
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBCarrier.pdf

The Illness

Hepatitis B is a viral disease spread though contact with blood and body fluids that ranges in severity from inapparent infections to fulminating liver failure and death. The virus infects liver cells, which then release large amounts of HBsAg, which is always present in the blood of people with active infection. The hepatitis B virus (HBV) has three antigens: surface antigen (HBsAg), core antigen (HBcAg) and a soluble ('e' for early) antigen (HBeAg) that is released from liver cells with active HBV infection.

Almost all people who acquire infection after early childhood will eradicate the infection within months:

- 80% have symptoms of jaundice, anorexia, nausea and malaise
- 20% of adults with acute infection are asymptomatic
- 1% develop acute liver failure
- >90% of infants who acquire infection perinatally become chronic carriers which may lead to cirrhosis, and hepatocellular carcinoma.



Epidemiology in New Zealand
Before the introduction of HBV immunisation in New Zealand, HBV

transmission was common among preschool and school-aged children. The exact mode of transmission is uncertain but is thought to be related to close contact. In the eastern Bay of Plenty region almost half of the population had been infected by age 15 years.7, 8 Even after the introduction of universal hepatitis B vaccine in 1988 (see Appendix 1), there were regions in New Zealand where children were still at risk of HBV infection due to poor immunisation coverage rates.[2]

Risk factors for acute hepatitis B in New Zealand include overseas travel, sexual contact and household contact with a chronic carrier. An estimated 1–2 percent of the New Zealand population are carriers of hepatitis B (the chronic hepatitis B carrier status is currently not notifiable.) There has been a downward trend in the rate of acute hepatitis B notifications over the last 20 years in New Zealand from 6.9 per 100,000 in 1987 to 1.2 per 100,000 in 2010, associated with a screening programme for pregnant women, vaccination of at risk neonates and the inclusion of the vaccine in the national immunisation schedule. In New Zealand, most cases of acute hepatitis B in Europeans reflect true adult-acquired infection, whilst most cases in Maori, Pacific and Asians reflect acute-on-chronic hepatitis B.

CASE DEFINITION

Clinical description

The clinical manifestations of acute hepatitis B infection in adults range in severity from minimal symptoms to fulminant hepatitis (in less than 1 percent of cases).
Adults: An illness with variable symptoms including fever, malaise, abdominal discomfort and anorexia with jaundice and/or elevated serum aminotransferase levels.
Infants: In first few months of life hepatitis B seldom causes clinical disease.
Children: Symptoms or signs are less common than in adults.

Incubation period: 6 weeks to 6 months, commonly 60–90 days (rarely 6-9 months).

Mode of transmission: Many body tissues and substances (such as blood, semen and vaginal fluids) are capable of transmitting hepatitis B, via percutaneous (intravenous, intramuscular, subcutaneous or through broken skin) or permucosal exposure. This includes transmission through sexual contact, body piercing and tattooing. Blood has the highest concentration of HBV particles and saliva the lowest. HBV in desiccated blood remains infective for at least one week. Perinatal mother-to-infant transmission and transmission through occupational exposure to infected blood is now uncommon in New Zealand.

Period of communicability: The case is potentially infectious 2–3 weeks before the onset of symptoms, during the clinical disease and usually for 2–3 months after acute infection, or as long as HBsAg continues to be present in blood. If a person continues to have HBsAg present
in their blood, they are a carrier (defined as having two positive HBsAg tests taken at least 6 months apart). Carriers of hepatitis B continue to be infectious. Those who are both HBsAg and HBeAg positive have the highest infectivity (ie, an actively replicating virus). The carrier state may follow asymptomatic infection and is most common after perinatal infection, infection in infancy or in those with immunodeficiency.

Prevention: Hepatitis B is prevented by the following measures: vaccination and screening programmes, safe handling of body fluids, safe sex practices, use of sterile equipment for injections, skin piercing, cutting etc., management of cases and contacts to prevent spread, occupational policies in the health sector to avoid transmission and education especially of the at risk group.

Notification Procedure

Only **acute** hepatitis B is notifiable.

The **chronic** carrier state is **not** notifiable (a chronic carrier is defined as having two positive HBsAg tests taken at least 6 months apart). The only way to distinguish **acute** HBV infection from **acute-on chronic** hepatitis B is through previous documentation of HBV infection. For management see Hepatitis B Carriers section.

Case classification

- **Under investigation:** A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Probable:** A clinically compatible illness with a positive HBsAg (over 12 months of age).
- **Confirmed:** A clinically compatible illness that is laboratory confirmed (see laboratory criteria below, including positive HBsAg in infants less than 12 months of age).

- **Not a case:** A case that has been investigated and subsequently found not to meet the case definition.

Laboratory Testing

Laboratory confirmation requires at least one of the following:

- HBsAg positive in an infant aged under 12 months
- Change from HBsAg negative to HBsAg positive within a 12-month period (requires the cumulative history to be available from the laboratory)
- Anti-HBcore IgM reactive (unless HBsAg positive more than 6 months ago and this history is available from the laboratory)
- Detection of hepatitis B virus (HBV) nucleic acid.

Diagnostic serology tests

HbsAg, HbcAg, anti-HBc IgM, anti-HBc IgG, anti-HBs, anti-HBe.

Other tests

- HBeAg - an indication of high infectivity
- DNA viral load - request this test if there has been a possible false negative HBeAg
- Liver function - elevated serum aminotransferase levels indicate inflammation of the liver.
- Testing for hepatitis D is indicated in clinically severe cases of suspected hepatitis B[3]

Interpretation Of Serology Results

Table 1. Summary of the interpretation of hepatitis B virus serology.[4]

TESTS	RESULTS	INTERPRETATION
HBsAg	negative	susceptible
anti-HBc	negative	
anti-HBs	negative	
HBsAg	negative	immune due to infection
anti-HBc	positive	
anti-HBs	positive	
HBsAg	negative	immune due to hepatitis B vaccination
anti-HBc	negative	

anti-HBs	positive	
HBsAg	positive	acutely infected
anti-HBc	positive	
IgM anti-HBc	positive	
anti-HBs	negative	
HBsAg	positive	chronic carrier
anti-HBc	positive	
IgM anti-HBc	negative	
anti-HBs	negative	
HBsAg	negative	four interpretations possible (see below)* but vaccination still required because interpretation 2 is possible, or if an infant, maternal antibody may be present.
anti-HBc	positive	
anti-HBs	negative	

* 1. Resolved infection (most common), 2. False positive anti-HBc thus susceptible, 3. "Low level" chronic infection, 4. Resolving acute infection.

Management of Case

In **South Canterbury** and **West Coast**, the Public Health Nurses follow up these notifications.

Investigation

Obtain a history of possible risk factors in the past 6 months including:

- overseas travel
- body piercing (including needles, acupuncture or tattooing)
- sharing razor blades
- infectious sexual contact (heterosexual or homosexual)
- household contact
- being bitten by someone
- sharing of drug-injecting equipment
- occupational exposure (including needle stick injury)
- occupational exposure to blood or blood products
- working in high-risk occupational settings such as laboratory, mortuary, ambulance or police work or employment in facilities for the mentally disabled
- residence in a facility for the mentally disabled
- accidental exposure of eyes, mucous membranes or a wound to the blood of another person
- any medical procedure, transfusion of blood or blood products, or dialysis
- any dental procedure
- any record of incarceration.

If the case is an infant:

- check the hepatitis B status of the mother.

{*Breast feeding does not appear to be a significant route of transmission. Faecal-oral and vector-borne modes of transmission have not been demonstrated.}*

Also:

◊ Coversheet and action within one working day
◊ Complete Case Report Form. Fax or phone notifying doctor/nurse for this
◊ Obtain a history of vaccination
◊ Ensure full hepatitis B serological testing of the case (including HBeAg and anti-HBe to determine level of infectivity) and consider testing for other blood-borne virus infections. Ask the laboratory to fax through results.
◊ For interpretation of results refer to Table 1 and discuss with the MOH if necessary

◊ Advise the case and primary health care doctor to repeat HBsAg testing after 6 months to identify the chronic carrier status
◊ Although chronic carriers are not notifiable, consider referral back to the primary health care doctor regarding follow-up for case care, and testing and immunisation of contacts. See **Other Control Measures**, **Hepatitis B carriers** below.
  – If a carrier, write 'Not A Case' on coversheet and file. For the management of contacts of chronic carriers see **Management of Contacts, Investigation**
◊ Only acute cases are entered on Episurv

Restriction

- Cases acutely infected with hepatitis B must not donate blood. Donors contracting acute hepatitis B may be acceptable 1 year after the acute episode providing there was clearance of HBsAg within 6 months and the New Zealand Blood Service medical officer has given medical clearance. Employers must assess infected health care workers to determine whether any work restrictions are indicated (for example, regarding exposure-prone procedures and adoption of universal precautions). Follow local (institutional or professional) protocols for high-risk occupations (e.g., dentistry, surgery) including workers in the sex industry (e.g. Prostitutes Collective procedure)
  - Standard precautions (http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Infection-Prevention-Control-Manual/Documents/Standard%20 Precautions.pdf) against exchange of body fluids until HBsAg negative
  - In almost all other cases there are no restrictions on work, attendance at early childhood service or school or other community activities.

Treatment

Antivirals are used in fulminant disease otherwise there is currently no specific treatment for acute hepatitis B other than supportive treatment.

Counselling

- Advise the case and their caregivers of the nature of the infection and its mode of transmission. For example, advise the case to:
  – not share drug-injecting equipment, razors or toothbrushes
  – use safer sex practices
  – avoid exposing others to their blood or other body fluids (including not donating blood or semen or registering as an organ donor)
  – cover cuts and sores with dressings
  – inform health care workers (including dentists) of their infectious status
- Avoid hepatotoxic agents including alcohol and recreational drugs
- Consider vaccination for HAV for those non-immune
- Chronic carriers need ongoing advice on follow-up care from GP (or ask GP to refer to the Hepatitis A Foundation of NZ) and precautions against transmission
- Post standard letter and Hepatitis B pamphlet to case.
- Fact sheets are available:

Fact sheets:
English:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBfactSheet.pdf

Maori:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBFactSheetMaori.pdf

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Hepatitis B Carrier fact sheet (Ministry of Health):
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBCarrier.pdf

Management of Contacts

For management of contacts of **chronic** hepatitis B see Hepatitis B Carriers section.

Whenever immediate protection is required for contacts (see Definition below and Table 2), a combination of vaccine and HBV immunoglobulin (HBIG) should be administered (at different sites). HBIG does not interfere with the response to vaccine. For a summary of the management of contacts see Table 2.

Definition
Contacts include all household members and people who have had unprotected relevant contact (for example, perinatal, sexual or percutaneous, including sharing drug injecting equipment or sharps injury, or mucosal exposure) with a case in the 3 weeks before onset of illness or during the subsequent period of communicability.

Investigation

- All contacts require serological testing for hepatitis B markers.
- In conjunction with the case, C&PH identify contacts and arrange for them to have serology and referral to a GP for immunoglobulin and vaccination if appropriate (see Table 2). Results of the serology should be sent to both C&PH and the contact's primary health care doctor. If it seems more appropriate for testing and subsequent management to be done by the GP, contact him/her and arrange.

- For details regarding obtaining immunoglobulin and administration refer GP to HealthPathways>immunoglobulin>administration.

Table 2

Management of contacts of hepatitis B cases - summary

Contact	Serological testing of contact (HbsAg, anti-HBs, anti-HBc IgM and IgG)	Immunoglobulin (if can be given within 7 days of onset of case's symptoms)	Immunisation*
Any sexual contact including protected sex	Yes	Yes, immediately after blood taken	Yes, immediately after blood taken
Household, mucosal or percutaneous	Yes	Yes, if serology negative	Yes, if serology negative
Other	Yes	No	Yes, if serology negative

* Hepatitis B vaccine is funded for children aged less than 16 years, and household and sexual contacts of hepatitis B cases and carriers[2]

Interpretation of results of serology (see Table 1 above)

1. If HBsAg negative + anti-HBs negative + anti-HBc negative, the contact is susceptible and vaccination is required.
2. If HBsAg negative + anti-HBs negative + anti-HBc positive, the contact may still be susceptible and vaccination is required because the results may indicate (amongst other possibilities) a false positive anti-HBc or, if an infant, maternal antibody.

3. If the contact is HBsAg positive, ensure their primary health care doctor is aware of this and that follow-up is arranged.
Any difficulties with interpreting serological results for cases and contacts should be discussed with the MOH and an infectious diseases physician or the laboratory if necessary.

Restriction
As for a case, at least until results of initial (and any necessary follow-up) blood tests are known.

PROPHYLAXIS (post exposure)
See Table 2 above
No post-exposure prophylaxis is required for the following contacts. Those who have:

1. had previous hepatitis B infection (is immune or chronically infected see **Hepatitis B Carriers** below in **Other Control Measures**)
2. protective level of antibodies from hepatitis B vaccination currently or at any time in the past, i.e., serum levels of anti-HBs ≥ 100 mIU/mL (Canterbury Health Labs. Feb 2014)

[*See the Immunisation Handbook 2014, Hepatitis B, for more information on testing post-vaccination, the management details of household and sexual contacts, those who are accidently inoculated, those who are exposed to blood from a case or perinatal exposure, as well as immunisation programmes and screening in pregnancy.]*

Immunoglobulin for contacts of hepatitis B cases
HBIG is given at the same time as the vaccine but at a different site. Table 3 sets out the required dose by age group.

Table 3

HBV immunoglobulin doses for contacts of hepatitis B cases, by age group	
Age	**HBIG dose (IU)**
Neonates under one month	100
1 month-4 years	200
5-9 years	300
10 years and over	400

HBIG is available from the New Zealand Blood Service. For details regarding access and administration refer to Community HealthPathways>Immunoglobulin> Immunoglobulin administration. For details of hepatitis B immunisation schedules for newborn infants of carrier mothers, and also for catch-up doses, see the *Immunisation Handbook*, [http://immunisation.book.health.govt.nz/].

Counselling
- Contacts should be advised of the nature of the infection and its mode of transmission and to seek medical attention if symptoms develop.
- Fact sheets are available:

English:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBfactSheet.pdf

Maori:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBFactSheetMaori.pdf

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Other Control Measures

⇒ **Needle-stick injury**

- Refer to the following sections in the Immunisation Handbook: 'Needle-stick injury' (see Index), and Management of Blood and Body Fluid Exposures (Hepatitis B chapter)[2], for details and consult with either an Infectious Disease physician or Clinical Microbiologist.

⇒ **Identification of source**

- Investigate potential relation to body piercing and/or tattooing or health care events.
- If the case could be transfusion-related, contact the NZ Blood Service.

⇒ **Disinfection**

(Hepatitis B virus is stable on environmental surfaces for at least 7 days.)

- Clean equipment and surfaces potentially contaminated with blood or body fluids. See Appendix 1: Disinfection[5] [http://www.health.govt.nz/system/files/documents/publications/cd-manual-appendices-may2012.pdf]

Health Education

- General education: Advise on risks of blood-borne viruses
- Immunisation: Encourage immunisation of all children
- Antenatal Screening: All women should be screened antenatally for the hepatitis B carrier state. Babies born to carrier mothers require HBIG and hepatitis B vaccine within 12 hours of birth. *[See the NZ Immunisation Handbook, Hepatitis B chapter for details.[2]]*

Hepatitis B Carriers

- Hepatitis B carriage is not notifiable
- Carriers should be provided with appropriate information on how to protect others and how to look after themselves. (see Management of Contacts, Counselling above)
- Consider referral via GP to the Hepatitis Foundation of NZ. [http://www.hepatitisfoundation.org.nz/>For Health Professionals>Refer to the Foundation]. The Foundation provides regular hepatitis serology and liver function testing, enabling timely referral in cases of early evidence of liver disease and/or cancer.

Contacts of hepatitis B carriers carriers

	⇒ **Immunoglobulin** ○ HBIG can be considered for susceptible household, sexual, percutaneous and mucosal contacts, particularly if: – the exposure is of recent limited duration – the exposure is highly significant (for example, exposure to a significant volume of infected blood) – the source case is HBeAg positive – the source case has high serum levels of HBV DNA (do not wait for this result, it may take 10 days) – the sexual contact was non-consensual.
	⇒ **Vaccination** ○ Indications for (the funded) hepatitis B vaccination for contacts of carriers are the same as for contacts of acute hepatitis B cases. **Counselling** • A fact sheet is available: – Hepatitis B carrier fact sheet (Ministry of Health): K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HepatitisBCarrier. pdf
Reporting	
	• Enter case details on EpiSurv • If an outbreak/cluster report in EpiSurv. • If an outbreak, inform the MoH Communicable Diseases Team and outbreak liaison staff at ESR, complete the Outbreak Report Form and write a report for the Outbreak Report File] • File.

References And Further Information

1. Ministry of Health, Hepatitis B. Communicable Disease Manual 2012, Wellington: Ministry of Health http://www.health.govt.nz/system/files/documents/publications/cd-manual-hepatitis-b-may2012.pdf
2. Ministry of Health. 2014. Immunisation Handbook 2014. December 2017 3rd edition. Wellington: Ministry of Health. http://immunisation.book.health.govt.nz/]
3. Ministry of Health, Laboratory testing, Hepatitis NOS. Communicable Disease Manual 2012, Wellington: Ministry of Health
4. Interpretation of Hepatitis B, Serologic Test Results (CDC, Atlanta), https://www.cdc.gov/hepatitis/hbv/pdfs/serologicchartv8.pdf, Accessed 3/2/2017
5. Ministry of Health, Appendices. Communicable Disease Manual 2012, Wellington: Ministry of Health http://www.health.govt.nz/ system/files/documents/publications/cd-manual-appendices-may2012.pdf