

09

Hepatitis B

Vaccine introduced to primary schedule 2008

NOTIFIABLE

In some circumstances, advice in these guidelines may differ from that in the Summary of Product Characteristics of the vaccines. When this occurs, the recommendations in these guidelines, which are based on current expert advice from NIAC, should be followed.

Hepatitis B
August 2015

Introduction

Hepatitis B virus (HBV) is a DNA virus and an important cause of serious liver disease including acute and chronic hepatitis, cirrhosis and primary hepatocellular carcinoma. People with chronic HBV infection can transmit the infection for many years. Under selective pressure from the host immune response and/or antiviral therapy, viruses with mutations (viral mutants) can emerge as the dominant viral population. A safe and effective vaccine is available for the prevention of HBV infection.

Epidemiology

It is estimated that there are at least 350 million chronically infected cases of HBV worldwide. (see Figure 9.1).

In high-prevalence areas ($\geq 8\%$ of the population hepatitis B surface antigen (HBsAg) positive), up to 20% of the population may be chronically infected. High prevalence is found in areas of sub-Saharan Africa, South-East Asia, the Eastern Mediterranean countries, South and Western Pacific Islands, the interior of the Amazon basin and the Caribbean.

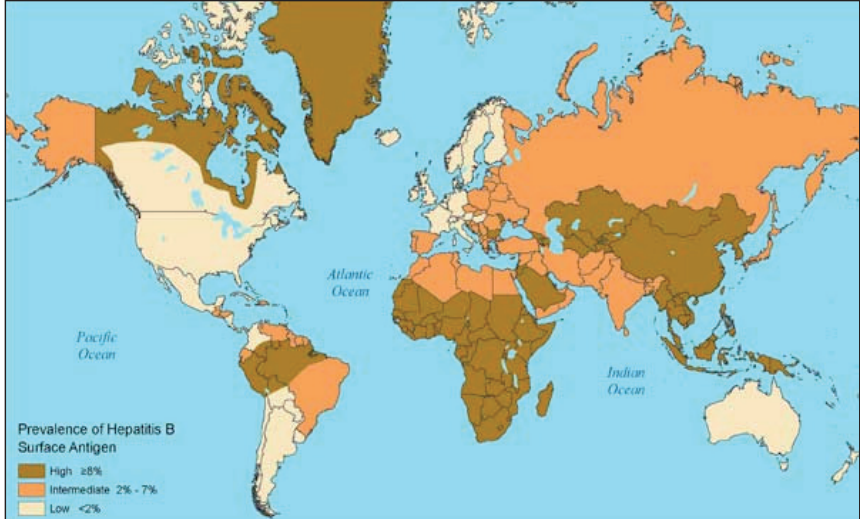
Chronic hepatitis is moderately prevalent (2-7% of the population HBsAg-positive) in South-Central and South-West Asia, Eastern and Southern Europe, the Russian Federation and most of central and South America.

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In Australia, New Zealand, Northern and Western Europe, and North America, the prevalence of chronic HBV infection is low (<2% of the population HBsAg-positive).

Figure 9.1 Geographic distribution of hepatitis B prevalence.

Source: CDC



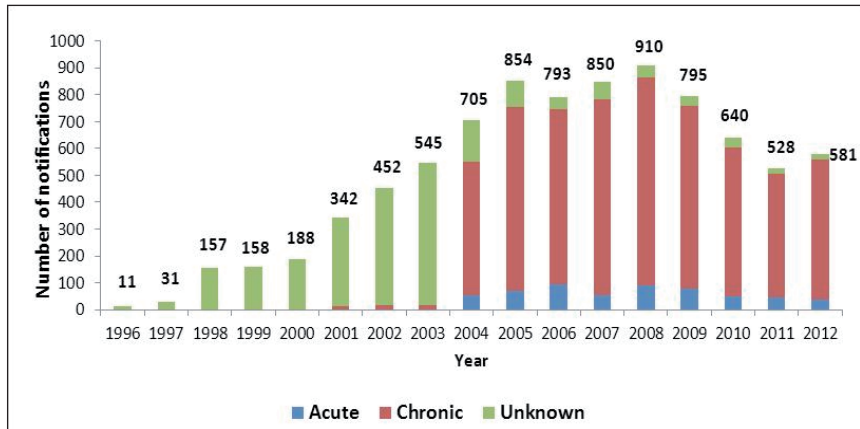
The prevalence of HBV in Ireland is low (anti-HBc 1.7%, HBsAg 0.1% in 2003). The prevalence of HBsAg in first time blood donors tested between 1997 and 2010 was 0.012%. The prevalence of HBsAg in pregnant women is estimated to be <0.5%.

HBV is more prevalent in certain subgroups of the Irish population (prisoners, IV drug users, homeless persons, asylum seekers).

Figure 9.2 shows the number of cases of hepatitis B notified annually in Ireland since 1996. There was a dramatic increase in notifications between 1997 and 2008, from 31 to 910 cases, mostly attributed to immigration to Ireland from HBV endemic countries. The decline in immigration in recent years has contributed to the significant decrease to 581 cases notified in 2012. From 2004-2012, less than 10% of cases were acute (most of whom were born in Ireland and acquired the infection sexually), with most notified cases being chronically infected.

Figure 9.2 Number of cases of hepatitis B notified by acute/chronic status, 1996 to 2012

Source: HPSC



Most of the notified cases from 2004-2012 were aged 20-44 years (Figures 9.3 and 9.4).

Figure 9.3 Age and sex specific rates for acute hepatitis B 2004 -2012

Source: HPSC

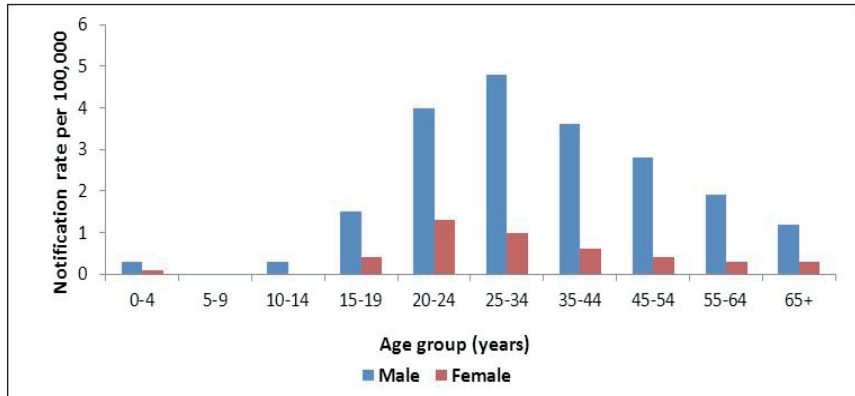
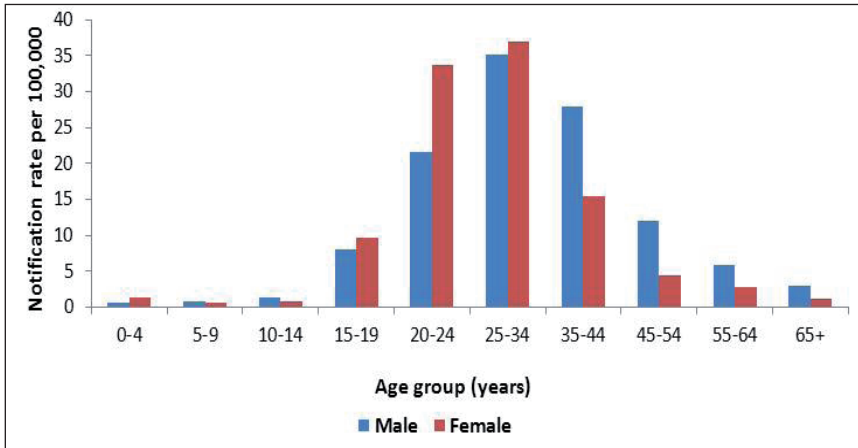


Figure 9.4: Age and sex specific rates for chronic hepatitis B 2004 – 2012

Source HPSC



Transmission

HBV has been found in virtually all body secretions and excretions. However, only blood (and serum-derived fluids), saliva, semen and vaginal fluids have been shown to be infectious. People with chronic HBV infection are the primary reservoirs of infection and can be highly infectious. The detection of Hepatitis B e antigen (HBeAg) indicates significant viral replication. However, high viral loads can occur in those individuals who are HBeAg negative but are infected with mutant HBV.

HBV can survive in the environment for 1 week or longer.

Transmission mainly occurs by:

1. Sexual contact, including vaginal and anal intercourse. The risk of transmission is increased in the presence of other sexually transmitted infections.
2. Percutaneous exposures e.g. sharing equipment used by injecting drug users (IDUs), haemodialysis, non-sterile glucometer equipment, sharing personal care items such as toothbrushes and razors, needlestick injuries, ear-piercing and tattooing.
3. Perinatal transmission. The risk of an infant acquiring HBV perinatally from an infected mother is 70-90% when the mother has a high hepatitis B viral load as evidenced by the presence of HBsAg and HBeAg. The risk

reduces to 5-20% when the viral load is low, when the mother is HBsAg positive but HBeAg negative. However, high viral loads can occur in those who are HBeAg negative but are infected with mutant HBV. Perinatal transmission usually occurs from blood exposure during labour and delivery. *In utero* transmission of HBV causes less than 2% of perinatal infections in most studies.

4. Close household contact with an HBV infected individual. In household settings, non-sexual transmission may occur. The precise mechanisms of transmission are unknown but may be due to contact of non-intact skin or mucous membranes with blood- containing secretions or saliva.
5. Transfusion of HBV contaminated blood or blood products is rare because of screening of blood donations and viral inactivation of certain blood products.
6. Transmission by bite injuries from an HBV infected individual is extremely rare.

Patterns of transmission vary according to the prevalence in a particular country. In areas of high prevalence, infection is predominantly acquired by perinatal transmission, or by horizontal transmission among children younger than 5 years.

In low-endemicity countries, the majority of infections are acquired by sexual transmission or sharing blood-contaminated needles. In areas of intermediate endemicity, the pattern of perinatal, childhood and adult infection is mixed and nosocomial infection may be important.

Effects of Hepatitis B

The incubation period generally ranges from 45 to 180 days, with an average of 60-90 days, but is dependent upon the mode of transmission and the HBV viral load of the infecting material. Clinical manifestations depend on the patient's age at infection. In general, the frequency of clinical disease increases with age, whereas the percentage progressing to chronic infection decreases.

Most acute infections are sub-clinical or present with an influenza like illness. In patients with clinical illness, the onset is usually insidious, with tiredness, anorexia, vague abdominal discomfort, nausea and vomiting, and sometimes arthralgia and rash. Jaundice occurs in approximately 10% of young children

and in 30-50% of adults. Acute HBV infection may occasionally lead to fulminating fatal hepatic necrosis.

Chronic infection, defined as the presence of HBsAg in the serum for at least 6 months, occurs in more than 90% of those infected perinatally, but this decreases to 20-50% in children infected between 1 and 5 years of age. Between 2-10% of infected immunocompetent adults become chronically infected. The risk of chronic infection is greater for immunocompromised individuals.

Approximately 20-25% of those with chronic HBV infection develop progressive liver disease leading to fibrosis, cirrhosis and decompensated liver disease, and are at increased risk of developing hepatocellular carcinoma. Globally, HBV causes 60-80% of primary liver cancers.

Hepatitis B vaccine

Hepatitis B vaccines contain recombinant HBsAg derived from yeast cells, which is adsorbed onto aluminium hydroxide or monophosphoryl lipid A adjuvant. Hepatitis B vaccines do not contain live organisms and therefore cannot cause HBV infection. The vaccine is 80 to 100% effective in preventing infection or clinical hepatitis in those who receive a complete course of vaccine.

Up to 15% of adults have a poor or no response to 3 doses of vaccine. Poor response is associated with age over 40 years, male gender, obesity and smoking. Lower seroconversion rates have been reported in alcoholics, particularly those with advanced liver disease. Patients who are immunosuppressed or have chronic renal failure may respond less well and may require larger or extra doses of hepatitis B vaccine (see below).

Between 90%-100% of vaccinated persons who develop anti-HBs concentrations ≥ 10 mIU/ml after a primary series are protected from significant HBV infection for at least 20 years and probably longer.

An up-to-date list of licensed vaccines can be accessed on the HPRA website www.hpra.ie

A list of the vaccines currently available from the National Cold Chain Service can be found at www.immunisation.ie

Hepatitis B containing vaccines must be kept refrigerated at +2 to +8°C, and protected from light. If a vaccine has been frozen it should not be used.

Dose and route of administration

The dose is 0.5 ml or 1ml by intramuscular injection into the anterolateral thigh or deltoid region.

Currently licensed vaccines contain different concentrations of antigen. The recommended dosage should be adhered to (see SmPCs). Specific vaccines are authorised for use in adult patients with chronic renal failure and may be considered for other immunosuppressed adults.

A combined vaccine containing Hepatitis A and Hepatitis B vaccines (Twinrix or Ambirix) may be used when protection against both HAV and HBV is required

Schedules

a) Primary vaccination

The primary course consists of 3 injections given at 2, 4 and 6 months of age as part of the 6 in 1 vaccine.

b) Vaccination of children and adults: (See Table 9.1)

Three doses of vaccine at 0, 1 month and 6 months.

The schedule for one of the higher dose vaccines (Fendrix) consists of four doses at 0, 1, 2 and 6 months.

Accelerated schedules (e.g. 0, 1 and 2 months; 0, 7 and 21 days) may be followed if rapid or very rapid protection is required for those at immediate risk or when compliance with the basic schedule is difficult to achieve. **These 3 doses should be followed by a dose of vaccine at 12 months to complete the course.**

Generally a hepatitis B vaccination course requires 3 or 4 vaccine doses. However two doses of Ambirix or adult strength Engerix B, given at 0 and 6 to 12 months, are acceptable in those aged 1-15 and 11-15, respectively. The two dose schedule should only be used when there is a low risk of HBV infection, and when compliance with the complete vaccination course can be assured.

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Table 9.1 Dose and schedule of Hepatitis B vaccines by age (not including the childhood 6 in 1 vaccine)

Hepatitis B				
		Dose	Volume	Schedules (months unless stated)
Age 16 and older	Engerix B	20µg	1ml	0,1,6 0,1,2,12 ¹ 0,7,21 DAYS ² + 12 months
	HBVAXPRO 10	10µg	1ml	0,1,6 0,1,2,12 ¹
	HBVAXPRO40 (adult dialysis and pre-dialysis)	40µg	1ml	0,1,6
Age 15 years and older	Fendrix (renal insufficiency) (NOT INTERCHANGEABLE)	20µg	0.5ml	0,1,2,6
Age 0-15 years	Engerix B paediatric	10µg	0.5ml	0,1,6 0,1,2,12 ¹
	Engerix B	20µg	1ml	0, 6 ³ (age 11- 15 years)
	HBVAXPRO 5	5 µg	0.5ml	0,1,6 0,1,2,12 ¹
Hepatitis A and B				
		Dose HAV/HBV	Volume	Schedule (months)
Age 16 years and older	Twinrix	720IU/ 20µg	1ml	0,1,6 0,7,21 DAYS ² + 12 months
Age 1-15 years	Twinrix	360IU/10µg	0.5ml	0,1,6
	Ambirix	720IU/ 20µg	1ml	0, 6-12 ³

¹when rapid protection is required

²when very rapid protection is required

³to be used only when there is a low risk of hepatitis B infection and when completion of the two-dose vaccination course can be assured

Vaccine interchangeability

In general different hepatitis B vaccine products can be used to complete a primary immunisation course or as a booster dose. However Fendrix is NOT interchangeable with any other hepatitis B vaccine.

Indications

A targeted immunisation programme for individuals at increased risk of HBV because of their occupation, lifestyle or other factors (e.g. close contact with a case or carrier) was introduced in 1988 and in 2008, universal hepatitis B vaccination was introduced in Ireland as part of the primary vaccination programme.

Ideally, immunisation should be carried out before the risk of exposure to HBV (pre-exposure prophylaxis) but may follow exposure (post-exposure prophylaxis).

PRE-EXPOSURE PROPHYLAXIS

Pre-exposure immunisation with hepatitis B vaccine is the most effective means of preventing HBV transmission. Non-responders at risk of HBV exposure need to report promptly any inoculation injury, as passive prophylaxis with specific immunoglobulin may be required.

1. Primary immunisation

Three doses given at 2, 4 and 6 months as part of a 6 in 1 vaccine (DTaP/IPV/Hib/Hep B).

Children born on or after 1/7/2008 should have received a full course of hepatitis B vaccine as part of their primary immunisation schedule.

2. At risk groups

The following groups are at increased risk of HBV infection and should receive hepatitis B vaccine if non-immune:

a) Persons with occupational risk of exposure to blood or blood-contaminated environments

Doctors, nurses, dentists, midwives, laboratory staff, mortuary technicians, ambulance personnel, cleaning staff, porters, medical, nursing and dental students, other health-care professionals.

Staff and carers in centres for those with learning disability (including day-care facilities, special schools and other centres).

Prison staff in regular contact with prisoners.

Security and emergency services personnel

- Members of security and rescue services
- Members of An Garda Síochána
- Members of the fire service
- Members of the armed forces
- Employees of security companies.

Any other workers who may be exposed to blood injuries.

b) Family and household contacts

Infants born to mothers with acute or chronic HBV infection (*see also Post-exposure prophylaxis below*).

The spouses, sexual partners, family and household contacts of acute cases and individuals with chronic infection. Where testing for markers of current or past infection is clinically indicated, this should be done at the same time as the administration of the first dose. Vaccination should not be delayed while waiting for results of the tests. Further doses may not be required in those with clear evidence of past exposure.

c) Adoption/fostering

Vaccination is recommended for families adopting children from countries with a high or intermediate prevalence of HBV. These children should be tested for evidence of current or past HBV infection.

All short-term foster carers and their families who receive emergency placements should be offered hepatitis B vaccination. Permanent foster carers and their families, who accept a child known to be at high risk of HBV, should also be offered immunisation.

Note: Hepatitis A vaccination may also be required (see Chapter 8).

d) Injecting drug users (IDUs) and their contacts

All IDUs.

Household contacts, children and sexual partners of IDUs.

Those at risk of progressing to injecting drug use (including those who are currently smoking heroin and/or crack cocaine or heavily dependent amphetamine users).

e) Individuals at high risk due to medical conditions

Those receiving regular transfusions of blood or blood products, and carers responsible for the administration of such products.

Those with learning disability attending centres such as day-care facilities, special schools and other units.

Patients with chronic renal failure. It is advisable to administer a hepatitis B vaccine formulated for use in patients with chronic renal failure (Fendrix or HBVAXPRO40). The immune response to hepatitis B vaccine may be diminished compared to immunocompetent individuals and a more rapid decline in anti-HBs can be observed.

Patients with chronic liver disease including those with persistent hepatitis C infection.

Patients who are non-immune and who are likely to become immunocompromised, such as transplant recipients or those receiving immunomodulatory agents.

HIV exposed and infected infants should be given Hepatitis B vaccine at birth and then continue with the routine childhood schedule.

f) People with other risks

Individuals who change sexual partner frequently, men who have sex with men (MSM), male and female commercial sex workers, people engaging in anal intercourse, attendees at clinics for sexually transmitted infections (STIs) and those diagnosed with an STI.

Inmates of custodial institutions.

Tattoo and body piercing artists/practitioners.

Immigrants from areas with a high or intermediate prevalence of HBV.

Homeless people.

Children born to parents from high or intermediate endemicity countries.

Travellers to areas with a high or intermediate prevalence of HBV.

3. **Booster doses**

For haemodialysis patients and immunocompromised people at continued risk of infection, the need for booster doses should be assessed by annual anti-HBs testing, and a booster dose should be given if the anti-HBs level is <10 mIU/mL.

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness; defer until recovery.

Adverse reactions

Local: Pain and redness at the injection site are common.

General: Fever, rash, malaise and influenza-like symptoms are uncommon

Post-vaccination serological testing of those at high risk

Testing for immunity after vaccination is recommended only for persons whose subsequent clinical management or occupational risk depends on knowledge of their immune status.

Such persons are

Healthcare and public safety workers at high risk of continued exposure to blood or body fluids containing blood. This includes HCWs with direct patient contact, HCWs who have the risk of needlestick or sharps injury, and laboratory workers who draw or test blood.

Immunocompromised persons.

Sex or needle-sharing partners of HBsAg-positive persons.

Infants born to HBsAg positive mothers.

Anti-HBs testing should be performed 2 months after the last dose of vaccine.

Post vaccination serology testing is not required for children receiving hepatitis B vaccine as part of the routine primary childhood immunisation schedule, or for those at low-risk.

Anti-HBs levels above 10 mIU/ml are accepted as protecting against HBV for those at low risk (Table 9.2 and Table 9.3).

For those at high risk of HBV infection

- For those with a level of anti-HBs <10m IU/ml. 2 months after the third dose, a repeated course of vaccination, preferably with an alternative hepatitis B vaccine, is recommended. This results in protective anti-HBs titres in 50 to 100% of previous non-responders.
- If there is still no response (anti-HBs <10m IU/ml. 2 months after the third dose) administration of a course of a double dose (2mls) of combined hepatitis A and B vaccine (Twinrix) at 0,1 and 6 months is recommended as this can induce a protective anti-HBs response in >90% of non-responders.
- If there is still no response (anti-HBs <10mIU/ml two months after the third dose), a single dose of Fendrix should be offered and anti-HBs checked 2 months later.

Anti-HBs titre declines post-vaccination but a rapid anamnestic response develops after exposure to the virus.

Table 9.2 Management following post-vaccination testing (see Table 9.3 for patients on haemodialysis)

Anti-HBs level	Action required
0 or <10 mIU/ml	Non responder. Test for anti-HBc*. If anti-HBc negative, repeat full course of hepatitis B vaccine (use a different brand). Recheck anti-HBs 2 months post completion and follow guidance above. If anti-HBs remains <10 mIU/ml, person is susceptible to HBV.
10-99 mIU/ml	Low response. If low level anti-HBs confirmed by 2 different assays, give booster dose if at increased risk (see page 12). There is no need to retest for anti-HBs.
100 mIU/ml or greater	Good response. No need for further vaccine or anti-HBs investigations.

*For those who are performing exposure-prone procedures, HBsAg testing should also be carried out.

Table 9.3: Management following post-vaccination testing for patients on haemodialysis

Anti-HBs level	Action required
0 or <10 mIU/ml	<p>Non responder. Repeat full course of hepatitis B vaccine (use a different brand of vaccine) Recheck anti-HBs 2 months post completion and follow guidance above. If anti-HBs remains <10 mIU/ml, person is susceptible to HBV. Test for HBsAg every month</p>
10-99 mIU/ml	<p>Low response. Give booster dose of vaccine. Check anti-HBs 2 months later using 2 different assays. Adequate response if both ≥ 10 mIU/ml. Re-check anti-HBs annually and if anti-HBs decreases to <10 mIU/ml give booster dose but no need to check the anti-HBs level until next annual check. Test for HBsAg every 3 months</p>
100 mIU/ml or greater	<p>Good response. Re-check anti-HBs annually and if anti-HBs decreases to <10 mIU/ml give booster dose but no need to check the anti-HBs level until next annual check.</p>

POST-EXPOSURE PROPHYLAXIS

Post-exposure immunoprophylaxis with hepatitis B vaccine and hepatitis B immunoglobulin (HBIG) or hepatitis B vaccine alone prevents most infections after exposure to HBV.

Post-exposure hepatitis B vaccination is highly effective at preventing clinically relevant infection if administered preferably within 48 hours but up to 7 days post-exposure.

When hepatitis B vaccine is used, it must be administered using the accelerated schedule, i.e. 0, 1, 2 and 12 months.

HBIG provides short-term protection (3-6 months).

Dose and route of administration of HBIG

Follow the manufacturer’s guidelines and ideally give within 48 hours of exposure but not later than 7 days after exposure.

Indications

1. Babies born to mothers who are HBsAg positive

Perinatal transmission of HBV infection can be prevented in approximately 95% of infants born to HBsAg positive mothers by early active and passive immunoprophylaxis of the infant. All babies born to these mothers should receive hepatitis B vaccine at 0, 2, 4 and 6 months and also HBIG as soon as possible ideally within 24 hours of birth, but no later than 7 days. The first dose of vaccine should be given within 24 hours of birth. The doses at 2, 4 and 6 months should be given as 6 in 1 vaccine. Arrangements should be made to follow-up the child for subsequent doses of vaccine and testing for anti HBs and for HBsAg and anti-HBc.

Hepatitis B vaccine may not give an adequate immune response in infants weighing less than 2kgs, until they are aged one month or more. However, if a mother is HBsAg positive, her infant should be given the hepatitis B vaccine and HBIG at birth irrespective of birth weight, and further doses (as 6-in-1 vaccine) at 2, 4 and 6 months of age.

Infants born to mothers who are HBV infected should be tested 2 months after completing hepatitis B immunisation to determine their HBV status and anti-HBs response.

2. Household exposures

HBIG and hepatitis B vaccine are recommended for unimmunised infants under 12 months of age if the mother or primary care giver has acute HBV infection. Prophylaxis with HBIG is not indicated for other unimmunised household contacts of persons with acute HBV infection unless they have blood exposure to the index patient, such as by sharing of toothbrushes or razors. Such exposures should be managed as are sexual exposures. All household contacts of acute and chronic cases should be given hepatitis B vaccine and screened. They should complete the vaccine course if susceptible.

3. Sexual exposure

Exposure to acute cases: Sexual partners of individuals suffering from acute hepatitis B and who are seen within one week of last contact should be offered both HBIG and vaccine, unless immune from vaccination or past exposure. Hepatitis B vaccine should be offered even if more than one week has elapsed since contact.

Exposure to chronic cases: Sexual contacts of newly identified chronic cases should be offered vaccine, unless immune from vaccination or past exposure. HBIG may be added if unprotected sexual contact occurred in the

previous week. A risk assessment may be needed depending on whether the contact is a long-term or recent sexual partner.

4. HCWs and those accidentally exposed to blood or body fluids

Individuals who sustain such injuries should wash the affected area well with soap and water and seek medical advice. The response required in terms of vaccination and/or HBIG will depend on a detailed risk assessment of the source, the vaccination/anti-HBs status of the person exposed, and the type of exposure. Appropriate prophylaxis should be commenced immediately (Table 9.4).

Significant exposure is defined as exposure from which hepatitis B transmission may result e.g.

- Percutaneous exposure to blood or body fluids, e.g. needlestick bleeding or other visible skin puncture.
- Mucocutaneous exposure to blood or body fluids, e.g. contamination of non-intact skin, conjunctiva or mucous membrane.
- Sexual exposure (unprotected oral, vaginal or anal).

Injuries from discarded needles in the community

While these injuries pose less of a risk than that resulting from a needlestick injury in health-care settings, the perception of risk often results in the necessity for evaluation, testing and counselling of the injured person.

Management of such injuries includes acute wound care and consideration of the need for prophylactic management. HBV can survive in the environment for 1 week or longer. It is advisable to administer a full course of hepatitis B vaccine to those susceptible to HBV infection. HBIG is not usually required unless the needle comes from a known hepatitis B positive source and a risk assessment identifies a significant risk of HBV transmission. The likelihood of transmission of other blood-borne viruses such as hepatitis C or HIV is very remote.

Recommendation: a baseline serum specimen from the injured person should be collected and tested if required. Initiate hepatitis B vaccination and test samples at 6 weeks and 3 months (for guidance refer to the EMI Guidelines, www.emitoolkit.ie). Test anti-HBs 2 months after completion of the vaccination course.

Testing the needles or syringe contents for evidence of blood borne infection is not indicated

Interpretation of Hepatitis B results is shown in Table 9.5.

Table 9.4: Hepatitis B post-exposure* prophylaxis (Adapted from the EMI Guidelines www.emitoolkit.ie)

*Needlestick injury/ Bite with breach of skin/ Sexual exposure/ Mucosal exposure to blood or body fluids containing blood

Vaccination status of person exposed					
Serology of source	Unvaccinated	Not fully vaccinated (<3 doses)	Fully vaccinated anti-HBs unknown ¹	Documented non-responder	Known responder i.e. anti-HBs>10 mIU/ml
HBsAg positive	Give HBIG ² Accelerated ³ vaccine course ⁴ Urgent consult to ID/GUM specialist	Test recipient for anti-HBs Consider HBIG ² if <10 mIU/mL Complete vaccine course ⁴ Urgent consult to ID/GUM specialist	Test recipient for anti-HBs Consider HBIG ² if <10 mIU/mL Give vaccine dose ⁴ Urgent consult to ID/GUM specialist	Give HBIG ² plus vaccine dose Urgent ID/GUM referral for alternative vaccination strategy	Consider giving HBV vaccine dose based upon risk assessment of severity of injury
HBV status unknown but potential high risk, i.e. from country of high or intermediate prevalence⁵	Make every effort to test source Accelerated ³ vaccine course ⁴	Make every effort to test source Complete vaccine dose ⁴	Make every effort to test source Give vaccine dose ⁴	Make every effort to test source Consider HBIG ² Give vaccine dose Urgent ID/GUM referral for alternative vaccination strategy	No need for further vaccine dose
HBV status unknown - no high risk features, i.e. normal population risk⁶	Accelerated ³ vaccine course ⁴	Complete vaccine course ⁴	Give vaccine dose ⁴	Make every effort to test source, Give vaccine dose Urgent ID/GUM referral for alternative vaccination strategy	No need for further vaccine dose
HBsAg negative	Routine vaccine course ⁴	Complete vaccine course ⁴	No need for further vaccine dose	Routine ID/GUM referral for alternative vaccination strategy	No need for further vaccine dose

Where indicated give Hepatitis B vaccine / Hepatitis B immunoglobulin (HBIG) within 7 days and preferably within 48 hours.

¹ If the recipient was fully vaccinated as an infant, no further testing or booster dose of hepatitis B vaccine is required. Universal infant hepatitis B vaccination commenced in Ireland in September 2008.

² For bite with no visible blood, risk assess or seek urgent ID specialist advice re giving HBIG.

³ An accelerated vaccine course consists of doses at 0, 1 and 2 months. A booster dose is given at 12 months to those at continuing risk. The standard course is 0, 1 and 6 months.

⁴ Test for anti-HBs 2 months after the final dose of hepatitis B vaccine.

⁵ Africa, Asia, Central and South America, Central and Eastern Europe. Refer to CDC map:

<http://wwwnc.cdc.gov/travel/yellowbook/2012/chapter-3/infectious-diseases-related-to-travel/hepatitis-b.htm>.

⁶ Injecting drug users in Ireland have only a 2% risk of being HBsAg +ve and are thus not considered to be high risk. The prevalence in the general population is <0.1%.

Table 9.5 Interpretation of Hepatitis B results

HBsAg	HBeAg	Anti-HBe	Anti-HBc IgM	Anti-HBc total	Anti-HBs	Interpretation
Neg	Neg	Neg	Neg	Neg	Neg	Susceptible to HBV
POS	POS	Neg	POS/Neg	POS/Neg	Neg	Acute HBV infection
Neg	Neg	Neg	POS	POS ¹	Neg	Recent HBV infection (HBsAg window)
POS	POS	Neg	WEAK POS/ Neg	POS	Neg	Chronic HBV infection ²
POS	Neg	POS/Neg	WEAK POS/ Neg	POS	Neg	HBeAg neg chronic HBV infection ³
Neg	Neg	POS/Neg	Neg	POS*	POS/Neg	Resolved HBV infection
Neg	Neg	Neg	Neg	Neg	<u>POS</u>	Response to hepatitis B vaccine

Notes

¹ Anti-HBc detected in two assays

² Follow up sample required to confirm chronic HBV infection

³ Follow up sample required and also HBV DNA viral investigations may be required

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