Chapter 13

Protecting health care workers and patients from Hepatitis B

Recommending Committee: Hospital Control of Infection Committee
Approving Committee: Clinical Performance Council
Signature: Chairman Clinical Performance Council
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Responsible Officer: Director of Infection Prevention & Control

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Document History

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Location of Policy

All wards and departments (for information purposes)
1. **GENERAL BACKGROUND**

**Occurrence**

About 5% of the population have been infected with Hepatitis B at some time. The majority of these people have had asymptomatic infections. Other people may develop mild hepatitis and a small number of severe and fatal illnesses occur. Only 5-10% of those adults who become infected become carriers. About 1 in 1,000 adults in this country is a Hepatitis B carrier.

**Modes of Transmission**

1. Contact with infected blood e.g. iv drug abusers, health care workers, dilaysis
   
   Includes inoculation injury, blood contamination of cuts, splash of blood in eye or mouth.

2. Unprotected penetrative sexual intercourse (both heterosexual and homosexual).

3. From mother to infant (usually at birth).

There is no evidence of airborne spread.

**Incubation period**

6 weeks to 6 months.

**Clinical presentation**

More than 80% of cases are asymptomatic. If illness occurs, onset is usually insidious with anorexia, vague abdominal discomfort, nausea and vomiting, often progressing to jaundice. Arthralgia and rashes may also occur.

**Period of communicability**

Blood is infective for several weeks before onset of symptoms, during the acute illness and during the carrier state which may persist for years. Some patients are more infectious than others. Patients carrying the ‘e’ antigen, which is present in the blood during the acute hepatitis illness and in a few carriers, are highly infective.

**Prognosis**

The case fatality rate in hospitalised patients is less than 1%. Only 5-10% of infected adults become carriers. About 1 in 1,000 adults in this country is a
Hepatitis B carrier. The majority of carriers will not have been identified as being HbsAg positive.

**Laboratory diagnosis of carrier or the acutely ill**

5 ml of clotted blood should be sent to the Microbiology Laboratory with a form requesting ‘HbsAg’ (Hepatitis B surface antigen). If a patient is newly diagnosed as carrying HbsAg then further tests will automatically be carried out on this specimen to see if they are one of the more infectious ‘e’ antigen positive carriers.

2. **Safe working practices for all staff**

It is the responsibility of all health care workers to ensure that they adopt safe working practices to prevent the transmission of Hepatitis B in health care settings.

2.1 Staff must have good standards of basic hygiene with regular handwashing.
2.2 Existing wounds or skin lesions must be covered with waterproof dressings.
2.3 Staff must wear protective clothing as indicated in guidelines contained in the Infection Control Manual in order to avoid contamination of their skin/eyes/clothing. (Chapter 5: Personal protective equipment policy; Chapter 11D: Operating Theatre Guidelines; Chapter 4: The Isolated Patient).
2.4 Sharps usage must be avoid wherever possible.
2.5 Whenever sharps are used, care must be taken to avoid sharps injuries (see Chapter 22, Infection Control Manual for further advice). If sharps injuries are sustained then protocol for management of sharps injuries must be followed.
2.6 All waste must be disposed of according to hospital policy.
2.7 Staff must observe the correct procedures for sterilisation and disinfection of instruments and equipment.
2.8 Any spillages of blood or body fluids must be cleaned up promptly according to the instructions given in the Infection Control Manual Disinfection Policy (Chapter 9).
2.9 When obtaining blood samples using a lancing device, staff must ensure that they use a disposable single-use lancing device. Staff must NOT use lancing devices intended for self-use by one patient only e.g. Softclix or Multiclix to obtain blood samples from multiple patients because of the risk of transmission of blood borne viruses (MDA/2005/063)

3. **Exposure prone procedures**

Exposure prone procedures are those where there is a risk that injury to the worker may result in the exposure of the patient’s open tissues to the blood of the
worker. These procedures include those where the worker’s gloved hands may be in contact with sharp instruments, needle tips and sharp tissues (e.g. spicules of bones or teeth) inside a patient’s open body cavity, wound or confined space where the fingertips may be not completely visible at all times.

Normal vaginal delivery is not in itself an exposure prone procedure. However, an infected health care worker may not perform procedures such as infiltration of local anaesthetic or suturing or episiotomy. Therefore, an infected health care worker may not undertake vaginal deliveries.

Exposure prone procedures must not be undertaken by a health care worker who is HIV Ab or Hepatitis B e Ag positive.

4. **Health Care Workers**

New and existing employees who will be involved in carrying out exposure prone procedures must be immunised against Hepatitis B.

This includes:

- Surgeons and other medical staff who undertake exposure prone procedures
- Dental staff
- Midwives
- Nursing staff who assist in theatre

Locums, agency staff, medical, dental, nursing and midwifery students must also be vaccinated for Hepatitis B if they are to undertake invasive procedures.

Staff who cannot complete the vaccination course because of allergy or pregnancy should be tested for Hep BsAg. If negative, they can be treated as non-responders (see 8.2). If positive, see 8.3 and 8.4. Pregnant staff must be immunised as soon as possible after delivery.

Other staff who are at risk of acquiring Hepatitis B occupationally are strongly advised to be immunised for their own protection. This includes those who may have direct contact with patients’ blood, blood-stained body fluids, or with patients’ tissues. This includes health care workers who are at risk of injury from blood-contaminated sharp instruments, or of being deliberately bitten by patients.
5. **Hepatitis B vaccination**

Unvaccinated members of staff should be given 3 intramuscular doses of Hepatitis B vaccine at 0, 1 and 6 months (an accelerated course may be given if required (see section 6). Although most people have no side effects, these may occur and include local soreness, nausea, vomiting, diarrhoea and abdominal pain. Vaccination should not be given in pregnancy. Blood should not be donated for transfusion until 48 hours after dose of vaccine.

6. **Accelerated Hepatitis B vaccination**

This may be given when a more rapid response to vaccine is required e.g. after needlestick injury from a known Hepatitis BsAg positive donor or for surgeons not previously immunised. Four doses of vaccine are given at 0, 1 month, 2 months and 12 months.

7. **Response to vaccine**

The response to vaccine is to be checked by measuring antibody levels 2-4 months after the last dose of vaccine. Take 5 ml of clotted blood and send with a virology form to the Microbiology Department requesting Hep B Ab levels (anti HBs).

8. **Interpretation of Hepatitis B antibody response**

The antibody response is measured in IU/L.

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<th>Result</th>
<th>Interpretation</th>
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<tbody>
<tr>
<td>&lt;10</td>
<td>No response. Check Hepatitis BsAg (may be a carrier). If Hep B sAg negative check anti-HBc to determine whether they have had previous infection and natural immunity or whether they are true non-responders for whom boosters or a further course should be considered. If Hep BsAg and anti-HBc negative, repeat course of vaccine and repeat antibody test 2-4 months later.</td>
</tr>
<tr>
<td>10-100</td>
<td>Unlikely to provide further protection for long. Further dose of vaccine to be given now. Repeat tests to be done in 6-8 weeks. Check Hepatitis BsAg</td>
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Issue Date: 1st August 2008
9. **Staff exclusions from various work areas**

9.1. **Workers who are protected by vaccine** are not excluded from work in any areas.

9.2. **Workers who do not respond to vaccine or who cannot be vaccinated due to allergy**, but who are not found to be Hepatitis carriers are not excluded from work in any areas. However, they must be warned that they are susceptible to infection with Hepatitis B and must make every effort to protect themselves from blood borne infections and to report any exposures. If they become jaundiced they must take sick leave and be tested for Hepatitis B status. Regular Hep BsAg tests are not required. Those whose work involves exposure prone procedures will be referred for specialist advice and counselling.

9.3. **Workers who are found to be Hep BsAg positive** should cease to perform exposure prone procedures until their eAg status has been established.

9.4. **Hepatitis B carriers who are e Ag negative** or who have no ‘e’ markers are not excluded from any area of work, even renal dialysis units provided their viral load does not exceed $10^3$ genome equivalents per ml (see below under “viral load testing”). They must be advised of their carriage status and given advice on how to avoid transmission of infection to others. If they are found to have transmitted infection to a patient, they will be dealt with as if they are Hep B e Ag positive. Referral to a gastroenterologist is advised if this has not already taken place.

If they have needlestick injury while performing a surgical procedure the incident must be reported immediately to the Consultant Microbiologist or deputy so that the patient can be started on an accelerated course of Hepatitis B vaccine, if appropriate. See Chapter 11E Appendix A for detailed guidance on management of this type of incident.

**Viral load testing**

**Annual viral load tests**

All hepatitis B carriers who are e Ag negative and who perform exposure prone procedures will be tested annually for viral load (Hepatitis B DNA). If the viral load exceeds $10^3$ (i.e. 1000) genome equivalents per ml or if investigation of a case of hepatitis B in a patient indicates the possibility of transmission, they will be excluded from any work involving exposure prone procedures. However a patient notification exercise will only be triggered if there is evidence to suggest transmission to a patient may
have taken place. Provided the viral load does not exceed $10^3$ equivalents they need not have their working practices restricted.

**Addition viral load tests**  
In addition viral load testing must also be done immediately if:  
(1) the health care worker becomes immunosuppressed for any reason or  
(2) has symptoms suggestive of a reactivation of their hepatitis B infection or  
(3) if investigation of a case of hepatitis B in a patient indicates the possibility of transmission.  
This new guidance has been introduced because there have been several incidents in which hepatitis B infected health care workers without the e Ag have been associated with transmission of infection to their patients. The viral load is a further test to assess infectivity. Staff who refuse the viral load test will not be allowed to carry out exposure prone procedures.

**Specimens required**  
Two specimens of a **minimum** of 10 ml clotted blood should be taken one week apart and should be sent separately and as soon as possible. The health care worker must be asked if they are currently being treated or have been treated within the last 12 months with interferon or antiviral therapy. If so, they may not continue to perform exposure prone procedures. They need to show that they have a viral load that does not exceed $10^3$/ml **one year after cessation of treatment** before a return to unrestricted working practices can be considered.

Health care workers must NOT provide their own specimens. Blood must be taken by the Occupational Health Doctor or Nurse. Blood must be sent to the Microbiology Laboratory and will then be forwarded to:

Regional Virus Laboratory  
Gartnavel General Hospital  
1053 Great Western Road  
GLASGOW. G12 OYN

Contact telephone numbers:  
0141 2110080 or 07775 783743

**9.5 Hepatitis B carriers who are e Ag positive** are excluded from any work involving exposure prone procedures. The Trust will make every effort to provide alternative employment should this be needed. Opportunities for retraining should be available. Hepatitis B is a Prescribed Industrial Disease for health care workers. Benefits are also available under the NHS Injury Benefits Scheme for NHS staff who become infected in the course of their work. Referral to a gastroenterologist is advised if this has not already taken place.
Spontaneous loss of e Ag with development of anti e occurs in about 5-15% of those infected as adults each year and a further 1-2% lose Hep BsAg. Others may respond to treatment with interferons. If e Ag negative status is sustained for 12 months after cessation of treatment they may resume exposure prone procedures as above. The advice of the UK Advisory Panel should be sought as to whether a return to duties involving EPPs would be appropriate.

9.6 **Staff who refuse immunisation or subsequent monitoring** are excluded from any work involving exposure-prone procedures, unless they are known to be naturally immune.

10. **Infected health care workers who refuse to modify their practice**

Physicians who are aware that an infected health care worker has not followed advice to modify their practice, must inform the General Medical Council, General Dental, Council or the UK Central Council for Nursing, Midwifery and Health Visiting. The relevant Director of Public Health must also be informed in confidence.

11. **Confidentiality**

Health care workers have the same rights of confidentiality as any patient seeking or receiving medical care.

The Hepatitis B status of a health care worker will not normally be disclosed without the health care worker’s consent. However, the Trust may need to be advised that a change in duties must take place. Also, when patients are or have been at risk, it may be necessary, in the public interest, for the Trust to have access to confidential information.

12. **Further advice**

Further advice may be obtained from a Consultant Microbiologist, Ext 1834/1836 or Medical Director, Ext 1458.

Further advice may also be obtained from the UK Advisory Panel (address given below). The worker’s identify should not be revealed to the panel. However confidentiality of all information will be maintained by members of the panel.

**UK Advisory Panel:**
The UKAP Medical Secretary
Health Protection Agency
61 Colindale Avenue
London
NW9 5EQ
Telephone: 020 8327 6423 (Medical Secretary)
020 8327 6074 (Administrative Secretary)
13. **Hepatitis BsAg positive patients in hospitals**

Unnecessary restrictions and precautions may cause distress to HBsAg carriers and should be avoided.

13.1 Patients should be admitted to the open ward unless they are bleeding or likely to bleed. They should be allowed the same activities as other patients and to use communal toilets, crockery and cutlery. If the patient is bleeding e.g. haematemesis, melaena, haematuria, vaginal bleeding they should be admitted to a side room.

13.2 **Parenteral procedures** should be kept to a minimum. Particular care must be taken when using needles or sharp instruments on HBsAg positive patients.

13.3 **Cuts and abrasions**, whether on the HBsAg patient or attendant staff, should be covered with waterproof dressings.

13.4 **Protective clothing**: When dealing with blood, secretions and excreta, personnel should wear plastic aprons and gloves. Gowns, masks and eye protection should be worn if splashing is a possibility e.g. during delivery of baby.

13.5 **If blood spillage occurs**, pour HazTab granules onto the site of the spillage, leave for 2 minutes, then put on a pair of disposable gloves and apron and clean up the spillage with a paper towel or disposable cloth. Contaminated gloves and paper towels or cloths should be placed in a yellow clinical waste bag for incineration.

13.6 **Clothing and linen**, if socially soiled only, presents no danger and can be placed in a white linen bag. When contamination with blood is likely, disposable linen and drapes should be used and placed in a yellow waste bag for incineration after use. If non-disposable clothing and linen have been contaminated with blood from a HBsAg positive patient they should be placed in a water soluble bag inside a red linen bag.

13.7 **When taking blood** from a HBsAg positive patient, follow this procedure:

   a. Complete the blood forms and complete Danger of Infection warning..
   b. Label all the blood bottles and attach a ‘Danger of Infection’ sticker.
   c. Place on a disposable tray, all that you require e.g. needle, Sarstedt container/Syringe, alcohol swab, cotton wool, plaster, tourniquet, plastic bag (one for each specimen bottle).
   d. Put on gloves and apron.
   e. Take tray and portable sharps box to the patient’s bedside.
   f. Take blood. DO NOT RE-SHEATH NEEDLE. Put needle directly into sharps box.
   g. Place each bottle into the appropriate plastic bag.
   h. Put plaster on patient’s puncture wound.
i. Dispose of tray and contents into the appropriate receptacles. Remove gloves and apron, place in yellow waste bag for incineration.

j. Seal the plastic bags and send to the laboratory. DO NOT STAPLE THE BAG

13.8 Surgery on HBsAg positive patients
See Section 11D of this manual for detailed guidelines on transportation of patients and precautions to be followed during and after the operation.

13.9 Endoscopy
See Operational Policy.

13.10 Counselling of HBsAg carriers
It is recommended that anyone found to be an HBsAg carrier should be counselled about the ways in which the infection may spread and the precautions which can be taken to reduce the risk to others.

13.11 In event of death
See Chapter 16 of this manual for details of care and removal of infected bodies.

14. Needlestick injuries/contamination with blood

See Chapter 22 for full details.

After accidental inoculation (e.g. needlestick injury) or splashing of blood into cut or abrasion, or eye, or mouth.

1. Wash affected area well with water immediately. If wound is present, encourage it to bleed (don’t suck wound).

2. Note identity of donor. Take 5 ml clotted blood (brown-capped bottle) from donor. Send with virology/bacteriology form to Microbiology noting on forms the name of patient and details of victim and how they can be contacted with the results.

3. Report the incident to the Head of Department/Ward Sister.

4. Complete Accident Form and give to Head of Department.

5. Report the incident to Occupational Health and attend immediately for any required treatment or blood tests. If the incident occurs out of hours, the victim should go to Accident and Emergency. However, they must still report the incident to Occupational Health as soon as possible.
References

1. HSG (93)40: Protecting health care workers and patients from hepatitis B.

2. Addendum to HSG(93)40: Protecting health care workers and patients from hepatitis B – EL (96) 77


4. HSC 2000/020 (Hepatitis B infected health care workers)
GLOSSARY

Hepatitis B surface Antigen (HepBsAg)

HBsAg is found during the latter part of the incubation period and acute phase of Hepatitis B infection. Its persistence is associated with failure to clear the virus from the body. Patients remaining HepBsAg positive for more than 6 months are regarded as having developed the chronic carrier state. HepBsAg disappears in about 1-2% of carriers per year.

Antibody to Hepatitis B surface Antigen (antiHBs)

Development of antiHBs is generally associated with disappearance of infectious virus in those recovering from natural infection. It is also made in response to Hepatitis B immunisation. It is a marker of immunity against the virus.

Hepatitis B e Antigen (HBeAg)

HBeAg is associated with the presence of infectious virus. Whilst carriers of the Hepatitis B virus are HBeAg positive their blood contains a high concentration of virus and is likely to transmit infection. Some carriers may have persistent HBeAg whilst others may develop antibodies to it after a variable period.

Antibody to HBeAg (antiHBe)

The blood or carriers who develop antiHBe is of low infectivity. In a minority of subjects who are antiHBe positive, detectable hepatitis B virus DNA (HBV DNA) may persist in association with evidence of abnormal liver function. This may indicate a slightly increased risk of transmission. However, no standardised test for routine use is yet available for HB DNA testing and evidence suggests that the majority of antiHBe positive subjects do not have significant levels of HBV DNA.

Hepatitis B core antibody (antiHBc)

Almost all those who have been infected by the Hepatitis B virus develop antibody to the core of the virus (antiHBc). This marker is not found in subjects who have vaccine-induced immunity. It is found in chronic carriers of the virus who also have HBsAg and it is also found in those who have cleared the virus and in whom HBsAg is no longer detectable. The latter group is referred to as naturally immune.
APPENDIX A

SUGGESTED STANDARD LABORATORY REQUEST FORM FOR HEPATITIS B VIRAL LOAD TEST

Request for HBV viral load testing in accordance with Health Service Circular 2000/020

Name of health care worker …………………………. Ref No: …………………………….

Age ………………………. Grade ……………………….

Has this health care worker been treated with interferon or antiviral therapy within the last twelve months? YES/NO*

Is yes, the health care worker should be advised as set out in paragraph 15 of the Health Service Circular implementation guidance.

*(Only send samples for testing if the health care workers claim that the circumstances in paragraph 15 of the implementation guidance can be met – please give details).

……………………………………………………………………………………………………..

Occupational Health Department ……………………………………………………………..

Address: ………………………………………………………………………………………

…………………………………………………………………………………………………….

Requesting physician: ………………………….. Signature: …………………………….

Date: …………………………….
APPENDIX B

INVESTIGATION OF HEPATITIS B INFECTED HEALTH CARE WORKERS WHO PERFORM EXPOSURE PRONE PROCEDURES AND WHO TEST HBsAg POSITIVE

Test for HBsAg

HbsAg positive
= current infection

HbsAg negative: no restrictions

Test for e-markers

HBeAg positive: anti-HBe No e-markers
practice positive restricted

Test for HBV DNA using genomic amplification assay at designated laboratory

HBV DNA exceeding $10^3$ genome equivalents per ml: practice restricted

HBV DNA not exceeding $10^3$ genome equivalents per ml: practice not restricted but subject to annual testing

Any hepatitis B infected health care worker associated with transmission of infection to a patient should cease performing exposure prone procedures.
APPENDIX C

Post exposure prophylaxis against hepatitis B for bomb victims

Background
During a bomb blast, fragments of tissue e.g. bone from a suicide bomber or from victims in close proximity to the bomb, may become embedded in other bomb victims. Blood borne viruses may therefore be inoculated as shrapnel into victims. It may not be clear whether or not this has happened during the incident. Therefore all bombings should be regarded as having the potential to infect victims with blood borne viruses.

Types of exposure

1. Directly injured in explosion with penetrating injuries leading to non-intact skin.
2. Indirectly injured (leading to non-intact skin) as a result of providing assistance to victims of the explosion (for example cut from fragments of glass or metal on bodies of victims)
3. Superficial exposure of skin or mucous membranes to blood of victims

Exposure types 1 & 2

Individual assessment of risk and then, if considered appropriate:

1. Accelerated course of hepatitis B vaccination i.e. 0, 1, 2, and 12 months. The first dose should be offered as soon as possible, ideally within 7 days, but people can be vaccinated up to 14 days after exposure if they present late.
2. Baseline 5mls clotted blood specimen to be sent with Virology form for storage only.
3. Patient should be advised to be tested at 3 and 6 months for hepatitis BsAg and hepatitis C Ab. The risk of HIV is considered too low to require action.

Exposure type 3

Risk assessment and post exposure management as for exposure types 1 & 2 only if blood exposure to non-intact skin or mucous membranes occurred.

Reference