# National Neonatal Network Guideline: Blood Borne Virus during pregnancy

# Hepatitis B virus: Prevention of perinatal transmission

## Nursing, midwifery, medical and allied health professionals providing antenatal or postnatal care to babies at risk of Hepatitis B infection

Scottish Perinatal Network
NEONATAL

## Document Control Sheet

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## Disclaimer

The recommendations in this guideline represent the view of the National Neonatal Network Guideline Development Group, arrived at after careful consideration of the evidence available. When exercising their clinical judgement, healthcare professionals are expected to take this guidance fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to follow the guideline recommendations and it remains the responsibility of the healthcare professional to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

# Contents

# 1. Introduction

### 1.1 Aim & Objectives

This guideline aims to prevent perinatal transmission of Hepatitis B virus to all at risk Scottish newborns

Objectives:
1. Provide all at risk Scottish newborns with Hepatitis B vaccine within 24 hours of birth
2. Provide all high-risk Scottish newborns with Hepatitis B immunoglobulin in timely manner
3. Ensure appropriate follow-up and serology monitoring of all Scottish newborns at risk of Hepatitis B infection.

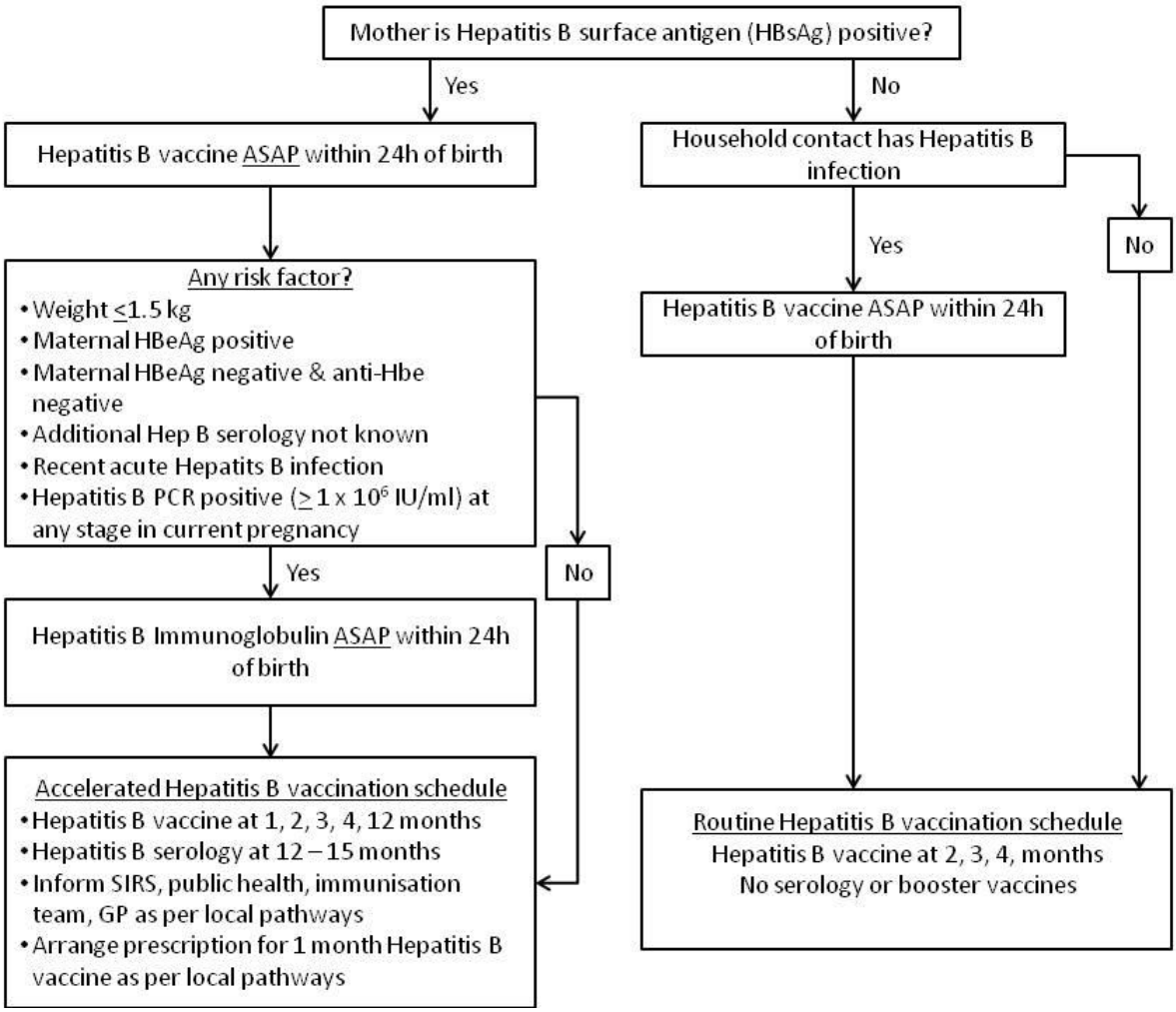
# 2. Overview of "at risk" newborns

There are two groups of newborns at risk of acquiring Hepatitis B:

1. Babies born to mothers with current Hepatitis B infection (HBsAg positive)
2. Babies going to live in a household with a Hepatitis B contact (not mother)

Note: Babies born to parents who are IV drug users are not an at-risk group if mother/household members do not have hepatitis B. However it is important to ensure that these newborns receive the Hepatitis B vaccine as part of the standard childhood immunisation schedule.

# 3. Postnatal management of newborns at risk of acquiring Hepatitis B virus




# 4. Hepatitis B vaccination

### 4a. Overview of Hepatitis B vaccine

- Hepatitis B vaccine has been part of the Routine Childhood Immunisation Programme in Scotland since 2017, with all infants recommended to receive Hexavalent Hepatitis B vaccine at 2, 3, 4 months old (Table 1)[2]
- The Hepatitis B vaccine is an inactivated (not live) vaccine prepared from yeast cells using recombinant DNA technology
- A pre-school booster of Hepatitis B vaccine is no longer recommended[2]

### 4b. Indications for Hepatitis B vaccine

- All infants born to Hepatitis B infected mothers (HBsAg positive) should receive the routine Hexavalent Hepatitis B vaccine doses plus additional monovalent Hepatitis B vaccine given at **birth, 4 weeks** and a booster at **12 months** of age ("Accelerated schedule") (Table 1)
- Babies going to a household in which a Hepatitis B person is resident should receive the monovalent Hepatitis B vaccine at birth and then the routine schedule (Table 1) with no requirement for additional Hepatitis B vaccine.

Table 1. Overview of routine and accelerated schedule of Hepatitis B immunisation

| Age | Routine Childhood Programme | | Babies born to Hepatitis B infected Mothers | | Household member with Hepatitis B |
|---|---|---|---|---|---|
| **At birth (in hospital)** | X | | ✓ | Monovalent[a] HepB (with HBIG if indicated) | ✓ |
| **4 weeks** | X | | ✓ | Monovalent[a] HepB | X |
| **8 weeks** | ✓ | Hexavalent[b] | ✓ | Hexavalent[b] | ✓ |
| **12 weeks** | ✓ | Hexavalent[b] | ✓ | Hexavalent[b] | ✓ |
| **16 weeks** | ✓ | Hexavalent[b] | ✓ | Hexavalent[b] | ✓ |
| **12 months** | X | | ✓ | Monovalent[a] HepB | X |
| **12-15 months** | X | | ✓ | Serology (HBsAg) | X |
| **Pre- school Booster** | X | | X | | X |

a. Monovalent Hepatitis B vaccines include Engerix B & HBVaxPRO

b. Hexavalent Hepatitis B vaccines include Infanrix hexa (DTaP/IPV/Hib/HepB)

### 4c. Administration of Hepatitis B vaccine

- Give the first dose of monovalent Hepatitis B vaccine **as soon as possible** within 24 hours of birth and before hospital discharge
- Subsequent doses should be given by the community vaccination teams (public health or GP) or Neonatal/Paediatric team if admitted beyond 4 weeks of age.
- The dose depends on the brand (5 or 10 micrograms) but the volume should always be 0.5ml
- Administer the vaccine intra-muscularly (IM) into the upper antero-lateral thigh

- Record the brand and batch number on the prescription record

# 5. Hepatitis B Immunoglobulin

## 5a. Indications for Hepatitis B Immunoglobulin (HBIG)

- HBIG is obtained from the plasma of immunised and screened human donors
- HBIG provides immediate but temporary passive immunity until the Hepatitis B vaccine becomes effective
- As the vaccine is highly effective and HBIG supplies are limited, HBIG is indicated only for newborns at highest risk of perinatal Hepatitis B transmission (Table 2)[2]

Table 2. Indications for Hepatitis B Immunoglobulin (HBIG)[2,4]

| **Indications for Hepatitis B Immunoglobulin** |
|---|
| Newborn weighs ≤1.5kg and mother is HBsAg positive, regardless of e-antigen status or HBV DNA viral load of mother |
| Mother is HBsAg positive and HBeAg positive |
| Mother is HBsAg positive, HBeAg negative and anti-HBe negative |
| Mother is HBsAg positive and additional Hep B serology is not available |
| HBsAg positive as a result of recent acute infection |
| Mother is HBsAg positive and has HBV DNA level equal or above $1x10^6$ IU/ml in any antenatal sample during this pregnancy (regardless of e-antigen status) |

## 5b. Hepatitis B immunoglobulin (HBIG) administration

- Give HBIG **as soon as possible** within 24 hours of delivery[2,4]
- Prescribe 250 IU (half of a 500 IU vial) (Note: 200 unit vials are no longer manufactured but can be used if still in stock)[4]
- Discard any unused portion
- Administer by intramuscular (IM) injection into the upper antero-lateral thigh of the opposite limb to that used for vaccine (Note: Do not use the buttock as efficacy may be reduced).
- Consider splitting the HBIG injection over 2 sites in neonates ≤1.5kg
- Give HBIG at the same time as the Hepatitis B vaccine but do not delay administration of the vaccine if HBIG is not readily available[4]

- If there is delay or uncertainty around interpretation of the e-marker results it is recommended to give HBIG, as a delay in administration could reduce the chances of preventing transmission[4]

# 6. Hepatitis B serology testing for at risk newborns

- All babies who receive the accelerated Hepatitis B immunisation schedule should have HBsAg serology checked at 12 – 15 months of age
- Testing is important to identify babies who became chronically infected despite post-exposure prophylaxis
- Serology testing should be done by GP/public health/pediatricians as per existing regional pathways
- If a baby is HBsAg positive they should be referred to a regional Paediatric Infectious Disease specialist for ongoing management.

# 7. Special considerations

### 7a. Premature and low-birth weight newborns

- The immune response to Hepatitis B vaccine is lower in premature and low-birth weight babies[2]
- All premature (<37 weeks gestation) neonates should receive the standard or accelerated Hepatitis B immunisation schedule according to risk factors for perinatal Hepatitis B transmission (Table 1). This should be given as per their chronological age, without correction for prematurity and in a timely manner
- **All newborns ≤1.5 kg** who are born to mothers with positive HbSAg (regardless of e-antigen status) should also receive HBIG at the same time as the vaccine
- Preterm babies with a history of apnoea or prolonged oxygen therapy should be monitored for apnoea or oxygen desaturation for at least 24 hours (48-72hrs if ≤28 weeks gestation) after the first vaccine dose[2]
- If apnoea, bradycardia or oxygen desaturation occur after the first immunisation, the second vaccine dose should be administered in hospital with respiratory monitoring for 48-72 hours[2]

### 7b. Breastfeeding

- Maternal Hepatitis B infection is NOT a contraindication to breastfeeding as baby is protected via passive and active immunisation

### 7c. Infection control

- The risk of acquiring Hepatitis B virus from baby at birth/post-natal period is very low
- No isolation of the newborn is necessary
- Universal precautions when obtaining blood samples and labelling samples are required

### 7d. Delay in administration of initial vaccination or HBIG

- If the initial vaccination and/or HBIG is delayed beyond 48 hours after birth, both can still be administered within 7 postnatal days.[2] In this event it is recommended to discuss the patient with regional Paediatric Infectious Disease specialists.

# 8. Overview of pathways & inter-speciality communication

### 8.1. Antenatal screening & communication

- All pregnant women in Scotland are screened for Hepatitis B virus at antenatal booking and should receive care from a multi-disciplinary team (Obstetrics, Hepatology)
- If a woman is HBsAg positive, the Regional Virus Laboratory will inform the patient's obstetrician and link Obstetrician by letter. Public Health will also be informed
- Confirmatory testing (Hepatitis e-markers, viral load and liver function) will be performed at antenatal clinic
- Repeat Hepatitis B serology and HBV DNA level testing should be done early in the third trimester (26- 28 weeks gestation) at antenatal clinic
- A **Neonatal management Plan** should be completed in the 3rd trimester by the obstetrician and Neonatologist or Paediatrician, depending on regional arrangements. This should be based on the blood results at 26-28 weeks and take into consideration indications for HBIG
- The **Neonatal Management Plan** should be documented on the mother's electronic medical record (e.g., TRAK or Badgernet) and be easily available for the maternity and Neonatal Medical teams, to avoid invasive fetal monitoring or fetal blood sampling and prompt administration of Hepatitis B vaccine +/- HBIG
- If an unbooked mother presents in labour, an urgent HBsAg test should be performed by the maternity team to ensure timely delivery of neonatal Hepatitis B vaccine. Hepatitis B e-markers and/or viral load should also be checked to assess the need for neonatal HBIG
- If, following detailed discussions and counselling, a mother refuses Hepatitis B vaccine or HBIG for their baby this should be documented in both maternity and neonatal medical records. HBsAg serology testing at 12-15 months should still be done to identify perinatal transmission and to enable timely management of the infant.

### 8.2. Postnatal management & communication

- Local pathways should be followed for:
  - Seeking signed consent for vaccination and documenting this in the medical notes.

- Obtaining and prescribing Hepatitis B vaccine and HBIG during out of hours to avoid delayed administration
- Documentation of Hepatitis B vaccine/HBIG given to newborn
- Informing the Scottish Immunisation Recall System (SIRS), Public Health, Immunisation team and GP to enable automatic recall for subsequent vaccine doses
- Ensuring availability of Hepatitis B vaccine for  dose at 1 month of age
- Checking of Hepatitis B serology at 12 - 15 months

- Parents should be given a Parent Information leaflet and informed of next steps for vaccination and serology checking
- If there is uncertainty around a baby's final discharge address or carer (e.g., if foster care is being considered), include the mother's details in any communication with Public Health and the baby will be tracked via their CHI number

# 9. Contributors

### 9.1 Key contributor

Dr Helen Brotherton, Consultant Paediatrician/Neonatologist, NHS Fife

### 9.2 Short life working group

National Neonatal Network Blood Borne Virus SLWG

### 9.3 Stakeholder group

National Neonatal Network Guideline Oversight Group

# 10. References


1. World Health Organization Global Hepatitis Report 2017 http://apps.who.int/iris/bitstream/10665/255016/1/9789241565455-eng.pdf
2. Hepatitis B: The Green book, Chapter 18. UK Health Security Agency. Updated Feb 2022
3. Hyams KC (1995) Risks of chronicity following acute hepatitis B virus infection: a review. Clin Infect Dis 20: 992–1000
4. Hepatitis B Immunoglobulin. UK Health Security Agency's Immunoglobulin Handbook. Updated September 2022


### Other resources:


- Health Protection Scotland and Glasgow Caledonian University. Blood borne viruses and sexually transmitted infections: Scotland 2017. Glasgow: Health Protection Scotland, Dec 2017

- Guidance on the Hepatitis B antenatal screening and selective neonatal immunisation pathway. PHE (2021). GW-17999.

# 11. Appendix I

### Epidemiology of Hepatitis B virus

- Hepatitis B virus is a DNA virus, acquired through contact with blood and bodily fluids
- An estimated 250 million people worldwide are chronically infected with highly endemic regions including Sub-Saharan Africa and South-East Asia[1]
- In high-endemic regions most affected persons acquire the virus from their mother perinatally or from environmental exposures during early childhood
- In low-endemic regions such as Western Europe, most infections are acquired in adulthood via sexual transmission or intravenous needle sharing by people who inject drugs (PWID)
- 90% of adults who are acutely infected with Hepatitis B clear the virus, become immune and are not infectious to others. A minority remain chronically infected and are HBsAg positive[2]
- Babies of women with acute or chronic Hepatitis B infection may be infected at delivery, or rarely during pregnancy
- Perinatal (vertical) infection has a high risk of chronic infection, with 90% of newborns who acquire Hepatitis B virus at birth developing chronic infection, mostly in endemic regions[2]
- Horizontal acquisition during childhood may occur via transmission from other household members with Hepatitis B infection but development of chronic infection is less likely in older children[3]

### Importance of preventing perinatal Hepatitis B virus transmission

- The implications of chronic infection are important, with increased risk of chronic liver failure/cirrhosis and hepatocellular carcinoma in adulthood
- The development of chronic infection after perinatal transmission can be prevented in >90% of cases by appropriate vaccination commencing immediately after birth[2]
- Preventing perinatal transmission is a cost-effective way of preventing both burden of Hepatitis B chronic infection and long-term complications

### Overview of Hepatitis B serology & quantitative viral load

- Positive Hepatitis B Surface Antigen (HBsAg) indicates chronic Hepatitis B infection, which is defined as persistence of HBsAG in the serum for ≥6 months[2]

- Positive Hepatitis B e-antigen (HBeAg) indicates that viral protein is present and the person is highly infectious
- Positive Hepatitis B e-antibody (Anti-HBe) indicates some antibody response to Hepatitis B. If HBsAG is positive and HBeAg is negative in presence of Anti-HBe, this indicates the person is infective at a low-level
- Negative Hepatitis B e-antibody (Anti-HBe) indicates that antibodies against Hepatitis B virus protein are not present. If HBeAg is positive, the person is highly infectious
- Quantitative Hepatitis B viral load detects the actual viral DNA in the blood and indicates high infectivity if greater than 1 $x10^6$ $IU/ml^2$