Public Health England

Protecting and improving the nation's health

Hepatitis B vaccination in adults and children: temporary recommendations from 4 August 2017

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

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Published August 2017
PHE publications
gateway number:2017256

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Hepatitis B temporary recommendations for vaccine prioritisation and use during supply constraints

Hepatitis B vaccine is highly effective in preventing infection if given prior to exposure following recommended schedules and is also effective post exposure. Post exposure vaccination should start immediately, ideally within 24 hours of exposure. Risk groups for pre and post exposure immunisation and the routinely recommended schedules are detailed in Chapter 18 of the Green Book.

Temporary recommendations on hepatitis B immunisation have been developed in light of recent global shortages of hepatitis B vaccine, including combination hepatitis A/B vaccine, which have severely impacted UK supply.These supply constraints do not affect the hexavalent vaccine (DTaP/IPV/Hib/HepB) used in the routine childhood immunisaiton programme. These recommendations include advice on prioritisation of vaccine for specific groups to preserve adult and paediatric monovalent hepatitis B vaccine stock for those at highest, immediate need and with the greatest ability to benefit.

1. Prioritisation of groups

For all pre and post exposure indications, an individual risk assessment is required. In general, the risk of acquiring infection from a significant exposure incident with a known infected source is higher than that from an unknown source or pre-exposure situations. Infants born to hepatitis B infected mothers are the highest priority for post-exposure vaccination as they are at greatest individual risk of infection; these infants have been exposed to a substantial amount of infected blood during the birthing process.

Prioritisation categories with relevant examples are described in table 1. These are based on a comprehensive assessment considering the following criteria:

- immediacy of exposure risk
- risk of acquiring infection
- risk of complications of infection
- immune response to vaccine products of varying antigen content
- vaccine availability and number of doses required
- compliance with vaccine schedule and follow up
- feasibility of delivery in settings
- likelihood of individual already being immune (including previous vaccine doses as well as infection)
- availability and effectiveness of non-vaccine preventative measures
- high risk of onward transmission

- availability and access to post exposure advice and prophylaxis
- co-circulation of other blood-borne viruses

The likelihood of acquiring infection following exposure is dependent on several factors including the hepatitis B status of the source, or if unknown status, the prevalence in the implicated population, the hepatitis B immune status of the recipient, the mechanism and route of transmission – whether it is a significant exposure, the likely infecting dose and/or volume of potentially infected blood/body fluid.

This prioritisation is provided to support decision-making on the basis of an assessment of the individual patient's risk. Many specific factors, detailed above, may alter the prioritisation assessment and the overall decision on whether someone should be a priority for vaccination requires some clinical judgement.

In post-exposure situations where the hepatitis B status of the source is unknown, **urgent testing of the source**, where possible, should be conducted to inform the need for further vaccination of recipient. Guidance on post-exposure vaccination (including need for hepatitis B immunoglobulin) is found in the Green Book, Chapter 18, Hepatitis B.

The National Travel Health Network and Centre (NaTHNaC) provides hepatitis B immunisation recommendations for travellers. Risk for travellers is low although certain behaviours or activities put individuals at higher risk, particularly when these occur in areas where hepatitis B is more common. These behaviours and activities include:

- unprotected sex
- exposure to blood or blood products through occupation, such as healthcare work
- exposure to contaminated needles through injecting drug use, or as a result of accessing medical or dental care
- long stay travel

Please visit the NaTHNaC website for indications for hepatitis B vaccination prior to travel. A risk assessment should be done on a case by case basis to determine whether vaccination against hepatitis B is indicated but it is unlikely to be available for travel purposes alone .

Table 1 Prioritisation of individuals / groups

Prioritisation	Exposure type		Examples of individuals in this category
1 Highest risk and urgency	Post exposure	Substantial exposure to infected blood from a known hepatitis B infected source	Infants born to hepatitis B infected mothers
2	Post exposure	Other exposure to a known hepatitis B infected source	Needlestick or other sharps injury from known positive person, sexual exposure to an acute case of hepatitis B
3	Post exposure	Exposure to an unknown source	Needlestick injury from discarded needle in community, sexual assault, mass casualties from a major incident
	Pre-exposure	Priming for unavoidable, high and imminent risk	Clinical health care workers with regular blood exposure, particularly those performing exposure prone procedures (e.g. surgeons, dentists), and those working in certain settings (e.g. renal units, hospital laboratory workers).
	Pre-exposure	Priming for unavoidable, high and imminent risk, with high risk of onward transmission and co-circulating viruses e.g. HIV, HDV	Sex workers, MSM with multiple partners, PWID, prisoners, people travelling to endemic countries for medical treatment, patients on renal dialysis units.
4	Pre-exposure	Priming for those at lower risk and those that can access advice in the event of a recognised exposure	Household contacts of people with hepatitis B, most other health care workers and ancillary staff in UK healthcare settings, other occupations at risk of percutaneous exposures.
	Pre-exposure	Priming for those at lower risk or where risk may be avoided or delayed	Other travel to medium and high endemicity countries.
5 Lowest risk and urgency	Pre-exposure	Boosting and reinforcing doses	For healthy individuals who have completed a primary course of immunisation (three doses)

2. Measures other than vaccination to prevent infection

Where appropriate, individuals should be advised of other precautions that are effective in protecting them against hepatitis B.

Individuals, including travellers to hepatitis B endemic countries, should be reminded to avoid contact with blood and bodily fluids by:

- avoiding unprotected sexual intercourse i.e. use condoms during sex
- following safe injecting, sharps disposal and universal precautions in healthcare settings
- using appropriate protective precautions where contact is unavoidable e.g. due to occupation
- avoiding tattooing, piercing and acupuncture (unless sterile equipment is used)
- not sharing needles or other injection equipment (and instead use needle and syringe exchange services, transition to opiate substitution therapies)
- not sharing shaving equipment

Individuals, including travellers, should be aware that using precautions will also help protect against other blood and body fluid-borne viruses (BBV), such as HIV and hepatitis C, for which there are currently no vaccines.

A sterile medical equipment kit may be helpful for travellers when visiting resource poor areas with high endemicity of hepatitis B.

Individuals at risk, including travellers, should be informed about seeking advice, and consideration of post exposure vaccination if they may have been exposed to hepatitis B.

3. Vaccine options

To mitigate the shortage of hepatitis B vaccine and to preserve adult and paediatric hepatitis B vaccine stock for those at the highest risk and with the greatest ability to benefit, several alternative schedules and vaccine options can be considered.

Paediatric dosages are based on a lower dose of antigen needed to achieve an adequate immune response in children, rather than any concerns about safety. There are therefore no expected safety issues from using adult dose vaccines in children, which can be considered when paediatric vaccines are not available.

Many of these vaccine options will be off-label use of licensed products. For further information on off-label use of vaccines see:
https://www.gov.uk/government/publications/off-label-vaccine-leaflets

The advice tables that follow include advice for pre-exposure and post exposure prophylaxis and for completion of primary schedules and boosting. The advice provided is not absolute; it requires some clinical judgement and hence is not presented in an algorithm, but in tables. The advice will be updated as vaccine availability changes.

Table 2: **Antigen content** of hepatitis B containing vaccines available in the UK
Table 3: **Post exposure dose-sparing options** for hepatitis B vaccination to preserve vaccine for groups most likely to benefit
Table 4: **Pre-exposure dose-sparing options** for hepatitis B vaccination to preserve vaccine for groups most likely to benefit
Table 5: **Dose sparing options for completion of pre-exposure** schedules and boosting

4. Vaccine supply and ordering

In the UK, licensed hepatitis B monovalent and combination hepatitis A/B vaccines are provided by Merck Sharp & Dohme Limited (MSD) or GlaxoSmithKline (GSK). These vaccines are not centrally procured or supplied by PHE. They should be ordered direct from manufacturers or wholesaler companies. PHE does not hold any emergency stockpile.

If your usual vaccine cannot be obtained from your usual supplier / manufacturer try an alternative supplier and/or an alternative vaccine. To register to become a customer of GSK or MSD visit http://www.aah.co.uk/shop/en-GB/aahpoint/opening-an-aah-account or telephone the AAH Customer Services number: 0344 561 8899, stating which company you would like to place an order with.

Providers are requested to exercise constraint in ordering vaccines and to observe manufacturers' ordering restrictions; these have been introduced to a) prioritise vaccine for post exposure vaccination (particularly infants born to infected mothers); and b) to prevent stock from being exhausted rapidly. Providers should order only the essential stock for immediate use and should not stockpile. Responsible ordering will help preserve scarce stock for those in greatest need.

Manufacturers have put in processes to allow exceptional requests for additional doses if there is a clear clinical and public health need on an individual patient basis or as part of an outbreak response e.g. transmission event in a renal dialysis unit.

Table 2 Antigen content of hepatitis B containing vaccines available in the UK

Formulation	Ages and group	Trade name	HepB vaccine antigen content (micrograms)	Volume (ml)	Manufacturer
Monovalent HepB	Paediatric: 0-15 years	EngerixB®	10	0.5	GlaxoSmithKline (GSK)
Monovalent HepB	Paediatric: 0-15 years	HBVaxPRO®	5	1.0	Merck Sharp & Dohme Limited (MSD)
Combination HepA/HepB	Paediatric: 1-15 years	Twinrix Paediatric®	10	0.5	GSK
Combination HepA/HepB	Paediatric: 1-15 years	Ambirix®	20	1.0	GSK
Combination DTaP/IPV/Hib/HepB	Paediatric: 6 weeks -2 years	Infanrix hexa®	10	0.5	GSK
Monovalent HepB	Adult: 16 years and over	EngerixB®	20	1.0	GSK
Monovalent HepB	Adult: 16 years and over	HBVaxPRO®	10	1.0	MSD
Combination HepA/HepB	Adult: 16 years and over	Twinrix Adult®	20	1.0	GSK
Monovalent HepB Renal high antigen content	Adult (15 years and over) renal pre-dialysis and dialysis patients	Fendrix®	20	0.5	GSK
Monovalent HepB Renal high antigen content	Adult renal pre-dialysis and dialysis patients	HBVaxPRO40®	40	1.0	MSD

Table 3 Post-exposure options for hepatitis B vaccination in adults and children (to be read in conjunction with Table 18.7 of the Green Book)

Post-exposure vaccination	Order of preference	Infants born to hepatitis B infected mothers	Other children exposed to a known or unknown source of hepatitis B	Adults exposed to a known or unknown source of hepatitis B
URGENT TESTING OF THE SOURCE SHOULD BE DONE IF THEIR HEPATITIS B STATUS IS UNKNOWN	1st	Paediatric monovalent HepB vaccine (EngerixB or HBVaxPRO)	Paediatric combination HepA/B vaccine (Twinrix paediatric)	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)
	2nd	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)	High dose paediatric HepA/B vaccine (Ambirix)	High Ag content HepB vaccine (Fendrix or HBVaxPRO40)
	3rd	Paediatric combination HepA/B vaccine (Twinrix paediatric)	Paediatric monovalent HepB vaccine (EngerixB or HBVaxPRO)	Adult combination HepA/B vaccine (Twinrix)
	4th	High dose paediatric or adult combination HepA/HepB vaccine (Ambirix or Twinrix)	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)	High dose paediatric HepA/B vaccine (Ambirix)
	5th	Combination DTaP/IPV/Hib/HepB* (Infanrix hexa)	Adult combination HepA/HepB vaccine (Twinrix)	Two simultaneous doses of paediatric combination HepA/B vaccine (Twinrix Paediatric)
Considerations /rationale/other advice	• A full risk assessment should be undertaken taking into account hepatitis B status of source, significance of exposure, vaccination status of recipient and indications for vaccine (+/- hepatitis B immunoglobulin (HBIG)) given as recommended in Table 18.7 of the Green Book and Immunoglobulin Handbook • **Urgent testing of the source, if their hepatitis B status is unknown or uncertain**, **should be done**, preferably before vaccine is given; if source is hepatitis B surface antigen negative, first or further doses may not be required – see table 18.7 in the Green Book • No immunogenicity data are available to support use of paediatric antigen content vaccine in adults post exposure • Vaccine administration should never be delayed for infants born to hepatitis B infected mothers, as these infants have been exposed to a substantial volume of infectious blood during the birthing process • Paediatric monovalent HepB vaccine is prioritised for infants born to hepatitis B infected mothers, so paediatric combination HepA/HepB vaccine is recommended for other post exposure indications in children. Combination DTP/IPV/Hib/HepB may be used from six weeks of age for second and subsequent doses. *Exceptionally, DTP/IPV/Hib/HepB (licensed from 6 weeks of age) may be used from four weeks of age but should not count towards the routine infant schedule for the other antigens. • High Ag content vaccine for renal indications can be used as post exposure vaccination in adults in preference to preserve adult normal Ag content monovalent or combination HepA/B vaccine for pre-exposure use or for post-exposure use in infants and children • Combination HepA/HepB vaccine may be preferred if HepA vaccination is also indicated e.g. MSM, travellers, chronic liver disease • Simultaneous doses of lower antigen content vaccines should be given at the same site and are preferred to doses given separately to ensure compliance			

Table 4 Pre-exposure options for hepatitis B vaccination in children and adults

Order of preference	Children	Immunocompetent adults	Adults with immunosuppression or chronic liver disease	Adults of any age with renal failure who are pre-dialysis or on dialysis
1st	Paediatric combination HepA/B vaccine (Twinrix paediatric)	Adult monovalent HepB vaccine (unless requiring hepatitis A) (EngerixB or HBVaxPRO)	Adult combination HepA/B vaccine (Twinrix)	High Ag content HepB vaccine (Fendrix or HBVaxPRO40)
2nd	Paediatric monovalent HepB vaccine (EngerixB or HBVaxPRO)	Adult combination HepA/B vaccine (Twinrix)	High dose paediatric HepA/B vaccine (Ambirix)	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)
3rd	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)	High dose paediatric HepA/B vaccine (Ambirix)	Adult monovalent HepB vaccine (EngerixB or HBVaxPRO)	High dose paediatric or adult combination HepA/HepB vaccine (Ambirix or Twinrix)
4th	High dose paediatric or adult combination HepA/HepB vaccine (Ambirix or Twinrix)	Paediatric combination HepA/HepB vaccine (Twinrix paediatric)	Two simultaneous doses of paediatric combination HepA/HepB vaccine (Twinrix paediatric)	Two simultaneous doses of paediatric combination HepA/HepB vaccine (Twinrix paediatric)
Considerations /rationale/ other advice	• No immunogenicity data are available to support use of paediatric antigen content vaccine in adults pre-exposure • Paediatric combination HepA/B vaccine is preferred for pre-exposure use in children to preserve monovalent paediatric HepB vaccine for those infants born to infected mothers; children may also have a (future) indication for hepatitis A vaccine too (travel to endemic countries) • Those who are older, immunocompromised (including HIV+) and have chronic liver disease may have a lower response to vaccine and are at higher risk of developing either chronic infection or serious complications • Combination HepA/HepB vaccine may be preferred if hepatitis A vaccine is also indicated e.g. MSM, travellers, chronic liver disease • Simultaneous doses of lower antigen content vaccines should be given at the same site and are preferred to doses given separately to ensure compliance • Renal dialysis patients are tested post vaccination and regularly; reinforcing doses can therefore be given if they have a suboptimal response to vaccine (see Green Book chapter 18) • People travelling to high risk countries for long periods of time should be advised of the usual precautions to protect against hepatitis B and other blood-borne viruses (HIV and hepatitis C) which are not preventable by vaccine but have similar transmission routes. (See section 1.1 above and NATHNAC for further advice) • Workers at occupational risk should be aware of universal precautions to prevent hepatitis B infection and other blood-borne viruses (HIV and hepatitis C) which are not preventable by vaccine but have similar transmission routes • At–risk individuals, particularly those at occupational risk, should be advised to follow post-exposure local guidance in the event of a significant exposure (see also table 18.7 in chapter 18 of the Green Book)			

Table 5 Dose sparing options for completion of pre-exposure schedules and for boosting

Dose sparing option	Rationale / Examples	Other advice
Schedule options for pre-exposure primary immunisation		• Remind workers at occupational risk of universal precautions to prevent hepatitis B infection and other blood-borne viruses (HIV and hepatitis C) which are not preventable by vaccine but have similar transmission routes • Remind at–risk individuals, particularly those at occupational risk, to follow post-exposure local guidance in the event of a significant exposure (see also table 18.7 in chapter 18 of the Green Book) • Remind travellers of other precautions to prevent hepatitis B and other blood-borne viruses (HIV and hepatitis C) which are not preventable by vaccine but have similar transmission routes. (See section 1.1 above and NATHNAC for further advice)
Avoid using 0, 7, 21 day (super-accelerated) schedule - preferentially use standard (0, 1, 6 months) or, if rapid protection required, the accelerated schedule (0, 1, 2 months)	• The super-accelerated schedule uses 3 doses in 1 month which is wasteful in the current supply climate and because the immune response following 3 doses with the super accelerated schedule is lower than that with 3 doses of the standard or accelerated schedule, it makes deferral of the reinforcing/booster dose at 12 months more risky • For most indications, particularly travel and occupational health, there should be sufficient time to complete or start the standard or accelerated course • Limited data suggest that, in healthy adults over 18 years, two doses at 0 and 1 months will provide equivalent protection to 3 doses at the super-accelerated schedule	
Defer third dose of primary pre-exposure immunisation to at least 6 months in those not at immediate risk of exposure who can recognise exposure and access care promptly	• Equivalent protection achieved after 3 doses with 0,1 6 month and 0,1,2 month schedules • In healthy adults and children, a high proportion will have started to respond after a second dose of hepatitis B vaccine and a completing dose given after an exposure should provide rapid protection.	
Boosting		
In immunocompetent individuals who have completed a primary immunisation course at 0, 1, 2 months, boosting can be deferred to 24 months	• Although knowledge about the duration of protection against infection and disease is still incomplete, studies demonstrate that, among successfully vaccinated immunocompetent individuals, protection against chronic infection persists for 20-30 years or more. Therefore WHO have concluded that there is no compelling evidence for recommending a booster dose of hepatitis B vaccine in routine immunisation programmes.	
In immunocompetent healthcare and lab workers, who have completed a primary immunisation course, defer the single booster dose currently recommended for five years after the primary course for at least another 12 months		

Other resources

The Green Book: Immunisation against Infectious Disease https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book) chapter 18 (hepatitis B)

Immunoglobulin handbook for hepatitis B: https://www.gov.uk/government/publications/immunoglobulin-when-to-use

NaTHNaC travel vaccination recommendations by country: https://travelhealthpro.org.uk/countries