Infanrix hexa: a hexavalent vaccine for infant immunisation

STEVE CHAPLIN

The hexavalent vaccine Infanrix hexa, which protects against hepatitis B in addition to diphtheria, tetanus, pertussis, poliomyelitis and *Haemophilus influenzae* type b, was introduced to the UK routine infant immunisation schedule in Autumn 2017. This article summarises its efficacy and adverse effects, with an overview of the new immunisation schedule.

**KEY POINTS**

- In Autumn 2017, hepatitis B vaccination was introduced in the UK as part of the routine infant immunisation schedule.
- Infanrix hexa, a vaccine protecting against diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b and hepatitis B, was first licensed in 2000.
- It has now replaced the pentavalent Pediacel and Infanrix-IPV+Hib vaccines for administration at 8, 12 and 16 weeks of age.
- Infanrix hexa confers seroprotection in 96–100% of recipients, though much of the available data on its real-world effectiveness include immunisation regimens and booster doses not used in the UK.
- Babies born to mothers with hepatitis B infection will continue to receive the monovalent hepatitis B vaccine at birth, four weeks and one year of age.

Since Autumn 2017, the UK routine immunisation schedule has included vaccination against hepatitis B for all infants born on or after 1 August 2017 (see Table 1). At the age of eight weeks, infants receive an oral liquid and three injections conferring protection against: rotavirus (oral Rotarix); meningococcus group B (intramuscular Bexsero); 13 serotypes of pneumococcus (intramuscular Prevenar 13); and diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b and hepatitis B (intramuscular DTap/IPV/Hib/HepB, brand name Infanrix hexa). This hexavalent vaccine replaces the pentavalent Pediacel and Infanrix-IPV+Hib.

Further doses of Infanrix hexa are due at 12 weeks old (with rotavirus vaccine) and 16 weeks old (with pneumococcal and meningococcal group B vaccines).

Children receive booster doses against meningococcal group B, pneumococcus and *H. influenzae* type b at one year of age; diphtheria, tetanus, pertussis and polio at age three years and four months; and against tetanus, diphtheria and polio at age 14 years, but a booster dose against hepatitis B is not required provided they have completed the Infanrix hexa infant schedule.

Infanrix hexa can also be used for catch-up immunisation for children up to their 10th birthday who did not receive primary immunisation. Babies born to mothers with hepatitis B infection will continue to receive the monovalent hepatitis B vaccine at birth, four weeks and one year of age in addition to the routine schedule for Infanrix hexa.

**Properties**

Infanrix hexa is not new: it was first licensed by the European Medicines Agency in 2000. It was added to the routine immunisation programme following a decision in 2014 by the Joint Committee on Vaccination and Immunisation that an infant combination vaccine offers a cost-effective way of immunising infants against hepatitis B.

Although the World Health Organization had recommended that every country should provide universal hepatitis B vaccination as long ago as 1992, the fact that the UK is a low prevalence country (with rates higher among people originally from endemic areas) meant that it was not cost effective to implement such a programme with a monovalent vaccine. There was also concern that combination vaccines may compromise the protection afforded against pertussis and *H. influenzae* type b.
zae type B infection but experience in the UK has shown this is not the case. The hexavalent vaccine then had to be procured at a price that made its use cost effective, which perhaps explains why it has taken so long for its inclusion in the routine immunisation programme.

Infanrix hexa is supplied in two parts (as was the pentavalent vaccine it replaces). The DTaP/IPV/HepB component is a solution in a prefilled syringe; this is injected into a vial containing the Hib vaccine powder to reconstitute the full vaccine, which is then withdrawn and administered by deep intramuscular injection into the thigh. Contraindications are the same as for other vaccines and include hypersensitivity to its components or excipients.

### Effectiveness

Several studies have evaluated the immunogenicity of Infanrix hexa, though they included immunisation schedules that were dissimilar to the dose regimen (at two, three and four months of age) now in use in the UK. According to data provided by manufacturer GlaxoSmithKline, the UK regimen is associated with one-month seroprotection rates of 96–100%, the lowest being against *H. influenzae* type B. Real-world effectiveness in protecting against pertussis infection (defined as ≥21 days of paroxysmal cough) was 84–89%, though the regimens used were different from that in the UK.

Evidence of long-term protection is provided by pooled data from studies including three-dose primary regimens with a booster dose in the second year. The prevalence of protective immunity against hepatitis B at seven to eight years of age among children who had received this regimen was at least 72%. The prevalence of protective immunity in children aged four to eight years exceeded 90% against poliovirus and *H. influenzae* type B, and was approximately 65% against diphtheria and tetanus and 25%, 98% and 87% against the three pertussis components.

### Adverse effects

The adverse effects of Infanrix hexa are similar to those of other vaccines and include fever, fatigue, pain and injection-site reactions. Evidence suggests that the risk of transient febrile reactions is increased when it is given at the same time as pneumococcal conjugate vaccine (Prevenar 13), a combination that is scheduled at eight and 16 weeks. Postmarketing surveillance suggests that the risk of convulsions (with or without fever) and hypertonic hyporesponsive episodes may also be increased when co-administered with Prevenar 13.

If an infant has a minor illness without fever, immunisation can still be given. However, if the infant is acutely unwell (e.g. with a fever above 38.5°C), immunisation may be postponed to avoid wrongly attributing symptoms to the vaccine.

### References


### Declaration of interests

None to declare.

Steve Chaplin is a medical writer specialising in therapeutics

![Table 1. UK routine immunisation schedule for infants aged 8–16 weeks, from Autumn 2017](https://www.medicines.org.uk/emc/product/2586)