11

The UK immunisation programme

Routine childhood immunisation programme

The overall aim of the routine childhood immunisation programme is to protect all children against the following preventable childhood infections:

- diphtheria
- tetanus
- pertussis (whooping cough)
- *Haemophilus influenzae* type b (Hib)
- polio
- meningococcal serogroup C (MenC)
- measles
- mumps
- rubella
- pneumococcal.

The immunisation schedule

The schedule for routine immunisations and instructions for how they should be administered are given in Table 11.1.

Primary immunisation with diphtheria, tetanus, pertussis, polio and Hib (DTaP/IPV/Hib) vaccine is given at two, three and four months of age. Pneumococcal vaccine is given at two and four months. MenC vaccine is given at three and four months. This ensures completion of the primary course at an appropriate age to provide protection against infections such as whooping cough, pneumococcal, Hib and meningococcal serogroup C, which are most dangerous for the very young.

Every effort should be made to ensure that all children are immunised, even if they are older than the recommended age range; no opportunity to immunise should be missed.

If any course of immunisation is interrupted, it should be resumed and completed as soon as possible. There is no need to start any course of immunisation again.

Table 11.1 Schedule for the UK's routine childhood immunisations

When to immunise	What vaccine is given	How it is given*
Two months old	Diphtheria, tetanus, pertussis (whooping cough), polio and Hib (DTaP/IPV/Hib)	One injection
	Pneumococcal (PCV)	One injection
Three months old	Diphtheria, tetanus, pertussis (whooping cough), polio and Hib (DTaP/IPV/Hib)	One injection
	Meningococcal C (MenC)	One injection
Four months old	Diphtheria, tetanus, pertussis (whooping cough), polio and Hib (DTaP/IPV/Hib)	One injection
	MenC	One injection
	PCV	One injection
Between 12 and 13 months of age (i.e. within a month of the first birthday)**	Hib/MenC	One injection
	PCV	One injection
	Measles, mumps and rubella (MMR)	One injection
Three years four months to five years old	Diphtheria, tetanus, pertussis and polio (DTaP/IPV or dTaP/IPV)	One injection
	Measles, mumps and rubella (MMR)	One injection
Girls aged 12 to 13 years old	Human papillomavirus (HPV)	Three injections
Thirteen to 18 years old	Tetanus, diphtheria and polio (Td/IPV)	One injection

* Where two or more injections are required at once these should ideally be given in different limbs. Where this is not possible, injections in the same limb should be given 2.5cm apart.

** For the vaccinations given as toddlers, local reactions are uncommon but the rate of local reactions was slightly higher after PCV than after MMR or Menitorix (Miller *et al.*, 2010). Based on this evidence where injections can only be given in two limbs, it may be preferable to give the PCV in one limb and MMR and combined Hib/MenC in the other limb.

Details of immunisation procedures are given in Chapter 4 and in the relevant disease-specific chapters.

Children should have received these vaccines by these ages:

By four months:	Three doses of DTaP/IPV/Hib. Two doses of PCV and MenC.
By 13 months:	A booster dose of Hib/MenC and PCV and the first dose of MMR.
By school entry:	Fourth dose of DTaP/IPV or dTaP/IPV and the second dose of MMR.
Before leaving school:	Fifth dose of Td/IPV and, for girls, three doses of HPV vaccine.

When babies are immunised in special care units, or children are immunised opportunistically in accident and emergency units or inpatient facilities, it is most important that a record of the immunisation is sent to the primary care trust, NHS trust or health board by return of an 'unscheduled immunisation form'.

Vaccination of children with unknown or incomplete immunisation status

For a variety of reasons, some children may not have been immunised or their immunisation history may be unknown. If children coming to the UK are not known to have been completely immunised, they should be assumed to be unimmunised and a full course of immunisations should be planned.

Where a child born in the UK presents with an inadequate immunisation history, every effort should be made to clarify what immunisations they may have had. A child who has not completed the routine childhood programme should have the outstanding doses as described in the relevant chapters.

Children coming to the UK who have a history of completing immunisation in their country of origin may not have been offered protection against all the antigens currently protected against in the UK. For country-specific information, please refer to www.who.int/immunization_monitoring/en/globalsummary/countryprofileselect.cfm.

Children coming from developing countries, from areas of conflict or from hard-to-reach population groups may not have been fully immunised. Where there is no reliable history of previous immunisation, it should be assumed that children are unimmunised and the full UK recommendations should be followed.

Children coming to the UK may have had a fourth dose of a diphtheria/tetanus/pertussis-containing vaccine that is given at around 18 months in some countries. This dose should be discounted, as it may not provide satisfactory protection until the time of the teenage booster. The routine pre-school and subsequent boosters should be given according to the UK schedule.

An algorithm for vaccinating individuals with uncertain or incomplete immunisation status is available at http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947406156

Premature infants

It is important that premature infants have their immunisations at the appropriate chronological age, according to the schedule. The occurrence of apnoea following vaccination is especially increased in infants who were born very prematurely.

Very premature infants (born ≤ 28 weeks of gestation) who are in hospital should have respiratory monitoring for 48-72 hrs when given their first immunisation, particularly those with a previous history of respiratory immaturity. If the child has apnoea, bradycardia or desaturations after the first immunisation, the second immunisation should also be given in hospital, with respiratory monitoring for 48-72 hrs (Pfister *et al*., 2004; Ohlsson *et al*., 2004; Schulzke *et al*., 2005; Pourcyrous *et al*., 2007; Klein *et al*., 2008).

As the benefit of vaccination is high in this group of infants, vaccination should not be withheld or delayed.

Selective childhood immunisation programmes

There are a number of selective childhood immunisation programmes that target children at particular risk of certain diseases, such as hepatitis B, tuberculosis, influenza and pneumococcal. For more information please see the relevant chapters.

Adult immunisation programme

Five doses of diphtheria, tetanus and polio vaccines ensure long-term protection through adulthood. Individuals who have not completed the five doses should have their remaining doses at the appropriate interval. Where there is an unclear history of vaccination, adults should be assumed to be unimmunised. A full course of diphtheria, tetanus and polio should be offered in line with advice contained in the relevant chapters.

Older adults (65 years or older) should be routinely offered a single dose of pneumococcal polysaccharide vaccine, if they have not previously received it. Annual influenza vaccination should also be offered.

Selective vaccines should also be considered for young adults unprotected against diseases including measles, mumps, rubella and meningococcal C. Other vaccinations should be considered for any adult with underlying medical conditions and those at higher risk because of their lifestyle. These vaccinations include Hib, MenC, influenza, pneumococcal and hepatitis B. For more information please see the relevant chapters.

Reference

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Miller E, Andrews N, Waight P *et al*. (2010) Safety and immunogenicity of co-administering a combined meningococcal serogroup C and *Haemophilus influenzae* type b conjugate vaccine with 7-valent pneumococcal conjugate vaccine and measles, mumps and rubella vaccine at 12 months of age. *Submitted*.

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Pfister RE, Aeschbach V, Niksic-Stuber V *et al*. (2004) Safety of DTaP-based combined immunization in very-low-birth-weight premature infants: frequent but mostly benign cardiorespiratory events. *J Pediatr* **145**(1): 58-66.

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Schulzke S, Heininger U, Lucking-Famira M *et al*. (2005) Apnoea and bradycardia in preterm infants following immunisation with pentavalent or hexavalent vaccines. *Eur J Pediatr* **164**(7): 432-5.