

Factsheet

Haemophilus influenzae type b
(Hib) and meningococcal
serogroup C (MenC) vaccines
for children



This factsheet explains the new schedule for MenC vaccine and the introduction of the combined Hib/MenC booster vaccine. It also provides background information on the vaccines and describes the diseases against which they protect.

A booster dose of combined *Haemophilus influenzae* type b (Hib) and meningococcal serogroup C (MenC) vaccine (Hib/MenC) in the second year of life was introduced into the routine childhood immunisation programme in 2006. At the same time, the timing of the primary MenC schedule was changed and a new vaccine against pneumococcal disease was introduced (see *Pneumococcal conjugate vaccine for children* factsheet – www.immunisation.nhs.uk).

For information on the other vaccines used in the routine immunisation programme, please refer to the NHS Immunisation Information website www.immunisation.nhs.uk or www.dhsspsni.gov.uk/phealth

The changes

What are the changes?

The two key changes to the routine MenC and Hib childhood immunisation schedules are:

- modification of the timing of the primary MenC vaccine in the first four months of life, and the introduction of a booster dose in the second year of life;
- the introduction of a booster dose of Hib in the second year of life.

Why were these changes made?

The routine childhood immunisation programme is changed when:

- new vaccines are developed, or
- new research shows that giving existing vaccines at different times provides better protection.

On what basis were these changes made?

Studies have shown that two doses of MenC in the first year of life provide the same level of protection as the three doses previously offered (Southern *et al.*, 2006). This means that, as there is no additional or increased protection from having three doses of MenC in early infancy, the number of doses of MenC given in the first year of life has been reduced. Evidence shows that the protection provided by the MenC immunisation in the UK begins to wane in the second year of life (Trotter *et al.*, 2004). A booster dose of MenC offered in the second year has been shown to provide protection through the early childhood years.

Recent evidence has shown that to ensure that Hib disease levels remain well controlled, a booster dose of Hib vaccine is needed in the second year of life (Trotter *et al.*, 2003).

The new schedule

Hib immunisation

Before 2006, Hib vaccine was routinely given to babies at two, three and four months as part of the combined DTaP/IPV/Hib vaccine, together with MenC. This schedule will continue, with a booster dose of Hib given shortly after the first birthday.

MenC immunisation

Before 2006, MenC vaccine was routinely given to babies at two, three and four months of age, together with their DTaP/IPV/Hib vaccine. Now, MenC vaccine will be given to babies at three and four months of age and a booster dose will be given shortly after the first birthday.

The revised schedule is shown in Table 1.

The diseases

There are a number of causes of meningitis and septicaemia. This factsheet describes two of these – *Haemophilus influenzae* type b (Hib) infections, and meningococcal serogroup C infections.

Haemophilus influenzae type b (Hib)

What is Hib disease?

Haemophilus influenzae (Hib) disease is the term used to describe infections caused by the group of bacteria *Haemophilus influenzae*.

There are six strains of *Haemophilus influenzae* bacteria known to cause disease. The strain that used to cause most disease in the UK is type b, usually referred to as Hib. Hib is spread by coughing, sneezing or close contact with an infected person.

Table 1 The new routine childhood immunisation programme for children up to 15 months of age

When to immunise	What vaccine is given	How it is given
Two months old	Diphtheria, tetanus, acellular pertussis, polio and Hib (DTaP/IPV/Hib)	One injection
	Pneumococcal conjugate vaccine (PCV)	One injection
Three months old	DTaP/IPV/Hib	One injection
	Meningococcal C (MenC)	One injection
Four months old	DTaP/IPV/Hib	One injection
	PCV	One injection
	MenC	One injection
12 months old	Hib/MenC booster	One injection
15 months old	MMR	One injection
	PCV	One injection

Not everyone who becomes infected with Hib develops the disease. Anyone can carry the Hib bacteria in their nose or throat without showing any signs of the disease but they can infect others. Before Hib vaccine was introduced, about four in every 100 children aged one to four years were Hib carriers (Howard *et al.*, 1988).

How serious is Hib disease?

Most children who develop Hib disease become very ill and need hospital care. Hib causes a number of serious diseases including meningitis, septicaemia (blood poisoning) and epiglottitis (see Table 2). The complications that arise from these diseases, such as deafness, convulsions and intellectual

impairment, can be devastating. Hib disease can be fatal: about one in 20 children who develop Hib meningitis die (Anderson *et al.*, 1995). Symptoms and complications from Hib disease are summarised in Table 2.

Following the introduction of the Hib vaccine, laboratory-confirmed cases of Hib disease in children under five years of age fell by 98%. Disease rates also declined in unvaccinated older children and adults because of the reduced circulation of Hib bacteria among vaccinated children. Similar marked declines of Hib disease have also been seen after the introduction of the vaccine in other European countries and in Australia, Canada and the USA (Peltola, 1998; Wenger, 1998).

Table 2 The symptoms and complications of Hib disease

Invasive disease caused by Hib	Symptoms	Serious complications
Meningitis, frequently accompanied by bacteraemia	In babies: A high-pitched, moaning cry. Irritable when picked up. A bulging fontanelle. Drowsy and less responsive/vacant/being difficult to wake. Floppy and listless or stiff with jerky movements. Refusing feeds, vomiting. Skin that is pale, blotchy or turning blue. Fever.	Up to 45 children in every 100 will develop long-term neurological problems, such as <ul style="list-style-type: none"> • hearing disorders • learning and language disability or delayed development • seizures (fits) • visual impairment. One child in every 20 who develops Hib meningitis will die.
Epiglottitis	Swelling of the epiglottis causing noisy and painful breathing.	Severe blockage of the airway that can be fatal.
Septic arthritis	Fever, painful, red, hot and swollen joints.	Long-term bone infection. Septicaemia – can lead to death.
Cellulitis	Sore, hot, painful area of skin.	Septicaemia – can lead to death.
Pneumonia	Cough, breathing difficulties, chest pain.	Can be fatal. Septicaemia – can lead to death.
Pericarditis	Chest pain, breathing difficulties.	Can be fatal.

Further information on the signs and symptoms of meningitis and septicaemia can be found on the websites www.immunisation.nhs.uk, www.meningitis.org (Meningitis Research Foundation, Freephone 24-hour helpline 080 8800 3344) or www.meningitis-trust.org.uk (Meningitis Trust, Freephone 24-hour helpline 0800 028 18 28).

How common is Hib?

Before Hib vaccine was introduced in 1992, around one in 600 children developed some form of Hib disease by their fifth birthday (Booy *et al.*, 1993; Howard *et al.*, 1991). Children under four years of age were at most risk from Hib disease. More than two-thirds of cases were in children less than two years of age and those most at risk were infants aged 10–11 months (Booy *et al.*, 1993).

Hib infection was the most common cause of bacterial meningitis in children in England and Wales, with eight to 11 children in every 100 developing long-term neurological problems following Hib meningitis. However, the number of children suffering long-term problems may be an underestimate as studies in the US found that up to 45 children in every 100 suffered long-term neurological problems following Hib meningitis (Sell, 1987). There were around 30 deaths every year in England and Wales and about 80 children were left with deafness and permanent brain damage (Tudor-Williams *et al.*, 1989; Howard *et al.*, 1991).

The introduction of Hib vaccine in October 1992 had a dramatic impact on the rate of Hib disease (see Figure 1). When Hib vaccine was introduced in 1992, all children under the age of four years were offered the vaccine as part of a catch-up programme.

What has happened to the levels of Hib disease in the last few years?

Following the introduction of the vaccine in 1992, Hib disease cases fell dramatically with the almost complete disappearance of the disease in young children. From 1999, there was a small but gradual increase in the reported number of cases of Hib disease. In children under four years of age, the numbers of cases (130 in 2002) were much lower than the levels seen before the introduction of Hib vaccine (about 800 every year).

In 2003, there was a one-off immunisation programme to boost young children's immunity to Hib, halting and reversing the increase of Hib disease in young children.

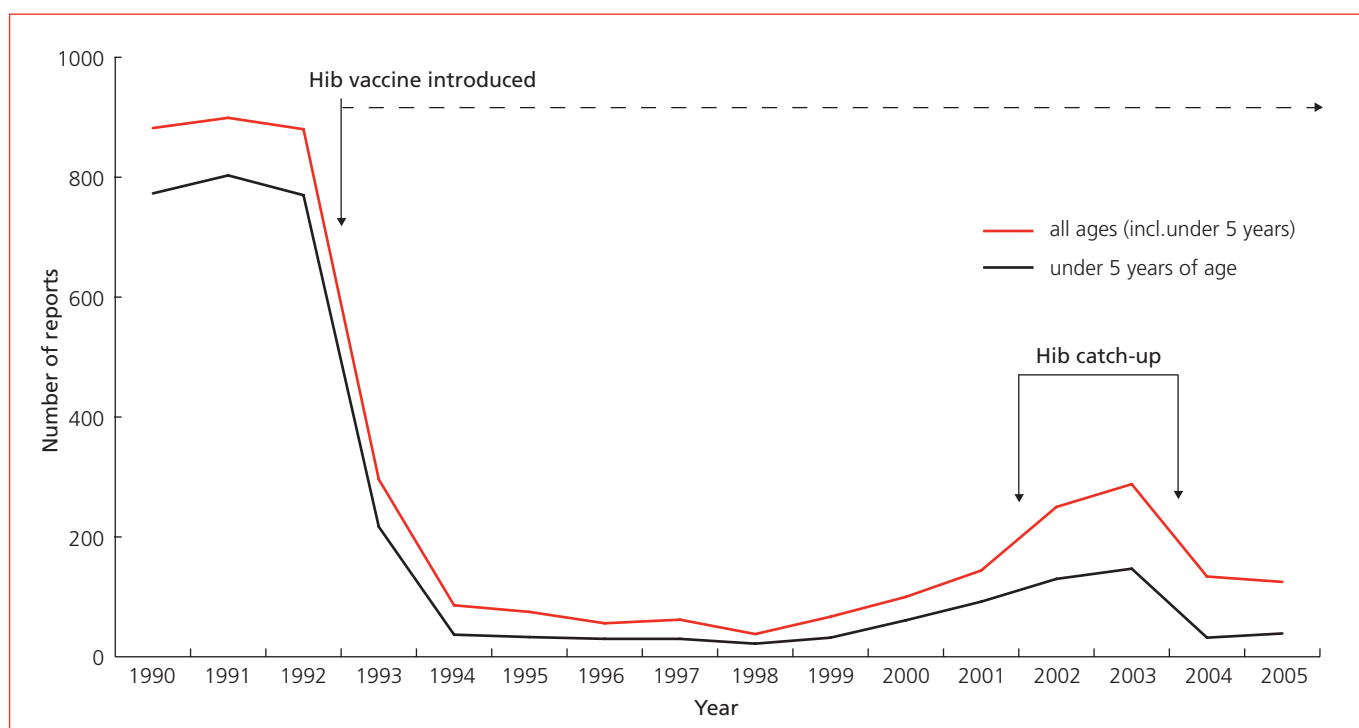


Figure 1 Laboratory reports of Hib disease in England and Wales 1990-2005
Source: Health Protection Agency

Meningococcal disease

Meningococcal disease is caused by an infection with the bacteria *Neisseria meningitidis*. There are at least 13 meningococcal serogroups, of which groups B and C are the most common in the UK. Meningococcal infection most commonly affects the lining of the brain (meningitis) or the blood (septicaemia). There is a marked seasonal variation in meningococcal disease rates, with peak levels in the winter months usually declining to low levels by late summer.

Groups B and C used to account for the majority of meningococcal cases in the UK. Following the MenC vaccine campaign in 1999, the number of laboratory-confirmed group C cases fell by over 90% in those age groups immunised (Salisbury *et al.*, 2001; Trotter *et al.*, 2004) and by two-thirds in other age groups as a result of herd immunity (Trotter *et al.*, 2003).

Group B strains now account for over 80% of laboratory-confirmed isolates submitted to the Health Protection Agency (HPA) Meningococcal Reference Unit.

Other serogroups of meningococcal disease, such as A, Y, W135, 29E and Z occur much less frequently.

How do you get it?

Transmission of the meningococcal bacteria is through droplets or respiratory secretions (e.g. coughing and sneezing), or more directly through kissing. Transmission from person to person requires either frequent or close prolonged contact.

Although carriage of the meningococcal bacteria in the nose and throat is unusual in infants and young children (Cartwright, 1995), up to 25% of adolescents and 5-11% of adults carry the bacteria without manifesting any signs or symptoms of the disease (known as carriers). It is not known why some individuals develop meningococcal disease and others do not.

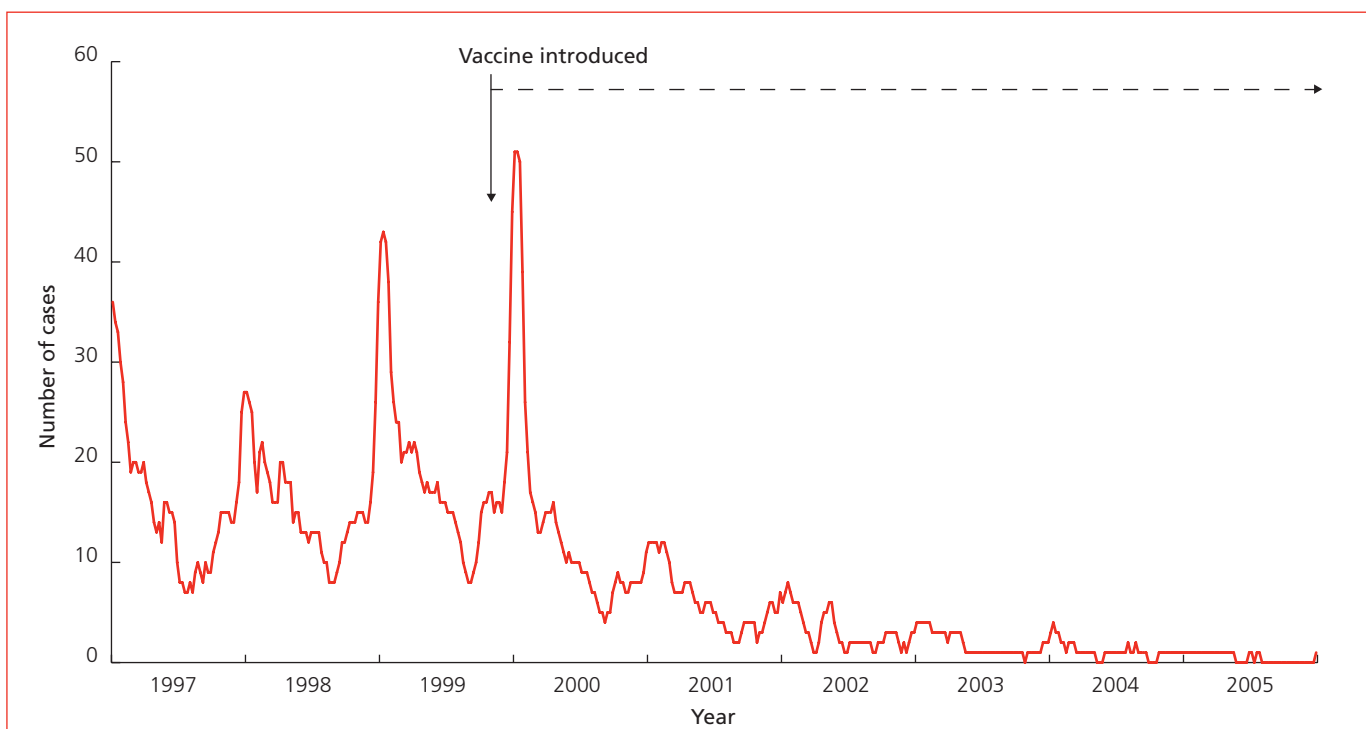


Figure 2 Laboratory reports of meningococcal C disease in England and Wales 1997-2006.

Source: Health Protection Agency North West, Manchester Laboratory

Meningococcal serogroup C disease

What is meningococcal serogroup C disease?

Meningococcal C disease is caused by an infection with the bacteria *Neisseria meningitidis* serogroup C.

How common is it?

Meningococcal C infection is now rare, affecting approximately five in 100,000 people a year in the UK (Figure 2).

What are the signs and symptoms of meningococcal C disease?

The most common signs and symptoms of meningitis and septicaemia are listed in Table 3 opposite. It is important to note that in the early stages of the infection, the symptoms can be mild and similar to those of flu. Not all the symptoms listed may occur and they may present slightly differently in different age groups.

The development of red or purple spots (resembling bruising) that do not fade under pressure is serious, indicating septicaemia that must be treated immediately with antibiotics.

Where a rash occurs, the 'glass test' should be done. Press the side of a glass firmly against the rash to see if the rash fades and loses colour under pressure (see Table 3). If it does not change colour, you should contact a doctor or go to the nearest hospital immediately.

How serious is meningococcal C disease?

Both meningitis and septicaemia are serious conditions and must be treated immediately. However, septicaemia is the more serious of the two conditions as it is associated with higher morbidity and mortality.

Are there any long-term problems associated with meningococcal C infection?

Approximately one in ten people who develop meningococcal disease will die (Ramsay *et al.*, 1997; Goldacre *et al.*, 2003). The death rate for septicaemia (20%) is substantially higher than for meningitis (7%) (Davison *et al.*, 2002). Of those who survive, approximately 25% report a reduced quality of life (Erikson and De Wals, 1998; Granoff *et al.*, 2004). The most common long-term effects are skin scars, hearing loss, seizures, limb amputation(s), and brain damage (Lepow *et al.*, 1999; Steven and Wood, 1995).

What has been the impact of the meningitis C conjugate (MenC) vaccine?

Following the introduction of this vaccine, there was a large fall in the number of laboratory-confirmed cases of group C disease in all age groups (Figure 2). Cases were reduced by 90% in all age groups that were vaccinated. An impact has also been seen in the unimmunised age groups, with a reduction of around 70%, suggesting that this vaccine has produced a herd immunity effect.

The UK was the first country in the world to introduce the MenC vaccine. Prior to its introduction in November 1999, serogroup C disease was the second most common cause of meningococcal disease, accounting for around 40% of cases. Serogroup C disease now accounts for less than 10% of cases, with serogroup B disease accounting for over 80% of cases.

A number of other countries including Canada, the Netherlands, Spain, France and Australia have now introduced MenC into their childhood immunisation programmes.

Table 3 Signs and symptoms of meningitis and septicaemia

The first symptoms of both meningitis and septicaemia may be non-specific and can be mistaken for a cold or flu (i.e. fever, vomiting, irritability and restlessness). However, individuals can become seriously ill within hours.

If the presentation is predominantly one of septicaemia (blood poisoning), symptoms may include:

in babies:

- rapid or unusual patterns of breathing
- skin that is pale, blotchy, or turning blue
- fever with cold hands and feet
- shivering
- vomiting, refusing to feed
- red or purple spots that do not fade under pressure (do the glass test explained below)
- pain or irritability from muscle aches or severe limb or joint pain
- floppiness
- severe sleepiness

in older children, adolescents and adults:

- being sleepy, less responsive, vacant, or confused (a late sign in septicaemia)
- severe pains and aches in the arms, legs and joints
- very cold hands and feet
- shivering
- rapid breathing
- red or purple spots that do not fade under pressure (do the glass test explained below)
- vomiting
- fever
- diarrhoea and stomach cramps

If the presentation is predominantly one of meningitis, symptoms may include:

in babies:

- a high-pitched, moaning cry
- being irritable when picked up
- a bulging fontanelle
- being drowsy and less responsive or difficult to wake
- being floppy and listless or stiff with jerky movements
- refusing feeds, vomiting
- skin that is pale, blotchy or turning blue
- fever

in older children, adolescents and adults:

- a stiff neck (check that they can kiss their knees or touch their forehead with their knees)
- a very bad headache (this alone is not a reason to get medical help)
- a dislike of bright lights
- vomiting
- fever
- being drowsy, less responsive or confused
- a rash[†]

Important information

Not everyone will develop all the symptoms listed above and symptoms can appear in any order. If an individual develops some of the symptoms listed above, especially red or purple spots (resembling bruises) that do not fade under pressure is indicative of septicaemia.



Press the side of a clear drinking glass firmly against the rash so you can see if the rash fades and loses colour under pressure.

[†]This type of rash is more likely in meningococcal infection and is very uncommon in pneumococcal infection. This condition must be treated immediately with antibiotics. If you cannot get in touch with your doctor, or are still worried after getting advice, trust your instincts and take your child to the emergency department of your nearest hospital. As the disease progresses, photophobia (dislike of light), disorientation and reduced awareness, possibly leading to coma, may develop.

The vaccines

Primary Hib vaccination programme

Primary Hib vaccination is given at two, three and four months of age as part of the combined DTaP/IPV/Hib vaccine.

What is this vaccine?

The vaccine contains Hib polysaccharide that has been conjugated to tetanus toxoid. The Hib vaccine is combined with diphtheria, acellular pertussis, tetanus and inactivated polio vaccines as DTaP/IPV/Hib.

The vaccine cannot cause Hib infection.

There is currently one product routinely used for primary immunisation as DTaP/IPV/Hib (Pediacef).

What does this vaccine protect against?

This vaccine protects against serious diseases caused by Hib, including meningitis, septicaemia and epiglottitis. It does not protect against meningitis and septicaemia caused by other bacteria and viruses such as *Pneumococcus* or mumps. (For information about the other parts of this combined vaccine please visit www.immunisation.nhs.uk)

How long does this vaccine protect for?

This vaccine will provide protection against Hib infection during the first year of life.

How safe is this vaccine?

Before being licensed, all medicines (including vaccines) are thoroughly tested to ensure that they are of high quality, and to assess their safety and immunogenicity. However, as with other medicines, vaccines can have side effects. These are outlined below.

What side effects may be seen?

Local reactions, such as swelling and redness, may occur in as many as one in ten recipients. These reactions tend to appear within three to four hours of the injection and usually last no longer than 24 hours. Mild side effects such as a slightly raised temperature have also been reported but are short-lived. No serious side effects have been reported that are specific to Hib vaccine.

Primary MenC immunisation programme

Primary MenC vaccination is given at three and four months of age.

What is this vaccine?

This vaccine contains meningococcal serogroup C polysaccharide, which has been conjugated to either tetanus toxoid or to CRM197 protein.

This vaccine cannot cause meningococcal serogroup C infection.

Meningitec, Menjugate and NeisVac are the three products currently used for routine primary immunisation.

What does this vaccine protect against?

This vaccine protects against meningococcal serogroup C infection and its consequences. It does not protect against meningitis and septicaemia caused by serogroup B meningococcal disease or other bacteria or viruses such as *Pneumococcus*, Hib or mumps.

How long does this vaccine protect for?

This vaccine will provide protection against meningococcal serogroup C infection during the first year of life.

How safe is this vaccine?

Before being licensed, all medicines (including vaccines) are thoroughly tested to ensure that they are of high quality, and to assess their safety and immunogenicity. However, as with other medicines, vaccines can have side effects. These are outlined below.

What side effects may be seen?

Local reactions, such as swelling and redness, may occur in as many as one in ten recipients. These reactions tend to appear within three to four hours of the injection and usually last no longer than 24 hours. Mild side effects such as a slightly raised temperature have also been reported but are short-lived. No serious side effects have been reported that are specific to MenC vaccine.

Booster Hib and MenC immunisation in the second year of life

A combined Hib/MenC conjugate vaccine is given at around 12 months.

What is this vaccine?

This vaccine contains Hib polysaccharide and MenC polysaccharide, both of which are conjugated to tetanus toxoid. The vaccine has been shown to elicit booster responses to both Hib and MenC when given in the second year of life to children who received their primary vaccines as babies.

This vaccine cannot cause either Hib or meningococcal serogroup C infection.

Menitorix is the product routinely used for boosting in the second year of life.

What does this vaccine protect against?

This vaccine protects against Hib and meningococcal serogroup C infections and their consequences. It does not protect against meningitis and septicaemia caused by serogroup B meningococcal infection or other bacteria or viruses such as *Pneumococcus* or mumps.

How long does this vaccine protect for?

This vaccine will boost the protection provided by the primary course of Hib and MenC vaccine to provide longer-term immunity through early childhood against both infections and their consequences.

How safe is this vaccine?

Before being licensed, all medicines (including vaccines) are thoroughly tested to ensure that they are of high quality, and to assess their safety and immunogenicity. However, as with other medicines, vaccines can have side effects. These are outlined below.

What side effects may be seen?

Mild side effects such as irritability, loss of appetite, pain, swelling, redness at the site of the injection and slightly raised temperature commonly occur, but are short-lived. No serious side effects have been reported that are specific to combined Hib/MenC vaccine.

Why is a booster dose of Hib/MenC needed?

This booster is needed to ensure longer-term protection from these two infections through the early childhood years, and to ensure that disease levels remain low in the population.

When will my child receive the Hib/MenC booster dose?

Your child will receive the booster dose of Hib/MenC at around 12 months.

How will my child be called for their booster dose of Hib/Men C?

Appointments will be sent to parents by the Child Health Computer System or by your GP. The vaccination will be given at your surgery, health centre or clinic.

My child had a bad reaction after a previous dose of MenC or Hib, what should they receive instead?

The only medical reason for not giving another dose of vaccine is if a child had a confirmed anaphylactic reaction to a previous dose of a MenC- or Hib-containing vaccine. Even if your child had a severe local or generalised reaction to a previous dose, it is recommended that he/she should receive further doses because the benefits of the protection afforded by the vaccine far outweigh the discomfort of the side effects.

General immunisation information

What should I do if my child is unwell after immunisation?

Side effects from any of these vaccines are usually mild. It is not unusual for your child to be a little unwell 24 to 48 hours after having the injections. You may notice a small lump where they had the injection but this will disappear.

A few children may develop a mild fever after immunisation. Children should be treated for a mild fever by making sure they have plenty of cool drinks and by giving them paracetamol or ibuprofen liquid. Parents should be reminded to read the instructions on the bottle carefully and give the correct dose for their child's age. This is especially important for ibuprofen where different dosages are only appropriate for children of certain ages and weights.

Never give medicine containing aspirin to children under 16.

If a child has a severe or unexpected reaction to this vaccine, this should be reported to your doctor, practice nurse or health visitor.

If parents are concerned about their child after immunisation, they should consult a doctor. It may be that the child is suffering from an illness that is unrelated to the vaccine.

If a parent, carer, doctor, nurse or pharmacist suspects that an adverse reaction to any vaccine has occurred in a child, they should report it to the Commission on Human Medicines (formerly the Committee on Safety of Medicines), by using the Yellow Card spontaneous reporting scheme (www.yellowcard.gov.uk) or by calling the Yellow Card hotline on freephone 0800 100 3352 (available weekdays 10.00am-2.00pm).

Are there any reasons why a child should not receive these vaccines?

There are very few medical reasons why a child should not be immunised. The only situations in which immunisation is contraindicated are those where a child has had:

- a confirmed anaphylactic reaction to a previous dose, or
- a confirmed anaphylactic reaction to any component of the vaccine

If a child is ill, with a fever, immunisation should be postponed until the child has recovered. This is to avoid wrongly associating any cause of fever, or its progression, with the vaccine and to avoid increasing any pre-existing fever. Children with a minor illness without a fever, e.g. a cold, should be offered immunisation.

Are these changes being made because too many vaccines were combined into one injection?

No. It is because the type of vaccines being used require a further dose in the second year of life to provide long-term protection.

Can the body cope with so many vaccines at one time?

Yes. As soon as a child is born it comes into contact with thousands of bacteria and viruses. From the moment of birth, a baby's immune system responds to all these bacteria and viruses, preventing them from causing harm. The vaccines that babies receive in the first year of life are just a drop in the ocean compared to the tens of thousands of bacteria and viruses in the environment that babies have to cope with every day. In fact, it has been estimated that the immune system of each infant could respond to 10,000 vaccines at any one time (Offit *et al.*, 2002).

Can my child have the Hib/MenC, MMR and PCV all at the same time?

It is not currently recommended that PCV is given at the same time as the Hib/MenC booster. This is a precautionary measure until more data accumulates as to whether these two conjugate vaccines can be given at the same time without any interference between them.

Further information and frequently asked questions

For further information on these and any other immunisations, please refer to the Immunisation Information website at www.immunisation.nhs.uk or www.dhsspsni.gov.uk/phealth

Glossary of terms

Acellular vaccine

An acellular vaccine contains only parts of cells that can produce immunity in the person receiving the vaccine.

Adverse reaction

A side effect of any medicine, including vaccines.

Allergic reactions

Sensitivity to certain substances that can lead to conditions such as asthma, eczema, hay fever and headache.

Anaphylaxis

An immediate and severe allergic reaction.

Antibodies

Proteins produced by the body to neutralise or destroy toxins and disease-carrying organisms.

Bacterium/bacteria

Single cell micro-organisms, some of which cause disease. Others are essential for our bodies to work properly.

Carrier

A person who is infected but does not show symptoms of a disease.

Cellulitis

A bacterial skin infection.

Chronic bronchitis

Inflammation of the air passages in the lung, characterised by the coughing up of excessive mucus.

Commission on Human Medicines (CHM)

Statutory independent body responsible for advising on the licensing and safety of human medicines.

Community (herd) immunity

The protection conferred on individuals who have not been immunised because sufficient numbers of the rest of the population have been immunised.

Conjugate vaccine

Vaccines made with part of the sugar (polysaccharide) coating of a bacterium being combined (conjugated) with a protein (e.g. tetanus or diphtheria) which makes it work better and gives better protection over a long period of time.

The conjugate vaccines in the childhood immunisation schedule are Hib, MenC and PCV.

Contraindication

A reason why a vaccine should not be given.

DTaP/IPV/Hib

Combined vaccine that protects against five different diseases – diphtheria, tetanus, pertussis (or whooping cough), polio and *Haemophilus influenzae* type b (Hib).

Diphtheria

Diphtheria is a disease that usually begins with a sore throat and can quickly cause problems with breathing. It can damage the heart and nervous system and, in severe cases, it can kill.

Efficacy

The measure of a vaccine's effectiveness. It is measured by the proportion of those immunised who don't get a disease when exposed to it, or by the number of antibodies produced by the immune system.

Encapsulated

Bacterium surrounded by a sugar coat.

Epidemiology

The study of patterns of diseases, including their occurrence, severity and distribution.

Epiglottitis

Inflammation or swelling of the epiglottis that can cause a blockage of the airway, and can be fatal.

Haemophilus influenzae

The family of bacteria that cause Hib disease. They occur in two forms – those with capsules (encapsulated) and those without (non-encapsulated). Serious disease is usually caused by the encapsulated organism, of which there are six types (a-f). Type b caused the majority of invasive disease before the introduction of Hib vaccine in 1992. Non-encapsulated strains are mainly associated with ear and chest infections.

Hib

Hib is an infection that can cause a number of major illnesses such as meningitis, blood poisoning and pneumonia. All of these illnesses can kill if they are not treated quickly.

Immune response

The body's response to an immunisation or infection.

Immunisation

The priming of the body's immune system with a vaccine.

Induration

The hardening of an area around an injection site.

Invasive disease

Serious forms of infections where bacteria such as *Pneumococcus*, Hib and *Meningococcus* have entered the bloodstream, leading to septicaemia, or other parts of the body such as the brain, causing meningitis.

Meningitis

Meningitis is an infection of the lining of the brain. It is very rare but very serious, although if it's picked up early enough, most people make a full recovery.

Meningococcus

Meningococcus is a type of bacteria of which there are over 13 serogroups, of which B and C are the most common in the UK, although the number of cases of both has dropped greatly in the last few years. Other serogroups such as A, Y, W135, 29E and Z occur much less frequently.

Mortality rate

The chances of dying from a particular condition.

Nephrotic syndrome

A kidney condition leading to loss of protein.

Otitis media

Inflammation of the middle ear, usually due to viral or bacterial infection.

Pericarditis

Inflammation of the lining of the heart.

Pertussis (whooping cough)

Whooping cough is a disease that can cause long bouts of coughing and choking, which can make it hard to breathe. It can last for up to ten weeks. It is not usually serious in older children, but it can be very serious in babies under one year old.

Pneumococcal pneumonia

Pneumonia caused by the *Streptococcus pneumoniae* bacterium.

Pneumonia

Inflammation of the lung from a variety of causes, such as viruses and bacteria, particularly *Streptococcus pneumoniae*.

Poliomyelitis/polio

A disease caused by a virus that attacks the nervous system, leading to paralysis of the muscles. If it affects the chest muscles, it can kill.

Polysaccharide vaccines

Polysaccharide vaccines are manufactured from parts of the sugar (polysaccharide) coat of a bacterium, e.g. *Pneumococcus*, Hib and *Meningococcus*.

Red Book

Personal Child Health Record (PCHR).

Septic arthritis

Serious infection in a joint.

Septicaemia

A serious form of blood poisoning (infection of the blood) due to the bacteria.

Serotypes

Different types of the same bacteria.

Streptococcus pneumoniae

Streptococcus pneumoniae is a type of bacterium, of which there are over 90 different serotypes.

Surveillance

The routine monitoring of disease levels, how many people are being immunised against the disease and the impact of immunisation programmes.

Tetanus

Tetanus is a painful disease that affects the muscles and can cause breathing problems. It is caused by bacteria that are found in soil and manure and can get into the body through open cuts or burns. Tetanus affects the nervous system and, if it is not treated, it can kill.

Vaccines

Vaccines are manufactured in different ways using part of the germ or virus which causes the disease. Since live, attenuated oral polio vaccine was withdrawn in 2004, they cannot cause the disease for which they give protection.

Yellow Card reporting scheme

The Yellow Card Scheme is for voluntary reporting of suspected adverse drug reactions (ADRs), including those following vaccination, for routine post-marketing surveillance of medicines. These cards may be completed by parents, carers, doctors, dentists, pharmacists, coroners and nurses, and by pharmaceutical companies under statutory obligations. They are submitted to the Commission on Human Medicines (CHM), Medicines and Healthcare products Regulatory Agency (MHRA).

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