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Pre-school immunisations

a guide to vaccinations at three years and four months of age

immunisation
the safest way to protect your child

‘The two public health interventions that have had the greatest impact on the world’s health are clean water and vaccines.’

World Health Organization

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This guide describes all the routine childhood immunisations for children at three years and four months of age

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Introduction

This guide is for parents or guardians of children aged three to five years old. It provides information on the routine immunisations that are given to children before they start school to protect them from serious childhood diseases. It describes these diseases and explains why young children need protection against them. It also answers some of the most common questions asked.

Summary

These immunisations are generally due about three years after your child has completed the ones they had when they were two, three and four months old. You will receive an appointment for the immunisations.

The table below shows the pre-school immunisations your child will be offered. These immunisations will make sure that your child has the best protection against serious childhood diseases as they grow up.

Vaccine to protect against	How it is given	Comments
diphtheria, tetanus, pertussis (whooping cough) and polio (dTaP/IPV or DTaP/IPV) - known as the 4 in 1 booster.	One injection, generally given in the upper arm (into the deltoid muscle).	This is a booster dose of the vaccine your child had as a baby but without the Hib (*Haemophilus influenzae* type b) part.
measles, mumps and rubella (MMR).	One injection, generally given in the upper arm (into the deltoid muscle).	This is the routine second dose of the vaccine. (If your child has not had the first dose yet, it should be given now and they should have their second dose in three months time).

Common questions about immunisation

What is immunisation?

Immunisation is a way of protecting against serious diseases. Once we have been immunised, our bodies are better able to fight those diseases if we come into contact with them.

How do vaccines work?

There are some diseases that can kill children or cause lasting damage to their health. Vaccines contain a small part of the bacterium or virus that causes a disease, or tiny amounts of the chemicals that the bacterium produces. Vaccines work by causing the body's immune system to make antibodies (substances that fight off infection and disease). Then if your child comes into contact with the infection, the antibodies will recognise it and be ready to protect him or her.

How do we know that vaccines are safe?

Before they are allowed to be used, all medicines (including vaccines) are thoroughly tested to make sure they are safe and effective. After they have been licensed, the safety of vaccines continues to be monitored.

All medicines can cause side effects, but vaccines are among the very safest. Based on ongoing research from around the world and many years' experience with immunisation, vaccines are known to be the safest way to protect your child's health.

Why does my child need to be immunised at this age?

Immunity (protection) against diphtheria, tetanus, pertussis (whooping cough) and polio fades over time. Also, immunity to measles, mumps and rubella may not develop after a single dose of the MMR vaccine. These immunisations given about the age of three years and four months – often called the pre-school boosters – will top up your child's level of antibodies (substances that fight off infection and disease) and help to keep them protected. Or if immunity did not develop, a second dose gives a further chance to get protected.

When you take your child for their pre-school boosters, you will have the chance to make sure their other immunisations are up to date.

A further booster of diphtheria, tetanus and polio is required to ensure optimum protection. This is given to all teenagers in the UK while they're at secondary school – usually from the age of 13 years.

If some diseases have disappeared from this country, why do we need to immunise against them?

In the UK, these diseases are kept at bay by high immunisation rates. Around the world, more than two million people a year die from infectious diseases with 1.4 million of these being children under five years old. Most of these deaths could be prevented by immunisation.

As more people travel abroad and more people come to visit this country, there is a risk that these diseases will come back into the UK. These diseases may spread to people who haven't been immunised so your child is at greater risk if he or she has not been protected. Immunisation doesn't just protect your child – it also helps to protect your family and the whole community especially those, who for medical reasons, cannot be immunised.

Remember, its never too late to have your child immunised. Even if he or she has missed an immunisation and is older than the recommended ages, talk to your Practice Nurse, Health Visitor or GP to arrange for them to be immunised.

I am worried that my child may have allergies. Can he or she have the vaccine?

Yes. Asthma, eczema, hay fever, food intolerances and allergies do not prevent your child having any vaccine in the routine childhood immunisation programme. If you have any questions, speak to your Practice Nurse, Health Visitor or GP.

Are some children allergic to vaccines?

Very rarely a person can have an allergic reaction soon after immunisation. This reaction may be a rash or itching affecting part or all of the body. Those giving the vaccine will know how to treat this. It does not mean that your child should stop having immunisations.

Even more rarely, individuals can have a severe reaction within a few minutes of the immunisation that causes breathing difficulties and can cause a collapse. This is called an anaphylactic reaction. A recent study has shown that only one anaphylactic reaction occurs in about a million immunisations. Those who give immunisations are trained to deal with anaphylactic reactions and children recover completely.

An anaphylactic reaction is a severe and immediate allergic reaction that needs urgent medical attention.

Are there any reasons why my child should not be immunised?

There are very few reasons why children cannot be immunised. The vaccines should not be given to children who have had:

- a confirmed anaphylactic reaction to a previous dose of the vaccine; or
- a confirmed anaphylactic reaction to neomycin, streptomycin, or polymyxin B (antibiotics that may be added to vaccines in tiny amounts).

What about the MMR vaccine? Are there any other reasons why my child should not receive this vaccine?

MMR is a live attenuated vaccine (that is, it contains live viruses that have been weakened). In general, children who are *immunocompromised* should not receive live vaccines.

Children who are immunocompromised include those:

- whose immune system does not work properly because they are undergoing treatment for a serious condition such as a transplant or cancer; or
- who have any condition that affects the immune system such as severe primary immunodeficiency (very rare disease) that means a child is more likely to catch infections.

If this applies to your child, you must tell the person giving the vaccine before the immunisation. They will need to get specialist advice about using live vaccines such as the MMR (and BCG for those who need it). MMR should not be given to children who have had a confirmed anaphylactic reaction to gelatin.

If your child:

- has a bleeding disorder (for example, haemophilia where the blood doesn't clot properly), or
- has had a fit not associated with fever (see **What is a fever?** on page 12),

speak to the person giving the vaccine before your child has any immunisation.

What if my child is ill on the day of the appointment?

If your child has a minor illness without a fever - such as a cold - the immunisations should be given as normal.

If your child is ill with a fever, you should delay the immunisation(s) until he or she has recovered. This is to avoid the fever being associated with the vaccine, or the vaccine increasing the fever he or she already has.

dTaP/IPV or DTaP/IPV vaccine booster given at 3 years 4 months or soon after

These vaccines boost the immunisations that were given to your child at two, three and four months of age. They protect against diphtheria, tetanus, pertussis and polio.

What is the difference between dTaP/IPV and DTaP/IPV, and does the difference matter?

Diphtheria vaccines are produced in two strengths, depending on how much diphtheria toxoid (the toxin produced by diphtheria bacteria that has been inactivated) they contain. The two strengths are abbreviated to 'D' for the high strength and 'd' for the low strength. There are two vaccines available for use in the pre-school booster – one containing the high-strength diphtheria (DTaP/IPV) and the other containing low-strength diphtheria (dTaP/IPV). Both vaccines have been shown to provide good responses, so it doesn't matter which one your child has for their pre-school booster.

What is diphtheria?

Diphtheria is a serious disease that usually begins with a sore throat and can quickly cause breathing problems. It can damage the heart and nervous system and, in severe cases, can kill. Before the vaccine was introduced in the UK, there were up to 70,000 cases a year causing up to 5,000 deaths.

What is tetanus?

Tetanus is a disease affecting the nervous system that can lead to muscle spasms, cause breathing problems and can kill. It is caused when germs found in soil and manure get into the body through open cuts or burns. Tetanus cannot be passed from person to person.

What is pertussis (whooping cough)?

Pertussis is a disease that can cause long bouts of coughing and choking making it hard to breathe. It can last for up to 10 weeks. Babies under one year of age are most at risk and it is not usually as serious in older children. Before the vaccine was introduced, the average number of cases reported each year in the UK was 120,000 and 92 children died in the year before the vaccine was introduced.

What is polio?

Polio is a virus that attacks the nervous system and can cause permanent paralysis of the muscles. It can affect the chest muscles or the brain. It can kill. Before the vaccine was introduced, as many as 8,000 cases occured in the UK in endemic years.
Due to the continued success of the vaccination, there have been no cases of natural polio infection in the UK for over 20 years (the last case was in 1984).

How effective are these pre-school vaccines?

Studies have shown that the vaccines are very effective.
The booster will not only protect your child until they are due to have their next booster at about 13 years of age, it will also prevent the infections from being passed on to babies who are too young to have had all of their immunisations.

Will there be any side effects from the injections?

Some children will have minor side effects and they might include:

- redness, swelling or tenderness where they had the injection (this will slowly disappear on its own);
- being a bit irritable and/or feeling unwell;
- a temperature (fever).

What is a fever?

A fever is a temperature over 37.5ºC. Fevers are quite common in young children, but are usually mild. If your child's face feels hot to the touch and they look red or flushed, he or she might have a fever. You should check his or her temperature with a thermometer to be sure.

If your child has a raised temperature and appears unwell:

- give him or her paracetamol or ibuprofen liquid (it is important that you follow the instructions on the bottle);
- give him or her plenty to drink;
- make sure he or she is not over dressed or wrapped up in too many layers;
- check that the temperature of the room feels comfortable and not too warm (about 18 to 21ºC).

If his or her temperature stays high or you are worried, contact your Practice Nurse, Health Visitor or GP.

It is important that you only give the paracetamol or iboprofen liquid if your child has a raised temperature and appears unwell after the vaccination. *They should not be given, either before or after vaccination, as a 'just in case' measure as the vaccine may not work so well.*

Remember, never give medicines that contain aspirin to children under 16.

If you are worried about your child, trust your instincts. Speak to your GP practice or call NHS Direct Wales on 0845 46 47.

Call the practice immediately if, at any time, your child:

- has a temperature of 39ºC or above; or
- has a fit.

What are fits?

Fits are also called seizures or convulsions in which a child starts shaking or becomes rigid (stiff) and may become unconscious. Some fits are associated with fever and some are not.

Seizures associated with fever (may be called a febrile seizure or febrile convulsion) are rare in the first six months of life and are most common in the second year of life. After this age, they become less frequent and are rare after the age of five years.

Febrile seizures are most often caused by viral infections, but can also cause them. Most children who have febrile seizures recover fully. When a child has a seizure within a short time after immunisation, it might not have been caused by the vaccine or the fever. It could be due to another cause such as an underlying medical condition.

If your child has a fit after an immunisation, contact your GP. You may be referred to a specialist for advice about further investigations and future immunisations. If the practice is closed or if you can't contact them any other way go straight to the emergency department of your nearest hospital.

MMR vaccine - second dose given pre-school

The MMR vaccine protects your child against measles, mumps and rubella (German measles).

Your child should have had the first dose of MMR vaccine between 12 and 13 months of age. It is given again when children are aged 3 years and 4 months.

The MMR vaccine contains weakened types of live measles, mumps and rubella viruses. Because the viruses are weakened, people who have had the vaccine cannot infect other people.

Why does my child need two doses of MMR vaccine?

Your child needs a second dose of MMR because it doesn't always work fully the first time. Some children who have only one dose of the vaccine might not be protected against one or more of the diseases.

If your child has not had a MMR vaccination before, they should have the first dose now and the second dose after three months.

Two doses of the MMR vaccine are routinely given across Europe as well as in the US, Canada, Australia and New Zealand. By giving your child a second dose of the vaccine, you can make sure they have the best possible protection.

How effective is the MMR vaccine?

The MMR vaccine is very effective against rubella and measles, and a little less effective against mumps.

Before the MMR vaccine was introduced, mumps was the most common cause of viral meningitis in children under 15 years old. It led to 1,200 people going into hospital each year. If children are not immunised with the MMR vaccine, they are at risk of getting mumps. Since it was introduced in the UK in 1988, the MMR vaccine has almost wiped out the three diseases in young children.

What is measles?

Measles is one of the most infectious diseases known and is caused by a virus. Nearly everyone who catches it will have a high fever, a rash and generally be unwell. Children often have to spend about five days in bed and could be off school for 10 days. Adults are likely to be ill for longer. It is not possible to tell who will be seriously affected by measles. It is common for children who catch measles to have complications. The most common complications include ear problems, chest infections, diarrhoea and fits. More rare complications include encephalitis (swelling of the brain), and brain damage.

Measles can kill. In 1987 (the year before the MMR was introduced in the UK), 86,000 children caught measles and 16 died.

How is it spread?

The measles virus is spread by tiny droplets in the air and a cough or a sneeze can spread the virus over a wide area. Because it is so infectious, the chances are your child will get measles if he or she is not protected and is exposed to a case.

What is mumps?

Mumps is caused by a virus that can lead to fever, headache, and painful, swollen glands in the face, neck and jaw. It can result in permanent deafness, viral meningitis (infection of the lining of the brain) and encephalitis. It commonly causes painful swelling of the testicles in adult and adolescent males and can affect the ovaries in females. Mumps lasts about 7 to 10 days. Before the MMR vaccine was introduced, about 1,200 people a year went into hospital because of mumps.

How is it spread?

Mumps is spread in the same way as measles. It is about as infectious as flu.

What is rubella?

Rubella (German measles) is also a disease caused by a virus. In children it is usually mild and can go unnoticed. It can cause a short-lived rash, swollen glands and a sore throat. Rubella is very serious for unborn babies. It can seriously damage their sight, hearing, heart and brain. This condition is called congenital rubella syndrome (CRS). In the five years before the MMR vaccine was introduced, about 43 babies a year were born in the UK with congenital rubella syndrome.

The greatest danger from rubella infection is to unborn babies in the first three months of pregnancy. If a woman is infected at that time, in 9 out of 10 cases her baby will be born deaf or blind, with a damaged heart, or mentally impaired. Miscarriages are also common among women who are infected with rubella in pregnancy. In many of the cases, pregnant women caught rubella from their own or their friends' children.

How is it spread?

Rubella is spread in the same way as measles and mumps. It is about as infectious as flu.

After the second (pre-school) dose of the MMR vaccine

It is less common to have side effects after the second dose than after the first dose. Also, when they do happen, they are usually milder.

The three different viruses in the vaccine act at different times and can produce the following side effects:

- 6 to 11 days after the immunisation as the measles part of the vaccine starts to work, it is very common to get a fever. Some children develop a measles-like rash and some go off their food (for advice on treating a fever, see page 12);

- about 1 in every 1,000 children immunised may have a fit caused by a fever. This is called a febrile convulsion (see page 13). However, if a child who has not been immunised gets measles, they are five times more likely to have a fit;
- uncommonly, children may get mumps-like symptoms (fever and swollen glands) about three weeks after their immunisation as the mumps part of the vaccine starts to work;
- very rarely, children may get a rash of small bruise-like spots in the six weeks after the vaccination. This is usually caused by the measles or rubella parts of the vaccine. If you see spots like these, take your child to the GP practice to be checked and they will tell you how to deal with the rash;
- fewer than 1 child in a million may develop encephalitis after vaccination but there is very little evidence that it is actually caused by the vaccine. However, if a child who has not been vaccinated catches measles, the chance of developing encephalitis is about 1 in 1,000.

Your GP practice will be able to discuss these issues in more detail.

Egg allergies

The MMR vaccine can safely be given to children who have had a severe allergic reaction (anaphylactic reaction) to egg. If you have any concerns, talk to your Practice Nurse, Health Visitor or GP.

MMR and Autism

There were many stories in the media linking MMR vaccine with autism in the 1990s. Some parents delayed their child's MMR immunisation or didn't let him or her be vaccinated. Outbreaks of measles followed. Independent experts from around the world have found no scientific evidence for such a link. The original research that caused the scare is now known to have been wrong and withdrawn.

Wouldn't it be better for my child to have MMR as separate vaccines?

No. The World Health Organization advises against giving separate vaccines as it leaves children at risk for longer and there is no evidence that single immunisations are safer than the MMR vaccine. In fact, children receiving the injections separately are more at risk from the diseases as it takes so much longer to protect them.

Pre-school immunisations give your child the best protection before they start school. If your child has missed any, they can have them now - talk to your GP practice.

Remember, these will be the last routine immunisations your child will receive before the final set of booster immunisations given to them as teenagers and HPV for girls age 12-13 years.

Watch out for meningitis and septicaemia

Both meningitis and septicaemia (blood poisoning) are very serious. It is important that you recognise the signs and symptoms and know what to do if you see them. Early symptoms of meningitis and septicaemia may be similar to a cold or flu (fever, vomiting, irritability and restlessness). However, those with meningitis or septicaemia can become seriously ill within hours.

It is important to be able to recognise the signs and symptoms of both these conditions and know what to do if you see them.

Although your child was immunised as a baby against Hib, meningitis C and some forms of pneumococcal bacteria (all of which cause meningitis and septicaemia), these vaccines will not protect them against other types of meningitis and septicaemia.

What is meningitis?

Meningitis is an infection of the lining of the brain and can be caused by several types of bacteria or viruses.

Infection with meningococcal bacteria can also cause diseases such as septicaemia, pericarditis (inflammation of the lining of the sac that contains the heart) and arthritis (swelling of the joints).

What is septicaemia?

Septicaemia is a very serious condition in which the blood becomes infected. The signs are cold hands and feet, pale skin, vomiting and being very sleepy or difficult to wake up. These signs can come on quickly. If you suspect that you, your child or someone else has septicaemia, get help urgently.

In babies and young children, the main symptoms of meningitis may include:

- an unusual cry, moaning;
- being fretful, not liking to be handled;
- a tense, bulging fontanelle in babies (see the glossary on page 24);
- feeling drowsy, floppy and not responding to you;
- refusing to eat/feed and vomiting;
- fever, cold hands and feet;
- neck stiffness, dislike of bright lights;
- convulsions/fits (see page 13).

The main signs of septicaemia may also include:

- breathlessness, fast or unusual patterns of breathing, grunting;
- skin that is pale, blotchy or turning blue;
- red or purple spots that do not fade under pressure (do the glass test explained on page 21.

It is important to remember that not everyone with meningitis or septicaemia will develop all the symptoms listed above.
If someone develops some of the symptoms listed, especially red or purple spots, get medical help urgently.

If you cannot get in touch with your GP practice or you are still worried after getting advice, trust your instincts and take your child to the emergency department of your nearest hospital.

The glass test

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. If it doesn't change colour, get medical help urgently.

*

Where can I get more information about meningitis?

The Meningitis Research Foundation and the Meningitis Trust both provide information on meningitis.

Meningitis Research Foundation – phone the free 24-hour helpline on 080 8800 3344 or visit the website at www.meningitis.org

Meningitis Trust – phone the 24-hour helpline on 0845 6000 800 or visit the website at www.meningitis-trust.org

You can also ask your Practice Nurse, Health Visitor or GP for advice or call NHS direct Wales on 0845 46 47.

* image provided by the Meningitis Trust.

Travel advice for children

If your child is going abroad, make sure their routine immunisations are up to date. Your child may also need extra immunisations. Contact your GP practice or travel clinic well in advance for up to date information about what your child needs to protect their health whilst travelling.

Glossary - describes some of the terms you might come across when your child has their immunisations.

Acellular pertussis vaccine	Whooping cough vaccine containing only parts of the pertussis bacterial cells that can produce immunity in the person receiving the vaccine.
Anaphylactic reaction	An immediate and severe allergic reaction that needs urgent medical attention.
Bacterium	A single germ. Many germs are called bacteria.
Convulsion	Also known as a fit. A medical condition where the muscles contract and relax rapidily resulting in uncontrollable shaking and usually unconsciousness.
dTaP/IPV & DTaP/IPV vaccines	The pre-school immunisations that protect against four diseases - diphtheria, tetanus, pertussis and polio. They contain acellular pertussis vaccine and inactivated polio vaccine.
DTap/IPV/Hib vaccine	An injection given to babies at two, three and four months of age to protect against five diseases - diptheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (Hib). It contains

	acellular pertussis vaccine and inactivated polio vaccine.
Encephalitis	Swelling of the brain.
Fit	Also known as a convulsion (see previous page).
Fontanelle	Space between the bones at the top of a baby's skull. This generally closes at about two years old.
Inactivated polio vaccine (IPV)	A polio vaccine made from viruses that have been killed.
Neomycin, Polymyxin and Streptomycin	Antibiotics put into vaccines to prevent contamination by bacteria.
Td/IPV	A combined vaccine that protects against three diseases – tetanus, diphtheria and polio. It contains tetanus, low-dose diphtheria and inactivated polio vaccine. It is given to young people aged 13 – 18 years to top up their levels of protection.
Toxoid	An inactivated bacterial toxin that stimulates an immune response when used in a vaccine.

Vaccine Damage Payment Scheme

Most immunisations are given without any trouble at all, but very rarely there may be problems. The Vaccine Damage Payment Scheme is designed to help with the present and future financial burdens of the person affected by the vaccinations and their family. It covers all the vaccines described in this leaflet but not the hepatitis B vaccine mentioned in the table on page 28.

There are several conditions that need to be met before a payment can be made. If you need more information, please contact:

Vaccine Damage Payments Unit
Department for Work and Pensions
Palatine House
Lancaster Road
Preston
PR1 1HB
Phone: 01772 899944
E-mail: CAU-VDPU@dwp.gsi.gov.uk

Where can I get more information?

You can also speak to your Practice Nurse, Health Visitor or GP or phone NHS Direct Wales on 0845 46 47.

Visit: www.nhs.uk/

The leaflet is also on the Welsh Government immunisation website:

www.wales.gov.uk/immunisation

Additional copies are available from the Welsh Government Publications Centre by:

e-mail: assembly-publications@wales.gsi.gov.uk
or telephone: 029 2082 3683
(between 08.00 and 17.00 Mon – Fri).

Any queries about this leaflet can be addressed to:

Health Protection Division
Welsh Government
Cathays Park
Cardiff
CF10 3NQ
Tel: 029 2080 1232 or 029 2080 1318

Routine childhood immunisation programme

Each vaccination is given as a single injection into the muscle of the thigh or upper arm.

Age to immunise	Diseases protected against	Vaccines given
Two months old	diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (Hib) pneumococcal infection	DTaP/IPV/Hib and PCV
Three months old	diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (Hib) meningitis C (meningococcal group C)	DTaP/IPV/Hib and MenC

Four months old	diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (Hib) meningitis C pneumococcal infection	DTaP/IPV/Hib and MenC and PCV
Between 12 and 13 months old (within a month of the first birthday)	*Haemophilus influenzae* type b (Hib) and meningitis C pneumococcal infection measles, mumps and rubella	Hib/MenC and PCV and MMR
Three years four months old	diphtheria, tetanus, pertussis and polio measles, mumps and rubella	DTaP/IPV or dTaP/IPV and MMR
Girls aged 12 – 13 years old	cervical cancer caused by human papillomavirus	HPV
From 13 years old	tetanus, diphtheria and polio	Td/IPV

Non-routine immunisations for at-risk babies

Age to immunise	Diseases protected against	Vaccines given
At birth (for babies who are more likely to come into contact with TB than the general population).	tuberculosis	BCG
At birth, 1 month, 2 months and 12 months old (for babies whose mothers have hepatitis B).	hepatitis B	Hep B
Each year between September and November (for children with chronic illness that increases the risk of flu).	influenza (flu)	Flu
From 2 years of age (for children with chronic illness that increases the risk of pneumococcal disease).	pneumococcal disease	PPV
(for the siblings of children susceptible to severe chicken pox).	chicken pox	Varicella