

Fact Sheet

Immunisation



Why do we need immunisation?

Immunisation means becoming immune to a disease as a result of receiving a vaccine. It is an effective and safe way of preventing a person from getting an infectious disease.

Years ago, pertussis (whooping cough), diphtheria and tetanus were amongst the killer diseases of childhood. Today, we have vaccines available to protect children against these and a number of other diseases. The word “vaccine” comes from the Latin “vacca” for cow to show that the first vaccines (against smallpox) were derived from cowpox. Smallpox was the first killer disease to be impacted on by vaccination in the 19th century and, in 1978, became the first disease to be wiped out from the world by vaccination. However, in the first part of the 20th century, more children died from infections like pertussis and diphtheria than from all other causes of child death today. Immunisation has almost wiped out these diseases and others like measles. But if immunisation rates go down, children will again be at risk, as happened in Russia when diphtheria immunisation rates went down in the 1990s.

We can now immunise against many diseases including the following:

- Pertussis (Whooping cough)
- Diphtheria
- Tetanus
- Measles
- Rubella (German measles)
- Mumps
- *Haemophilus influenzae* type b (Hib)
- Hepatitis B
- Hepatitis A
- Poliomyelitis
- Influenza
- Varicella (Chickenpox)

- Pneumococcal disease (some types)
- Meningococcal disease (some types)
- Rotavirus gastroenteritis
- Human papillomavirus (some types)

How does immunisation work?

Every time your child has an infection, cells of his/her immune system are stimulated and become active. They also produce some special protein chemicals called antibodies to fight against that infection. Different antibodies work against different infections.

Immunisation mimics a natural infection without giving the child the disease. This stimulates the body’s immune system so that it becomes prepared to fight against that infection if it comes along. The immunity produced by vaccines can survive for a long time; sometimes even a lifetime. So your child builds up resistance to the virus or bacteria without having to suffer from the infection, with its distress and risks of complications. If the immunised person comes into contact with the disease in the future, the body is able to make antibodies fast enough to prevent the person getting sick most of the time. Vaccines that are recommended for the general population to take are highly effective.

These days, children are recommended to receive more vaccines than in the past. Some parents may be concerned that their baby or small child might not be able to cope with so many vaccines at a time. In fact, several vaccines can safely and effectively be given at the same time.

Some vaccines are being made as combination vaccines so that the child can get protected against many diseases using fewer needles (for example there is a vaccine formulation for infants that protects against diphtheria, tetanus, pertussis, poliomyelitis, “Hib” disease, and hepatitis B in one injection).

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Humans are in contact with thousands of “antigens” (the part of a virus or bacteria) that stimulate the immune system every day. The small number of antigens in vaccines are like a “drop in the ocean” compared with those the body can react to at any one time. It is safe, and in fact recommended, that all due vaccines are given at the same visit. Giving all due vaccines at the same visit will also cause less trauma for your child and yourself than stringing them out over several visits.

Where to go for immunisation

- Your local doctor (general practitioners – GPs).
- Your local council, hospital or community centre may have free immunisation clinics.
- Some vaccines are offered through vaccination programs conducted in schools.

The diseases

Pertussis (whooping cough)

Young babies who suffer from pertussis typically cough in persistent bouts, sometimes lasting for up to three months. When they gasp for air at the end of the cough, a sound like a “whoop” is sometimes made. This is how the disease got its common name. Vomiting is also common with this disease, and pneumonia, seizures (fits) and brain damage may occur. When babies get pertussis, they may spend a long time in hospital and some need to be in intensive care; some of these babies die. In countries where immunisation rates have gone down, more babies are now getting pertussis. Even in countries like Australia where childhood immunisation rates are high, babies are still at risk because teenagers and adults are getting pertussis and may pass it on to young children. Unlike many diseases, protection against pertussis wears off several years after vaccination or after having the disease. There is now also a pertussis vaccine

formulation available for teenagers and adults, and it is recommended that all adolescents, people planning a pregnancy or who have just had a baby, and adults who work with young children should be vaccinated against this serious disease.

Diphtheria

Diphtheria most commonly affects the nose and throat and can cause severe inflammation that may block the windpipe. It can also produce toxins that may affect the heart and some nerves. The vaccine is very effective so we now very rarely see diphtheria in Australia. However, diphtheria still occurs overseas and people who are not adequately vaccinated can acquire it overseas, or it may be brought into Australia from an overseas traveller and may infect young babies or those who are unimmunised.

Tetanus (lockjaw)

Tetanus (lockjaw) is caused by toxins produced by some germs from the soil that has contaminated cuts and wounds, especially wounds containing foreign objects (like wood splinters) or wounds following burns, animal bites, trauma or fractures. Superficial injuries such as a scratch or a prick from a thorn contaminated by soil, dust or manure can also lead to tetanus. Tetanus may cause widespread muscle stiffness, muscle spasms and difficulties in breathing. Various complications and even death may occur.

Unfortunately, the tetanus germ is everywhere, so anyone who is not adequately immunised has the chance of catching tetanus. It is even possible to get tetanus twice, as the immunity resulting from the infection does not provide long-term protection.

Poliomyelitis (polio)

Poliomyelitis is caused by a highly infectious virus, which may be caught when the virus is introduced into the mouth, usually through water or food contaminated with faecal particles.

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Many infected people have no symptoms, but excrete the virus in their faeces and pass it on to others. The virus destroys nerves and can leave people permanently paralysed. If the disease affects the breathing muscles then the person may die unless their breathing is helped by medical equipment. The Salk vaccine (injectable polio) was the first polio vaccine introduced and it effectively stopped epidemics in developed countries. Oral Sabin vaccine has been used worldwide since the 1960s because it provides protection in the gut where the polio virus multiplies. Polio is almost wiped out world-wide but until it is completely wiped out, all countries must continue to immunise. Australia, like other many developed countries, is moving back to a modern form of injectable polio vaccine (from November 2005, polio will be combined with other vaccines) because of the extremely low risk of vaccine-related polio from the oral vaccine.

Measles

Measles is a highly infectious disease spread by respiratory droplets. It is characterised by fever, cough, conjunctivitis and a rash. Measles is a more serious illness than many people realise and is often complicated by middle ear infections and pneumonia. Measles can also, rarely, infect the brain and cause death or serious permanent brain damage. The very young and those with chronic illness are most at risk of these complications. Measles has become rare in Australia since the national measles control campaign in 1998 for primary schoolchildren and a national campaign for young adults. The only cases now occurring in Australia are brought in from overseas or are in unimmunised people who have contacted those overseas cases. Infants, who are too young to have had the measles vaccine, and other children and adults who are not vaccinated, are still at risk. It is important to make sure that two doses of measles vaccine (MMR) have been given, particularly to young adults, who may have missed being vaccinated as infants (when coverage was low), while during their childhood a second dose was

not yet recommended and disease exposure was decreasing.

Mumps

Mumps is caused by a virus and typically infects the salivary glands causing swelling of the face, but it can also cause meningitis. After puberty mumps can cause inflammation of the testes in men, the ovaries in women, the pancreas and other organs. Mumps virus can affect the inner ear and cause deafness at any age.

MMR is a combination vaccine in which three vaccines (measles, mumps and rubella) are combined in one injection to prevent these diseases.

Rubella (German measles)

Rubella is usually a mild illness in children but can be more severe in older people, with rash, swelling of the lymph glands, and joint problems. If a woman catches rubella in early pregnancy, the major concern is that her baby may be born with multiple problems such as deafness, blindness, heart defects and/or intellectual disability (this is known as the "congenital rubella syndrome").

It is important that everyone, but particularly women prior to pregnancy, are protected against rubella by having received two MMR vaccine doses at least one month apart earlier in life. Pregnant women generally have a blood test in early pregnancy. Rubella has become rare in Australia for much the same reason as measles. However, cases of congenital rubella can still occur when a pregnant woman who is not adequately immunised is exposed to an infected person. Women born in some overseas countries who may not have received rubella vaccine are at particular risk.

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***Haemophilus influenzae* type b (Hib)**

Haemophilus influenzae type b (Hib) is a type of bacteria which can cause severe diseases like pneumonia, meningitis (inflammation of the lining around the brain) and other life-threatening illnesses like epiglottitis, which blocks the upper airway. Since Hib vaccine was introduced in 1993, these diseases caused by Hib have gone from over 500 cases a year to becoming very rare. All children should have Hib vaccine, starting at 2 months of age.

Hepatitis B

Hepatitis B is a virus that infects the liver. Individuals, and especially babies, who get this disease may have no or only mild symptoms to start. However, when the virus is caught in infancy or childhood, it is likely that it will remain in the body and blood causing chronic or long term infection. This is called being a “carrier” and means that person can also pass the virus on to other people. Over 25% of hepatitis B carriers develop chronic liver disease, liver cancer or liver failure later in life. The hepatitis B vaccine prevents this infection – the first dose is now given at birth to maximise the protection against catching hepatitis B from any source. For later doses, starting at 2 months, the hepatitis B vaccine is given in combination with other vaccines as a single injection.

Varicella (Chickenpox)

Chickenpox is a viral illness. It is usually a mild disease of short length in otherwise healthy children, but can sometimes cause complications. In Australia, only a small proportion of people who suffer from chickenpox will need hospitalisation due to complications such as secondary infections from bacteria, pneumonia and neurologic problems. However, as almost everyone would contract chickenpox sooner or later if they were not immunised, this small percentage translates to about

1500 Australians hospitalised each year with chickenpox. Chickenpox is particularly likely to be severe in older children and adults, or children who also have other medical problems. Vaccination against chickenpox is available under the National Immunisation Program at 18 months of age. Children require one dose only, but individuals aged 14 years or over require two doses, to be taken about one to two months apart.

Invasive Pneumococcal Disease (IPD)

The term invasive pneumococcal disease (IPD) refers to the most serious types of infection caused by the bacterium *Streptococcus pneumoniae* (pneumococcus). Pneumococcus can “invade” the bloodstream causing septicaemia (or “blood poisoning”), invade the lining of the brain to cause meningitis, or cause chest infections (pneumonia). Until recently, no effective vaccine was available for children under 2 years of age to prevent IPD. However, since 2005, all children aged less than 2 years have been eligible to receive pneumococcal vaccine free of charge under the National Immunisation Program. It is important for infants to start this immunisation course at the age of 2 months. The number of doses needed may vary depending on the age at which the first dose is received and whether the child has other medical conditions.

Meningococcal disease

Meningococcal disease is a bacterial infection that can cause septicaemia (“blood poisoning”) and meningitis (inflammation of the lining of the brain). There are several common strains of meningococcal bacteria in Australia, with two of these (types B and C) being the most frequent causes of meningococcal disease.

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A meningococcal vaccine for use in children has been available in Australia since 2002, but it is protective only against meningococcal C disease. The C type of meningococcal disease accounts for around one third of meningococcal cases (and about half the deaths) in this country. Until vaccines effective against other strains, especially type B, become available, meningococcal disease will continue to be a concern. Meningococcal C vaccine is effective in all age groups including infants. A mass campaign of all pre-school and school children was carried out during 2003 and 2004, and the vaccine is now recommended at 12 months of age.

Rotavirus gastroenteritis

Rotavirus is the most common cause of severe gastroenteritis in infants and young children in Australia and worldwide. The disease may range from being minor diarrhoea to severe diarrhoea with vomiting and fever. It can sometimes lead to severe dehydration and shock. Compared with other causes of diarrhoea in young children, rotavirus infections are often more severe, and are more likely to result in dehydration and treatment in hospital. Rotavirus infections in children are common in Australia – almost every child will have suffered from it at least once by the age of 3 years. Before the vaccine was available, there were about 10,000 hospital admissions and one death due to rotavirus infection in young children every year in Australia.

The rotavirus vaccine is very effective at preventing severe diarrhoea and vomiting caused by the rotavirus. Vaccinated children who get infected by rotavirus will generally have a milder form of the disease. This vaccine will not prevent diarrhoea and vomiting caused by other infectious agents. Rotavirus vaccine is given by mouth in either a two or three dose course at 2, 4 (and 6) months. It is not recommended for older babies, and the first dose should be started by around 2 months of age to be able to commence the vaccine course.

Rotavirus vaccine became available free for all Australian infants born after April 2007.

Human papillomavirus (HPV) disease

Human papillomaviruses (HPV) can cause cancer of the cervix, other cancers, genital warts and skin warts. There are many different virus types, but only certain types cause certain diseases. The cervix is a part of a woman's uterus that is at the top of the vagina. Infection of the cervix by certain types of HPV may cause changes in the cells of the cervix, and some of these may eventually lead to cervical cancer. It usually takes more than 10 years for cervical cancers to develop. Most genital infections with HPV do not cause any symptoms and therefore people do not know that they have been infected. The HPV types that infect the genitals can be spread by direct contact during sexual activity with a person who has the virus.

A HPV vaccine that can prevent infection from four types of HPV became available in Australia in late 2006. Two of these four HPV types are together responsible for about 70% of all cervical cancers, while the other two types cause about 90% of genital warts. Another HPV vaccine that has recently become available prevents infection from the two major cervical cancer-causing types of HPV (that cause about 70% of all cervical cancers). HPV vaccine is most effective if it is given before exposure to the virus occurs (through sexual activity), so it is recommended for young adolescent girls and young women, and is currently given through school-based immunisation programs across Australia. Because the vaccines do not protect against all the types of HPV that cause cervical cancer it is very important that all women continue to have regular cervical screening ("Pap" smears) to prevent the development of cervical cancer.

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Side-effects of immunisation

Immunisation is very safe and effective. The huge benefits of immunisation far outweigh the very small risks. Like many useful substances, be it a medication, a lotion or a food item, a vaccine can sometimes cause side-effects in an individual. These are usually minor, such as soreness at the injection site, mild fever or being a bit irritable. In very rare cases, a child may have an unknown sensitivity to a vaccine component and develop a more serious reaction. Sometimes a child may happen to get sick after taking a vaccine, but not because of the vaccination.

Discuss your concerns about possible side-effects with the doctor or nurse who give your child the vaccine. They will also advise on ways to reduce side-effects. Having a cough or cold (with no or only mild fever) is not a reason to delay immunisation. In very rare cases, if your doctor thinks that it may not be wise for your child to have a particular vaccine in the GP surgery, there are special clinics held at both The Children's Hospital at Westmead and Sydney Children's Hospital, which can provide expert advice and give the vaccine under supervision if necessary. Contact these hospitals for further information about these clinics.

Remember

- The benefits of immunisation far outweigh the risks.
- Side-effects from vaccines are generally mild.
- Local doctors (GPs), local councils, hospitals or community centres may provide immunisations. There are also several school-based vaccination programs in NSW.

For further information: please refer to "About immunisation", "Common questions and answers (fact sheets)" and "Immunisation: Myths and Realities" developed by the Australian Government Department of Health and Ageing. These documents contain additional information about the vaccines, their benefits and side-effects, as well as answers to frequently asked questions.

Accessible at:
<http://immunise.health.gov.au/>

This fact sheet is for education purposes only. Please consult with your doctor or other health professional to make sure this information is right for your child.

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the children's hospital at Westmead

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NSW Immunisation Schedule for children from 1 July, 2007

AGE	ANTIGEN	VACCINE (Brand name)
Birth	Hepatitis B	HBVaxII
2 months	Diphtheria, Tetanus, Pertussis (DTPa), Haemophilus influenzae type B, Hepatitis B, and Poliomyelitis (DTPa-Hib-HepB-IPV, also known as the six-in-one vaccine) Pneumococcal Rotavirus	Infanrix-hexa Prevenar Rotarix
4 months	DTPa-Hib-HepB-IPV (as above) Pneumococcal Rotavirus	Infanrix-hexa Prevenar Rotarix
6 months	DTPa-Hib-HepB-IPV (as above) Pneumococcal	Infanrix-hexa Prevenar
12 months	Measles, Mumps, Rubella (MMR) Hib Meningococcal C	Priorix Hiberix Meningitec
18 months	Varicella (Chickenpox)	Varilrix
4 years	Diphtheria, Tetanus, Pertussis, Poliomyelitis (DTPa-IPV) MMR	Infanrix-IPV Priorix
12 years (given through schools, for those who were not vaccinated earlier in life) 12 years (given through schools, girls only)*	Hepatitis B Varicella (Chickenpox) Human papillomavirus (HPV)	Hep B Vax II Varilrix Gardasil
15 years (given through schools)	Diphtheria, Tetanus, Pertussis (dTpa)	Boostrix

* In NSW, catch-up vaccination for female students in years 10, 11 & 12 were provided in 2007, and catch-up vaccination for female students in years 7, 8, 9 & 10 will be provided in 2008 through the school-based HPV vaccination program.

Note: Additional vaccines may be recommended for children who have got some specific medical conditions – your doctor will advise accordingly.