

Immunisation

Protecting People who have Down's Syndrome Against Infection

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The
Down Syndrome
Medical Interest
Group



This factsheet is based on an article written for DSA's Journal by Dr Liz Marder, Consultant Paediatrician, and Down Syndrome Medical Interest Group (DSMIG)

People who have Down's syndrome differ from the general population in their response to infection. They may be more susceptible to some infections especially respiratory (chest, ear and throat, for example) and when they do get infections may have more problems fighting them. Infections therefore may be more frequent, prolonged, and are more likely to need medical attention, including hospital admission.

There is no single reason why people who have Down's syndrome experience these difficulties. There is some evidence that the immune system, the body's defence system against infection, works less effectively, particularly in young children. Also important are other medical problems that are more likely to occur in Down's syndrome.

Differences in the structure of the ears and mid-face make ear, nose and throat infections more problematic, and gastroesophageal reflux and heart disease may also contribute to respiratory disease. Good general health care and nutrition, and prompt recognition and treatment of infections all help to reduce the impact of infections, but of course one of the best ways of reducing the impact is to avoid infections in the first place. We can do this by immunisation.

Immunisation is a way of helping the body's own natural defence system to build up resistance to an infection before the person comes into contact with that infection. This is done by giving a vaccine that includes a tiny dose of the microbe that causes the infection, which has been weakened or killed, or to use the toxin produced by a bacteria that has been modified to make it safe.

The body responds in the same way that it would if it actually met the infection, by producing antibodies against that infection, although the person does not get the symptoms of the disease. If they later come into contact with the infection, the body can now produce an immune response quickly, preventing the infection developing.

The vaccine used for immunisation is usually given by an injection, but some are available by mouth or by nasal spray. The vaccines are often combined, so a single injection may be used to immunise against a number of different infections.



Immunisations are very effective for most people, with most vaccines being at least 90% effective. They do not necessarily give 100% protection to everyone, though often those who still get the disease will get it in a milder form or will be protected against some of the more serious effects of that disease.

Some immunisations need to be given more than once to properly build up the immune response, and some are only effective after a certain age (e.g. babies have an immature immune system and do not produce an adequate response to certain immunisations).



The protection given may not last for ever and for some infections booster doses are recommended. Even when the full course of immunisation is given at the right time (see NHS vaccination schedule below), a small percentage of people do not respond, and there is some evidence that this may happen more commonly in people who have Down's syndrome.

If this is a concern, blood tests can be done following immunisation to see if there has been an adequate response and, if not, additional booster doses may be recommended.

The immunisations advised by the NHS have all been extensively tested over a number of years on large numbers of people. There is ongoing monitoring to ensure that they are safe. Occasionally there are minor side effects such as inflammation and discomfort at the site of an injection, or a mild fever. Serious side effects are very unusual and should always be reported to a health professional so they can be properly assessed. It is important to remember that the diseases where immunisation is recommended are relatively common and may have very serious side effects.

The risk of side effects from immunisations are very small when compared to the potential risks of getting the disease. Immunisations can safely be given to people with long-term medical conditions and, for many of these people, the risk of infections may be even greater than for the general population, so the immunisations are even more important.

Occasionally, an ongoing medical problem may alter the type or timing of immunisations, and this should be discussed with a health professional familiar with the person's medical history.

Immunisation can still take place in people with short-term minor illnesses such as coughs and cold, though during more serious illness, particularly with a very high fever, immunisation should be delayed a few days until the person has recovered.

Routine immunisation

People who have Down's syndrome should be offered all the routine immunisations suggested by their local immunisation schedule. The schedules differ a little from country to country but are broadly similar.

The latest NHS schedule is in the table shown below.

Additional doses of some routine vaccines may be indicated in children who have Down's syndrome if they are felt to be at particular risk, and if blood tests suggest that they have not responded well to the usual course.



Additional immunisations recommended for those who have Down's syndrome

In addition to the routine immunisations recommended for all people, additional immunisations may be recommended for particular groups of people who are at high risk. The risk may be because of their occupation, where they live or travel to, or because of long-term medical conditions.

Health professionals will be able to advise on these high risk groups, and those who have Down's syndrome should be offered these immunisations as would anyone else within these groups. There are however some additional immunisations that may be particularly recommended for those who have Down's syndrome because of their different response to infection, and because of medical conditions associated with the syndrome.

These are as follows:

Influenza (flu) vaccine

Childhood flu vaccination is now well-established for all children, from age 2 through to the end of year 11, secondary school.

Most children are able to have the nasal spray flu vaccine, although if they have a blocked nose they may be asked to wait until this has cleared. The nasal spray has been shown to be more effective in children, particularly in small children, compared to the injection.

Annual flu vaccination is recommended throughout life for people who have Down's syndrome, from the age of 6 months. Between 6 months and 2 years of age, the injectable form of flu vaccine is recommended.

When the flu vaccine is given for the first time, a second dose is recommended 6 months later, to ensure adequate immunity. From the age of 18, the injectable flu vaccine is again recommended.

Chicken pox

The chicken pox vaccine is currently not given routinely. It is given to those children who might cause an increased risk to others if they pass on chicken pox (e.g. siblings of a child with leukaemia, or a child whose parent has a weakened immune system). In the experience of DSMIG, children who have Down's syndrome may be at increased risk from chicken pox and the complications of chicken pox (including chicken pox pneumonitis – a form of lung infection, encephalitis – brain infection, and secondary infection with invasive Group A Strep), therefore some parents may choose to pay for vaccination against chicken pox privately. Two doses of vaccine are given, 4-8 weeks apart.

The JCVI has recently recommended that the chicken pox vaccine is introduced into the childhood vaccination schedule for all children, at 12 and 18 months of age, and that a catch-up programme be carried out for older children.



Pneumococcal polysaccharide PPV vaccine

There are several different types of vaccine against infection with the pneumococcal bacteria, which can cause pneumonia, meningitis and sepsis.

Since 2020 all infants have been offered two doses of either PCV13 or PCV15 (depending on supply) – one at 12 weeks and a second at 12 months.

It is recommended that people who fit into an at-risk category should have a single dose of PPV23 (Pneumovax) at (or after) 2 years of age. Many children or adults who have Down's syndrome may meet these criteria, so doctors may consider vaccination with PPV23 for children at 2 years of age, or as soon as they are identified as being at risk, if this is after 2 years of age.

Some children will qualify for the PPV23 vaccine by having certain breathing or heart conditions, or diabetes. There is some evidence that the response to PPV23 may be suboptimal in those with Down syndrome. Although children who have Down's syndrome are not usually immunosuppressed (another qualifying condition, in which the immune system has been suppressed by chemotherapy or high doses of steroids), there is good evidence that children who have Down's syndrome (and many adults) have a less effective immune system.

Many children will have their own evidence of this through immune function tests or their previous reactions to infections. The Green Book (the national guide to vaccination, which healthcare professionals follow) does say that the list of conditions are examples, and that clinicians should use their clinical judgement in deciding who is at increased risk.

Some people with severe immunocompromise or some splenic problems are offered PPV23 every 5 years.

PPV23 is recommended for all adults aged 65 years and over.



Respiratory Syncytial Virus (RSV)

Currently, monoclonal antibodies (Palivizumab) are given to some babies at high risk from RSV (which may include some babies who have Down's syndrome). These work in a different way to standard vaccinations. Rather than encouraging the body to produce antibodies to fight potential infection, the antibodies are provided to the body ready-made. Monthly injections are given over the winter months to babies born at 35 weeks or less of gestation and under six months of age at the onset of the RSV season, children under two years of age and requiring treatment for the lung condition bronchopulmonary dysplasia within the previous six months, and children under two years of age with congenital heart disease significantly affecting the circulation.

Many babies with Down's syndrome will meet the relevant criteria (in the vaccination guide, The Green Book), so doctors may consider vaccinating against RSV.

A new vaccine has been introduced to prevent infection with RSV – Nirsevimab.

The JCVI (Joint Committee on Vaccination and Immunisation) has recently recommended the introduction of this vaccine for all babies. This is likely to be through maternal vaccination (as with the whooping cough vaccine), along with a catch-up programme likely to involve antibody injections for unvaccinated babies.

Other vaccines that may be discussed

BCG vaccine for tuberculosis (TB)

There is no longer any routine BCG vaccination in the UK, but it is now offered to all babies who are deemed to be at high risk.

In the UK the vaccine is offered to all babies in high prevalence areas (including some parts of inner-city London), those whose parents or grandparents have come from high-risk areas abroad, or those who are in close contact with someone who has TB.

There is no hard evidence on which to base a recommendation for children who have Down's syndrome, as there is neither recent evidence to suggest they are at greater risk nor to suggest the vaccine is effective in this population. In view of this, it should be given in keeping with national recommendations for other children.



NHS Vaccination Schedule (as at March 2023) – see link below for further information

AGE	VACCINE	PROTECTION AGAINST	NOTES
8 weeks	6-in-1 vaccine	Diphtheria, hepatitis B, Hib (Haemophilus influenzae type b), polio, tetanus, whooping cough	Hib causes a number of serious childhood illnesses including epiglottitis, meningitis, pneumonia, arthritis
	Rotavirus vaccine	Rotavirus gastroenteritis	Profuse diarrhoea and vomiting
	MenB vaccine	Meningococcal group B bacteria, causes meningitis	Single injection
12 weeks	6-in-1 vaccine (2nd dose)	As above	As above
	Pneumococcal vaccine	Meningitis, sepsis, pneumonia	1st dose at 12 weeks and a booster dose at 1 year
	Rotavirus vaccine (2nd dose)	As above	As above

<p>16 weeks</p>	<p>6-in-1 vaccine (3rd dose)</p> <p>MenB vaccine (2nd dose)</p>	<p>As above</p> <p>As above</p>	<p>As above</p> <p>As above</p>
<p>1 year</p>	<p>Hib/MenC vaccine (1st dose)</p> <p>MMR vaccine (1st dose)</p> <p>Pneumococcal vaccine (2nd dose)</p> <p>MenB vaccine (3rd dose)</p>	<p>Haemophilus influenzae type b (Hib) and meningitis C</p> <p>Measles, mumps and rubella (german measles)</p> <p>As above</p> <p>As above</p>	<p>The Hib/MenC vaccine is given to 1 year old babies after they've had 3 doses of the 6-in-1 vaccine, which also protects against Hib</p> <p>Given as a single injection - 2 doses of the MMR vaccine provide the best protection.</p> <p>As above</p> <p>As above</p>
<p>2 to 15 years</p>	<p>Children's flu vaccination (every year until children finish year 11 of secondary school)</p>	<p>Influenza</p>	<p>Nasal spray from age 2-15 annually</p>

3 years and 4 months	MMR vaccine (2nd dose) 4-in-1 pre-school booster	As above Diphtheria, polio, tetanus and whooping cough	As above Pre-school booster, given as a single injection
12 to 13 years	HPV vaccine (boys and girls)	Human papillomavirus (HPV) – certain types of cancer and genital warts	The number of doses you need depends on your age and how well your immune system works - people under 25 usually only need one dose
14 years	3-in-1 teenage booster vaccine MenACWY vaccine overview	Tetanus, diphtheria and polio. Meningitis and septicaemia	Teenage booster, given as a single injection. Routinely offered to teenagers in school years 9 and 10
65 years and older	Flu vaccine (every year after turning 65) Pneumococcal vaccine Shingles vaccine (if you turned 65 on or after 1st September 2023)	As above As above Shingles	Injection needs to be given annually – adult vaccine. As above Injection
70 to 79	Shingles vaccine	As above	As above

Further information

Information about immunisations can be found at:
[NHS vaccinations and when to have them - NHS \(www.nhs.uk\)](http://www.nhs.uk)

Or information for health professionals at:
[Immunisation against infectious disease: the green book front cover and contents page - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

For further discussion on any of the information above and how it relates to individuals please discuss with your GP, Practice Nurse or Health visitor.



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