

Vaccines and myeloma

This Infosheet provides information on how vaccines work, the different types of vaccines and the vaccines that are recommended for myeloma patients.

How do vaccines work?

Vaccines are treatments which boost the body's immune system and help to protect the body against specific infections. They work by stimulating the immune system to produce antibodies (also known as immunoglobulins) against an infection without actually causing the infection itself. If the vaccinated person then comes into contact with that

particular infection, their immune system will recognise it and produce the antibodies needed to fight it.

What is the immune system?

The immune system is made up of specialised cells, tissues and organs which work together to protect the body from foreign organisms (such as bacteria or viruses) that enter the body.

White blood cells are important components of the immune system. Plasma cells are a type of white blood cell produced in the bone marrow. Plasma cells make antibodies and release them into the bloodstream.

Antibodies fight infection by helping to kill bacteria and viruses and by building up immunity to disease.

The immune system, vaccines and myeloma

In a healthy immune system, a mixture of different types of antibody is produced, each of which plays a specialised role in fighting infection.

In myeloma, a large amount of a single type of abnormal antibody called paraprotein is produced.

Paraprotein plays no useful role in the body and reduces the production of normal antibodies.

This means that myeloma patients have a weakened immune system and therefore a reduced ability to fight infection, including vaccine-preventable infections.

It is therefore recommended that myeloma patients are vaccinated against certain vaccine-preventable infections.

Unfortunately, because of their weakened immune system myeloma patients have a reduced ability to respond to vaccination. Therefore the immunity provided by vaccines may be less than in a healthy individual.

Nevertheless, vaccination is still recommended for myeloma patients in the hope that they will gain at least some immunity.

Types of vaccine

The two main types of vaccine are:

- **Live vaccines** (also known as attenuated vaccines) contain a version of a living virus or bacterium that has been weakened in the laboratory so that it will cause no or a very mild infection

- **Inactivated vaccines** contain only a part of a virus or bacterium which has been killed with chemicals, heat or radiation

It is recommended that myeloma patients do not have live vaccines. This is because their weakened immune system may not be able to mount a sufficient immune response even to the very small amounts of live but weakened bacterium or virus contained within the vaccine.

This means they would be at risk of developing the actual infection.

Some of the most common live vaccines which are NOT recommended for myeloma patients are:

- Shingles
- BCG (Tuberculosis)
- Measles
- MMR (Measles, Mumps and Rubella)
- Oral typhoid
- Rubella (German measles)
- Yellow fever

Inactivated vaccines are safe for myeloma patients.

Inactivated vaccines include:

- Influenza
- Pneumococcal
- Diphtheria, tetanus and polio (DTP)
- Haemophilus influenza B (Hib)
- Hepatitis A
- Hepatitis B
- Meningococcal meningitis
- Typhoid injection (but NOT the vaccine given by mouth)
- Whooping cough (pertussis)

Which inactivated vaccines are all myeloma patients recommended to have?

Flu vaccine

It is recommended that all myeloma patients get the seasonal flu (influenza) vaccine from their GP every year. Usually the vaccine is available from September to the end of January.

If you are currently on treatment for your myeloma, you should discuss with your haematologist when would be the best time to be vaccinated – they may advise to have the vaccine during the rest days of a treatment cycle, or when your current myeloma treatment has come to an end.

2015 guidance from the Department of Health recommends that close family members of people with a weakened immune system – such as myeloma patients – also get the annual flu vaccine.

Pneumococcal vaccine

It is also recommended that all myeloma patients get the pneumococcal vaccine **every five years**. This vaccine protects against serious infections such as some types of pneumonia, meningitis, and septicaemia.

It can often be given at the same time as your flu vaccine to save you having to make two separate appointments.

For the best protection myeloma patients require two different pneumococcal vaccines. It is recommended that patients receive a first vaccination of PCV13 (pneumococcal conjugate vaccine 13) and then another vaccine PPV23 (pneumococcal polysaccharide vaccine 23), two or more months afterwards. A single standard pneumococcal vaccine may be enough, but the ideal is to have the double vaccination.

Myeloma is rare enough that your GP practice may not be aware of this recommendation so you may wish to show them this information.

Again, if you are currently on treatment for your myeloma, you should discuss with your haematologist when would be the best time to be vaccinated – they may advise to have the vaccine during the rest days of a treatment cycle, or when your current myeloma treatment has come to an end.

Repeat childhood vaccines following high-dose therapy and stem cell transplantation

If you have received high-dose therapy and an autologous (using your own cells) or an allogeneic (using a donor's cells) stem cell transplant, you may no longer be immune to some diseases you were vaccinated against as a child, and you may need to be re-vaccinated.

It is important to note that each hospital will have their own guidelines and recommendations on the vaccines you should receive after the different types of stem cell transplant, and some may recommend you have none.

This is because there is limited evidence to show that re-vaccination is necessary. However, it may be recommended that you are considered for re-vaccination against the diseases outlined in Table 1 on page 5*:

*Please note that some vaccinations require a number of doses. The vaccines are given either as a single (e.g. influenza) or a combined (e.g. diphtheria-tetanus-pertussis) vaccine.

Months post-transplant	Vaccine
4 - 6 months then annually thereafter	<ul style="list-style-type: none"> ■ Flu (influenza)
6 - 12 months	<ul style="list-style-type: none"> ■ Polio ■ Diphtheria-tetanus-pertussis ■ H. influenzae type B (Hib) ■ Pneumococcal (PCV13 then PPV23 two to three months after) ■ Meningococcal group C (often given first as a Hib/MenC combined vaccine, then MenACWY one month after) ■ Meningococcal group B

Table 1: Possible recommendations for repeat childhood vaccines following high-dose therapy and stem cell transplantation

Travel vaccination

If you are planning on travelling to certain countries, it may be advised to have certain vaccines against some of the serious diseases found in other parts of the world.

Some of these vaccines will be live vaccines, however, which should be avoided by myeloma patients.

You should speak to your doctor or nurse about travel vaccines at least six weeks before you travel and ensure you discuss your myeloma and any current treatment you are on.

Risk of vaccine-induced infection from others

A concern sometimes raised by family members of myeloma patients is whether they could pass on infection to the patient after having a live viral vaccine, such as the shingles vaccine.

The basis for this concern is that when someone has a live viral vaccine, they can shed small amounts of vaccine virus via their body fluids (such as saliva, blood, faeces or the blisters of a skin rash) for a short while following vaccination.

While it is theoretically possible for someone shedding vaccine

virus to infect other members of their household, this is thought to represent an extremely small risk. It should therefore only be a real consideration for patients who are highly immunocompromised, such as patients shortly after autologous stem cell transplantation, or patients who have had an allogeneic stem cell transplant.

In the specific case of the shingles vaccine, spreading of the vaccine virus (chickenpox virus) is only possible if blisters form at the vaccination site (i.e. the upper arm). This occurs rarely and even then, the risk of the patient becoming infected is very small. This is because the vaccine virus, which has been weakened in the laboratory, is far less able to spread from person to person than the natural virus. If infection was to occur, it would likely be extremely mild. Covering any blisters that appear at the vaccine site is thought to prevent the spread of infection.

In the case of other live viral vaccines, such as the MMR vaccine or the nasal flu spray (offered to children aged 2 - 5 years), infection due to vaccine viral shedding is not considered to be an issue.

As part of the routine vaccination programme in the UK, babies aged 8 - 12 weeks are offered an oral rotavirus vaccine (a live vaccine). It is possible that traces of the vaccine virus will shed into the baby's nappy. As a precaution, immunocompromised myeloma patients in close contact with recently vaccinated babies should take special care with personal hygiene, including regular washing of hands and avoiding nappy changes if possible.

If someone close to you is due to have a live viral vaccine and you are concerned, talk things through with your haematologist or clinical nurse specialist.

Future directions

Infection can be a significant challenge for myeloma patients due to their weakened immune system. It is currently recommended that myeloma patients receive a number of vaccines in order to increase protection from certain vaccine-preventable infections.

Unlike normal vaccines, which are given to *prevent* certain infections, vaccines are also being developed to *treat* certain cancers, such as myeloma.

Vaccines in development for myeloma work by training the immune system to attack myeloma cells. This is achieved by first growing immune cells with myeloma cells (or parts of myeloma cells, such as their DNA) in the laboratory. Once the immune cells have shown that they recognise and respond to myeloma cells, they are infused back into the patient. Inside the patient, if the immune cells come into contact with myeloma cells, they start an immune response, killing the myeloma cells.

Myeloma vaccines are still the subject of early-phase research, but some have shown promising results so far.

About this Infosheet

The information in this Infosheet is not meant to replace the advice of your medical team.

They are the people to ask if you have questions about your individual situation. All Myeloma UK publications are extensively reviewed by patients and healthcare professionals prior to publication.

Other information available from Myeloma UK

Myeloma UK has a range of Essential Guides, Infoguides and Infosheets available covering many areas of myeloma, its treatment and management.

To order your free copies or to talk to one of our Myeloma Information Specialists about any aspect of myeloma, call the **Myeloma Infoline: 0800 980 3332** or **1800 937 773** from Ireland.

The Myeloma Infoline is open from Monday to Friday, 9am to 5pm and is free to phone from anywhere in the UK and Ireland.

Information and support about myeloma is also available around the clock at www.myeloma.org.uk

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