

HSCT and MS



Multiple sclerosis information

Welcome to this Choices booklet on hematopoietic stem cell transplantation (HSCT) and MS

MS-UK listens to the voices of people affected by multiple sclerosis (MS) to shape the information and support we provide. It is these people that bring us perspectives that no one else can give.

For every Choices booklet we produce, MS-UK consults the wider MS community to gather feedback and uses this to inform our content. All of our Choices booklets are then reviewed by the MS-UK Virtual Insight Panel before they are published.

This Choices booklet has been designed with you in mind. We hope it will answer some of your questions and also provide some first-hand experience from those who have been in your position - people who can truly understand and empathise with your current thoughts and feelings.

Every time you find bold text with quotation marks like this, it is a quote directly from someone affected by multiple sclerosis

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What is HSCT?

Hematopoietic stem cell transplantation (HSCT) is a procedure which is used to treat chronic conditions such as MS and some forms of cancer. It has been used since the mid-1990s to treat MS and other auto-immune diseases in small but growing numbers of people.

In simple terms, the procedure's aim is to replace unhealthy blood cells with healthy ones. Bone marrow, found at the centre of some bones, produces stem cells. These stem cells have the ability to become different types of blood cell, each of which perform specific functions that help our bodies stay healthy. For example, they can become red blood cells which help to distribute oxygen around the body, or white blood cells which are instrumental in supporting our body's fight against infections.

Platelets, also known as thrombocytes, which help our blood to clot therefore preventing bleeding, are another stem cell derivative.

The critical roles that stem cells play in keeping the human body fit and healthy has led to them being used to treat a wide range of disorders (1).

There are many treatments being developed using stem cells which cover a wide range of medical conditions. However, this booklet is specifically about HSCT as a treatment option for MS.

Types of HSCT

There are different types of HSCT which are used for stem cell transplantation. These are autologous HSCT (aHSCT) and allogeneic HSCT. Autologous means that stem cells are taken from the patient and allogeneic HSCT is when stem cells are taken from a donor. In most instances, MS will be treated using autologous hematopoietic stem cell transplantation (aHSCT).

AHSCT is a procedure that involves harvesting stem cells from the patient's blood, then wiping out the existing immune system via chemotherapy. The stem cells are then transplanted back to the patient which enables the immune system to rebuild (2).

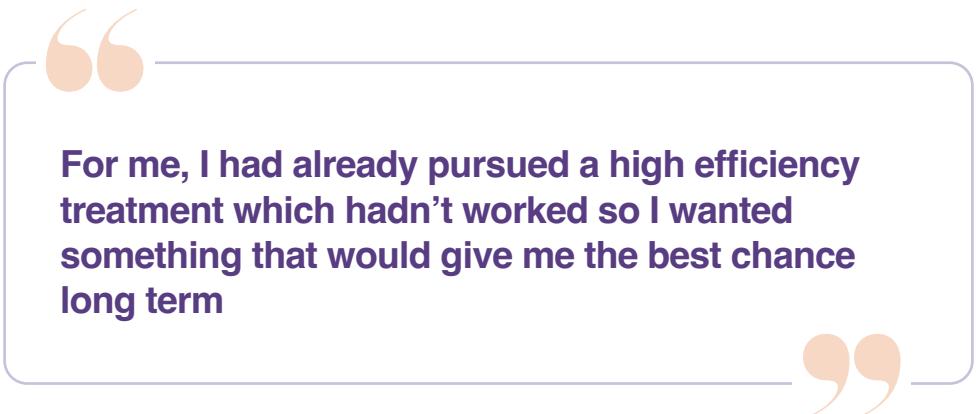
Treating MS with HSCT

Since the turn of the century there has been a slowly growing evidence base which underpins HSCT's high level of effectiveness in treating MS, and other auto-immune conditions. According to the European Group for Blood and Marrow Transplantation (EBMT) registry there were over 1,400 transplants completed throughout Europe alone during 2019 for people with MS. The majority were conducted in the UK, Italy, Sweden, and Poland. HSCT for MS is organised using a multi-disciplinary approach, meaning it will involve input from services such as haematology and MS specialist teams (3).

HSCT is a major focus of international research and new learning is emerging all the time, however existing data is enough to know that it can be used as a treatment for MS. A recent evidence-based review, conducted by members of the European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) in partnership with the EBMT found that approximately 70-80 per cent of people with relapsing remitting MS (RRMS) who had the treatment experienced no evidence of disease activity (NEDA) up to five years post-transplant (3).

The aim of HSCT is to thoroughly suppress the inflammatory activity caused by MS. Improvements to existing MS symptoms have been noted and although not for all people, some improvements to existing disability have been reported post-treatment (3).

We will now take a deeper dive into research detailing the efficacy and safety of HSCT as a treatment for MS.



For me, I had already pursued a high efficiency treatment which hadn't worked so I wanted something that would give me the best chance long term

What are the risks and benefits?

HSCT has historically been seen to present much higher risks than standard MS treatments. That said, these risks have reduced over time, with potential benefits of the treatment becoming more prominent.

Transplant mortality rates

In the earlier years of using HSCT to treat MS and auto-immune conditions, there was a relatively high post-transplant mortality risk. More recent studies have found that transplant related mortality rates have fallen over time, though figures do vary.

A retrospective, international study published in 2017 looked at 281 MS patients who were historically treated with HSCT between 1995 and 2006. It found that there was a mortality rate of 2.8 per cent within 100 days of transplant (4). Since then, a 2025 study conducted by the same author found that in their sample of 364 patients with MS who underwent HSCT treatment in the UK, transplant related mortality within the same 100-day period had decreased to 1.4% (5).

Some studies have posted transplant related mortality levels as low as 0.2 per cent, and while there are differences in reported figures, the general trend is that rates are falling worldwide. Indeed, a recent Swedish study involving 231 people with MS who underwent HSCT treatment found there was not a single case of transplant related mortality (6).

Sheffield Teaching Hospitals, one of the most experienced HSCT treatment centres in the UK, advise patients that there is a related mortality rate of one per cent. This reflects the range of possible

associated transplant risks, despite no deaths connected to someone with MS being treated with HSCT at the hospital (7).

What we do know for certain is that outcomes for people with MS being treated with HSCT have greatly improved as clinicians across the world gain greater experience and clinical knowledge. Health systems have learned how to improve patient selection, refine transplant techniques, and gained accreditation to help standardise the HSCT process for MS and autoimmune diseases.

Treatment outcomes

Better results for patients treated with HSCT are associated with younger patient age, the patient having RRMS, and with a lower Expanded Disability Status Scale (EDSS) score at the time of treatment.



It was a choice of having the independent life I wanted to live or a life dependant on others - it was 100 per cent worth the risk to me



Sheffield Teaching Hospitals, along with hospitals from around the world, were part of the 'MIST' trial. This trial, which took place between 2005 and 2016, included 110 people with RRMS. The study compared outcomes of HSCT to existing 'best available' disease modifying therapies (DMT). Its aim was to measure the time it took for participants' MS to progress or worsen measured by EDSS changes and other neurological criteria (8).

The trial found that the EDSS score of people receiving the transplantation improved from an average of 3.5 to 2.4, whilst for those using DMTs, their EDSS scores declined from an average score of 3.3 to 3.9. At three years post-transplant it was found that six per cent of people receiving HSCT had experienced disability progression, compared to 60 per cent for those in the DMT treatment arm.

More recently a retrospective study covering 20 years of post-HSCT outcomes for people with MS in the UK found that overall progression-free survival (PFS) was just over 80 per cent at two years post treatment, and almost 63 per cent at five years. It was found that people who were more impacted by disability at the time of receiving HSCT had reduced PFS outcomes post-treatment (5).



The treatment can be tough. The support of your family and friends can help get you through



Potential side effects

Compared to most other MS therapies, HSCT treatment is more intensive and involves more risk as it uses high doses of chemotherapy (7).

Chemotherapy has a wide range of possible short and long-term side effects. Short-term effects include hair loss, nausea, sickness,

tiredness, rashes, and diarrhoea. In the main, these normally last a few weeks, and hair regrowth should begin within a few months.

Permanent infertility issues can arise in both males and females. Indeed, a recent review of studies conducted over a 20-year period found that just over half of females who received HSCT treatment subsequently became infertile. For males, this figure was just over one-third (9). If fertility is a concern for you speak to your medical support team prior to deciding whether or not to go ahead with HSCT treatment. Consider the options of having your eggs frozen, if you are female, or for males, having sperm frozen prior to treatment.



Chemotherapy was tough and so was the recovery process. Be prepared for bumps in the road and developing a secondary autoimmune condition



There is also the possibility of developing secondary autoimmune disease post-transplant. This means that some may be at an increased risk of developing other auto-immune conditions. Studies have shown that the risk of developing a secondary autoimmune condition is just under 10 per cent at five years after HSCT treatment (10).

Graft versus host disease (GvHD) can also occur within a few months of HSCT treatment. This is where transplanted cells attack the patient's recipient cells with symptoms such as diarrhoea, sickness, shortness of breath and joint pain (11).

It is usually mild and reactive to treatment but can be more serious for some. GvHD is more common in those who have received stem cells from a donor, as occurs in allogenic HSCT, however it can affect some people who receive autologous HSCT treatment. Studies have shown that GvHD incidence in people receiving autologous HSCT is between one and five per cent, compared with approximately 50 per cent for those who have received allogenic HSCT therapy (12).

There are other potential issues to consider as well. Whilst your body is creating healthy blood cells after having your stem cell transplant there will be an increased risk of the following

- anaemia
- excessive bleeding or bruising
- infections due to a lack of white blood cells

The clinicians overseeing your treatment will have ways of supporting you if you encounter any problems. Haematology services should explain the whole process and any associated risks.

My haematologist was in favour of me getting HSCT and they were very reassuring about the safety of the procedure

Further considerations

HSCT is a treatment that is not suitable for everyone with MS and needs to be considered thoroughly. The short-term risks are

substantially higher than other forms of MS DMTs, but the possible long-term impact on MS could potentially cease its progression. Whether or not to go ahead with HSCT is a complex decision to make, one that should include the support of those closest to you and a specialist multidisciplinary team. This will include the coordinated expertise of health professionals from various disciplines including neurology, haematology and reproductive medicine (3). They can speak with you about their thoughts of the suitability of HSCT treatment, its potential risks and benefits.

More information

The Anthony Nolan charity provides a wealth of information about stem cell therapy and fertility.

www.anthonynolan.org/patients-and-families/preparing-a-stem-cell-transplant/fertility-after-a-stem-cell-transplant

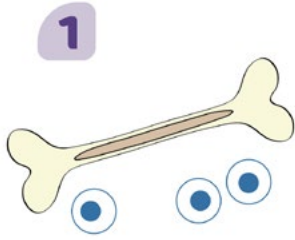
Macmillan Cancer Support offer some useful guidance concerning chemotherapy related hair loss.

www.macmillan.org.uk/cancer-information-and-support/impacts-of-cancer/hair-loss

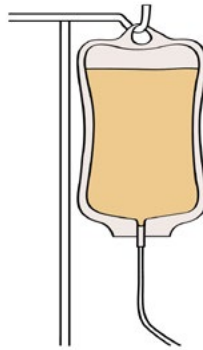
What is the transplantation process?

There is no major surgery involved in the transplantation process. HSCT will involve a lot of preparatory appointments, approximately 30 days as an inpatient in hospital with many months of monitoring post-transplant. During this time there will be certain lifestyle adjustments including reviewing your dietary intake and rehabilitation.

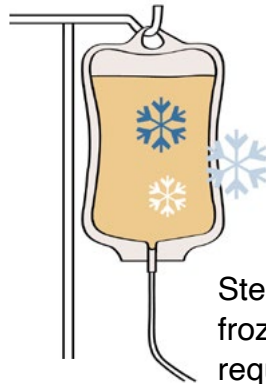
The image and notes opposite summarise the transplantation process.



1
Mobilise stem cells
using growth factor and
chemotherapy



2
Stem cells
collected from
peripheral blood



3
Stem cells
frozen until
required



4
Conditioning
chemotherapy
to suppress
immune system



5
Stem cells thawed
and re-infused




6
Support with blood
products and antibiotics
(approx 2 weeks)




7

Further follow-up as outpatient for 2-3
months with regular tests and medication



The process itself was very straightforward, but it does leave you feeling very weak and tired. I did have a stomach upset and some bone pain, but both were looked after by the doctors. Understanding the process will give you confidence as you proceed through the treatment



Stage 1

Growth factor and chemotherapy medications are delivered by infusion. These are administered to help your stem cells become mobilised so that they move from bone marrow to the general bloodstream.

Stage 2

When there is enough stem cells present in your bloodstream, which is usually a few days after the mobilisation process, the stem cells are then collected from your blood. This will involve you being connected to a machine that will gather and separate your stem cells and return the blood to your body.

Stage 3

The stem cells are frozen until needed.

Stage 4

A further, more intensive 'conditioning chemotherapy' is used to suppress or wipe out your immune system. This chemotherapy

can be given at different levels of intensity depending on where you are being treated and which regime the hospital is using.

Stage 5

Your stem cells are then thawed, re-infused and ‘transplanted’ back into your system.

Stage 6

Supported with blood products and antibiotics, the immune system will begin to rebuild. During this time, you are especially vulnerable to infection. You will need to be especially careful of avoiding infection and you will be monitored closely.

Stage 7

You will require follow-ups and monitoring as an outpatient for a few months which will include regular blood tests and appropriate medication. The follow-up appointments should involve both MS specialists and haematologists (13).

Access to HSCT in the UK

The Joint Accreditation Committee of the International Society Cell and Gene Therapy Europe (JACIE) is Europe’s official accreditation body that promotes excellence in the field of HSCT. It is an initiative produced by the European Society for Blood and Marrow Transplantation (EBMT) and International Society of Cell and Gene Therapy (ISCT).

All HSCT procedures completed in the UK will be at JACIE-accredited centres, all of which will work according to the same rigorous standards with each centre being inspected regularly.


Ensure that the clinic overseas is JACIE accredited and has a good reputation

NHS access


Under the NHS, HSCT for the treatment of MS is available at various locations around the UK for people that fall into certain eligibility criteria. The NHS England treatment algorithm for MS offers guidance to neurologists regarding patient eligibility for DMTs including HSCT. It states that HSCT can be offered to patients with relapsing forms of MS as a second or third-line treatment for those who are experiencing disease activity, including relapses, despite taking highly effective disease modifying drugs (14). Disease activity is evidenced via MRI scans which will show if new lesions have appeared within the CNS.

Health Technology Wales updated their latest guidance in July 2020 and found that evidence supports the use of HSCT for people with RRMS that have had continued disease activity despite previous DMT use (15).

The Scottish Health Technologies Group (SHTG) published advice in October 2019 and states that HSCT should be made available via the NHS to people with MS who meet eligibility criteria. This criteria states that people affected by RRMS who have evidence of disease activity and have not responded to high-efficacy DMTs should be offered HSCT treatment (16).



It's very important to advocate for yourself when you have a chronic illness like MS. HSCT in my experience wasn't offered as a line of treatment and it was only through talking to others that I became aware I could even have this under the NHS. Do your own research and advocate for yourself where necessary



NHS hospitals that offer HSCT treatment will likely follow guidelines provided by the EBMT. They aim to provide general guidance on transplant indications to inform individual patient decisions led by their multidisciplinary team. The EBMT guidelines suggest a range of issues should be considered prior to HSCT treatment being offered to patients. This includes assessing the risk of each patient to ensure the procedure is as safe and successful as possible. Considerations should cover medical co-morbidities, the patient's general health, and anything which may compromise patient safety and successful outcomes of the treatment (17).

It is important that everyone who is interested in HSCT treatment are aware of the potential risks of the procedure. Risks may differ from one person to another and these need to be clarified by members of the multidisciplinary team before treatment goes ahead. We looked at general risks of HSCT treatment earlier in this booklet.

If you are interested in HSCT and feel that you fulfil the eligibility criteria, it is worth discussing this with your MS team. They can answer any questions you have about the potential risks and benefits of the treatment, if it would be suitable for you and if so, the centres at which you may be treated.

Private access within the UK

If you have tried to access HSCT treatment under the NHS and have been refused, then there is the possibility of accessing private treatment in the UK. This can be costly and prices can differ greatly between different clinics and hospital sites.



I didn't qualify for HSCT in the UK, so had to launch my personal fundraising campaign, which I found tiring. We eventually reached my target after 10 months



HSCT to treat MS is currently available privately in the UK at specialist centres based in London and Sheffield (7,18). There will still be eligibility criteria that need to be met which includes recent MRI scans showing evidence of new disease activity, along with comparable recent baseline scans. You will also need to be referred to these centres by your MS neurologist or GP.

More information

You can view the current list of JACIE accredited centres in the UK, Europe and beyond on the EBMT website.

Visit, www.ebmt.org/ebmt

Travelling abroad for HSCT

In recent times some people with MS have chosen to access HSCT treatment abroad. This has been due to reasons such as not being deemed eligible for treatment via the NHS, their neurologist would not refer them for private treatment within the UK, or simply because they felt that waiting to fulfil eligibility criteria was not an option. Understandably for some, going outside of the UK for treatment may feel like their only option to access HSCT.


I reached out to the AIMS charity straight away – they're incredibly supportive, non-pushy, and connect you with people who've had it abroad (including recent Mexico patients). Their peer calls helped me make an informed decision without pressure

Undergoing treatment abroad may need careful consideration and planning to ensure you get the best care possible. Eligibility criteria may differ from centre to centre, with some willing to treat people with 'active' and 'non-active' forms of MS. Each centre will have their own eligibility criteria, so anyone interested in going abroad for treatment will need to check these prior to making any further plans.


I went to Russia for HSCT and organised my aftercare before I went. I spoke to my GP, explained what I would need, and met a local haematologist to supervise my recovery. All went smoothly with the aftercare from the NHS

Earlier in this booklet we explained how the EBMT sets guidelines which hospitals in the UK and Europe follow when administering HSCT. Hospitals outside of Europe offering HSCT may not work with the same regime as the EBMT suggests. However, they may belong to other accredited bodies in their home nations and work to different protocols.


It is therefore important to check that any centres you are interested in are accredited with bodies that ensure adherence to internationally agreed standards of practice, such as JACIE and the Foundation for the Accreditation of Cellular Therapy (FACT) who are a US based organisation that are members of the ISCT.




The process in Mexico was well-organised and outpatient-focused, which felt less daunting than full hospitalisation



The EBMT and JACIE published general information for people considering HSCT. It says that although they recommend seeking treatment in your home country, if travelling, it is better if you have the full support of your MS specialist, a transplant specialist, or your GP. (13)



Plan everything in advance – aftercare with your GP, finances/fundraising, having a carer travel with you, and strict hygiene for the low-immunity months



Follow-up monitoring and aftercare medications will be needed once at home, and this will need arranging and facilitating

carefully. The EBMT therefore recommend that before arranging treatment abroad, people discuss follow-up care arrangements with their local health services (13).

It is also worth investigating the experience of the clinic and clinicians in question, speaking with people who have been through the process and making sure you have anticipated and planned for as many potential issues as possible. Just because the clinic is not in the UK does not necessarily mean that it will not be able to deliver good quality transplant procedures.



My neuro put me forward on the NHS and I was turned down. When I told them I was going to Mexico they weren't delighted, but they did agree to support my follow-up and referred me to a haematologist



More information

You can view the current list of FACT accredited organisations on their website. Visit accredited.factglobal.org

The charity Auto Immune and Multiple Sclerosis (AIMS) has been set up to specifically support people with MS and autoimmune

diseases with an emphasis on HSCT. They can offer travel grants and peer support. Visit, www.aimscharity.org

Current HSCT for MS trials

Researchers and advocates hope that through larger trials, with higher numbers of participants, evidence can be gathered to underpin the safety and efficacy of HSCT treatment for MS.

Star-MS is a trial that is currently ongoing in the UK, testing the safety and efficacy of HSCT for treating highly active MS. They have participating hospitals in England, Wales, and Scotland. In total there are nineteen hospital sites taking part in the trial, with almost 200 participants. The trial is comparing HSCT treatment against Ocrevus (ocrelizumab), Lemtrada (alemtuzumab), Mavenclad (cladribine) and Ofatumumab (kesimpta), which are the highest efficacy approved DMTs available via the NHS (19). Initial results from the Star-MS trial are expected during 2027.

BEAT-MS is a trial based in the United States which was officially launched in 2019. This randomised trial is designed to compare the efficacy and safety of HSCT against existing high efficacy DMTs, over a six-year period. All participants have active RRMS or SPMS which has been resistant to the best available DMTs (20). It is expected that results from this trial will be published soon after its completion in late 2029.

More information

Be Part of Research provides details of current and historical clinical trials in the UK. This can be used by people who are

interested in taking part in a trial or those who wish to find out more about the trials which have taken place.

Visit, www.bepartofresearch.nihr.ac.uk

The Clinical Trials website provides information regarding current and historical clinical trials around the world.

Visit, www.clinicaltrials.gov

Life after HSCT

MS-UK asked veterans of the HSCT process to share their thoughts and insights about life after HSCT. The following is a snapshot of their feedback.



I feel lucky to have had HSCT. I want to spread the word because I think it is an incredible procedure



My MS has been in remission since I received HSCT in January 2020, and I've not been on any DMTs for seven years now. I'm no worse, and my cognitive and fatigue levels are far better now



I was 66 when treated and now, nearly six years later, I have had no new MS symptoms. I believe that I am generally weaker. I was at EDSS 7.5 when treated. The main improvement for me was that the fatigue has gone. My mobility has deteriorated slightly



My MS has been halted! I have many improvements - fatigue, stamina and toileting issues have been resolved. I'm not cured, and the damage done is irreversible, but I have gained so much, and I have been given a second chance



Three years later, no progression and my improved bladder and bowel symptoms remain improved. The main problem is that my thyroid and ovaries were damaged by treatment and getting appropriate care for those complications has been a massive struggle



I can't say I have seen any big improvements, but I am still only one year in. My MRI scan has shown stability which is good news and some symptoms I do not get anymore, like the MS hug, so I see that as a win



To date, my MS is in remission, and I am hopeful that this will continue. I have not had any disease activity for two years post-HSCT and I've not been on medications. I don't feel many improvements other than my brain fog is better, but my MS has not gotten any worse, which is a massive bonus. My MS was becoming pretty aggressive before I had HSCT



I'm five years post now, and I have my life back. My EDSS of 6 is still the same but coping with walking is much easier



I'm 86 days post-transplant, so I'm not sure about disease activity. I've no new symptoms, anyway. But I have had a lot of joint pain arise and it seems to have put me in early menopause and I'm suffering a lot with that



My MS has halted. No new lesions on MRI since my return. All in all, I live a totally normal life. Any ongoing symptoms are minor and manageable. I had no side effects after treatment except trying to grow my hair back, which seemed to take forever



It's not a miracle cure and nothing dramatic has reversed yet, but stabilising things so early after diagnosis has given me huge peace of mind and hope for the long term

Further information and support

AIMS

Autoimmune and multiple sclerosis (AIMS) is a charity that has been set up to support people living across the UK looking to seek HSCT as a treatment for MS and other autoimmune conditions. They offer information, peer support, signposting, grants and more. Visit, www.aimscharity.org

MS-UK's YouTube channel

Scott McCormick recorded a series of exclusive videos all about his journey with HSCT. You can view them all on our YouTube channel. Visit, www.youtube.com/c/Ms-ukOrg/videos

HSCT for MS

This YouTube channel documents the journey of MSer Chris Wasey during his HSCT treatment in the UK. Visit, www.youtube.com/@HSCTforMS

There are a variety of Facebook support groups with a wealth of personal insights and experiences. The more popular and active groups are listed below.

Scottish HSCT Network

A not-for-profit organisation offering information and support to people in Scotland considering HSCT as a treatment. They have a Facebook group and are led by people with experience of MS and HSCT. Visit, www.facebook.com/p/Scottish-HSCT-Network-100066646732505

UK HSCT Facebook group

Visit, www.facebook.com/groups/ukhsct

**HSCT Hematopoietic Stem Cell Transplant -
MS & Autoimmune Diseases Facebook group**

Visit, www.facebook.com/groups/hsctworldwide

HSCT Veterans Support Group for Autoimmune Diseases

Visit, www.facebook.com/groups/172430049818483

You can view the current list of JACIE accredited centres
in the UK, Europe and beyond on the EBMT website.

Visit, www.ebmt.org/ebmt

About MS-UK

MS-UK is a national charity supporting anyone affected by multiple sclerosis (MS). Our hope for the future is a world where people affected by MS live healthier and happier lives.

MS-UK has always been at the forefront of promoting choice, of providing people with all the information and support they need to live life as they wish to with MS, whether that be through drugs, complementary therapies, lifestyle changes, a mixture of these or none at all.

We will always respect people's rights to make informed decisions for themselves.

The MS-UK Helpline

We believe that nobody should face MS alone and our helpline staff are here to support you every step of the way.

Our service is informed by the lived experience of real people living with MS, so we can discuss any treatments and lifestyle choices that are of benefit, whether they are clinically evidenced or not.



New Pathways

Our bi-monthly magazine, New Pathways, is full of the latest MS news regarding trials, drug development and research as well as competitions, special offers and product reviews. The magazine connects you to thousands of other people living with MS across the country.

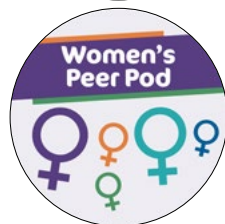
Available in print, audio version, large print and digitally.

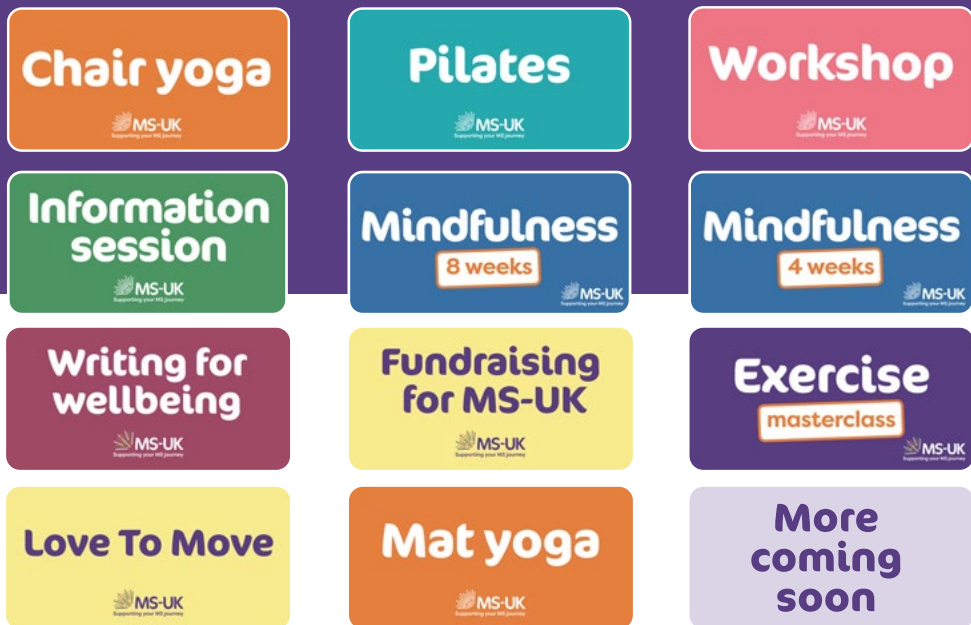
Visit [ms-uk.org/new-pathways-magazine](https://www.ms-uk.org/new-pathways-magazine)

About MS-UK

Peer support service

Our peer support service enables people to connect with others in a safe space and share experiences on topics of interest. Our Peer Pods take place regularly and are all volunteer led. Please visit the website to find out more [ms-uk.org/peer-support-service](https://www.ms-uk.org/peer-support-service) or email peersupport@ms-uk.org.





MS-UK's online activities

MS-UK offers a variety of online activities for those affected by MS to stay active, connected with others and to manage their symptoms to live happier and healthier lives. Activities include exercise sessions, mindfulness courses, chair yoga classes, information sessions and workshops. To get involved, please go to www.ms-uk.org or email register@ms-uk.org.

MS-UK E-learning

Do you work with or support someone living with MS and want to increase your understanding and knowledge of this long-term health condition? Professionals at MS-UK have created an accredited eLearning course that can help you do this. Visit www.ms-uk.org/ms-awareness-e-learning to find out more.

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Registered Office D3 Knowledge Gateway,
Nesfield Road, Colchester, Essex, CO4 3ZL

