



## **FAQ About HSCT (Hematopoietic Stem Cell Therapy) in MS**

### **Q. What is HSCT for multiple sclerosis?**

A. HSCT (Hematopoietic Stem Cell Transplantation) attempts to “reboot” the immune system, which is responsible for damaging the brain and spinal cord in MS. In HSCT for MS, hematopoietic (blood cell-producing) stem cells, which are derived from a person’s own (“autologous”) bone marrow or blood, are collected and stored, and the rest of the individual’s immune cells are depleted by chemotherapy. Then the stored hematopoietic stem cells are reintroduced to the body. The new stem cells migrate to the bone marrow and over time produce new white blood cells. Eventually they repopulate the body with immune cells.

### **Q. What is the idea behind autologous HSCT for MS?**

A. The goal of HSCT is to reset the immune system and stop the inflammation that contributes to active relapsing MS.

### **Q. Is HSCT an FDA-approved therapy option for people with MS?**

A. No, HSCT is not the type of procedure that the FDA would review or approve.

### **Q. What is involved in the HSCT procedure?**

A. While the general approach is the same, there are different treatment protocols that vary depending on the medical center and doctors performing the procedure. In general, these are some of the steps involved:

1. A person undergoing HSCT to treat MS is given some form of chemotherapy, usually by infusion in the vein, for up to 10 days (usually as an outpatient) to stimulate the production of bone marrow stem cells and promote their release into the blood. Then some blood is drawn from a vein and the stem cells in the blood are stored for later use.
2. Then the individual is usually hospitalized, and given a powerful mix of chemotherapies for up to 11 days to kill or suppress immune cells throughout the body.
3. The stored stem cells are then infused into the bloodstream through a vein.
4. The individual is usually given medicines such as antibiotics to help combat infection.

5. The person remains in the hospital for an additional period of time while the immune system begins to rebuild itself. Sometimes individuals are discharged from the hospital in two to four weeks, but this can be longer. In a recently published [Canadian study](#), the hospital stay after transplantation lasted 10 to 160 days, depending on any side effects experienced.
6. The immune system gradually rebuilds itself within 3 to 6 months.

**Q. When would I be able to go back to work or resume normal activities after HSCT?**

A. This varies by the individual and any adverse reactions they might experience. Normal activities might be safely resumed after the immune system has rebuilt itself so that it can ward off the threat of infection. Published information of autologous HSCT in which the immune system is completely depleted before the stem cell transplantation suggests that the immune system can rebuild itself fully within 3 to 6 months.

**Q. Who might benefit from HSCT?**

A. So far, published results suggest that people who may benefit from HSCT have highly inflammatory relapsing-remitting MS, can walk, have had MS for 10 years or less, and have not been helped by available disease-modifying therapies. “Highly inflammatory” means that there are significant signs of disease activity, made evident by relapses and relatively rapid worsening of symptoms and disability.

**Q. How effective is HSCT?**

A. There is no single answer to this question, since different medical groups around the world have used different treatment regimens and evaluation methods. The effectiveness varies according to the characteristics of the individuals, the intensity of their treatment, and the side effects experienced. Some people have gone into long-term remission from MS, experiencing no further MS symptoms, and some have even recovered functions that had previously been lost. Others have had MS disease progression and relapses return. From recently published results:

- A multi-center, 5-year trial called the [HALT MS](#) Study tested HSCT in 25 people with MS and active relapsing-remitting disease that was not controlled by disease-modifying medications. After five years, 69% of participants experienced no new disease activity after the procedure and did not need disease-modifying

therapies to control their disease. Most side effects related to blood cell reductions and infections.

- A long-term [Canadian trial](#) involving 24 people with aggressive relapsing-remitting MS whose disease was not controlled with available therapies showed that three years after the procedure, 100% were free of MS relapses, 70% remained free of disease activity, with no relapses, no new MRI-detected inflammatory brain lesions, and no signs of progression, and 40% experienced reductions in disability. One participant died and another required intensive hospital care for liver complications. All participants developed fevers, which were frequently associated with infections, and other toxicities.
- A small, 5-year [trial in Italy](#) involving seven people with aggressive relapsing-remitting MS whose disease was not controlled with available therapies showed that “low-intensity lympho-ablative regimen” in which the immune system was suppressed but not completely depleted before the stem cell transplant reduced but did not eliminate MRI-detected inflammation after the procedure. After 5 years, two participants remained stable, one significantly improved, and four had mild disease progression. One experienced a relapse. No severe side effects occurred.
- Doctors at Northwestern University published their [10-year experience](#) of treating people with very active MS with “nonmyeloblastic” HSCT, in which the immune system is suppressed but not completely depleted before the stem cell transplant. Individuals were followed from 6 months to 5 years, or an average of 2.5 years. The EDSS disability scores improved compared to pretreatment, by one point or more in 64% of those followed out to year 4. Relapses and MRI-detected disease activity were also reduced. They reported that people with relapsing-remitting MS who had had MS for ten years or less showed improvements in their disability scores, whereas those with secondary-progressive MS or disease duration greater than ten years did not show improvements on their disability scores. They reported no treatment-related deaths or serious infections. ITP (immune-mediated thrombocytopenia), a potentially serious bleeding disorder, developed in 7 people, and thyroid disorders developed in 7 people.

**Q. Would I benefit from autologous HSCT?**

A. It’s important to work with your MS neurologist to determine whether your type of MS might benefit from HSCT, weighing potential benefits and risks. Some forms of HSCT carry a risk of fatality. Estimates of the fatality rate range up to 5%

worldwide. Although this procedure has been done in hundreds of people with MS around the world, the medical centers have used different regimens and so it is still not clear what is the best and safest approach to HSCT for MS. It is also not clear how HSCT compares to available disease-modifying therapies for MS.

**Q. Where is autologous HSCT available for MS in the U.S.?**

A. To determine whether HSCT works for MS, it's important that clinical trials are conducted. At this time there is one [clinical trial](#) being conducted in MS in the U.S. This trial is currently recruiting participants at its sites Northwestern University and Rush University Medical Center, both in Chicago. [Read more](#) about who may be eligible to participate. At least one other trial is in planning stages, but no details are available yet.

Outside of clinical trials, there are a few centers where autologous HSCT procedures are typically offered for treating MS. They include Fred Hutchinson Cancer Center in Seattle and Northwestern University. Other centers that provide autologous HSCT for autoimmune diseases may include multiple sclerosis among the conditions they will treat. It's important that the center have expertise and experience in treating multiple sclerosis.

**Q. Does HSCT help people with long-standing progressive MS?**

A. Based on published results to date, it does not appear to. The evidence so far suggests that this procedure might benefit a subset of people with very active, relapsing-remitting MS that is not controlled by available medications.

**Q. What are the risks of HSCT?**

A. There are a number of known risks and toxicities associated with autologous HSCT, including the risk of death. The main risk comes from the chemotherapy regimen used to reduce or deplete the immune system. This makes the individual vulnerable to a wide variety of bacterial, fungal and viral infections, and sepsis (a serious condition that can occur as a result of infection). Other risks include irritations in the mouth and/or gastrointestinal tract, and also rare toxicities such as lung or kidney problems. Urinary tract infections are a side effect that occurs more commonly in people with MS, since catheters are often used because of bladder problems. Infertility is also a risk, depending on the regimen used.

People with MS who have a greater degree of disability before transplant are at risk of developing further loss of mobility due to the muscle weakness that results from the use of chemotherapy. Cognitive problems also may worsen, due to

effects of the chemotherapy on the brain. In some people with MS who undergo autologous (using their own cells) transplant, brain tissue volume has been shown to decrease within the first years after transplant, possibly related to disease activity before transplant, or related to the chemotherapy regimen. Also, people with immune-mediated diseases like MS who undergo HSCT have been noted to develop other immune-mediated diseases afterward, such as autoimmune thyroid problems.

**Q. Will my insurance pay for HSCT?**

A. This depends on your insurance provider. If a procedure is not approved by the Food and Drug Administration (HSCT is not approved for MS), chances are significant that health insurance plans won't cover the procedure. There are many different factors involved in insurance coverage and trying to get more information from your insurance company can be a difficult process. Even if your plan covers investigational or experimental procedures there still may be many other restrictions to actually getting the coverage.

The best course of action for anyone who is considering a stem cell procedure is to contact their health insurance provider before any formal treatments are conducted to ask for preapproval of insurance coverage. A patient's medical history, the health provider's legal position and the exact nature of the stem cell procedure need to be examined before a coverage determination is made. Each case is unique and going through the process with your insurance company will present its own unique challenges.

Before your transplant, it's important that you work closely with your insurance company to understand your benefit plan. You'll be responsible for any of your transplant and medical care costs not covered by your insurance company. You may want to ask your insurance company several questions regarding your transplant expenses, including:

- Does my health plan pay for transplant for my specific disease? What is the specific coverage of my plan?
- Does my health plan cover all parts of the transplant process? If not, what doesn't it cover?
- Does my health plan pay for all of the prescription medicines I will need before and after a transplant?
- Does my health plan require use of a special pharmacy company or store?

- What are my deductibles, coinsurance, copayments, both medical care and transplant services? What is my maximum out-of-pocket cost? What counts and doesn't count towards the out of pocket maximum?
- Does my plan require any special approvals for evaluation or transplant? How long does the approval process take once submitted to insurance?
- Does my health plan provide travel or lodging benefits for me or for my caregiver?
- Where can I find a list of in-network transplant centers? If I don't have a transplant center in-network, does my plan provide any coverage for me at an out-of-network transplant center?
- Ask your insurance company to provide you with a copy of your health insurance policy, and any information they can give you about your plan.
- When talking with your insurance company, it can be helpful to ask for a specific person from the insurance company to be assigned to you. Many insurance companies assign a case manager to help patients. Be sure the person you are talking to is authorized to quote coverage information. Ask for his or her name, contact details, and record the date(s) of your conversations.

Keep in mind that if insurance covers most of the cost of your transplant, you will probably have to pay part of the medical expenses out-of-pocket. Insurance co-payments, deductibles and uncovered expenses can quickly add up. In addition, your daily living expenses may be higher, particularly if your transplant is out of town or you or a family member needs to stop working temporarily. You check with the transplant center about financial assistance. You can also apply to The Assistance Fund's [Multiple Sclerosis Health Insurance Premium, Travel & Incidental Medical Expense Assistance Program](#).