

[Home](#) > [Navigating Cancer Care](#) > [Diagnosing Cancer](#) > [Tests and Procedures](#) > Donating Bone Marrow

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<http://www.cancer.net/navigating-cancer-care/diagnosing-cancer/tests-and-procedures/donating-bone-marrow>

## **Donating Bone Marrow [1]**

**This section has been reviewed and approved by the [Cancer.Net Editorial Board \[2\]](#), 06/2016**

A bone marrow transplant replaces diseased bone marrow with healthy bone marrow. However, the blood stem cells, not the actual bone marrow, are transplanted. So this procedure is more commonly called a stem cell transplant. Blood stem cells may come from the blood that usually circulates throughout the body or from [umbilical cord blood \[3\]](#).

An allogeneic transplantation (ALLO transplant) uses stem cells from a donor. And huge improvements in the donation process have made it as easy and painless as giving blood.

### **The importance of bone marrow**

Bone marrow is a soft, spongy material found in large bones. It makes more than 200 billion new blood cells every day:

- Red blood cells carry oxygen to all parts of the body.
- White blood cells help the body fight infections and diseases.
- Platelets help blood clot and control bleeding.

These functions do not work well in patients with bone marrow disease. This includes certain types of cancer, such as leukemia, lymphoma, myeloma, and aplastic anemia. It also includes some types of genetic and immune system disorders. For many of these patients, stem cell

transplant offers the best chance of survival and a possible cure. Learn more about the [types and process of bone marrow transplantation](#) [4].

## **Tissue typing for an ALLO transplant**

A successful bone marrow transplant requires the bone marrow of the donor to be well-matched with the bone marrow of the recipient. Human leukocyte antigens (HLAs) are specific proteins on the surface of white blood cells and other cells that make each person's tissue type unique. HLAs give doctors information about how well a donor's bone marrow will benefit the recipient. HLA-matched bone marrow/blood stem cells are less likely to cause graft-versus-host disease (GVHD). In GVHD, the immune cells in the transplanted bone marrow recognize the recipient's body as foreign and attack it. Learn more about [GVHD](#) [5].

So before a person receives an ALLO transplant, the health care team must find a matching donor through a special blood test called HLA typing.

## **Finding Donors**

About 30% of patients who need a bone marrow transplant can find an HLA-matched donor in their immediate family. Because a person's brothers and sisters are more likely to have HLA-matched bone marrow, the health care team usually tests them first. Parents and children may be a match, but the chances are low. For the remaining 70% of patients, doctors try to find HLA-matched bone marrow from the worldwide pool of volunteer donors.

The nonprofit [National Marrow Donor Program](#) [6] (NMDP) helps doctors locate matching donors. The NMDP finds people who would be willing to donate bone marrow and records their HLA tissue type into a confidential registry. The NMDP is the largest registry, but doctors examine every registry in the world when searching for a donor.

A person has a better chance of finding a bone marrow match from the same racial and ethnic group. But people belonging to minority populations and those from multiple racial or ethnic backgrounds are under-represented in donor registries. These populations include American Indian, Alaskan Native, Asian, black, Hispanic, Native Hawaiian, and Pacific Islander. So some registries specialize in finding donors for specific ethnic groups. This helps increase donations from these populations and give more people a chance to find a matched donor.

## **Who can donate bone marrow**

The following are the basic bone marrow donation guidelines from the NMDP. For the full list of guidelines, visit the [NMDP website](#) [7]. Donors should contact their local NMDP center for specific details and discuss donations with their health care team.

- Potential donors must be healthy and between the ages of 18 and 60.

- If matched with a person needing a transplant, each donor must pass a medical examination. Donors must also be infection-free before donating bone marrow.

## **How to register as a bone marrow donor**

Registering to become a bone marrow donor is easy. Locate a donor center by visiting the [NMDP's website](#) [6] or by calling 800-MARROW2 (627-7692). If you can't find a donor center in your area, you can register online. NMDP will mail you a tissue-typing kit with instructions on how to register.

Donor centers may charge a nominal, tax-deductible fee ranging from \$50 to \$100. But in some cases, there is no cost to the donor. The patient receiving the bone marrow transplant is usually responsible for any additional costs.

When donors register, they must fill out a short medical questionnaire. They also must sign a consent form stating that they understand what it means to participate in the registry. Either a small sample of blood (about 1 tablespoon) or cells from inside the cheek using a cotton swab is taken. The sample is analyzed to find out the donor's HLA type and recorded in a national database. Doctors from across the country access the database when patients need a transplant.

When a match is made, the NMDP contacts the donor. A new sample of blood is taken and sent to the patient's transplant center to confirm the HLA match. Once the match is confirmed, a counselor from the NMDP calls the donor to schedule an appointment. During the appointment, the counselor discusses the risks, benefits, and procedure involved in bone marrow donation. After agreeing to the procedure, the donor receives a medical exam to protect his or her health and the health of the bone marrow recipient.

Donors are under no obligation after registration. They can ask to have their name removed from the registry at any time. And they should contact the registry if their contact information changes.

## **The donation process**

Today, most donors have a peripheral blood stem cell (PBSC) collection:

- For 5 days beforehand, a donor receives injections of a white blood cell growth hormone called granulocyte colony-stimulating factor (G-CSF). These injections last 5 minutes.
- On day 5, a needle is placed in each of the donor's arms.
- A machine circulates the person's blood and collects the stem cells.

- Then it returns the rest of the blood to the donor.

This collection takes about 3 hours. And it may be repeated on a second donation day. There is very little blood loss. Side effects may include headaches, bone soreness, and discomfort from the needles during the process.

Although less common, a donor may receive a bone marrow harvest:

- During this procedure, doctors take bone marrow from the donor's hip bone during surgery.
- Anesthesia is given during this procedure to block the awareness of pain.
- Donors usually go home the same day they donate the bone marrow. And they can return to normal activity within 1 week.

Common side effects of a bone marrow harvest can include nausea, headache, and fatigue. These side effects are most often related to the anesthesia. Donors may also experience bruising or discomfort in the lower back.

However, most donors have minimal side effects. The body replaces lost bone marrow within 4 to 6 weeks. A member of the health care team contacts the donor for several months after donation to make sure he or she has fully recovered.

## **More Information**

[What Is a Stem Cell Transplant \(Bone Marrow Transplant\)?](#) [4]

[Side Effects of a Stem Cell Transplant \(Bone Marrow Transplant\)](#) [5]

## **Additional Resources**

[ExploreBMT](#) [8]

[Blood & Marrow Transplant Information Network](#) [9]

U.S. Department of Health and Human Services: [Bone Marrow and Cord Blood Donation and Transplantation](#) [10]

[The Bone Marrow Foundation](#) [11]

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**Links**

- [1] <http://www.cancer.net/navigating-cancer-care/diagnosing-cancer/tests-and-procedures/donating-bone-marrow>
- [2] <http://www.cancer.net/about-us>
- [3] <http://www.cancer.net/node/24503>
- [4] <http://www.cancer.net/node/24717>
- [5] <http://www.cancer.net/node/24674>
- [6] <http://bethematch.org/>
- [7] <https://bethematch.org/support-the-cause/donate-bone-marrow/join-the-marrow-registry/medical-guidelines/>
- [8] <http://www.explorebmt.org/>
- [9] <http://www.bmtinfonet.org/>
- [10] <http://bloodcell.transplant.hrsa.gov/>
- [11] <http://www.bonemarrow.org/>