Recruiting Unrelated Donors for the
National Marrow Donor Program

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Medical advances have made bone marrow transplantation the treatment of choice for certain hematologic diseases. For those patients eligible for a marrow transplant only about 30 percent find an HLA-compatible match within their families. Studies indicate that unrelated volunteers are willing to donate their marrow.

The National Marrow Donor Program was formed in 1986 as a result of a federal contract. This group is a network of donor centers, transplant centers, and collection centers. The Connecticut Red Cross Blood Services is one of approximately 70 donor centers. Recruitment methods vary with each donor center, depending on the resources available. The Connecticut Red Cross Blood Services has recruited more than 1,000 volunteers for entry into the National Marrow Donor Program.

Bone marrow transplantation (BMT) is now considered standard therapy for many diseases, including chronic myelogenous leukemia, severe aplastic anemia, severe combined immunodeficiency syndrome, and myelodysplasia [1,2]. There are four basic types of bone marrow transplantation in use today: syngeneic, autologous, allogeneic from related donors, and allogeneic from unrelated donors.

Syngeneic transplants are those in which the donor and recipient are identical twins. Autologous transplants are performed using the patient's own marrow, and allogeneic transplantation involves transplanting marrow from an individual other than the patient or the patient's identical twin. This discussion will be limited to the recruitment of unrelated donors for allogeneic transplantation.

The type of transplantation chosen depends on the specific disease, the patient's condition, and the availability of a human lymphocyte antibody-(HLA) matched suitable donor. Since the HLA tissue type of an individual is based on Mendelian inheritance, and taking into consideration the current family sizes, only about 30–40 percent of eligible candidates are able to find a compatible match within the family.

Early experiences in performing BMT from unrelated donors proved promising. In one study, marrow from an unrelated donor was transfused to a patient with acute lymphoblastic leukemia in second remission. The patient and the donor were HLA-identical. The successful transplant demonstrated that marrow from an HLA-identical unrelated donor could be used for the treatment of patients with leukemia [3].

A conference was held in 1981 to discuss the feasibility of recruiting unrelated donors for BMT [4]. Ethical, legal, and practical issues in the donation of bone marrow by unrelated volunteers were discussed. It was concluded that donors must be properly

Abbreviations: AABB: American Association of Blood Banks  ARC: American Red Cross  BMT: bone marrow transplantation  CCBC: Council of Community Blood Banks  CRCBS: Connecticut Red Cross Blood Services  HLA: human lymphocyte antibody  MLC: mixed lymphocyte culture  NMDP: National Marrow Donor Program

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educated concerning all aspects of the donation and must be allowed the opportunity to
decline to participate. Protocols must be established for handling requests, donor and
patient selection, liability of organizations and personnel involved, coverage of the
donor's medical costs, and assurance of donor safety.

The National Marrow Donor Program (NMDP) was established in 1986. A
government contract was awarded to the American Association of Blood Banks
(AABB), the American Red Cross (ARC), and the Council of Community Blood Centers (CCBC), with the ARC acting as administrative recipient. The Connecticut Red Cross Blood Services (CRCBS) is one of approximately 70 donor centers
participating in the registry.

Following guidelines set by the NMDP, recruitment of unrelated donors began in
October 1986. The goal at that time was to recruit 100,000 donors. It was determined
that apheresis donors who had been previously HLA-A,B-tested would be the target
group for recruitment [5]. The CRCBS identified 1,416 eligible (between 18 and 55
years old) apheresis donors at that time.

Recruitment was carried out in two phases. This system allowed the potential donors
to control the amount of information they received. In phase I, all eligible (1,416)
donors were sent a cover letter and brochure explaining the new marrow program.
Those who were interested in receiving additional information were requested to reply
by postcard; 434 or 31 percent of the apheresis donors responded favorably. Phase II
consisted of mailing another booklet with more detailed information about BMT and
the donor experience. Also included in the phase II mailing was a consent form for
participation into the NMDP; 204 or 47 percent returned the completed consent forms
and were subsequently entered into the registry. The overall percentages for initial
recruitment have been higher at centers where more resources were available for
personal telephone follow-up of each potential donor. Since the initial recruitment
phase, all first-time apheresis donors are invited to participate in the registry.

The media and personal family pleas for bone marrow donors also support recruit-
ment. Family pleas in Connecticut resulted in the development of two recruitment
satellite organizations. Money which was raised to finance a child's BMT was then
used to fund these recruitment satellites after the child died. The combined recruit-
ment efforts of these satellites resulted in an additional 503 persons HLA-tested and
entered into the registry (Table 1).

Other specific requests caused the Connecticut Red Cross Blood Services to set up
"bone marrow testing sessions," where samples were collected at a public site from
those wishing to join the NMDP and sent to a contract lab for HLA testing. Five
"testing sessions" added 197 new potential donors.

The Puget Sound Blood Center in Seattle, Washington, demonstrated that frequent
whole blood donors may be likely candidates for recruitment into the registry [6]. The
CRCBS recently held a mobile blood drive specifically to target potential donors.
Persons were contacted who had previously shown an interest in the program and were
scheduled to give a unit of blood. It was explained to them that an additional tube
would be drawn for the purpose of HLA testing and participation in the NMDP. Of the
76 persons presented to the bloodmobile, 69 were productive units, and 51 signed up for
the NMDP. Red Cross personnel were at the site to educate and provide "informed
consent" to all potential donors. Pending the availability of funding, we intend to adopt
this method as our program recruitment vehicle.

Once recruited into the NMDP, actual donor selection is based on HLA-A,B,DR
TABLE 1
CT Marrow Program—3/20/90

| Recruitment                                |     |
|--------------------------------------------|-----|
| Apheresis donors                           | 524 |
| Satellites                                 | 503 |
| Testing sessions                           | 197 |
| Bloodmobile                                | 51  |
| Other recruitment organizations            | 12  |
| Phone recruitment study                    | 4   |
|                                            | 1,291 |

| Race*                                      |     |
|--------------------------------------------|-----|
| Caucasian                                  | 968 |
| Black                                      | 10  |
| Oriental                                   |  5  |
| Hispanic                                   |  8  |
| Native American                            |  6  |
| Other                                      |  5  |
| Declined to answer                         |  2  |
| Unknown*                                   | 287 |

*Information obtained from donor questionnaire
*Information not previously requested at time of recruitment; will be determined at time of DR request

compatibility and low MLC (mixed lymphocyte culture reactivity with the recipient. Since apheresis donors and most other donors entered into the registry are previously tested only for HLA-A and B antigens, further testing is required to obtain DR results. This stage is also the appropriate time to assure the donor's preliminary commitment to bone marrow donation. Search requests using code numbers are generated from the coordinating center in St. Paul, Minnesota, to the donor center. Much emphasis is placed on donor confidentiality. The actual identity of the donor is known only to the donor center.

After it has been determined that the HLA-A,B,DR, and MLC results are compatible, the requested donor is thoroughly educated about the transplant and harvest procedures as well as re-assessed for continued commitment. A video is shown at this session demonstrating the actual bone marrow harvest. Donors are encouraged to bring their spouses to this session and to seek other counsel (donor advocate, clergy, other donors) in order to decide whether or not to proceed with the donation. The potential donor is then examined by a third-party physician to determine the medical eligibility of the donor and to provide a safe product for the marrow recipient. The donor must be able to tolerate general or spinal anesthesia and the aspiration of between 2–5 percent of his or her marrow.

An "Intent to Donate" is signed by the potential donor after it has been determined that all eligibility requirements are met and the donor is willing to proceed. The transplant center will notify the recipient that a match has been found, and a date for collection/transplant will be set. The identity of the donor is never known to the transplant facility.

The amount of marrow collected depends on the size of the recipient and whether or not the marrow is treated, but it should not exceed 1,500 ml. Autologous units of whole blood must be collected from the donor according to the anticipated volume of marrow to be harvested.
The donor is hospitalized either the day before or the morning of the marrow harvest at an approved collection facility near the individual's home. Immediately following the harvest, the marrow is transported to the recipient's transplant center by the donor center coordinator or other responsible courier. The marrow should reach the transplant center within 12 hours after the harvest.

The statistics provided by the NMDP in Figs. 1 and 2 show the number of patient/donor searches that actually culminated in transplantation. During this period of time, the NMDP received over 3,000 search requests. In Connecticut, 72 potential donors were requested for MLC testing; three of these proceeded to transplant. An additional five transplants were scheduled and subsequently cancelled due to progression of the patient's disease or decisions to pursue alternate therapy if available. There are at present no figures available for comparison with other donor centers.

It is imperative at this stage in the development of the registry to recruit a population with more ethnic diversity. HLA types are characterized by complex genetic traits, which are often unique to a particular race. The NMDP currently has an agreement with several independent recruitment organizations for help in recruiting African-Americans, Asian-Americans, and Hispanics. The CRCBS is also in need of defining new recruitment strategies, as indicated by the race information provided in Table 1, so that all races have equal representation within the donor population.

Individuals are willing to donate their bone marrow to an unrelated patient. Utilizing available resources, the CRCBS has recruited 1,291 potential marrow
FIG. 2. National Marrow Donor Program searches reaching transplant: cumulative total, 1988–1990.

FIG. 3. National Marrow Donor Program: volunteers willing to donate marrow, 1987–1990.
donors. The total number of volunteers in the NMDP is shown in Fig. 3. Further expansion of the registry within the state and nationwide will now have to focus on issues of minority recruitment, so that all individuals will be equally represented. The new recruitment goal of the NMDP is 250,000 donors. As the registry expands, the issues surrounding donor's rights need to be preserved.

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