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The National Marrow Donor Program 20 Years of Unrelated Donor Hematopoietic Cell Transplantation

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ABSTRACT

In the 20 years since the National Marrow Donor Program (NMDP) facilitated the first unrelated donor transplant, the organization has grown to include almost 7 million donors, and has facilitated over 30,000 transplants on 6 continents. This remarkable accomplishment has been facilitated by the efforts of over 600 employees, and an extensive international network including 171 transplant centers, 73 donor centers, 24 cord blood banks, 97 bone marrow collection centers, 91 apheresis centers, 26 HLA typing laboratories, and 26 Cooperative Registries. In this article, we review the history of the NMDP, and cite the major trends in patient demographics, graft sources, and conditioning regimens over the last 20 years.

KEY WORDS

National Marrow Donor Program • NMDP • Unrelated donor • Stem cell transplant • Transplantation

ESTABLISHMENT OF THE NMDP

In 1986, when the National Marrow Donor Program (NMDP) was established, Ronald Reagan was President of the United States, the Big Easy was the most popular movie, and the U.S. Supreme Court ruled that Rotary Clubs must admit women. In science, the first heart and lung transplant was performed, and Prozac and AZT were first approved for use.

The NMDP was established in July 1986 when it was awarded a contract with the U.S. Navy to establish the National Bone Marrow Donor Registry. The program had 1 full-time employee and subcontracted the information system to the University of Minnesota. Computer programs were DOS-based programs. The first search requests for donors were processed in September 1987, and the first transplant was facilitated in December 1987. Forty-four donor centers and 7 transplant and collection centers comprised the network. In June 1988, the Board of Directors voted to name the organization the National Marrow Donor Program.

Today, the program is supported in part through multiple federal contracts administered by the Health Resources and Services Administration (HRSA). The NMDP employs over 600 people and the program enjoys 160,000 square feet of office space near downtown Minneapolis.

The NMDP is comprised of the coordinating center in Minneapolis, 128 U.S. transplant centers, 43 international transplant centers, 66 U.S. donor centers, and 7 international donor centers. A cord blood program was begun in 1998 and now includes 21 U.S. cord blood banks and 3 international cord

blood banks. In addition, the NMDP's extensive network includes 26 Cooperative International Registries located on 6 continents. Approximately 35% of the NMDP-facilitated transplants are performed internationally.

TRANSPLANT ACTIVITY

Over the past 20 years there have been several major trends in transplant activity. In addition to an increase in the overall number of adult and pediatric transplants, there has been a dramatic increase in transplants for patients over the age of 50 years, in the use of reduced-intensity (RIC) preparative regimens, and in the use of peripheral blood stem cells (PBSC) and, most recently, umbilical cord blood (UCB) as the graft source. There have been modest increases in the use of transplant for nonmalignant diseases. This section will explore these trends, as well as highlight the changing demographics of the NMDP transplant and donor population.

Figure 1 outlines the number of adult transplants between 1987 and 2007. In 1988, 54 transplants were performed; in 1997, 879 transplants were performed; and in 2007, 2640 adult transplants were facilitated by the NMDP. PBSC was first used as a graft source for primary transplants in NMDP transplants in 1999, and in 2003, PBSC surpassed bone marrow (BM) as the preferred stem cell source. Presently, PBSC grafts comprise the majority (72%) of adult transplants. In 2000, the NMDP facilitated its first unrelated UCB transplant for an adult patient. The numbers continued to grow, and by 2007 UCB was used as a graft source in 10% of adult transplants.

Pediatric transplants have followed some similar trends, as seen in Figure 2. As expected, there are fewer pediatric than adult transplants. In 1987, the first pediatric NMDP transplant was performed in a child with acute leukemia from Raleigh, NC. In 2007, 864 pediatric unrelated transplants were performed. PBSC was added as a graft source for primary transplants in 1999; in 2007, 20% percent of NMDP pediatric transplants were PBSC grafts. UCB transplants were added in 2000 for pediatric patients and in 2007 comprised 41% of pediatric unrelated transplants.

A significant trend has been an increase in the numbers of transplants in patients over the age of 55 years. This reflects activity in the matched sibling setting, likely because of the introduction of PBSC grafts and RIC regimens [1,2]. This is an important advance, given the median age of 68 years for patients with acute myelogenous leukemia (AML) [3,4]. Figure 3 outlines the number of first NMDP transplants in patients over the age of 55 years. In 2000, 8% (116 of 1543 transplants) of the initial NMDP transplants were in patients 55 years and older. By 2005, 21% (540 of 2522 transplants) of the initial

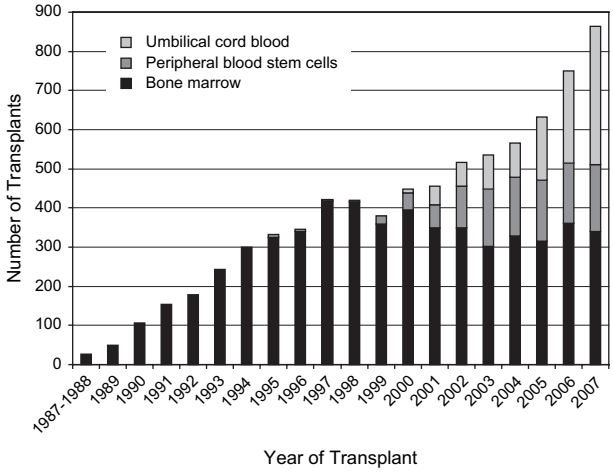

Figure 2. Number of pediatric transplants facilitated by the NMDP, by year and stem cell source.

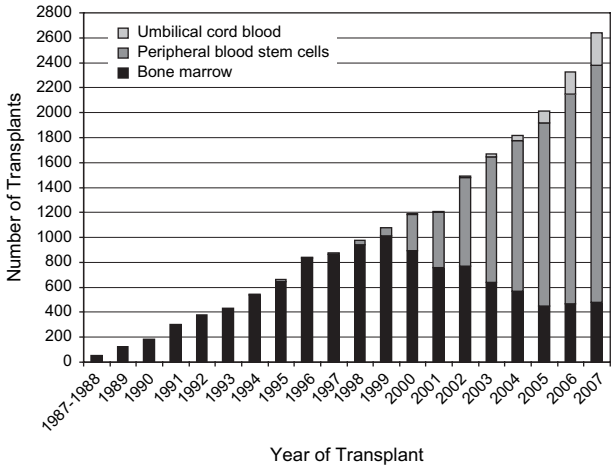

Figure 1. Number of adult transplants facilitated by the NMDP, by year and stem cell source.

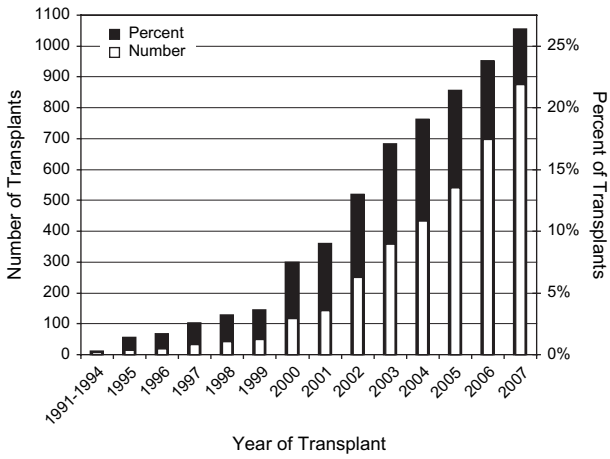

Figure 3. Initial NMDP transplants in patients 55 years of age and older.