50 YEARS OF
STEM CELL TRANSPLANTATION
AND CELLULAR THERAPIES
Advancing Care through
Expertise and Innovation
PROGRESS AND PROMISE IN CELLULAR THERAPIES

Fifty years ago, Brigham and Women’s Hospital and Boston Children’s Hospital initiated a joint bone marrow transplant program. In the early 1980s, Dana-Farber launched its own transplant program. When the programs merged in 1996, Joseph Antin, MD and Robert Soiffer, MD collaborated to create one of the largest adult programs in the nation with a robust research engine to improve stem cell transplant treatment and outcomes. It is now one of largest programs in the country and performs more unrelated donor transplants than any other program.

The progress we have made as a program and throughout the field of hematopoietic stem cell transplantation is incredible. Through innovation, research, and advanced patient care, we are able to utilize stem cell transplantation to offer cure and better quality of life to an increasing number of patients. Some highlights of key advances are summarized below, with more detail of our program’s contributions on the following page.

<table>
<thead>
<tr>
<th>THEN</th>
<th>NOW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Age</strong></td>
<td>Maximum age was 35</td>
</tr>
<tr>
<td><strong>Number of Transplants for Adult Patients</strong></td>
<td>When our programs merged in 1996, we were doing approximately 250 transplants annually.</td>
</tr>
<tr>
<td><strong>Donor Types</strong></td>
<td>Related (largely matched siblings only)</td>
</tr>
<tr>
<td><strong>Stem Cell Sources</strong></td>
<td>Bone marrow harvests were the main source of stem cells.</td>
</tr>
<tr>
<td><strong>Cell Processing</strong></td>
<td>Processed in an individual research lab</td>
</tr>
<tr>
<td><strong>One-Year Survival Rate</strong></td>
<td>56-58%¹</td>
</tr>
</tbody>
</table>

¹For transplants prior to 2000
²Based on CIBMTR 2021 Transplant Center-Specific Survival Report for unrelated and related donor stem cell transplants.
As we mark the 50th anniversary of our program, we extend a heartfelt thanks to our entire team. Whether they are working with patients directly or behind the scenes, our extraordinary team shows an unwavering focus on making the best decisions to help patients through their treatment journey and achieve the best possible outcomes.

We also thank our patients and their caregivers for their trust and commitment to this complex treatment. We will continue working to make stem cell transplant more tolerable and accessible, and achieve even better outcomes.

While we have made tremendous strides, there is still more work to do to prevent relapse after stem cell transplant and make stem cell transplant accessible to more patients. With the solid foundation we and others have built, we’re confident of continued progress and impact for patients requiring stem cell transplant.

We look forward to continued collaboration with you and our stem cell transplant colleagues around the world to continue to improve outcomes for our patients.

Your partners in care,

Catherine Wu, MD, Chief, Division of Stem Cell Transplantation and Cellular Therapies
Corey Cutler, MD, MPH, FRCPC, Medical Director, Adult Stem Cell Transplantation Program
Robert Soiffer, MD, Chief, Division of Hematologic Malignancies
Joseph Antin, MD, Chief Emeritus, Adult Stem Cell Transplantation Program
50 YEARS OF ADVANCING CELLULAR THERAPIES FOR CANCER PATIENTS

1970s

Transplant program established as first in New England

First transplant performed at combined pediatric and adult program at Brigham and Women’s Hospital and Boston Children’s Hospital

1980s

Developed antibodies that purge patient’s body of their own bone marrow; used first in pediatric patients with acute lymphoblastic leukemia (ALL); then in adults with leukemia and B-cell lymphoma

Autologous transplant program began at Dana-Farber Cancer Institute

Demonstrated safety and effectiveness of T-cell depletion to reduce graft-versus-host disease (GVHD)

First use of monoclonal antibodies to prevent GVHD

First use of DNA technology to distinguish host and donor cells from one another in order to reliably document and characterize successful engraftment

Immunotherapy using interleukin-2 (IL-2) following bone marrow transplants enhances patient’s immunity against tumors

1990s

Demonstrated that effective “purging” of bone marrow associated with improved outcomes for patients with follicular lymphoma

Joined the National Marrow Donor Program as a transplant, collection, and donor center

Our research into the biology of GVHD identified cytokines as important contributors to GVHD. Our team identified the role of B cells in GVHD, leading to the development of anti-B cell therapies including ibrutinib. Later, our studies showed that regulatory T cells were deficient in GVHD, leading to the use of IL-2 for chronic GVHD and autoimmune diseases.

2000s

Received FACT accreditation for the stem cell transplant program, stem cell collection program, and cell processing lab. With this accreditation, the CMCF can perform complex cell manufacturing and gene therapy.

Non-myeloablative transplant approach developed to strengthen graft-versus-leukemia effect

First use of sirolimus for GVHD prevention

Pasqualello Tissue Bank established to prospectively collect and analyze blood samples for transplant, leukemia, and lymphoma research studies. To date, the Bank includes more than 20,000 patients registered and more than 190,000 samples.

First US use of donor lymphocyte infusion (DLI) as a cure for relapsed leukemia after transplant. Confirmed the immune system role in controlling leukemia. This ultimately led to the use of reduced-intensity transplants, enabling older adults to receive transplant.

Connell and O’Reilly Families Cell Manipulation Core facility (CMCF) established as a CORE facility for Dana-Farber/Harvard Cancer Center

Began development of first drug (defibrotide) with potential to reverse veno-occlusive disease.
500th unrelated donor adult transplant

First CMCF expansion complete; moved to a GMP cell processing facility

1,000th unrelated blood stem cell transplant

Demonstrated that immunization with irradiated autologous tumor cells genetically engineered to secrete GM-CSF (GVAX) could induce potent anti-tumor immunity

Umbilical cord blood donation program launched

2010s

CMCF manufactures its first CAR T-cell product

First to demonstrate that immune checkpoint blockade with ipilimumab can induce responses for patients with post-transplant disease relapse

Based on Dana-Farber Brigham research, FDA approved defibrotide approved for veno-occlusive disease, a serious post-transplant complication

Immune Effector Cell Therapies Program launched to focus on care and research of emerging cellular therapies

Based on Dana-Farber Brigham research, FDA approved letermovir for prevention of cytomegalovirus (CMV) infection, common for stem cell transplant patients

2020s

One of first to offer first FDA-approved CAR T-cell therapy for mantle cell lymphoma

Based on Dana-Farber Brigham research, belumosudil is FDA approved for chronic graft-versus-host disease

One of first to offer first FDA-approved CAR T-cell therapy for indolent follicular lymphoma and first FDA-approved CAR T product for multiple myeloma

Based on research led by Leslie Kean, MD, PhD, director of the pediatric stem cell transplant center Dana-Farber/Boston Children’s, abatacept is FDA approved for acute GVHD

DETERMINATION, a landmark study led by Dana-Farber demonstrates improved progression-free survival for upfront stem cell transplant for multiple myeloma patients
A TRUSTED LEADER IN STEM CELL TRANSPLANTATION AND CELLULAR THERAPIES

For 50 years, the Division of Stem Cell Transplantation and Cellular Therapies program at Dana-Farber Brigham Cancer Center has been a leader in cellular therapies. Our stem cell transplantation program is one of the largest and most experienced transplant centers in the world. This experience makes a difference for our patients. Our outcomes regularly exceed expected outcomes established by the Center for International Blood and Marrow Transplant Research (CIBMTR). In addition, our active research program leads to advances in the field and improves outcomes.

We have performed more than **11,100 transplants** for adult patients, including more than:

- **5,830 allogeneic transplants**
- **5,340 autologous transplants**

Our program is also at the forefront of emerging cellular therapies. We are the **highest volume CAR T-cell therapy center in New England and one of the largest nationally**. We were **one of the first centers** to offer this innovative therapy and offer all FDA-approved CAR T therapies as well as many clinical trials of CAR T and other forms of cellular therapy for blood cancers and solid tumors.

**ACCREDITATIONS AND AFFILIATIONS**

**Program Accreditations, Registrations, Licenses**
- Foundation for the Accreditation of Cellular Therapy (FACT) for stem cell transplant and immune effector cell therapies
- U.S. Food and Drug Administration
- American Association of Blood Banks (AABB)
- Centers for Medicare and Medicaid Services
- The Joint Commission
- Fully accredited by the National Marrow Donor Program (NMDP)

**Clinical and Research Affiliations**
- Member of the Center for International Blood and Marrow Transplant Research (CIBMTR)
- Charter member of the Blood and Marrow Transplant Clinical Trials Network of the National Institutes of Health (BMT-CTN)
- Member of the Alliance for Clinical Trials in Oncology (formerly CALGB)
- Founding members of Dana-Farber/Harvard Cancer Center, designated a comprehensive cancer center by the National Cancer Institute

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*Includes transplants since 1982 through 2021. While our transplant center has been operational since 1972, data capture using current standards began in November 1982.*
LEADERSHIP

Robert J. Soiffer, MD
Vice Chair, Department of Medical Oncology; Chief, Division of Hematologic Malignancies;

Catherine J. Wu, MD
Chief, Division of Stem Cell Transplantation and Cellular Therapies

Joseph Antin, MD
Chief Emeritus, Stem Cell Transplantation Program

Corey Cutler, MD, MPH
Medical Director, Stem Cell Transplantation Program; Director of Clinical Research, Stem Cell Transplantation Program; Director, Stem Cell Transplantation Survivorship Program

Vincent Ho, MD
Director of Clinical Operations, Stem Cell Transplantation Program

Caron Jacobson, MD, MMS
Medical Director, Immune Effector Cell Therapy Program

John Koreth, MBBS, DPhil
Director of Translational Research, Stem Cell Transplantation Program

Sarah Nikiforow, MD, PhD
Technical Director, Immune Effector Cell Therapy Program; Medical Director, Connell and O’Reilly Families Cell Manipulation Core Facility

Jerome Ritz, MD
Executive Director, Connell and O’Reilly Families Cell Manipulation Core Facility

Rizwan Romee, MD
Director, Haploidentical Transplantation Program

Eric Smith, MD, PhD
Director, Translational Research, Immune Effector Cell Therapy Program
A STEM CELL TRANSPLANTATION CLINICAL PROGRAM WITH DEEP EXPERIENCE AND STRONG OUTCOMES

Our stem cell transplantation program is one of the largest in the nation, caring for adult patients with a variety of hematologic malignancies, bone marrow failure syndromes, and rare and congenital blood disorders. We are experienced in both autologous and allogeneic transplantation.

For allogeneic transplant patients, we offer:

- Related donor transplant
- Haploidentical ("half-matched") transplant with a biological parent, child, or sibling
- Unrelated donor transplant
- Reduced-intensity ("mini" or “RIC”) transplant
- Umbilical cord blood transplant
- Outpatient transplant for some patients

Having experience with a range of donor sources enables us to make stem cell transplant available to more patients.
### Donor Services for Allogeneic Patients

Our experienced Donor Services team provides comprehensive services for related and unrelated donors for allogeneic patients. This includes:

- A specialized unrelated donor search team that routinely reviews strategies for finding the best donor for each patient in the shortest timeframe and at the lowest cost. Our unrelated donor program is the largest NMDP-designated allogeneic donor program in the U.S.
- Coordinating HLA typing and donor identification of family members and unrelated donors
- A dedicated and skilled donor clinician team that manages the donor’s medical evaluation and collection process. This team acts as the donor’s advocate, looking out for the donor’s best interests throughout the recruitment, matching, testing, and donation processes
- Comprehensive education for all potential donors
- Follow-up care and support for donors

Our program is a fully accredited member of the National Marrow Donor Program as a transplant center and as an apheresis and marrow collection center.

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### STEM CELL TRANSPLANTATION PROGRAM BY THE NUMBERS*

<table>
<thead>
<tr>
<th></th>
<th>1982-99</th>
<th>2000-21</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total transplants</td>
<td>1,809</td>
<td>9,373</td>
<td>11,182</td>
</tr>
<tr>
<td>Autologous transplants</td>
<td>1,069</td>
<td>4,277</td>
<td>5,346</td>
</tr>
<tr>
<td>Allogeneic transplants</td>
<td>740</td>
<td>5,096</td>
<td>5,836</td>
</tr>
<tr>
<td>Related donor (includes haploidentical)</td>
<td>588</td>
<td>1,792</td>
<td>2,380</td>
</tr>
<tr>
<td>Matched, unrelated donor</td>
<td>105</td>
<td>2,475</td>
<td>2,580</td>
</tr>
<tr>
<td>Umbilical cord blood and mismatched unrelated donor</td>
<td>47</td>
<td>829</td>
<td>876</td>
</tr>
<tr>
<td>Myeloablative conditioning regimen</td>
<td>740</td>
<td>2,017</td>
<td>2,757</td>
</tr>
<tr>
<td>Non-myeloablative conditioning regimen</td>
<td></td>
<td>2,716</td>
<td>2,716</td>
</tr>
</tbody>
</table>

*Includes transplants since 1982 through 2021. While our transplant center has been operational since 1972, data capture using current standards began in November 1982. Does not include rescue transplants.
Disease and Conditions Treated with Transplant

We utilize stem cell transplant to treat patients diagnosed with the following conditions, including older adults and those with advanced disease:

**BLOOD CANCERS AND MALIGNANT DISORDERS**
- Acute lymphoblastic leukemia (ALL)
- Acute myeloid leukemia (AML)
- Chronic lymphocytic leukemia (CLL/SLL)
- Chronic myelogenous leukemia (CML)
- Hodgkin lymphoma
- Non-Hodgkin lymphoma
- T-cell lymphoma
- Mantle cell lymphoma
- Follicular lymphoma
- Multiple myeloma
- Waldenström’s macroglobulinemia
- Blastic plasmacytoid dendritic cell neoplasm (BPDCN)
- Testicular or germ cell cancer
- And others

**MYELOPROLIFERATIVE DISORDERS AND MYELODYSPLASTIC SYNDROMES**
- Myelofibrosis
- Myeloproliferative disorders (MPD)
- Myelodysplastic syndromes (MDS)
- Chronic myelomonocytic leukemia (CMML)
- And others

**NON-MALIGNANT AND CONGENITAL BLOOD DISORDERS**
- Aplastic anemia
- Diamond-Blackfan anemia
- Dyskeratosis congenita
- MonoMAC Syndrome
- Paroxysmal nocturnal hemoglobinuria (PNH)
- Shwachman-Diamond syndrome
- Sickle cell anemia
- Thalassemia
- Hemophagocytic lymphohistiocytosis (HLH)
- Immunodeficiency syndromes
- And others

**Early Referral for Transplant Evaluation**

We encourage you and your patients to consult with us early in the treatment cycle to evaluate if a stem cell transplant may be appropriate. For our guide on Recommended Referral Timing for Transplant Evaluation, visit [www.dana-farber.org/sctmd](http://www.dana-farber.org/sctmd).
## NUMBER OF TRANSPLANTS BY DISEASE CATEGORY*

<table>
<thead>
<tr>
<th>Disease Group</th>
<th>1982-99</th>
<th>2000-21</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>759</td>
<td>2,138</td>
<td>2,897</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>229</td>
<td>2,232</td>
<td>2,461</td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>191</td>
<td>1,825</td>
<td>2,016</td>
</tr>
<tr>
<td>Myelodysplastic syndromes</td>
<td>70</td>
<td>889</td>
<td>959</td>
</tr>
<tr>
<td>Hodgkin lymphoma</td>
<td>52</td>
<td>618</td>
<td>670</td>
</tr>
<tr>
<td>Acute lymphoblastic leukemia</td>
<td>123</td>
<td>502</td>
<td>625</td>
</tr>
<tr>
<td>Other leukemia (includes CLL/SLL, BPDCN, PLL)</td>
<td>148</td>
<td>397</td>
<td>545</td>
</tr>
<tr>
<td>Chronic myelogenous leukemia</td>
<td>225</td>
<td>229</td>
<td>454</td>
</tr>
<tr>
<td>Myeloproliferative neoplasm</td>
<td>3</td>
<td>242</td>
<td>245</td>
</tr>
<tr>
<td>Severe aplastic anemia</td>
<td>5</td>
<td>115</td>
<td>120</td>
</tr>
<tr>
<td>Solid tumor (includes germ cell tumor, testicular cancer)</td>
<td></td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Hemoglobinopathy</td>
<td>2</td>
<td>47</td>
<td>49</td>
</tr>
<tr>
<td>Histiocytic disorders</td>
<td></td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Other disease</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Immunodeficiencies</td>
<td></td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Autoimmune</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Platelet disorders</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,808</strong></td>
<td><strong>9,375</strong></td>
<td><strong>11,182</strong></td>
</tr>
</tbody>
</table>

### Transplants for Older Adults*

Stem cell transplant has become a viable option for older adults up into their 70s. A major factor has been the development of reduced-intensity transplants in which lower doses of chemotherapy are used. Our Older Adult Hematologic Malignancies Program provides dedicated support for older patients. Each patient receives collaborative care from both their Dana-Farber Brigham oncologist and a geriatrician from Brigham and Women’s Hospital to identify the best treatment approach as well as to manage other health and wellness issues they may face.

In addition, our center led the recent BMT-CTN 1102 study that demonstrated that stem cell transplant is a safe and effective treatment option for older patients (age 50 – 75 years) with higher-risk MDS.

<table>
<thead>
<tr>
<th>Age</th>
<th># of Transplants</th>
</tr>
</thead>
<tbody>
<tr>
<td>55-59 years</td>
<td>1,397</td>
</tr>
<tr>
<td>60-64 years</td>
<td>1,384</td>
</tr>
<tr>
<td>65-70 years</td>
<td>1,354</td>
</tr>
<tr>
<td>70+ years</td>
<td>608</td>
</tr>
</tbody>
</table>

*Includes transplants since 1982 through 2021. While our transplant center has been operational since 1972, data capture using current standards began in November 1982.
CELLULAR THERAPIES CLINICAL PROGRAM: FIRST TO BRING NOVEL THERAPIES TO PATIENTS

Novel cellular therapies that help the immune system fight cancer such as CAR T-cell therapy, cancer vaccines, NK-cell therapy, and other genetically-modified T cells have emerged as potent therapeutic options for many patients with blood cancers. Our program remains at the forefront of emerging cellular therapies and is often among the first to offer clinical trials in this area. We offer trials of emerging cellular therapies such as Tregs, NK-cell therapy, cytotoxic T lymphocyte (CTL) cells, and tumor infiltrating lymphocytes (TILs) for many types of cancer. Several novel therapies are being manufactured and evaluated through our Cell Manipulation Core Facility.

Our program has extensive experience providing CAR T-cell therapy. We offer all FDA-approved CAR T-cell therapies as well as several clinical trials of CAR T for hematologic malignancies and solid tumors.

CAR T is currently FDA approved for:

- Large B-cell lymphoma, mantle cell lymphoma, and follicular lymphoma. The first approval was for large B-cell lymphoma in 2017.
- Multiple myeloma. The first product was approved for multiple myeloma in 2021.
- B-cell acute lymphoblastic leukemia. CAR T was first approved for B-ALL patients up to age 25 in 2017. In 2021, a second product was approved for adults with B-ALL.

NUMBER OF CAR T TREATMENTS

Includes patients treated on clinical trials as well as commercial products across all disease types, 2015-2021.
### Number of CAR T Treatments by Disease Type

<table>
<thead>
<tr>
<th>Disease</th>
<th># of CAR T treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphoma</td>
<td>407</td>
</tr>
<tr>
<td>Multiple Myeloma</td>
<td>65</td>
</tr>
<tr>
<td>Leukemia</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

### Cellular Therapies Program Leaders

**Caron Jacobson, MD, MMSc**  
Medical Director, Immune Effector Cell Therapy Program

**Sarah Nikiforow, MD, PhD**  
Technical Director, Immune Effector Cell Therapy Program; Medical Director, Connell and O’Reilly Families Cell Manipulation Core Facility

**Jerome Ritz, MD**  
Executive Director, Connell and O’Reilly Families Cell Manipulation Core Facility

**Eric Smith, MD, PhD**  
Director, Translational Research, Immune Effector Cell Therapy Program
ON-SITE CELLULAR THERAPY LAB FACILITATES INNOVATIVE TREATMENT APPROACHES

The Connell and O’Reilly Families Cell Manipulation Core Facility (CMCF) is a critical component of our stem cell transplantation and cellular therapies program. This cutting-edge lab is among the largest cellular therapies labs at an academic medical center and New England’s only Class 10,000 Good Manufacturing Practices (GMP) cellular manufacturing facility in an academic center. The CMCF recently tripled in space size to address the growing cellular therapy field.

The CMCF is an experienced manufacturer of cellular products for clinical use, including:

- Routine hematopoietic stem cells or selected subsets
- Genetically-modified hematopoietic stem cells
- CAR T cells and other genetically-modified immune cells
- Dendritic, regulatory T cells, natural killer (NK), and cytotoxic T lymphocyte (CTL) cells
- Selected T-cell subsets (Tregs) for immunotherapy
- Cancer vaccines
- Mesenchymal stromal cells
- Induced pluripotent stem cells
- Limbal stem cells
The Kraft Family Blood Donor Center at Dana-Farber Cancer Institute and Brigham and Women’s Hospital is another vital part of our cellular therapies program. This on-site facility manages the apheresis collection process for stem cell transplant patients and donors, as well as patients treated with other autologous cellular therapies such as CAR T-cell. The Kraft Center also provides on-site therapeutic apheresis, photopheresis, and blood transfusions.

In 2021, The Kraft Center managed:
- 284 autologous stem cell collections
- 101 allogeneic stem cell donor collections
- 149 CAR T collections (commercial and research)
- 43 NMDP collections

Each year, the CMCF processes more than **1,000 cellular products** for adult and pediatric patients, including stem/progenitor cells, immune effector cells, and genetically modified products.

The CMCF supports more than **65 clinical research protocols** for more than **20 FDA investigational new drugs (INDs)**, with a focus on translational research in stem cell transplant and cellular immunotherapy for cancer.

The lab is accredited by FACT for cellular therapy product processing for both minimal and more than minimal manipulations. The Cell Therapy Testing Laboratory is CLIA licensed and Joint Commission accredited.

**Lab Facts:**
- **15** separate ISO-7 clean rooms
- **32** individual workstations
- Operates at biosafety **level 2-plus**
- **CLIA approved** product testing lab
- **Process development lab** for scaling up of novel processes

Quality is a cornerstone of our program, with dedicated and highly-trained specialists in QA, QC, QI and regulatory management. We adhere to extensive safety systems and documentation resources.
A SPECIALIZED TEAM PROVIDES EXCEPTIONAL CARE TO PATIENTS

Our multidisciplinary team of experts has a deep understanding of the complex needs and complications of patients receiving stem cell transplant and cellular therapies. Our program has more than 50 credentialed transplant physicians and dedicated teams experienced in CAR T-cell therapy.

Our physicians are:
- Faculty members of Harvard Medical School
- Leaders in national organizations, working to influence policy and improve standards of care
- Authors of peer-reviewed published articles in leading journals

Patient care teams include:
- Attending physician
- Nurse practitioner/physician assistant
- Nurse coordinator
- Oncology nurse navigator
- Inpatient nurse
- Inpatient house staff/resident
- Non-RN coordinator
- Social worker
- Donor search and collection coordinator
- Donor collection NP/PA
- Financial counselor
- Clinical data specialist
- Housing resource specialist
- Research nurse and clinical research coordinator for patients on clinical trials

Patients are followed by the same attending physician and nurse practitioner throughout their treatment, enabling:
- Continuity of care
- Strong patient-care team relationship
- Clear and easy access for patients and their local providers

Dana-Farber’s partnership with Brigham and Women’s Hospital, one of the nation’s leading hospitals, expands our care team to include experts in infectious disease, critical care, gynecology, oral medicine, dermatology, neurology, nephrology, cardiology, pulmonology, and other areas to address any side effects or complications a patient may experience.
Nurses play a key role in managing a patient’s clinical care in both the inpatient and outpatient settings.

**BEFORE TREATMENT**
- Assesses needs and coordinates resources to support patients and caregivers
- Provides tailored education to ensure patients and caregivers understand what to expect during and post treatment
- Serves as a consistent contact to answer clinical questions across their journey

**DURING TREATMENT**
- Administers conditioning chemotherapy, stem cell/CAR-T infusion, and supportive treatments throughout nadir and engraftment
- Provides ongoing monitoring of physiologic status and support for coping with complex treatment
- Conducts discharge education and coordinates post-transplant services to facilitate patients’ transition home

**FOLLOW-UP CARE**
- Manages post-transplant/treatment care with transplant physician and local oncologist
- Monitors blood counts and medication level
- Addresses side effect concerns
- Monitors for graft-vs-host disease

Both Dana-Farber Cancer Institute and Brigham and Women’s Hospital have earned Magnet designation for excellence in nursing service and practice by the American Nurses Credentialing Center — the nation’s preeminent accreditation organization.
SUPPORTING PATIENTS THROUGHOUT THE TREATMENT JOURNEY

Our program provides comprehensive care for stem cell transplant and cellular therapies patients — from treatment planning, donor search, and inpatient care through post-treatment care.

Services and support include:

- A shared care initiative that fosters pre- and post-treatment collaboration with local providers, enabling more care close to home
- Comprehensive patient and caregiver education program
  > Multiformat patient education materials including printed guides, website, videos, and interactive learning modules to meet different learning styles and diverse audiences
  > Dedicated caregiver guide and support
- Stem cell transplantation survivorship program to address the long-term needs to stem cell transplant survivors
  > Survivors can also access support and services through Dana-Farber’s Adult Survivorship Program
- Graft-versus-host disease prevention and management
- Dedicated program for older patients that helps guide therapy decisions, minimize side effects, and enhance the patient’s overall quality of life
- Specialized programs for transplant and cellular therapies patients, including imaging, infectious disease, pathology, radiation oncology, neurology, photopheresis
- Hematopathologic evaluation and diagnosis
- Toxicity management
- Nutrition services
- Pharmacy services
- Integrative therapies
- DNA sequencing for leukemia and related disorders
- Dedicated social work resources
- Patient and family resource center
- Emotional and psychosocial support
- Financial counseling
- Housing assistance
We support patients throughout their journey with nurse navigators, social work guidance, and comprehensive education resources.
Our robust research enterprise in basic and translational research aims to advance and improve care and outcomes for transplant and cellular therapies patients.

**Our transplant research program:**
- Is supported by funding from NIH program project and research project grants, Leukemia & Lymphoma Society, Patient-Centered Outcomes Research Institute, and other sources
- Offers several clinical trials, many of which are only available at Dana-Farber Brigham

**Current transplant research efforts are focused on:**
- Relapse treatment and prevention – exploring strategies in immunotherapy, vaccine therapy, and NK-cell therapy to induce or restore anti-tumor activity
- Management/prevention of GVHD – evaluating novel treatments for acute and chronic graft-versus-host disease
- Shared care – assessing the impact of a post-transplant shared care model between Dana-Farber Brigham and local providers on outcomes and quality of life
- Quality improvement – optimizing resource utilization, testing efficiency, and transplant safety and care
- Novel applications – evaluating stem cell transplant for autoimmune diseases

**Cellular therapies cancer research explores:**
- CAR T-cell therapy in combination with other immunotherapies; earlier in the treatment cycle; and for other forms of blood cancer
- Allogeneic (“off the shelf”) CAR T-cell therapy
- Vaccine therapies for melanoma, glioblastoma, and stem cell transplant patients
- Tumor infiltrating lymphocytes (TILs) for melanoma and lung cancer
- Cytotoxic T cells against viral proteins and tumor antigens
- NK cell therapy for myeloid malignancies, head and neck cancer, ovarian cancer, and urothelial cancer

**We have many transplant and cellular therapies trials open at any time, typically offering:**
- **20** clinical trials for stem cell transplant patients
- **35** immune effector cell trials (i.e. CAR T and other cellular therapies)
- A robust pipeline of new investigator-initiated and industry-sponsored trials opening monthly
Quality is a cornerstone of our program. Our Stem Cell Transplantation and Cellular Therapies Quality Assurance Department teams with clinicians, investigators, and programs to achieve outstanding outcomes. Services provided include:

**Quality Assurance and Regulatory Compliance**

- Performing internal and external audits to ensure that Dana-Farber and its contracted services and suppliers operate in compliance with established policies, procedures and standards
- Auditing departmental practices and instituting corrective action when needed
- Ensuring that Dana-Farber is always in a state of inspection readiness and compliance with all policies and regulations

**Quality Improvement (QI)**

- Improving patient care
- Ensuring patient safety
- Enhancing patient satisfaction
- Reducing unnecessary testing and readmissions
- Improving workflow
- Reducing costs

**Regulatory Affairs**

- Actively involved, both across Dana-Farber and nationwide, in shaping the regulatory field for cellular therapy
- Helping Dana-Farber investigators gain clearance for clinical trials using novel cellular therapy products
- Conversing with the U.S. Food and Drug Administration about the challenges of fitting cellular therapy manufacturing into the regulatory pharmaceutical environment
- Ensuring Dana-Farber’s status as one of the first centers registered as a Human Cell and Tissue Product Establishment when federal regulations changed

**Data Capture and Analysis**

- Capturing data from various cellular therapy programs and clinical trials engaged in services for patients
- Benchmarking certain data against internal standards and national standards
- Reporting other data to external agencies to ensure quality and establish ongoing quality improvement measures in the field of cellular therapy
To refer a patient for evaluation for stem cell transplant, CAR T-cell therapy, or other cellular therapies, we recommend you consult with us early in the patient’s treatment for evaluation for these advanced therapies. Listed below are the physician teams who can partner with you to provide advanced cellular therapies to patients.

**Allogeneic Stem Cell Transplant**
- Joseph Antin, MD
- Corey Cutler, MD, MPH, FRCPC
- Christopher Gibson, MD
- Mahasweta Gooptu, MD
- Vincent Ho, MD
- John Koreth MBBS, DPhil
- Sarah Nikiforow, MD, PhD
- Rizwan Romee, MD
- Roman Shapiro, MD
- Robert Soiffer, MD

**Autologous Stem Cell Transplant (Lymphoma)**
- Inhye Ahn, MD
- Philippe Armand, MD, PhD
- Jennifer Brown, MD, PhD
- Jennifer Crombie, MD
- Matthew Davids, MD, MMSc
- David Fisher, MD
- Eric Jacobsen, MD
- Caron Jacobson, MD, MMSc
- Austin Kim, MD
- Ann LaCasce, MD, MMSc
- Benjamin Lampson, MD, PhD
- Reid Merryman, MD
- Oreofe Odejide, MD, MPH
- Erin Parry, MD, PhD

**Autologous Stem Cell Transplant (Multiple Myeloma)**
- Kenneth Anderson, MD
- Irene Ghobrial, MD
- Monique Hartley-Brown, MD, MMSc
- Jacob Laubach, MD, MPP
- Shonali Midha, MD
- Clifton Mo, MD
- Nikhil Munshi, MD
- Omar Nadeem, MD
- Paul Richardson, MD
- Adam Sperling, MD, PhD

**CAR T for Lymphoma**
- Inhye Ahn, MD
- Philippe Armand, MD, PhD
- Jennifer Brown, MD, PhD
- Jennifer Crombie, MD
- Matthew Davids, MD, MMSc
- David Fisher, MD
- Arnold Freedman, MD
- Eric Jacobsen, MD
- Caron Jacobson, MD, MMSc
- Austin Kim, MD
- Ann LaCasce, MD, MMSc
- Benjamin Lampson, MD, PhD
- Reid Merryman, MD
- Oreofe Odejide, MD, MPH
- Erin Parry, MD, PhD

**CAR T for Multiple Myeloma**
- Kenneth Anderson, MD
- Irene Ghobrial, MD
- Monique Hartley-Brown, MD, MMSc
- Jacob Laubach, MD, MPP
- Shonali Midha, MD
- Clifton Mo, MD
- Nikhil Munshi, MD
- Omar Nadeem, MD
- Paul Richardson, MD
- Adam Sperling, MD, PhD

**CAR T for Leukemia**
- Daniel DeAngelo, MD, PhD
- Jacqueline Garcia, MD
- Andrew Lane, MD, PhD
- Marilise Luskin, MD, MSCE
- Christopher Reilly, MD
- Maximilian Stahl, MD
- Richard Stone, MD
- Rahul Vedula, MD
- Martha Wadleigh, MD
- Lachelle Weeks, MD, PhD
- Eric S. Winer, MD

**Online Referrals**
[www.dana-farber.org/patientreferrals](http://www.dana-farber.org/patientreferrals)

**Stem Cell Transplantation**
617-632-6028

**Cellular Therapies**
877-801-2278
cartinquiries@dfci.harvard.edu

**International Patients**
+1-617-658-4835
brighamandwomensintl@bwh.harvard.edu