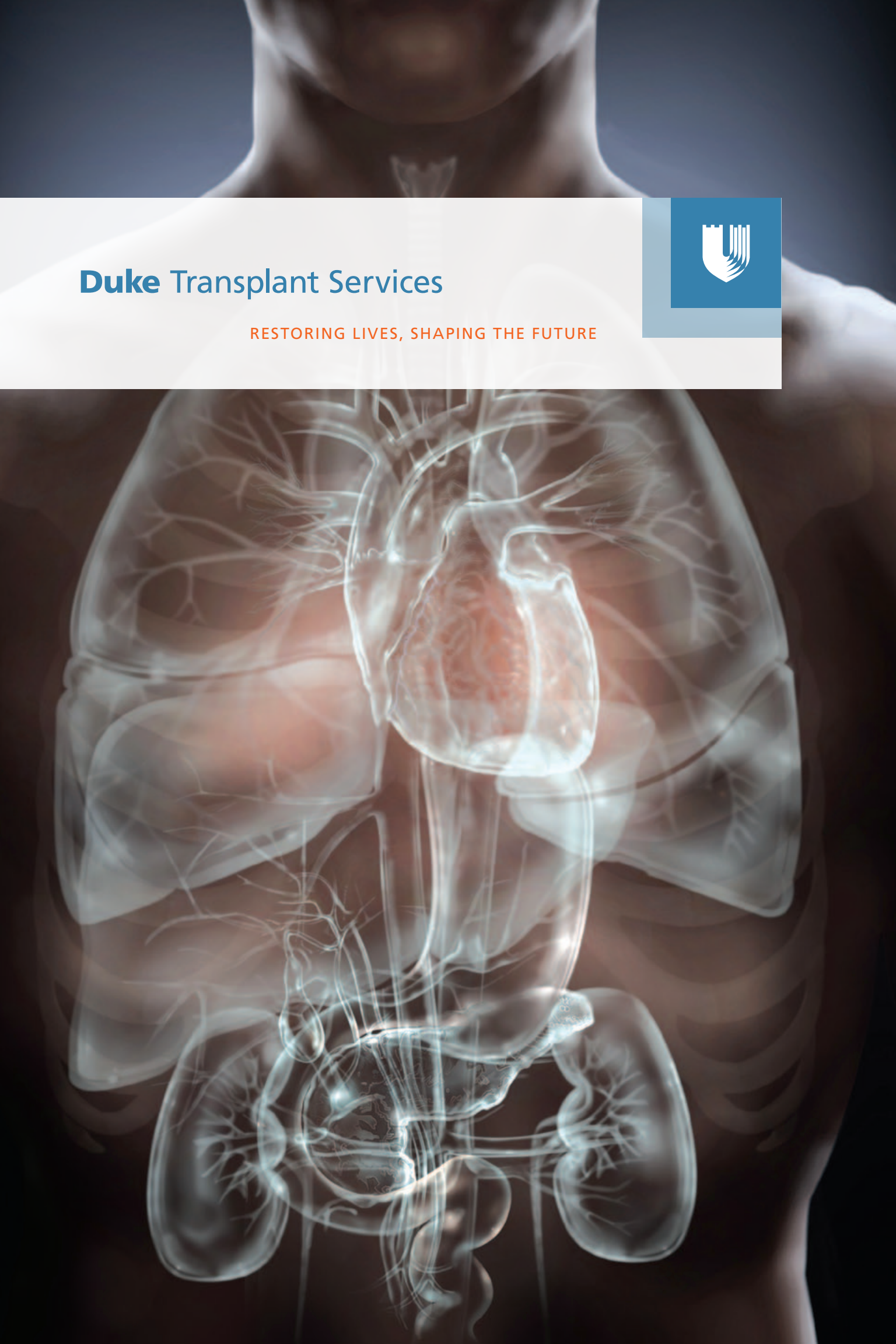


Duke Transplant Services

RESTORING LIVES, SHAPING THE FUTURE



DUKE TRANSPLANT SERVICES has a distinguished history, a thriving present, and a promising future. Our patient outcomes consistently exceed national averages—a level of success that can be attributed to several key factors:

- Administrators, faculty, and staff at every level share Duke's **institution-wide commitment to safety, quality, and the most current evidence-based practices**—as well as a resolute focus on what is best for our patients.
- Our **high volumes** mean experienced, insightful, proactive care at every level.
- **Multidisciplinary collaboration** among our world-class faculty and staff enable Duke to successfully transplant sicker patients and perform more combined-organ transplants than many other centers.
- **Aggressive and innovative organ-recovery efforts** also set Duke apart, enabling us to procure and successfully transplant more viable organs in more patients who need them.
- **A culture of innovation** continues to yield advances in knowledge, technologies, and techniques that benefit patients—from pioneering organ-rejection and tolerance research to a soon-to-launch composite-tissue transplant service.



R. Duane Davis, MD, and Kimberly N. Nicoll, RN, MPH

Patients suffering from end-stage organ failure, but who are not candidates for transplantation, are also in skilled hands at Duke. Using the most current evidence-based therapies and technologies—and working in tandem with referring physicians—our experienced medical teams often can manage organ failure so well that the need for transplant is postponed or eliminated.

We in Duke Transplant Services are grateful for every donated organ we receive, and strive to be good stewards of these life-changing gifts. We encourage you to learn more about our work in these pages—and look forward to helping you deliver the best care available to your patients.

Sincerely,

A handwritten signature in black ink that reads "R. Duane Davis".

R. Duane Davis, MD
Director
Transplant Services
Duke University Medical Center

A handwritten signature in black ink that reads "Kimberly N. Nicoll".

Kimberly N. Nicoll, RN, MPH
Vice President
Transplant Services
Duke University Medical Center

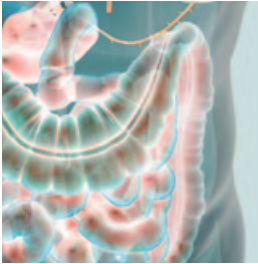


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Duke Life Flight delivers some of the donor organs transplanted at Duke University Hospital.

SHAPING THE FUTURE OF TRANSPLANTATION

DUKE TRANSPLANT SERVICES

dukehealth.org/transplants

Every year, our multidisciplinary teams care for thousands of patients in all stages of the transplant process. Through a variety of innovative clinical, research, and educational endeavors, Duke Medicine continues to expand the understanding of transplantation and advance the field's techniques, technologies, and outcomes.

AWARDS AND RECOGNITION

Duke Transplant Services was recognized by the Health Resources and Services Administration at the 2009 National Learning Congress as being among the nation's transplant centers with the **largest increases in solid-organ transplant volumes**.



Duke University Medical Center has been ranked among the top 10 on the Honor Roll of **"America's Best Hospitals"** by *U.S. News & World Report* for more than 20 consecutive years.



Duke University Hospital was awarded a **Medal of Honor by the Department of Health and Human Services** in 2008 for achieving a 75 percent organ donor-conversion rate.

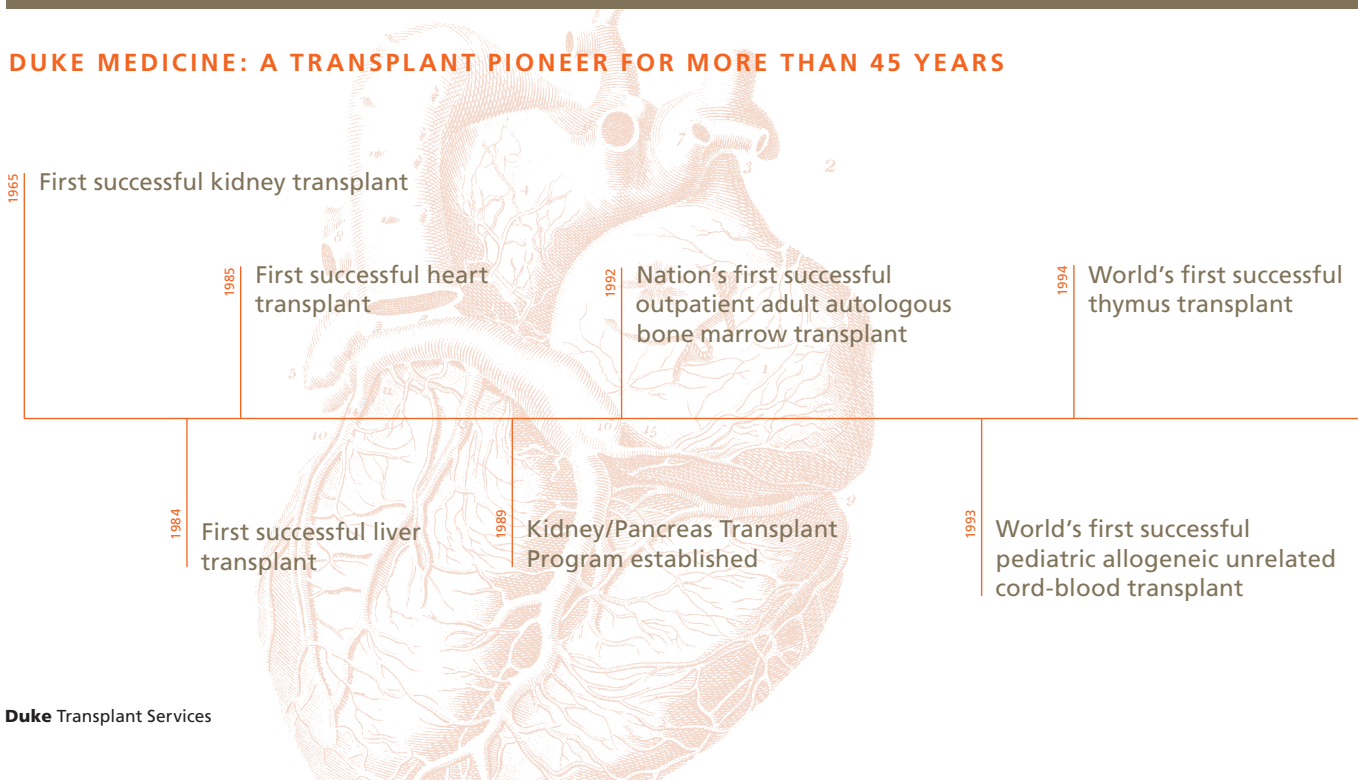


Duke University Hospital has been named among the country's **highest-performing heart transplant centers** by the U.S. Department of Health and Human Services.



In 1969, Duke's D. Bernard Amos, MD, along with David M. Hume, MD, established the first regional organ-sharing program in the U.S.—which led to the creation of both the United Network for Organ Sharing (UNOS) and the American Foundation for Donation and Transplantation (AFDT). Amos's groundbreaking work was the cornerstone of the universally used HLA tissue-typing system.

DUKE MEDICINE: A TRANSPLANT PIONEER FOR MORE THAN 45 YEARS





Laura Margaret Burbach underwent the first planned tandem cadaveric lung and bone marrow transplant at Duke.

In early 2010, Duke physicians performed (in two phases) the first tandem cadaveric lung and bone marrow transplant. The patient, Laura Margaret Burbach, 16, had developed bronchiectasis due to a lifelong immunodeficiency disorder. She had both lungs transplanted before undergoing a bone marrow transplant several weeks later. Burbach was discharged in April and to date, she continues to do well.

This pioneering procedure may have broader implications for developing strategies that create tolerance to the transplanted organ—eliminating the need for immunosuppression and greatly improving long-term post-transplant outcomes.



2009 Small Bowel Transplant Program established

2010 First planned tandem cadaveric lung and bone marrow transplant performed at Duke

1995 Lung Transplant Program established

2010 Composite-Tissue Allotransplantation Program established

DUKE TRANSPLANT SERVICES: WHAT SETS US APART

Aggressive recovery efforts, novel preservation strategies expand organ pool

Duke's multifaceted organ recovery and preservation efforts enable our physicians to evaluate and recover far more viable donor organs than most other centers:

Innovative preservation strategies

Our novel efforts to maintain and/or improve the viability of donor organs include studies of *ex vivo* perfusion in recovered hearts (page 8) and lungs (page 10).

Living-donor transplants of lungs, kidneys, and livers

New surgical techniques mean less invasive surgeries and better outcomes for donors.

Paired-donation transplants

Duke's Kidney Transplant Program (page 14) is preparing to offer paired living donations, which match ABO- or cross-match-incompatible donor-recipient pairs with other donor-recipient pairs with whom they can "swap" kidneys for a successful transplant.

Extended-criteria heart transplant program

Offers transplantation to carefully selected patients who do not meet the standard criteria for transplant (page 8).

Effective donor-management strategies

Duke's close partnership with our local organ procurement organization (OPO), Carolina Donor Services—as well as with OPOs nationwide—ensures the evaluation, recovery, and transplantation of every possible donor organ.

Improving recipient eligibility

The Duke Clinical Transplantation Immunology Laboratory conducts comprehensive histocompatibility assessments for prospective transplant recipients to maximize the chances of identifying compatible donors.

Research to increase transplant tolerance, improve outcomes

Duke's innovative research to prevent rejection and improve long-term patient outcomes includes:

- **Studies of antibody-mediated rejection** seek to prevent graft loss; offer alternatives to plasmapheresis and splenectomy for managing antibody response; and enable re-transplantation of patients who develop antibody-producing B cells against their grafts.
- Studies in animal models are **examining immune-response pathways** that can activate allospecific T cells and lead to tissue injury and graft rejection. This research aims to provide new insights into the molecular basis of alloimmunity and immune tolerance in an effort to develop targeted anti-rejection therapies.
- **First-time investigation of osteopontin's role in regulating STAT1-dependent protein expression in sepsis**, which can cause bodily functions to break down following major infections and/or injury, including those related to transplant.
- Ongoing work to develop a **biomarker test to monitor abdominal-organ grafts and check for signs of rejection**—currently done via biopsy. Such a test would be far less invasive and carry fewer risks for immunosuppressed patients.

SAFETY, QUALITY, AND PERFORMANCE

Duke University Health System is consistently recognized for its safety, quality, and performance initiatives. Duke Transplant Services upholds that same standard of excellence and accountability by:

Duke University Hospital is one of only three hospitals to earn a 2009 American Hospital Association-McKesson Quest for Quality Prize award, receiving the Citation of Merit.



- Establishing and adhering to **safety and quality mechanisms beyond those required by national guidelines**. For example, Duke has in place blood-typing and organ-verification policies—including our ABO-verification process—that are more stringent than federally mandated policies.
- Participating in **national transplant-safety initiatives** through UNOS committee membership
- Adhering to a **comprehensive quality plan** that enables Duke to meet and exceed national transplant requirements and regulations

A NATIONAL LEADER IN MULTI-ORGAN TRANSPLANT VOLUMES

Duke's experience in both routine and uncommon multiple-organ transplants ranks among the nation's highest. Our surgeons have performed the following numbers of atypical multi-organ transplants:

6 Heart-Kidney	19 Liver-Kidney	6 Lung-Liver
1 Liver-Heart	2 Lung-Heart-Liver	

Clinical research offers novel therapies to patients with failing organs

An international leader in clinical research, Duke conducts hundreds of clinical studies each year:

- Duke is one of nine member sites of the elite **Cardiothoracic Surgical Trials Network**, which conducts clinical studies to assess novel procedures for adults with cardiovascular disease.
- A repository of tissue samples from patients with all stages of **intestinal disease** is now being created. This valuable tool will inform an array of investigations conducted at Duke and elsewhere.
- Duke Transplant Infectious Diseases leads the **Transplant Infection Network**, a multi-center repository of tissues and clinical data from recipients who develop infections. Samples and data will be used to evaluate new diagnostic assays and to identify genetic factors that may predispose transplant patients to infections.
- The **nation's only thymus-transplant clinical trial** has achieved a 73 percent success rate since it began in 1994 (page 18).



Visit dukehealth.org/clinicaltrials to see a listing of current clinical trials.

Establishing national guidelines and policies

Duke Transplant Services plays a key role in developing the evidence-based guidelines and policies that regulate transplant practices nationwide.

Transplant administrators from Duke and several other U.S. transplant programs have **worked with Press Ganey to develop the first standardized transplant-specific patient-satisfaction survey**, which will enable national benchmarking for transplant care.

Our faculty and staff lead and participate in committees and efforts of organizations that include:

- United Network for Organ Sharing
- American Society of Transplantation
- American Society of Transplant Surgeons
- The International Society for Heart and Lung Transplantation
- American Thoracic Society
- National Kidney Foundation
- Infectious Diseases Society of America (Transplantation Infectious Disease and Compromised Hosts)

- **Presenting for national organizations and at events** such as the HRSA Organ Donation and Transplantation Breakthrough Collaborative and the annual UNOS Transplant Management Forum

- **Collaborating with the Duke Clinical Transplantation Immunology Lab** to verify donor- and recipient-specific information at the time of listing and to confirm compatibility at the time of transplantation

- **Working closely with our local OPO, Carolina Donor Services**, to ensure safe and reliable practices
- **Reviewing Duke's transplant safety and quality issues and activities regularly** with the multidisciplinary transplant teams

Visit dukehealth.org/quality to learn more.

Heart

Top-ranked program, exceptional outcomes

- Adult age 18 and older
- **Average one-year patient survival rate, 1998-2008**
88.7% Duke, 86.9% U.S.

73 percent of Duke heart transplant patients are alive five years post-transplant (equal to the U.S. average) and 59 percent ten years out (U.S. average of 54 percent).

PROGRAM HIGHLIGHTS

- **More than 750 procedures performed since 1985**—among the nation’s highest volumes
- Transplant rates significantly higher than national average
- Outcomes are consistently among the nation’s best
- Named **among the country’s highest-performing heart transplant centers** by the U.S. Department of Health and Human Services
- Excellent outcomes for people well into their 70s
- Duke University Hospital is a mainstay on *U.S. News & World Report’s* annual list of the nation’s top hospitals for cardiac care

Hope for patients ineligible for standard transplant

Ten to 15 percent of Duke’s heart transplant recipients are chosen for our **Extended Criteria Cardiac Transplant Program**, which offers transplantation to carefully selected patients who do not meet standard transplant criteria. Since 2000, Duke has performed 70-plus extended-criteria transplants—with complication rates and lengths of hospital stays comparable to standard-list transplants.

people without evidence of formal brain death. After mechanical ventilation is halted and cardiopulmonary arrest occurs, the heart is removed and resuscitated on an *ex vivo* cardiac perfusion device. Researchers also hope to identify biomarkers of cardiac injury that predict functional recovery.

Comprehensive options for advanced heart failure

The Duke Heart Failure Program, the nation’s best in terms of volumes, outcomes, and research, offers the **complete range of treatments for heart failure** patients—from an acclaimed disease-management program to sophisticated device therapies. Collaborations among Duke heart failure specialists and cardiac surgeons facilitate **patient access to surgeries not performed at other centers**. A founding member of the NIH Heart Failure Clinical Research Network and the Cardiothoracic Clinical Trials Network, Duke offers patients access to clinical trials testing promising new therapies.

A leader in ventricular assist device (VAD) therapy

Duke offers VADs both as a temporary bridge to transplant and as permanent therapy for heart failure. Both applications have resulted in **outstanding outcomes**: a 2009 analysis showed a 75.4 percent two-year survival rate for Duke patients implanted with non-pulsatile devices. A JCAHO-certified Center of Excellence in destination VAD therapy, Duke is a leader in developing, testing, and implanting next-generation devices such as the HeartMate II and HeartWare devices.

Study aims to resuscitate cardiac-death hearts

A pioneering NIH-funded study at Duke aims to optimize a strategy to recover hearts from severely brain-injured

LEARN MORE

dukehealth.org/transplants
919-684-2651

Heart_Transplant@mc.duke.edu

Duke Consultation and Referral Center:
800-MED-DUKE (800-633-3853)

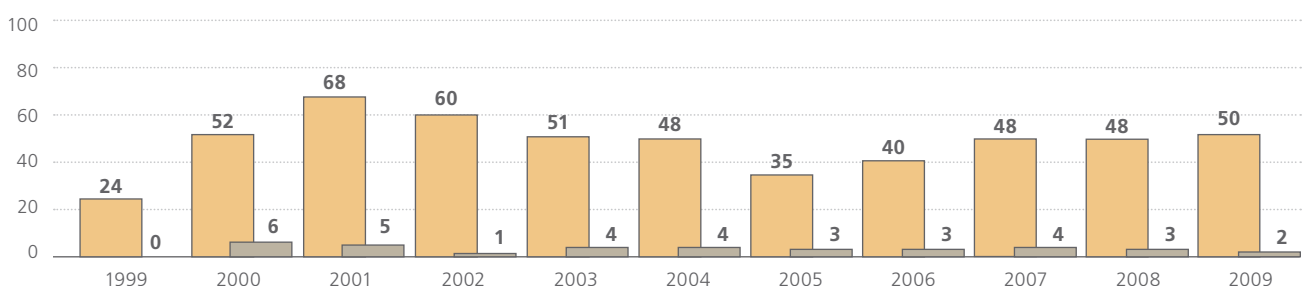
NUMBER OF ORGANS TRANSPLANTED*

Adult: 524

Pediatric: 35

*Includes re-transplants

Source: United Network for Organ Sharing



PEDIATRIC (NEONATE THROUGH AGE 17)

State's largest program sees excellent outcomes

For the most current data, visit ustransplant.org

COMBINATION TRANSPLANT EXPERIENCE

Heart
and/or Liver
and/or Lung
Heart-Kidney

PROGRAM HIGHLIGHTS

- North Carolina's largest pediatric heart transplant program
- North Carolina's only pediatric cardiac intensive care unit
- Shares world-class resources with Duke's Adult Heart Transplant Program
- Works closely with the Duke Pediatric Heart Failure Program, North Carolina's largest, to provide coordinated care, family support, and long-term follow-up
- Pediatric cardiothoracic surgeons and a cardiologist dedicated to pediatric transplant patients

When transplant isn't an option

Transplantation isn't always indicated in children with failing hearts. Duke offers other proven options, including:

Advanced medical management

With access to the most promising new drug therapies and regimens through scores of Duke clinical trials

Ventricular assist devices

The Pediatric Heart Failure Program offers a variety of VADs, including the EXCOR Pediatric, HeartMate II, and DeBakey HeartAssist 5 Pediatric

Other implantable devices

Our specialized pediatric pacemaker service serves the growing number of children best treated with ICDs

SUCCESS STORY

At nine months old, Heath Tuttle was diagnosed with restrictive cardiomyopathy. A month later, he came to Duke with shock and low heart rate and was placed on mechanical circulatory support to save his life. He received a heart transplant ten days later. Despite his ordeal, Heath is now a healthy, active two-year-old. "It was a terrifying time, but the people at Duke have taken remarkable care of us," says Chris Tuttle, Heath's father. "Everyone listened, was patient, and helped us understand what was happening and what our options were."

"Duke's faculty and staff continue to care for us and our son and are personally invested in seeing him thrive."

Heath Tuttle, 2
Heart transplant, 2008



Lung

Nation's shortest wait times, exceptional outcomes—even for the sickest patients

- Ages 14 and older
- Average one-year patient survival rate, 1998-2008
85.3% Duke, 81.5% U.S.

COMBINATION TRANSPLANT EXPERIENCE

Lung and/or Heart and/or Liver
Lung-Kidney

PROGRAM HIGHLIGHTS

- Nation's shortest waiting times to transplant—with a median wait of only 12 days in 2009
- Aggressive strategies to prevent organ rejection and injuries to transplanted lungs caused by aspiration and other environmental factors
- Significantly better short- and long-term patient-survival rates than national averages, despite increasingly sicker patients
- Graft-survival rates consistently exceed expected and national rates
- Outstanding outcomes in recipients ages 70 and older
- Living-donor transplants
- Duke University Medical Center has ranked among the nation's top hospitals for pulmonology since 1997, according to *U.S. News & World Report*

Duke's is the country's second-largest lung transplant program—and the Southeast's largest—with more than 900 transplants performed and more double lung transplants since 2000 than any other U.S. center.

SUCCESS STORY

Born with cystic fibrosis, Andrew Desjardins says his symptoms were fairly mild until his mid-20s. When breathing became difficult, he came to Duke, where ten months later, he underwent a complex 14-hour double lung-liver transplant surgery. Today Desjardins' health is well managed with the minimum dosages of immunosuppression, antifungal, and antiviral drugs. Free of a chronic cough and able to breathe easily, he exercises daily, coaches a youth hockey team, and plays in a men's hockey league—and returns to Duke only twice a year for follow-up.

"The transplant completely changed my perspective on life, and I'm living in the moment like I never have. If I had to do it again, I'd definitely go to Duke."

Andrew Desjardins, 34
Double lung-liver transplant, 2008



Special expertise for special populations

The Duke Lung Transplant Program has seen **remarkable outcomes in transplanting patients who have not historically been candidates for transplantation:**

Cystic fibrosis (CF)

More than 170 transplants with a five-year survival rate of more than 65 percent and a median survival of nearly nine years. Duke offers both living-related lung transplant and lung-liver transplant to CF patients, and accepts patients whose lungs are colonized with resistant pathogens.

Coronary artery and/or valvular heart disease

More than 40 concurrent cardiac surgeries-lung transplants, with excellent outcomes

Critical illness

Duke regularly transplants patients with coronary artery disease and/or who require mechanical ventilation—including ECMO—with very good results.

Pulmonary rehab program among the world's best in boosting lung function

Duke's renowned Pulmonary Rehabilitation Program annually serves about 300 patients with advanced pulmonary disorders, the majority of whom are undergoing lung transplantation. A team of specialists helps patients maximize their lung function through supervised exercise, education, medical management, and psychosocial support. Learn more by visiting dukehealth.org/pulmonaryrehab

Complete care for advanced lung disease

Duke's interventional pulmonology team provides comprehensive options to meet the individual needs of both patients awaiting lung transplantation and those ineligible for transplant. These include:

Lung-volume reduction surgery

For patients with chronic obstructive pulmonary disease, performed with both video-assisted thoracoscopic surgery and median sternotomy

Pulmonary stenting and laser surgery for lung cancer

Pulmonary thromboendarterectomy (PTE)

Duke is one of only a few U.S. centers—and the only

one on the East Coast—that offer PTE, which often cures patients with pulmonary hypertension and other conditions that can cause chronic pulmonary emboli. Outcomes have been excellent.

Extracorporeal membrane oxygenation (ECMO), including innovative ambulatory ECMO—as both a bridge to transplant and to support patients post-transplant

Access to clinical trials of innovative therapies, including promising drugs for pulmonary hypertension and idiopathic pulmonary fibrosis (IPF), bronchial thermoplasty for asthma, and humeral rejection-prevention agents

Pioneering research

To prevent lung injury

Faculty conduct both basic and clinical studies aimed at understanding the mechanics of environmental exposures that can drive rejection and immunological responses.

To increase the number of viable donor lungs

Studies show that *ex vivo* lung-perfusion therapy can be a successful way to improve the function of recovered lungs so well that transplanting them is not a concern.

To prevent infection

Program faculty have led the development and implementation of aerosolized antifungal and oral cytomegalovirus (CMV) agents soon after transplant surgery. These strategies have significantly reduced the post-transplant burden of infectious complications and have been incorporated into clinical practice at centers worldwide.

To reduce the risk of rejection

Pioneering research at Duke has defined genetic variants that may influence the risk of lung rejection. Such approaches might someday enable post-transplant medical management to be customized to patients' unique genetic risks for rejection.

LEARN MORE

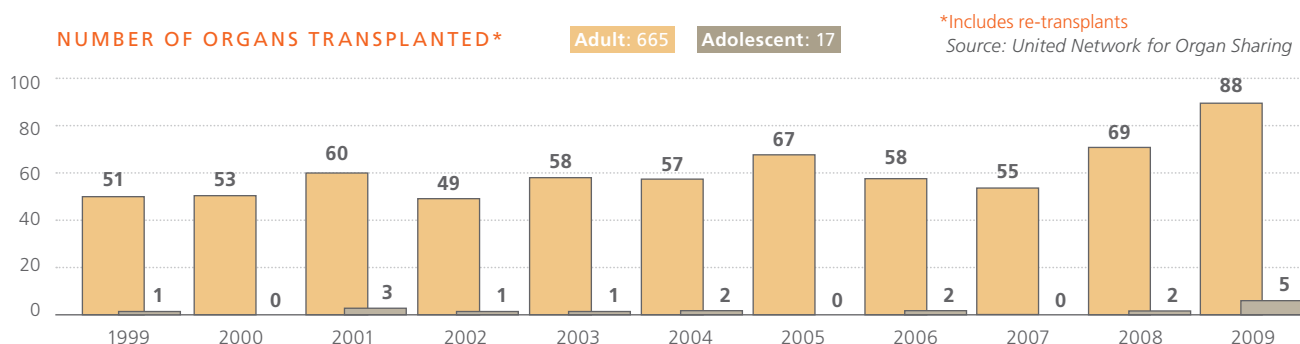
dukehealth.org/transplants

919-684-2240 (local), 800-249-5864 (toll-free)

lung_transplant@mc.duke.edu

Duke Consultation and Referral Center:

800-MED-DUKE (800-633-3853)



Liver

New leadership, rising volumes, better outcomes

- Adult and pediatric
- **Average one-year patient survival rate, 1998-2008:**
84.9% Duke, 87.1% U.S.
- **Average one-year graft survival rate, 1998-2008:**
81.0% Duke, 82.2% U.S.

For the most current data, visit ustransplant.org

COMBINATION TRANSPLANT EXPERIENCE

Liver-Kidney

Liver

and/or Lung

and/or Heart

Liver

and/or Small Bowel

and/or Pancreas

North Carolina's first successful liver transplant was performed in 1984 by Duke surgeons. More than 25 years later, the Duke Liver Transplant Program continues to advance the field.

Since the September 2008 arrival of surgical director **Debra Sudan, MD**—also the abdominal transplant surgical chief—the program has experienced significant growth, increased its transplant volumes considerably, and seen improved patient outcomes.

SUCCESS STORY

Shasta Miller didn't know she had liver disease until a sudden onset of unrelenting abdominal pain led her family doctor to order liver-function tests. The tests indicated that her liver was failing rapidly, and she was diagnosed with autoimmune hepatitis. Miller was referred to Duke, where complete liver failure caused her to slip into a coma days later.

"The doctors told my family that I needed a liver transplant right away or I would die," recalls Miller, who underwent a cadaveric transplant and says she now feels good. "Going to Duke saved my life."

"I definitely had a good experience at Duke. The people there take the time to tell you the facts, and they really work with you to get you through something like this."

Shasta Miller, 31
Liver transplant, 2008



PROGRAM HIGHLIGHTS

- A comprehensive, multidisciplinary approach to patient management that unites hepatology and hepatic surgical faculty with specialists that include biliary endoscopists, radiologists, dedicated transplant pathologists, and oncologists
- A living-related-donor transplant program for children and adults, established in 1997
- Special expertise in performing split-liver and pediatric transplants
- Recruitment of additional multifaceted liver transplant surgeons consolidates expertise and ensures that no offers for potential donor organs are declined
- A longtime team of highly experienced nurse transplant coordinators

Skilled hepatology program stresses screening, aggressive intervention

With one of the country's larger hepatology programs, Duke is able to deliver the complete spectrum of evidence-based medical therapies to patients with failing livers—therapies that may delay or prevent the need for transplant—as well as to transplant recipients, a population at high risk for disease recurrence and complications.

Given the increasing prevalence of hepatitis C virus and non-alcoholic liver diseases—the most common indications for liver transplants and their complications (liver cirrhosis and primary liver cancer)—Duke's hepatology team closely monitors all patients and intervenes aggressively and at an early stage when problems arise.

Since 1993, *U.S. News & World Report* has ranked Duke University Medical Center one of the nation's top hospitals for gastroenterology.



Abdominal transplant surgeon **Debra L. Sudan, MD**, consults with team members in Duke University Hospital.

Innovative studies aim to better treat liver diseases

Duke is a leading center for basic and clinical research in viral hepatitis B and C and non-alcoholic fatty liver disease—work that is aided by the Duke Hepatology Clinic Research Database and Biorepository. Ongoing study topics include:

- Genetic variants that influence patient responses to hepatitis therapies
- Genetic factors that influence the development of liver cirrhosis
- The use of protease inhibitors and other direct antiviral agents in treating hepatitis
- Drugs that raise low platelet counts seen in patients with liver disease, making invasive procedures such as liver biopsy and cancer ablation safer
- Evaluation of new diagnostic testing and treatment strategies for patients with fatty liver disease

LEARN MORE

dukehealth.org/transplants

Adult: 919-684-6419, 919-801-7930, 919-613-6133

Pediatric: 919-668-2466

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Duke Consultation and Referral Center:

800-MED-DUKE (800-633-3853)

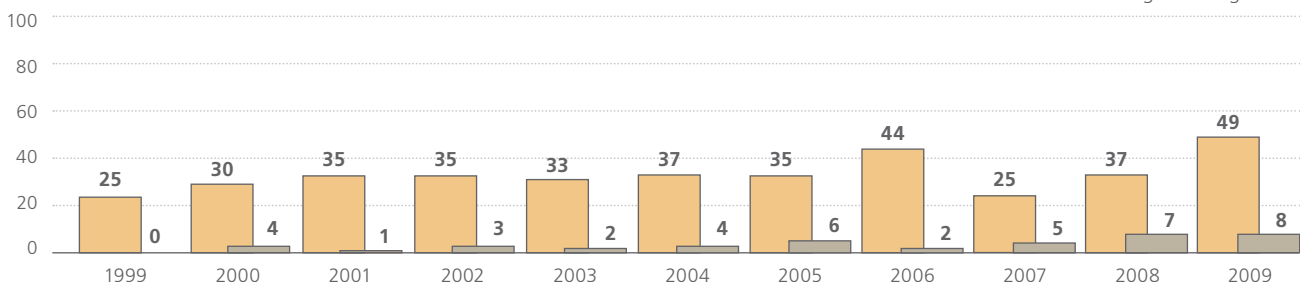
NUMBER OF ORGANS TRANSPLANTED*

Adult: 385

Pediatric: 42

*Includes re-transplants

Source: United Network for Organ Sharing



Kidney and Pancreas

KIDNEY

High volumes, ongoing care, active research agenda

- Adult and pediatric
- **Average one-year patient survival rate, 1998-2008**
96.1% Duke, 96.2% U.S.
- **Average one-year graft survival rate, 1998-2008**
92.3% Duke, 91.9% U.S.

MULTI-ORGAN TRANSPLANT EXPERIENCE

Kidney-Pancreas

Kidney-Heart

Kidney-Lung

Kidney-Liver

PROGRAM HIGHLIGHTS

- One of the nation's most experienced pediatric renal transplant programs, Duke has special expertise in transplanting patients with congenital kidney conditions
 - Multidisciplinary collaborations enable physicians to aggressively prepare and treat patients with complex histories and co-morbidities related to kidney disease
 - Dedicated transplant nephrologists see patients from pre-transplant evaluations through post-transplant care
 - A robust clinical trials program enables patients to participate in studies of new anti-rejection drugs that promote long-term function of transplanted organs
- In 1965, Duke established North Carolina's first kidney transplant program—one of only a handful in the U.S. at the time.**

An acclaimed living-donor program

More than 30 percent of Duke's renal transplant patients receive their kidneys from carefully screened living donors, with excellent outcomes. In 2009 Duke surgeons pioneered the use of single-incision laparoscopic surgery for removing kidneys from living donors—a technique used in virtually every living-donor nephrectomy since.

Experienced care for failing kidneys

Duke's End-Stage Renal Disease (ESRD) Dialysis Clinics serve more than 700 patients. In addition to traditional thrice-weekly in-center hemodialysis, the clinics offer nocturnal dialysis and several in-home options, including home peritoneal dialysis.

ESRD patients who require vascular-access hemodialysis are seen by Duke's expert vascular surgeons, many of whom also conduct research into maintaining vascular access and preventing access failure, even among patients

whose vascular-access options are nearly exhausted.

The Chronic Kidney Disease (CKD) Clinic offers proven therapies intended to prevent CKD from progressing to ESRD.

Basic research to improve long-term outcomes

In an ongoing effort to head off the graft loss and chronic rejection that can characterize kidney transplantation—as well as to better understand, prevent, and treat chronic renal disease—Duke faculty are continually conducting an array of basic research studies.

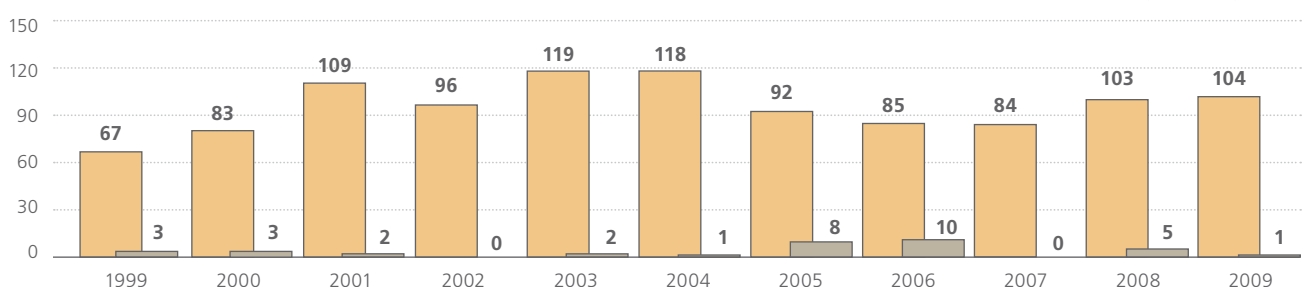
For example, animal immunobiology studies seek to better understand immune response and inflammatory mechanisms. Knowledge gleaned from these models may help scientists develop novel targeted therapies that modulate post-transplant immune responses—and spare patients the side effects of corticosteroid drugs.

NUMBER OF ORGANS TRANSPLANTED*

Adult: 1,060

Pediatric: 35

*Includes cadaveric, living donor, and re-transplants
Source: United Network for Organ Sharing



KIDNEY/PANCREAS (ADULT)

Good outcomes for even the sickest type 1 diabetics

- Average one-year patient survival rate, 1998-2008: 96.2% Duke, 95.1% U.S.
- Average one-year graft survival rate, 1998-2008: Kidney: 93.7% Duke, 92.1% U.S.
Pancreas: 83.4% Duke, 84.4% U.S.
- Number of combined organs transplanted 1999-2009: 158

PROGRAM HIGHLIGHTS

Established in 1989, Duke's Kidney/Pancreas Transplant Program is **among the Southeast's leading centers in patient volumes and outcomes**. While the program does offer pancreas-only transplants on a case-by-case basis, they are typically transplanted in conjunction with other organs—usually kidneys.

Curing patients of type 1 diabetes

Most patients in need of pancreas transplant are chronically ill, with many suffering serious complications of type 1 diabetes, including renal failure. Despite the complexity of this population—and of combined pancreas-transplant surgeries—**Duke's outcomes are excellent**, thanks to our specially skilled physicians and strong interdisciplinary teams.

Advanced care for patients ineligible for transplant

For the many patients with pancreas failure who are not transplant candidates, Duke offers **expert medical management**, including the latest insulin-pump technologies, which data show can be as effective as transplant in many cases.

LEARN MORE

dukehealth.org/transplants

919-684-5859

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Duke Consultation and Referral Center:

800-MED-DUKE (800-633-3853)

SUCCESS STORY

Ervin Hester had already suffered serious complications of type 2 diabetes when progressive kidney failure led his nephrologist to refer him to Duke, where he was prescribed dialysis and listed for a transplant. One of Hester's five children, his then-40-year-old daughter, turned out to be a perfect match, and in December 2000, she underwent a minimally invasive living-donor procedure to give her dad one of her kidneys.

"Those were frightening times, but the care at Duke was and still is superior," says Hester, the Southeast's first African American news anchor and a past president of the John Avery Boys & Girls Club of Durham. "I've been doing great."

"From the doctors to the people who work in the trenches, the care at Duke is superior. I tell people, 'You won't find better care anywhere.'"

Ervin Hester, 72
Living-donor kidney transplant, 2000

Small Bowel

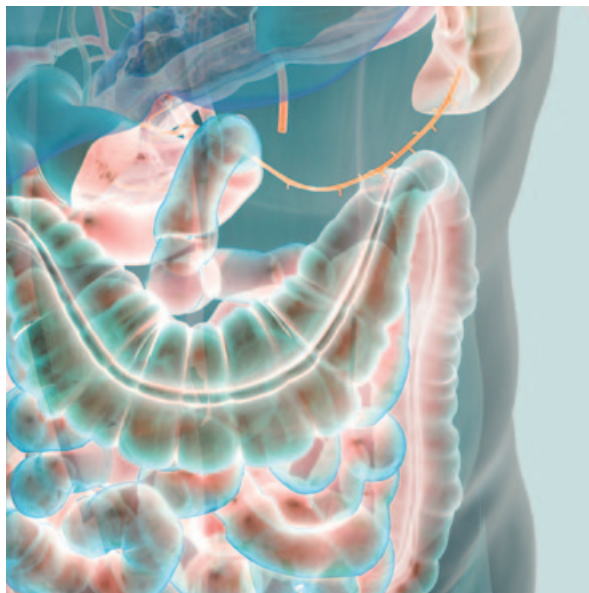
The Carolinas' only small-bowel transplant program now up and running

- Adult and pediatric

COMBINATION TRANSPLANT EXPERIENCE
Small Bowel-Liver-Pancreas

PROGRAM HIGHLIGHTS

- Led by faculty **experienced in performing small-bowel transplants and intestine-lengthening surgeries**
- One of only a few programs in the U.S. to serve **both adult and pediatric patients**
- Establishing an active clinical trials agenda, which will be enhanced by Duke's membership in the Pediatric Intestinal Failure Consortium



In 2009, Duke established the Small Bowel Transplant Program, the only one in the Carolinas and one of 21 active programs in the U.S.

LEARN MORE

dukehealth.org/transplants
Adult: 919-684-6419 / Pediatric: 919-668-2466
Intestine_Transplant@mc.duke.edu
Duke Consultation and Referral Center:
800-MED-DUKE (800-633-3853)

A complicated procedure for the sickest patients

Small bowel transplant utilizes an unusual, particularly complex type of graft that **requires special surgical expertise**. Despite an abundance of donor organs, fewer than 200 of the procedures are performed annually in the U.S.

Small bowel transplants are indicated primarily for patients with short bowel syndrome (SBS)—which causes chronic nutrient malabsorption and poor intestinal motility—and also can be appropriate for some people with conditions that include severe intestinal dysfunction and/or enterocyte abnormalities.

Patients who undergo small bowel transplantation typically have few treatment options. Most are very ill and have life-threatening complications, such as infections and liver damage due to their long-term dependence on total parenteral nutrition (TPN).

Duke physicians aggressively employ medical and surgical therapies to strengthen patients as much as possible prior to transplantation.

Alternatives to transplant

Duke offers several surgical interventions to adult and pediatric patients with severe intestinal disease (including SBS) who are not candidates for transplant. We have special expertise in the surgical treatment of intestinal failure, which can reduce or eliminate a patient's need for TPN, and offer procedures that include:

- Serial transverse enteroplasty (STEP)
- Closure of enterocutaneous fistulas
- Reverse-segment procedures

Composite-Tissue Allotransplantation

Duke Transplant Services is working to establish a program dedicated to composite-tissue allotransplantation (CTA), a promising new transplant specialty.

A multidisciplinary interface of plastic/reconstructive surgery and transplant surgery, CTA involves grafting skin, muscle, bone, and other bodily structures. There are currently only five U.S. centers performing CTA procedures.

CTA aims to restore appearance and function in patients with extensive tissue loss—such as facial disfigurement and limb loss—by replacing that tissue with similar structures from deceased donors. The pre- and post-transplant care of CTA patients mirrors that of solid-organ transplant recipients, including immunosuppression.

The success of more than 50 hand, 15 abdominal wall, and 11 face transplants worldwide has generated hope for this evolving field, as many people suffer from serious musculoskeletal deficits that conventional plastic surgical techniques cannot correct.

The major advantage of CTA grafts is that they are readily visible and easily accessible for biopsy to monitor immunological events such as acute and chronic rejection. This aspect has the potential to individualize immunosuppression therapies and avoid related complications.

Duke's CTA faculty includes surgeons with prior CTA experience, including hand transplantation. These faculty members are currently conducting basic research and reviewing potential clinical cases. The first patients to be considered for CTA will be those with large abdominal-wall defects that cannot be reconstructed with traditional surgery.

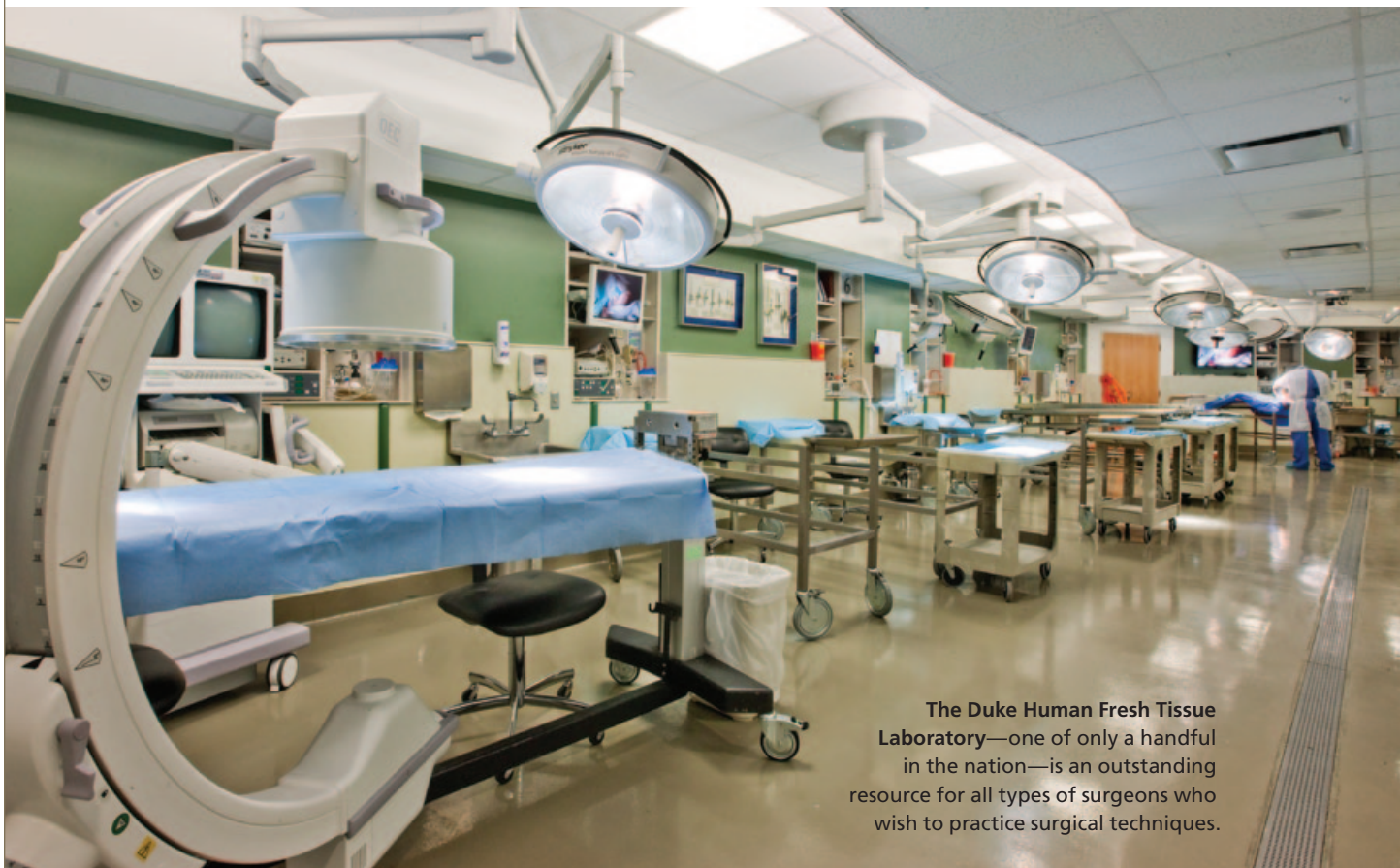


Transplantation can greatly improve the quality of life among patients whose abdominal walls have been damaged by abdominal surgery, injury, or congenital defects.

LEARN MORE

Call Kadiyala Ravindra, MD, at 919-613-6133 or Detlev Erdmann, MD, PhD, MHSc, at 919-684-3320.

Duke Consultation and Referral Center:
800-MED-DUKE (800-633-3853)



The Duke Human Fresh Tissue Laboratory—one of only a handful in the nation—is an outstanding resource for all types of surgeons who wish to practice surgical techniques.

In addition to Transplant Services, which houses solid-organ transplant programs and a soon-to-launch Composite-Tissue Allotransplantation Program, Duke is also home to these world-renowned transplant programs:



Nelson J. Chao, MD, Director

ADULT BONE MARROW AND STEM CELL TRANSPLANTATION (ABMT) PROGRAM

Established in 1984, the Duke ABMT Program is globally recognized for delivering novel treatments to adults with diseases including leukemia, lymphoma, myeloma, hemoglobinopathies, and some autoimmune diseases. The program has performed more than 3,600 transplants, with more than half of patients alive one year later. Visit dukehealth.org/services/adult_bone_marrow_transplant to learn more.



Joanne Kurtzberg, MD, Chief

PEDIATRIC BLOOD AND MARROW TRANSPLANT (PBMT) PROGRAM

The world's largest, Duke's PBMT Program annually transplants about 100 children who suffer from recurrent cancers, rare genetic diseases, congenital immunodeficiency syndromes, hemoglobinopathies, and blood disorders.

Established in 1990, the program has performed more than 1,600 transplants—with more than half of the patients still alive and considered cured of their underlying diseases. To learn more, visit dukehealth.org/services/pediatric_bone_marrow_transplant or dial 919-668-1125.

Both programs are research leaders that continue to make valuable strides in extending the efficacy and utility of transplant—and both work closely with the renowned Duke Comprehensive Cancer Center (cancer.duke.edu), named among the country's top cancer programs year after year by U.S. News & World Report.



Alan N. Carlson, MD, Chief

CORNEA TRANSPLANT PROGRAM

With one of the nation's most active and successful cornea-transplant programs, the nationally ranked Duke Eye Center performs more than 200 cornea transplants every year. Fellowship-trained ophthalmologists who subspecialize in corneal transplantation surgery offer both adult and pediatric patients several advanced alternatives to traditional "full-thickness" transplantation techniques. To learn more, visit dukeeye.org.

THYMUS TRANSPLANTATION

Nation's only center performing thymus transplants sees 73 percent success rate in clinical trial

This procedure, performed at Duke since 1994, **has saved the lives of 43 children** with DiGeorge syndrome who were born without thymus glands. Because the thymus is the organ in which T cells develop, patients without one typically succumb to infections before two years of age.

Physician-researchers from the Division of Pediatric Allergy and Immunology have performed **60 thymus transplants to date**—with a success rate of nearly three out of four.

Funded by the Food and Drug Administration (FDA) and the National Institutes of Health, Duke's efforts are still considered investigational—although the study team is taking steps to apply for an FDA biologic license. If approved, Duke will be able to offer thymus transplantation to patients outside of a clinical trial. The team also has been awarded two federal grants to follow thymus transplant recipients over the long term.

To learn more, call Louise Markert, MD, PhD, at 919-684-6263.



Duke's organ procurement organization (OPO) is Carolina Donor Services, online at carolinaldonorservices.org

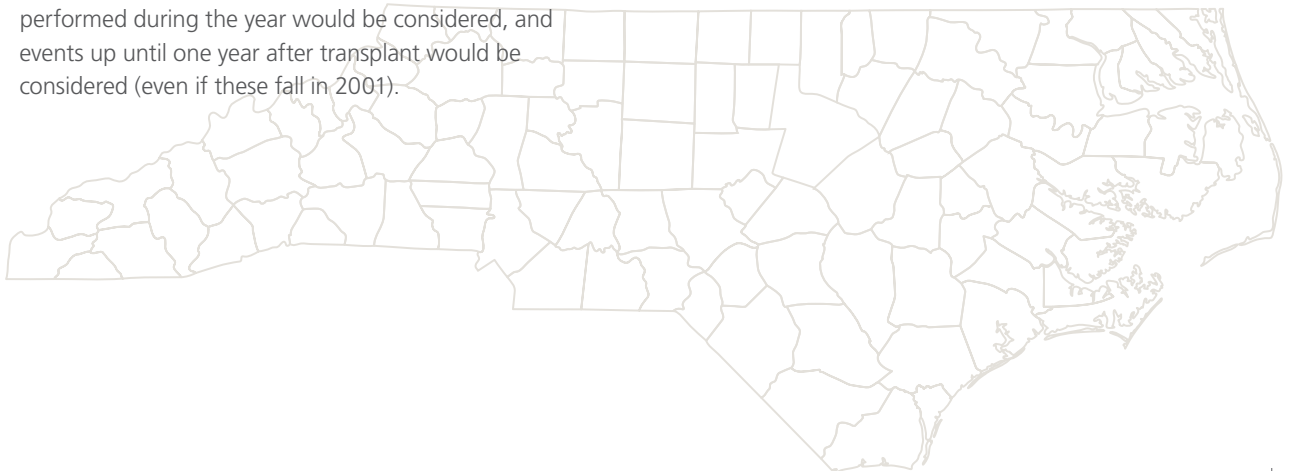
Notes

EXPLANATIONS OF VOLUMES DATA

Counts of transplants in this publication may not match published figures for transplant volumes. For graft and patient survival, the Scientific Registry of Transplant Recipients (SRTR) typically excludes multi-organ transplants. Patient survival is typically calculated only after first transplant for a patient, so patient survival also excludes patients with previous transplants.

Transplant survival cohorts are determined by the time period of the transplant operation. Any survival experience following that transplant within the study period is considered regardless of whether that experience falls within the cohort year. For example, for patient survival for the year 2000, all transplants performed during the year would be considered, and events up until one year after transplant would be considered (even if these fall in 2001).

Choice of transplant cohorts is often limited by the expected follow-up for a transplant, as determined by the form follow-up schedule (six months, yearly anniversaries) and expected lag time in completion of Organ Procurement and Transplantation Network (OPTN) forms or other sources. For example, transplants performed within the six to 12 months preceding an analysis are often not included because we expect incomplete and unreliable follow-up information for these patients. For further information, see "Lag Time and Cohort Selection" in Levine et al, "Analytical Methods and Database Design: Implications for Transplant Researchers, 2005."



Patient Experience

Nearly one-third of our Transplant Nurse Coordinators have been with Duke Transplant Services for more than 15 years, and half for at least five years. This degree of experience and dedication is found at few other centers—and translates into expert patient care.

Integrated transplant teams

Duke successfully transplants sicker patients with more complex medical histories than most other centers, thanks to expert multidisciplinary care. The following specialized team members collaborate to provide seamless, comprehensive care before, during, and after transplantation:

- Transplant nurse coordinators
- Transplant pharmacists
- Transplant social workers
- Transplant infectious disease specialists
- Transplant nutritionists
- Transplant immunologists
- Transplant pathologists

Learn more at dukehealth.org/transplants

Duke Transplant Services also works closely with subspecialties that include:

Radiology

dukehealth.org/services/radiology

Physical and Occupational Therapy

dukehealth.org/services/physical_therapy

Behavioral Medicine

dukehealth.org/services/psychiatry/programs/behavioral_medicine

Transplant Patient Financial Coordinators (TPFCs)

TPFCs verify and explain insurance coverage of transplant services; educate patients and families about transplant costs in relation to insurance coverage; and assist patients and families in initiating fundraising activities. Visit dukehealth.org/patients_and_visitors/patient_billing/patient_billing



DUKE UNIVERSITY HOSPITAL

2301 Erwin Road
Durham, NC 27710
919-684-8111

For directions, helpful contact information, check-in tips, pre-surgical instructions, and other information, visit dukehealth.org/locations/duke_hospital



Patient satisfaction

Duke University Hospital, the site of all transplant surgeries and related inpatient care, earns high Press Ganey patient-satisfaction scores year after year. In addition, both inpatients and outpatients consistently report that Duke Transplant Services meets or exceeds their expectations, according to transplant-specific Press Ganey patient-satisfaction surveys, currently used by Duke and only a handful of other U.S. centers.

LEARN MORE

From the HealthView patient Web portal to valet parking to community education programs, learn more about Duke University Hospital's patient and visitor services by calling Patient and Visitor Relations at 919-681-2020 or visiting dukehealth.org/patients_and_visitors

Duke Center for Living

The acclaimed Duke Center for Living is home to a broad spectrum of evidence-based, medically supervised medical, wellness, and health navigation programs and services. Some, like the pulmonary rehabilitation program

(page 10 and pictured at left), are geared toward pre- and post-surgical patients, including transplant recipients.

Others—such as the Duke Health & Fitness Center, Duke Integrative Medicine, and the Duke Diet & Fitness

Center—serve people of every health status and fitness level with customized offerings. For details, call 919-660-6610 or visit dukehealth.org/locations/center_for_living

Patient support services

Duke University Hospital offers a broad range of programs and services to support our patients and families, including:

Assistance finding long-term temporary housing

To learn more, call the Duke University Hospital Department of Clinical Social Work at 919-681-4722.

Organ-specific transplant support groups

Call Duke University Hospital's Department of Clinical Social Work at 919-681-4722 for details.

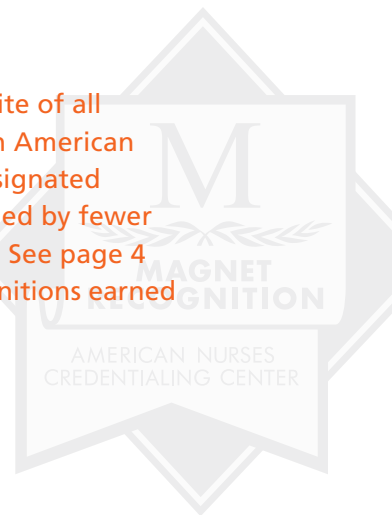
International Patient Center

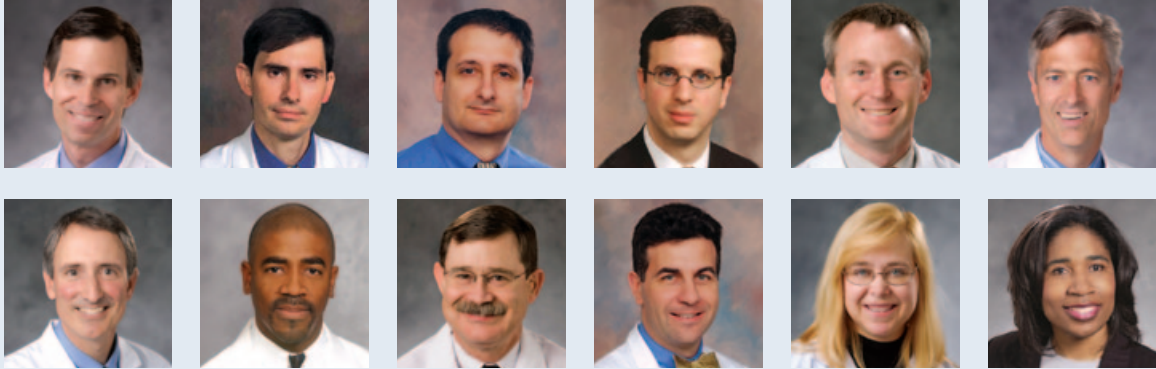
Offers a range of services to meet the needs of international patients and families. Call 919-684-5191 or 919-681-3007 or visit dukehealth.org/locations/duke_hospital/services/international_patient_center

Special Constituent Patient Program

Patient Navigators serve patients and families who have unique needs or require special assistance with issues such as accessing information and services, getting around, and scheduling appointments. Call 919-684-6919.

Duke University Hospital—the site of all Duke transplant surgeries—is an American Nurses Credentialing Center-designated Magnet hospital, an honor earned by fewer than 5 percent of U.S. hospitals. See page 4 for additional awards and recognitions earned by Duke University Hospital.





TOP ROW

Joseph G. Rogers, MD; Carmelo A. Milano, MD; Michael P. Carboni, MD; Andrew J. Lodge, MD; David W. Zaas, MD; R. Duane Davis, MD

BOTTOM ROW

Stephen R. Smith, MD, MHS; Bradley H. Collins, MD; John W. Foreman, MD; Alastair D. Smith, MB ChB; Debra L. Sudan, MD; Carla W. Brady, MD, MHS

Every Duke transplant program comprises many people responsible for performing an array of cohesive functions—each one critical to the outcomes of our patients. To learn more about the faculty and staff of the programs listed below, visit dukehealth.org/transplants.

For details about our physicians, including their clinical interests and research activities, visit dukehealth.org/physicians.

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dukehealth.org/transplants

RESOURCES FOR CLINICIANS AND PATIENTS

Clinicians

To learn more, schedule a consultation, or make a referral, call the Duke Consultation and Referral Center toll-free at 800-MED-DUKE (800-633-3853) or visit dukehealth.org/transplants.

Patients

To learn more, call the Duke Consultation and Referral Center toll-free at 888-ASK-DUKE (888-275-3853) or visit dukehealth.org/transplants.

Clinical Trials

For a listing of clinical trials at Duke, visit dukehealth.org/clinicaltrials.

Education and Training

Call Duke Transplant Services at 919-684-5926 for more information about transplantation-related residencies, fellowships, and other educational offerings for both trainees and practicing clinicians. Visit cme.mc.duke.edu to learn about Continuing Medical Education courses.

ACCESS THE DUKE TRANSPLANT SERVICES REPORT ONLINE

Visit dukemedicine.org/transplantreport for a PDF of this report—plus links to helpful Web sites related to transplantation at Duke. While care was taken to ensure the accuracy of data and information reported in this publication, any necessary updates or corrections will also be available via this Web page.



This report is printed on Utopia Two XG, 100-lb. text and cover.

Environmental savings realized by using this paper are summarized below:

Lbs of Paper used **27486** | Trees Saved **81** | Waste water reduction in Gallons **29601** | Landfill Waste Reduced in Lbs **4898**
Net Greenhouse Emissions Saved in Lbs **9030** | Energy Consumption Reduced in BTU **56.2** Million