

# Transplant Update

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## Liver Hemochromatosis

Liver hemochromatosis is a disorder in which the body absorbs increased amounts of iron from the intestine and deposits it in the liver and other organs. Most cases result from a common genetic defect(s), although diet, heavy alcohol use or repeated blood transfusions also can contribute.

About 1 in every 200 to 250 Caucasians have the defect, while it is uncommon in Asians, Hispanics and African-Americans. But not every person who has the defect will necessarily develop iron overload.

“We don’t know how many people with the gene mutation will actually develop the disease” says Gary L. Davis, MD, director, general and transplant hepatology Baylor University Medical Center at Dallas. “Much depends on the severity of the defect—there are a variety of mutations that affect the likelihood that iron overload will occur.”

Patients with liver hemochromatosis may present with abnormal liver tests or evidence of cirrhosis or iron overload in other tissues or organs. The disease also can cause arthritis and iron deposition in the pituitary gland, resulting in hypogonadism or impotence. The disease also is associated with an increased risk of diabetes. But diabetes is now so common in the adult population that it is hard to prove statistically which cases result from hemochromatosis, Dr. Davis says. Less common presenting features are bronzing of the skin or heart disease. The disease is usually suspected when iron levels in the blood, particularly iron saturation and ferritin, are elevated, but these tests are very non-specific and often are elevated in patients with other conditions such as rheumatoid arthritis,

pneumonia, obesity or alcoholism. When suspected, a simple blood test—a gene marker—can confirm most cases. Physicians also might choose to do a liver biopsy to measure the iron overload and determine how much scar tissue exists.

“We also see elevated iron levels in viral hepatitis, but this is just a non-specific inflammatory effect,” Dr. Davis says. “It is common to see people diagnosed with this disease when they don’t actually have it.”

Alcohol can exacerbate liver hemochromatosis. Alcohol, which increases the absorption of iron from the bowel, will not by itself cause significant iron overload unless a patient is predisposed through the genetic defect.

Treatment for liver hemochromatosis is quite simple: phlebotomy. One unit of blood is removed every week for six months to a year until the patient becomes iron deficient. Physicians try to keep a patient’s ferritin level between 20 and 50. Maintenance therapy usually consists of phlebotomy three to four times per year.

“With therapy, conditions like arthritis and diabetes tend to improve,” Dr. Davis says. “But if a patient already has cirrhosis or significant scar tissue in the liver, getting rid of the iron doesn’t reduce risk of liver cancer.”

In patients with cirrhosis from hemochromatosis, liver cancer is the leading cause of death. Some patients with liver cancer may be eligible for transplant, but standard national criteria must be met.

- Over 25 years ago, Baylor pioneered the first liver transplant program in the Southwest.
- One of three programs in the nation to perform more than 3,100 liver transplants.\*
- Baylor’s expertise in the areas of hepatitis B and C is internationally renowned.

\*Volumes based on liver transplants at Baylor University Medical Center and Baylor All Saints Medical Center.



## Living Kidney Donation

Almost 80,000 people in the United States are on the waiting list for a kidney transplant. With living donation, the waiting time for a transplant recipient can be significantly reduced. In addition, the quality of the donated kidney is generally better than one from a deceased donor.

“With living donation, the half-life of the allograft can increase by five to seven years,” says Bernard Fischbach, MD, medical director of kidney and pancreas transplantation at Baylor All Saints Medical Center at Fort Worth.

Dr. Fischbach emphasizes that these numbers are variable, depending on the age of the donor, the health of the recipient and, most importantly, the recipient’s compliance with the post-transplant medical regimen.

“In addition to longer allograft survival, with living donation a patient may be able to take fewer immunosuppressive drugs, resulting in less side effects or complications, especially if it’s from a related donor,” he says.

Of the kidney transplants at Baylor University Medical Center at Dallas and Baylor Fort Worth, around 20 percent are from living donors, with more than half of those donors not related to the patient.

“We’d like to increase that number,” Dr. Fischbach says. “Often a patient may not know living donation is an option, or he or she may be hesitant to ask a family member to donate.”

The most important factor in matching donor and recipient—whether related or unrelated—is blood type, Dr. Fischbach says. Donors have to be at least 18 years old, preferably over 21. The upper age limit is generally determined on a case-by-case basis; the oldest donor to date at Baylor has been a very healthy 72-year-old.

As with any surgical procedure, donating a kidney has some risks, including the potential for bleeding. The length of hospitalization has generally decreased to two or three days. Recovery is about four to six weeks.

To minimize the health risks, Dr. Fischbach says potential donors undergo rigorous screenings. In addition to undiagnosed hypertension and diabetes—two of the major reasons people develop end-stage renal disease—potential donors are screened for cardiovascular disease, and undiagnosed infections and malignancies.

“We essentially screen for all the common conditions that can affect mortality in the general population,” he says.

### Quick Facts

- With more than 2,500 kidney transplants performed, our kidney and kidney/pancreas program is one of the largest in Texas.\*
- According to the United Network for Organ Sharing (UNOS), survival rates for Baylor kidney recipients exceed the national and state averages.

\* Volumes based on kidney transplants at Baylor University Medical Center and Baylor All Saints Medical Center.



## Porcine Islets May Alleviate Donor Shortage

While still an experimental protocol, researchers at Baylor Regional Transplant Institute and Baylor Research Institute believe islet cell transplantation may become the standard therapy for patients with Type 1 diabetes.

Yet donor shortage remains a critical issue. More than 1 million patients in the United States have Type 1 diabetes, but only about 6,000 donor pancreases become available each year.

Researchers at Baylor have begun a study of bioartificial islets, specifically porcine islets, as a potential solution for the donor shortage.

“While this approach is promising, there are major challenges to overcome,” says Shinichi Matsumoto, MD, PhD, director of the Islet Cell Laboratory at Baylor All Saints Medical Center at Fort Worth (Baylor Fort Worth) and the team’s lead scientist. “These include overcoming the immunological hurdles, establishing reliable islet isolation methods and controlling infection from porcine endogenous retrovirus or PERV.”

To overcome some of these hurdles, Baylor has teamed with The University of North Texas (UNT) and Texas Christian University (TCU) on grant

### Quick Facts

- First facility in the Southwest to be approved by the American Society of Transplant Surgeons as a surgical training program in pancreas transplantation.
- Pancreas graft survival rates at Baylor University Medical Center and Baylor All Saints Medical Center exceeded the national average for one year and three year survival.

applications. Baylor researchers theorize that encapsulating pig islets with collagen will minimize immunogenicity. Scientists at UNT have experience using unique materials for encapsulation, especially collagen tissues. TCU provides bio-reactors that can provide ideal circumstances for cell culture.

“Our experience in clinical islet cell isolation has allowed us to establish a reliable isolation method for the porcine islets,” Dr. Matsumoto says. “We have developed a novel islet isolation method that minimizes stress on the islets. This method is even more important for pig islet isolation because pig islets are more fragile than human islets.”

Dr. Matsumoto said surgeons who are familiar with islet isolation are part of the team that procures the donor pancreas. These surgeons pay close attention to maintaining the pancreas in good

condition. In addition, a new pancreas preservation solution effectively protects the islet cells.

Baylor also has more than a decade’s experience in controlling PERV. Dr. Marlon Levy, surgical director for liver and kidney transplantation at Baylor Fort Worth, a transplant surgeon on the medical staffs of Baylor Fort Worth and Baylor University Medical Center at Dallas, and principal investigator of islet cell transplantation at Baylor, has performed successful extracorporeal hepatic support using transgenic pig livers at Baylor. He established a method for monitoring PERV, which showed no infections for patients or health care workers.

“With a significant research effort, we believe bioartificial islet cells eventually may solve the issue of donor shortage,” Dr. Matsumoto says.



# Improved Outcomes in the Islet Cell Lab

Scientists in the Baylor pancreatic islet cell processing laboratory, a joint project of Baylor Regional Transplant Institute and Baylor Research Institute, are improving processing methods to achieve better patient outcomes. In fact, the team's ability to extract pancreatic islet cells in large quantities and of high quality is among the best in the world, exceeding published results from leading institutions.

These improvements are the result of modifications at the time of surgical pancreatectomy, including pancreatic duct injection of protective enzymes, as well as refinements in the techniques of pancreas digestion, cell separation and purification. In general, a larger number of high-purity/high-quality islets at the time of transplant leads to better results in the recipient.

The team is presenting their results at several national and international scientific meetings in 2009. In addition, they have a number of scientific manuscripts in preparation for publication.

“Our goal is to continually improve our processes so that we can extract the maximum amount of healthy islets from any given donor pancreas,” says Shinichi Matsumoto, MD, PhD, director of the Islet Cell Laboratory at Baylor All Saints Medical Center at Fort Worth (Baylor Fort Worth) and the team's lead scientist.

## Quick Facts

- North Texas' first islet cell transplant.
- Baylor's islet cell laboratory, one of only a few in the country and the only one in the southwest, processed cells for transplantation.

In addition, the improved results impact the treatment of patients with chronic pancreatitis. These patients, who often experience intractable pain, are treated with removal of their pancreas as a definitive form of pain relief. The patient's islet cells, after extraction, are re-infused into them in an effort to minimize or eliminate the risk of post-pancreatectomy diabetes.

“The results obtained by our laboratory scientists are applied both to our diabetic allotransplant research subjects, as well as to our patients treated for refractory chronic pancreatitis,” says Marlon F. Levy, MD, surgical director for liver and kidney transplantation at Baylor Fort Worth, a transplant surgeon on the medical staffs of Baylor Fort Worth and Baylor University Medical Center at Dallas, and principal investigator of islet cell transplantation at Baylor. “This work is another example of Baylor's commitment to innovation and improving results in patient care.”

	Original (n=3)	New Method (N=8)	p-value
Total Islet Yield (IE)	129,313 ± 89,421	466,885 ± 262,319	006
Islet Yield (IE/g pancreas)	1,336 ± 791	5,794 ± 2,267	0.01

## Outcomes and Advances in Heart Transplantation

Approximately 2,000 heart transplants are performed each year in the United States. Outcomes have remained steady since the mid-1990s with a 95 percent one-year survival rate, 85 percent five-year survival and 75 percent 10-year survival.

While the absolute age limit used to be 65, a healthy 70-year-old with no limiting co-morbidities may be considered for a heart transplant. The age for organ donors also has increased. Potential donors above the age of 40 are heavily screened with echocardiograms and cardiac catheterizations to provide a healthy donor organ.

“More recently, we’ve become more proactive and aggressive with mechanical support devices,” says Johannes Kuiper, MD, a cardiologist on the medical staff of Baylor University Medical Center at Dallas. “These devices are becoming more numerous, and some of the choices are quite long lasting.”

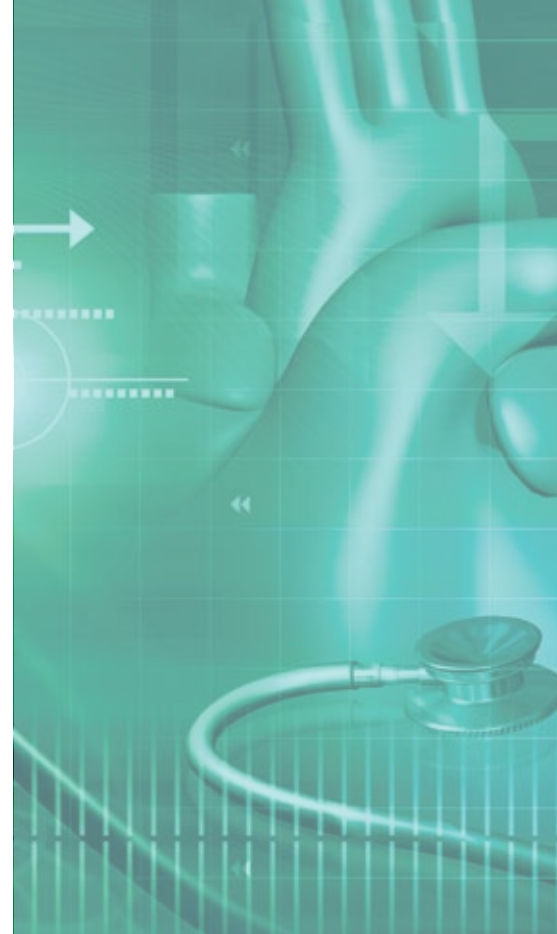
Both temporary and long-term assist devices are available. One device takes

blood through the venous system almost directly out of the lungs and puts it straight into the artery. The device can be kept in the patient up to a month or beyond until a suitable donor heart can be found.

Another device recently approved by the Food and Drug Administration consists of a tiny propeller that sits across the aortic valve and moves blood smoothly in the right direction.

The most popular long-term assist device has an expected longevity of up to five years, making it an option as a bridge to transplant or destination therapy for a patient who is not a candidate for transplantation.

With transplantation, rejection is always a possibility. According to Dr. Kuiper, for the last 25 years patients have received periodic biopsies of the heart muscle. More recently, a blood test has been developed specifically to identify activated lymphocytes, which are believed to be a marker for rejection. The blood test is unique to heart transplants.



### Quick Facts

- The VAD program at Baylor Dallas was the nation's first to receive the Gold Seal of Approval from the Joint Commission.
- The Baylor/UTSW heart transplant program held the highest one year patient survival statistics in the state of Texas and exceeded the national average.

“We now use the blood test about half of the time,” Dr. Kuiper says. “Biopsies of the heart muscle can now be spaced apart years at a time.”

# Heart

# Lung Volume Reduction Can Be Alternative to Transplant

Lung volume reduction surgery (LVRS) is designed to help patients with severe emphysema. While not a cure, the procedure has shown improvements in spirometry, respiratory muscle function, gas exchange, breathlessness and exercise capacity, all leading to improved quality of life.

According to Mark Millard, MD, a pulmonologist on the medical staff of Baylor University Medical Center at Dallas (Baylor Dallas) and medical director of the Martha Foster Lung Care Center, the fundamental problem in patients with emphysema is too much air trapped in the chest.

“This causes the diaphragm to be out of position and work at a tremendous mechanical disadvantage,” he says. “When you reduce the volume of the lungs, the diaphragm can return to its normal shape, allowing the chest wall and lungs to expand and the patient to breathe more efficiently.”

Dr. Millard said the surgery is effective when patients are properly selected and that mortality often improves. The criteria include:

- Emphysema must be more localized in the upper part of the lungs.
- Patient must have enough lung function to be able to take in enough air. Lung function cannot be below 20 percent of predicted normal.
- No pulmonary hypertension
- Patient must be off tobacco for six months.

“This is absolutely critical,” Dr. Millard says. “We even check a patient’s urine for nicotine to document that they are truly not smoking.”

Baylor Dallas participated as a rehabilitation center in the National Emphysema Therapy Trial (NETT), a Medicare-sponsored trial to document that lung volume reduction surgery is effective in treating severe emphysema. NETT found that post-operative mortality for LVRS was less than 7.5 percent.

To maximize success, Baylor Dallas established a dedicated, multidisciplinary LVRS team of physicians on its medical staff, nurses, respiratory therapists, physical and occupational therapists and social workers. The team developed standardized appropriate care plans that were broadly disseminated to all ICU and general care clinicians. Special attention was given to providing the post-operative LVRS patient with a quiet and supportive environment and adequate pain control. When possible, physical therapists begin mobilization with exercise on the same day of surgery.

“Our goal is to provide patient comfort, minimize their anxiety and pain and get them back into rehab as soon as possible,” Dr. Millard says. “And there is no reason that a patient who has had LVRS can’t go on to have a lung transplant in the future if needed.”



### Quick Facts

- The Baylor Dallas lung transplant program has a one year lung graft survival and patient survival that exceeded the national average. In addition, the three year patient survival exceeded the national average.
- Dallas’ first single and double lung transplant.

# Baylor Regional Transplant Institute



The Baylor Regional Transplant Institute is the integration of transplant services at Baylor University Medical Center at Dallas and Baylor All Saints Medical Center. Together, Baylor Dallas and Baylor All Saints are one of the largest multi-specialty transplant centers in the country.

## Liver

We have performed more than 3,000 liver transplants, one of the few transplant centers to reach this milestone.

## Kidney and Pancreas

Our patient survival outcomes exceed the national average as reported by the United Network for Organ Sharing.

## Small Bowel

This rare procedure may be a treatment for intestinal failure.

## Heart and Lung

We have been providing new hope, restored health and freedom for patients with end-stage heart and lung disease.

## Islet Cell

The first center in Texas to receive FDA permission to independently process pancreatic islet cells for transplantation.

## For More Information Please Call 1-800-774-2487.

With one phone call, a physician can request additional information, an appointment for a patient, or a consult. Call 1-800-774-2487 and a Baylor Regional Transplant Institute representative will assist you.



**Baylor University Medical Center at Dallas**  
**Baylor All Saints Medical Center at Fort Worth**



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