



Live-Donor Liver Transplantation: A Life-Saving Option for End-Stage Liver Disease

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Clinical Director, Thomas E. Starzl Transplantation Institute

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PITTSBURGH—THE BIRTHPLACE OF LIVER TRANSPLANTATION

- Liver transplantation: one of the miracles of modern medicine
- Liver transplant is now established as the only definitive treatment for **end-stage liver disease (ESLD)**
- Survival following liver transplant
 - ✓ 1 year survival: 87 – 93%
 - ✓ 5 year survival: > 75%

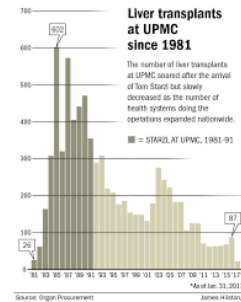


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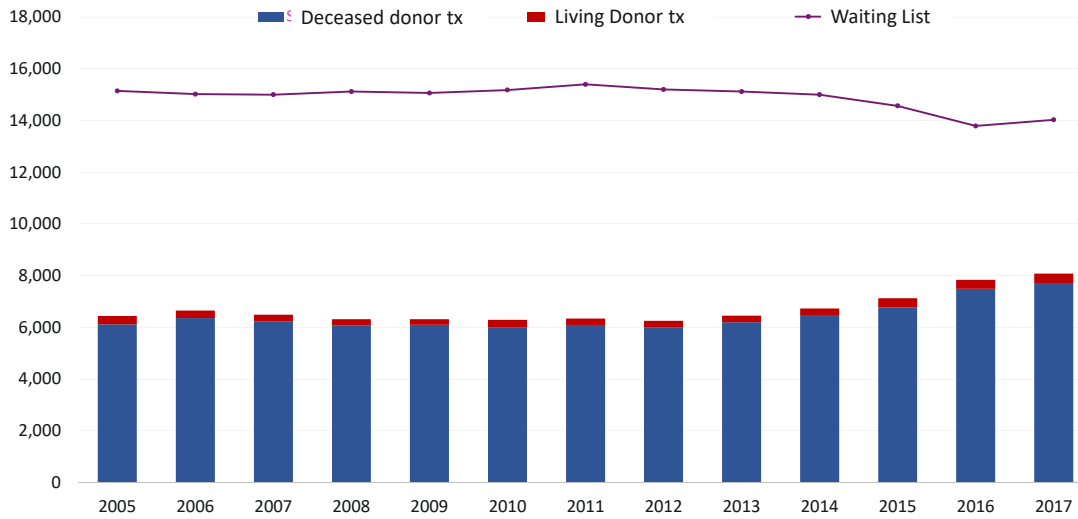
LIVER TRANSPLANTATION AT UPMC: AN ESTABLISHED LEGACY

- 1981** Dr. Starzl performs Pittsburgh's first liver transplant, establishing the country's first liver transplant program.
- 1985** Over 600 liver transplants performed in a single year.
- 1989** Tacrolimus introduced as the new immunosuppressant drug.
- 1999** UPMC performs its first adult living-donor liver transplant.
- 2017** UPMC performs more living-donor liver transplants than deceased donor liver transplants.
- 2018** UPMC and Pitt establish the Immune Transplant and Therapy Center, which will work to reduce immunosuppressants.



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CURRENT STATUS OF LIVER TRANSPLANT IN THE U.S.



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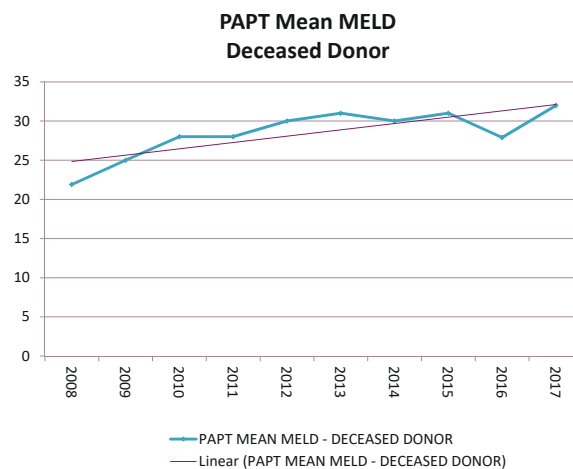
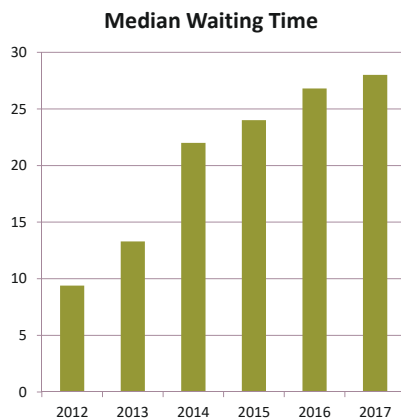
CONSEQUENCES OF A WAITING LIST AND LIMITED RESOURCE

What does this mean for the individual patient needing a liver transplant?

1. About a **15-25%** chance of never making it to transplant
2. **Longer waiting times** before receiving a transplant
 - A more debilitated state by the time a transplant is performed
 - A longer and more difficult recovery time post-transplant
3. **Not all patients** that could benefit are listed or offered transplant

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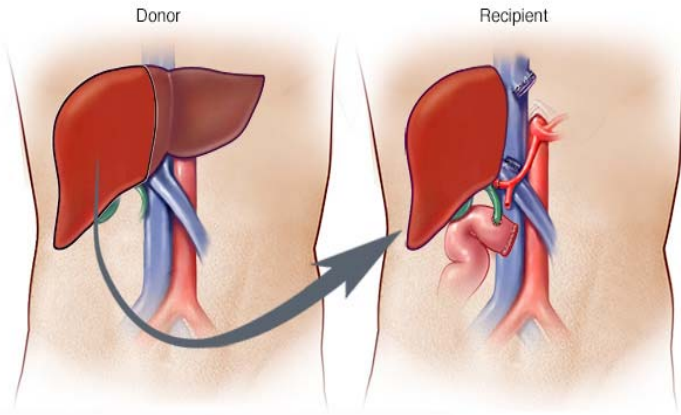
PROBLEM: NOT ENOUGH LIVERS FOR ALL THE PEOPLE WHO NEED THEM



Patients in our local area are waiting longer and are sicker by the time they receive a transplant. Waitlist mortality of 25%.

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LDLT—A POSSIBLE SOLUTION FOR THE WAITING LIST PROBLEM



Possible because of 2 unique properties of our liver:

- Extra capacity built in
- Ability to regenerate

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ADVANTAGES AND DISADVANTAGES OF LDLTX

Disadvantages

- Short-term risks to donor
- Long-term risks to donor
- Increased incidence of biliary and vascular complications
- Decreased hepatic reserve

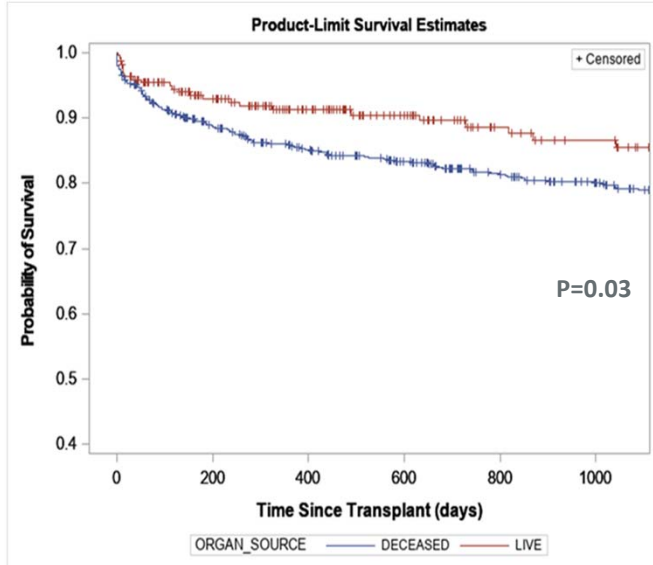
Advantages

- Decrease waitlist mortality
- Decreased waiting time
- Transplant prior to recipient becoming critically ill
- Elective, non-emergent
- Minimal cold ischemia
- Immunologic advantage
- Adds to cadaver pool
- Financial benefit

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RESULTS WITH LIVER TRANSPLANT AT UPMC: LIVING VS DECEASED DONOR



	Living Donor N=222	Deceased donor N=625	P value
Median LOS	11 days	14 days	0.03
No intraop transfusion	48%	22%	0.01
1 year survival	91%	86%	0.02



TECHICAL OUTCOMES WITH LIVER TRANSPLANT AT UPMC: 2009-2018 LIVING VS DECEASED DONOR

	Living Donor N=226	Deceased donor N=632	P value
Hepatic artery thrombosis	3.4%		
Portal venous complication	1.3%	0.32%	P=0.12
Biliary complication	14.3%	11.5%	P=0.20
3 month reoperation	29%	29%	P=0.81



UPMC Living Donor Utilization/Cost Comparison

- **Cost of transplant (from 6 months pretransplant to 1 year posttransplant) was 30.8% cheaper in LDLT group ($p < 0.01$)**
- **Waitlist patients had an average of 2.7 admissions/year to hospital with charges for each hospital stay averaging \$70k.**

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UPMC Living Donor Utilization/Cost Comparison

UPMC data shows cost benefits for living donors related to pre-transplant radiology and post-transplant radiology, ED visits, GI procedures and surgeries, and labs.

Deceased-Donor Liver
Transplant Recipient
N=52



Pre-transplant:
3.4 average radiology scans

Post-transplant:
12.0 average radiology scans
.7 average ED visits
.7 average GI procedures and surgeries

Living-Donor Liver
Transplant Recipient
N=60

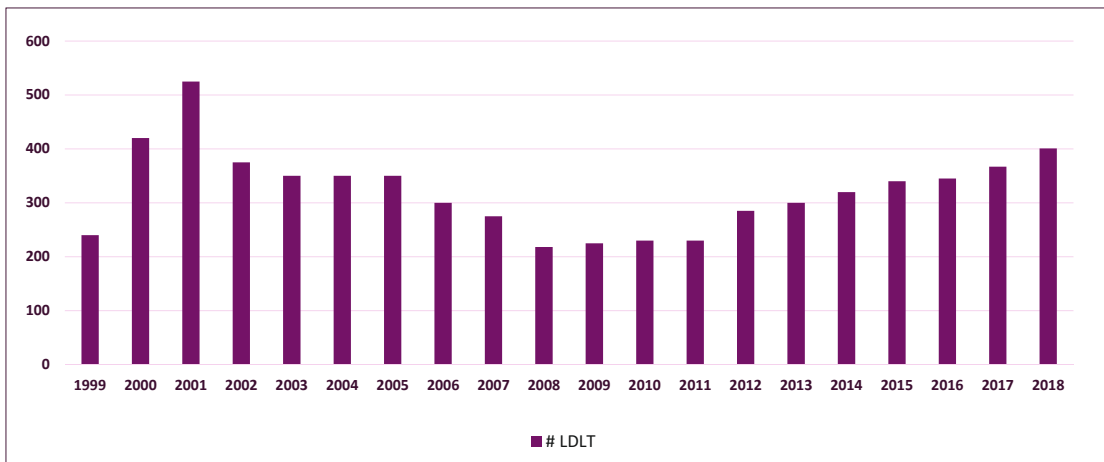


Pre-transplant:
2.6 average radiology scans

Post-transplant:
8.6 average radiology scans
.5 average ED visits
.2 average GI procedures and surgeries
25 percent reduction in outpatient labs

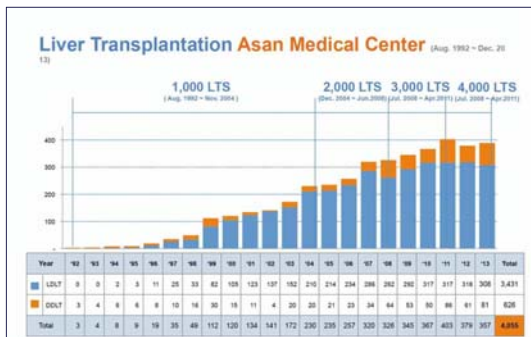
12 *Based on UPMC Transplant cases in CY 17

CURRENT STATE OF LDLT IN THE U.S.

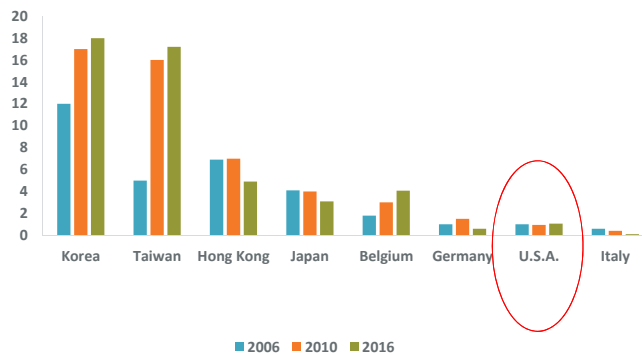


**UNDERUTILIZED: ONLY 401 LDLT PERFORMED IN THE ENTIRE U.S. IN 2018
THIS ACCOUNTED FOR 4.8% OF THE TOTAL NUMBER OF TRANSPLANTS.**

DRAMATIC DIFFERENCE WITH USE OF LDLT AROUND THE WORLD



Living Donor Liver Transplants per Million People





WHY HAVE THE NUMBER OF LDLTS REMAINED SO LOW IN THE U.S.?

- Complex procedures that require **great degree of technical expertise** from an entire team
- Numerous regulations with significant consequences for center:
 - UNOS, CMS, state
- Donor complications/deaths that have been highly publicized
- Risk for careers of specific team members
- **People don't know or are misinformed!**

Lack of Awareness

Patients

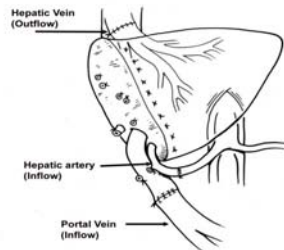
Providers

Payors

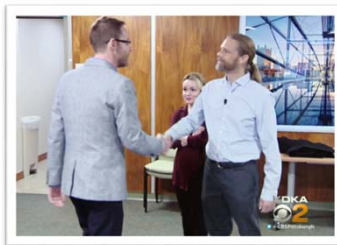
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UPMC STRONGLY BELIEVES IN THE VALUE OF LDLT TO HELP PATIENTS



Pediatric LDLT



Adult LDLT

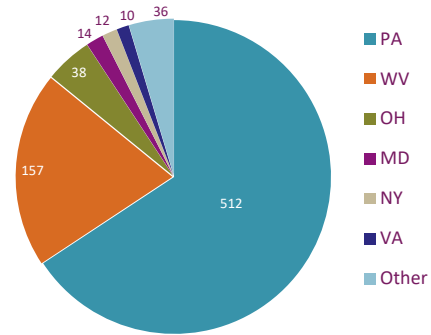
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UPMC STRONGLY BELIEVES IN THE VALUE OF LDLT TO HELP PATIENTS

- UPMC is the **only center** performing LDLT in western PA
- More than 50% of our transplants in 2017 and 2018 were with a **living donor** (national average 4.5%)

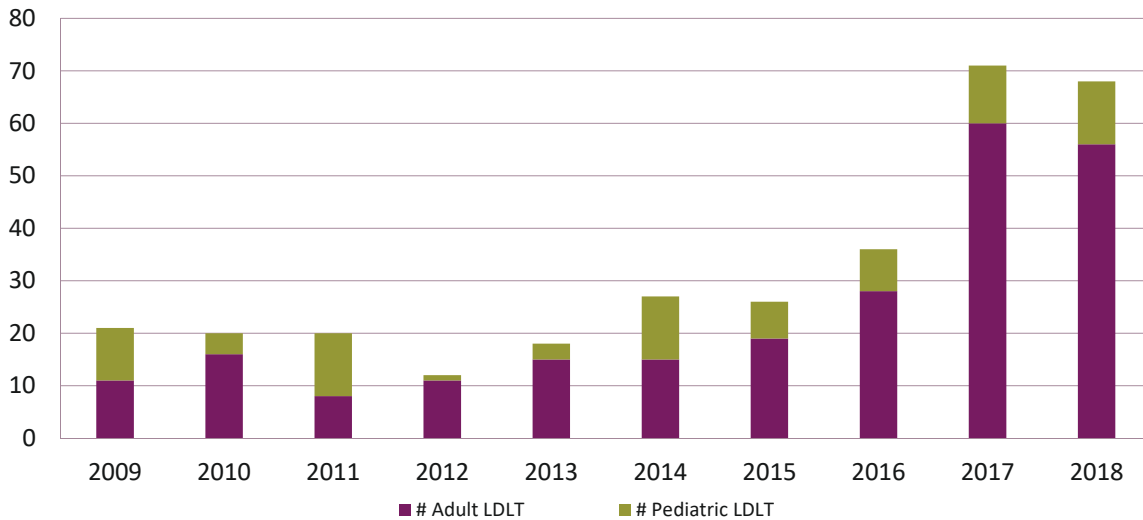
Liver TX Referrals By State, 1/2013-12/2014



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NUMBER OF LDLT AT UPMC BY YEAR

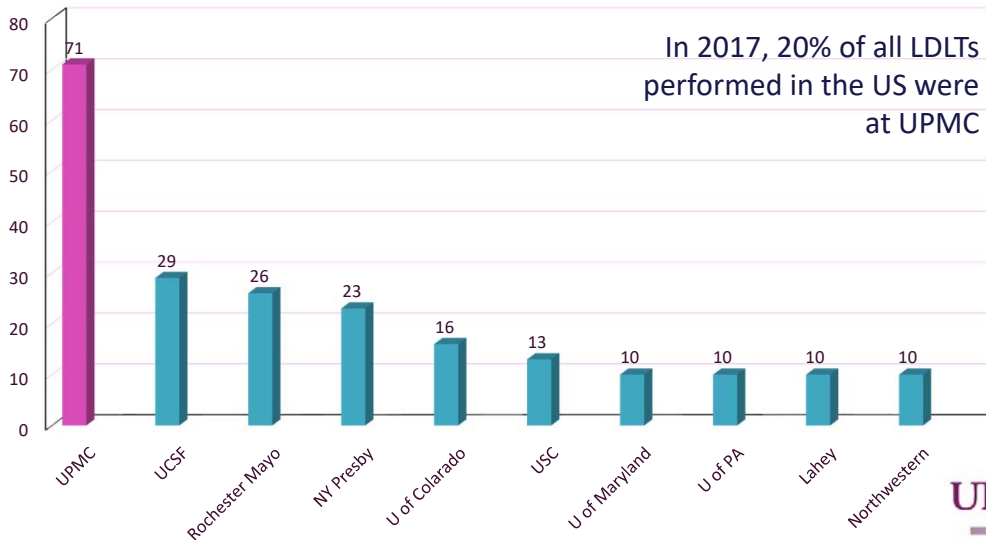


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LDLT AT UPMC COMPARED TO THE REST OF THE U.S.

2017 LDLT US volume by center
Total 2017 volume: 367



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HIGHLY PUBLICIZED DONOR DEATH AND THE IMPACT

M E D I C I N E

The Ultimate Sacrifice

A healthy man gives his brother half his liver—and dies. Should this kind of transplant be allowed?

By CHRISTINE GORMAN

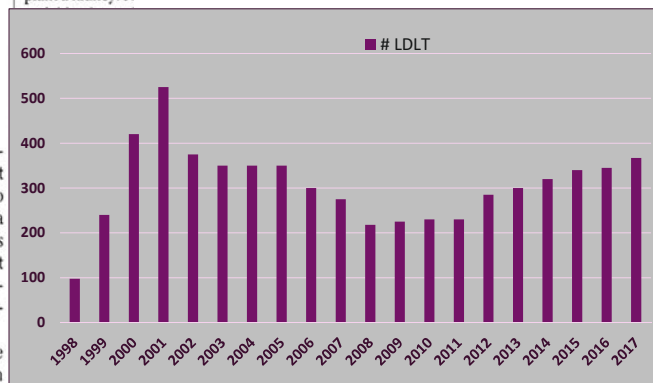
MIKE AND ADAM HUREWITZ GREW UP together on Long Island, in the suburbs of New York City. They were very close, even for brothers. So when Adam's liver started failing, Mike offered to give him half of his. The operation saved Adam's life. But Mike, who went into the hospital in seemingly excellent health, developed a complication—perhaps a blood clot—and died last week. He was 57.

Mike Hurewitz's death has prompted a

like bad odds, but there's more to this ethical dilemma than a simple ratio. The first and most sacred rule of medicine is to do no harm. "For a normal healthy person, a mortality rate of 1% is hard to justify," says Dr. John Fung, chief of transplantation at the University of Pittsburgh Medical Center. "If the rate stays at 1%, it's just not going to be accepted."

On the other hand, there's an acute shortage of traditional donor organs from people who have died in accidents or suffered fatal heart attacks. If family members fully understand the risks and are willing to

however, is a lot plant a kidney. N



much as 60% of t removed. "There for error," says D

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DONOR RISK

National Data

6826 LDLT
(Jan 2019)

6 donor deaths
(0.10%)

3 donors
received a
LTX

- Overall complication 30%
- Major complication 10%

UPMC Data

- No donor deaths
- No cases of liver failure
- Overall complication rate 19.5%
- Major complication rate of 8.8%
- Mean length of stay- 5.8 days

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DONOR OUTCOMES

- **Reoperation rate of 6.2%**
 - Early (<3 months)- 2.7% (bowel perforation, bleeding, SBO, negative lap)
 - Late (>3 months)- 3.5% (hernias)
- **Biliary leak/biloma: 3 (1.3%)- all managed with percutaneous drainage +/- ERCP**
- **Medical complications: UTI, pneumonia, c diff, DVT/PE, wound infection, fever nyd, abdominal pain nyd, nerve injury.**

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DONOR SAFETY AND RECOVERY IS KEY

- Recovery:
 - ✓ 5-7 days in hospital
 - ✓ 4-6 weeks desk job
 - ✓ 10-12 weeks physical job
 - ✓ 80-90% by 3 months post donation

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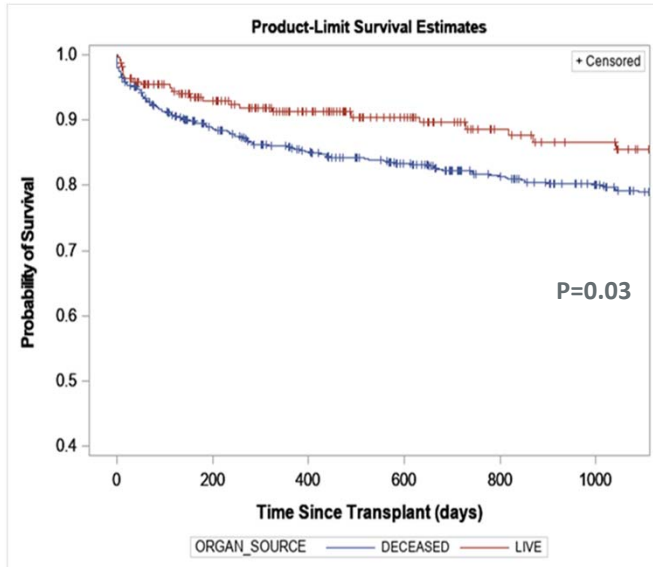


Live donor kidney transplant is the gold standard treatment for ESRD

- Between 1999 and 2011 there were 25 kidney donor deaths within 3 months of donation.
- There is a very slight increase in risk for developing ESRD over time in kidney donors
- No cases of late liver failure reported after liver donation



RESULTS WITH LIVER TRANSPLANT AT UPMC: LIVING VS DECEASED DONOR

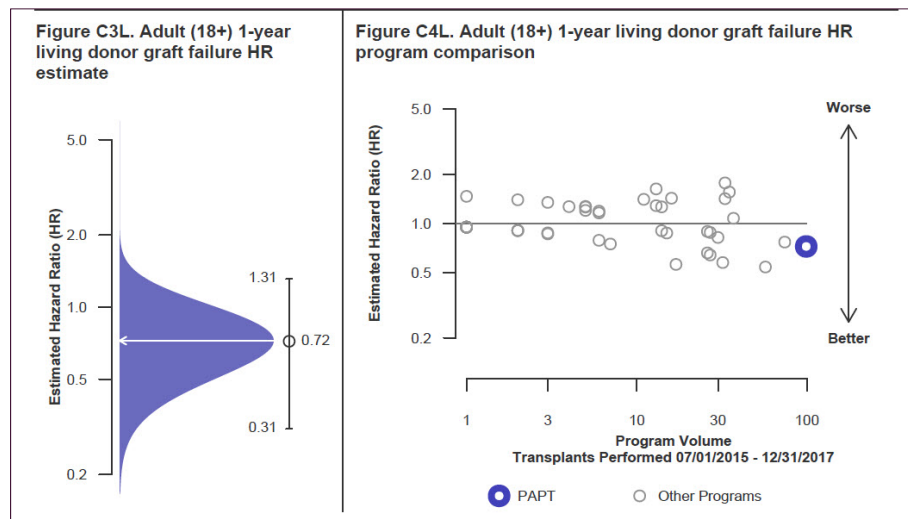


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SRTR PAPT LDLT GRAFT SURVIVAL RATE

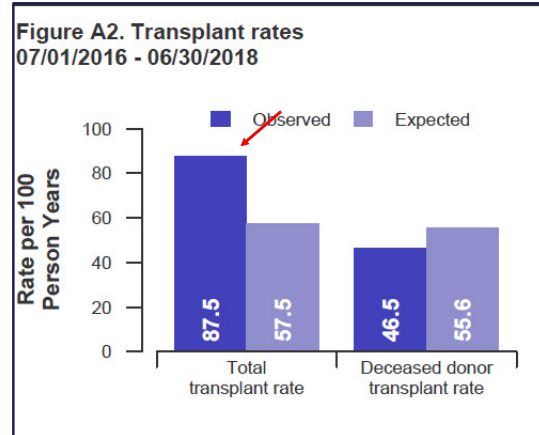
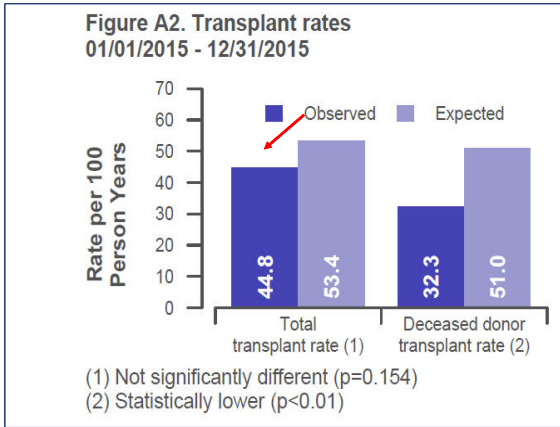
Graft Survival- 1 year



www.optn.org

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OVERALL TRANSPLANT RATE AT UPMC HAS INCREASED AS A RESULT OF USE OF LDLT

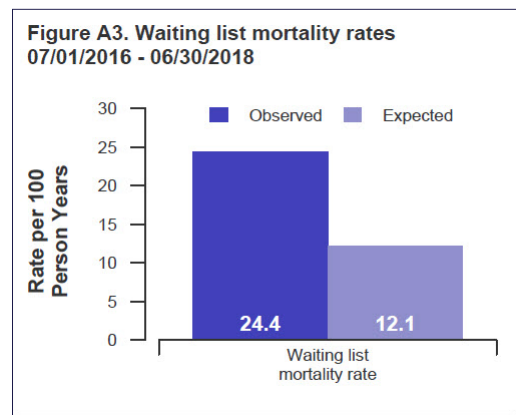
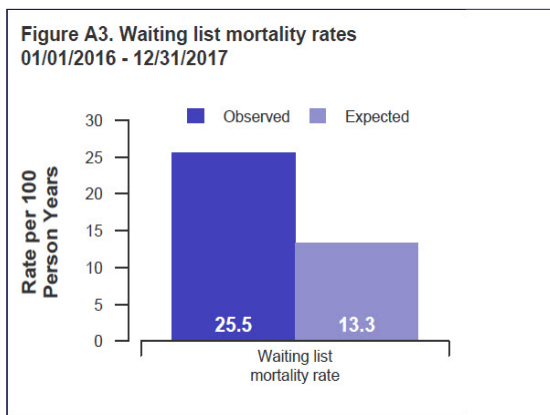


www.optn.org

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Waitlist Mortality is Starting to Decrease



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Evolution of how we think about LDLT at our center

Initial recipient selection criteria:

- Patients low on waiting list but with bad prognostic signs
- Patients with liver tumors in and out of criteria
- International patients

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RESULTS WITH LDLT FOR HIGH-MELD PATIENTS

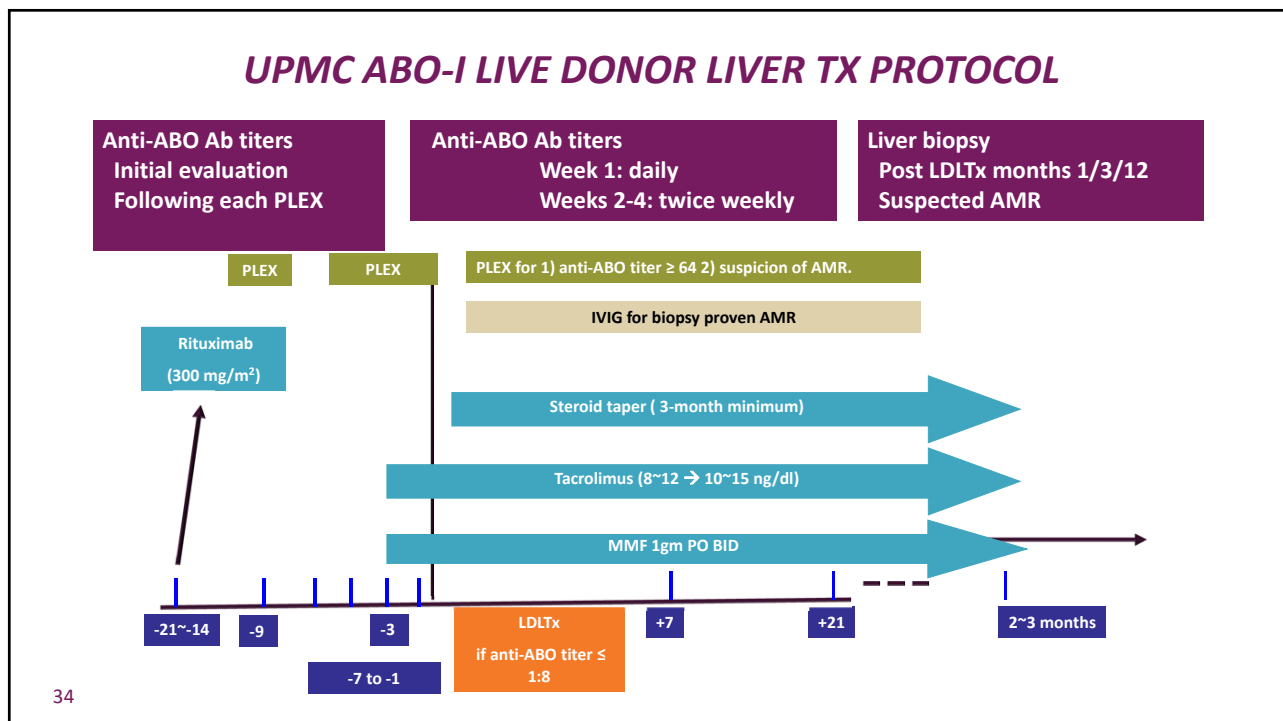
Strategies to transplant high-MELD patients:

- Right lobe grafts
- Young donors
- Include MHV in the graft

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	<p align="center"> UNIVERSITY OF PITTSBURGH MEDICAL CENTER STARZL TRANSPLANTATION INSTITUTE LIVER TRANSPLANT POLICIES AND PROCEDURES POLICY LT-CCA-0415 LIVER TRANSPLANTATION IN PATIENTS WITH HILAR CHOLANGIOCARCINOMA </p>
	<p align="center"> UNIVERSITY OF PITTSBURGH MEDICAL CENTER STARZL TRANSPLANTATION INSTITUTE LIVER TRANSPLANT POLICIES AND PROCEDURES POLICY LT-CCA-0415 LIVER TRANSPLANTATION IN PATIENTS WITH METASTATIC COLORECTAL METASTASIS </p>
	<p align="center"> UNIVERSITY OF PITTSBURGH MEDICAL CENTER STARZL TRANSPLANTATION INSTITUTE LIVER TRANSPLANT POLICIES AND PROCEDURES POLICY LT-CCA-0415 LIVER TRANSPLANTATION IN PATIENTS WITH HCC BEYOND MILAN </p>
	<p align="center"> UNIVERSITY OF PITTSBURGH MEDICAL CENTER STARZL TRANSPLANTATION INSTITUTE LIVER TRANSPLANT POLICIES AND PROCEDURES POLICY LT-CCA-0415 LIVER TRANSPLANTATION IN PATIENTS WITH METASTATIC NEUROENDOCRINE AND OTHER RARE TUMORS </p>



Extended use of LDLT at the STI

- Acute Alcoholic Hepatitis
- HCC: Extended criteria
- Cholangiocarcinoma
- Jehovah's Witness: Bloodless surgery
- ABO Incompatible LDLT
- Unresectable colorectal metastases
- International patients
- Low/High-MELD patients
- Older recipients
- Simultaneous liver-kidney
- Re-do liver transplants
- NET and other rare tumors
- HIV recipients
- Acute liver failure

A suitable LDLT is the first option for all of our patients

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TIME TO CHANGE THE PARADIGM OF HOW WE THINK ABOUT LIVER DISEASE IN THE SETTING OF LDLT PROGRAM:

- Current rules of allocation and MELD are appropriate for utilization of a limited resource.
- With a LDLT and 1 donor /1 recipient situation- **These rules don't apply.**
- Criteria for LDLT should be based on ability to provide a **survival advantage.**
- LDLT is not the last resort but rather the **first and best resort.**

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RECIPIENT SELECTION CRITERIA AT UPMC

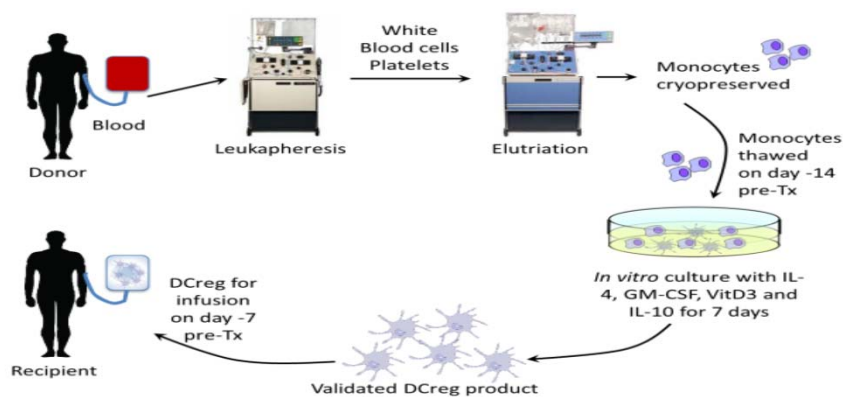
1. **Significant survival benefit** with liver transplant vs. best other therapy
2. Suitable, willing **living donor**

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LDLT ALLOWS FOR UNIQUE RESEARCH OPPORTUNITIES

Use of donor derived dendritic cells to induce immune tolerance:

- Funded through ITTC by UPMC
- Goal of study to remove **long-term immunosuppression** from transplant patients



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KEYS TO SUCCESS

Strong living donor team:

- Donor Surgeon
- Transplant Hepatologist
- Living Donor Nurse Coordinator
- Transplant Social Workers
- Transplant Financial Counselor
- Independent Living Donor Advocate



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EDUCATION & AWARENESS CAMPAIGN

Patients and caregivers

- **Education** about LDLT and risks and benefits
- **Education** about how to find living donor

Physicians and other healthcare workers

- **Education** about LDLT risks and benefits
- **Education** about Suitability and indications

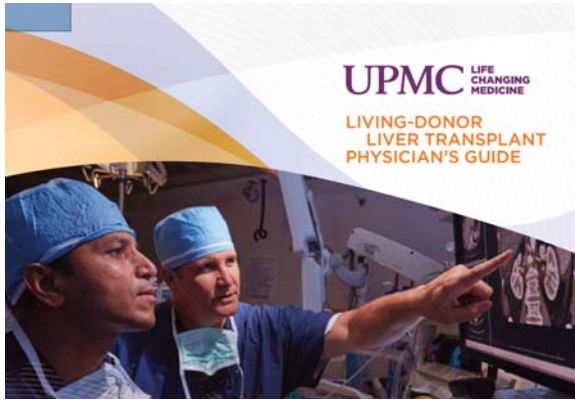
Payors

- **Education** about LDLT risks and benefits
- **Education** about financial benefits

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Physician Resources - Educational Brochures and Lectures



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LIVING-DONOR LIVER TRANSPLANTS ARE A VIABLE OPTION FOR PATIENTS WITH LIVER DISEASE WHO NEED A LIVER TRANSPLANT

The liver's amazing ability to regenerate
Because the liver regenerates, the living donor (relative, friend, or stranger) can donate a portion of their liver. The re-growth of the liver cells in the remaining portion of the liver occurs in a short period of time for both donor and recipient.

While the procedure involves some risk for the donor, the UPMC Liver Transplant team will perform an extensive evaluation to ensure that risk is minimized. The majority of donors are back to baseline health within three months after surgery.

Big demand, little supply
The numbers are staggering. Although more than 14,000 Americans are on the waiting list for a liver transplant, only 6,000 deceased-donor livers are available for transplant. That means only one-third of those on the waiting list will be able to receive a liver. Living-liver donation saves lives -- and valuable time -- by increasing the number of available organs for patients in desperate need.

3X SUPPLY DEMAND

In a **pediatric living-donor liver transplant**, 25 percent of the donor's liver is removed.

In an **adult living-donor liver transplant**, 60 percent of the donor's liver is removed.

LIVING-DONOR LIVER TRANSPLANTS SAVE LIVES

Living-donor liver transplants offer many life-saving advantages for patients on the liver transplant waiting list. UPMC is the only center offering living-donor liver transplants in the Pittsburgh area. In fact, when it comes to the number of yearly cases, we are one of the top programs in the country.

For the Recipient

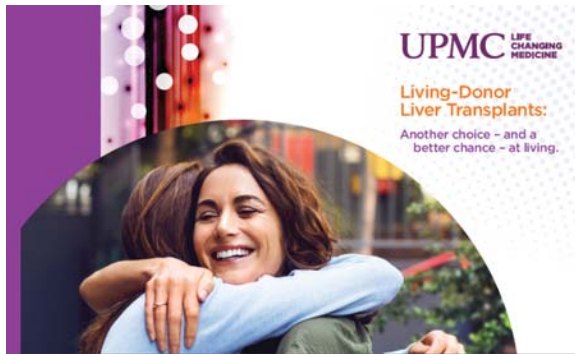
- Shorter wait times -- Patients can find a suitable living donor without having to face the long wait on the national liver transplant list. It reduces the risk of waiting list mortality. And most importantly, the recipient can receive a life-saving transplant before he or she becomes cirrhotic.
- Improved long-term outcomes -- Transplant candidates generally have better results and better genetic matches when they receive organs from living donors as compared to deceased donors.
- Increased treatment options -- Living-donor transplantation increases available treatment options for patients.
- Quicker recovery times -- Patients recover faster.

For the Living Donor

- Huge impact on someone's life -- Donors can feel good knowing they're saving another person's life with this meaningful gift.
- Removes a candidate from the national transplant waiting list -- This reduces the competition for the limited amount of deceased-donor livers available for transplantation.

BENEFITS

Patient Resources - Educational Brochure and Video Series



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You and donor will both see some beneficial outcomes:

- Transplant techniques
- Good recipient recipient
- Living donor donor
- Transplant donor
- Transplant donor
- Transplant donor

We are the pioneers in living-donor liver transplants.
UPMC does have living donor liver transplants than any other center in the world. The experience shows in the best rates of the most common cause.

UPMC Coverage Program
The UPMC Coverage Program is designed to assist patients and their families in finding a living donor for a living-donor liver transplant. Our goal is to help make your experience as smooth as possible and to ensure you have the resources you need to get the best possible outcome. We will help you understand the process and what to expect. We will also help you understand the process and what to expect. We will help you understand the process and what to expect.

UPMC Living Donor Coverage Program
At UPMC, we understand the challenges living donors on the liver transplant waiting list. The UPMC Living Donor Coverage Program gives you and your family through the long decision-making process. We will help you understand the process and what to expect. We will help you understand the process and what to expect. We will help you understand the process and what to expect.

UPMC Living Donor Coverage Program - Health partners with Living Donor Coverage. Individuals who will receive support by UPMC employees in the new Living Donor Coverage Program.

We have information about the role of a living donor (donor) and to determine the UPMC Living Donor Coverage Program.

Introduction to the Liver Transplant Waiting List and Living-Donor Liver Transplant



If you have been diagnosed with a liver disease, a liver transplant may be your only hope.

Understanding the Liver Transplant Waiting List

95 percent of the patients on the liver transplant waiting list are eligible for a living-donor liver transplant.



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Patient Resources – Champion Program

UPMC Champion Program (On-going)

- Champion workshops
- Community info sessions
- Champion support group
- Town hall event
- Champion toolkit
- Champion ambassador



Champion Support Group

Social Media

While social media has long been a tool for sharing pictures or personal stories, it is also a growing resource for finding the help people need for some of life's heavier issues. The most popular and effective social media platform with regard to this type of request is Facebook. We'll take a look at how that site can help you the most in your role as the Champion.

If you already have a personal Facebook profile, you can start by visiting the UPMC & Donors Life Living Donor Transplant Facebook page. Here, you can learn more about what living donation means and connect with others who have gone through, or are currently going through, the same situation as you and your loved one.

When it comes to your contact list, start with those that are close to the person needing a transplant — this may take a little digging and research.

If you don't have a personal Facebook profile, you'll need to set one up. Don't worry, it's simple and free of charge.

1. Go to www.facebook.com
2. If you see the sign-up form, fill out your name, your email address or phone number, a password that you've created and will be able to remember, your birthday, and your gender. If you don't see the form, click Sign Up, then fill out the form.
3. Click Sign Up.

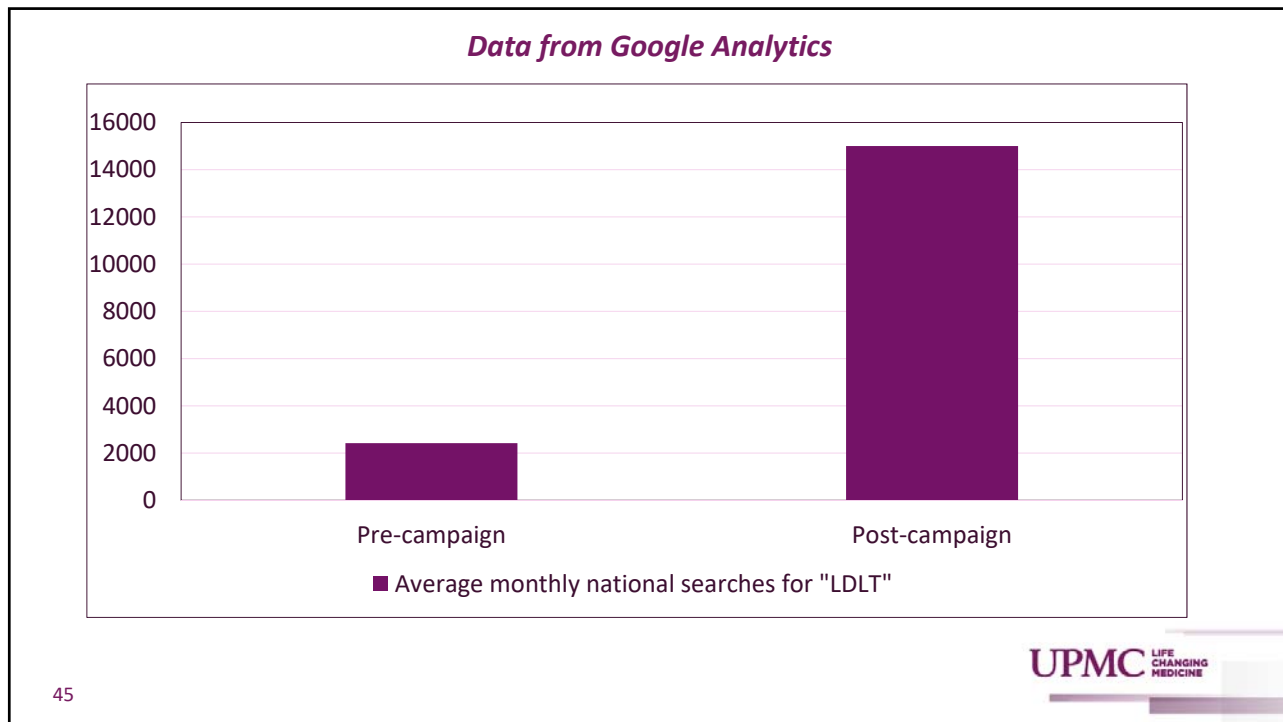
Once you sign up, you'll need to confirm your email address or phone number. Facebook will then send you either an email or a text message to help you confirm your account. After your page is set up, you can begin requesting friends. We strongly suggest you start with, and keep to, family and friends you know and trust.

Champion toolkit



“Get out of line” Campaign





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- THE FUTURE: WHAT'S NEXT FOR LIVER TRANSPLANT**
- **Eliminate** the wait list
 - **Educate** physicians, payors, patients and families
- UPMC LIFE CHANGING MEDICINE

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OUR PATIENTS WILL TAKE US THERE



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