



Knowledge and Compassion
Focused on You

Living Donor Kidney Transplantation: A Golden Opportunity

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Surgical Director, CNMC Pediatric Kidney Transplant Program

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Disclosures

I have no financial disclosures.

October 23, 2018

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Objectives

- Appreciate the prevalence of kidney disease in our community.
- Discuss the benefits of living donation.
- Explain the risks of living donation.
- Examine how African Americans fare in our current process.
- Discuss possible process improvement measures to improve access for living donor transplants.

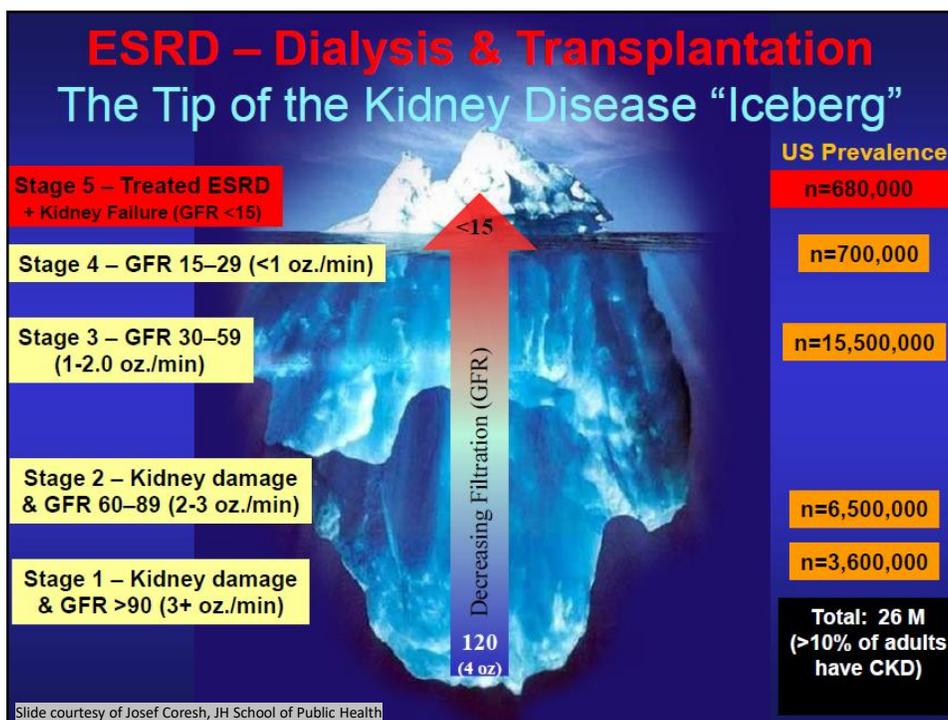
October 23, 2018

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As of October 8, 2018...

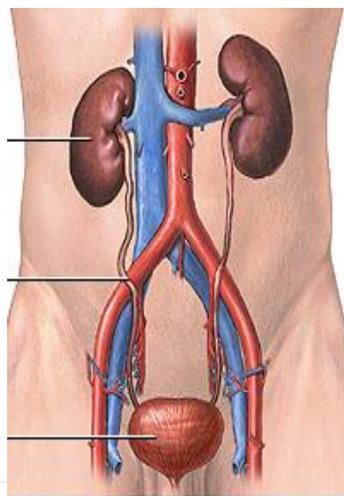
- 95,203 waiting list candidates for a kidney nationally
- 1048 pediatric patients on waiting list
- Most recipients will wait 3-5 years for a deceased donor kidney
- 17% of pediatric patients wait more than 5 years
- Most common causes of kidney failure:

Adult	Pediatric
DIABETES	Congenital Anomalies
Hypertension	FSGS
Glomerulonephritis	Glomerulonephritis
Polycystic Kidney Disease	

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Why Kidney Transplant?



Successful
Live Longer
Better Quality of life
Decrease Costs

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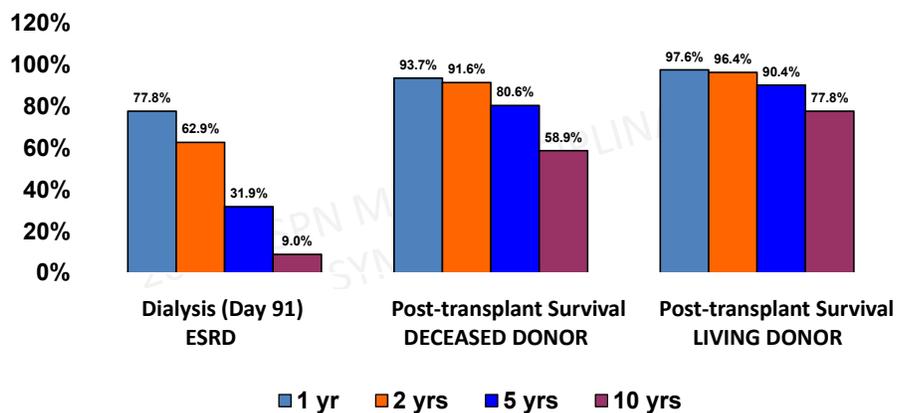
Transplant-Related Quality-of-Life Benefits

- Relatively unrestricted diet
- Freedom to travel
- Ability to become pregnant and bear children
- Can engage in training for athletic competition
- Lifestyle free of dialysis



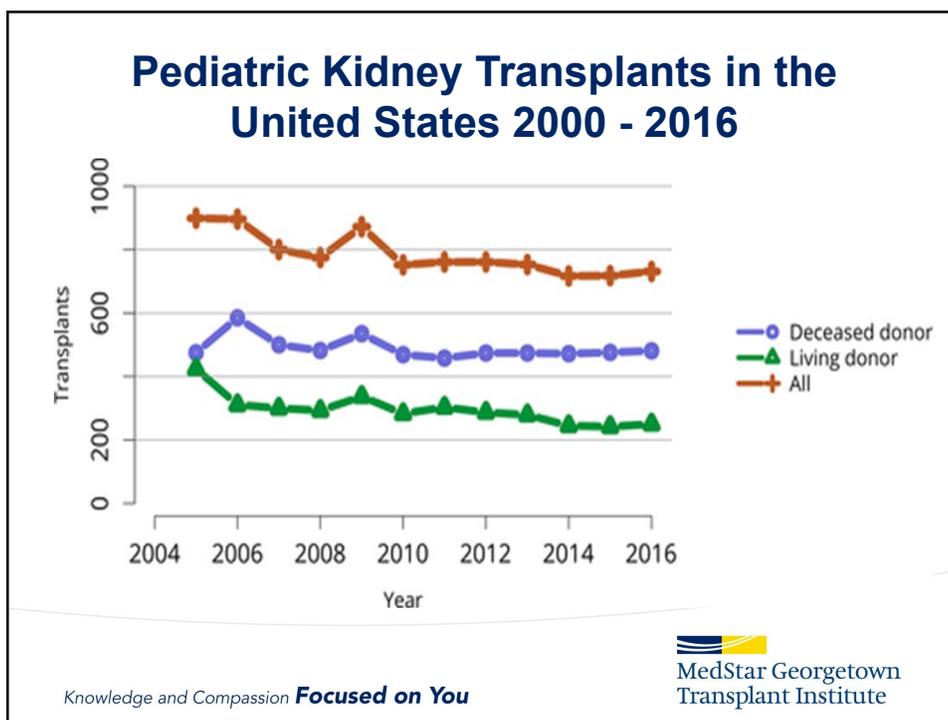
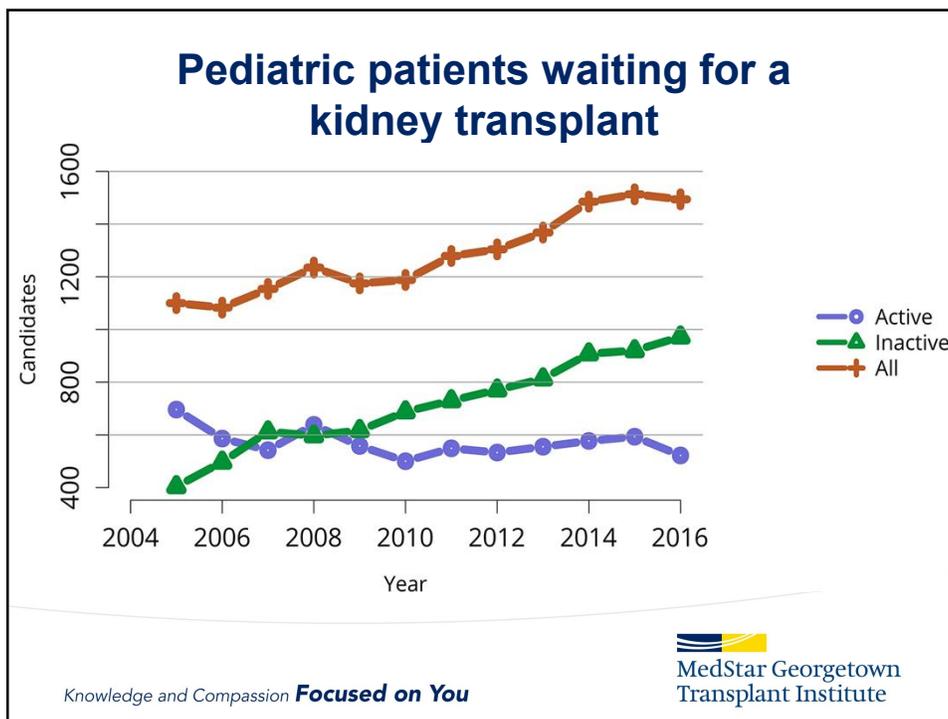
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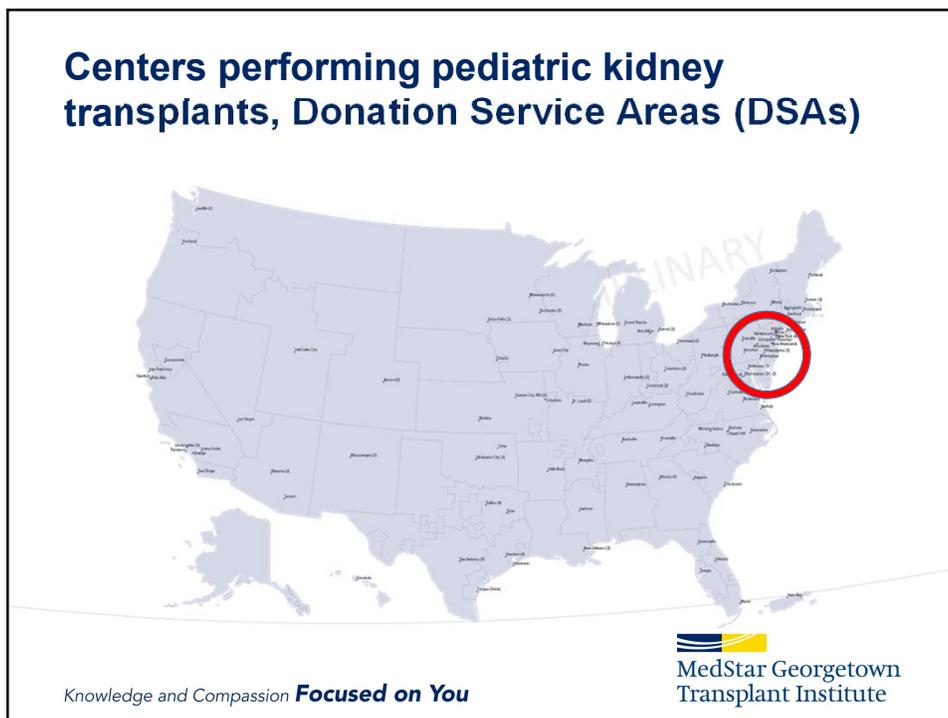
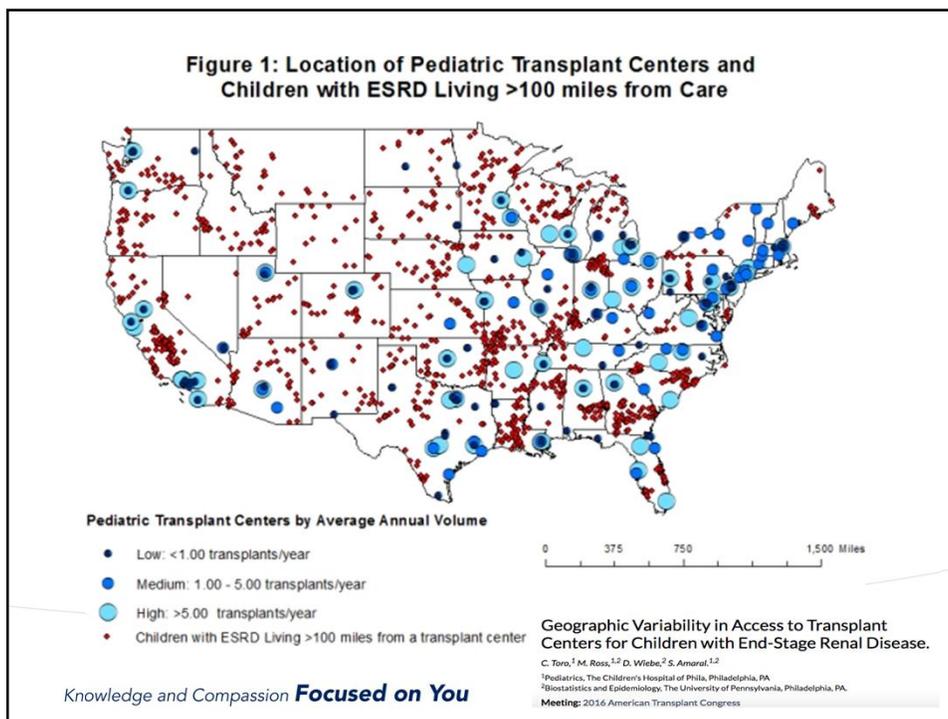
ESRD Survival by Treatment Modality



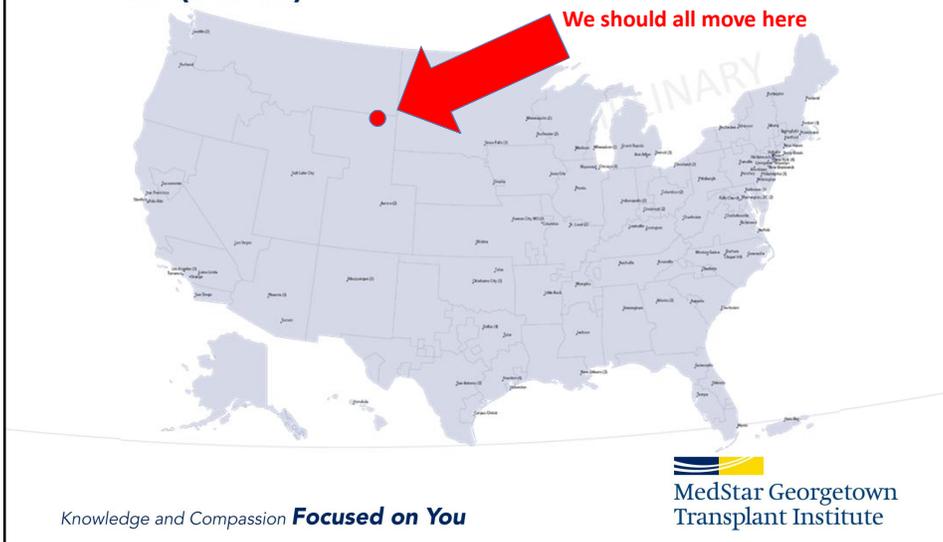
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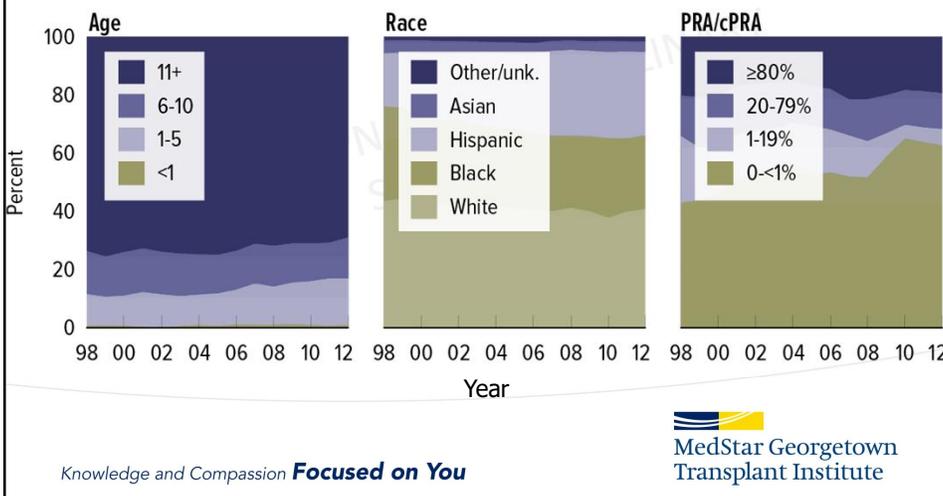




Centers performing pediatric kidney transplants in 2012, within Donation Service Areas (DSAs)

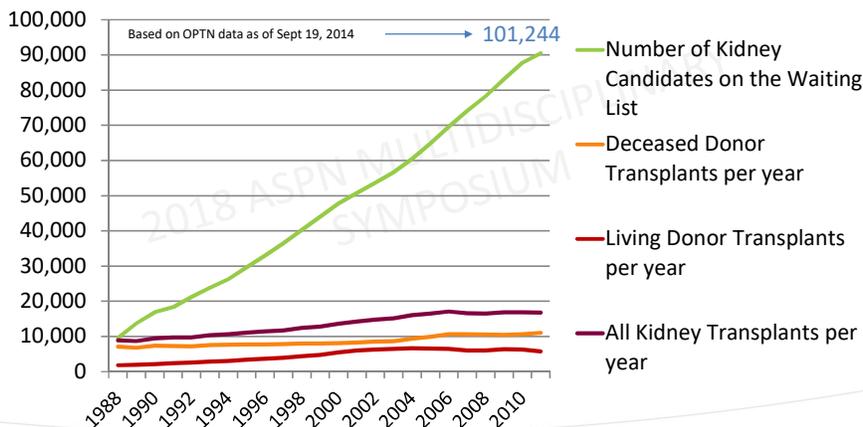


Distribution of pediatric patients waiting for a kidney transplant



The Growing Waiting List

Kidney Waiting List and Transplants



OPTN data

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New Kidney Allocation System (KAS) December 2014

- Pediatric patients – 1% of the waitlist
- Priority for only the highest quality organs
 - Donors less than 35 years old
 - Donors with KDPI less than 35



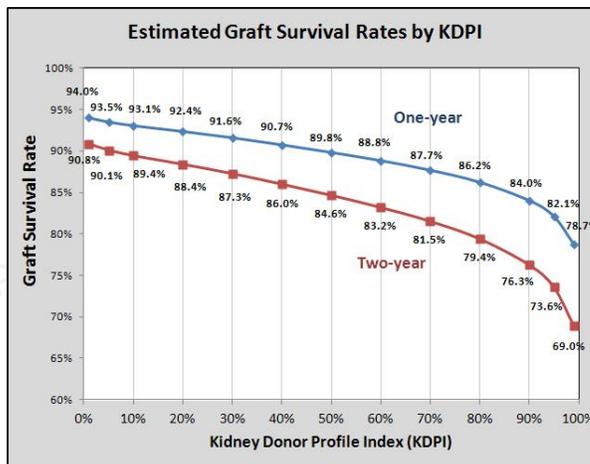
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Kidney Donor Profile Index (KDPI)

KDPI Variables

- Donor age
- Height
- Weight
- Ethnicity
- History of Hypertension
- History of Diabetes
- Cause of Death
- Serum Creatinine
- HCV Status
- DCD Status



KDPI values now displayed with all organ offers in DonorNet®

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New Kidney Allocation System (KAS) December 2014

- Behind recipients with 100% and 99% PRA
- After KAS, pediatric transplants decreased from 4.2% to 3.7%.



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Sequence A KDPI <=20%	Sequence B KDPI >20% but <35%	Sequence C KDPI >=35% but <=85%	Sequence D KDPI >85%
Local CPRA 100	Local CPRA 100	Local CPRA 100	Local CPRA 100
Regional CPRA 100	Regional CPRA 100	Regional CPRA 100	Regional CPRA 100
National CPRA 100	National CPRA 100	National CPRA 100	National CPRA 100
Local CPRA 99	Local CPRA 99	Local CPRA 99	Local CPRA 99
Regional CPRA 99	Regional CPRA 99	Regional CPRA 99	Regional CPRA 99
Local CPRA 98	Local CPRA 98	Local CPRA 98	Local CPRA 98
Zero mismatch (top 20% EPTS)	Zero mismatch	Zero mismatch	Zero mismatch
Prior living donor	Prior living donor	Prior living donor	Local + Regional
Local pediatrics	Local pediatrics	Local	National
Local top 20% EPTS	Local adults	Regional	
Zero mismatch (all)	Regional pediatrics	National	
Local (all)	Regional adults		
Regional pediatrics	Regional adults		
Regional (top 20%)	National pediatrics		
Regional (all)	National adults		
National pediatrics			
National (top 20%)			
National (all)			

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Disparities in Transplant are an old story

HEALTH

Why Black People Get Fewer Organ Transplants Than Whites

New study on children with kidney failure confirms a stark racial divide

African-Americans less likely to receive kidney donation, study shows

By Olympia Baralis, Special to CNN
Updated 7:31 AM ET, Mon June 25, 2012



USA TODAY

Blacks face tougher time finding kidney for transplant

The New York Times

Science

WORLD U.S. N.Y./REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION
ENVIRONMENT SPACE & COSMOS

Studies Find Unequal Access to Kidney Transplants

By SANDRA BLAKESLEE
Published: January 24, 1999

WHITE men receive a greatly disproportionate share of the nation's transplanted kidneys compared with white women and blacks of both sexes, three recent studies have shown.

1-1-1993

Unequal Racial Access to Kidney Transplantation

Ian Ayres
Yale Law School
Laura Dooley
Robert Gaston

October 23, 2018

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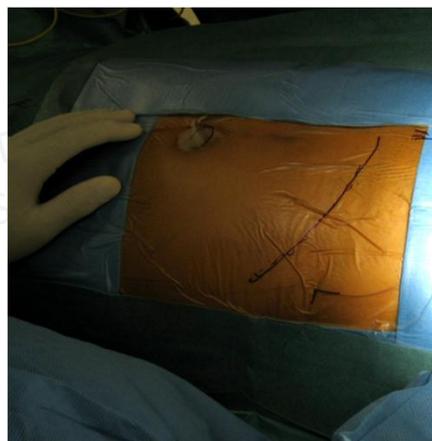
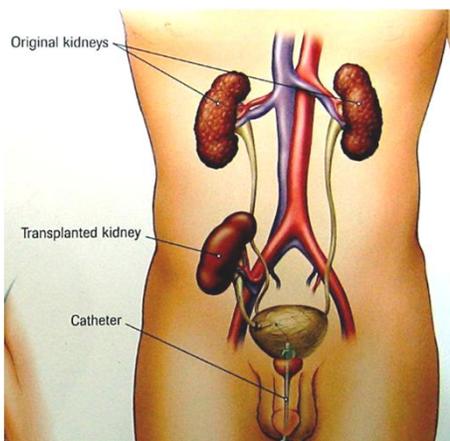
Surgery



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Kidney Transplantation

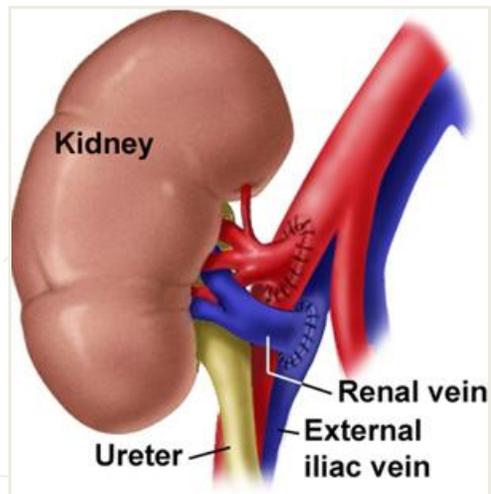


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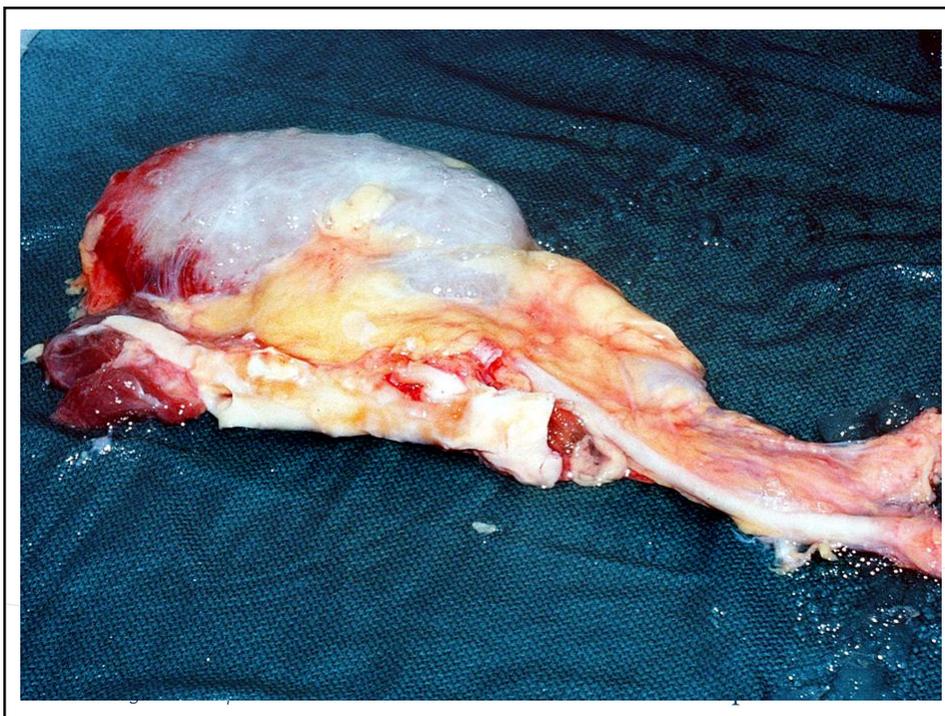


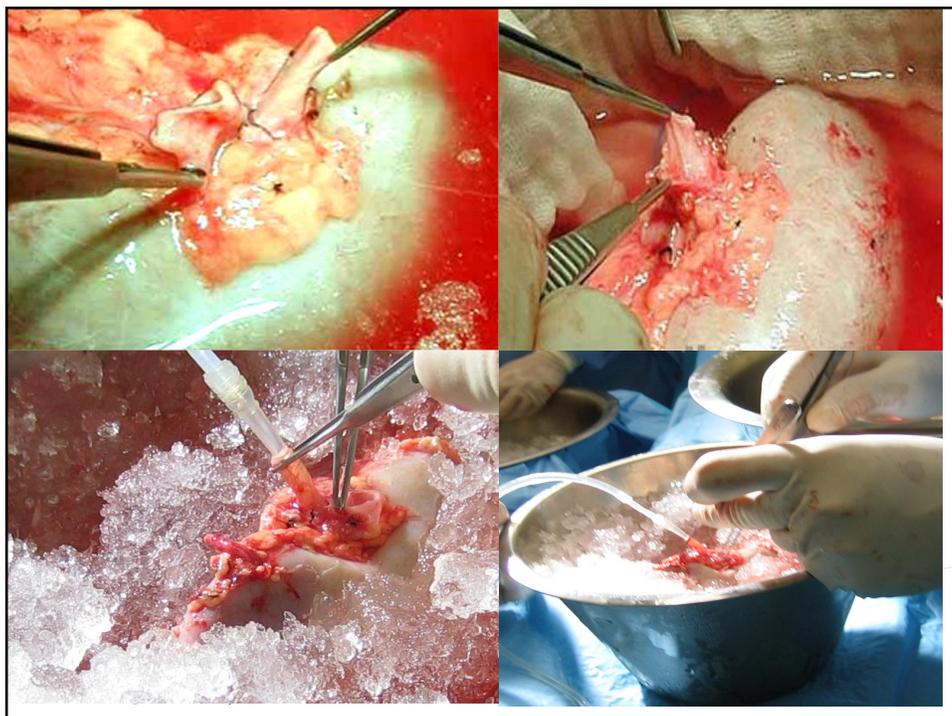
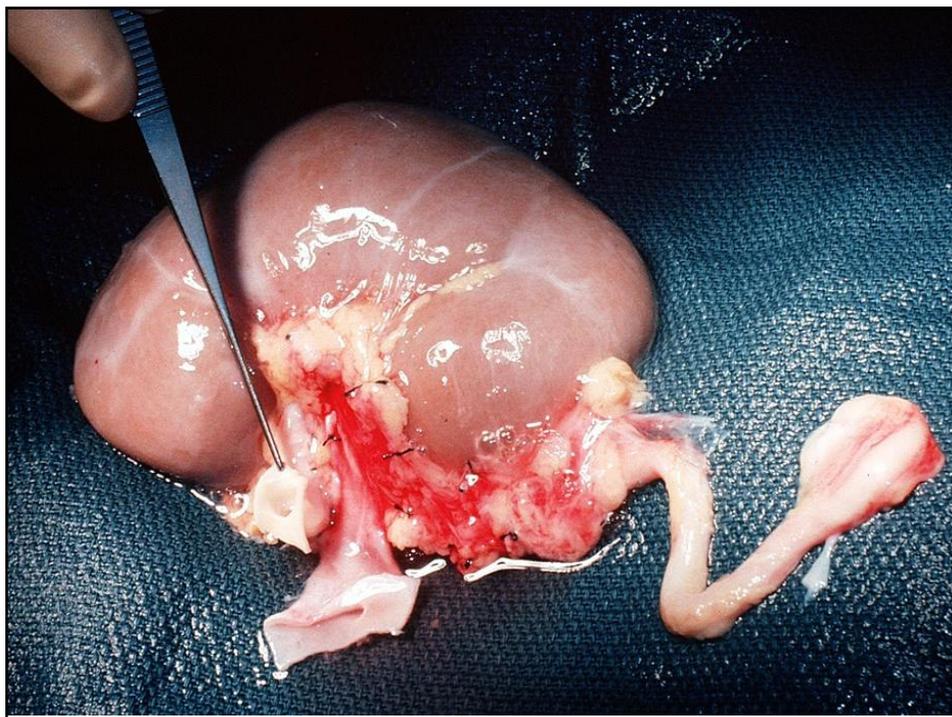
Kidney Transplant Operation

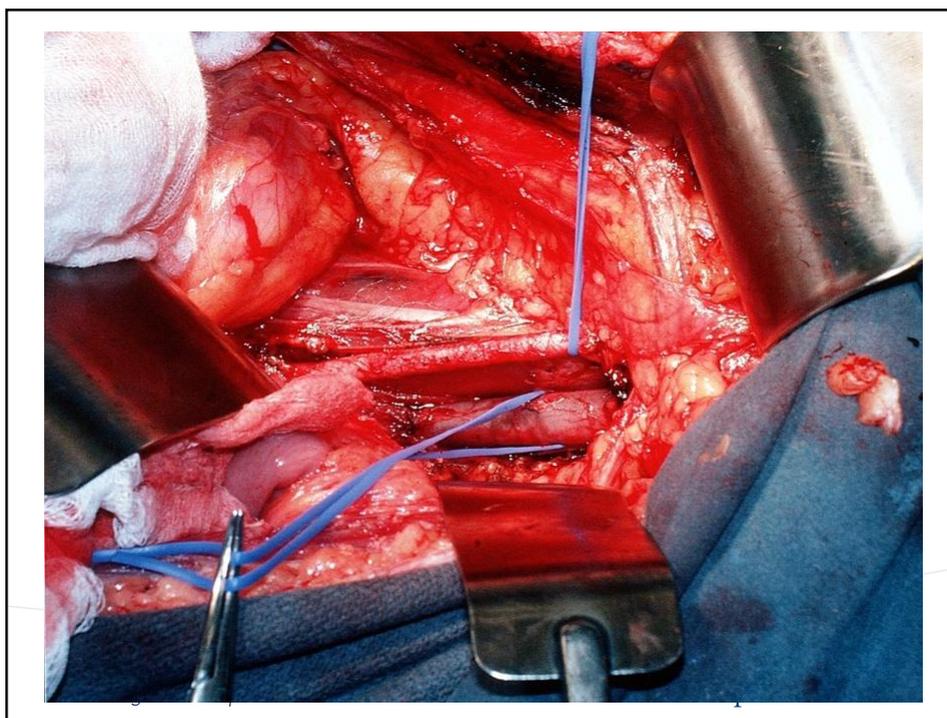


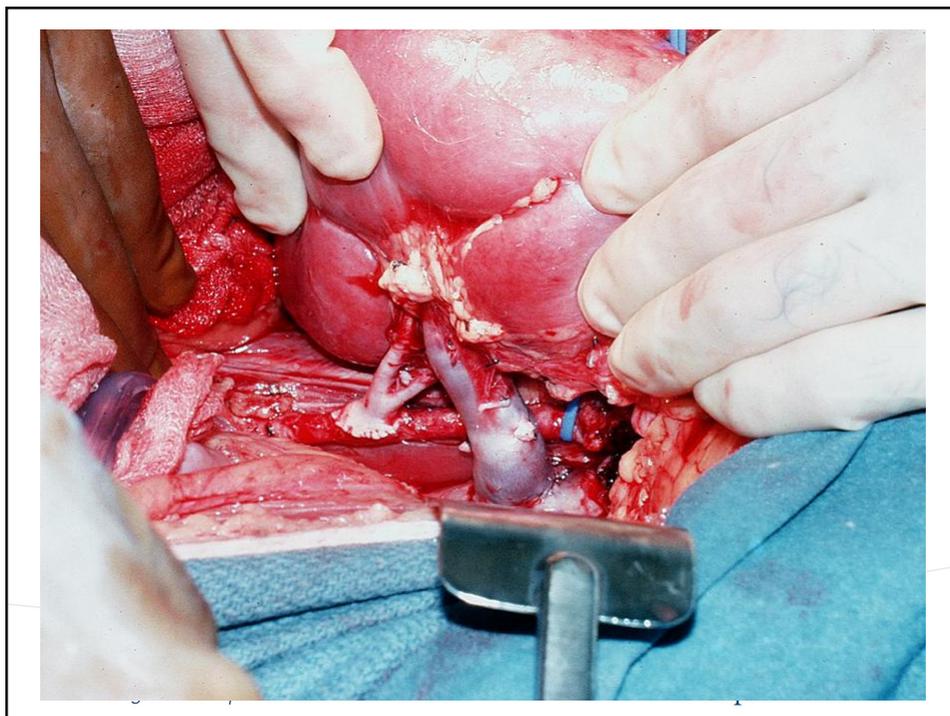
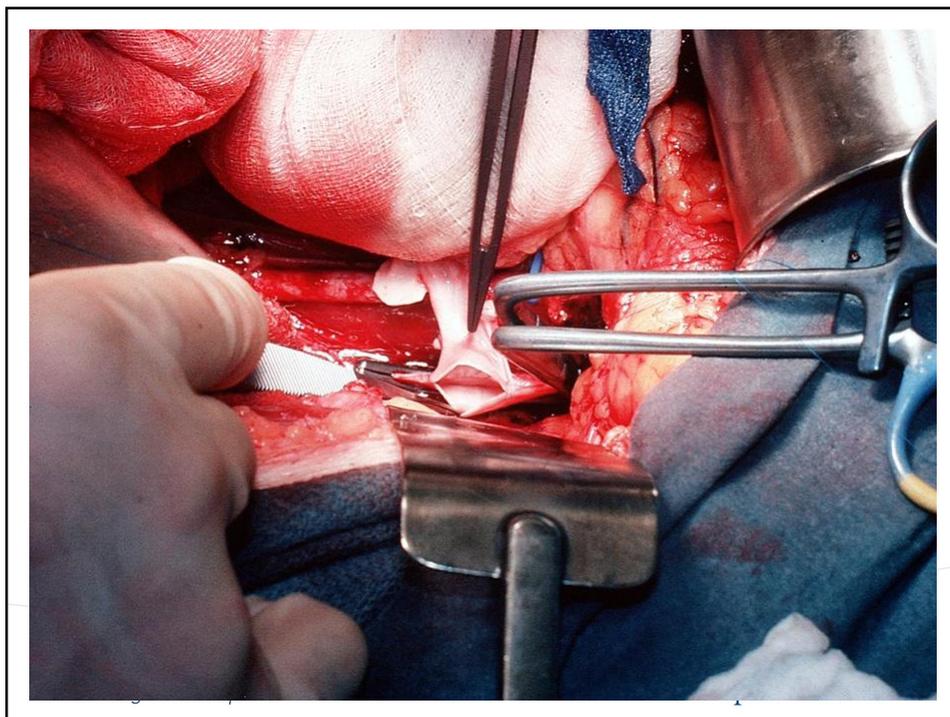
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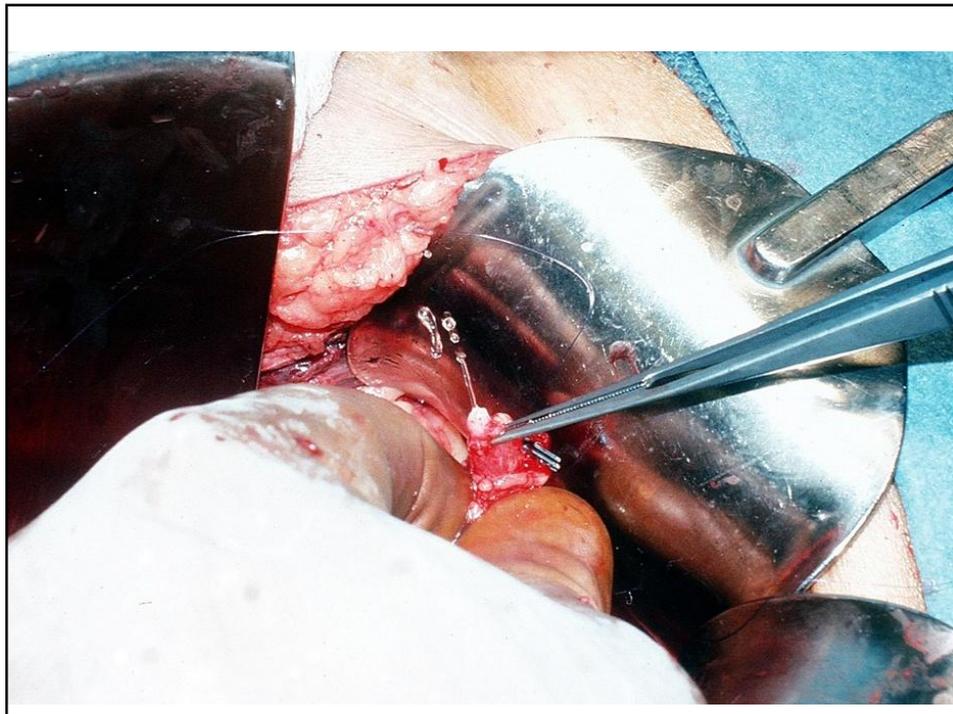
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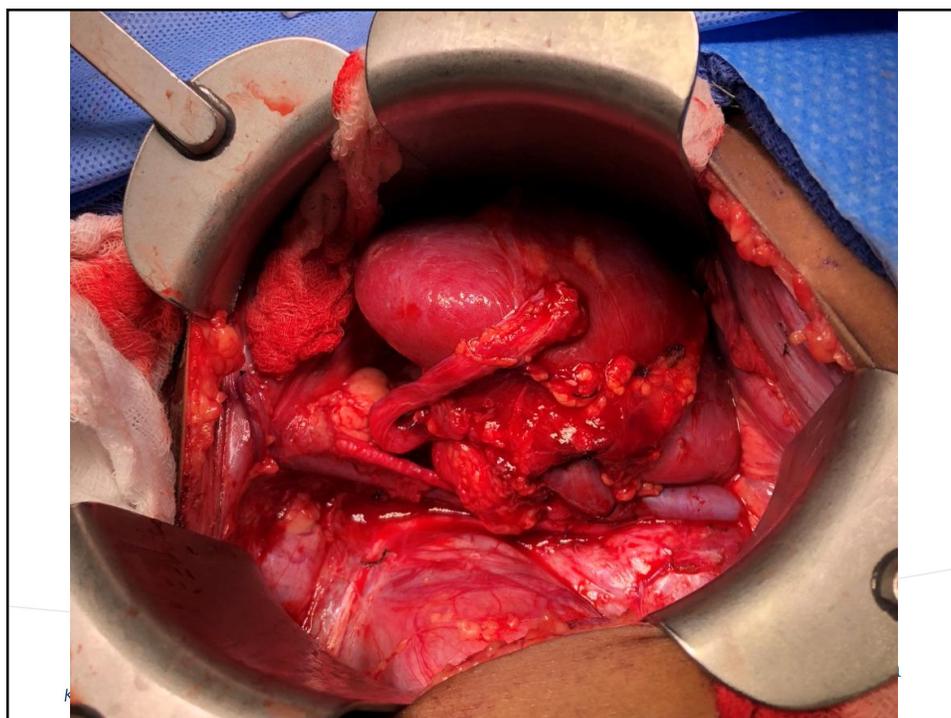
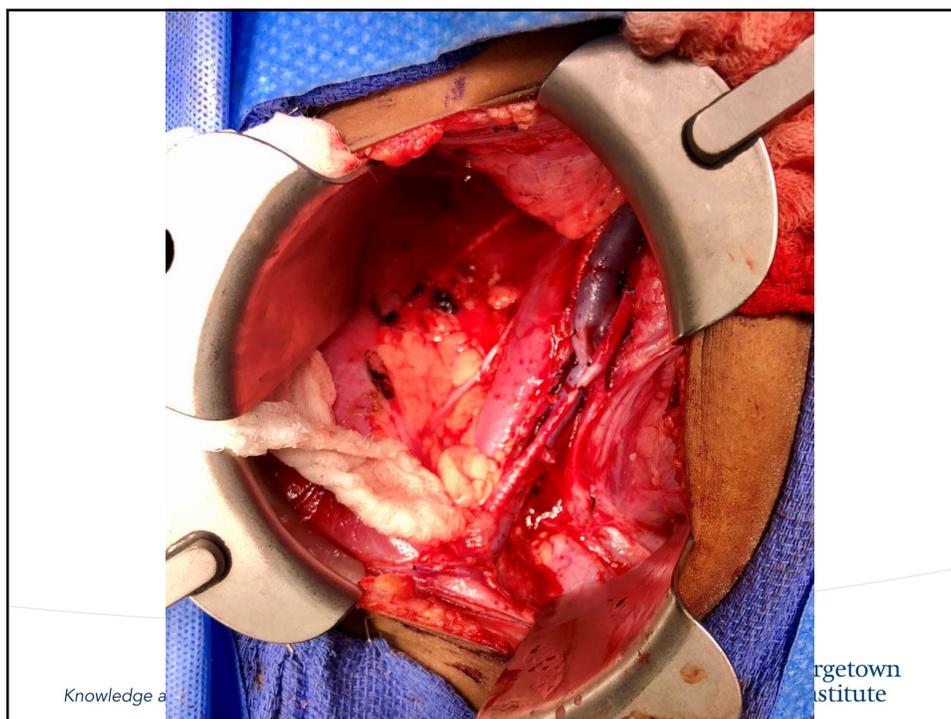












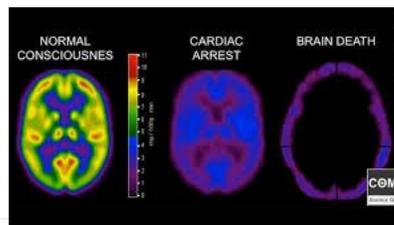


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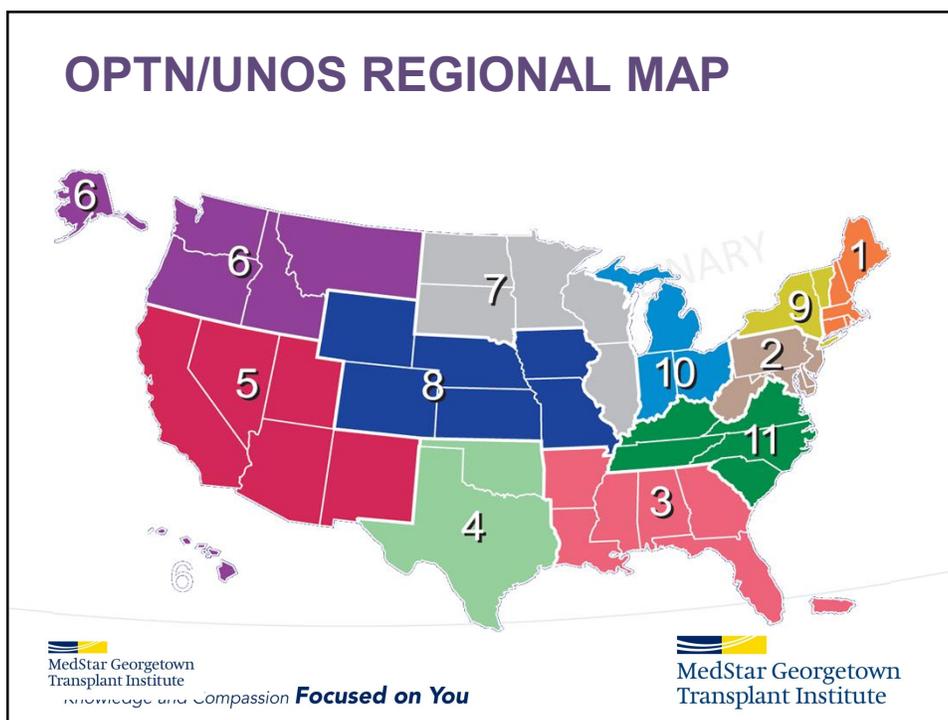
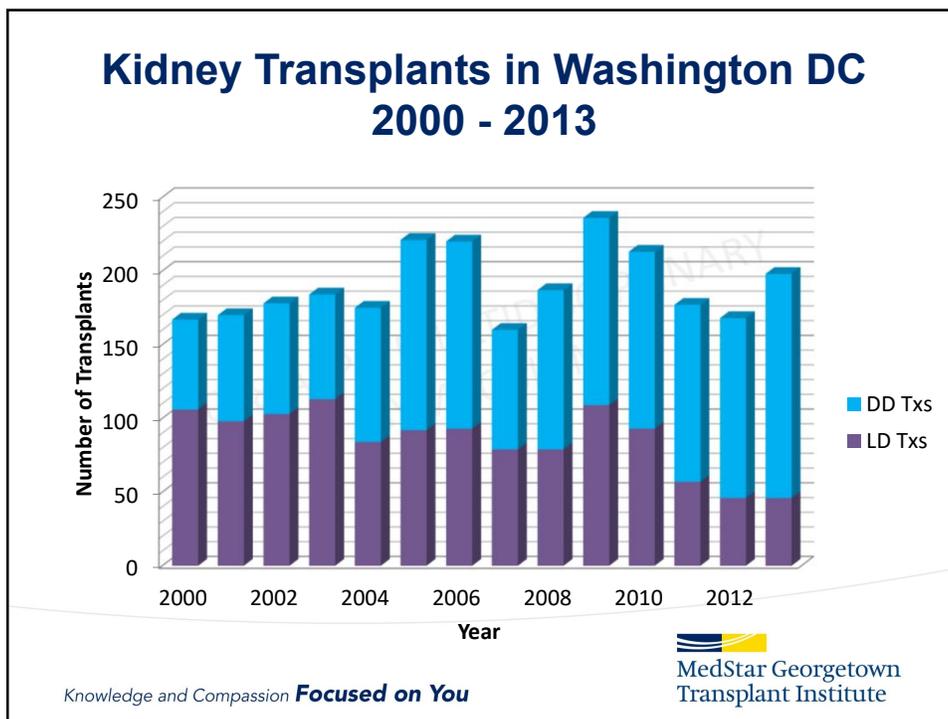
Types of Kidney Donors

- **Living - related donors**
- **Living - unrelated donors**
 - Spouse, friend, non-directed
- **Deceased donors**
 - **KDPI**
 - **Allocation System**
 - **2 Types:**
 - Brain dead donors
 - Donation after cardiac death (DCD)



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Secure Enterprise x DonorNet x

https://portal.unos.org/DonorNet/default.aspx

Jennifer Verbesey - DCCH-TX1

UNet - DONORNET

Donors > Death Notification Registrations > Manage Data > Reports > Test Resources > Notification > Help >

Organ Offers

DCCH-TX1-Children's National Medical Ctr >
Active Notifications - Offers from the last 5 days - Total 0
 There are no new electronic notifications for DCCH-TX1.

Under Evaluation - Offers from the last 5 days - Total 0
 There are no electronic notifications that are under evaluation for DCCH-TX1.

Evaluation Complete - Offers from the last 5 days - Total 1

OPD	Donor ID	Organ	Match ID	Allocation Status	Provisional Acceptance	Refusal	Acceptance	Match Run Date and Time	Initi Date
DCTC	AAJ404	KI	809049	In Progress	2	1	0	10/22/2013 11:30:58 PM	10/22

DCGU-TX1-Georgetown Univ Med Ctr >
Active Notifications - Offers from the last 5 days - Total 0
 There are no new electronic notifications for DCGU-TX1.

Under Evaluation - Offers from the last 5 days - Total 0
 There are no electronic notifications that are under evaluation for DCGU-TX1.

Evaluation Complete - Offers from the last 5 days - Total 53

OPD	Donor ID	Organ	Match ID	Allocation Status	Provisional Acceptance	Refusal	Acceptance	Match Run Date and Time	Initi Date
VATB	AAJR056	LI	809076	In Progress	6	1	0	10/23/2013 3:23:42 AM	10/23
VATB	AAJR056	PA	809078	In Progress	0	1	0	10/23/2013 3:23:42 AM	10/23
PADV	AAJ085	KI	809070	Complete	0	1	0	10/23/2013 3:20:44 AM	10/23

Page 1 of 18 [Show all results](#)

DCWH-TX1-Washington Hospital Center >
Active Notifications - Offers from the last 5 days - Total 0
 There are no new electronic notifications for DCWH-TX1.

Under Evaluation - Offers from the last 5 days - Total 0
 There are no electronic notifications that are under evaluation for DCWH-TX1.

Secure Enterprise x DonorNet x

https://portal.unos.org/DonorNet/DonorContainer.aspx?fp=Y&Don_Id=AAJU481&MatchId=808759&Mode=add&from

DONOR INFORMATION

Name: ***** Height: 5 ft 7 in / 170.18 cm
 Date of birth: 10/08/1976 Weight: 159 lbs / 72.0000 kg
 Age: 37 Years Body Mass Index (BMI): 24.861 kg / m²
 Gender: FEMALE
 Current KDPI: 34%
[Graft Survival Rates by KDPI](#)
 Ethnicity/race: White: White: Not Specified/Unknown

Cause of death: HEAD TRAUMA Admit date: 10/19/2013 02:34
 Mechanism of injury: BLUNT INJURY Pronouncement of death date:
 Circumstance of death: MVA Cross-clamp date:
 Cold Ischemic Time: **[Cross-clamp data not available.]**

Donor meets ECD criteria: NO
 Donor meets DCD criteria: **YES**
 Cardiac arrest/downtime?: NO
 CPR administered?: NO

Donor Highlights:
 1994 FHS Guidelines used to evaluate donor Lipase value on 10/19 at 0233 is a null value

Admission course comments:
 pt un-helmeted passenger on motorcycle struck by another motorcycle;unresponsive on scene;ETT in ED. pt has right posterior open wound with skull fx and large hematoma with extrusion of b neg tox screen; positive ETOH. Broken ribs R1, L9, and L10

MEDICAL & SOCIAL HISTORY

History of diabetes: NO
 History of cancer: NO
 History of hypertension: NO
 History of coronary artery disease (CAD): NO
 Previous gastrointestinal disease: NO
 Chest trauma: YES
 Cigarette use (>20 pack years) ever: NO
 Heavy alcohol use (2+ drinks/daily): NO
 I.V. drug usage: NO

Secure Enterprise | DonorNet

https://portal.unos.org/DonorNet/DonorContainer.aspx?fp=Y&Don_Id=AAJU481&MatchId=808759&Mode=add&fro

VITAL SIGNS - DONOR MANAGEMENT INDICATORS

Begin Date & Time	10/19/2013 03:45	10/20/2013 00:00	10/21/2013 00:00
End Date & Time	10/19/2013 23:00	10/20/2013 23:00	10/21/2013 13:00
Average/Actual BP	120 / 80	145 / 85	140 / 85
Average heart rate (bpm)	80 - 110	85 - 125	105 - 113
High BP	160 / 78	171 / 78	160 / 72
Duration at high (minutes)	15	60	60
Low BP	110 / 60	133 / 65	139 / 60
Duration at low (minutes)	30	60	60
Core Body Temp.	97.0 - 100.8 °F	37.5 - 39.1 °F	37.9 - 39.1 °F
Urine output (cc/hour)	221	140	230
CVP (mm/Hg)			
PA Pressure (Sys./Diastolic)			
PCWP (mm/Hg)			
PAMP (mm/Hg)			
CO/CI (L/min / L/min/m2)			

Vital Signs comments:

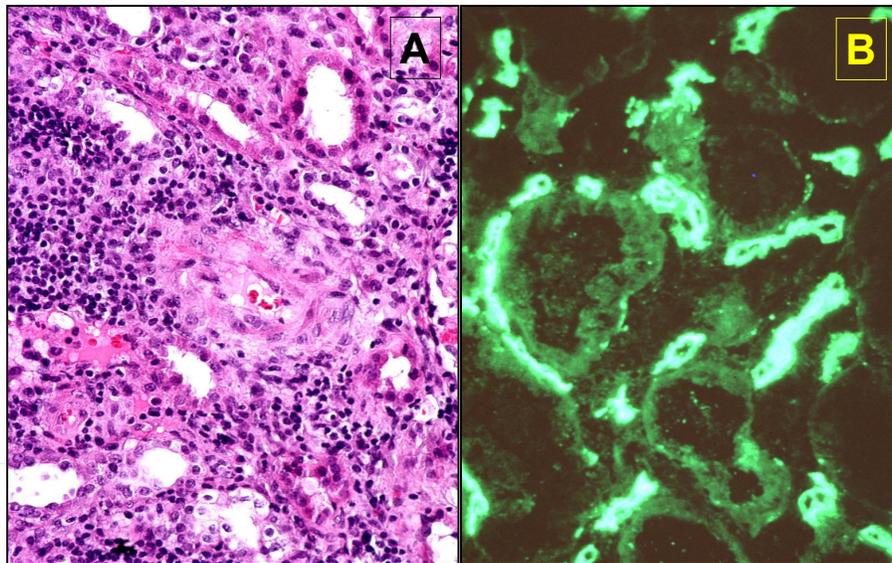
COMPLETE BLOOD COUNT (CBC)

Date	10/19/2013	10/19/2013	10/19/2013	10/19/2013	10/20/2013	10/21/2013
Time	02:33	04:47	08:50	11:42	04:27	02:05
WBC (thous/mcL)	16.1	29.7	22.3	22.7	17.4	18.6
RBC (mill/mcL)	2.96	4.28	3.83	3.7	2.96	2.51
Hgb (g/dL)	8.9	12.8	11.4	11	8.8	7
Hct (%)	26.8	38	33.9	31.9	25.2	20.8
Plt (thous/mcL)	162	136	104	90	73	75
Bands (%)						

LAB PANEL

Date	10/19/2013	10/19/2013	10/19/2013	10/19/2013	10/20/2013	10/21/2013
Time	02:33	04:47	08:50	11:42	04:27	07:30
Na (mEq/L)	140	137	143	143	139	150
K+ (mmol/L)	3.5	3	4	5.1	3.5	3.5

Kidney Biopsy



Pulsatile Perfusion Pump



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Living Kidney Donation

“Works Faster, Lasts Longer”

- First successful human living donor transplant was done in 1954 by Dr. Joseph E. Murray
- The recipient (left) Richard Herrick received a kidney from his twin brother Ronald Herrick
- Richard Herrick survived for 8 years following the transplant



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Advantages of Living Donor Transplantation



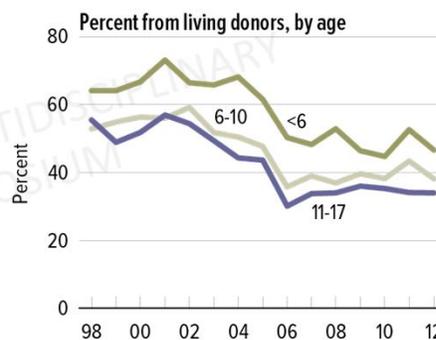
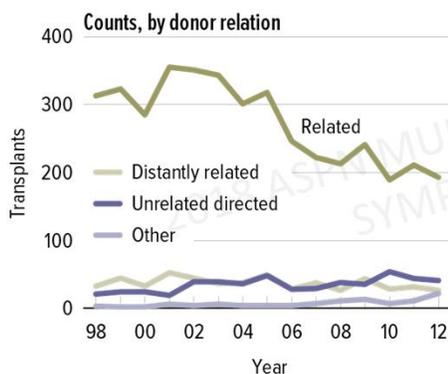
- Start working faster, last longer
- Recipient will spend less time on the waiting list
- Recipient can be transplanted pre-dialysis
- Scheduled surgery at both donor and recipient's convenience
- Can organize swaps or exchanges

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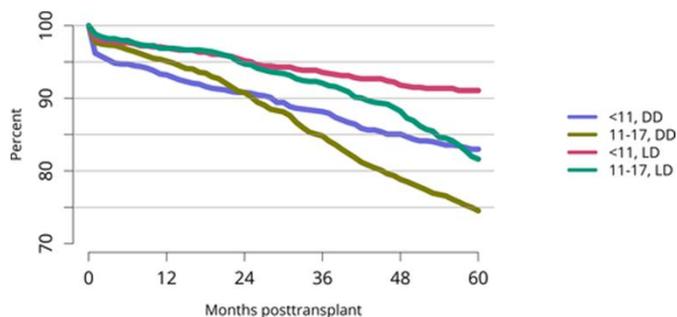
Pediatric kidney transplants from living donors



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Graft Survival in Pediatric Recipients



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Living Donors at MGTI



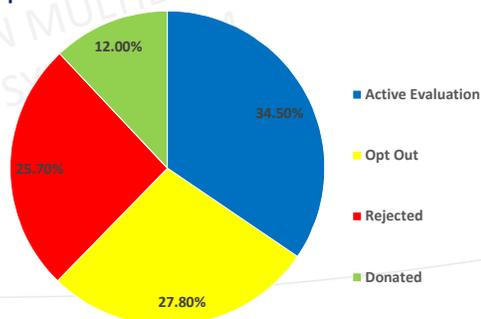
- Living Donor Questionnaire – medical and surgical history, family history, relationship and motivation, consents
- Laboratory Tests, Blood Typing, HLA Testing
- Clinic Evaluation – surgeon, nephrologist, social worker, coordinator, **independent donor advocate** (Out of state & International donors)
- CXR, KUB, MRI, EKG, Echo
- Completion of evaluation is donor driven: usually 2-3 months

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Rigorous Evaluation

- Of the 417 potential donors over last 2 years:
 - 144 (34.5%) are in the middle of active evaluation
 - 116 (27.8%) chose to opt out of the donation process
 - 107 (25.7%) were rejected
 - 50 (12.0%) completed donation



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- Evaluation, surgery, and hospitalizations paid for by the recipient's insurance. However, we encourage all donors to have their own medical insurance.
- Follow-up at 1 week, 6 months, 1 year, and 2 years postop



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Donor Myths

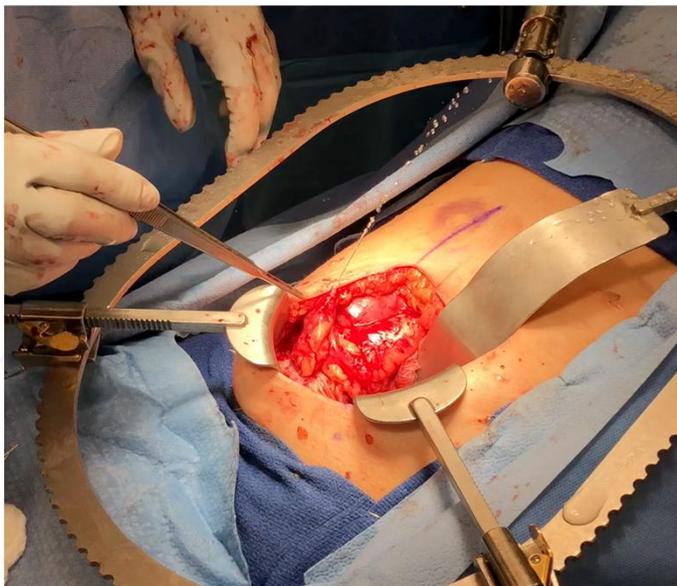
After I donate . . .

- Do I have to take medication?
- Will I have to change my diet?
- Can I drink alcohol?
- Can I play contact sports?
- Can I have a healthy pregnancy?
- Will my blood pressure be ok?



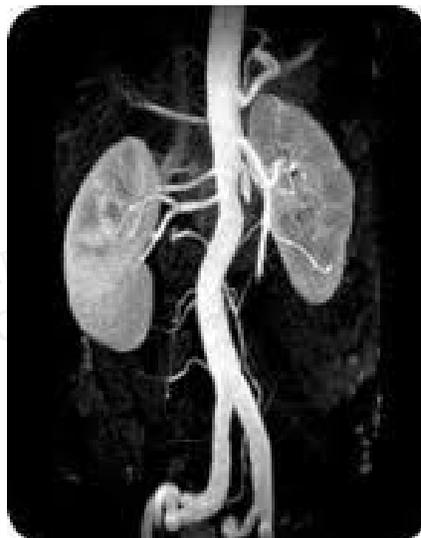
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No age limit to living donors



Left nephrectomy is most common.

MRI helps determine number of arteries and veins and any other aberrant anatomy.



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Straight lap –
Pfannenstiel incision

Hand Assisted Lap -
midline incision



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Possible Risks to Donors

- Early
 - DVT/PE
 - Wound or urine infections
 - Nausea/Vomiting
 - Injury to other organs
 - SBO
- Late
 - Higher Blood Pressure
 - Proteinuria
 - ESRD
- Death 3/10,000



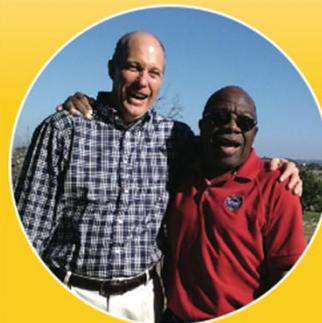
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Long-term Effects on Donors

- Past studies
 - Risk of ESRD:
 - 180/1,000,000 in donors vs
268/1,000,000 in general
population

Clyde Horton (right) is one of the many who has benefited from a living kidney donor. Clyde received a kidney from his longtime friend, Joe Wolken. Today, Clyde feels better than he has in 20 years.



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2 Recent High Profile Articles



Official Journal of the International Society of Nephrology

<http://www.kidney-international.org>

© 2013 International Society of Nephrology

see commentary on page 20

Long-term risks for kidney donors

Geir Mjøen¹, Stein Hallan^{2,3}, Anders Hartmann¹, Aksel Foss¹, Karsten Midtvedt¹, Ole Øyen¹, Anna Reisaeter¹, Per Pfeffer¹, Trond Jenssen¹, Torbjørn Leivestad⁴, Pål-Dag Line¹, Magnus Øvrehus², Dag Olav Dale¹, Hege Pihlstrøm¹, Ingar Holme⁵, Friedo W. Dekker⁶ and Halvard Holdaas¹

¹Department of Transplant Medicine, Oslo University Hospital, Oslo, Norway; ²Department of Nephrology, St Olav University Hospital, Trondheim, Norway; ³Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway; ⁴Norwegian Renal Registry, Department of Transplant Medicine, Oslo University Hospital, Oslo, Norway; ⁵Department of Preventive Medicine, Oslo University Hospital, Oslo, Norway and ⁶Department of Clinical Epidemiology, Leiden University Medical Center, Leiden, The Netherlands



The Journal of the American Medical Association

Original Investigation

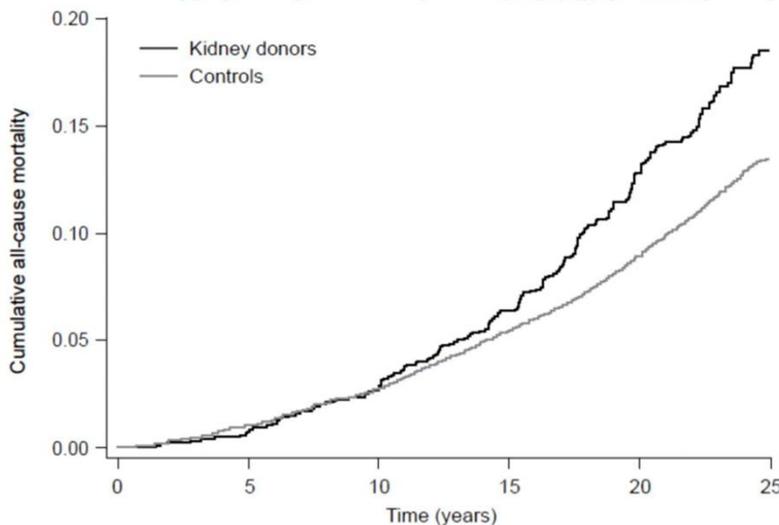
Risk of End-Stage Renal Disease Following Live Kidney Donation

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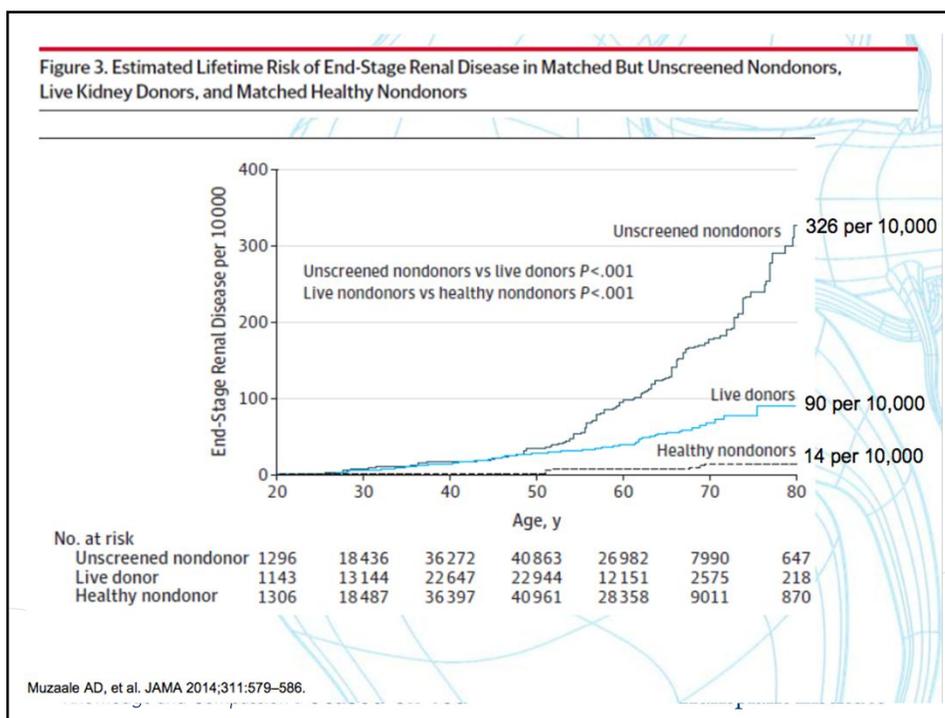
Abimereki D. Muzale, MD, MPH; Allan B. Massie, PhD; Mei Cheng Wang, PhD; Robert A. Montgomery, MD, DPhil; Maureen A. McBride, PhD; Jennifer L. Wainright, PhD; Dorry L. Segev, MD, PhD

Knowledge and Com

All-cause mortality



Mjøen G, et al. Kidney Int 2013 DOI: 10.1038/ki.2013.460.



Conclusions

- “Our findings will not change our opinion in promoting live-kidney donation. However, potential donors should be informed of increased risks, although small, associated with donation in short-term and long-term perspective.”
- “Compared with a matched cohort of healthy non-donors, kidney donors had an increased risk of ESRD; however, the magnitude of the absolute risk was small. These findings may help inform discussions with persons considering live kidney donation.

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What are the implications of these new observations?

a. Informed consent

Should the data be presented to living donor candidates as:

i. Relative risk?

A donor has 8–10 times ↑ risk of developing ESRD?

OR

ii. Absolute risk?¹

There is increased lifetime risk of ESRD in donors

Mjøen G, et al:² 5/1,000

Muzaale AD, et al:³ 9/1,000 (varies by subgroup)

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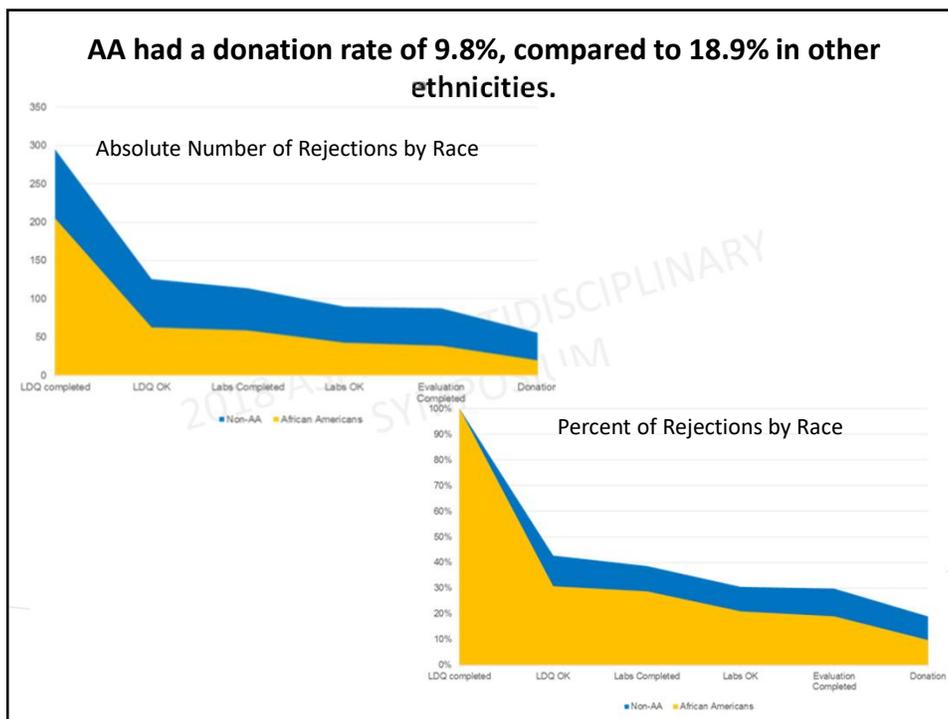
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How does this affect us?

- Notion that donors must accept some risk is not new.
- Advance and refine our understanding of medical risk for donors
- Payers and regulators must understand that this is a work in progress
- Appropriate informed consent – amplifies our ability to educate donors

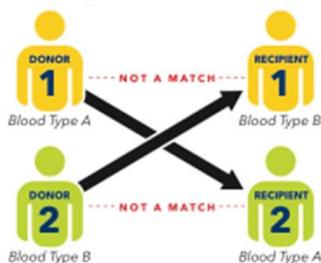
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Types of Living Donor Transplants

- Direct – ABO- or HLA-Compatible Transplants
- ABO- or HLA- incompatible Transplants
- Positive X-match/Highly Sensitized transplant with desensitization
- Paired Kidney Exchange Compatible Pairs



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ABO- or HLA-Incompatible Transplants

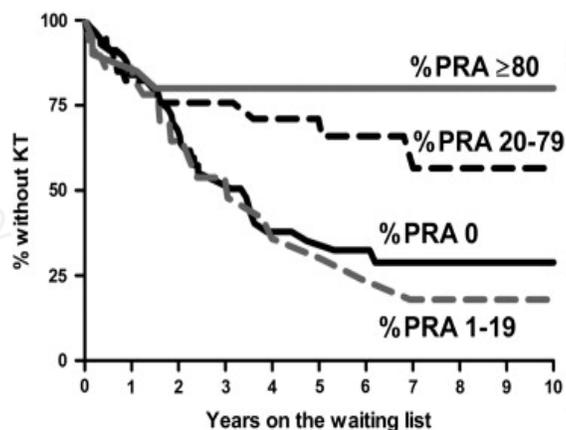
- Check ABO titers
- HLA testing – patients with high PRA and/or DSA present with low MFIs
- Can desensitize patients (Plasmapheresis and IVIG) if low titers
- Transplants possible in pairs that have been refused in the past

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Higher PRA decreases the possibilities of kidney transplantation



Bostock et al.
Transplant
Immunology

Kaplan Meier curve depicting the percentage of patients without a KT among the different % PRA groups adjusted for time on the waiting list (years).

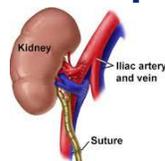
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Sensitization in Kidney Transplantation

Previous Kidney Transplant

Pregnancy



Blood Transfusion



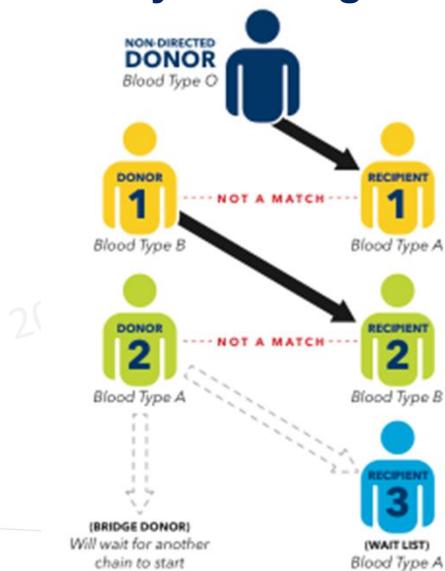
- The time interval of the latest transfusion remains the most significant risk factor.

Hung et al. Human Immunology 2014

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Paired Kidney Exchange



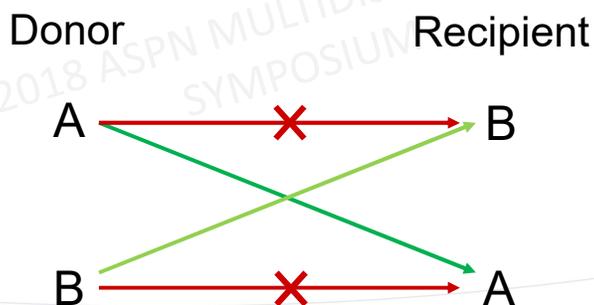
- Can combine exchange with desensitization
- MGTI participates in regional and national exchange programs (NKR, UNOS)

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Paired Kidney Exchange

Conventional- only ABOi pairs A/B or B/A
 (< 3% of donor/recipient pairs eligible)

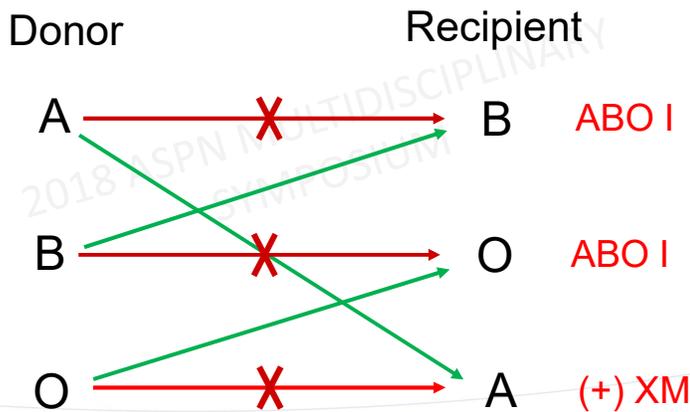


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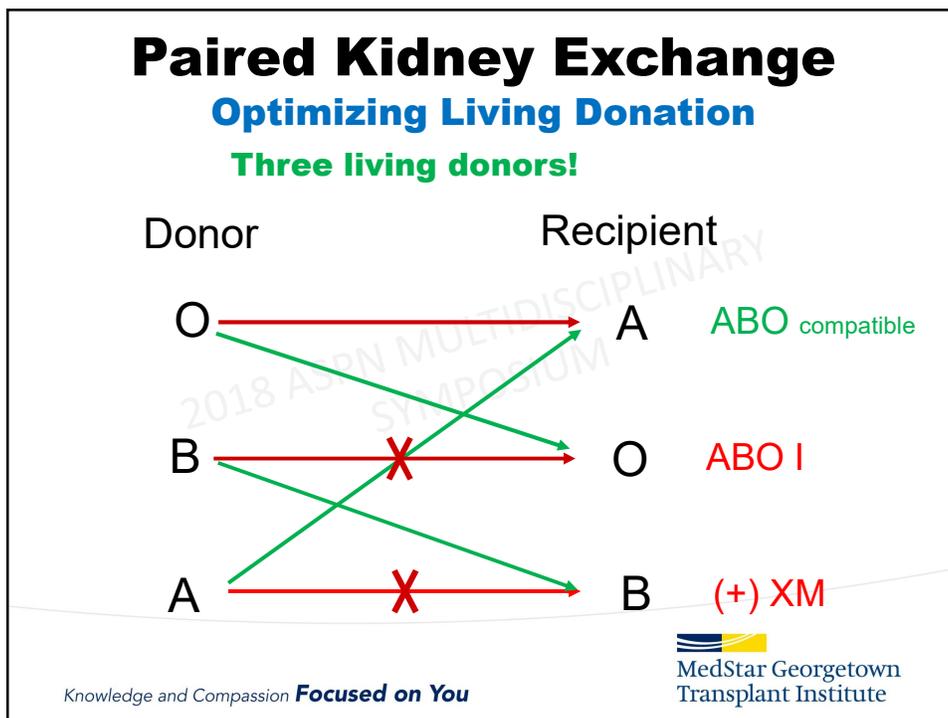
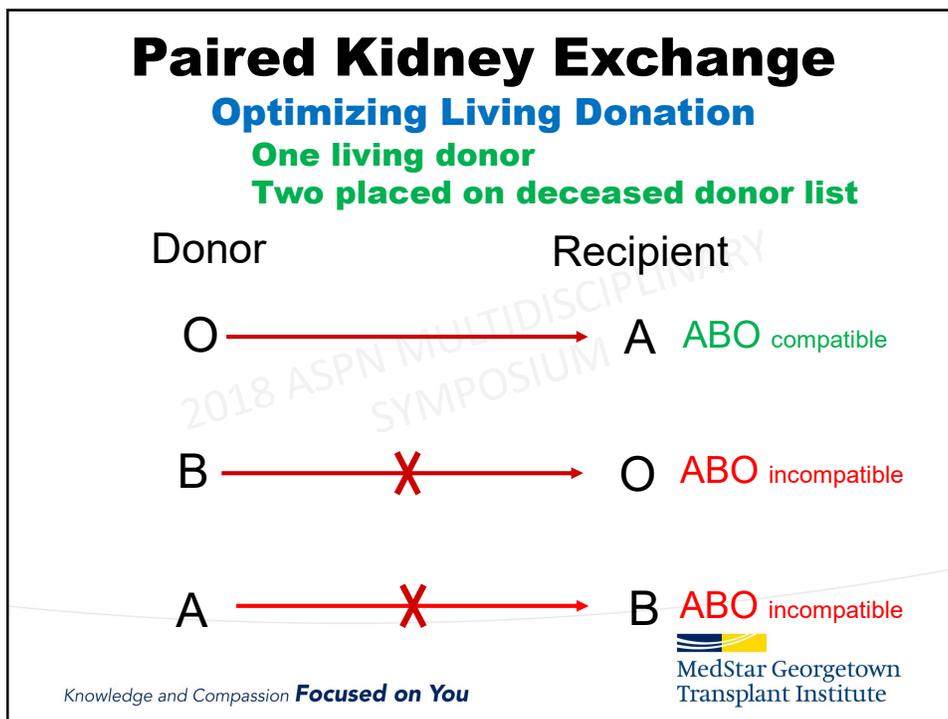
Paired Kidney Exchange

Unconventional
 (all ABOi and + XM donor/recipient pairs eligible)



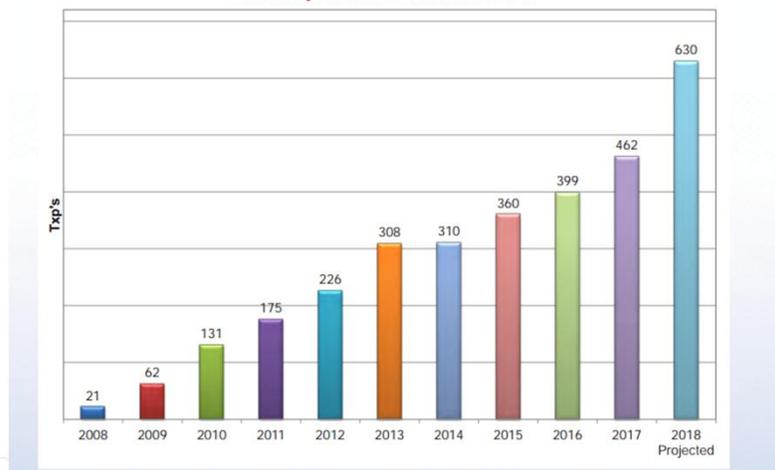
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National Kidney Registry (NKR)

Transplants Facilitated



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National Kidney Registry (NKR)

- Compatible Pairs
- Advanced Donation Program
- Donor Protection Program/Donor Shield
- DASH
- Donor Care Network
- Remote Donation



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Ethical Issues in Living Donation

- Perfectly healthy AA 24 year old with extensive family history of HTN and DM
- High risk recipient
- HLA testing shows donor is not actually father of recipient
- Son with low IQ would like to donate to his mother, shows very little understanding of process or risks
- Non-directed donor – unemployed because he wants to be able to donate

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April 5, 2013

Dear Jenn,

It's my two-month anniversary! So exciting to live again!

My mom and I always gush about you to anyone who will listen. None of it is exaggerated, though. I don't have words for how grateful I am to you for everything you've done for me and for my mom, so I'll keep it simple...thank you, thank you, thank you.

New York, NY

Besides, I probably don't even know what you're doing...

Not only do I not mind being saved from cancer, I don't mind having the honor of being a small part of my daughter's recovery, nor mind my daughter's new chance to not just live, but to live a real life again.

You are an unremovable part of my heart, Jack's heart, and, most importantly, Lia's heart.

Thank you beyond words,

John & Mary

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