The Future of Living Donor Transplantation

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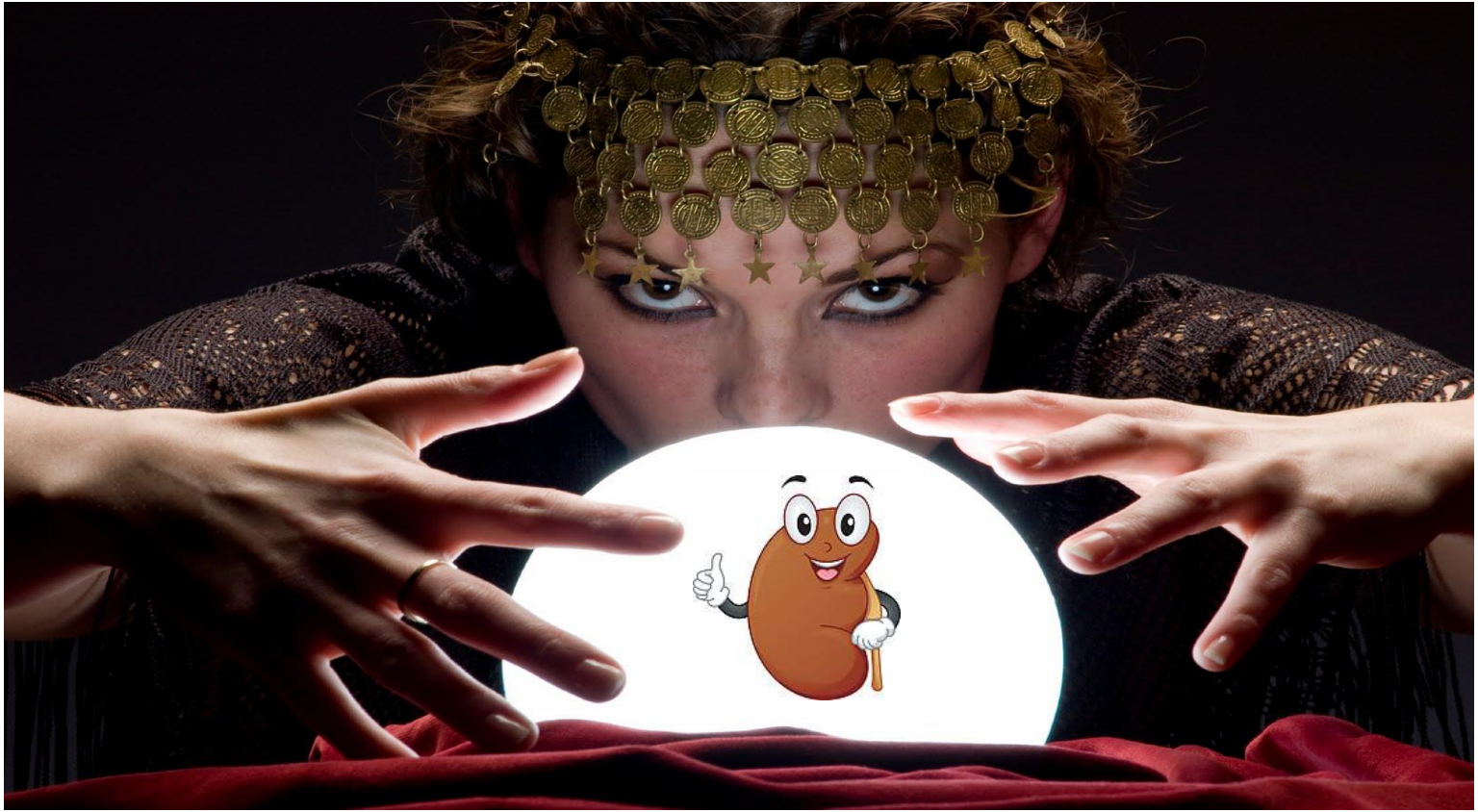
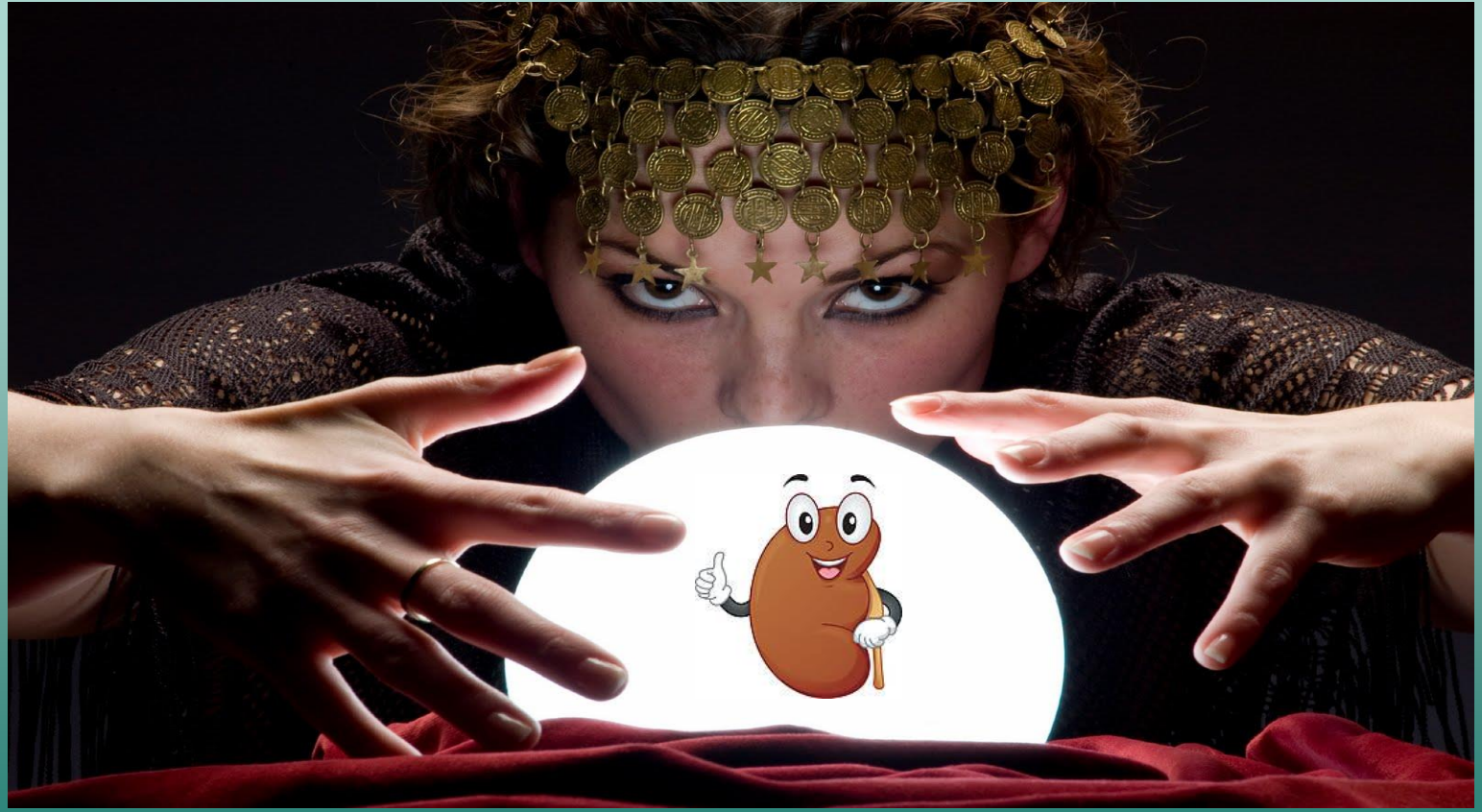
Chief of Transplantation
Director, Solid Organ Transplant Line
Professor of Surgery
Medical College of Wisconsin
Past President, OPTN/UNOS
President, AFDT

Disclosures

- Surgical Director and Medical Advisor – National Kidney Registry



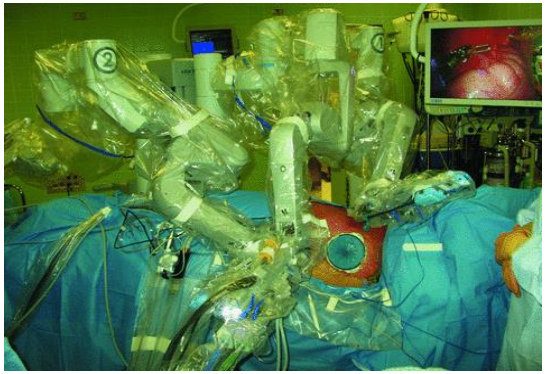


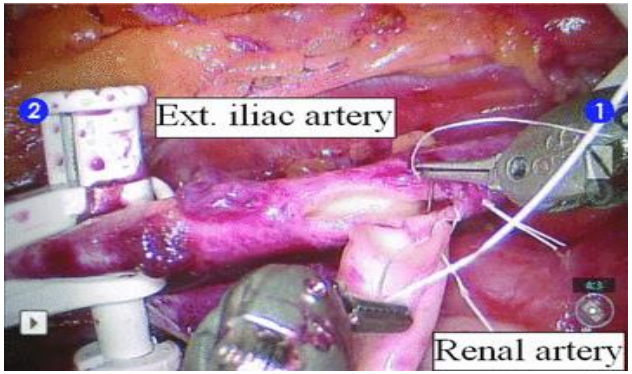
Disclaimer!!

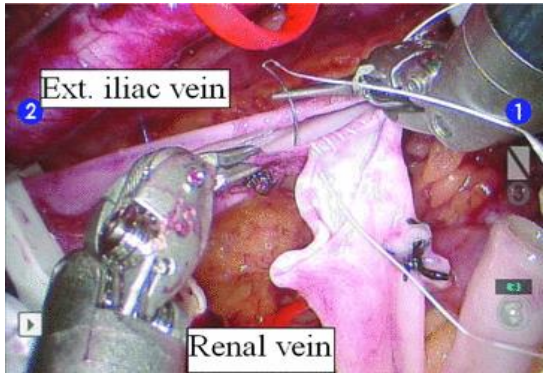
Robotics – Donors and Recipients

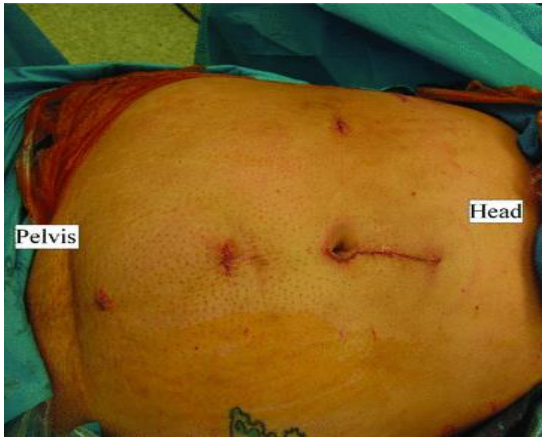
Robotic Trans-abdominal Kidney Transplantation

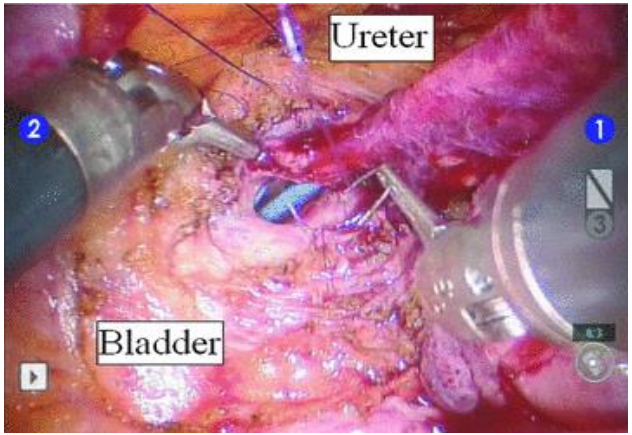
Robotic Trans-abdominal Kidney Transplantation











Giulianotti et al: AJT 2010, 10(6):1478-1482

Robotic Trans-abdominal Kidney Transplantation

Robotic Assisted Living Donor Nephrectomies

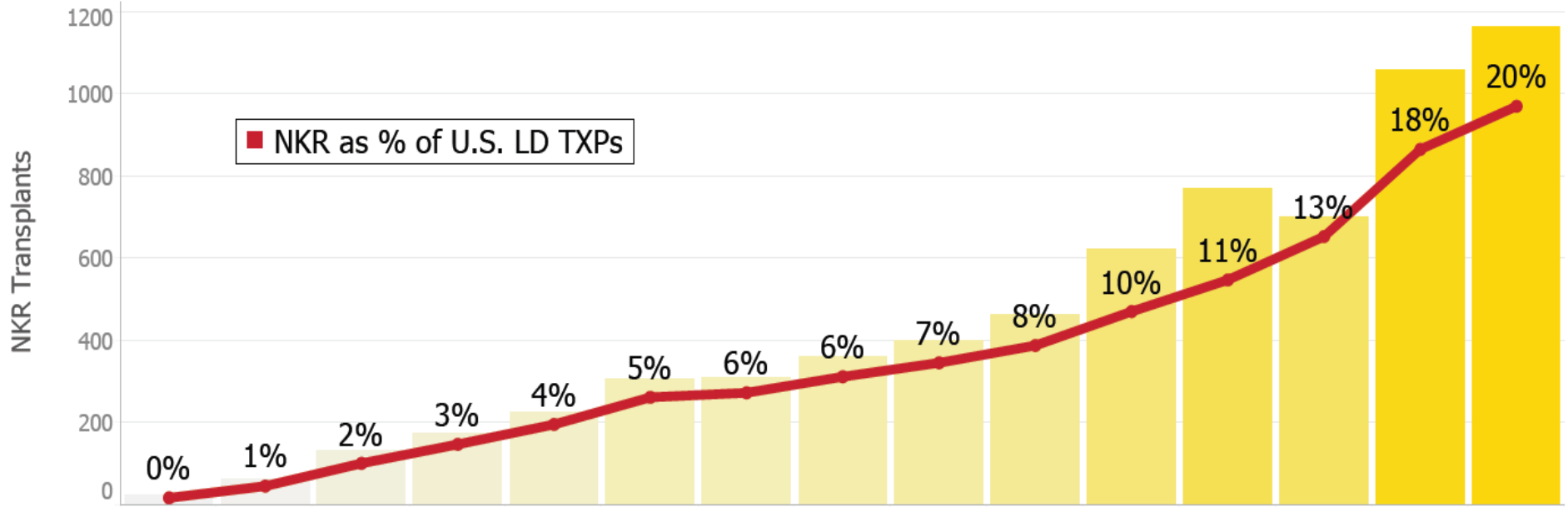
A Safe Alternative to Laparoscopic Technique for Kidney Transplant Donation

Spaggiari, Mario MD*; Garcia-Roca, Raquel MD†; Tulla, Kiara A. MD*; Okoye, Obi T. MD*; Di Bella, Caterina MD*; Oberholzer, José MD‡; Jeon, Hoonbae MD§; Tzvetanov, Ivo G MD*; Benedetti, Enrico MD*

ANNALS OF SURGERY

Giulianotti et al: AJT 2010, 10(6):1478-1482

Mandatory Paired Kidney Exchange Options



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NKR Facilitated TXPs*	22	61	131	175	226	308	310	360	399	462	621	770	700	1,058	1,164
U.S. LD TXPs**	5,968	6,387	6,278	5,773	5,619	5,733	5,538	5,628	5,629	5,811	6,442	6,867	5,234	5,974	5,863

The NKR Voucher Program

Potential donors could be incompatible with their intended recipient based on:

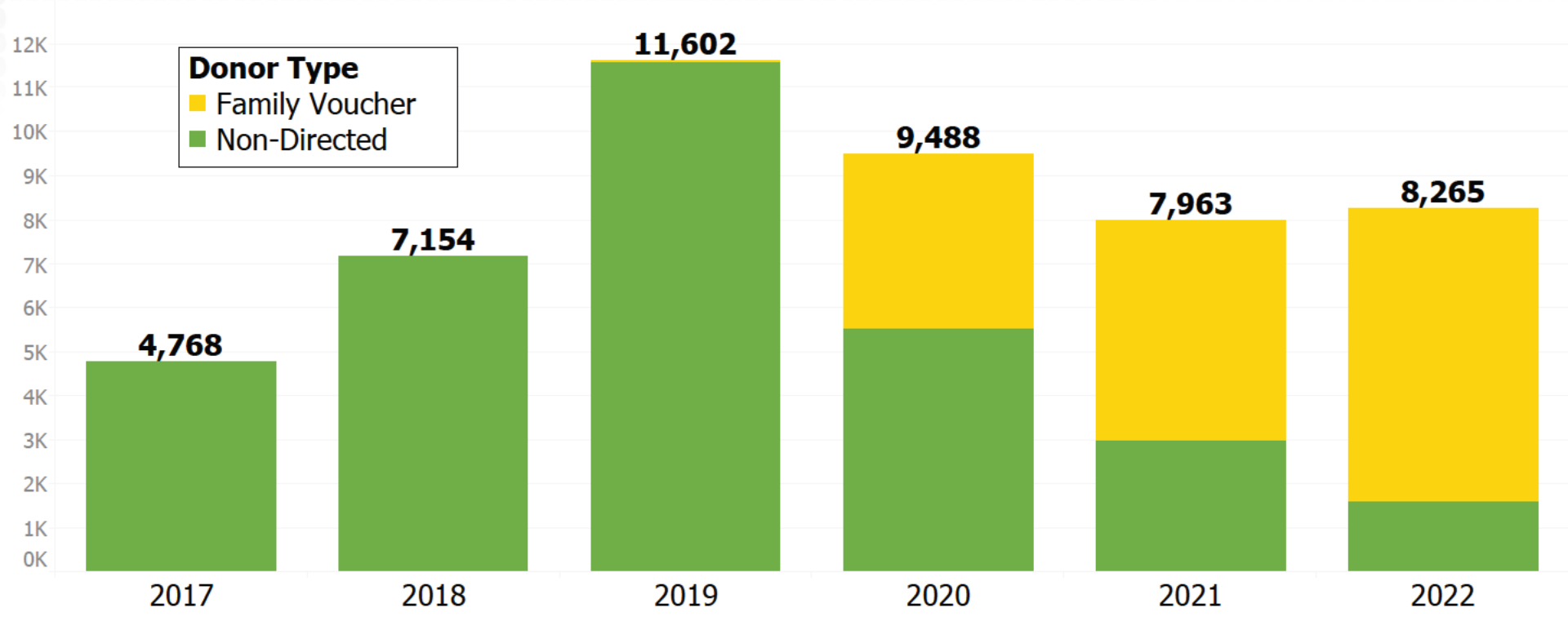
- Blood Type
- DSA
- Anatomy
- Time


Quinn Gerlach, left, plays with his grandfather, Howard Broadman.
(Photo: Ronald Reagan UCLA Medical Center)

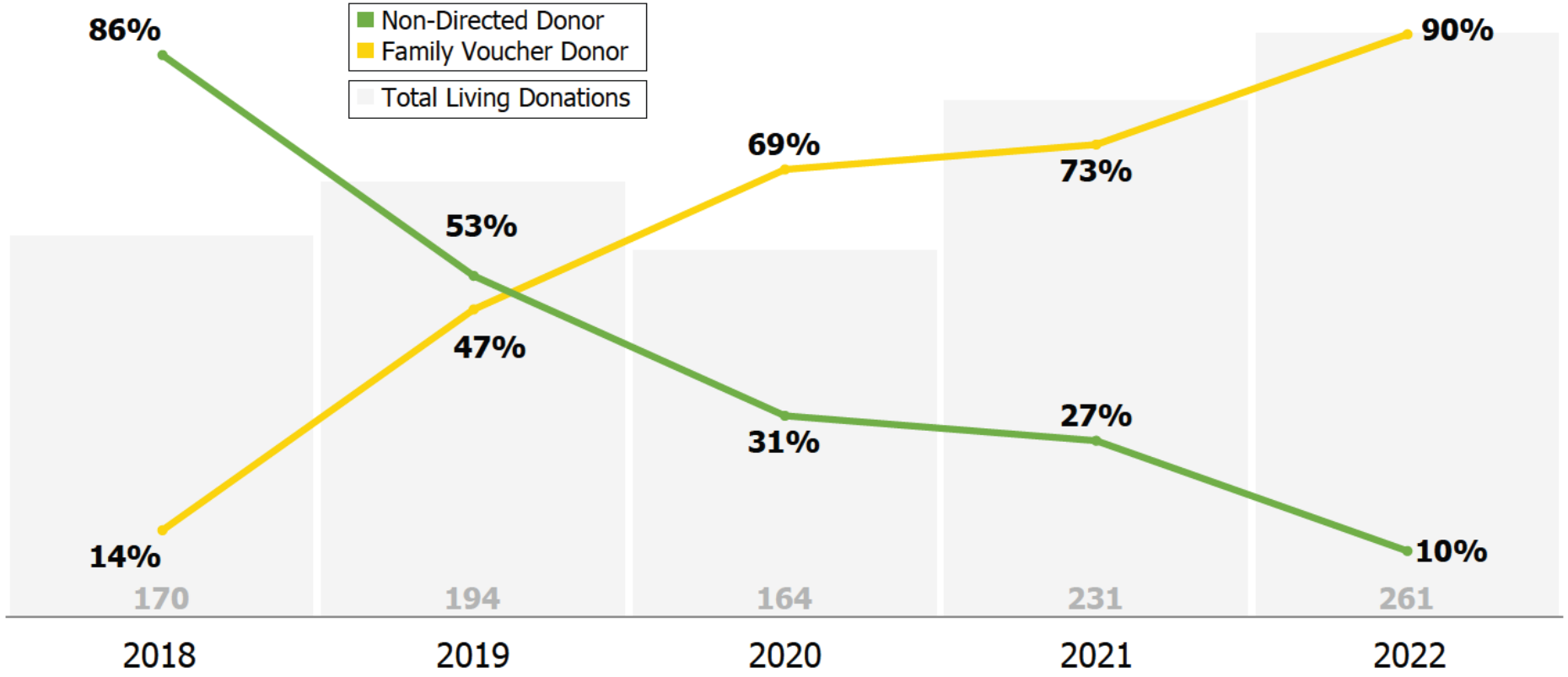
First 'voucher donor' Judge Broadman and first 'voucher holder' his grandson Quinn (UCLA 2014)

Family Voucher allows identification of up to 5 immediate family members to hold vouchers if EVER needing kidney!

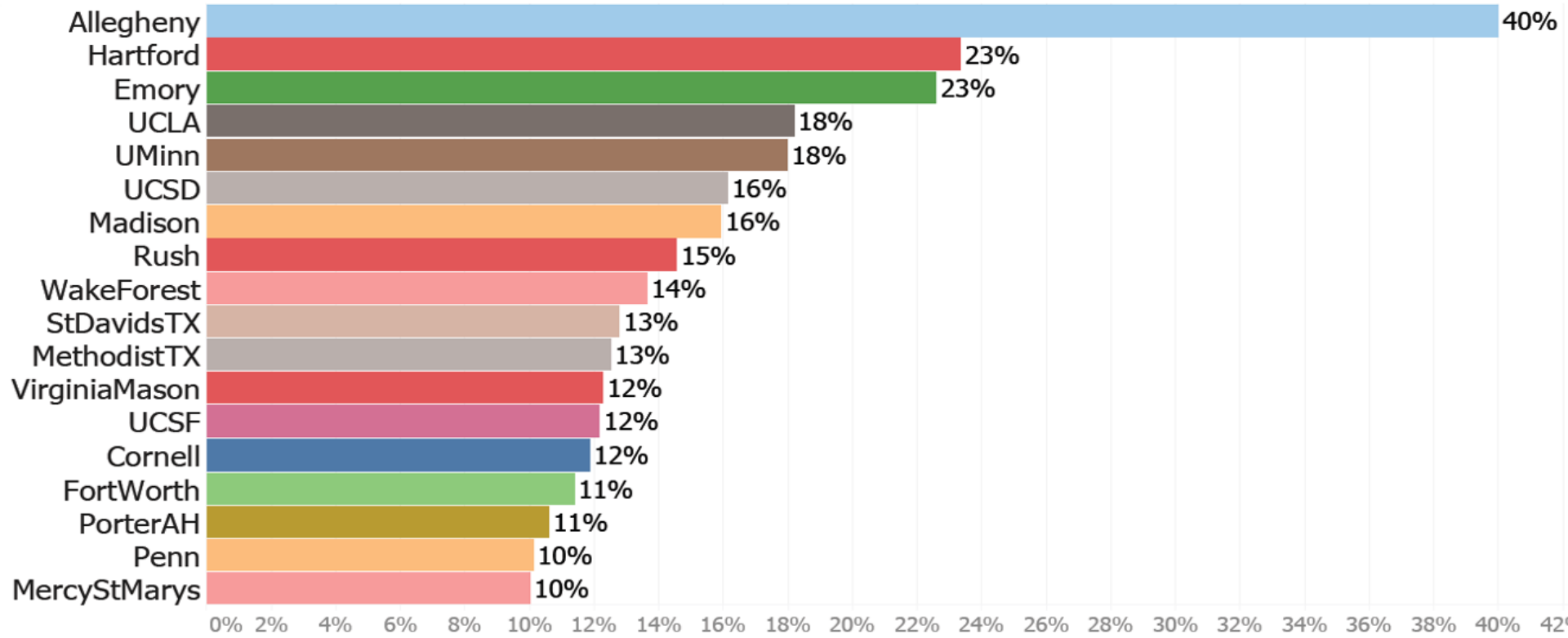
Non–Directed Donors as a National Resource



Transition to Family Voucher Donation



LD Conversion Rates Becomes a Metric



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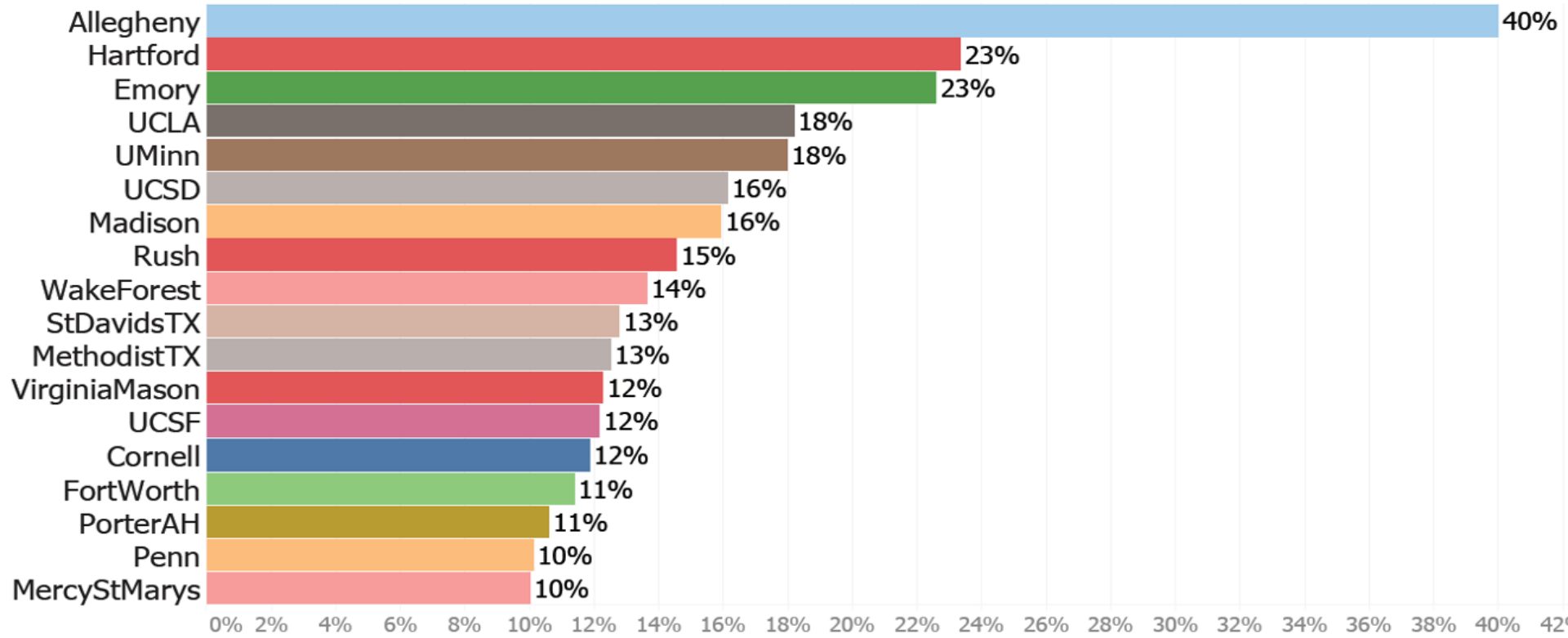
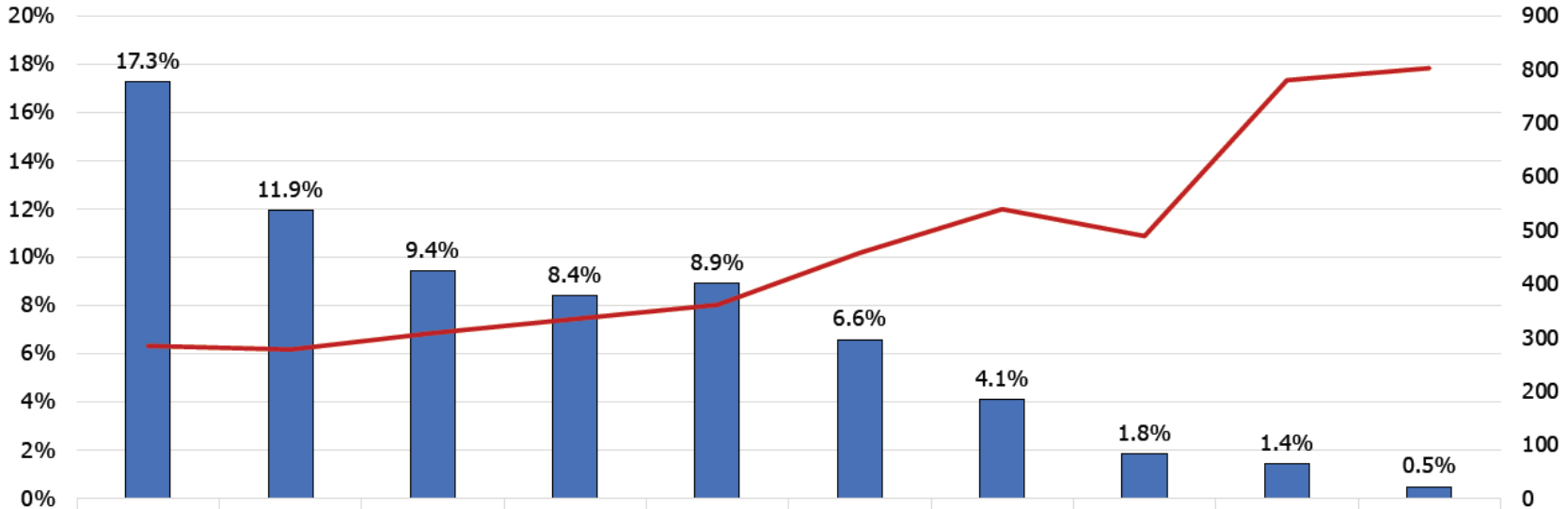
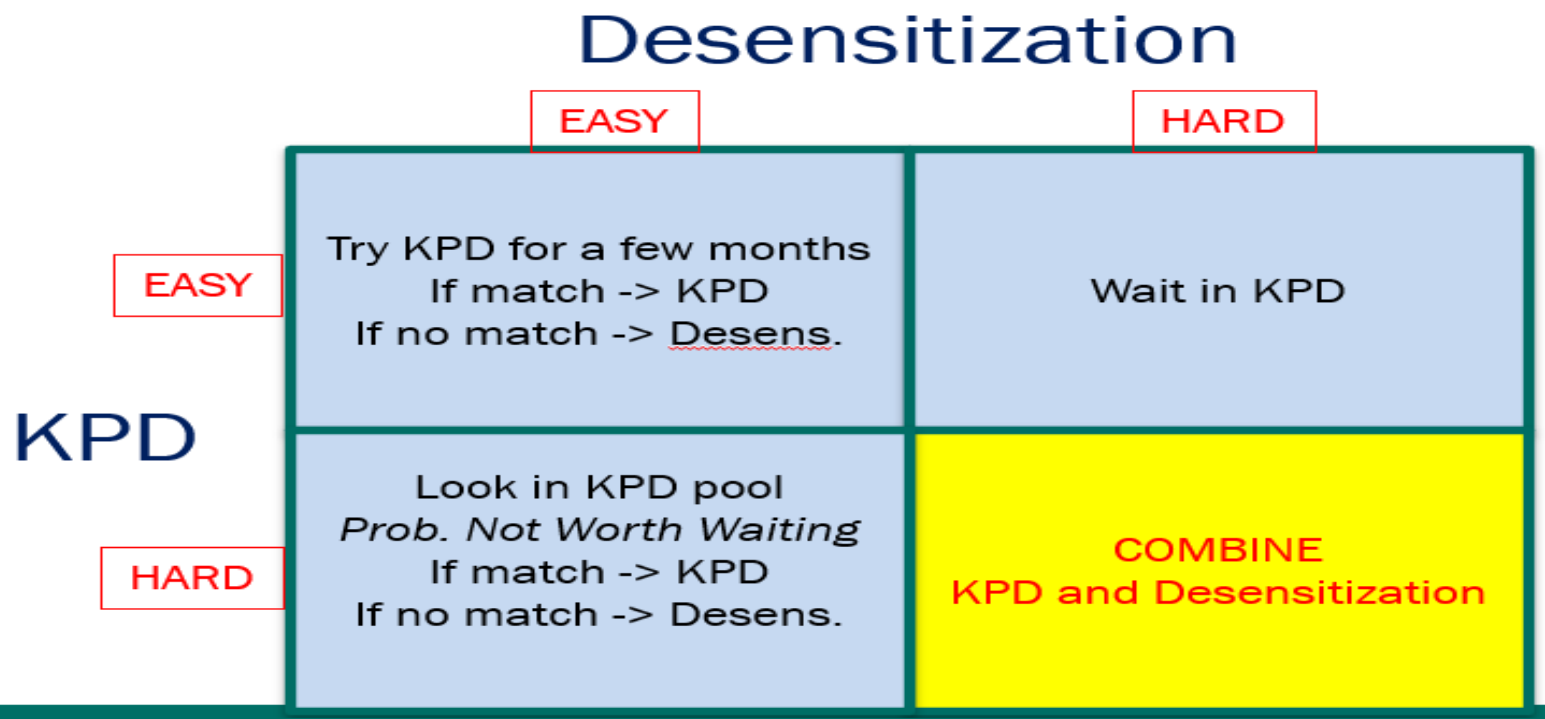


NKR Desensitization Cases Decline as Volume Grows

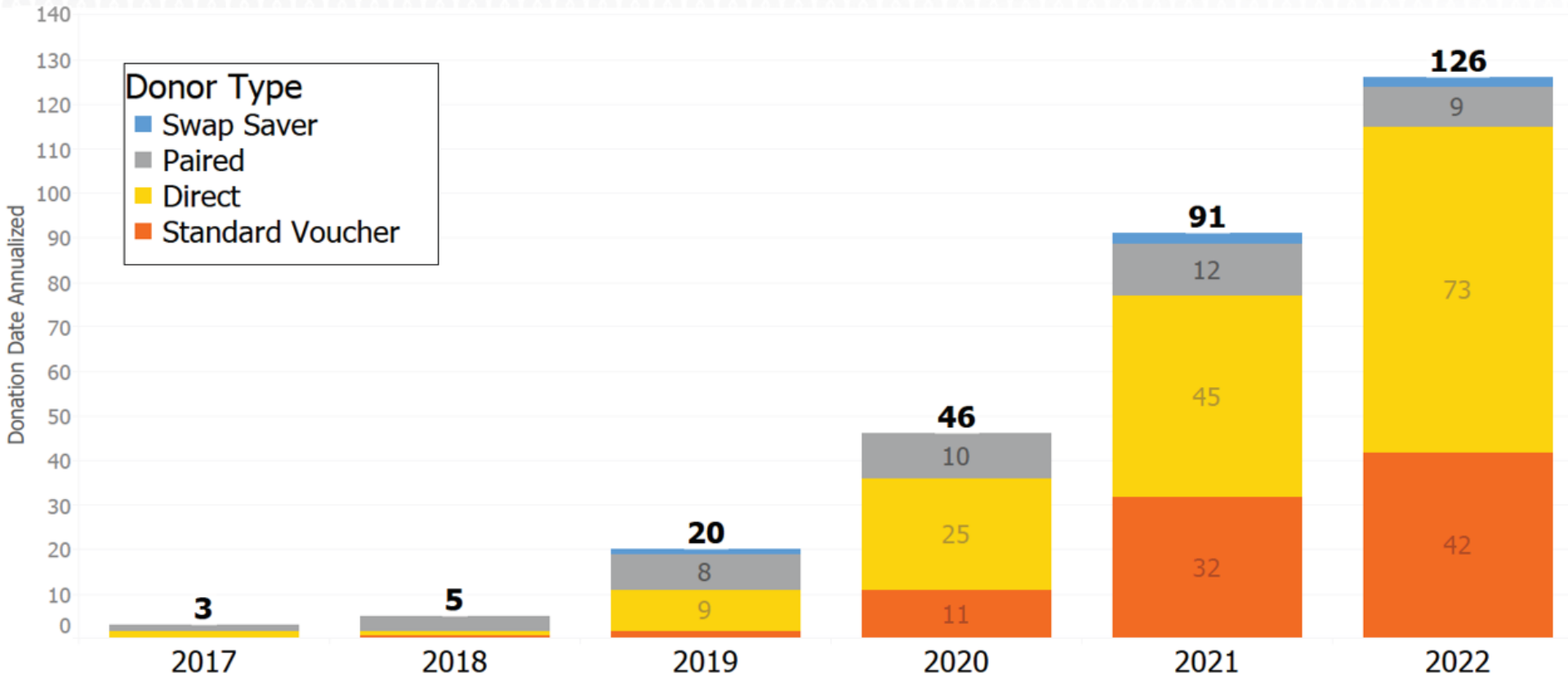


	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 Annualized
Desensitization Cases	49	33	29	28	32	30	22	9	11	4
NKR Transplants	284	277	308	334	360	457	539	489	779	802

Using KPD to Transplant the 'Untransplantable'

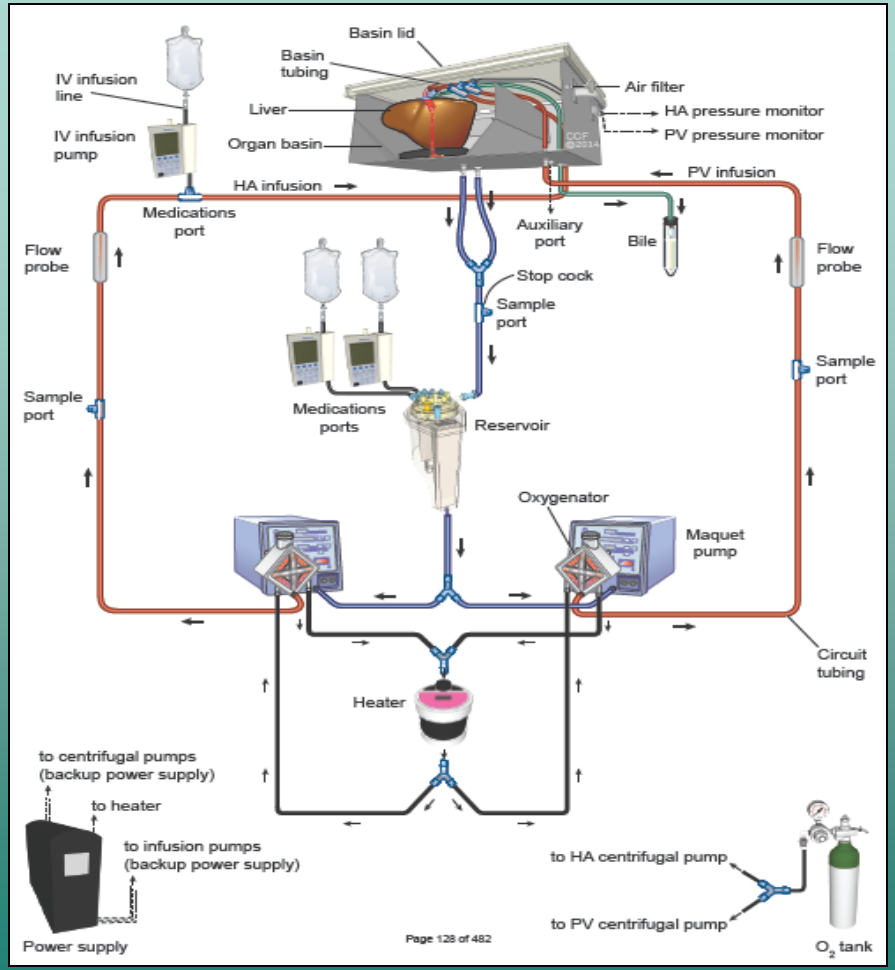


Remote Donations → Donor Convenience



Normothermic Preservation

Vs


Basin lid
Basin tubing
IV infusion line
IV infusion pump
Liver
Organ basin
Air filter
HA pressure monitor
PV pressure monitor
HA infusion
PV infusion
Medications port
Auxiliary port
Bile
Flow probe
Stop cock
Sample port
Medications ports
Reservoir
Oxygenator
Maquet pump
Circuit tubing
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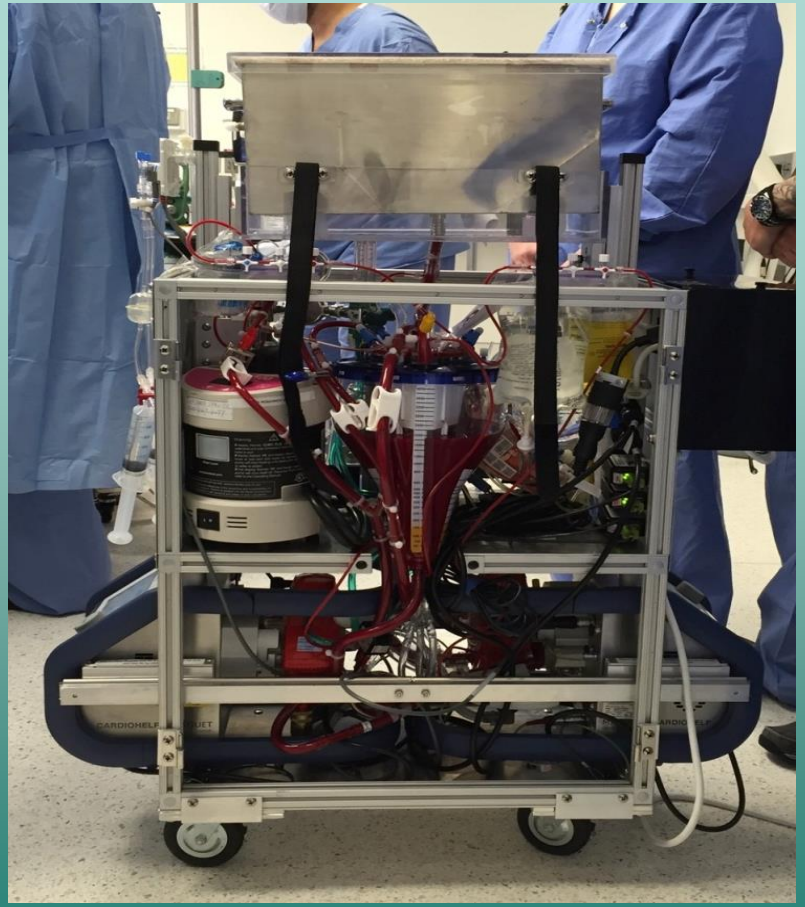
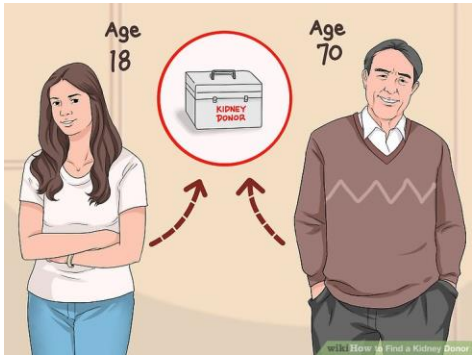
Power supply
to HA centrifugal pump
to PV centrifugal pump
O_2 tank
Page 128 of 482



Compatible Pairs → Optimize Outcomes

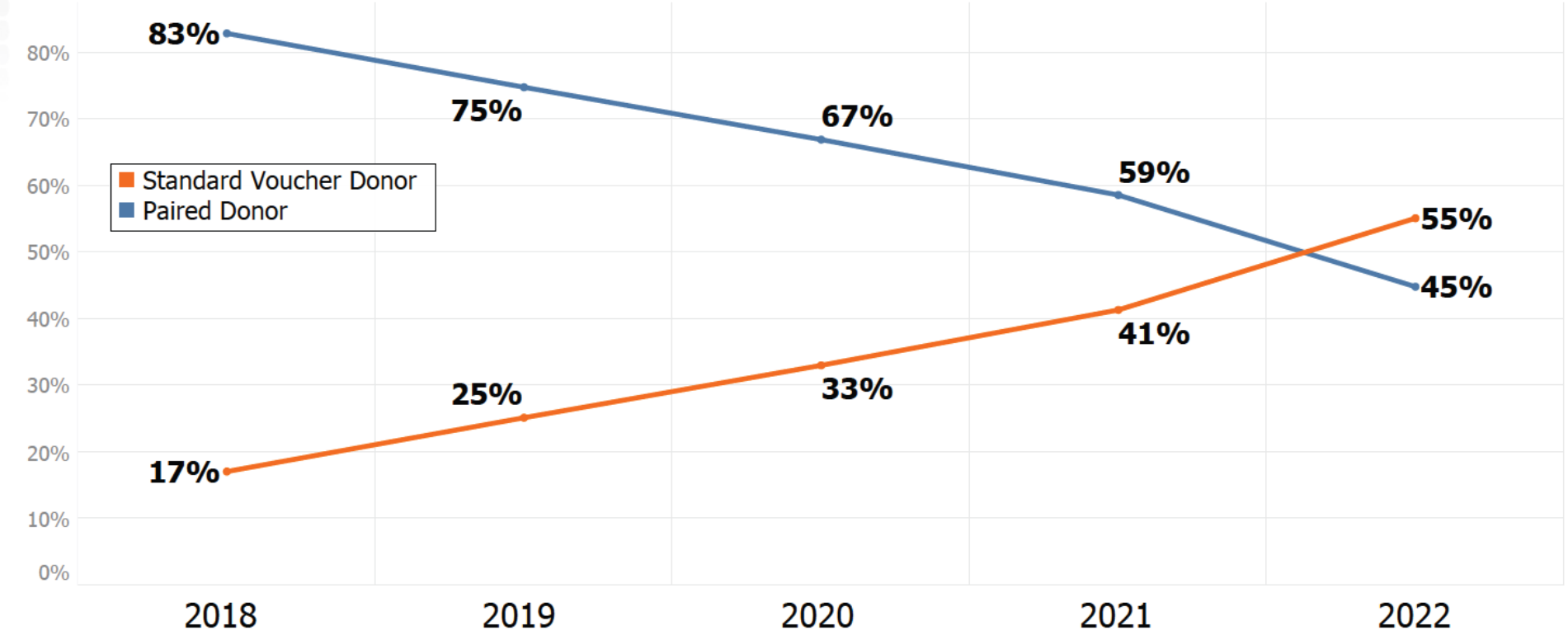
- What a compatible pairs gain:
  - Younger donor
  - Better size match (nephron mass)
  - O-mismatch
  - Ability to be one another's support



- What the incompatible pool gains if compatible pairs participate:
  - Higher match rates
  - More O-recipients match

Decoupling Trend

Transition from Paired to Standard Voucher Donation



www.transplantmodels.com

The Epidemiology Research Group for Organ Transplantation is a research group focused on organ transplantation at the Johns Hopkins School of Medicine. Below are some of the decision models we have developed.

For more information, please visit our website, www.transplantepi.org

Living Kidney Donor Risk Index (LKDPI)

This model predicts recipient risk of graft loss after living donor kidney transplantation based on donor characteristics, on the same scale as the KDPI …

Massie AB, Leanza J, Fahmy LM, Chow EK et al. A Risk Index for Living Donor Kidney Transplantation. AJT 2016 (epub ahead of print)

Continue to model »

ESRD Risk Tool for Kidney Donor Candidates

This model is intended for low-risk adults considering living kidney donation in the United States. It provides an estimate of 15-year and lifetime incidence of end-stage renal disease…

Grams ME, Sang Y, Levey AS, Matsushita K, Ballew S, Chang AR et al. Kidney-Failure Risk Projection for the Living Kidney-Donor Candidate. NEJM 2015 (epub ahead of print)

Continue to model »

Infectious Risk Donors

When a patient with end stage renal disease (ESRD) on the waitlist for a kidney is offered an Infectious Risk Donor (IRD) kidney, they need to decide whether they will accept the IRD kidney and the associated infectious risk, or if they will decline it and continue to wait for the next available infectious-risk free kidney …

Chow, E. K. H., Massie, A. B., Muzaale, A. D., Singer, A. L., Kucirka, L. M., Montgomery, R. A., … & Segev, D. L. (2013). Identifying appropriate recipients for CDC infectious risk donor kidneys. American Journal of Transplantation, 13(5), 1227-1234.

Continue to model »

Transplant Candidacy for Patients 65+

This prediction model is intended for adults with ESRD on dialysis aged 65 and above; it provides the predicted probability of 3-year survival after kidney transplantation (KT). Patients with predicted 3-year post-KT survival in the top quintile are deemed "excellent" candidates …

Grams, M. E., Kucirka, L. M., Hanrahan, C. F., Montgomery, R. A., Massie, A. B., & Segev, D. L. (2012). Candidacy for kidney transplantation of older adults. Journal of the American Geriatrics Society, 60(1), 1-7.

Calculate your score »

Pediatric Transplant: Living or deceased donor first?

Most pediatric kidney transplant recipients live long enough to require retransplantation. The most beneficial timing for living donor transplantation in candidates with one living donor is not clear…

Van Arendonk, K. J., Chow, E. K., James, N. T., Orandi, B. J., Ellison, T. A., Smith, J. M., Colombani, P. M., & Segev, D. L. (2012). Choosing the Order of Deceased Donor and Living Donor Kidney Transplantation in Pediatric Recipients: A Markov Decision Process Model. Am J Transplant, 99(2):360-6.

Continue to model »

Postdonation Risk of ESRD in Living Kidney Donors

Risk estimation is critical for appropriate informed consent and varies substantially across living kidney donors.

Massie, Allan B., et al. "Quantifying Postdonation Risk of ESRD in Living Kidney Donors." Journal of the American Society of Nephrology (2017): ASN-2016101084.

Continue to model »

www.transplantmodels.com

The Epidemiology Research Group for Organ Transplantati
Johns Hopkins School of Medicine. Below are

For more information, please vis

Characteristic	aHR[a]	*P* Value
Men (at age 40)	1.88 (95% CI, 1.50 to 2.35)	<0.001
black race (at age 40)	2.96 (95% CI, 2.25 to 3.89)	<0.001
Age per 10 yr: nonblack	1.40 (95% CI, 1.23 to 1.59)	<0.001
Age per 10 yr: black	0.88 (95% CI, 0.72 to 1.09)	0.3
BMI per 5 kg/m^2	1.61 (95% CI, 1.29 to 2.00)	<0.001
First-degree biologically related to recipient	1.70 (95% CI, 1.24 to 2.34)	<0.01

the top quintile are deemed "excellent" candidates ...

Grams, M. E., Kucirka, L. M., Hanrahan, C. F., Montgomery, R. A., Massie, A. B., & Segev, D. L. (2012). Candidacy for kidney transplantation of older adults. Journal of the American Geriatrics Society, 60(1), 1-7.

Calculate your score »

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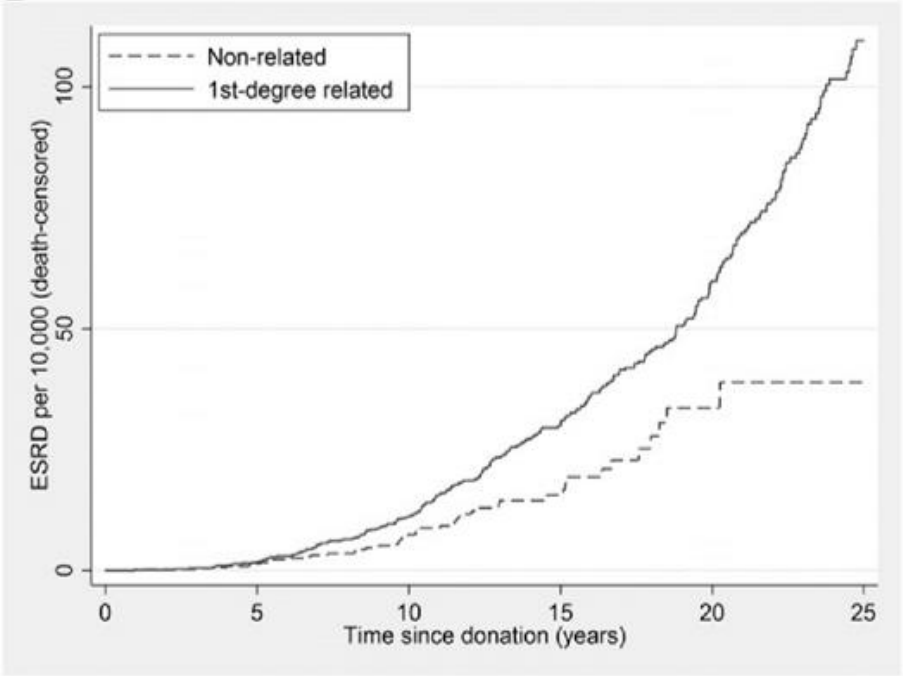

www.transplantmodels.com

The Epidemiol
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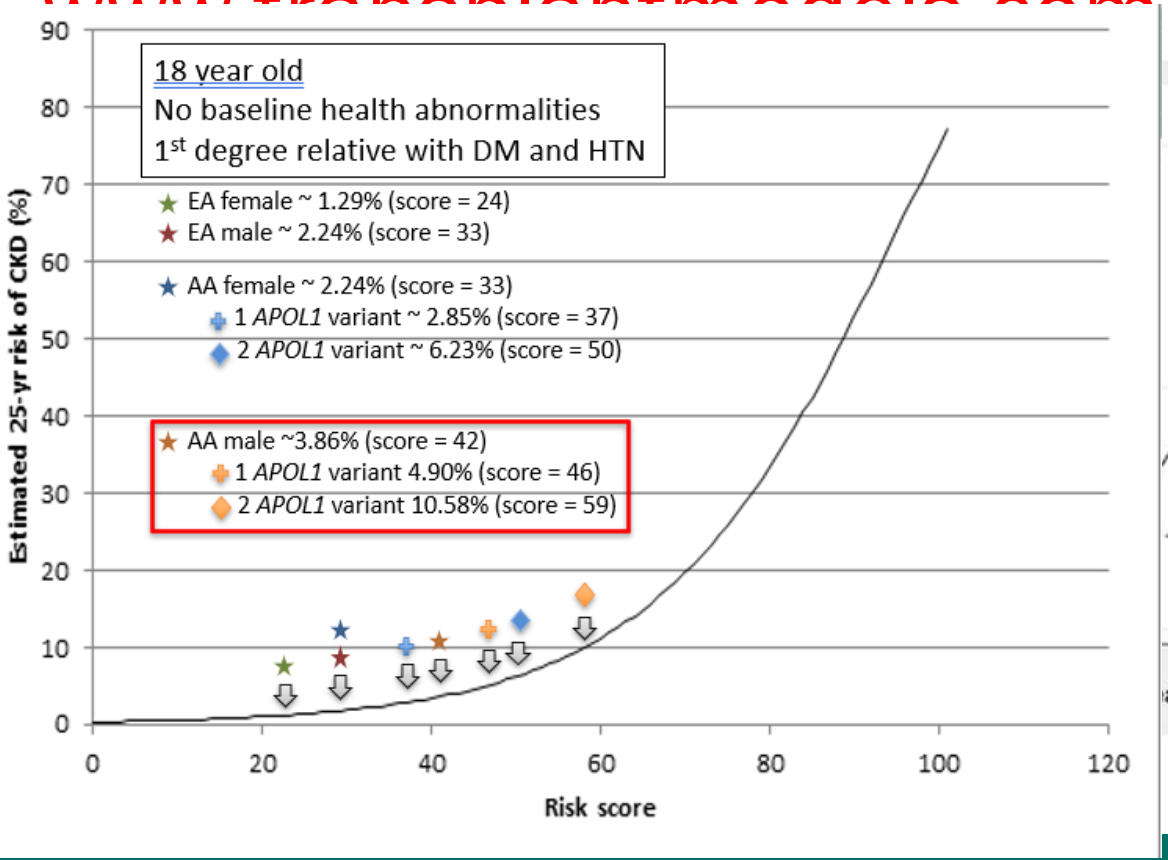
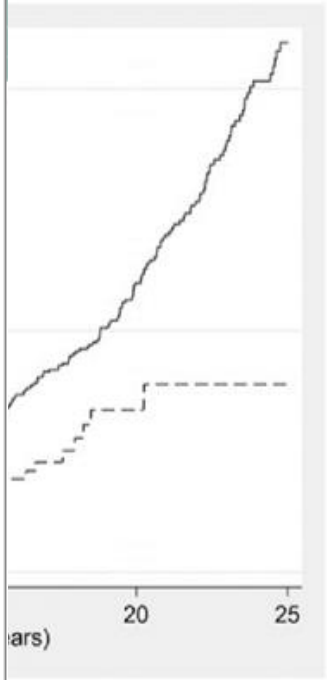
Grams, M. E., Kucirka, L. M., A. B., & Segev, D. L. (2012). C adults. Journal of the America

Calculate your score





Cumulative graft loss by LKDPI

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Living Kidney Donc

This model predicts recip
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Massie AB, Leanza J, Fahmy LM
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Continue to model »

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A. D., Singer, A. L., Kucirka, L. M.,
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Grams, M. E., Kucirka, L. M., Ha
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adults. Journal of the American

Calculate your score »

RD in Living Kidney

opropriate informed consent
living kidney donors.

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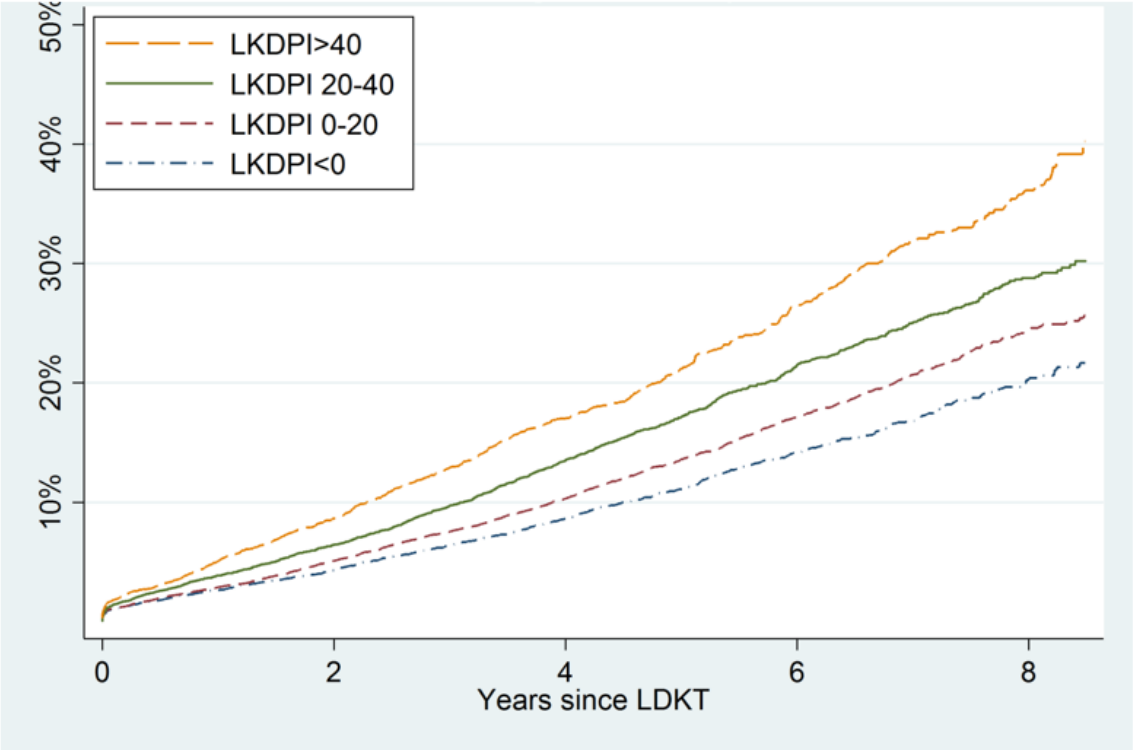
Society of Nephrology (2017):



Eplet Matching in the NKR

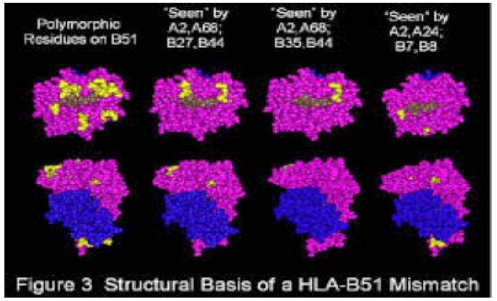
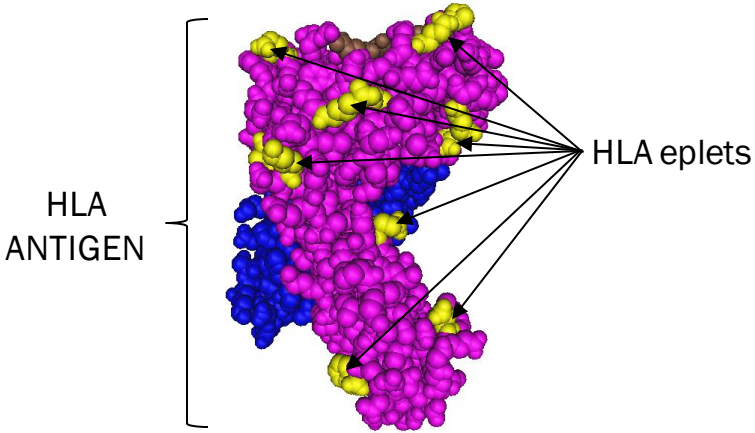


Figure 3 Structural Basis of a HLA-B51 Mismatch

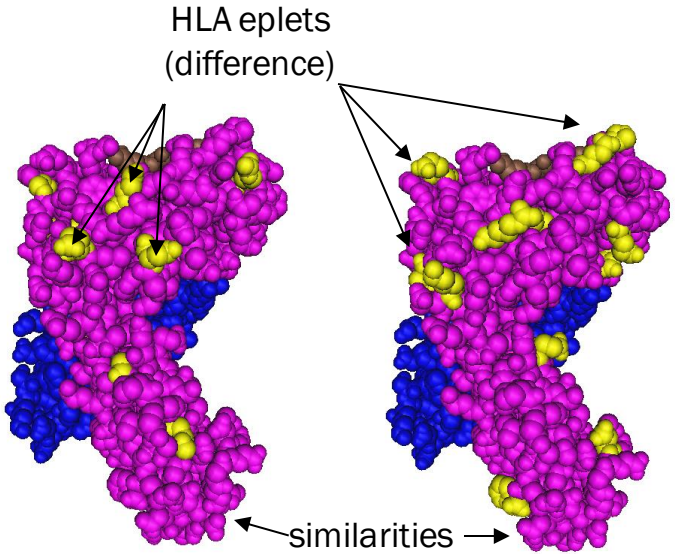
-Compatible pairs
-May benefit from closer immunologic matching
-Longer life for kidney
-Possibly less immunosuppression needed

NKR KIDNEY FOR LIFE PROGRAM

HLA EPLET: the “immunogenic” unit of HLA antigens



The HLA antigens are complex amino-acid structures expressing several immunogenic hot-spots, known as “HLA eplets”

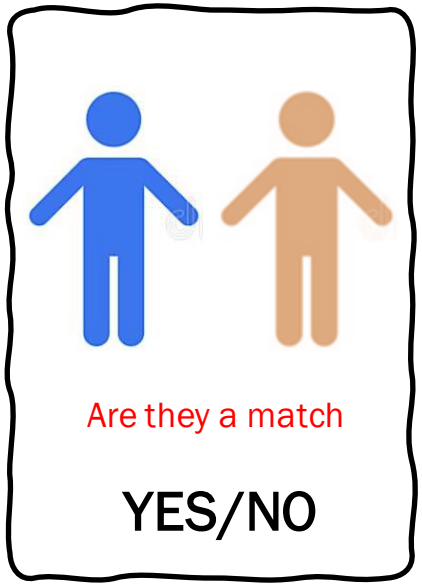


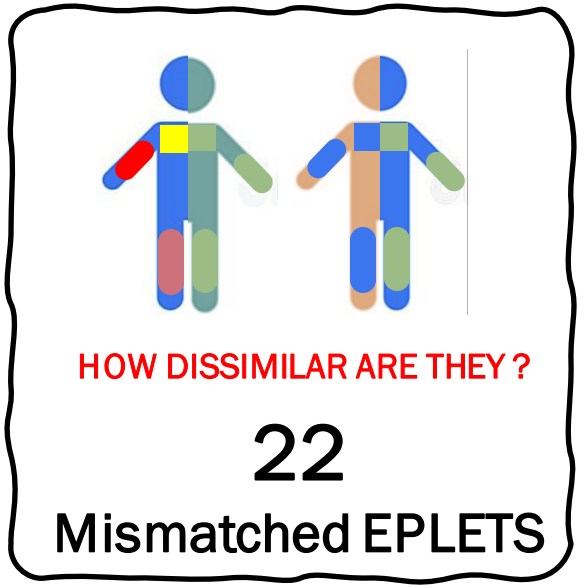
The HLA antigens of two individual share a large degree of homology (magenta areas) but differ at some or all the HLA eplets (yellow patches)

.

HLA EPLET: the new HLA compatibility "currency"

We need to change the way we define HLA compatibility ….

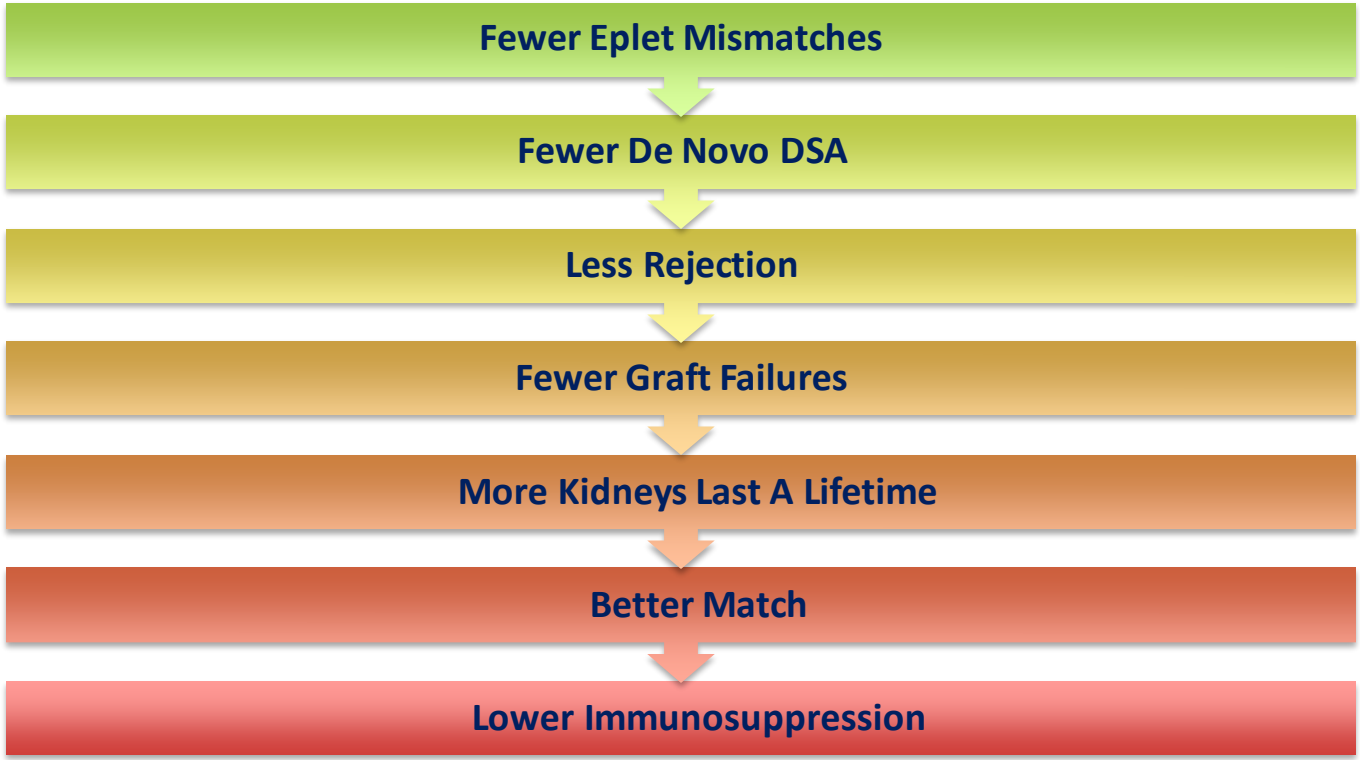




CONVENTIONAL HLA MATCH DOES NOT QUANTIFY THE IMMUNOLOGICAL RISK

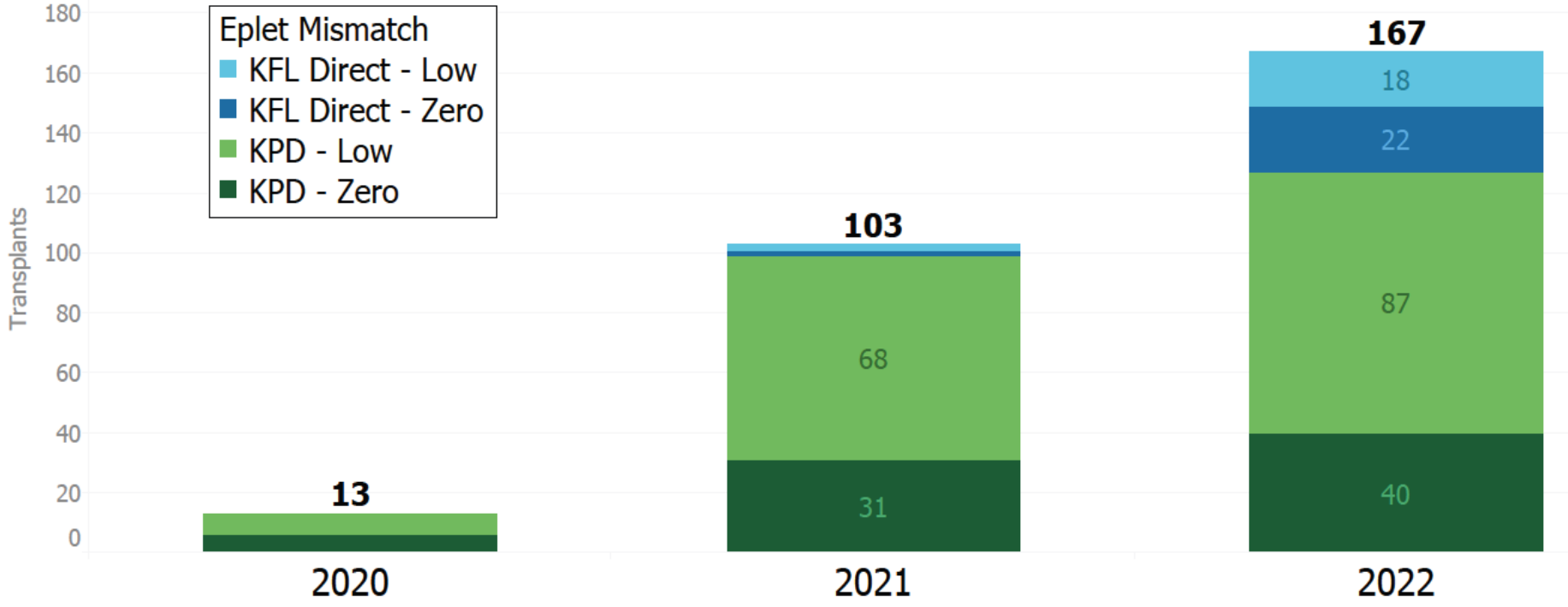
BETTER REPRESENTATION OF THE IMMUNOLOGICAL RISK

Kidney For Life Basics



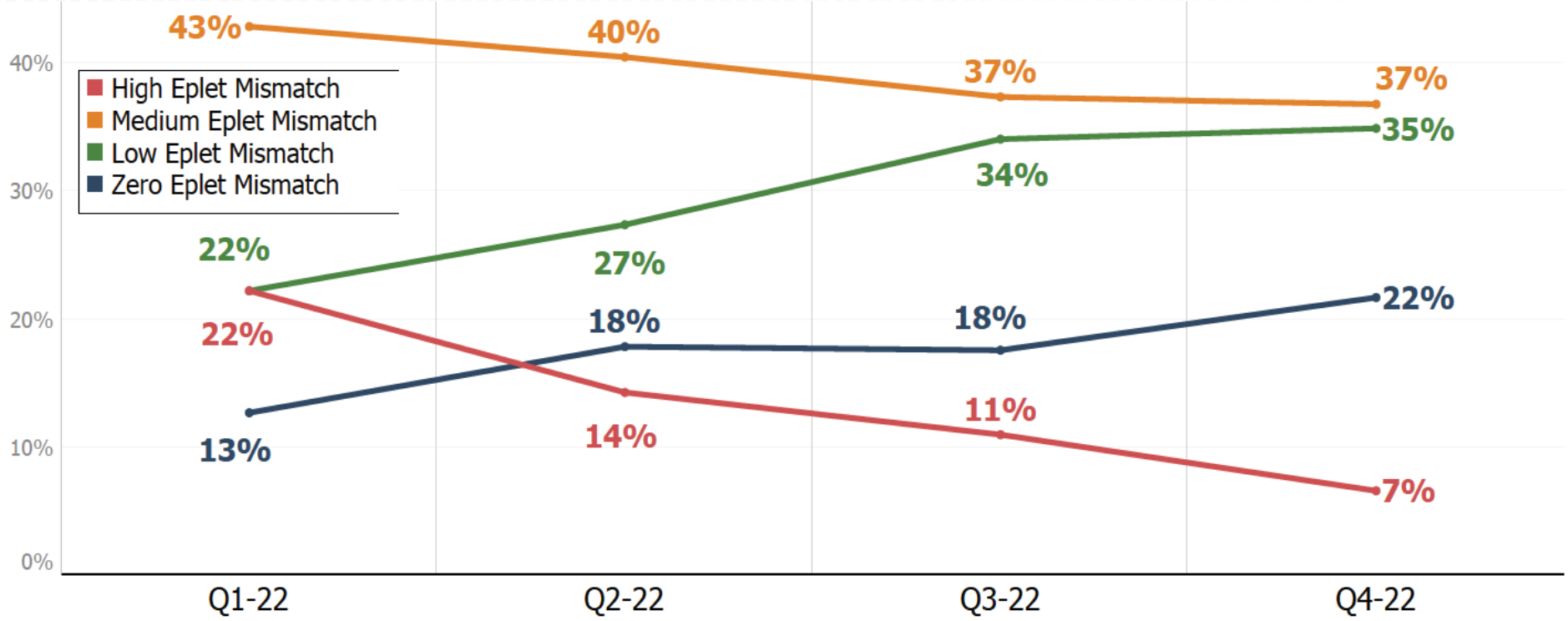
Kidney for Life Low Eplet Mismatch Transplants

Compatible and Incompatible Pairs



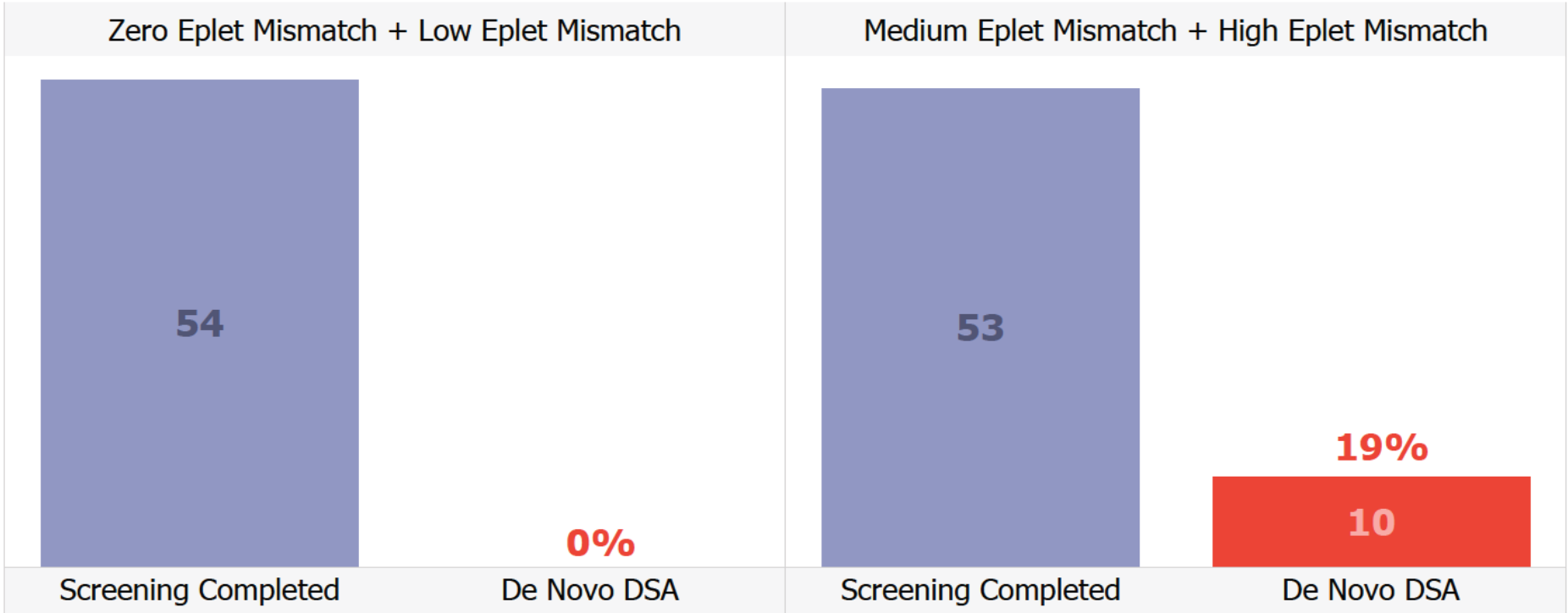
Percentage of Transplants with Eplet Mismatch Data

Continually Improving Low & Zero Eplet Mismatch Percentage

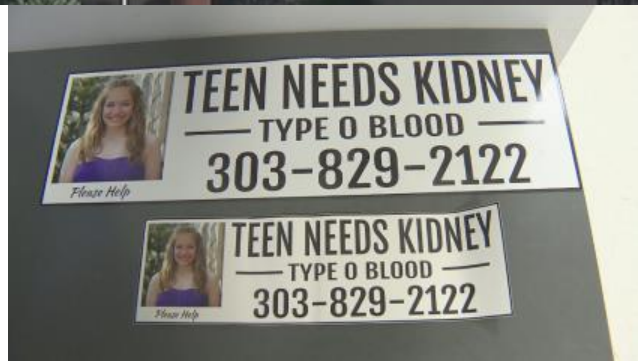


Kidney for Life Results

One Year Antibody Screening



Patients/Families Tell Their Story



Champion Microsites

- ✓ Center invites patient to setup site
- ✓ Patient creates site profile
- ✓ Center & NKR approve site
- ✓ Microsite link posted to the web
- ✓ NKR prints/ships business cards to patient

National Kidney Registry

Khadijah Sabir

I NEED A KIDNEY DONOR

If you are interested in learning more about my story, kidney donation or in being tested to see if you are eligible to donate, please visit the URL below.

WWW.NKR.ORG/CEN498

National Kidney Registry

Nathaniel Aiken

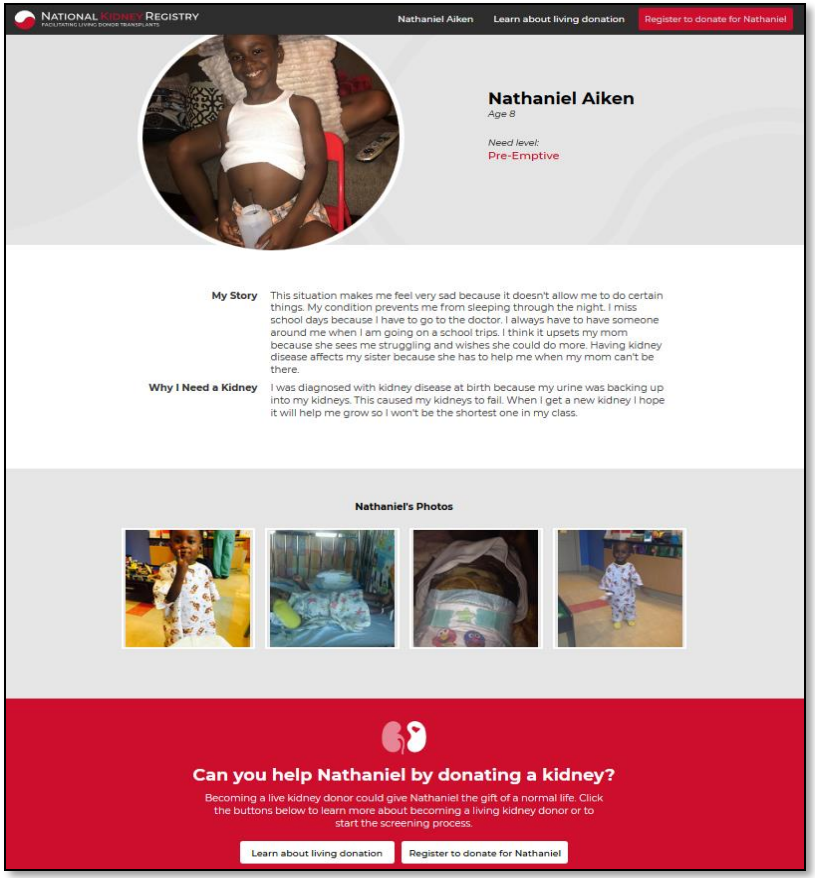
I NEED A KIDNEY DONOR

If you are interested in learning more about my story, kidney donation or in being tested to see if you are eligible to donate, please visit the URL below.

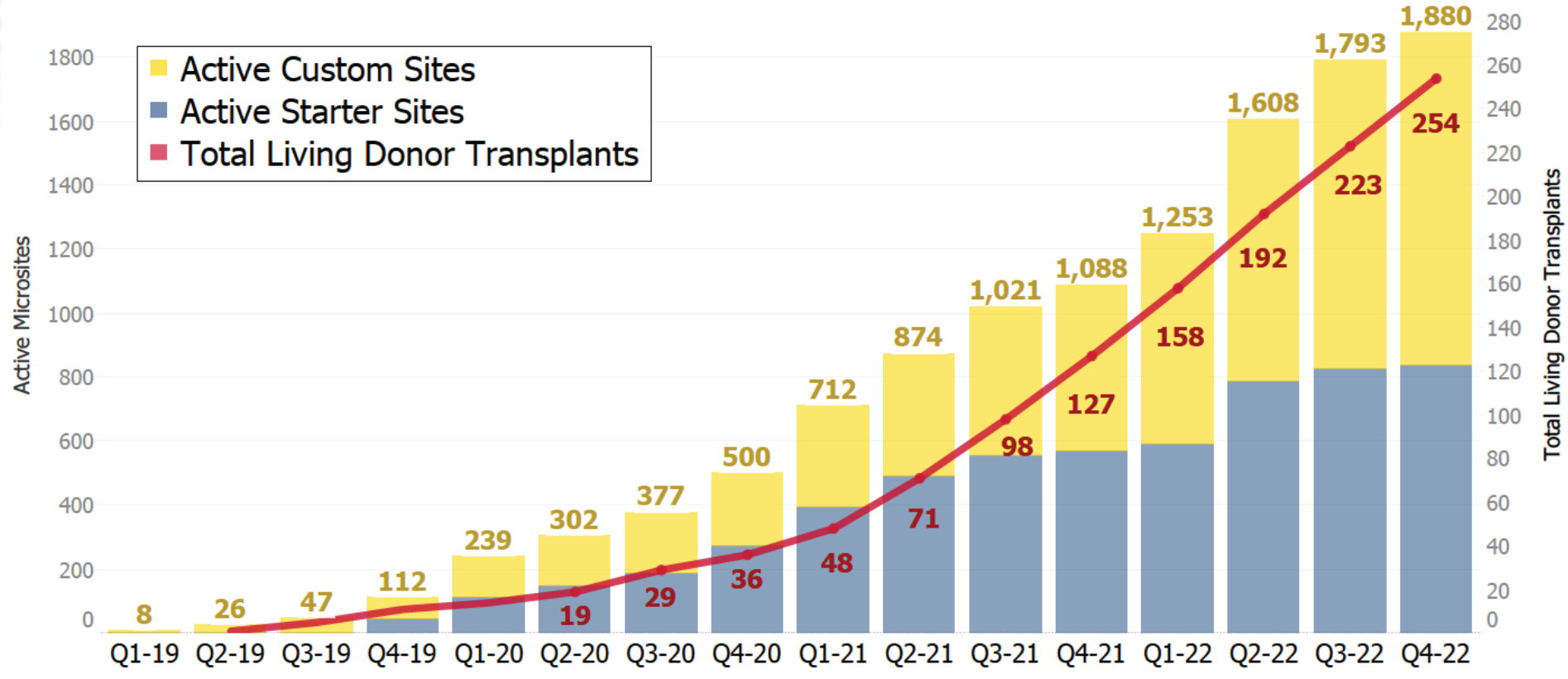
WWW.NKR.ORG/ZHS796 498

Written policy for what is NOT allowable on microsite:

- •Disclosure of financial information of any kind
- •Material items in photos / videos
- •Anything that can be construed as an attempt to compensate potential donors



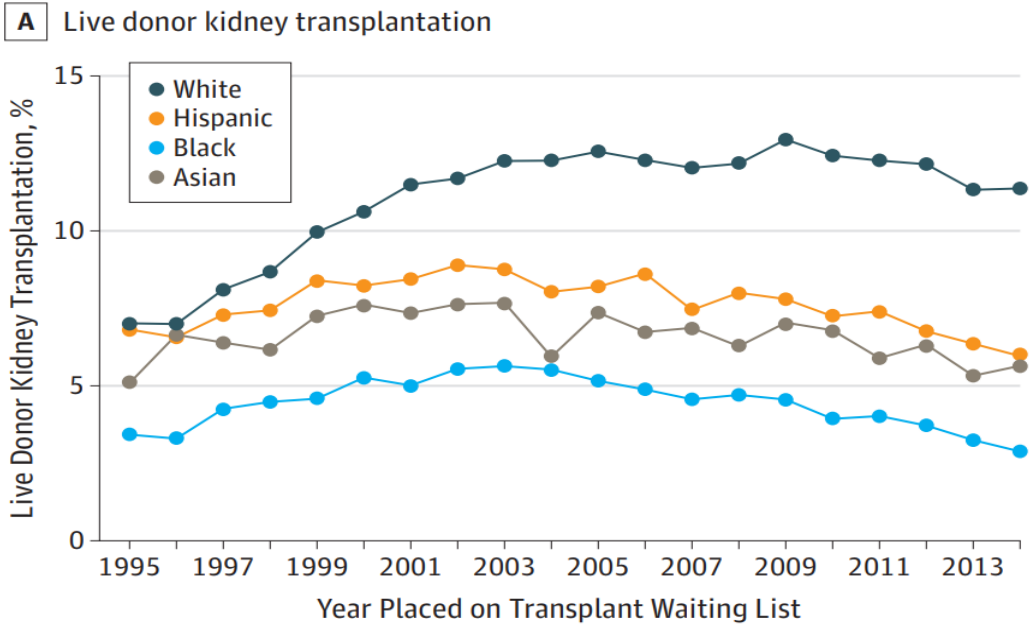
Smarter Use of Social Media



JAMA | Original Investigation

Association of Race and Ethnicity With Live Donor Kidney Transplantation in the United States From 1995 to 2014

Tanjala S. Purnell, PhD, MPH; Xun Luo, MD, MPH; Lisa A. Cooper, MD, MPH; Allan B. Massie, PhD; Lauren M. Kucirka, MD, PhD, ScM; Macey L. Henderson, JD, PhD; Elisa J. Gordon, PhD, MPH; Deidra C. Crews, MD, ScM; L. Ebony Boulware, MD, MPH; Dorry L. Segev, MD, PhD



1995-1999	2014-2019
0.83 Hispanic	0.52 Hispanic
0.45 Black	0.27 Black
0.56 Asian	0.42 Asian

JAMA 2018

Current State
Go out and find a living donor

Live Donor Champion: Finding Live Kidney Donors by Separating the Advocate From the Patient

Jacqueline M. Garonzik-Wang,[1] Jonathan C. Berger,[1] Reside Lorie Ros,[1] Lauren M. Kucirka,[1] Neha A. Deshpande,[1] Brian J. Boyarsky,[1] Robert A. Montgomery,[1] Erin C. Hall,[1] Nathan T. James,[1] and Dorry L. Segev[1,2,3]

Future State
Let us help you find a living donor!

Not ‘Do you have’ but ‘Who is your living donor?

Making House Calls Increases Living Donor Inquiries and Evaluations for Blacks on the Kidney Transplant Waiting List

James R. Rodrigue,[1,5] Matthew J. Paek,[1] Ogo Egbuna,[2] Amy D. Waterman,[3] Jesse D. Schold,[4] Martha Pavlakis,[1] and Didier A. Mandel

Transplant Center Provision of Education and Culturally and Linguistically Competent Care: A National Study

E. J. Gordon[a,b,*], J. C. Caicedo[b], D. P. Ladner[a,b],

Received 14 July 2010, revised 13 A
accepted for publication 04 Septemb

ORIGINAL CLINICAL SCIENCE—GENERAL

Financial Impact of a Culturally Sensitive Hispanic Kidney Transplant Program on Increasing Living Donation

Wang, Andrew PhD, MPH[1,2]; Caicedo, Juan Carlos MD[3]; Mathur, Amit K. MD, MS[4]; Ruiz, Richard M. MD[5]; Gordon, Elisa J. PhD, MPH[1,3]

Financial Neutrality??

National Living Donor Assistance Center

Program ▾ Potential Donors ▾ Transplant Centers ▾ News & Updates Resources Login

"This is a terrific program. Thank you so much."
– Lenora - Living Kidney Donor

Living Donor Assistance Program

Providing financial assistance to those who want to donate an organ, priority is given to individuals not otherwise able to afford the travel and subsistence expenses associated with living organ donation.
Learn more ▸

For Donors

Learn if you are eligible for reimbursement of travel and subsistence expenses and how to file an application.
More information ▸

OUR MISSION IS TO REDUCE FINANCIAL DISINCENTIVES to LIVING ORGAN DONATION

350 participating transplant programs

3,340 organ donations made possible

90% of applications have received funding

Financial Neutrality → A Must!!

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Donor Shield Program

- Lost wage reimbursement up to $1500/week for up to 6 weeks
- Travel and lodging reimbursement up to $3000 for donor and a caregiver
- Kidney Prioritization should the donor ever need a transplant
- Donation life insurance with $1,000,000 principal sum
- Donation disability insurance
- Free legal support
- Complication Protection
- Home blood draws

American Journal of Transplantation 2015; 15: 1187–1191
Wiley Periodicals Inc.

doi: 10.1111/ajt.13232

Personal Viewpoint

Living and Deceased Organ Donation Should Be Financially Neutral Acts

F. L. Delmonico[1,*], D. Martin[2], B. Domínguez-Gil[3], E. Muller[4], V. Jha[5], A. Levin[6], G. M. Danovitch[7] and A. M. Capron[8]

care units; LDCOP, Live Donor Community of Practice; LKD, living kidney donor; NLDAC, National Living Donor Assistance Center; NOTA, National Organ Transplant Act

American Journal of Transplantation 2015; 15: 1173–1179
Wiley Periodicals Inc.

doi: 10.1111/ajt.13233

Meeting Report

AST/ASTS Workshop on Increasing Organ Donation in the United States: Creating an ''Arc of Change'' From Removing Disincentives to Testing Incentives

D. R. Salomon[1,*], A. N. Langnas[2], A. I. Reed[3], R. D. Bloom[4], J. C. Magee[5] and R. S. Gaston[6] for the AST/ASTS Incentives Workshop Group (IWG)[a]

Transplant Act; OPTN, Organ Procurement and Transplantation Network

Received 14 October 2014, revised and accepted for publication 16 January 2015

American Journal of Transplantation 2015; 15: 1180–1186
Wiley Periodicals Inc.

doi: 10.1111/ajt.13234

Personal Viewpoint

Between Scylla and Charybdis: Charting an Ethical Course for Research Into Financial Incentives for Living Kidney Donation

J. S. Fisher[1], Z. Butt[2], J. Friedewald[3], S. Fry-Revere[4,5], J. Hanneman[6], M. L. Henderson[7], K. Ladin[8,9,10], H. Mysel[11], L. Preczewski[12], L. A. Sherman[13], C. Thiessen[14] and E. J. Gordon[15,*]

financial compensation on living kidney donation rates, many fear that financial incentives will exploit vulnerable individuals and cast the field of transplantation in a negative public light, ultimately reducing donation rates. This paper provides an ethical justification for conducting a pilot study of a federally regulated approach to providing financial incentives to living

Inducing Tolerance??

Human Immunology 79 (2018) 272–276

Contents lists available at ScienceDirect

Human Immunology

journal homepage: www.elsevier.com/locate/humimm

Tolerance induction in HLA disparate living donor kidney transplantation by facilitating cell-enriched donor stem cell Infusion: The importance of durable chimerism

Joseph R. Leventhal[a,*], Suzanne T. Ildstad[b]

[a] Department of Surgery – Comprehensive Transplant Center, Northwestern University, Chicago, IL, USA
[b] Institute for Cellular Therapeutics, University of Louisville, Louisville, KY, USA

Tolerance as SOC!!

Human Immunology 79 (2018) 272–276

Contents lists available at ScienceDirect

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Tolerance induction in HLA disparate living donor kidney transplantation by facilitating cell-enriched donor stem cell Infusion: The importance of durable chimerism

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[b] Institute for Cellular Therapeutics, University of Louisville, Louisville, KY, USA

Value proposition for “One Transplant for Life”

Human Costs:
Lost Productivity
Impaired QoL

Clinical & Economic Costs:
IS Complications
IS Co-morbidities
Graft Loss
IS Costs

Value From Eliminating Chronic IS

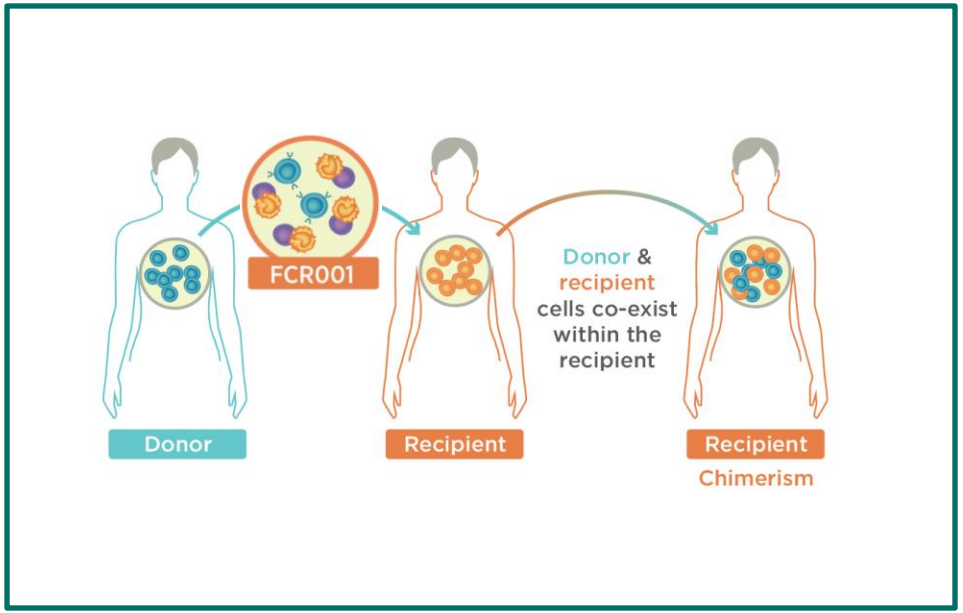
- **Improve outcomes**
  - Fewer rejections, graft losses
  - No IS co-morbidities or complications
  - Enhance patient’s QoL and freedom
- **Reduce systematic costs**
  - IS and meds to manage co-morbidities
  - Avoid return to dialysis or 2nd transplant
  - Bolster recipients’ productivity

Allogeneic Tolerance and Chimerism

Nobel Prize 1960*

Goal: **facilitate allogeneic tolerance** by establishing **durable chimerism**

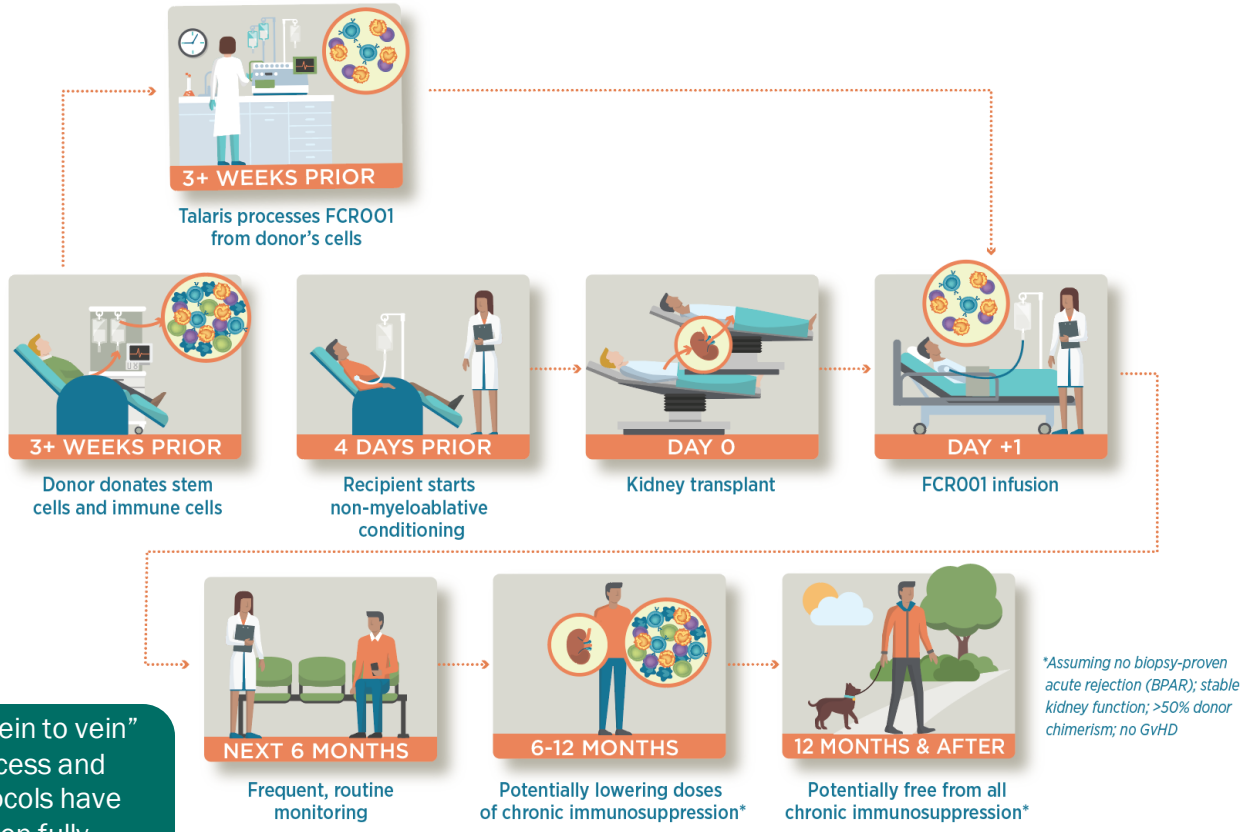
Allogeneic tolerance: An approach to enable donor HSCs to coexist with recipient HSCs in the recipient's bone marrow ("chimerism"), and mature into mutually-tolerated, functional immune cells and blood cells



Nobel Prize in Physiology or Medicine 1960 was awarded jointly to Sir Frank Macfarlane Burnet and Peter Brian Medawar 'for discovery of acquired immunological tolerance.'

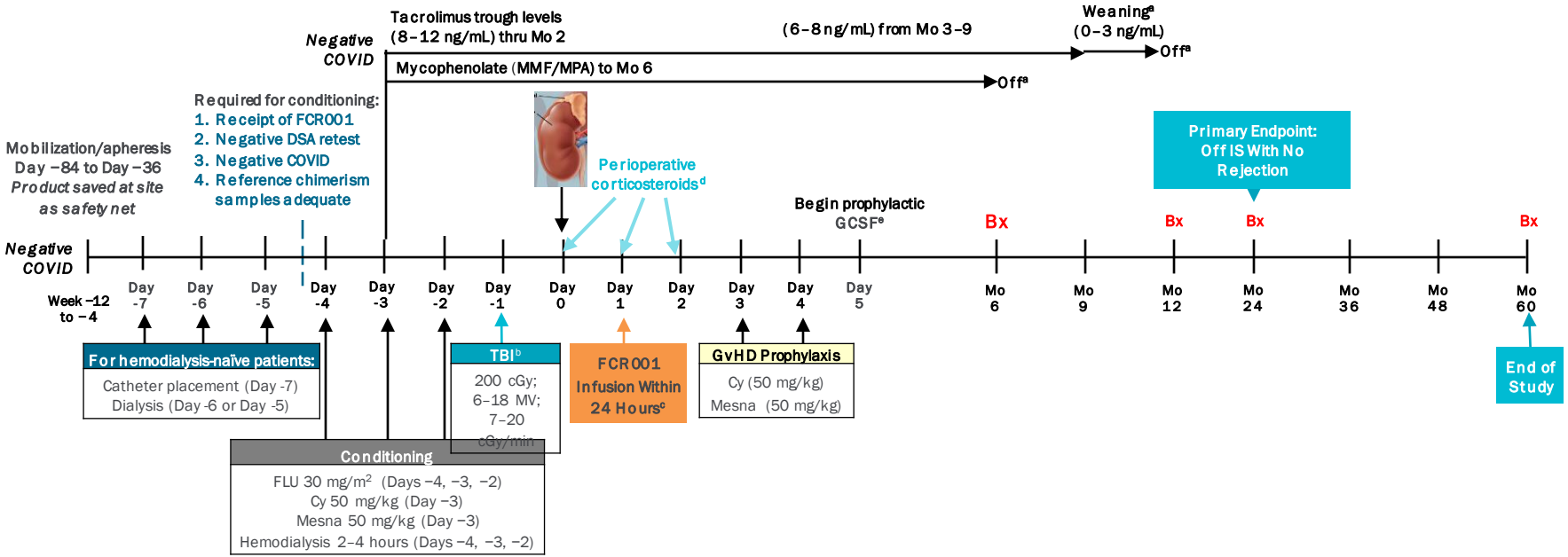
FCR001: The Donor-Recipient Journey

Our “vein to vein” process and protocols have been fully proceduralized



talaris THERAPEUTICS

FREEDOM-1: FCR001 Protocol Overview



[a]Patients demonstrating stable donor chimerism (>50%), no history of rejection, no DSA, no GvHD, not using corticosteroids, and adequate kidney function.
[b]TBI dose of 200 cGy delivered as a single fraction at 10–18 MV at a rate of 15–20 cGy/min are the preferred energy and rate parameters and should be followed when possible.
[c]Administered using a central or dedicated peripheral line; infusion by gravity.
[d]Methylprednisolone 500 mg IV on Day 0 in OR; 250 mg Day 1 and 125 mg Day 2.
[e]Until absolute neutrophil count is >1000/mm³ for 3 consecutive days.

Highlights from Phase 2 Study (+ long-term followup)

37 adult living donor kidney transplant (LDKT) patients were dosed with our therapy at two leading US transplant sites between 2009 - 2016

70%

(26 OF 37) OFF ALL IMMUNOSUPPRESSION THERAPIES **

- Across all HLA-mismatches
- 82% success rate (14 of last 17) once key parameters were optimized

100%

TAKEN OFF IMMUNOSUPPRESSION REMAIN IS-FREE

- Median follow up: >7 yrs
- Six patients followed >10 years
- Longest follow up: >12 yrs

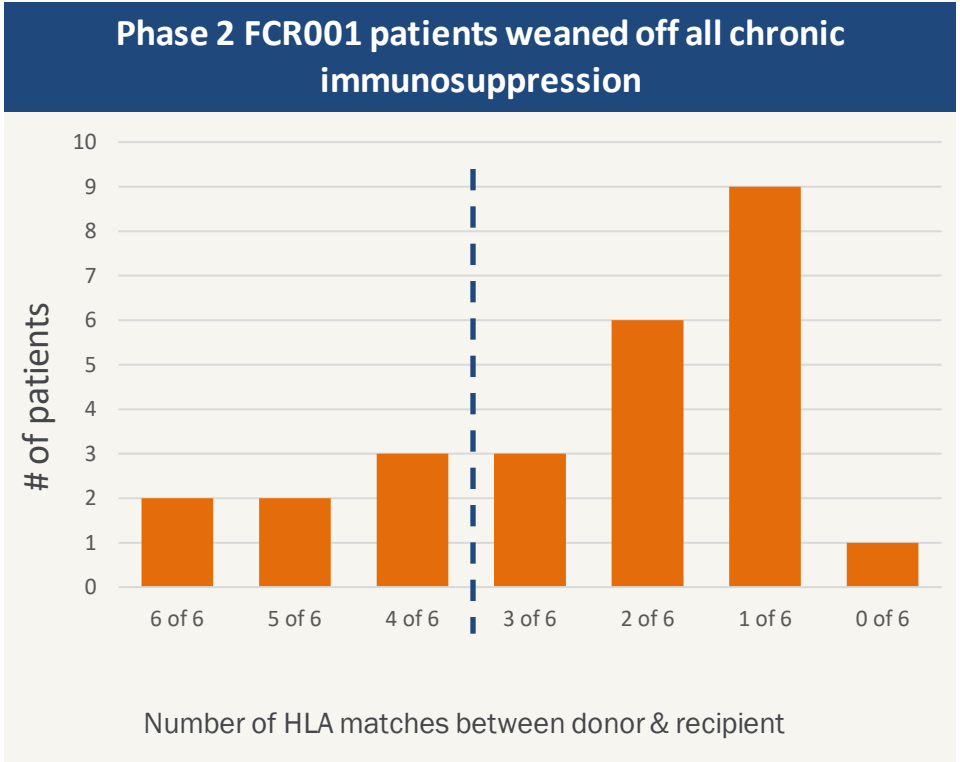
7/7

TOLERIZED PATIENTS WITH PRIOR KIDNEY AUTO-IMMUNE CONDITION HAD NO RECURRENCE

- Recurrence ordinarily seen in 20% - 60% of patients***

talaris THERAPEUTICS

Phase 2 Results Robust Across All Degrees of HLA-Mismatch



19/26 (73%) durably off all chronic immunosuppression had HLA match of 3 or less between LDKT donor & recipient

Comparable kidney and patient survival for all FCR001 vs standard of care (SoC) LDKT patients

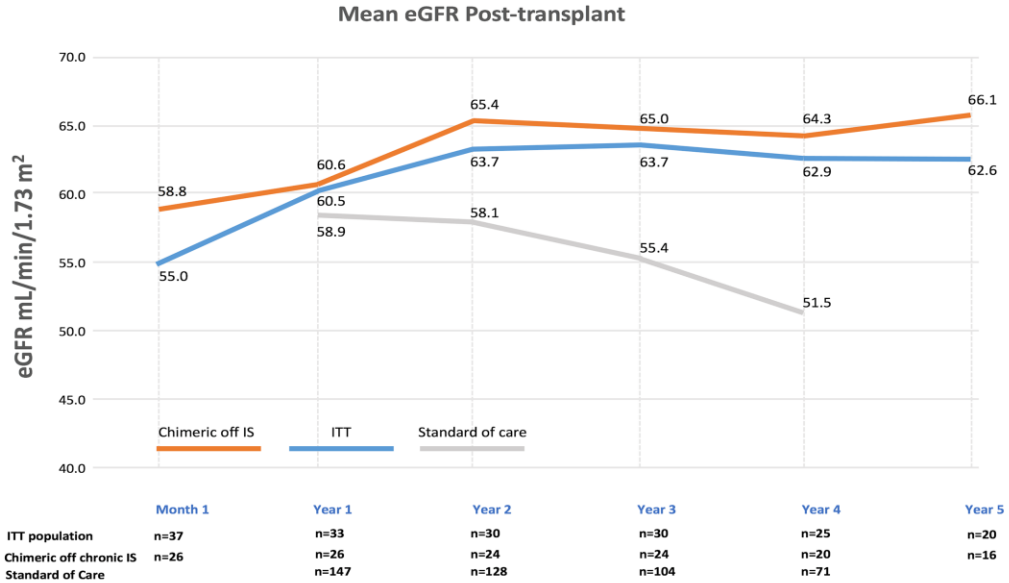
FCR001 safety & tolerability generally consistent with separate SoC kidney transplant + allogeneic HSCT with non-myeloablative conditioning

No acute rejection or donor-specific antibodies in FCR001 patients off immunosuppression

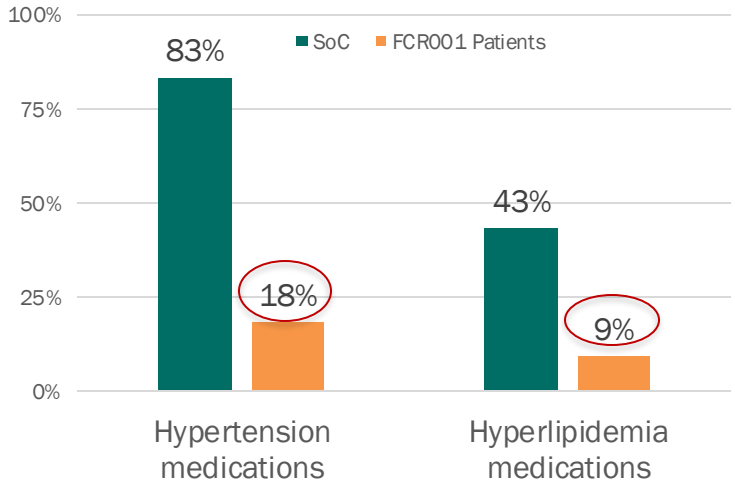
Evidence of Potential Longer-Term Clinical Benefit

FCR001 improved Quality of Life, preserved kidney function and enabled lower reliance on cardiovascular medications

Mean Estimated eGFR* Over Time Post- Transplant



Cardiovascular Medication Usage SoC vs Durably Chimeric FCR001 Patients



Potential to Extend Across Solid Organ Transplant

Living Donor Kidney Transplant Delayed Tolerance Induction

FREEDOM·2

- Phase 2 study - initiated October 2021
- **Goal**: Safely induce durable tolerance and eliminate immunosuppression in **prior recipients of LDKT** (those transplanted 3 – 12 months prior to FCR001 administration)
- Potential to expand market to prevalent LDKT population

Potential US Market Opportunity: ~6,000 – 10,000*/yr

Deceased Donor Kidney Transplant

FREEDOM·4

- Active research program to establish easibility of extracting same cells directly from deceased donor bone marrow
- Relationships established with KODA and other OPOs
- Product would be administered a few months after organ transplant

Potential US Market Opportunity >~16,500 / yr

Uterus Transplantation – Greater Interest

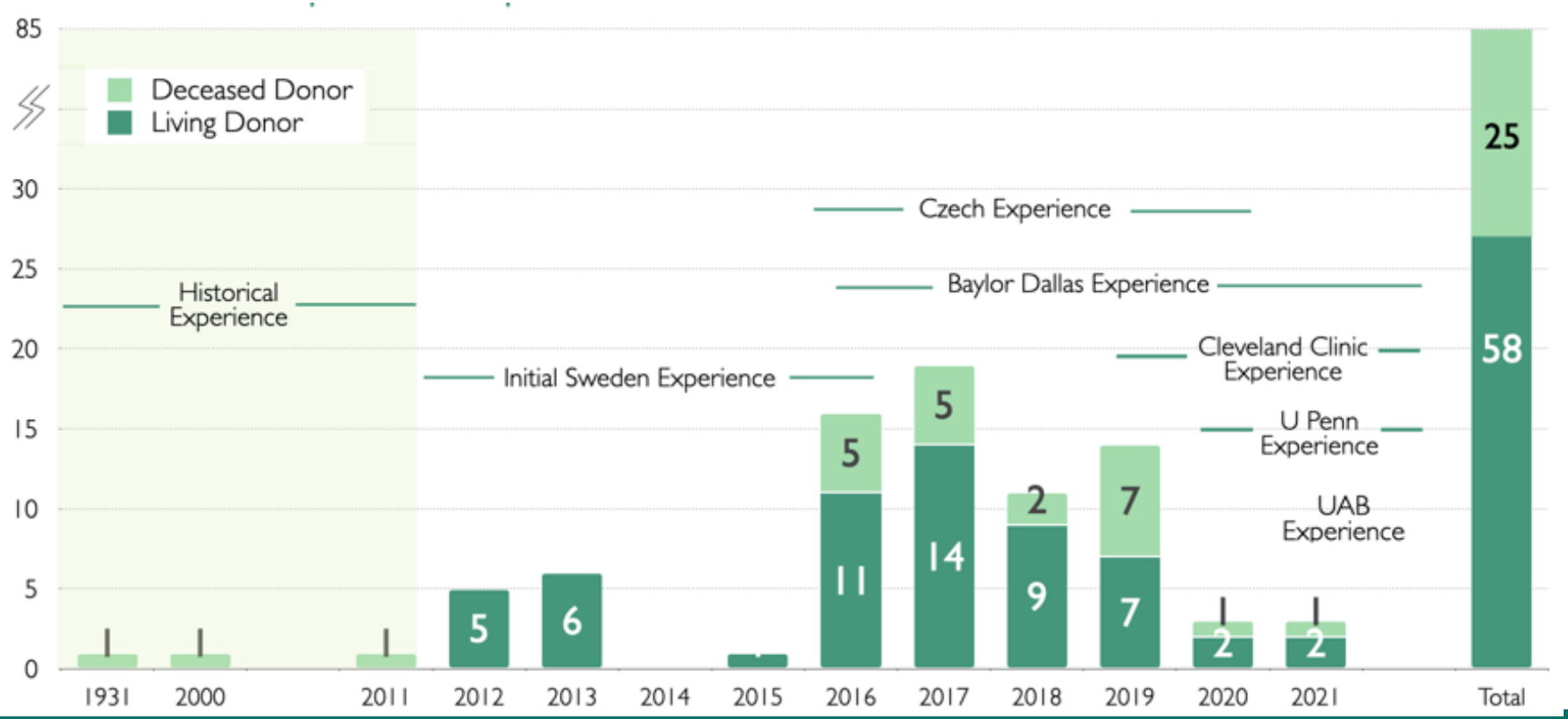
Uterus Transplant - A Unique Type of Transplant

1) Non-lifesaving transplant (However can enhance QOL for parents)
2) Recipients are healthy w/out comorbidities (some MRKH have solitary kidney)
3) Temporary transplantation
4) Living or deceased donor option
5) Stepwise success determined years posttransplant
6) Living donors renounce an organ for transplantation after it has exhausted its function in the donor
7) One allograft shared by two recipients

The First Baby Born From A Transplanted Uterus in the US

November 2017

World Uterus Transplant Experience



Logistical Issues – Donor Organ Supply

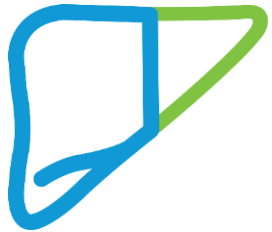
Potential Annual Demand for Uterus		Potential Annual Supply Deceased Donor Uterus
~ 3050 Uterus Allograft	Mismatch ≠	<< 2000 Deceased Donor Uterus Allograft

Deceased donor supply unlikely to demand → Need living donors

Liver Paired Donation Program

Nation's first multi-hospital liver paired donation (LPD) program

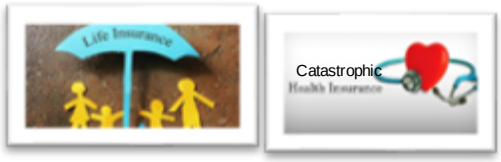
- Increase access to living donor transplant
- Increase candidate access earlier, when in better health
- Determine how to create a nationally available program, how to sustain it, identify challenges
- Keep it algorithmically simple, 2-way only



Insurance coverage

In partnership with the American Foundation for Donation and Transplant

- Accidental death and dismemberment
  - maximum, one year $500,000
- Medical complications
  - $5,000 deductible, maximum $250,000
- Temporary disability
  - maximum $100 per week
- Permanent disability
  - $5000.00 per month up to maximum $250,000
- Traveling companion benefit (one person)
  - One year $500,000 accidental death and dismemberment benefit



Center Requirements

All participating centers must:

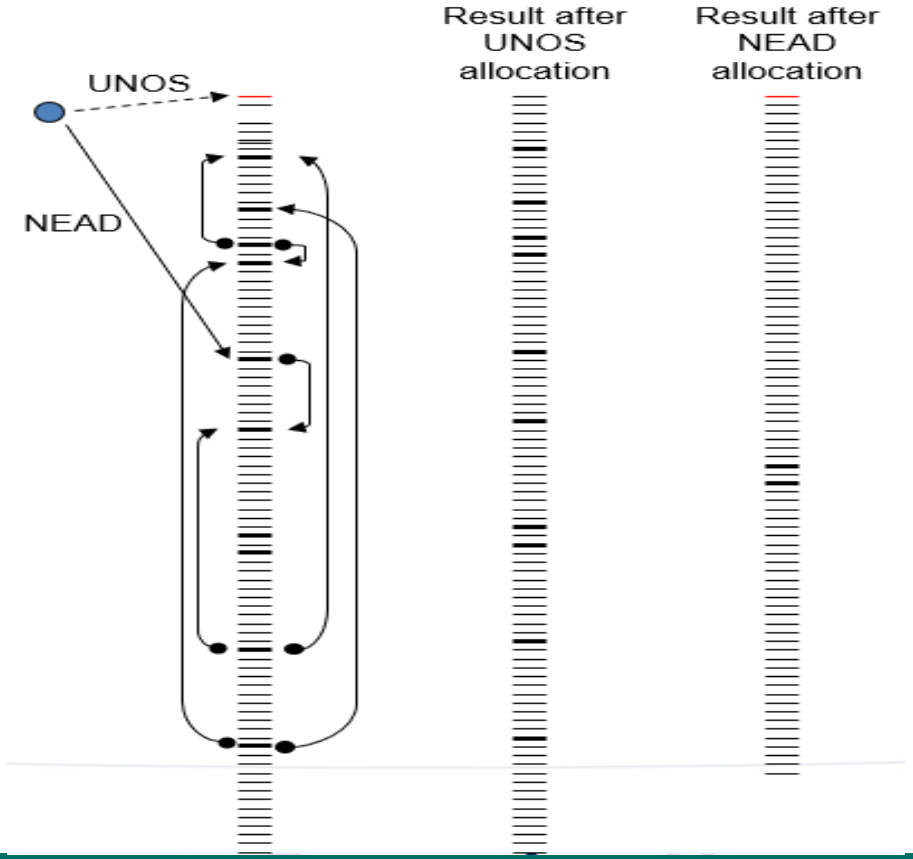
- ✓ Have performed ~20 adult LDLTs or more over the last 3 years or a children's hospital affiliated with a donor recovery hospital who meets criteria
- ✓ Have consistent liver transplant program directorship over the last 3 years;
- ✓ Not be under OPTN review for liver transplant or living liver donation-related outcomes

Centers must also:

- ✓ Agree to the Participation Agreement;
- ✓ Abide by the Liver Paired Donation Pilot Program Operational Guidelines;
- ✓ Be active OPTN and UNOS members and OPTN-approved to perform liver transplants and living liver recoveries;
- ✓ Abide by all relevant OPTN and UNOS Policies;
- ✓ Agree to share feedback with UNOS to facilitate improvements to the program;

Expand Donor and Candidate Eligibility

Deceased Donor-initiated Chains



Patient on Deceased Donor Waiting List without an incompatible willing living donor

*Estimated Distribution by Ethnicity**

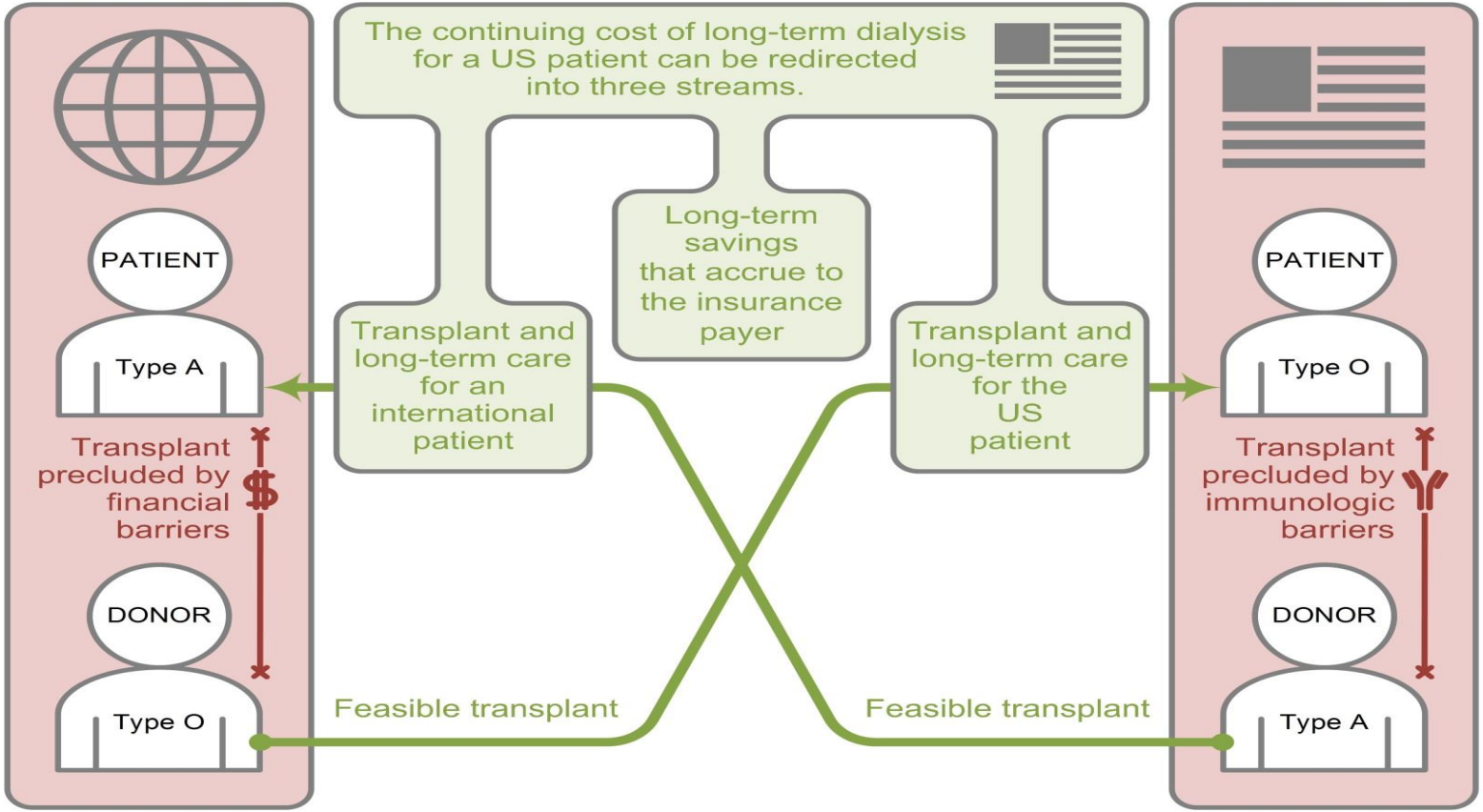
Caucasian	38.4%
African American	34.0%
Hispanic	18.1%
Asian	8.1%
Other	1.4%

Patient on Deceased Donor Waiting List with an incompatible, but willing living donor

*Estimated Distribution by Ethnicity**

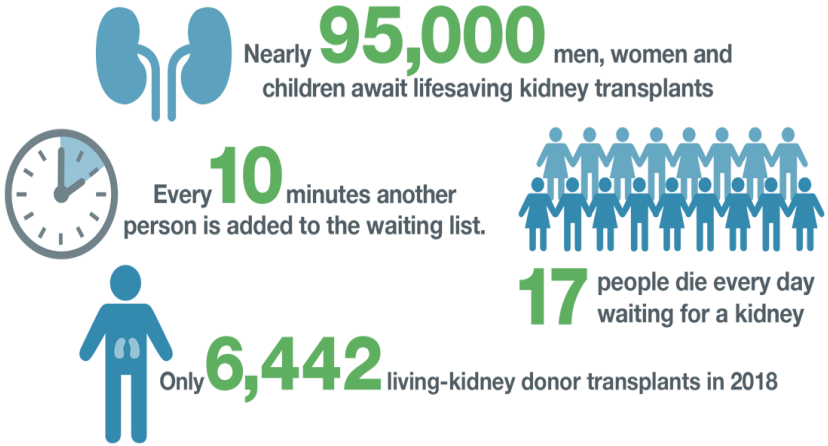
Caucasian	70.3%
African American	12.5%
Hispanic	13.0%
Asian	2.9%
Other	1.2%

Global Kidney Exchange



Living Donor Registry

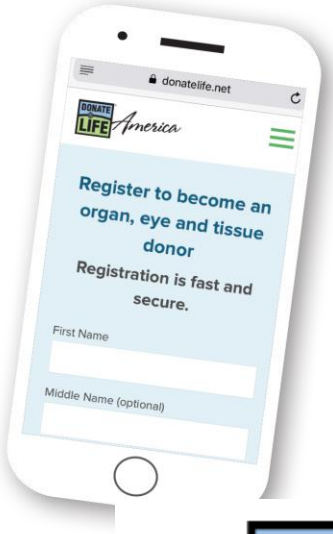
- More lives would be saved through living donation.
- The majority of the public expresses support of living donation; however, the number of living donor transplants has remained flat.
- Estimated that for every 35 living donors, there may be another 26 willing to donate.
- Transplant Centers may not be equipped with personnel and resources to efficiently conduct an abundance of living donor prospect testing.



DONATE LIFE America

National Donate Life Registry

All living donor prospects will enter the living donor registry pathway through the National Donate Life Registry (NDLR)



Here's why:

More than 6 Million Registrations

- **4,000 NEW Registrations Every Day**
- 8.5% Registration Conversion Rate
  - *Exceeding national nonprofit benchmark of 1.5%*
- 1,263 Campaign Pages with more than 700 organization pages
- National Partnerships with Apple, Walgreens and Android
- 1.9 million donor searches conducted in last 24 months
- All NDLR data is handled in accordance with HIPPA privacy standards and is only accessed by certified organ recovery organizations

Living-Donor Prospect Experience

1. Express interest through the National Donate Life Registry

4. Return sample for lab analysis

2.Complete online health screen questionnaire

5.Potential donor shared with transplant program through UNOS connectivity

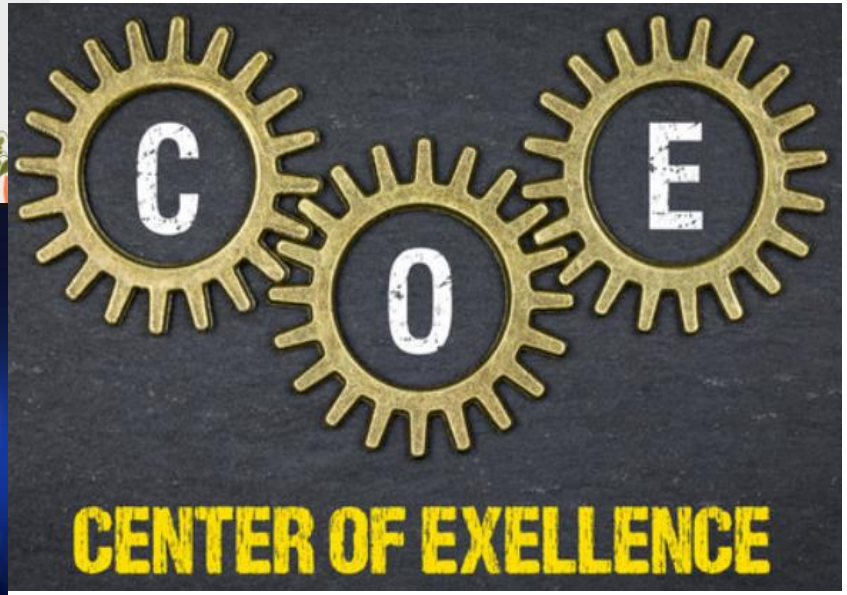
3. Collect saliva sample

6. Follow-up by transplant program

DONATE LIFE America


Contact Center
Field Reps
CENTER OF
EXCELLENCE


1.
2.
3.
C.O.E CENTER
OF EXCELLENCE


C
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CENTER OF EXELLENCE

Living Donor Transplant Centers of Excellence

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

BlueCross BlueShield

OPTUM®

What is the Future of LD Transplant?

FOR