



# Blood and Treasure: The High Costs and Even Greater Benefits of Transplanting Challenging Kidneys

Luke Preczewski  
University of California, Davis

---



CUTTING EDGE OF  
TRANSPLANTATION

AST | AMERICAN SOCIETY OF  
TRANSPLANTATION

**RESOLVING THE ORGAN SHORTAGE**



PRACTICE |



POLICY |



POLITICS

FEBRUARY 25-27, 2016 • PHOENIX, ARIZONA

# Conflict of Interest Disclosure

- I have no relevant financial relationships to disclose.
- This presentation will not discuss off-label use of FDA-approved drugs or devices.

# Life in Region 5

	Region 5	US	Region 5 %
<b>10/2/15 Waitlist</b>	<b>21,652</b>	<b>101,160</b>	<b>21.4%</b>
<b>2014 WL Additions</b>	<b>6576</b>	<b>36,156</b>	<b>18.2%</b>
<b>LD Transplants</b>	<b>820</b>	<b>5538</b>	<b>14.8%</b>
<b>DD Transplants</b>	<b>1997</b>	<b>11570</b>	<b>17.3%</b>
<b>Total Transplants</b>	<b>2817</b>	<b>17108</b>	<b>16.5%</b>
<b>Total Population</b>			<b>16.7%</b>

Source: *Preczewski, L, Presentation to OPTN Region 5 Collaborative 2015*

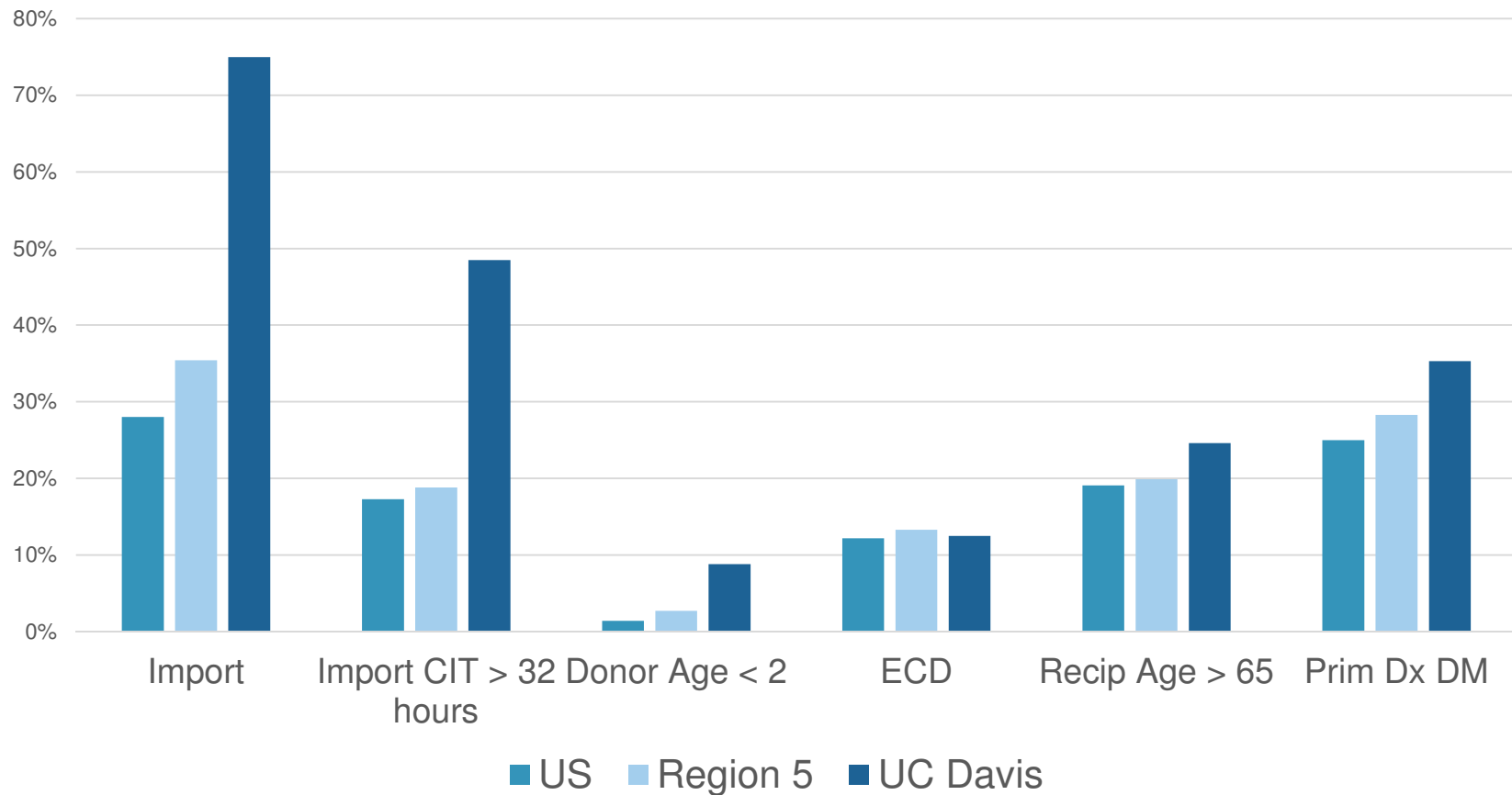
**UC DAVIS**  
**HEALTH SYSTEM**

# Can Anything Be Done?

- Many kidneys discarded or not recovered
  - AKI
  - Pediatric en bloc, especially small donors
  - Positive Serology
  - PHS high risk
  - Long Cold Ischemic Time
  - DCD
  - Combined Risk Factors

**UCDAVIS**  
**HEALTH SYSTEM**

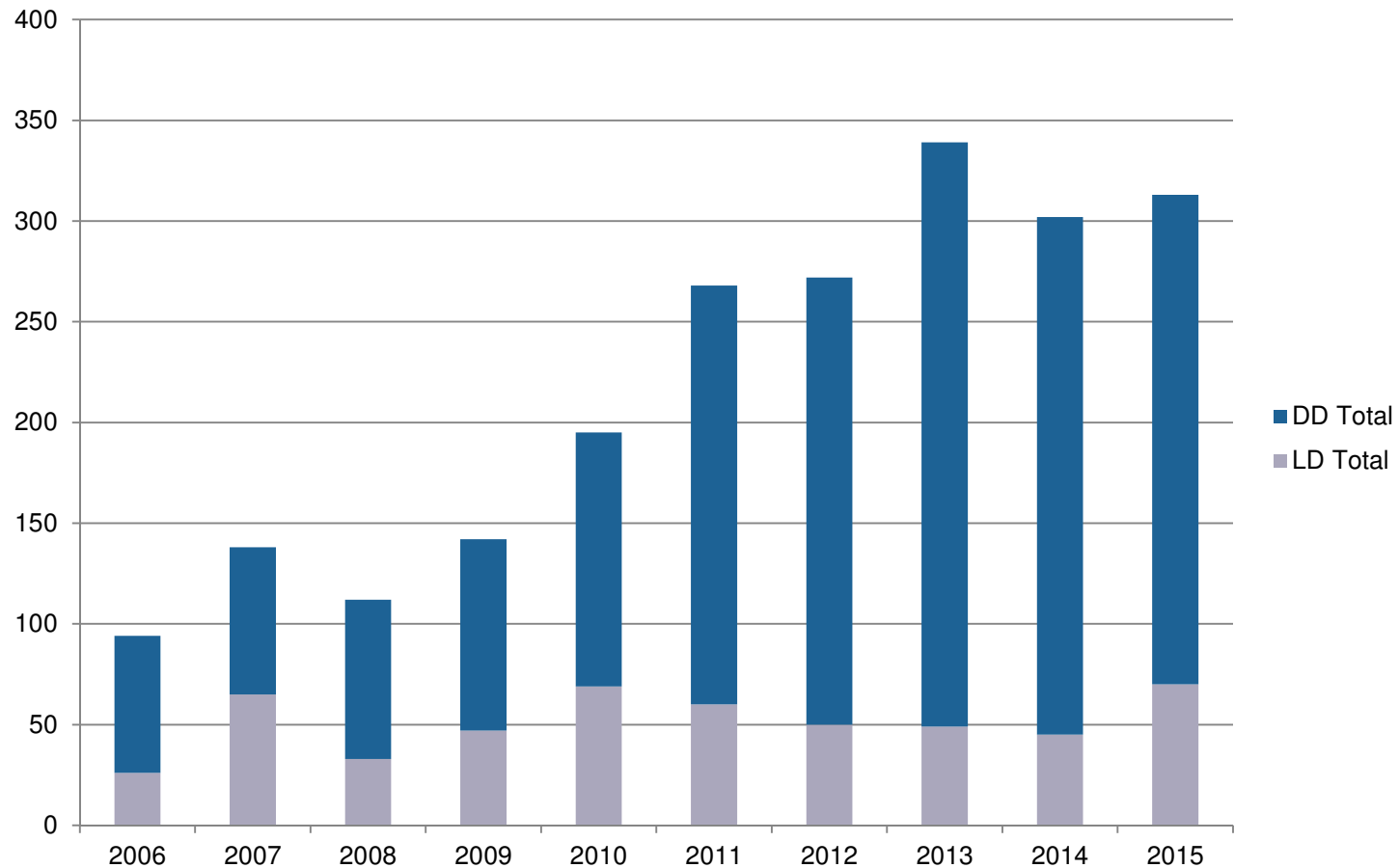
# Expanding Access



Source: *Scientific Registry of Transplant Recipients PSR*

**UC DAVIS**  
**HEALTH SYSTEM**

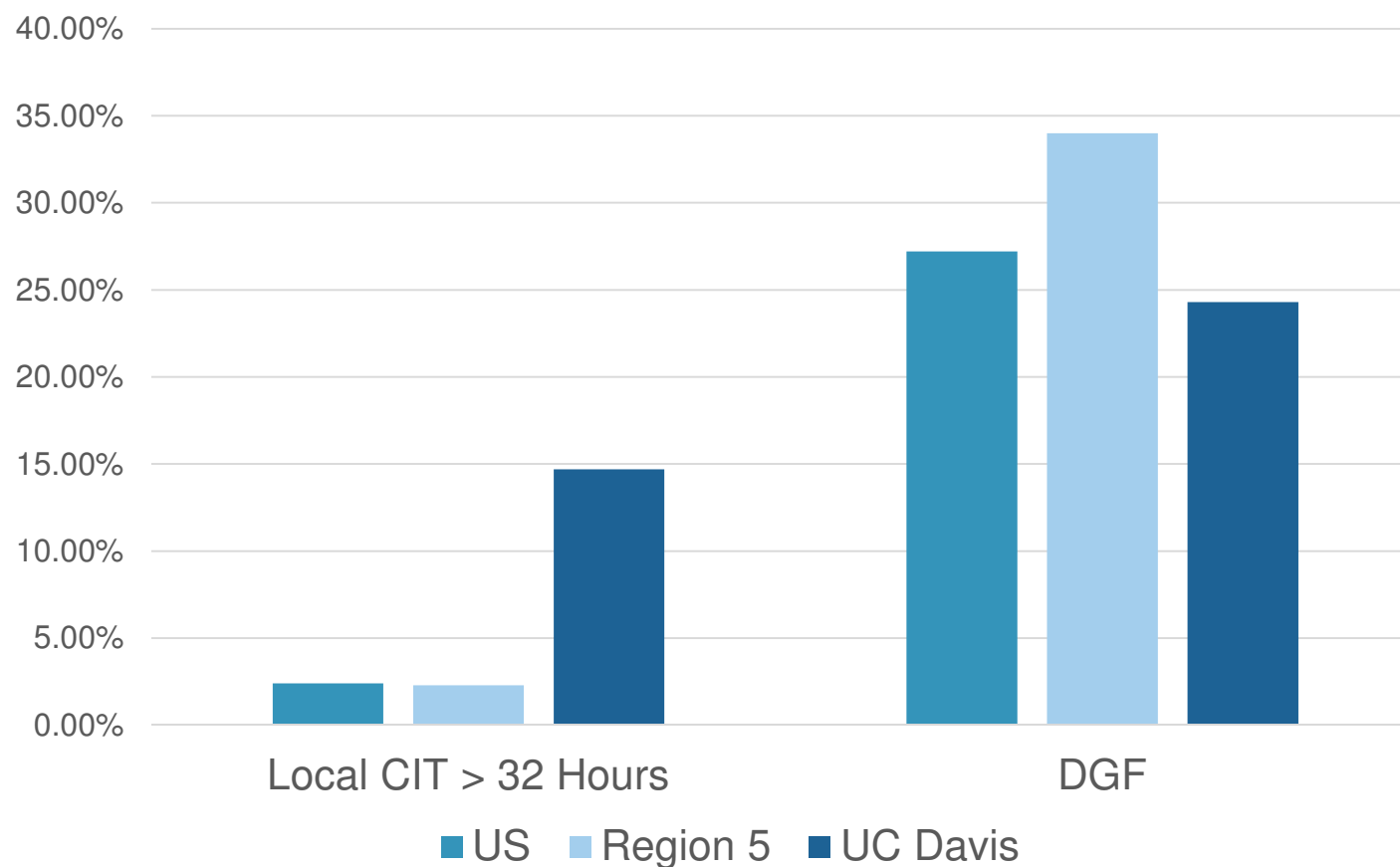
# UC Davis Kidney Program Growth



Source: Internal Data, Fiscal Years

**UC DAVIS**  
**HEALTH SYSTEM**

# Local Consequences

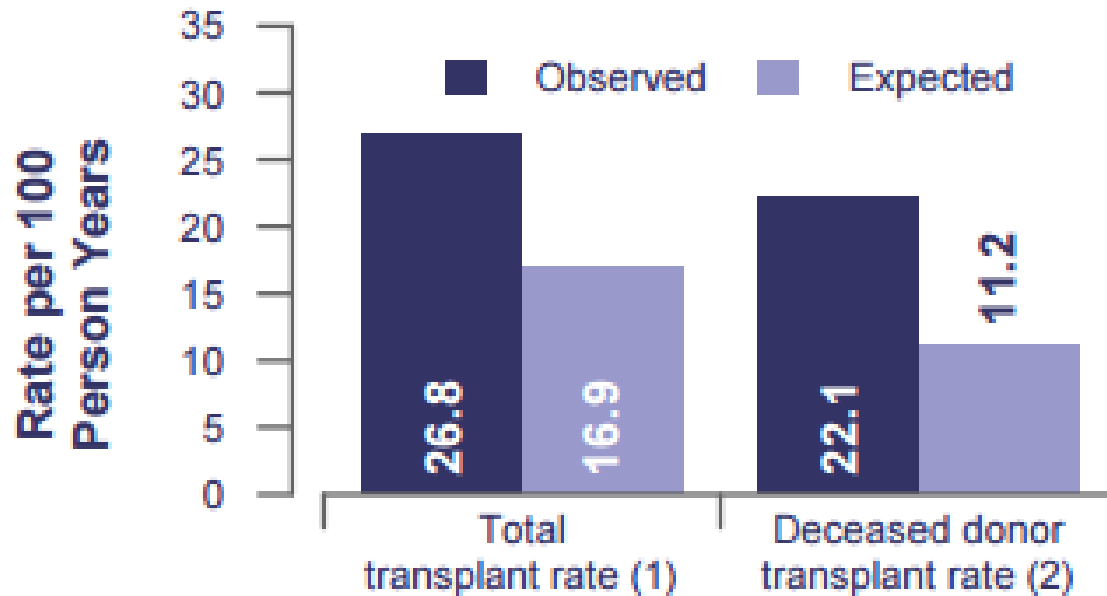


Source: *Scientific Registry of Transplant Recipients PSR*

**UC DAVIS**  
**HEALTH SYSTEM**

# Pre-Transplant Outcomes

**Figure A2. Transplant rates**  
07/01/2014 - 06/30/2015



- (1) Statistically higher ( $p < 0.01$ )
- (2) Statistically higher ( $p < 0.01$ )

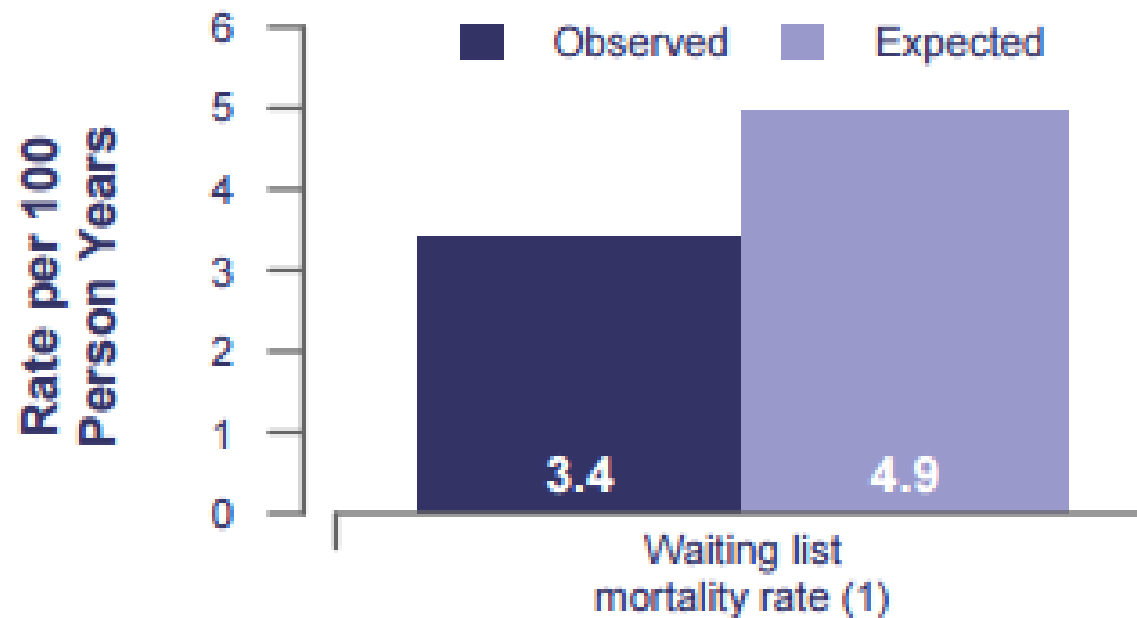
Source: Scientific Registry of Transplant Recipients PSR

**UC DAVIS**  
**HEALTH SYSTEM**



# Pre-Transplant Outcomes

Figure A3. Waiting list mortality rates  
07/01/2014 - 06/30/2015



(1) Statistically lower ( $p=0.010$ )

Source: Scientific Registry of Transplant Recipients PSR

**UC DAVIS**  
**HEALTH SYSTEM**

# Pre-Transplant Outcomes

**Table B9. Time to transplant for waiting list candidates\***  
**Candidates registered on the waiting list between 07/01/2009 and 12/31/2014**

Percentile	Center	Months to Transplant**		U.S.
		OPO/DSA	Region	
5th	1.5	1.8	2.3	2
10th	3.1	3.5	5.4	4.4
25th	11.1	12.9	19.5	15.9
50th (median time to transplant)	32.2	40.0	Not Observed	Not Observed
75th	Not Observed	Not Observed	Not Observed	Not Observed

\* If cells contain "Not Observed" fewer than that percentile of patients had received a transplant. For example, the 50th percentile of time to transplant is the time when 50% of candidates have received transplants. If waiting times are long, then the 50th percentile may not be observed during the follow-up period for this table. Also, if more than 50% of candidates are removed from the list due to death or other reasons before receiving transplants, then the 50th percentile of time to transplant will not be observed.

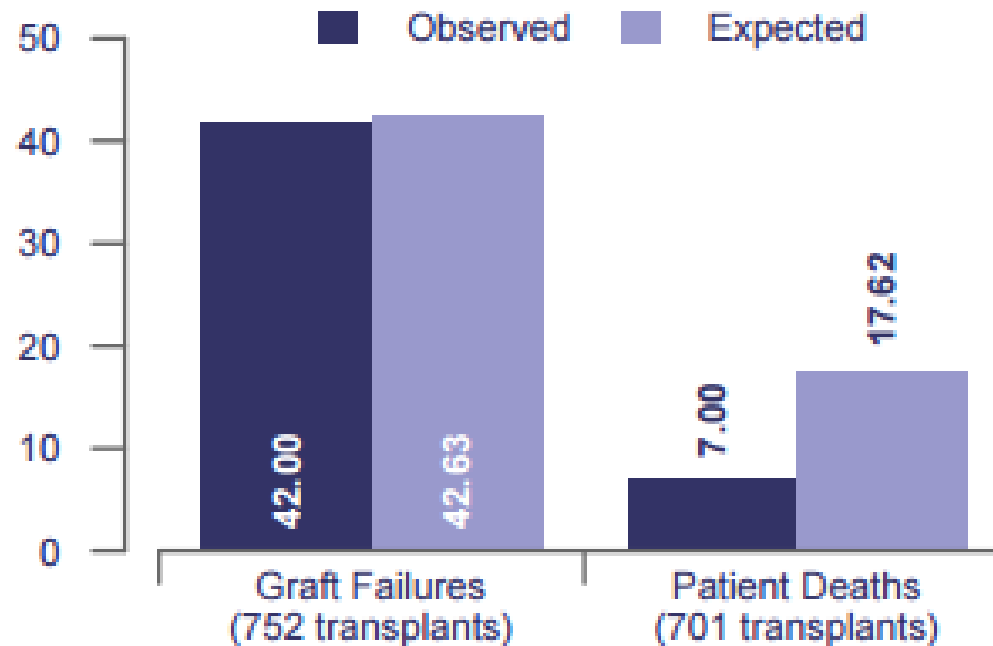
\*\* Censored on 06/30/2015. Calculated as the months after listing, during which the corresponding percent of all patients initially listed had received a transplant.

Source: Scientific Registry of Transplant Recipients PSR



# Post-Transplant Outcomes

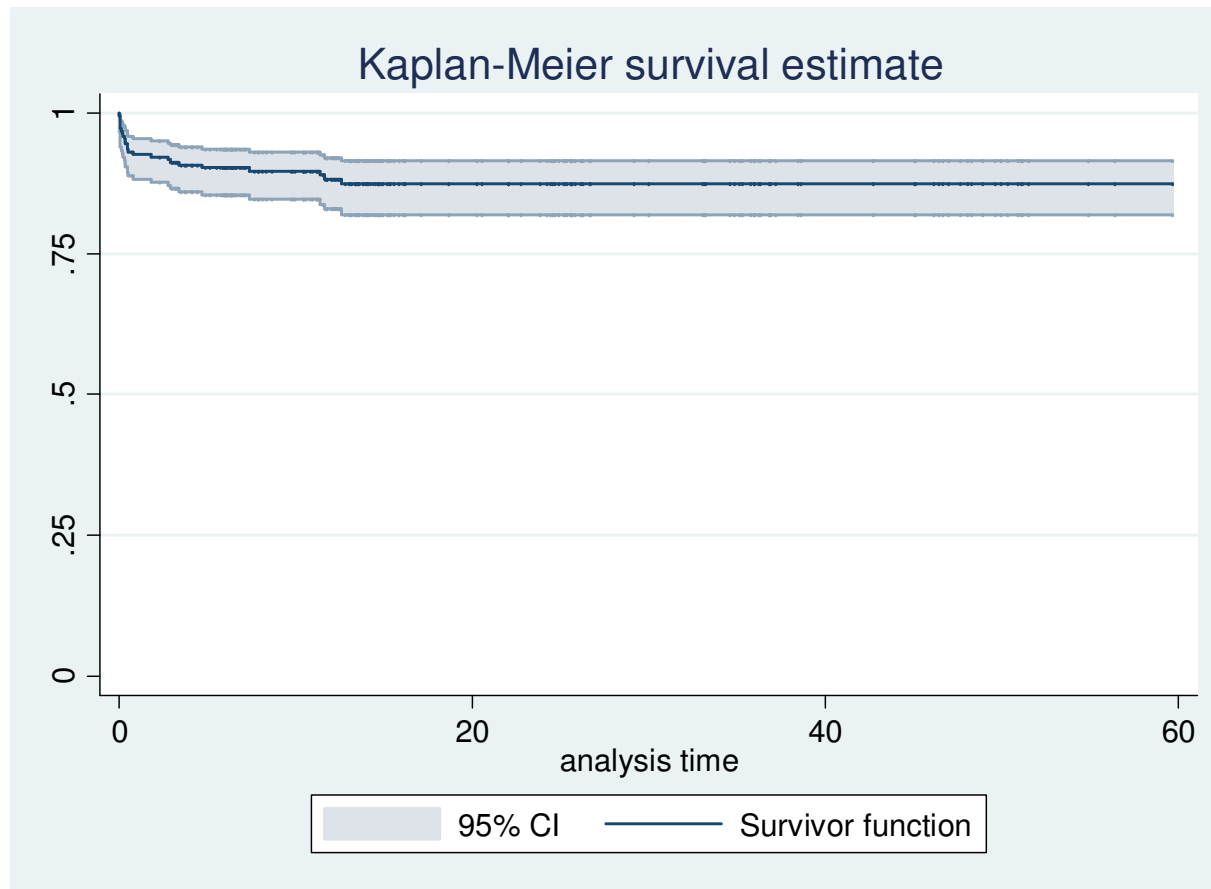
Figure A4. First-year adult graft and patient survival: 07/01/2012 - 12/31/2014



Source: Scientific Registry of Transplant Recipients PSR

**UC DAVIS**  
**HEALTH SYSTEM**

# Survival of Pediatric En Bloc Kidneys



Source: Preczewski, L, et al. Presentation at American Transplant Congress 2015

**UC DAVIS**  
**HEALTH SYSTEM**

# Pediatric En-Bloc Kidney KDPI

Table 2: Estimated Kidney Graft Survival Rates, by Donor KDRI

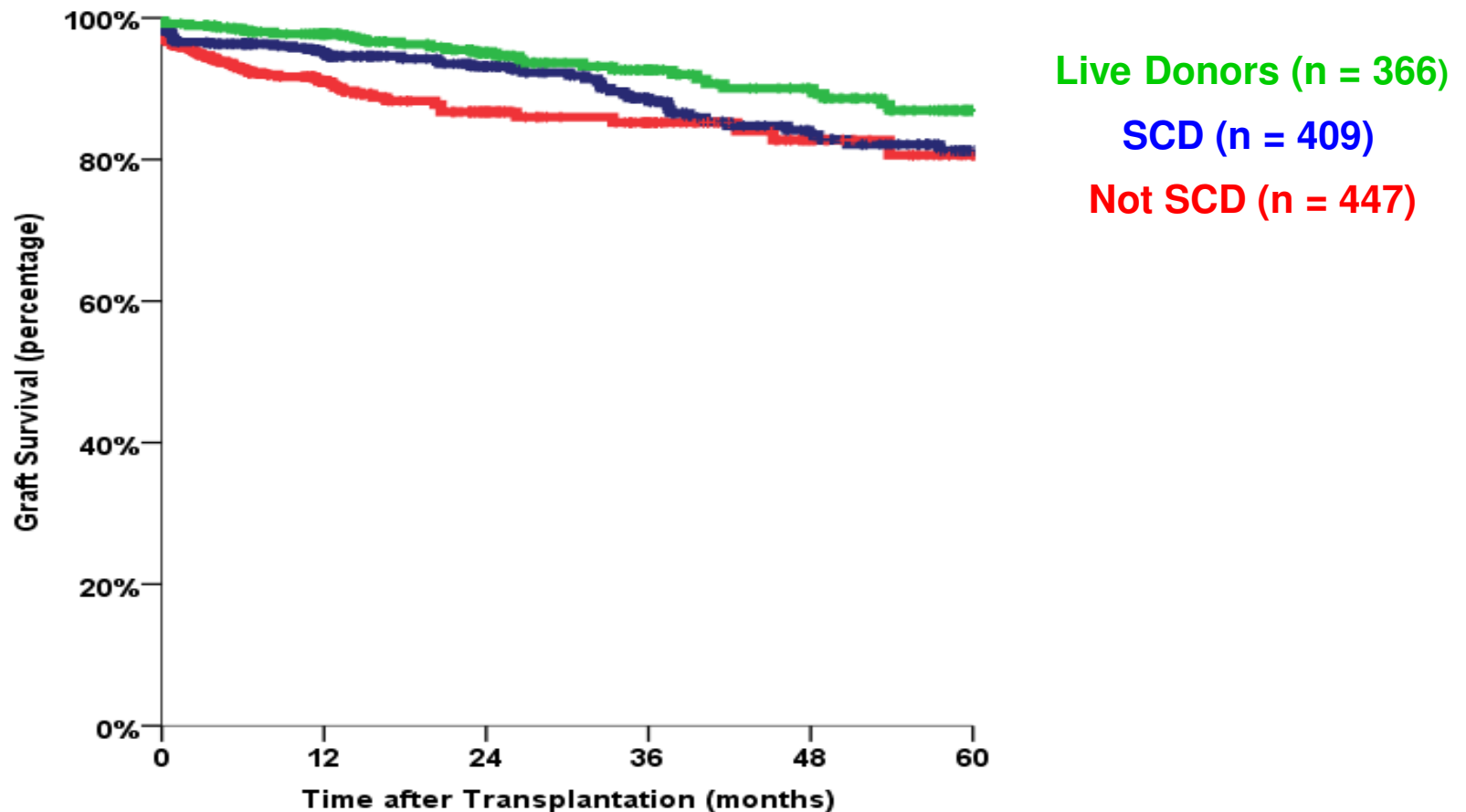
KDPI	KDRI	Estimated SINGLE Kidney Graft Survival Rates				
		1 Year	2 Years	3 Years	5 Years	8 Years
1%	0.57	95.3%	92.7%	89.9%	83.3%	72.2%
5%	0.63	94.8%	92.0%	88.9%	81.8%	69.9%
10%	0.67	94.4%	91.4%	88.1%	80.6%	68.1%
20%	0.75	93.8%	90.5%	86.8%	78.6%	65.1%
30%	0.82	93.2%	89.5%	85.6%	76.7%	62.3%
40%	0.91	92.5%	88.5%	84.2%	74.5%	59.2%
50%	1.00	91.7%	87.3%	82.6%	72.2%	55.9%
60%	1.11	90.8%	86.0%	80.8%	69.6%	52.4%
70%	1.23	89.8%	84.5%	78.9%	66.7%	48.6%
80%	1.39	88.5%	82.6%	76.5%	63.3%	44.2%
90%	1.62	86.7%	79.9%	72.9%	58.3%	38.2%
95%	1.84	85.0%	77.5%	69.8%	54.2%	33.5%
99%	2.25	81.8%	72.9%	64.2%	46.9%	25.9%

Based on OPTN data as of April 4, 2014 including primary, solitary, adult, deceased donor kidney transplants from 2004-2011. These survival rates are for SINGLE kidney alone transplants; survival rates are generally higher for en bloc or double kidney transplants. These rates were not adjusted for recipient characteristics, but instead reflect the expected survival averaged across the broad spectrum of adult recipients. The survival rates for any particular recipient will depend on specific characteristics of that recipient. Survival rates were estimated using a Cox regression model with log(KDRI) as the sole independent variable and graft failure defined as loss of graft or patient death. Donor reference population: all deceased kidney donors recovered for transplantation in 2013.

Source: Preczewski, L, et al. Presentation at American Transplant Congress 2015

**UC DAVIS**  
**HEALTH SYSTEM**

# Survival of Challenging Kidneys

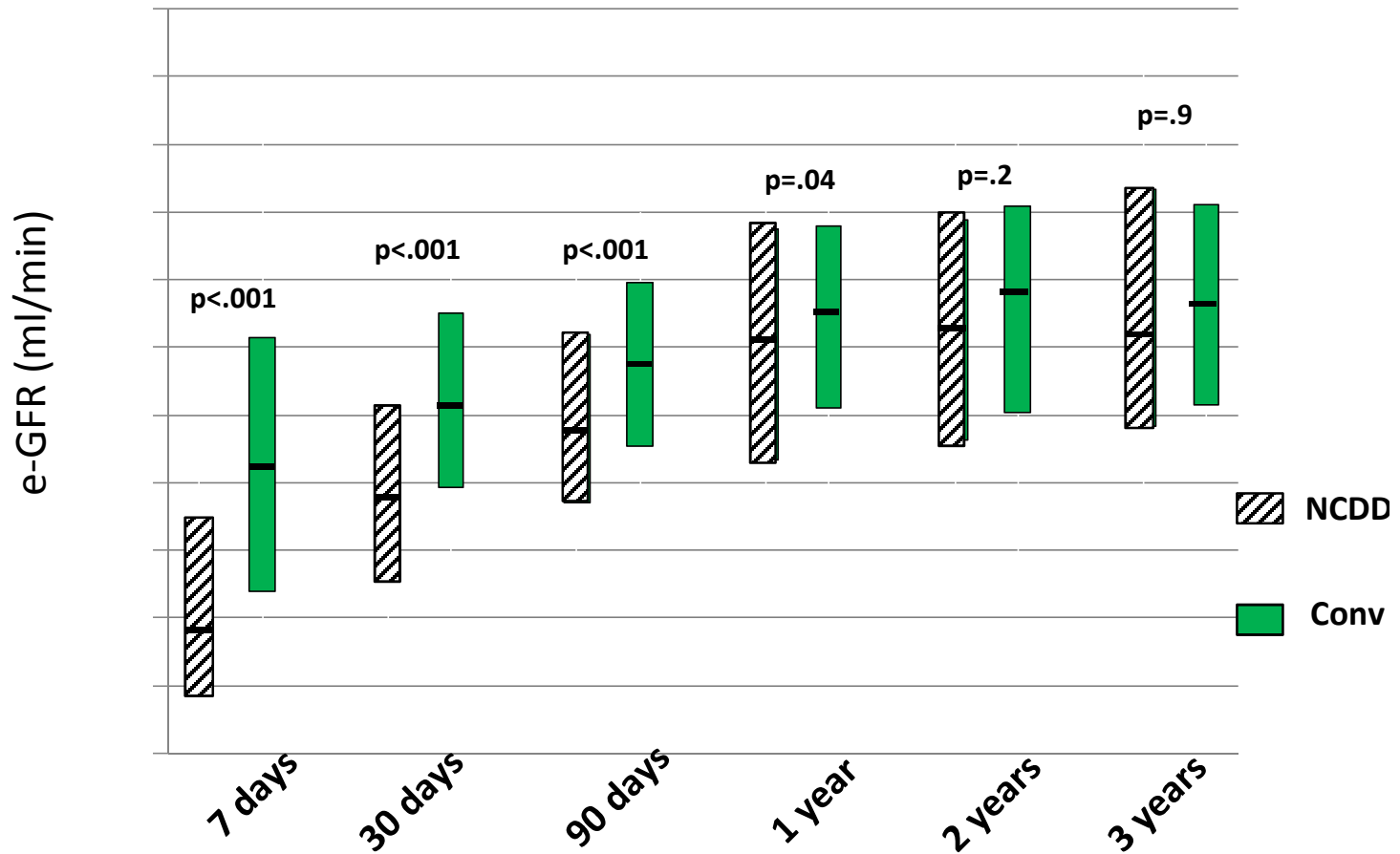


Source: Adey, D, et al. Presentation at American Transplant Congress 2013

**UCDAVIS**  
**HEALTH SYSTEM**

# Estimated-GFR

by Type of Deceased-Donor



Source: Adey, D, et al. Presentation at American Transplant Congress 2013

**UC DAVIS**  
**HEALTH SYSTEM**



# The UC Davis Kidney Experience

- Largest US Deceased Donor Kidney Transplant Center Three Years Running (Hopefully Four)
- One of Only Five US Centers with Statistically Significantly Better than Expected One-Year Patient Survival
- Shortest Wait Time in California
- Challenging Organs; Challenging Recipients
- Excellent Post-Transplant Survival

**UCDAVIS**  
**HEALTH SYSTEM**



# Costs of Expanding Donors

- Surgeon Effort (Center)
- Nephrologist Effort (Center)
- On-Call RN Effort (Center)
- Admissions Without Transplants (Patients/Center/Payers)
- Pumping Costs (Center)
- Discarded Organs (Center/OPOs)
- Increased LOS and DGF (Center/Payers)
- Long Cold Ischemic Time to Other Organs(Center)
- Reintervention (Patients/Center/Payers)

**UCDAVIS**  
**HEALTH SYSTEM**

# Savings of Expanding Donors

- Less Time on Waiting List (Center)
- Avoided Dialysis (Payers/Patients)
- Life Years Gained (Patients)

**UCDAVIS**  
**HEALTH SYSTEM**

# Bottom Line

- Pumping All Kidneys Costs Approximately \$1800/Transplant at UC Davis
- Recipients of Challenging Kidneys Increase Cost Variably.
- Almond, et al estimate suggests DGF adds 76% to inpatient admission cost
- Patients at Our Center Save Just Under 2 Years on Dialysis, Equal to \$175,890 in Medicare Cost

*Sources: Internal UC Davis Data (1, 2), Almond, et al (3), USRDS 2013 Annual Report (4)*

**UC DAVIS**  
**HEALTH SYSTEM**

# The Alignment Problem

- Centers and OPOs bear the cost (and regulatory risk) of using these kidneys
- Patients receive the most important benefit of improved quality and quantity of life
- Payers receive a huge financial benefit
- Physician reimbursement poorly compensates nephrologists and surgeons for this additional effort

**UCDAVIS**  
**HEALTH SYSTEM**

Thank You

**UCDAVIS**  
**HEALTH SYSTEM**

**AST** | AMERICAN SOCIETY OF  
TRANSPLANTATION

© 2016 AST

CUTTING EDGE OF TRANSPLANTATION 2016  
**RESOLVING THE ORGAN SHORTAGE**  
PRACTICE | POLICY | POLITICS