AST | AMERICAN SOCIETY OF TRANSPLANTATION

Current State of Organ Utilization Enhancement Efforts

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CUTTING EDGE OF TRANSPLANTATION

TRANSPLANT SUMMIT 2020

BALANCING EQUITY AND UTILITY IN THE FACE OF AN ORGAN SHORTAGE

Disclosures

- EBSCO Industries Inc - content writer
- Transplant Solutions LLC – consultant
- Medeor Therapeutics – site PI
- American Society of Transplantation – Chair, Education Committee

Learning Objectives

1. Define "realization rate" in regards to deceased organ donor potential
2. Summarize current organ utilization enhancement goals and efforts

"What is the potential for U.S. deceased organ donation?"

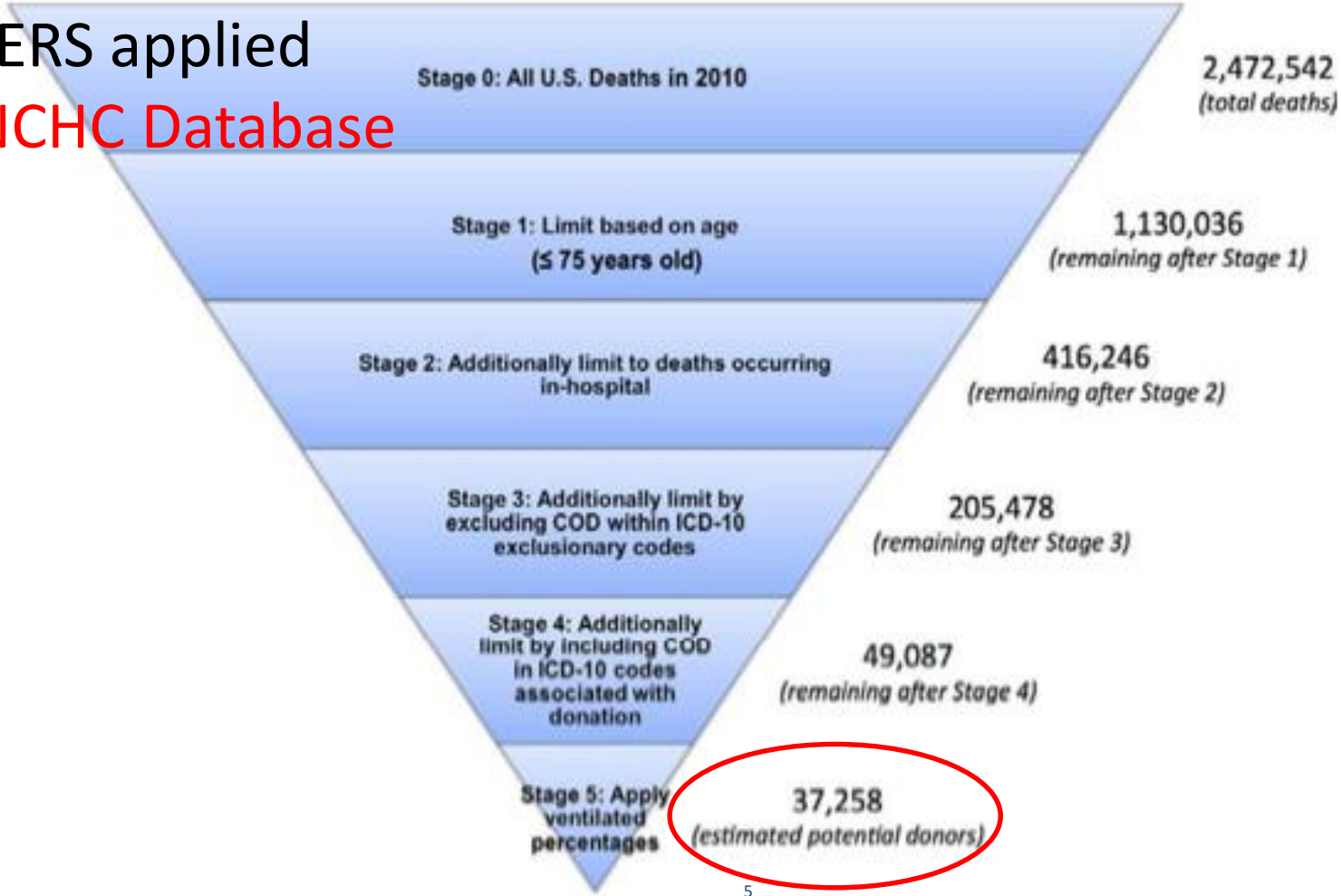
What is our current state of affairs?

- *National Center for Health Statistics (NCHC) Multiple Cause Mortality Database*
- 99% of all US deaths
- Death certificate data
- Lacks co-morbidity info

- *Agency for Healthcare Research and Quality – Nationwide Inpatient Sample (AHRQ-NIS)*
- 95% of all hospital deaths
- Includes disease severity and vent status

Klassen American Journal of Transplantation 2016; 16: 1707–1714

FILTERS applied To NCHC Database



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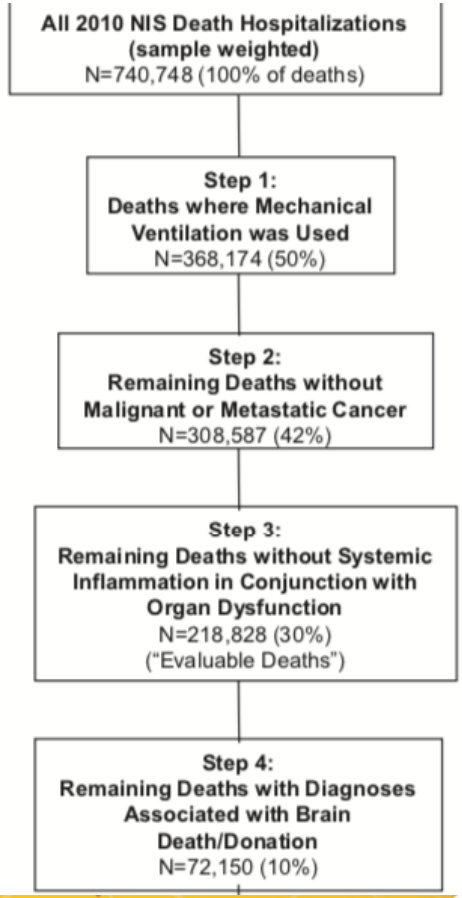
FILTERS applied to AHRQ-NIS database

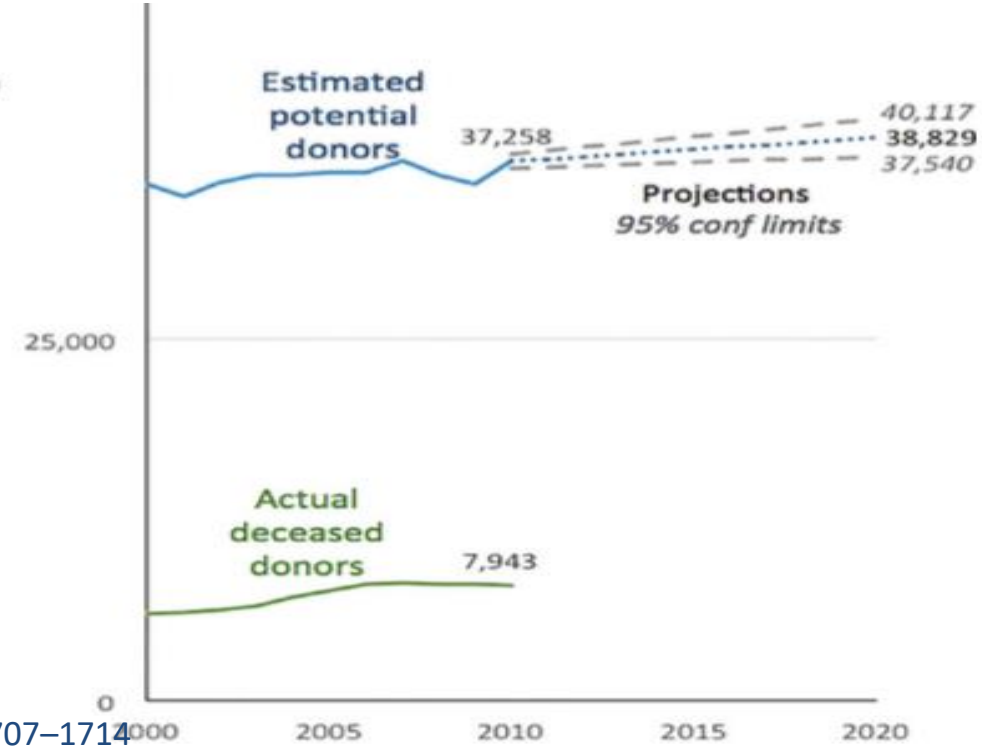


Step 5: Remaining Deaths with Age<=90 N=69,332 (9%)		Length of Stay		
		<=3	<=14	Any
Age	Severity of Illness Score			
0-75	<=18	24,638	38,292	42,436
	Any	25,474	40,835	46,030
0-85	<=18	32,846	51,979	57,816
	Any	33,991	55,604	62,928
0-90	<=18	35,981	57,222	63,590
	Any	37,301	61,360	69,332

Klassen American Journal of Transplantation 2016; 16: 1707–1714

Estimated versus actual deceased donors

- "Realization Rate" is the *actual number of donors* divided by the potential donor estimate
- Realization rate varies by donor age



Klassen American Journal of Transplantation 2016; 16: 1707–1714

Unrealized donor potential exists mostly in the oldest donor populations, age 50–75

Table 1: Age distribution of estimated potential donors based on Agency for Healthcare Research and Quality—Nationwide Inpatient Sample (AHRQ—NIS) compared to actual donors from the Organ Procurement and Transplantation Network (OPTN) dataset

Age	A. Estimated potential donors	B. Actual donors w/organ(s) transplanted (per OPTN)	C. Estimated "realization rates" (actual/potential donors)	D. Gap (unrealized potential donors, A–B)	E. % of unrealized donors
<1	504	112	22.2%	392	1.3%
1–5	634	191	30.1%	443	1.4%
6–10	201	100	49.8%	101	0.3%
11–17	808	427	52.8%	381	1.2%
18–34	5052	2140	42.4%	2912	9.4%
35–49	6268	1961	31.3%	4307	13.9%
50–64	13 274	1965	14.8%	11 309	36.6%
65–75	11 552	463	4.0%	11 089	35.8%
All	38 292	7359	19.2%	30 934	100.0%

DCD donation drops precipitously over age 60

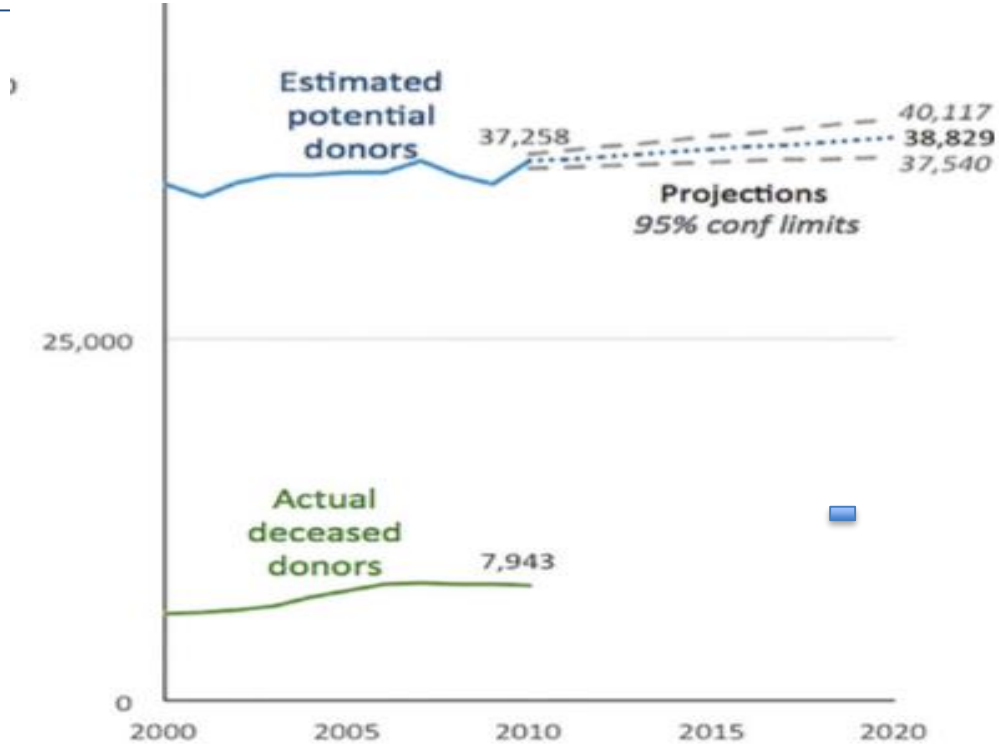
OPTN actual donor numbers 2014-2019

	2014	2015	2016	2017	2018	2019
ALL	14,416	15,069	15,946	16,470	17,571	19,250
DECEASED	8,596	9,079	9,971	10,286	10,721	11,870
LIVING	5,820	5,990	5,975	6,184	6,850	7,380

https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/#

"Realization Rate," is the *actual number of donors* divided by the potential donor estimate

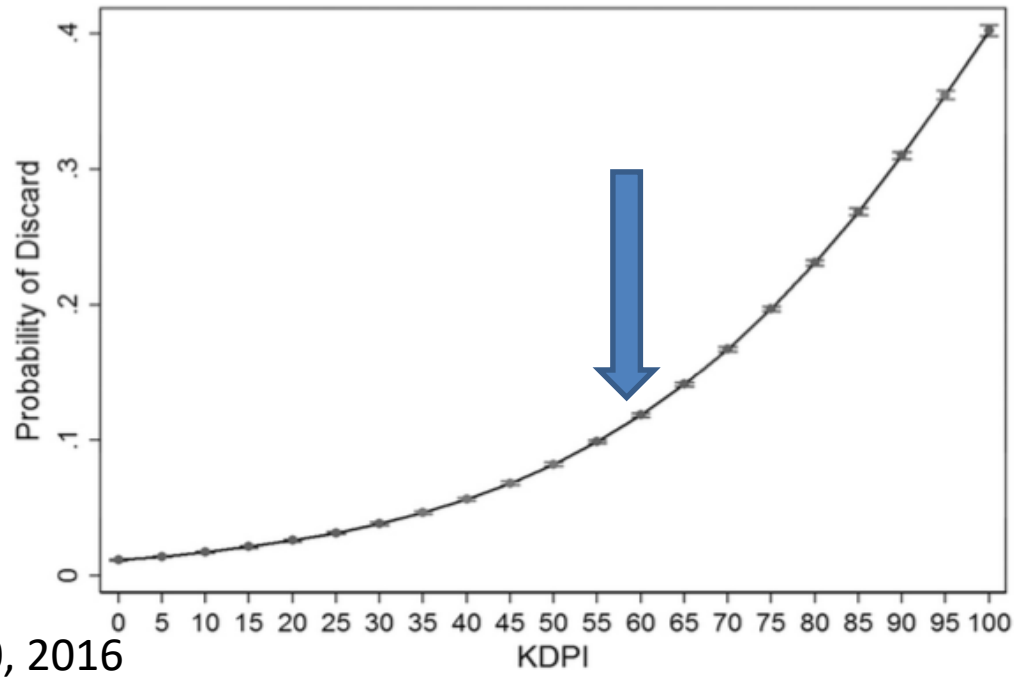
- *unrealized donor potential is greatest in oldest donor populations, particularly those age 50–75*, accounting for greater than 70% of the gap between potential donors and actual donors
- 100% utilization is not a realistically obtainable or an ethically appropriate goal



American Journal of Transpl. 2016;16;1707–1714

Discard rates increase with higher KDPI

- 2-year graft failure rises *linearly* from 9% to about 29% for the highest KDPI donors
- probability of kidney discard *sharply increases* as the KDPI nears 60%



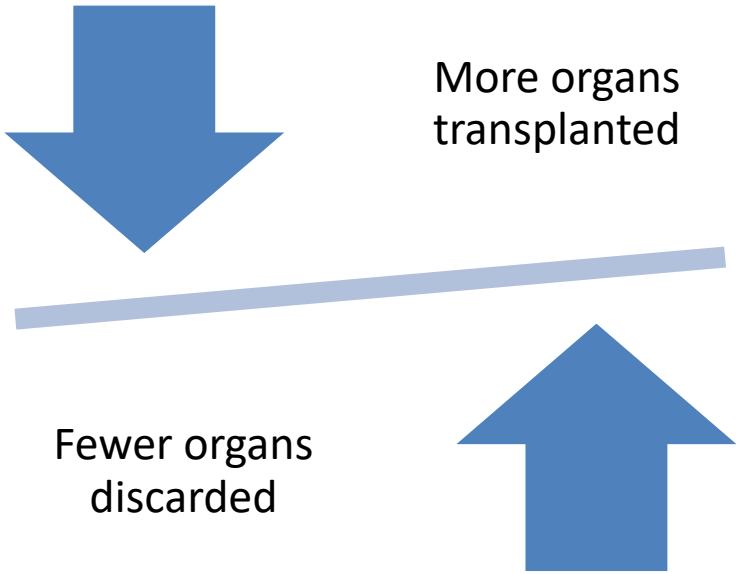
Reese J Am Soc Nephrol 27: 973–980, 2016

Important goals

- GOAL 1: increase the number of actual donors
  - Reduce delayed referrals or failures to obtain authorization
- Goal 2: increase the number of transplanted organs by increasing the realization rate
  - Reduce discard rate of older and DCD donor organs

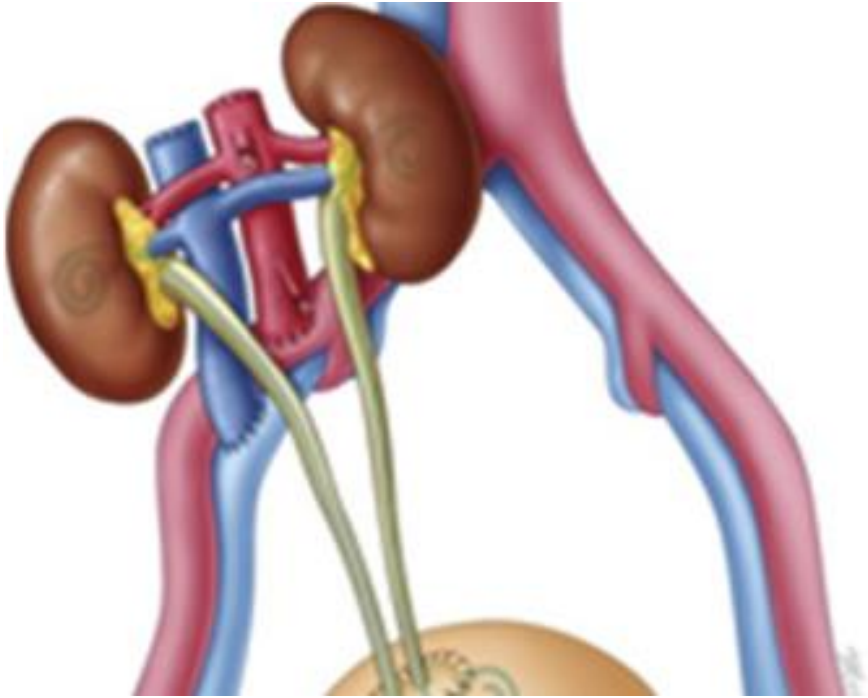
Current efforts to increase utilization

- Dual kidney policy changes
- KAPP
- Offers filter project
- Donor image sharing pilot
- COIIN
- OPO benchmark report
- Organ Utilization tool
- CARE
- UNOS labs
- Simunet
- Improving offer and acceptance processes



Dual kidney transplantation

- Kidneys from donors with KDPI >85% offered out as dual
- The proportion of dual KI TX from these donors increased from
- 56.2% (N=73) pre-policy
- 82.4% (N=14) post-policy



Kidney Accelerated Placement Project (KAPPP)

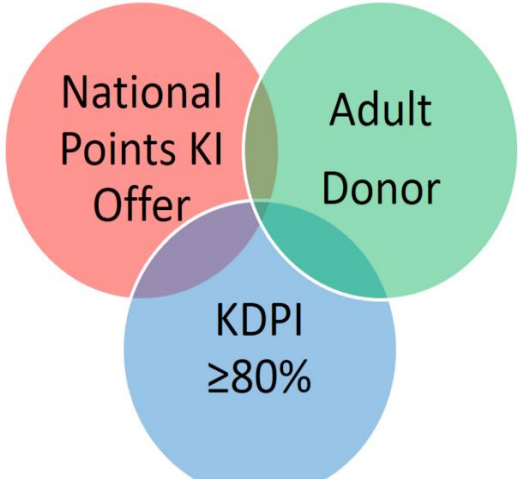
- Accelerate extremely hard-to-place kidneys via the Organ Center
- Offer to centers with a recent established history
  - program has transplanted a kidney with similar or more marginal donor characteristics in the past 2 years
  - Updated monthly

Kidney Accelerated Placement Project (KAPP)

- KAPP offers for that particular match if the kidney reaches the national level and qualifies as hard-to-place

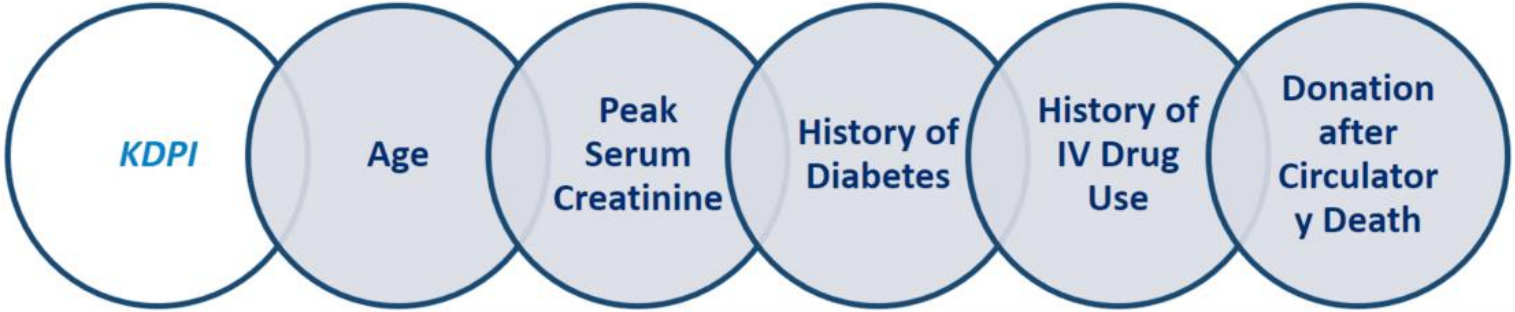
Which Donor Matches Are Included?

Donors must meet ALL 3 triggers for KAP to be applied to a match:



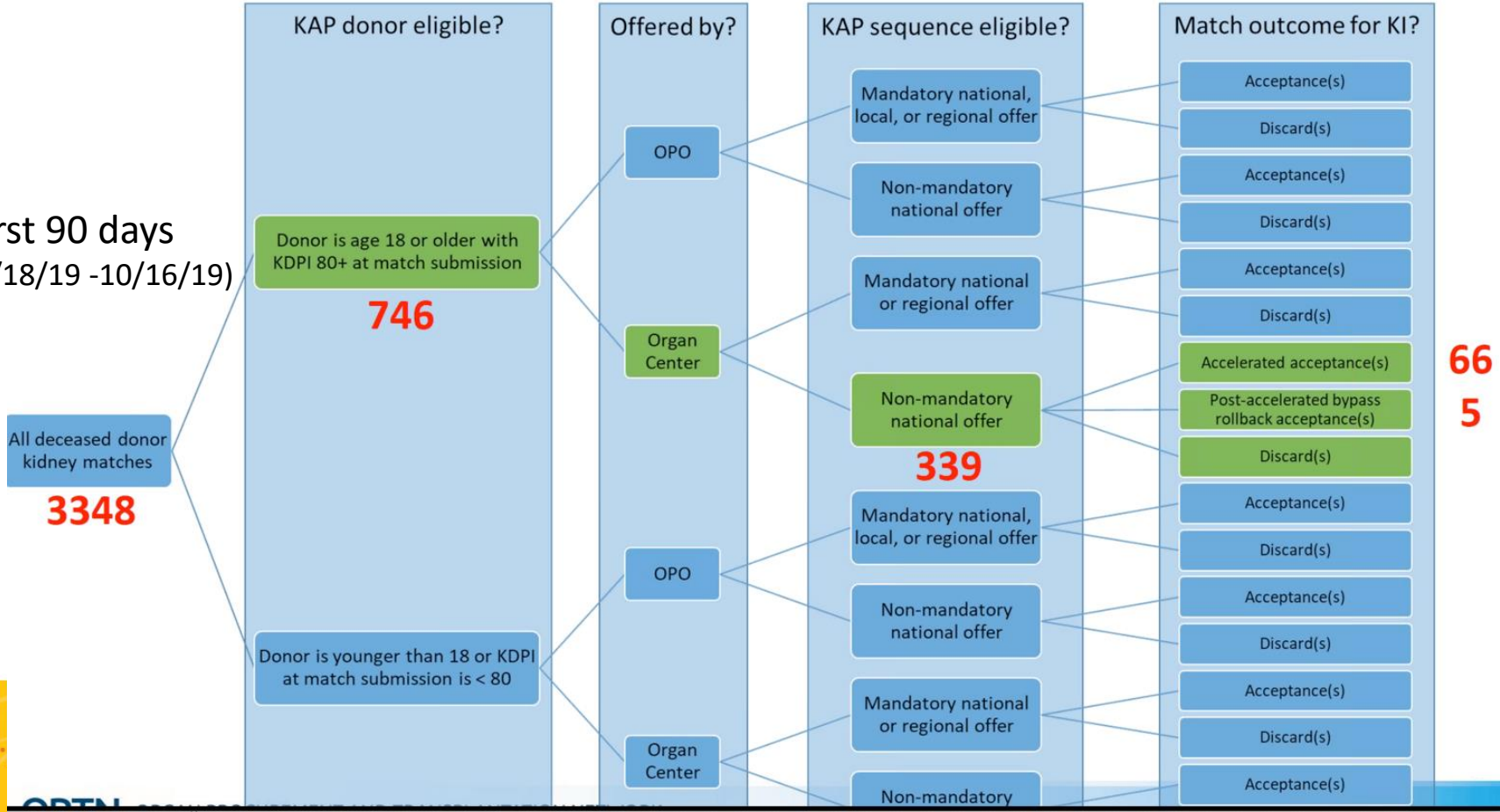
Kidney Accelerated Placement Project (KAPP)

Match Characteristics for KAP



KAPP First 3 months

First 90 days
(7/18/19 -10/16/19)



KAPP - First 6 months

- July 18, 2019 to January 18, 2020
- A total of 6583 kidney match runs
  - Organ Center attempted placement of 735 of these donors - national level sequences
    - 104 of the 735 (14%) donors had a KAP-related acceptance
    - 123 kidneys placed during the **accelerated** portion of KAP
    - 12 kidneys placed after all accelerated centers refused the organ

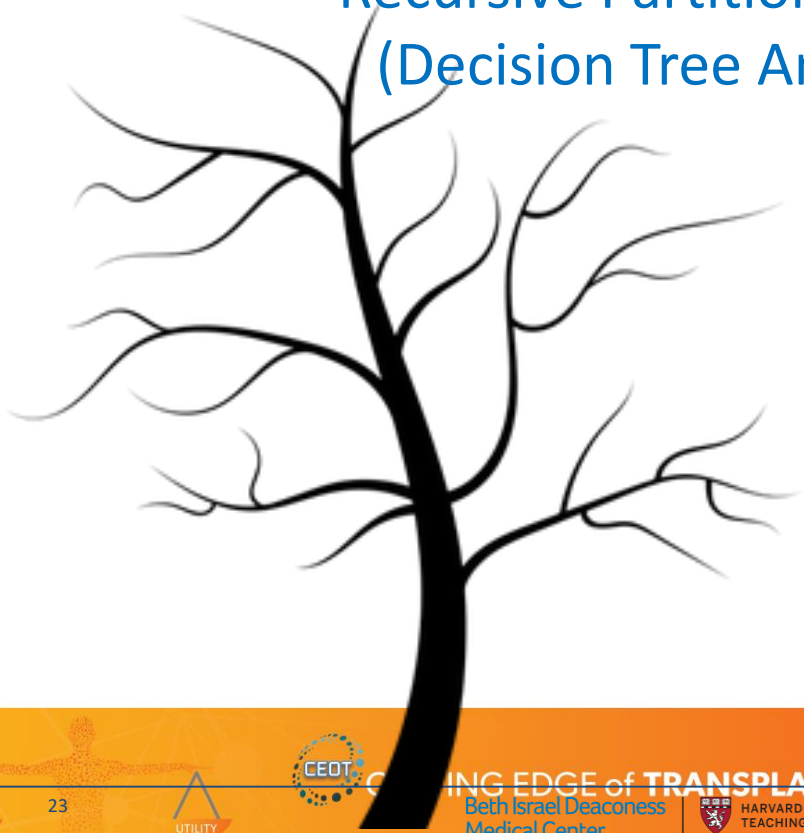
Offers filter project - Change how offers are filtered

- Goals
  - increase the number of transplants by getting to YES faster.
  - Reduce unwanted offers
  - Decrease CIT
  - Increase organ acceptance of hard to place organs

How are filters generated?

- Filters are only generated for types of offers that the center ***never*** accepts
- The center must have received that type of offer from at least 20 different donor and ***never accepted any of them***

Recursive Partitioning
(Decision Tree Analysis)



OPTN Offer Filters Pilot Phases

Done

Phase One

No Bypass

Center Filters

Currently being programmed

Phase Two

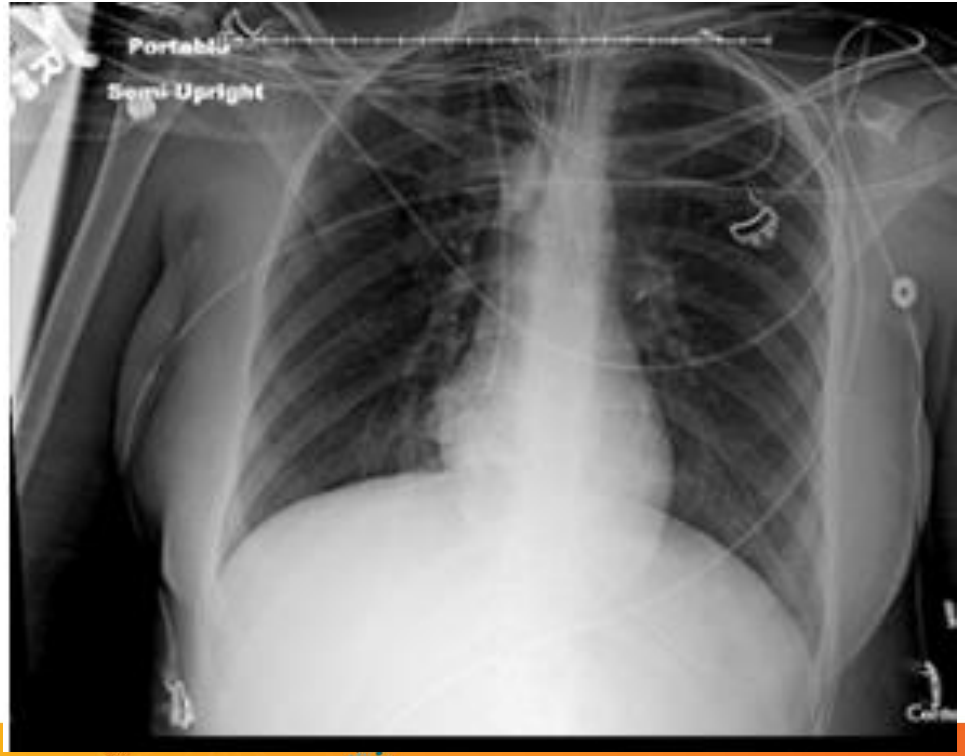
ByPass Option

Phase Three

Candidate Criteria

Donor image sharing project

- DonorNet® accommodates certain images
  - file sizes are limited
  - process is inefficient, preventing routine use
- Existing process can be costly, involving multiple vendors and applications that don't talk with each other.
- This pilot project currently could make a high quality universal donor image system a reality



The Collaborative Innovation and Improvement Network-COIIN

- A 3-year project focused on bringing transplant centers and OPOs together to increase the use of *high KDPI kidneys*.
- 9-month timeframe of three 90-day improvement cycles towards key focus areas: waitlist management, organ offer and acceptance and care coordination
- Participating teams worked collaboratively with those of other centers and received on-site as well as virtual coaching from UNOS performance improvement specialists

Wey *Am J Transplant*. 2019

COIIN

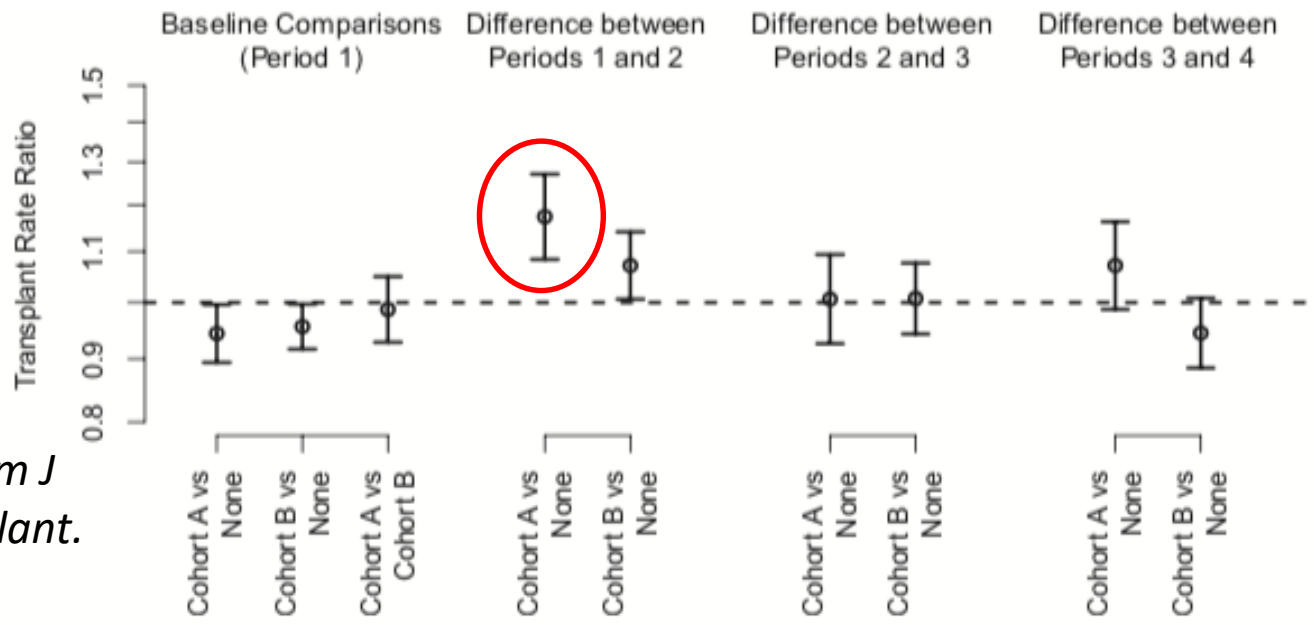
- collaborative website with intervention guide,
- resources, discussion boards and data dashboards
- monthly collaborative conference calls, facilitated webinars, kick-off meetings for each cohort and site visits Wey *Am J Transplant.* 2019

COIIN results differed for Cohort A versus B

- Overall, COIIN did not affect kidney yield or waitlist mortality rates
- Cohort A, but not cohort B, had significantly *higher deceased donor transplant and offer acceptance rates* during its intervention period than programs not in COIIN
- Further research is necessary and further monitoring of posttransplant outcomes is required.

Period 2
active intervention for cohort A

The Collaborative Innovation and Improvement Network-COIIN



Wey *Am J Transplant.* 2019

Organ Utilization Tool (OUT)

- This is a monthly *workbook created in Tableau* that visually illustrates the characteristics and outcomes of organs local centers *turned down that were transplanted elsewhere*, including graft and patient status and survival rates at 6-months and *1-year post-transplant*
- Dynamic filters to review offers of specific types of organs (DCD, HCV+, PHS increased risk, etc)
- Displays most recent 24 months of data on *offers from an OPO*
- Can be customized to include offers to specific centers outside of your local area. There is a charge for this

Center Acceptance and Refusal Evaluation (CARE)

- transplant centers can see all of the *outcomes for organ offers they accept as well as all of those they refuse*

· Abdominal OR Thoracic: $3,000 1st year / $1,500 annually

· Both (purchased together): $5,500 1st year / $3,000 annually

UNOS Labs-3 Pillars

Behavioral Research

Study the impact of human interactions with the system

Data Science

Testing new algorithms and advanced analytics to uncover actionable insights

Technology Innovations

Deploy new tools and technologies to strengthen system performance

UNOS Labs Active Projects

Horizon 1

- Natural Language Processing: Organ Utilization Predictor & Yield Models
- Understanding Cold Ischemic Time
- Projecting Travel Time (feasibility phase III)

Horizon 2

- Predictive Analytics: Impact on Transplant Qualitative Assessment
- Predictive Analytics: Cognitive Interviewing
- SimUNet: The Impact of Clinical Decision Support on Decision Making in Kidney Offer Evaluation

Horizon 3

- GPS tracking (feasibility)

Simunet

Cohort

68 kidney transplant surgeons and nephrologists

80% "routinely involved" in offer acceptance decisions

18 different kidney programs represented

Intervention

Each received the same 20 hypothetical kidney offers

4 low serum creatinine (<1.5 mg/dL) donors

Experimental variants
- "Good biopsy"
- No biopsy
- "Poor biopsy"

4 AKI donors

Experimental variants
- "Good biopsy"
- No biopsy

Analysis of 1300 offer responses revealed…

Acceptanc
odds ratio (

Low serum creatinine (<1.5 mg/dL)

"Good" biopsy	3.07 (CI 1.88-5.02
No biopsy	2.53 (CI 1.56-4.09
"Poor" biopsy	Reference

Acute Kidney Injury (AKI)

"Good" biopsy	3.67 (CI 2.47-5.4
No biopsy	Reference

Summary

- Donor realization rate is an actual number divided by an estimate; improving this rate will likely depend on increasing use of organs from older donors
- Multiple utilization enhancement efforts are underway, reviewed here. The metrics of organ utilization are subject to multiple variables and regulations