Disclosure

Consulting and Equity Interest – Transplant Genomics, Inc.
Consulting and Research Support – Abbvie, Veloxis
Research Support – Vitaeris
Speaker – Novartis, Sanofi

Learning Objectives

Understand the current algorithm for kidney allocation
Understand the difference between candidate vs. center-driven allocation
Understand the benefit and risk of the above with regards to risk for organ discard

Balancing Utility and Equity

- Because of the limited supply of organs, we are forced to balance these at times opposing goals, both supported based on guidance from NOTA

- Another important concept is the idea that **kidney offers are made to individual candidates**, but in reality this is only partially accurate

- Centers make decisions about donor offers based on numerous criteria that are independent of candidate choice (size/GFR mismatch, anatomic variants, programmatic decisions about risk tolerance based on outcomes or available resources, etc.) – time and logistics also weigh heavily here

Goals of the System

- Use the kidney

- Use the kidney locally (⬇ cost, CIT)

- Right organ/right recipient "personalized"
  - GFR match
  - Longevity match
  - Immunity match, etc.

A Complex Mix

- Within the system, there are centers with varying risk tolerance with lists full of candidates of varying risk tolerance and goals

- How do we balance all of these factors to make the most efficient system?

- How do we make sure candidates are getting what they want? Does a candidate who would be willing to take a kidney from a donor with KDPI 98% and CIT=30 hrs know that the center at which they are listed would never do so? Do they understand the risks and consequences and the benefits of taking such a kidney offer?

Deceased Donor Kidney Transplants by Center, April 1, 2015 - March 31, 2017
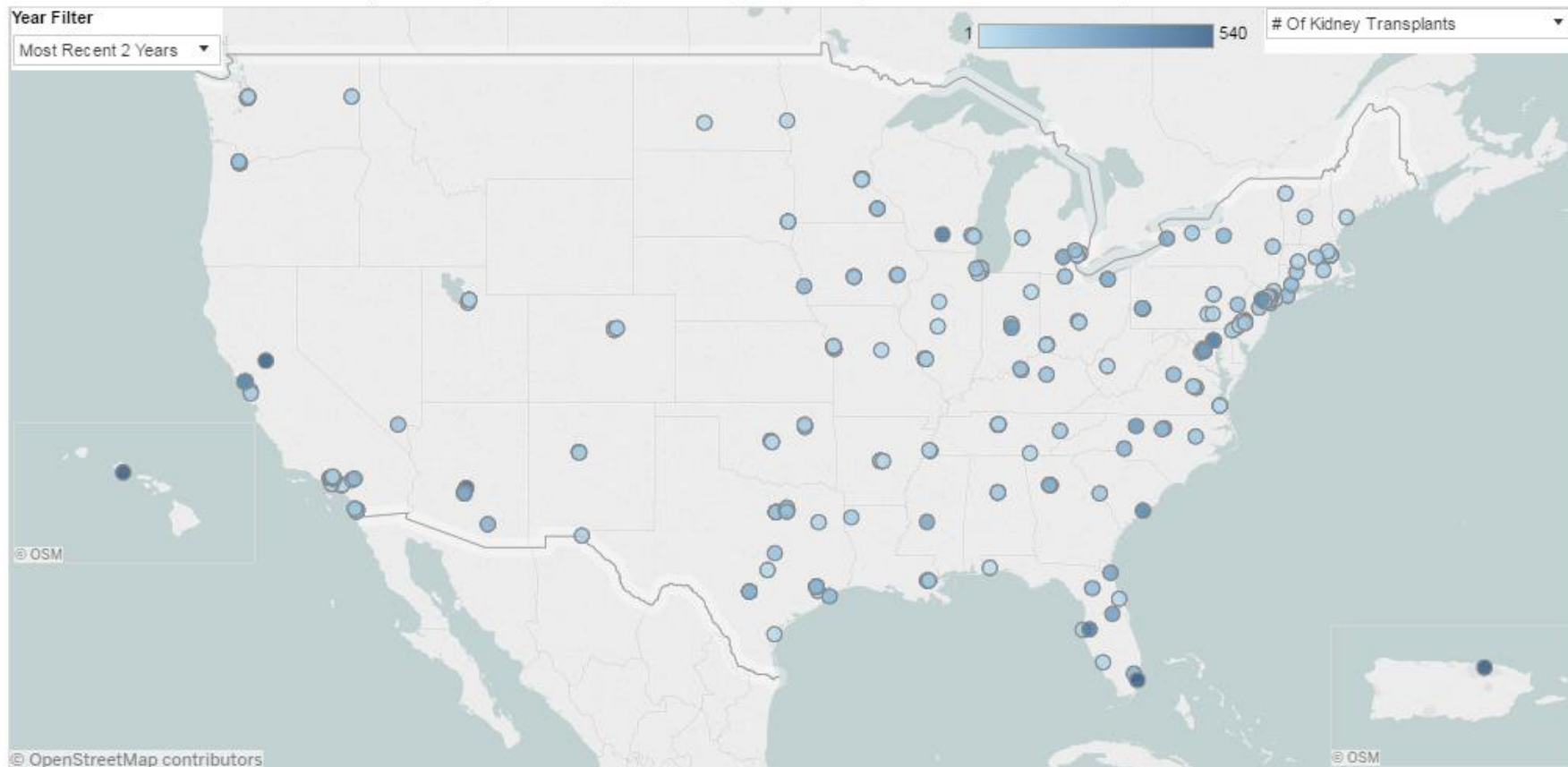
Case Study

- 67 yo F donor

- petite (5'1", 105lbs)

- died of toxic ingestion requiring several sessions of dialysis

- KDPI 94%

Size restrict list?

CDC Increased Risk due to HD
- Seems medically simple to us (low risk)
- But consent gets more complicated and takes more TIME
- Candidates decline at various times (talk to family, MDs) after Xmatch tray set

Introduces unpredictability

Match List

- 1. yes
- 2. yes
- 3. NU Pt – 48 yo, declined older donor kidney
- 4. yes
- 5. yes
- 6. yes
- 7. yes
- 8. yes
- 9. yes
- 10. yes
- 11. yes
- 12. NU patient – made xmatch tray by exception
- … yes…

- 250. NU patient (zero PRA, NYOD) -

Challenges

- Older candidates
- Although less variability with no DR points, still variability with other factors mentioned on last slide (size, pt. choice with CDC IR, etc.)
- Need to keep list ready – CENTER RESOURCES
- Timing with other pretransplant factors (pre-surgery dialysis, travel to center, etc.)

- **So What Happened???**
- In the few hours post xclamp – centers 1-11 dropped out (frequently happens but not always a given) – that makes it even harder – patient 12 lived at a distance, needed pre-surgery dialysis
- **What about the other kidney?**
- No one else xmatched locally, so was going to be offered out of DSA
- We found a candidate (#250) that was ready (all testing up to date) and could go with initial virtual xmatch (zero PRA) and wouldn't need dialysis pre-op

Challenges with high risk offers

- That same scenario plays out over and over with a variety of kidney donor risk types (AKI, high KDPI, etc.)

- High KDPI is the easiest because the list is already trimmed, other risk types have a larger potential candidate pool and require even more resources

- It is hard to mobilize the army for an offer where your patient is not even in the top 10, let alone a second recipient

- Adds CIT, cost (fire drills for no offer), patient anxiety, transplant center staff burnout

- OK to say we can "tolerate" these constraints, but is it optimal?

Constraints

- Physical (crossmatch tray – not limitless sera, etc)
- Too many centers with wide risk tolerance and unwillingness to be excluded from offers
- Candidate/kidney distance from the center – may worsen with new allocation
- Logistics (get to center, need dialysis pre-op) – all increase CIT, all may be for naught if centers ahead accept, etc.
- Complex lists, complex patients
- Lack of good data on interplay between increasing warm and cold ischemia (DCD, long CIT - complications may not be immediate but often in short term and affect center outcomes and patient QOL)

Geography

- The geography of the US cannot be discounted as we discuss solutions that may work well in smaller areas such as the UK or EU

- CIT is a major factor at play here with higher risk organs

- Time (and therefore distance) should be a priority!

How have other countries addressed this?

Impact of the new fast track kidney allocation scheme for declined kidneys in the United Kingdom

Alan D. White, Heather Roberts, Clare Ecuyer, Kathryn Brady, Samir Pathak, Brendan Clark, Lutz H. Hostert, Magdy S. Attia, Matthew Wellberry-Smith, Alex Hudson, Niaz Ahmad ✉

Table 1. Criteria for offering kidneys via the fast track kidney allocation scheme

Donation after brain death kidneys	Donation after circulatory death kidneys
The kidney is deemed unusable by the SNOD or member of the procurement team	The kidney is deemed unusable by the SNOD or member of the procurement team
The kidney is declined by five centers for donor or organ quality reasons	The kidney is declined by three centers for donor or organ quality reasons
The kidney has not been allocated to a recipient or a center and six h of cold ischemia time has elapsed	The kidney has not been allocated to a recipient or a center and six h of cold ischemia time has elapsed

Adapted from the NHSBT organ donation and transplantation directorate—kidney advisory group, June 2013.

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ORIGINAL ARTICLE

Rescue allocation and recipient oriented extended allocation in kidney transplantation—influence of the EUROTRANSPLANT allocation system on recipient selection and graft survival for initially nonaccepted organs

Roger Wahba[1,2] (iD), Barbara Suwelack[1,3], Wolfgang Arns[1,4], Figen Cakiroglu[5], Ute Eisenberger[1,6] (iD), Thorsten Feldkamp[1,7], Anita Hansen[1,8], Kathrin Ivens[1,8], Thomas Klein[1,9], Andreas Kribben[1,6], Christine Kurschat[1,10], Ulrich Lange[4], Anja Mühlfeld[1,11], Martin Nitschke[1,5], Stefan Reuter[1,3], Kevin Schulte[7], Richard Viebahn[1,9], Rainer Woitas[1,12], Martin Hellmich[13] & Dirk L. Stippel[1,2]

How about in the US?

Predictors of Deceased Donor Kidney Discard in the United States

Wesley J. Marrero, BS,[1] Abhijit S. Naik, MD, MPH,[2] John J. Friedewald, MD,[3] Yongcai Xu, BS,[1] David W. Hutton, PhD,[4] Mariel S. Lavieri, PhD,[1] and Neehar D. Parikh, MD, MS[5]

Improved methods to detect kidneys at risk of discard

Prospective Validation of Prediction Model for Kidney Discard

Zhou, Sheng, MBBS, ScM[1]; Massie, Allan B., PhD, MHS[1,2]; Holscher, Courtenay M., MD[1]; Waldram, Madeleine M., BA[1]; Ishaque, Tanveen, ScM[1]; Thomas, Alvin G., MSPH[1]; Segev, Dorry L., MD, PhD[1,2,3]

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How do we effectively learn from and scale systems from other countries?

Candidate Age Ranges from 25-77

SSN	Age	ABO	CPRA	Score	Mismatch A	Mismatch B
-**-*	50	O	0	10.172603	1	2
-**-*	52	O	0	9.175342	2	2
-**-*	67	O	28	8.800000	1	2
-**-*	65	O	0	8.676712	1	2
-**-*	63	O	0	8.315068	1	2
-**-*	67	O	0	8.271233	2	1
-**-*	72	O	0	8.178082	2	2
-**-*	77	O	2	7.923288	1	2
-**-*	73	O	0	7.767123	2	2
-**-*	63	O	3	7.726027	2	2
-**-*	53	O	0	7.673973	1	2
-**-*	56	O	68	7.616438	2	1
-**-*	60	O	0	7.523288	1	1
-**-*	58	O	0	7.298630	2	1
-**-*	65	O	0	7.276712	2	2
-**-*	54	O	29	7.265753	2	2
-**-*	62	O	8	7.230137	2	2
-**-*	28	O	0	7.197260	2	1
-**-*	66	O	0	7.178082	2	2
-**-*	65	O	0	7.117808	2	2
-**-*	65	O	0	7.090411	2	2
-**-*	52	O	0	7.000000	1	2
-**-*	48	O	0	6.980822	2	2
-**-*	65	O	0	6.887671	2	2
-**-*	66	O	0	6.884932	1	2
-**-*	54	O	0	6.865753	2	2
-**-*	75	O	0	6.756164	2	2
-**-*	37	O	0	6.621918	1	2
-**-*	57	O	0	6.597260	2	2
-**-*	65	O	22	6.441096	1	2
-**-*	65	O	0	6.435616	1	2
-**-*	52	O	0	6.402740	2	1
-**-*	67	O	54	6.369863	1	1
-**-*	51	O	0	6.287671	1	2
-**-*	52	O	2	6.260274	1	2
-**-*	66	O	4	6.252055	1	2
-**-*	69	O	0	6.147945	2	2
-**-*	25	O	12	6.123288	2	2
-**-*	72	O	0	6.076712	2	2

of **TRANSPLANTATION**

Can we bypass centers or candidates completely?

- Kidneys at high probability of discard or delay are offered to centers that have never used such a kidney 35% of the time

- Because we have continuous variables of kidney risk (KDPI), centers that have a track record of using high risk kidneys can be offered them first
- Centers that want to earn their way into that group can increase utilization of kidneys that are just outside that window
- Focusing on local or regional centers that have a record of using these kidneys would be most efficient – because these are often going into higher risk recipients, time and logistics are paramount (sending blood for prospective crossmatch, pumping kidney, etc.)

National Kidney Foundation® of Illinois

- OPTN should identify transplant programs that never or very rarely accept high risk kidneys and make changes to the kidney allocation policy to allow Organ Procurement Organizations to direct donations of high-risk kidneys to programs that are most likely to use them. Transplant programs which do not use these organs can voluntarily opt out of the allocation process for these kidneys. Disclosure of the transplant program's decision to opt out or a transplant program that is bypassed due to the likelihood it will not accept a high-risk kidney must be communicated to patients for patients to determine if alternate listing at another less risk averse transplant program is necessary.

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