Defining Equity – How are Disparities and Equity Defined in Transplantation?

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Disclosure

I have no relevant disclosures
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Learning Objectives

1. To summarize how is equity defined in healthcare and how such definitions can be applied in organ transplantation.

2. To explain the OPTN's methodology for measuring equity in access to kidney transplants and how the approach is used for evaluating allocation policies.

3. To identify the factors most associated with disparities in access to a kidney transplant and how this has changed over time.
The Kidney Waiting List

Blood type AB
Non-sensitized
Short waiting time DSA

Blood type B
Highly sensitized
Diabetic
Long waiting time DSA

When’s my turn?
OPTN Strategic Goals

1. Increase the number of transplants
2. **Provide equity in access to transplants**
3. Improve waitlisted patient, living donor, and transplant recipient outcomes
4. Promote living donor and transplant recipient safety
5. Promote efficiency in donation and transplant
“There is little consensus about the meaning of the terms ‘health disparities,’ ‘health inequalities,’ or ‘health equity.’”
“Health disparities are systematic, plausibly avoidable health differences according to race/ethnicity, skin color, religion, or nationality; socioeconomic resources or position (reflected by, e.g., income, wealth, education, or occupation); gender, sexual orientation, gender identity; age, geography, disability, illness, political or other affiliation; or other characteristics associated with discrimination or marginalization.”

Overcoming “differences between disadvantaged groups that have poorer survival rates, life conditions, and health status – that perpetuate their disadvantage – is at the core of health equity.”
“...some may argue that we need to focus on a model of patient engagement in which the patient is given full volition to pursue her own ‘highest possible standard of health’ even if that results in an unequal distribution of health for all. This approach fits with the ‘process’ view of equity (Nozick 1974), where the focus is on the fairness of the decision-making process, rather than the end result.”
“In contrast, others might argue that we should look at health outcomes (the end result) to determine if health equity has been achieved.”
(a) The OPTN Board of Directors shall be responsible for developing, with the advice of the OPTN membership and other interested parties, policies within the mission of the OPTN as set forth in section 372 of the Act and the Secretary's contract for the operation of the OPTN, including:

(1) Policies for the equitable allocation of cadaveric organs in accordance with §121.8;

... 

(3) Policies that reduce inequities resulting from socioeconomic status

...

(b) Allocation performance goals. Allocation policies shall be designed to achieve equitable allocation of organs among patients consistent with paragraph (a) of this section...
Defining *In*equity in Transplant Access

The degree to which disparities in rates of deceased donor organ transplantation exist among candidates on the waiting list for a particular organ, excluding intentional disparities attributable to candidate-based priorities (e.g., pediatric status; medical urgency status) codified in allocation policy.

Other Types of Transplant Disparities

1. Access to the waiting list
   ✓ Referral disparities
   ✓ Listing disparities, among referred

2. Waiting list mortality disparities

3. Post-transplant outcome disparities
Elementary Approach to Assessing Disparities: %WL vs. %TX

Pre-KAS

Transplant rates remain low for Asian candidates post-KAS.

3/31/13 WL snapshot; tx 4/13-3/14
Transplant rates remain low for Asian candidates post-KAS.
OPTN Equity in Access Methodology

- Transplant rate regression; quarterly periods; 2010-2019
- Candidate factors potentially contributing to equity measure
  - CPRA
  - Blood type
    - Age (among adults)
    - Age (among pediatrics)
  - Ethnicity
  - Prior recipient
  - Insurance (public, private)
  - Diagnosis
  - Education
  - Citizenship
  - Place of residence/listing
  - Community health risk score
  - BMI
  - Gender
EQUALITY vs EQUITY
OPTN Equity in Access Methodology

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- Candidate factors potentially contributing to equity measure
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  - Community health risk score
  - BMI
  - Gender

- Standard deviation of Access to Transplant Scores (log(transplant rate))
- *Intentional* disparities codified in allocation policy are “discounted”
  - Pediatric
  - Prior living donor
  - Medical urgency
  - Previously accumulated waiting time
Equity in Access (1Q 2016)
Variability in “Access to Transplant Scores”

Example Patient #1
ATS = -2.29
(estimated MWT > 14.4 years)
CPRA=99.99%, Blood type B,
listed in DSA #10 (see Fig 20-22)

Example Patient #2
ATS = 0.00 ("average" score)
(estimated MWT = 4.9 years)
CPRA=37%, Blood type C,
listed in DSA #37 (see Fig 20-22)

Example Patient #3
ATS = 2.34
(estimated MWT = 0.5 years)
CPRA=0%, Blood type AB,
listed in DSA #19 (see Fig 20-22)

Measure | Value
--- | ---
Mean | 0.000
SD | 0.865

Distribution based on assuming candidates are adults with 540 days of qualified waiting time at time of listing.

MWT = median waiting time

Probability Density

Access-to-Transplant Score (ATS)
Equity in Access (1Q 2016 vs. 2Q 2014)  
Variability in “Access to Transplant Scores”
KAS Reduced Disparities in Access

Figure 3: Tracking Variability in Access-to-Transplant Score (ATS) Among Waitlisted Kidney Candidates by Quarter (January 2010 - March 2016)

(40% drop)
Candidate Factor Associations with Disparities

Little or no association with disparities
Disparities by Candidate Factors over Time

KAS Implementation 12/4/2014

Factor
- Donor Service Area
- CPRA
- ABO
- Age
- Ethnicity
- Gender

Standard Deviation of Access-to-Transplant Score (ATS)

Period (Quarter)
Risk-adjusted ("All Else Equal") Disparities by Candidate CPRA

**Pre-KAS**


CPRA

**Post-KAS**

Disparate Treatment vs. Disparate Impact

Risk adjustment for factors such as blood type, geography fully “explain away” ethnicity effect.

The two curves suggest (a) no disparate treatment by ethnicity, but (b) disparate impacts.
Intended
(“Discounted”!) Disparities
Prior Living Donor and Pediatric Advantages

Risk-adjusted transplant incidence rate ratios (IRR), 10/2017-12/2018

Stewart, ATC 2019
Risk-adjusted transplant incidence rate ratios (IRR), 10/2017-12/2018

~5x

~4x

~3x

Stewart, ATC 2019
How Does Tracking Equity Help Improve the System?
Tracking Equity Helps…

1. Identify unexpected trouble spots
2. Spur and inform healthy debate
3. Weigh tradeoffs with other goals
Kidney donation and transplantation in Eurotransplant 2006-2007: minimizing discard rates by using a rescue allocation policy  

Utilization of Deceased Donor Kidneys to Initiate Living Donor Chains

M. L. Melcher¹, J. P. Roberts²,*, A. B. Leichtman³, A. E. Roth⁴ and M. A. Rees⁵,⁶
Achieving Equity through Reducing Variability in Accepting Deceased Donor Kidney Offers

Sumit Mohan* ‡ and Mariana C. Chiles* ‡

In this issue of the Clinical Journal of the American Society of Nephrology, Huml et al. (1) report an important analysis of the outcomes for all offers of deceased donor discards (7–10). These implicit biases and other risk-averse behavior are perpetuated by the absence of feedback on these decisions. Informing providers...
Teasing out kidney center from DSA effects...

Fig 2. Center (including DSA) and Residual DSA Random Effect Estimates from Kidney Equity in Access Model, 2017-2018

= estimated center effect (including center’s DSA effect)
= estimated residual DSA effect

All other variables (e.g., candidate ABO, CPRA) held constant

Donor Service Area (DSA)

To be presented at ATC 2020
D. Stewart, A. Robinson, D. Klassen, A. Wilk
Lung equity center effects
CEOT 2020 poster

D. Stewart, S. Sweet, E. Lease, R. Goff
Summary

1. Health equity can be defined as the elimination of avoidable disparities in health outcomes among socially disadvantaged groups.

2. OPTN has developed a methodology for measuring and monitoring disparities in transplant access, among waitlisted patients.

3. DSA, CPRA, and blood type are highly associated with access differences.

4. Kidney access disparities associated with demographic and socioeconomic are very low or non-existent (no “disparate treatment”).

5. OPTN currently refining framework to include center-level variation.
How Can I Keep Tabs on Allocation System Equity?
Disparities in access to deceased donor kidney transplants among candidates on the waiting list decreased substantially after the implementation of the Kidney Allocation System (KAS) in 2014. The kidney ATS standard deviation declined from approximately 1.5 to 1.1 during this time.
The OPTN Equity in Access to Transplant Dashboard monitors system-level and factor-level trends related to access to deceased donor transplants among candidates on the waiting list for an organ transplant in the United States. The OPTN strategic plan prioritizes providing equity in access to transplants.

The measures shown in this dashboard are derived from an access to transplant score, or ATS. The ATS summarizes into a single number a candidate’s relative likelihood of receiving a deceased donor transplant. Learn more about equity and access to transplant scores in the 2017 Report on Equity in Access.

View the Equity in Access dashboard
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Extras
Overarching goals include

“Achieve health equity, eliminate disparities...”

https://www.healthypeople.gov/
Measuring and monitoring equity in access to deceased donor kidney transplantation

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The Organ Procurement and Transplantation Network monitors progress toward strategic goals such as increasing the number of transplants and improving waitlisted patient, living donor, and transplant recipient outcomes. However, a methodology for assessing system performance in providing equity in access to transplants was lacking. We present a novel approach for quantifying the degree of disparity in access to deceased donor kidney transplants among waitlisted patients and determine which factors are most associated with disparities. A Poisson rate regression model was

The goal of the UNOS organ allocation system is to achieve, *in balance with one another*, the following objectives:

1. Maximize the availability of transplantable organs by:
   a. Promoting consent for donation;
   b. Enhancing procurement efficiency;
   c. Minimizing organ discards; and
   d. Promoting efficiency in organ distribution and allocation.

2. Maximize patient and graft survival.

3. Minimize disparities in consistently measured waiting times until an offer of an organ for transplantation is made among patients with similar or comparable medical/demographic characteristics. (At the present time, there are no Waiting List criteria; therefore, commencement of waiting time varies among patients.)

4. Minimize deaths while waiting for a transplant.

5. Maximize opportunity for patients with biological or medical disadvantages to receive a transplant.

6. Minimize effects related to geography.

7. Allow convenient access to transplantation.

8. Minimize overall transplantation-related costs.


10. Provide for accountability and public trust.
Alternative Ways to Track Equity within our Framework

1. Disparities in access to deceased and living donor transplantation
2. Disparities in access among both actively and inactively listed patients
3. Disparities in access to “higher quality” kidneys (e.g., KDPI<85%)
OPTN Equity in Access Dashboard

Insights.unos.org/equity-in-access