



# Disparities in Transplantation Recovery and Survival

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*The National Academies of Sciences, Engineering, Medicine: State of Science of Transplantation and Disability*



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## Transplantation Benefits and Disparities

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# Benefits of Transplantation: Enhanced Outcomes

Life Expectancy	Well-Being
Quality of Life	Patient Satisfaction
Treatment Satisfaction	Recreational Activities
Social Functioning	Independence
Full-time Employment	Activities of Daily Living

**Sources:** <sup>1</sup>Purnell TS, etc. Comparison of life participation activities among adults treated by hemodialysis, peritoneal dialysis, and kidney transplantation: a systematic review. Am J Kidney Dis. 2013 Nov;62(5):953-73. <sup>2</sup>U.S. Renal Data System, Annual Data Reports. <sup>3</sup>Scientific Registry of Transplant Recipients, Annual Data Reports.

# Racial and Ethnic Disparities in Heart Transplant Outcomes

## STATE OF ART

### Racial and ethnic disparities in outcomes after heart transplantation: A systematic review of contributing factors and future directions to close the outcomes gap



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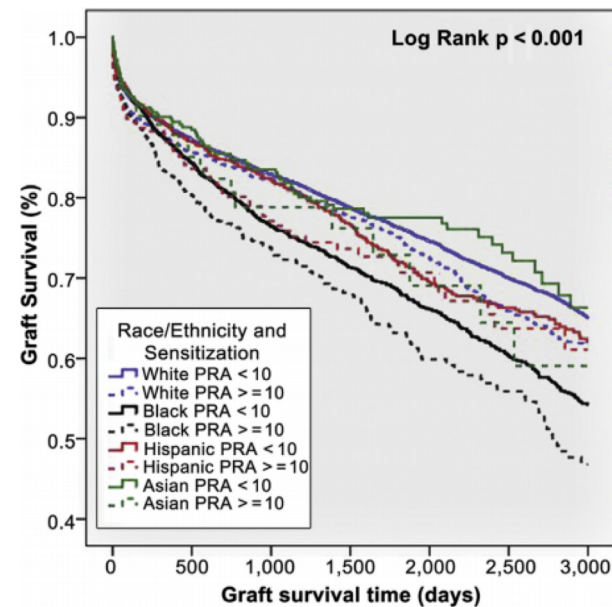
#### KEYWORDS:

cardiomyopathy;  
heart transplantation;  
health disparities;  
race/ethnicity;  
LVAD

The demographics of patients undergoing heart transplantation in the United States have shifted over the last 10 years, with an increasing number of racial and ethnic minorities undergoing heart transplant. Multiple studies have shown that survival of African American patients after heart transplantation is lower compared with other ethnic groups. We review the data supporting the presence of this outcome disparity and examine the multiple mechanisms that contribute. With an increasingly diverse population in the United States, knowledge of these disparities, their mechanisms, and ways to improve outcomes is essential.

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**Figure 4** Graft survival in heart transplant recipients by recipient ethnicity and PRA level. Kaplan-Meier curve showing graft survival in heart transplant recipients stratified by recipient ethnicity and PRA level (<10% or ≥10%). African American recipients with PRA ≥10% had the lowest graft survival, whereas Asian recipients with PRA <10% had the highest graft survival. (From Morris et al.<sup>3</sup>)



# Poverty/Gender Disparities in Kidney Transplant Outcomes

## Neighborhood Poverty and Sex Differences in Live Donor Kidney Transplant Outcomes in the United States

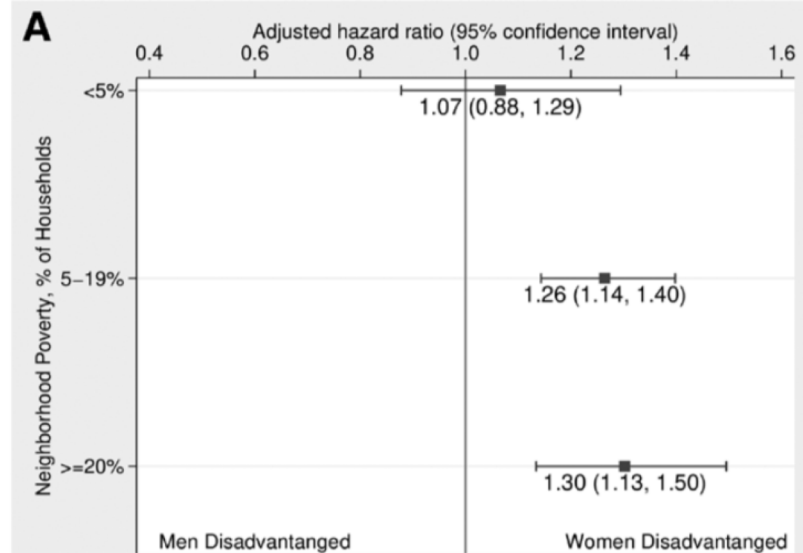
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**Background.** Neighborhood poverty has been associated with worse outcomes after live donor kidney transplantation (LDKT), and prior work suggests that women with kidney disease may be more susceptible to the negative influence of poverty than men. As such, our goal was to examine whether poverty differentially affects women in influencing LDKT outcomes.

**Methods.** Using data from the Scientific Registry of Transplant Recipients and US Census, we performed multivariable Cox regression to compare outcomes among 18955 women and 30887 men who received a first LDKT in 2005–2014 with follow-up through December 31, 2016. **Results.** Women living in poor (adjusted hazard ratio [aHR], 1.30; 95% confidence interval [CI], 1.13–1.50) and middle-income (aHR, 1.26; 95% CI, 1.14–1.40) neighborhoods had higher risk of graft loss than men, but there were no differences in wealthy areas (aHR, 1.07; 95% CI, 0.88–1.29). Women living in wealthy (aHR, 0.71; 95% CI, 0.59–0.87) and middle-income (aHR, 0.82; 95% CI, 0.74–0.92) neighborhoods incurred a survival advantage over men, but there were no statistically significant differences in mortality in poor areas (aHR, 0.85; 95% CI, 0.72–1.01).

**Conclusions.** Given our findings that poverty is more strongly associated with graft loss in women, targeted efforts are needed to specifically address mechanisms driving these disparities in LDKT outcomes.

(*Transplantation* 2019;103: 2183–2189)



Gender Differences in Graft Failure by Neighborhood Poverty Level

# Reduced Racial Disparities in Kidney Transplant Outcomes

CLINICAL RESEARCH www.jasn.org

## Reduced Racial Disparity in Kidney Transplant Outcomes in the United States from 1990 to 2012

Tanjala S. Purnell,<sup>\*,††</sup> Xun Luo,<sup>\*</sup> Lauren M. Kucirka,<sup>\*,†</sup> Lisa A. Cooper,<sup>†,‡§</sup> Deidra C. Crews,<sup>‡||</sup> Allan B. Massie,<sup>\*,†</sup> L. Ebony Boulware,<sup>||</sup> and Dorry L. Segev<sup>\*,†</sup>

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### ABSTRACT

Earlier studies reported inferior outcomes among black compared with white kidney transplant (KT) recipients. We examined whether this disparity improved in recent decades. Using the Scientific Registry of Transplant Recipients and Cox regression models, we compared all-cause graft loss among 63,910 black and 145,482 white adults who received a first-time live donor KT (LDKT) or deceased donor KT (DDKT) in 1990–2012. Over this period, 5-year graft loss after DDKT improved from 51.4% to 30.6% for blacks and from 37.3% to 25.0% for whites; 5-year graft loss after LDKT improved from 37.4% to 22.2% for blacks and from 20.8% to 13.9% for whites. Among DDKT recipients in the earliest cohort, blacks were 39% more likely than whites to experience 5-year graft loss (adjusted hazard ratio [aHR], 1.39; 95% confidence interval [95% CI], 1.32 to 1.47;  $P<0.001$ ), but this disparity narrowed in the most recent cohort (aHR, 1.10; 95% CI, 1.03 to 1.18;  $P=0.01$ ). Among LDKT recipients in the earliest cohort, blacks were 53% more likely than whites to experience 5-year graft loss (aHR, 1.53; 95% CI, 1.27 to 1.83;  $P<0.001$ ), but this disparity also narrowed in the most recent cohort (aHR, 1.37; 95% CI, 1.17 to 1.61;  $P<0.001$ ). Analyses revealed no statistically significant differences in 1-year or 3-year graft loss after LDKT or DDKT in the most recent cohorts. Our findings of reduced disparities over the last 22 years driven by more markedly improved outcomes for blacks may encourage nephrologists and patients to aggressively promote access to transplantation in the black community.

J Am Soc Nephrol 27: ●●●●●, 2016. doi: 10.1681/ASN.2015030293

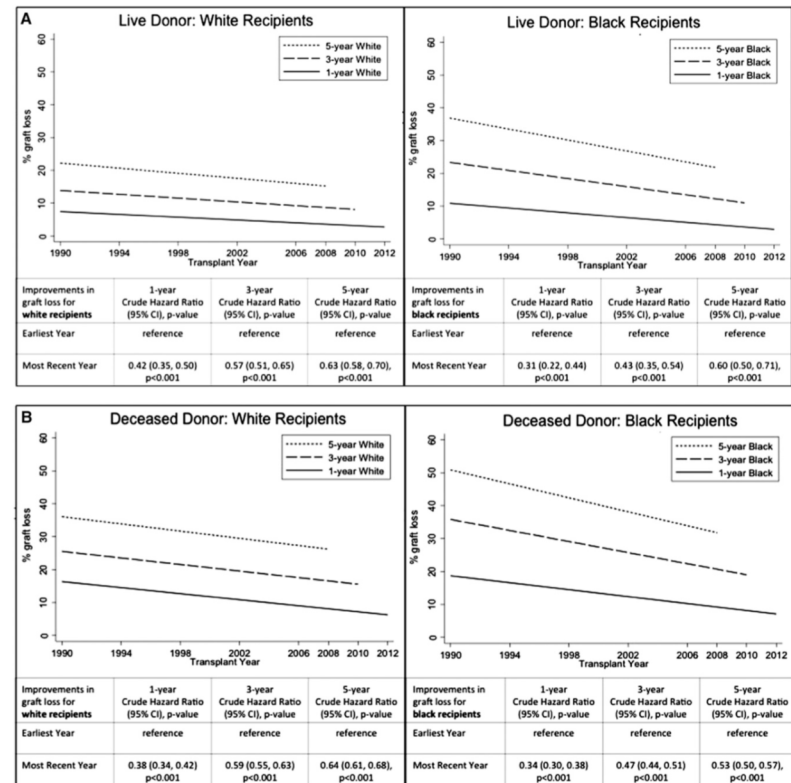


Figure 1. Time trends in all-cause graft loss after KT for white and black adults in the United States. The graphs illustrate unadjusted trends in 1-year, 3-year, and 5-year all-cause graft loss (%) after (A) LDKT and (B) DDKT, stratified by recipient race.

# Two Decades of Disparities in Transplantation Access

Research

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

**IMPORTANCE** Over the past 2 decades, there has been increased attention and effort to reduce disparities in live donor kidney transplantation (LDKT) for black, Hispanic, and Asian patients with end-stage kidney disease. The goal of this study was to investigate whether these efforts have been successful.

**OBJECTIVE** To estimate changes over time in racial/ethnic disparities in LDKT in the United States, accounting for differences in death and deceased donor kidney transplantation.

**DESIGN, SETTING, AND PARTICIPANTS** A secondary analysis of a prospectively maintained cohort study conducted in the United States of 453 162 adult first-time kidney transplantation candidates included in the Scientific Registry of Transplant Recipients between January 1, 1995, and December 31, 2014, with follow-up through December 31, 2016.

**EXPOSURES** Race/ethnicity.

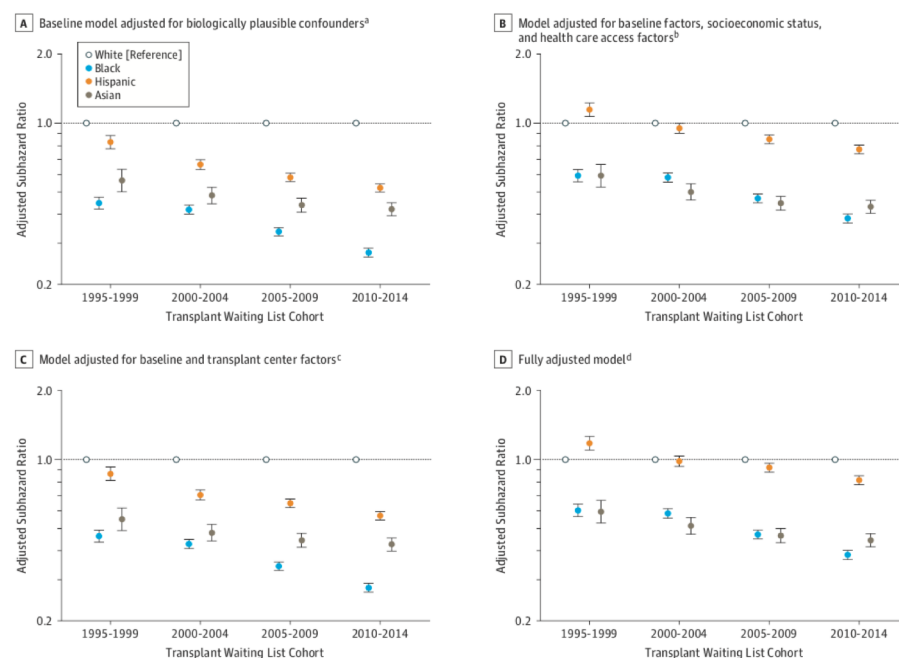
**MAIN OUTCOMES AND MEASURES** The primary study outcome was time to LDKT. Multivariable Cox proportional hazards and competing risk models were constructed to assess changes in racial/ethnic disparities in LDKT among adults on the deceased donor kidney transplantation waiting list and interaction terms were used to test the statistical significance of temporal changes in racial/ethnic differences in receipt of LDKT. The adjusted

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CME Quiz at  
jamanetwork.com/learning  
and CME Questions page 80

Figure 2. Robustness of Estimates of Racial/Ethnic Disparities in Receipt of Live Donor Kidney Transplantation (Primary Outcome) From 1995-1999 to 2010-2014





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## Factors Influencing Transplant Disparities

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## What is Race?

The data on race were derived from answers to the question on race that was asked of individuals in the United States. The Census Bureau collects racial data in accordance with guidelines provided by the U.S. Office of Management and Budget (OMB), and these data are based on self-identification.

The racial categories included in the census questionnaire generally reflect a social definition of race recognized in this country and not an attempt to define race biologically, anthropologically, or genetically. In addition, it is recognized that the categories of the race item include racial and national origin or sociocultural groups. People may choose to report more than one race to indicate their racial mixture, such as “American Indian” and “White.” People who identify their origin as Hispanic, Latino, or Spanish may be of any race.

OMB requires five minimum categories: White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander.

**Source:** <https://www.census.gov/topics/population/race/about.html>

The U.S. Census Bureau must adhere to the 1997 Office of Management and Budget (OMB) standards on race and ethnicity which guide the Census Bureau in classifying written responses to the race question:

**White** – A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

**Black or African American** – A person having origins in any of the Black racial groups of Africa.

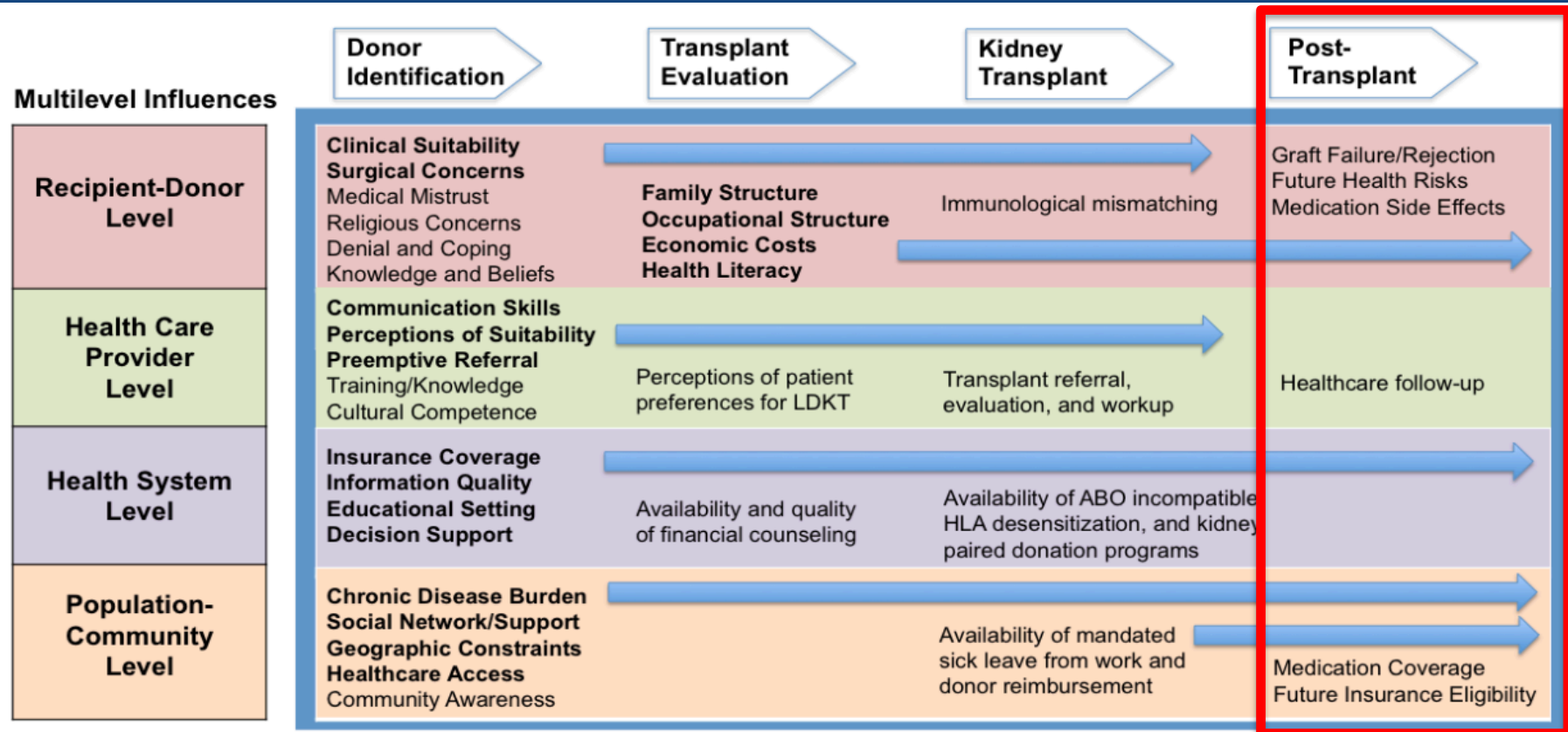
**American Indian or Alaska Native** – A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.

**Asian** – A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

**Native Hawaiian or Other Pacific Islander** – A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

The 1997 OMB standards permit the reporting of more than one race. An individual's response to the race question is based upon self-identification.

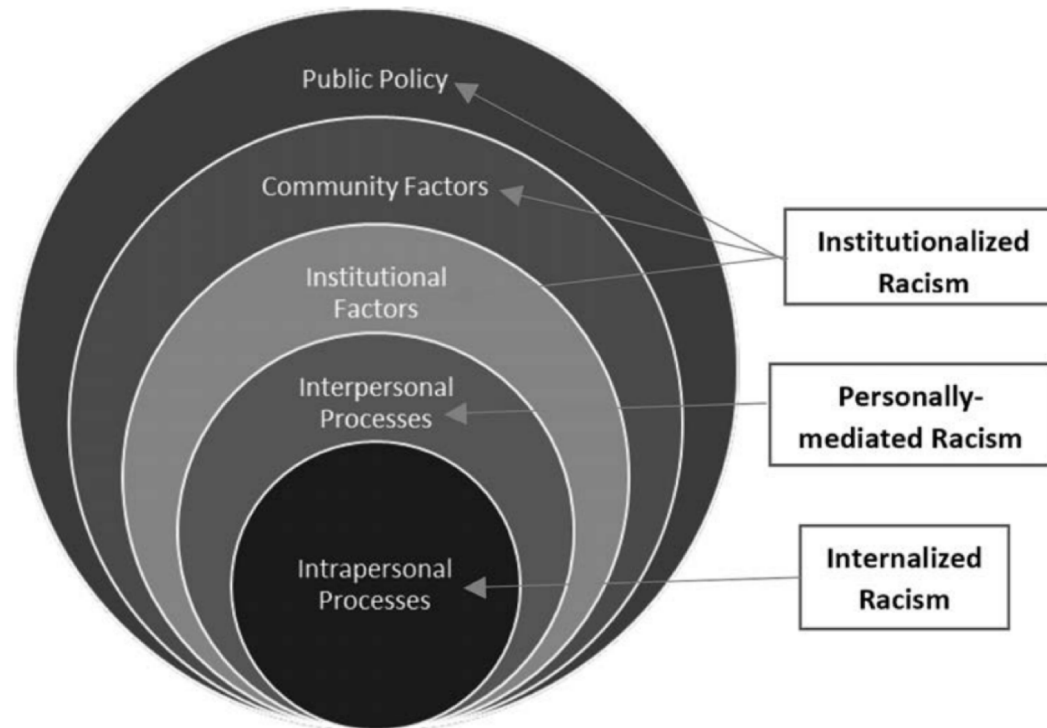
# Multilevel Barriers that Influence Transplant Disparities



Source: Purnell TS, Hall YN, Boulware LE. Understanding and Overcoming Barriers to Living Kidney Donation among Racial and Ethnic Minorities in the United States. *Advances in Chronic Kidney Disease*. 2012 Jul; 19(4): 244-51.



# Race, Racism, and Disparities in Transplantation

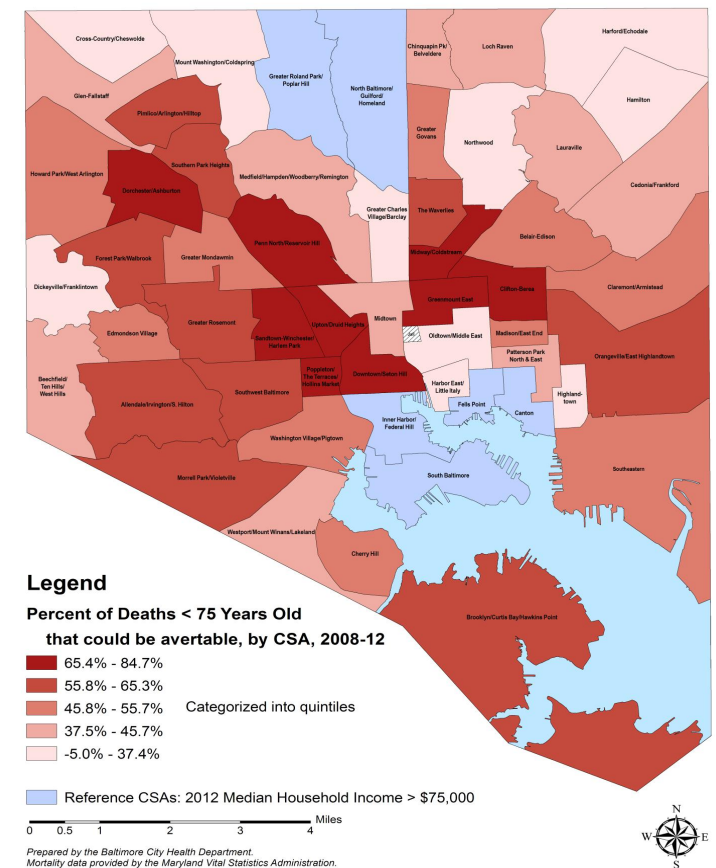


- Arriola KJ. Race, Racism, and Access to Renal Transplantation among African Americans. *J Health Care Poor Underserved*. 2017;28(1):30-45. doi:10.1353/hpu.2017.0005. PubMed PMID: 28238984.

# What Is Structural Racism?

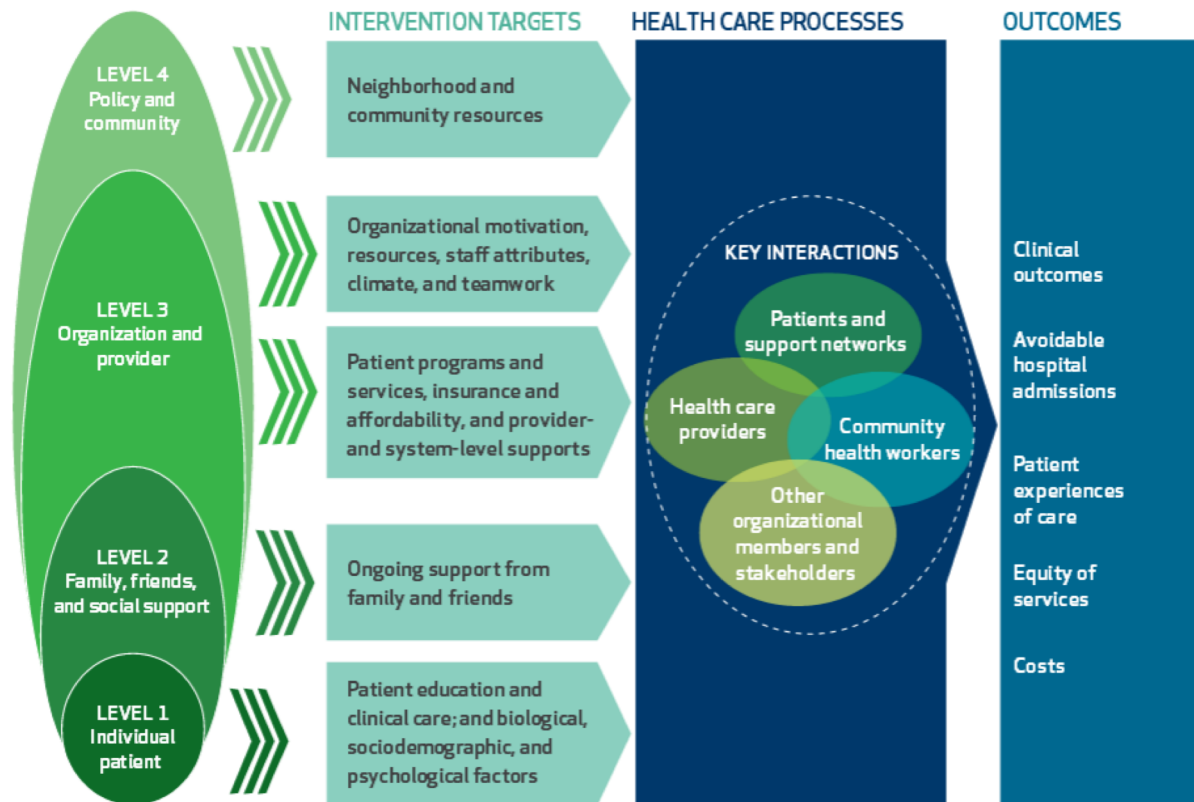
- ▶ *Definition:* Mechanisms by which societies foster **racial discrimination** through systems of housing, education, employment, earnings, benefits, credit, media, health care, and criminal justice that reinforce discriminatory beliefs, values, and distribution of resources
- ▶ *Example:* Legacy of **residential segregation**, in U.S. cities, including, the practice of ‘red-lining’—the drawing of red lines around portions of a map to indicate areas in which a mortgage lender does not want to make loans

**Sources:** <sup>1</sup>Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *Lancet*. 2017; 389(10077):1453-1463. <sup>2</sup>Baltimore City Health Disparities Report Card 2013, BCHD Office of Epidemiologic Services, April 2014





# Targeted Solutions to Advance Equity in Transplantation



**Source:** Purnell TS, et al. Achieving Health Equity: Closing the Gaps in Health Care Disparities, Interventions, and Research. *Health Affairs*. 2016 Aug 1; 35(8): 1410-5.

# Want to Learn More about Health Equity?

<https://www.coursera.org/learn/health-equity-research>

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