The effect of gender, race, and socioeconomic biases on the UNOS organ transplant waitlist and organ allocation.

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Introduction

The United Network for Organ Sharing (UNOS) is the main organ donation and distribution system in the United States. UNOS utilizes a multi-tiered program for determining patient prioritization based on the national waiting list. As of April 2025, there are 104,932 patients on the organ transplant waitlist (HRSA, 2025). The order of the waitlist is determined by more factors than just a first-come, first-served approach. Specifically, blood type match, medical need, and tissue match are the primary factors in determining the list order. Although this approach may seem direct and unbiased, various factors may leak into the system to introduce bias from UNOS and healthcare providers. This discussion will examine how gender, race, and socioeconomic status influence one's placement on the UNOS organ transplant waiting list and one's likelihood of acquiring essential organs.

While the UNOS waitlist is only accessible by physician referral, unequal movement, mobility, and access to the waitlist still exist. The UNOS waitlist as of April 2025 included over 86% people in need of a kidney transplant, 9% needing a liver transplant, and 3% needing a heart transplant. Additional percentages consist of various other organs of need (UNOS, n.d). Although the racial composition of the UNOS waitlist compares similarity to national demographics (Organ Transplants and Black/African Americans, 2024), disparities in the rates of transplants conducted display underlying inequalities.

This review displays research and evidence exemplifying the effect of gender, race, and socioeconomic status on patients standing on the UNOS organ transplant waitlist and the chances of receiving a transplantation.

Results

Gender Inequality in Organ Transplantation

Based on survey data from the National Institute of Public Health, there is a large difference between the rates at which women donate organs, and the rates at which women need organ transplantation. Specifically women account for more than 60% of the organs that are donated, whether alive or deceased. However women only account for around 40% of those in need of organs (Yee et. al., 2021). Women are very disadvantaged in the organ transplant process compared to men. In a study done by Amanda J. Vinson in association with Dalhousie

University, after careful examination of the organ transplant waitlist over time, changes in position and rates that one received care displayed that women were less likely to be referred for transplant, particularly kidney transplant, less likely to progress on the waitlist in comparison to the rates at which men progressed, and less likely to receive the necessary treatment that they needed for survival (Vinson, 2022).

This inequality can be traced to the root of the UNOS waitlist: physicians. Physicians and primary care workers are the initial contact for patients needing an organ transplant. Patients must receive a referral from their physician to be placed on the United Network for Organ Sharing (UNOS) transplant waitlist. In a study conducted by BMC Nephrology, women on the kidney transplant waitlist were surveyed about their experiences with evaluation, referral, and waiting time on the UNOS waitlist. The study also used long-standing UNOS data as a comparison. Based on this survey, researchers were able to find that women encounter much greater doubt and skepticism when pairing a kidney transplant in comparison to men. Women had to jump through more hoops, such as additional appointments and referrals, and undergo a much more extended process to achieve a referral compared to male patients (Gompers et al., 2024). As seen in the same study, women face much lower rates of referral, evaluation, and waitlisting for kidneys. Once waitlist status was achieved, women waited for much more extended periods in comparison to men, displaying gender disparities in movement and acceptance to the organ transplant waitlist (Gompers et al., 2024).

These biases are not only the result of flawed medical analysis and testing but can also be seen in physician biases and external societal influences. A previous study conducted by Amanda J. Vinson, in collaboration with Dalhousie University, also examined how physicians perceive their patients during care and referral. Based on female patient testimony and waitlist standings, she was able to draw conclusions about the experience that many women faced during the transplantation process. Vinson was able to observe that healthcare providers during primary screening often used a patient's perceived frailty as a factor in waitlist referral, and this factor had a significantly greater impact on women, contributing to the discrepancy in referral rates between women and men, especially among the elderly. Vinson defined frailty in her study as an age-related state of increased vulnerability to adverse health outcomes (Gordon & Hubbard, 2019). Based on her findings, she found that older women tended to be rated as more frail than men of the same age, purely based on social stereotypes and surface-level views of their health.

These ratings and decisions by physicians inherently set these women further and further back on the waitlist, as the frail state the doctors saw them in could pose a risk for post-transition complications (Vinson, 2022). This view of women's concerns being seen as lesser is a view rooted deep in our society, and one that must be pushed out of the minds of healthcare providers when determining status and conditions used in waitlist determination.

These disparities persist beyond the initial referral period for women. In terms of liver transplantation, waitlist position and urgency are determined by a Model for End-Stage Liver Disease score (MELD score). The MELD score ranges from 6, indicating less severe symptoms and lower urgency, to 40, meaning the patient is in dire need of a liver transplant. The MELD score is determined by the patient's levels of bilirubin, albumin, sodium, and creatinine (UNOS, n.d). While levels of bilirubin, albumin, and sodium in the body are typically the same when comparing men with women, creatinine levels (determined by muscle mass) are naturally higher in men, as they biologically possess a greater amount of muscle mass (Rogers et al., 2023).

In a study conducted by the Routledge, Taylor, and Francis group in New York and London, comparing MELD score levels in men and women based on these four substance levels in the body, a systemic bias can be observed in the liver transplant system based on the MELD score. Since impacted livers are usually unable to cleanse creatinine from the blood at healthy rates effectively, men have greater creatinine levels during liver impairment. This physical and biological difference contributes directly to a greater MELD score in a man, even with the same liver disease severity as a woman, due to their increased creatinine production even in a healthy body (Rogers et al., 2023). This UNOS-required and implemented system leads to more seriously affected women being pushed lower and lower on the organ transplant list by less severely affected men who have naturally higher MELD scores due to naturally higher creatinine production levels.

Racial Disparities in Organ Transplantation

Despite the race of a donor not being a contributing factor in organ survival or viability rates, and matching the race of the donor and recipient not being a medical necessity (Middleton, 2023), some racial populations biologically face higher rates of specific diseases that can contribute to increased need for organ transplants. Based on specific data collected by the US Department of Health, Black patients are 1.4 times more likely to be diagnosed with diabetes in comparison to white non-hispanic patients (Office of Minority Health, 2024). This increased likelihood contributes directly to increased chances that these patients will experience kidney disease, requiring kidney transplantation (Wesselman et al., 2021). Despite this higher need for care, black patients have a lower percentage of being selected as kidney transplant recipients.

According to a research study at the University of Pittsburgh Medical Center (UPMC), this disparity is well-demonstrated. Looking at patients at the UMPC, researchers were able to find that of the white patients awaiting kidney transplants, 38% received the transplant that they needed. Looking at black patients waiting for transplants, only 24% received a transplant. The difference in white patients having a 14% greater chance of receiving a transplant displays the

underlying biases and racial differences in the organ transplant system and waitlist (Wesselman et al., 2021).

In the same study conducted at the UMPC, further evidence of this disparity of organ transplant rates due to race can be seen. Examining patients waiting for transplants and the care they received during this period revealed variations in care. White patients, on average, spent much less time on dialysis, a form of kidney replacement used in patients with severe kidney disease awaiting a transplant, compared to black patients. Black patients were subjected to this intermediate care for much more extended periods than patients of other races, putting their health at risk as they waited for more extended periods for a transplant. Based on data from the UMPC, this difference in the period of dialysis instead of receiving a transplant is apparent. Black patients, on average, spent approximately one year longer on dialysis than did white patients, with their risk of death from kidney disease increasing every day. This difference in wait time of over a year for patients looking to receive a kidney transplant directly displays the bias in the waitlist system.

Socioeconomic Disparities in the Organ Transplant System

When taking factors such as race and gender out of the equation, socioeconomic status, tracked using markers such as wealth and geographic location, is a significant determinant in one's likelihood of receiving life-saving organs. One's insurance plan's coverage, financial status, post-operation costs, and overall accessibility and proximity to transplant centers all become significant factors in a patient's ability to access transplant procedures.

Financial hurdles account for a large amount of obstacles when it comes to patients receiving an organ transplant (Hays et al., 2016). According to a research study on Organ Transplant list analytics by the National Library of Medicine, considerable ethical issues arise from the fact that financial considerations and a patient's ability to pay influence how an organ is allocated to one patient over another.

The push for financial neutrality is strong in the medical community, allowing medical need to be the sole factor in organ allocation, rather than financial ability. The issue of those with more money getting priority for care is growing ever more prevalent in the modern world. A study done by Hod and Goldfarb saw similar issues to this. They analyzed groups of various socioeconomic status and their outcomes, including those who obtained and live with organ transplants. Through their research, they found that low income individuals faced improper care and acute organ rejection at a rate of 36%, compared to high-income patients who received a rejection rate of 27%. (Hod & Goldfarb, 2014). Individuals with a higher income have nearly a 9% greater chance of surviving the process of organ transplantation, directly highlighting the

disparity in the organ transplant process and care given between those of different socioeconomic status.

Geographic factors additionally play a critical role in this socioeconomic disparity. Organ transplant centers often operate out of large hospitals, primarily located in cities and urban areas. Those living in more rural areas tend to have lower incomes in comparison to those living in urban centers, limiting not only their proximity to medical centers, but their ability to reach them at all. This poses a challenge for rural residents needing a transplant, sometimes living hours away from the closest transplant center. Where an organ transplantation patient is listed to receive their procedure is noted by UNOS to be one of the most significant factors when determining organ allocation, giving way to large disparities within the system. Due to the organ's time of viability, often not more than a couple of hours, UNOS must work quickly to make sure that an organ is allocated enough time for a successful transplant. However, with these quick decisions, rural residents are often overlooked as candidates, seemingly too far away to safely transplant the organ to (Hackmann et al., 2022). This constant overlooking of rural residents can lead to years on the waitlist, with individuals being automatically dismissed from consideration time and again due to their distance from a transplant hospital.

One's socioeconomic status has a significant and influential effect on their access to organ transplantation. Financial barriers and assessments based on income prevent those of lower socioeconomic status from even having the chance of an organ transplant. Additionally, one's proximity to a transplant center is listed by UNOS itself as a factor, a factor that has led to patients being left out of consideration for transplant due to where they live. Socioeconomic status should not be used as a determinant for organ allocation, which should focus solely on medical need.

Conclusion

The Organ Transplant System is a pivotal and essential aspect of global medical care. Without it, people would never be able to receive organ transplants and the care they need for survival. Kidney and liver disease would become deadly in UNOS’s absence, and heart issues would become far more fatal. There is no doubt that the Organ Transplant System is essential, operating to serve the people and their needs. However, the biases and factors considered for organ allocation raise questions about how it should be determined.

Considering the determining factors, purely medical-based systems must be implemented to mitigate some of these biases. Making sure that one's physical appearance or assumptions

based on age or looks are excluded from the referral and scoring process of organ necessity, are steps in the right direction to unbiased organ allocation.

Even in some of the medical scales themselves, disparities can be found. When evaluating MELD scores for liver disease, it is essential to standardize all factors in these scores across men and women, ensuring that biological components such as muscle mass or nutrient production rates do not influence the assessment of how a disease affects the body. These scales for organ urgency must purely reflect the urgency in question, not the patient's sex or their natural reproductivesex of the patient or their natural production systems. Movement must be made to eliminate these weighted determinants in the allocation system of organs to cleanse the organ transplant system of further disparities.

A patient's race must also not play a factor in movement on the UNOS waitlist. The fact that black patients often wait up to a year longer on the waitlist than non-Hispanic white patients directly shows the action that must be taken to remove race as a determinant in the organ selection process. The stagnation in movement on the waitlist of patients of color displays long-lasting disparities that must be eliminated for an ethical waitlist to be achieved. Changes such as a race blind evaluation system and removing that factor from all documents that it is not needed in, can help to eliminate these issues of racial biases of the organ transplant waitlist.

One's low financial income can be seen to greatly reduce the likelihood of having an organ transplant and moving up on the waitlist. This factor turns the medical field against those with lesser income and makes them much less likely to actively or even pursue the case in which they need it. In addition, work must be done by UNOS, insurance agencies, and society itself to reduce the factor of distance and proximity in organ allocation. Funding for travel and heightened alert time of organ availability could all help to remove this factor as much as possible, working with organs short viability. Work must be done so that the determinant of distance from a medical center can be reduced to only come into play when the organ's viability is at risk, and organs must not be given to those most convenient, but to those in most need.

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