# TEMPLE UNIVERSITY
## Lewis Katz School of Medicine
### Center for Urban Bioethics

# THE CURRENT AND FUTURE ROLE OF ARTIFICIAL INTELLIGENCE IN MEDICINE: BIOETHICAL CONSIDERATIONS AND EXPLORATION OF AI IN MEDICINE, RADIOLOGY AND MAMMOGRAPHY
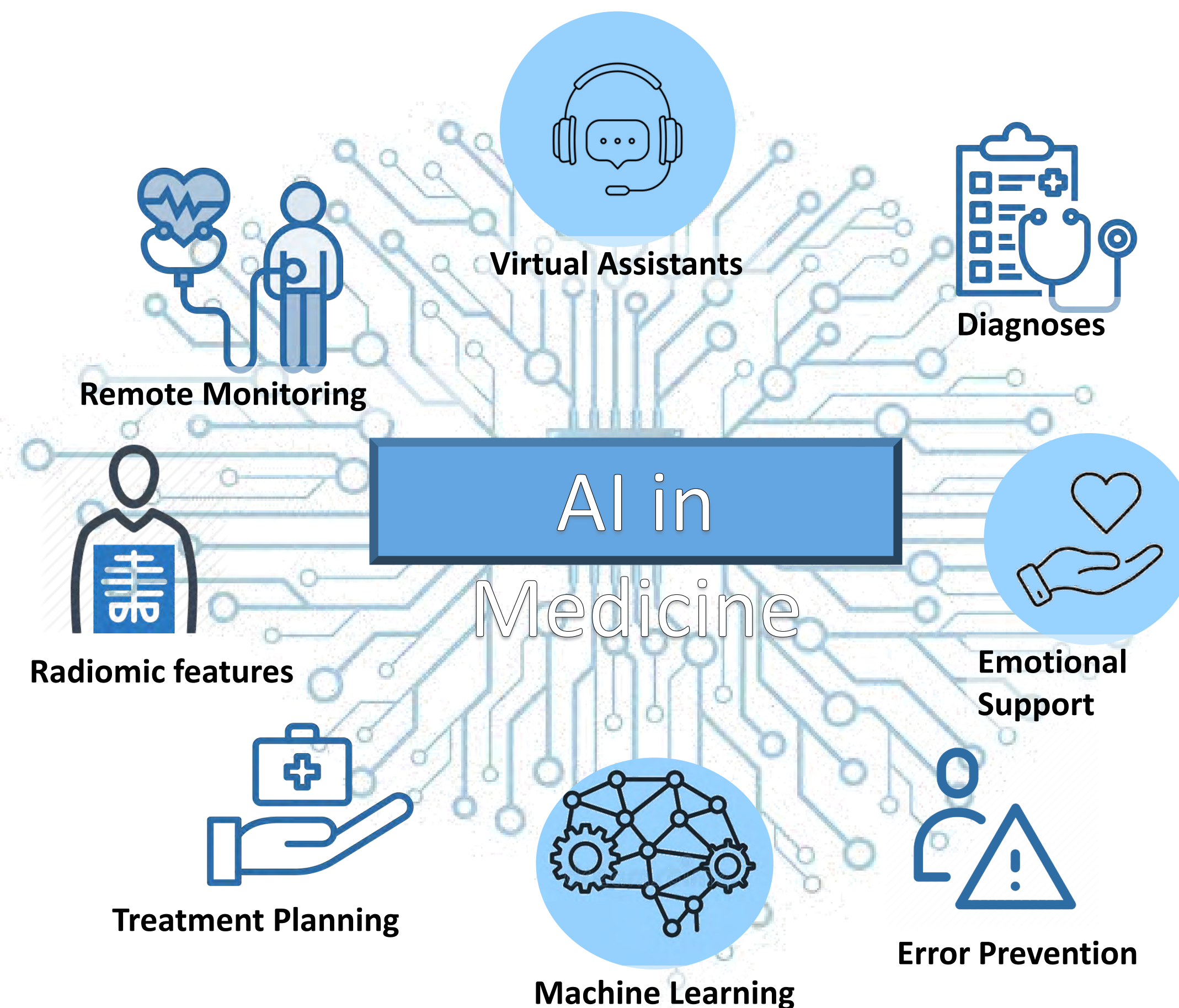
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## Introduction

Artificial Intelligence (AI) is a rapidly evolving field of computer science that aims to create intelligent machines capable of learning and performing tasks that typically require human intelligence. AI systems utilize various techniques such as machine learning and computer vision to enable machines to learn, reason, and make decisions like humans. AI has immense potential to revolutionize many industries, including healthcare.

As AI becomes more prevalent in our daily lives, the need for guidelines, training, and legislation to ensure its responsible use should be prioritized at this point. There is a huge potential for bias to be introduced and perpetuated through the use of machine learning algorithms that are trained on biased datasets, and there are several examples of this. It is therefore of utmost importance to ensure that AI algorithms are transparent and accountable to prevent bias and promote ethical and equitable decision making. There must be interventions early on given that AI datasets based on biased data can be perpetuated if not corrected early In focusing on AI's potential in healthcare, it is essential to be aware of and recognize its limitations. One could argue that having a comprehensive understanding of the limitations of AI is of greater significance than its potential applications.

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AI in Medicine
- Virtual Assistants
- Diagnoses
- Remote Monitoring
- Emotional Support
- Radiomic features
- Error Prevention
- Treatment Planning
- Machine Learning

**Benefits of AI in Medicine:**
- Improves accuracy and efficiency in diagnosis and treatment
- Decreases healthcare costs
- Reduces human errors in medicine
- Can help bridge gap in health literacy, language barriers
- Provides personalized care
- Virtual assistants and chatbots improve patient engagement & can offer emotional support
- Automate routine tasks for healthcare providers
- Identify radiomic features in imaging to aid in cancer detection and pathology

**Challenges of Implementing AI in Healthcare:**
- Concerns for data quality, privacy, and security
- Requires significant time, resources, and problem-specific training data
- Implicit and explicit bias must be addressed
- AI models must be representative of the population being treated
- There must be full transparency and trust in the data used to develop AI tools

## Ethical Considerations with AI

The use of AI in the field of medicine presents ethical complexities due to the potential exploitation of sensitive health information for training algorithms from vulnerable patient populations. Thus the protection and well-being of patients should be prioritized above all else, and early intervention and introduction of ethical guidelines and regulation of AI should take place immediately. Roundtable discussions should exist between healthcare professionals, ethicists, researchers, and data scientists. It is important to recognize that AI has plenty of applications in the field of medicine, however, it can only be an adjunct or tool to augment and enhance the capabilities of medical providers to provide better care and improve health outcomes for patients-- it cannot replace doctors. Medicine is a nuanced career path, to practice medicine, it requires not only a deep understanding of biology, human behavior, and social and cultural factors, but it also requires empathy and human connection.

- Physicians
- Bioethicists
- Data Scientists
- Legislators
- Patient Advocates
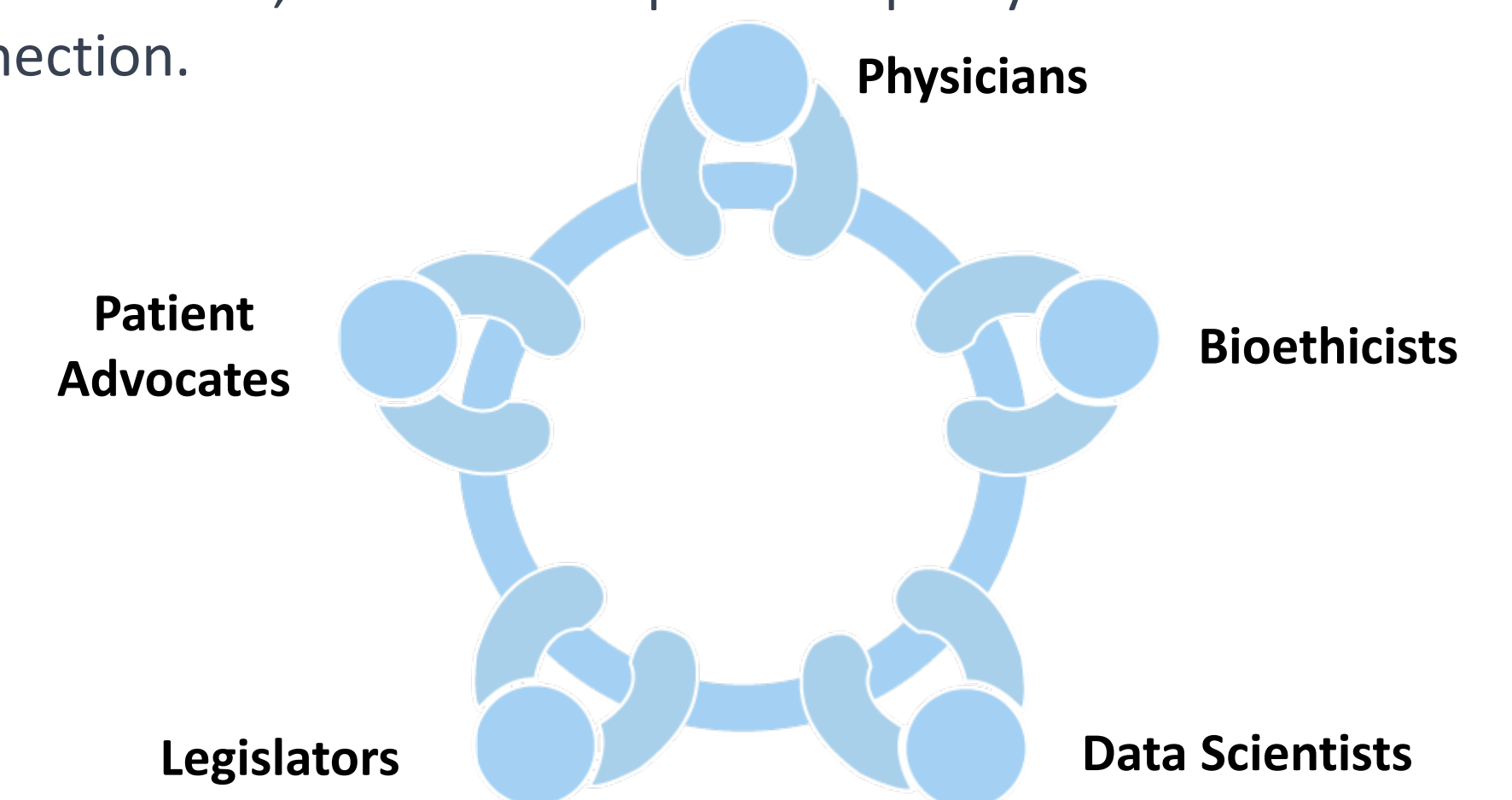
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# Ethical Assessment of Social Support as a Criterion in Kidney Transplant Candidacy in an Urban, North Philadelphia Setting

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## Introduction

Organ transplantation criteria have expanded to be more holistic and inclusive over the years. Despite the shift, marginalized populations are still bearing the inequities of the transplant realm (i.e., worse post-transplant outcomes, less proportion on transplant list). Social support as a criterion for kidney transplantation, there is lack of standardization and understanding to staff, clinicians, even patients and their families.

- Inadequate social support serving as an exclusion criterion inequities currently present in kidney transplant considerations may be perpetuated.
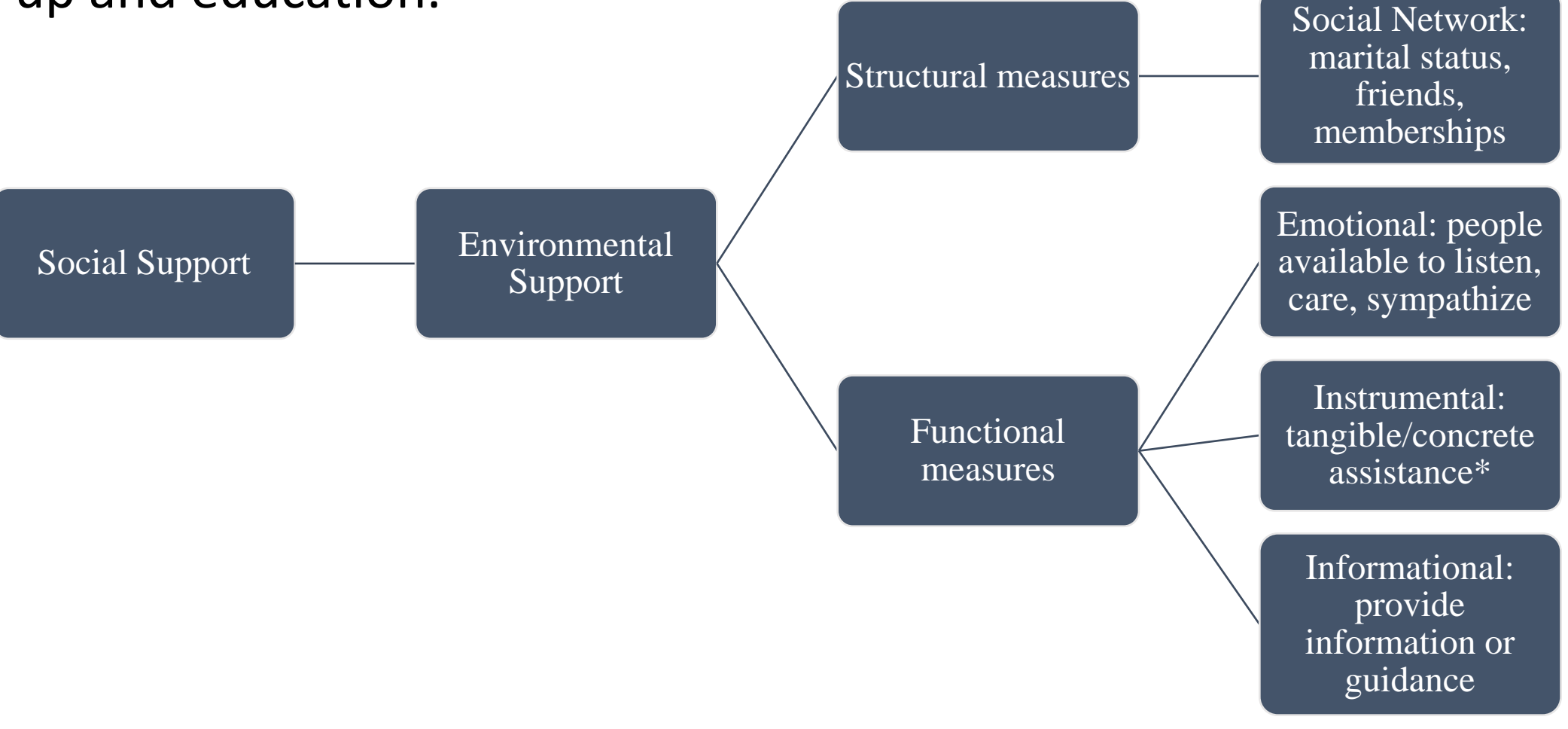
The goal of this work is to tangibly define this social support criterion within an urban North Philadelphia setting: Temple University Hospital (TUH). Given the definitions and literature, the criterion will be assessed to see if it fulfills the standard urban bioethical principles. Most important, this work will present a framework for social support referrals to be implemented as a necessary resource when patients lack it. In support of the urban bioethical principles of social justice and solidarity, power infrastructures should be funding this resource for patients.

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## Defining "Social Support" through the literature and at TUH

According to Helgeson, social support can be divided into structural (social networks) and functional (emotional, instrumental and informational). Studies have highlighted that instrumental support has been most impactful for patient follow-up and education.

```
                              ┌─ Structural measures ── Social Network:
                              │                         marital status,
                              │                         friends,
                              │                         memberships
Social Support ─ Environmental┤
                 Support      │                      ┌─ Emotional: people
                              │                      │  available to listen,
                              │                      │  care, sympathize
                              └─ Functional ─────────┤
                                 measures            ├─ Instrumental:
                                                     │  tangible/concrete
                                                     │  assistance*
                                                     │
                                                     └─ Informational:
                                                        provide
                                                        information or
                                                        guidance
```

At TUH, 8 transplant team staff members filled out the REDCap survey and 63% found instrumental support most important for transplant candidacy at TUH.

**Which form of social support do you believe is most important in transplant candidacy considerations at your institution?**

Pie chart: 0%, 25%, 12%, 63%
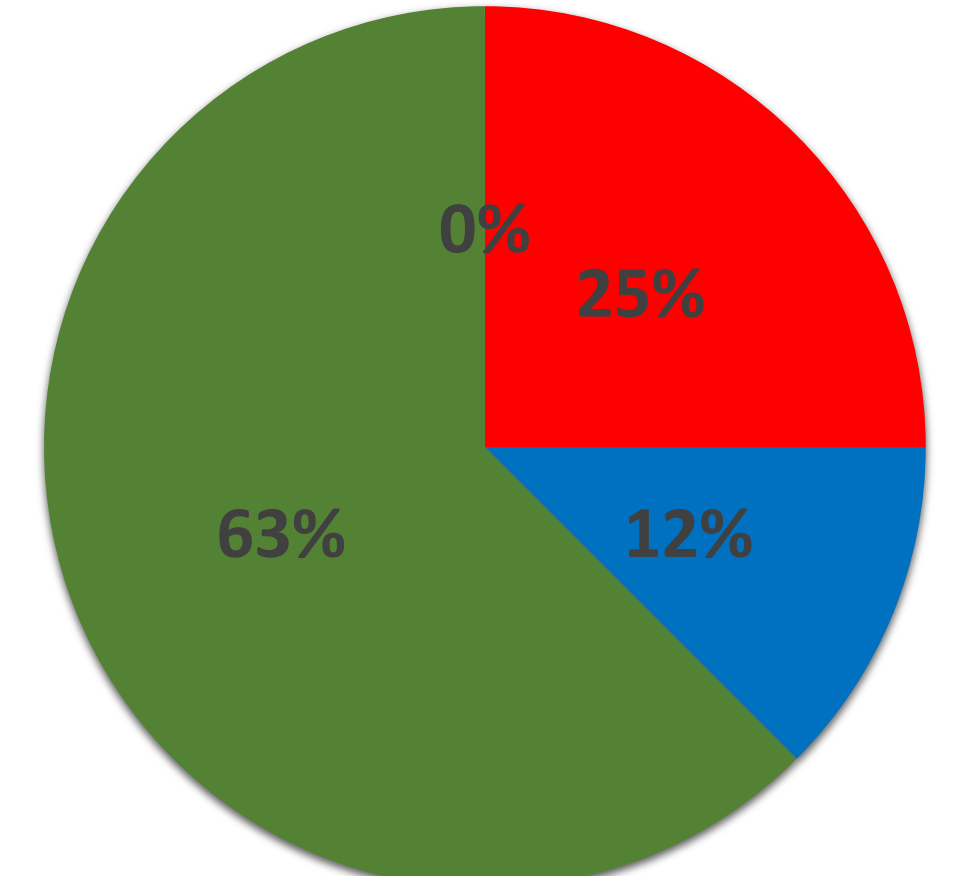
- Social Networks (marital status, friends, memberships)
- Emotional Support (people available to listen, care, sympathize)
- Instrumental Support (tangible/concrete assistance)
- Informational Support (provide information or guidance)

## Patient Scenario Reactions/Ethical scaling

It is important to note that 7/8 survey respondents were Non-Hispanic White males (ages 18 -74). And although this does not reflect the community served, the whole staff did not complete the survey.

Previous literature has demonstrated that providers are not very confident in social support as a criterion in transplant evaluation. For the final part of this survey: six patient scenarios that dealt with poverty versus wealth, marital problems like infidelity, and child autonomy.

- marital infidelity scenarios: whether spouse unfaithful or the patient unfaithful, most providers believed it was ethically sound for patient to remain transplant candidate
- Wealth vs poverty: most against poor patient w/o social networks receiving transplant while in favor of rich patient w/o social networks
- child autonomy: child wants the transplant, but the parent does not: most staff believed it was ethical to remain kidney transplant candidate. When the patient does not want transplant, but the parent wants them to, most staff disagreed with having the patient remain a kidney transplant candidate.

With varying opinions on ethical soundness, but also information on instrumental support being most important at TUH, the social support criterion must be better adapted and funded for patients who lack it (also more cost effective than dialysis).

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# An Ethical Call for Early Implementation of Palliative Care for Underserved Heart Failure Patients

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## Introduction

Heart failure (HF) is a disease that affects millions of Americans, but has a disproportionate impact on underserved, minority communities. Over the coming decade, heart failure will become a chronic disease for more Americans as treatments improve, but the disease cannot be cured. Minority populations are, and will continue to be, disproportionately impacted by heart failure due in large part to their increased risk factors, which stem from social and structural determinants of health. Palliative care (PC) services offer incredible benefits for patients and caregivers covering a variety of areas, such as goals of care discussions, shared decision-making, and psychosocial support. Providing early palliative care services to underserved heart failure patients offers extra resources to effectively manage their disease and lifestyle in a personalized fashion, and aligns with the urban bioethical principles of agency, social justice, and solidarity.

## Background

- Roughly 6 million people in the USA have heart failure
- Mortality rates are as high as 50% within 5 years of diagnosis
  - General public does not view HF as a fatal disease
- Hospitalizations are costly and readmissions can occur for 1 in 4 patients within thirty days of discharge
- Black individuals have a higher prevalence of HF risk factors, such as hypertension and diabetes
- Likelihood of hospitalization for HF is 50% higher for Blacks
- Decreased socioeconomic status is associated with high rates of HF when controlling for known cardiovascular risk factors
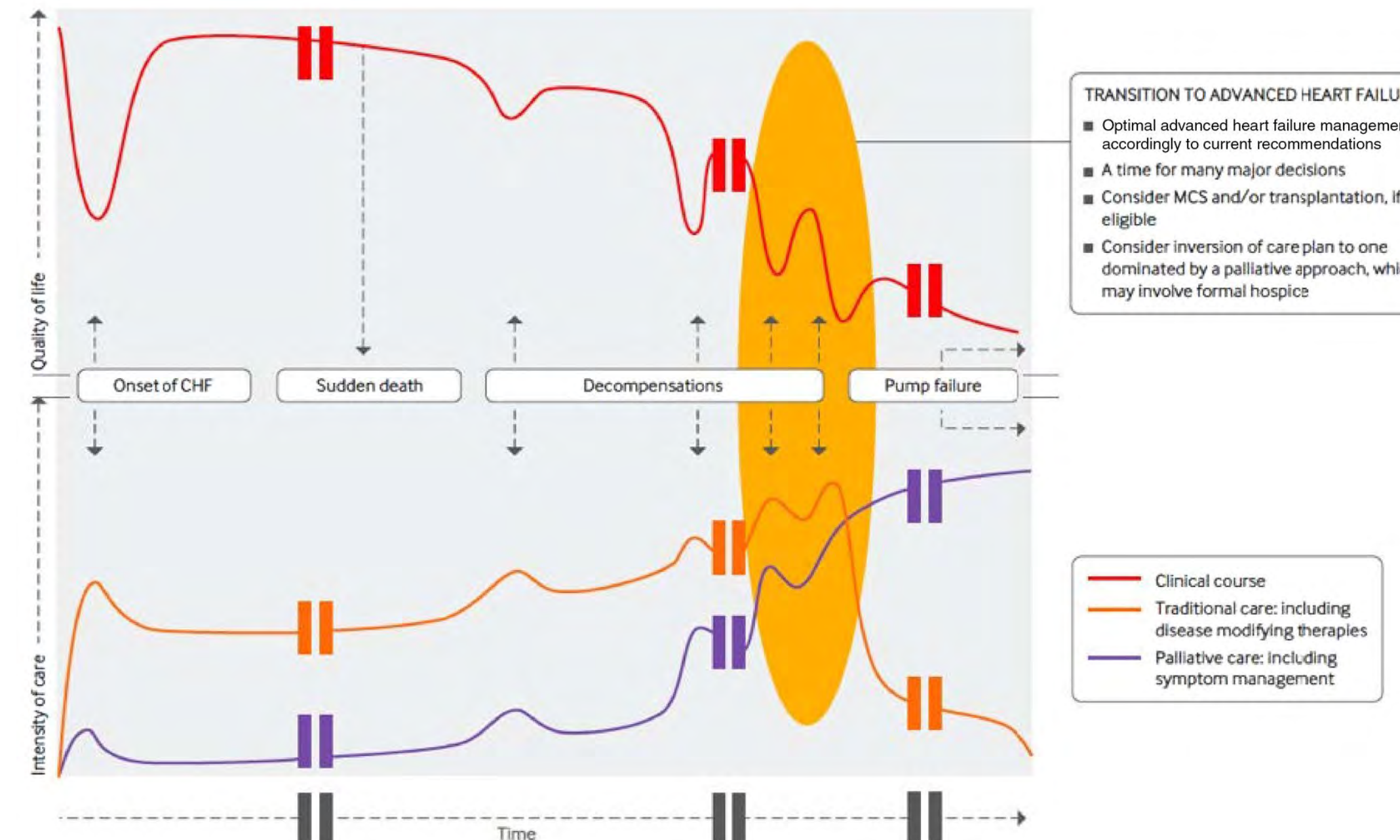
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Figure 1: The clinical course of heart failure with associated types and intensities of therapies[2]

| Technique | Sample Language |
|---|---|
| **Name** the emotion | You seem worried about what will happen if we don't implant the LVAD. Can you tell me more about that? |
| **Understand** the emotion | I see why you might be fearful of proceeding with the transplant. Can you help me understand what you're afraid of? |
| **Respect** the emotion | You have shown a lot of strength up to this point. Tell me more about what keeps you going |
| **Support** the patient | Whether or not you choose to have the procedure, I want you to know that I will continue to be your cardiologist and will take care of you no matter what happens |
| **Explore** the emotion | You mentioned earlier that you're concerned about what this worsening of your shortness of breath might mean. Can you tell me more about your concerns? |

LVAD indicates left ventricular assist device.
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Table 1: Using the NURSE mnemonic when communicating with patients with advanced heart disease[1]

## Palliative Care and Heart Failure

- PC fosters communication around goals of care discussions, shared decision-making, and caregiver support
- PC can assess patient preferences for:
  - Survival
  - Healthcare costs and burden
  - Quality of life (e.g. physical symptoms, mental health)
- Psychosocial support is paramount because up to 77% of HF patients suffer from depression, which is a negative prognostic factor
- No consensus recommendation on when to involve PC for HF.
- PC is underused in minority communities
- Because HF prognosis is difficult to predict, clinicians are turning to needs and symptoms assessments
  - Of the validated studies available, all have shortcomings in assessing social needs, especially among disadvantaged and minority communities

## Future Directions

- Heart failure patients from underserved communities need PC services to optimize understanding of the disease, managing symptoms, and access to support resources
- A tool does not exist that specifically identifies unmet psychosocial needs of HF patients from disadvantaged backgrounds
- Until a tool is developed, involving palliative care early for underserved HF patients supports agency and social justice while strengthening solidarity

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# Ethical Approach to Mitigating the Effects of Educational Inequality: Socialization in American Public Schools
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## Introduction

"Education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men, the balance-wheel of the social machinery" - Horace Mann, 1848

There is a complex web of factors that perpetuate racial and ethnic inequality within the American educational system. In the past, the idea of schools being separate but equal was ruled unlawful due to inherent inequalities. Desegregation and attempts to equitably fund schools have resulted in notable improvement in achievement gaps based on race; however, there is still considerable improvement to be made. I argue that to assuage disparity en route to equal educational opportunities, the psycho-social influence of race and identity must be considered in the classroom. One way we can support students is though ethnic-racial socialization.

## History

After the Brown v. Board of Education ruling, the supreme court ordered and oversaw the desegregation of public schools to promote educational equality. By the late 1990s, school districts were free of court supervision, effectively ending court oversight of desegregation. In 2002, the Charlotte-Mecklenburg school district of North Carolina adopted a neighborhood-based school zoning plan, relocating most of its public-school children. Research on the long-term effects of this change revealed an increased gap in education outcomes between black and white students. Unintended consequences from the Charlotte-Mecklenburg re-zoning initiative raise questions about the relationship between race and educational success.

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INEQUALITY   EQUALITY
EQUITY   JUSTICE
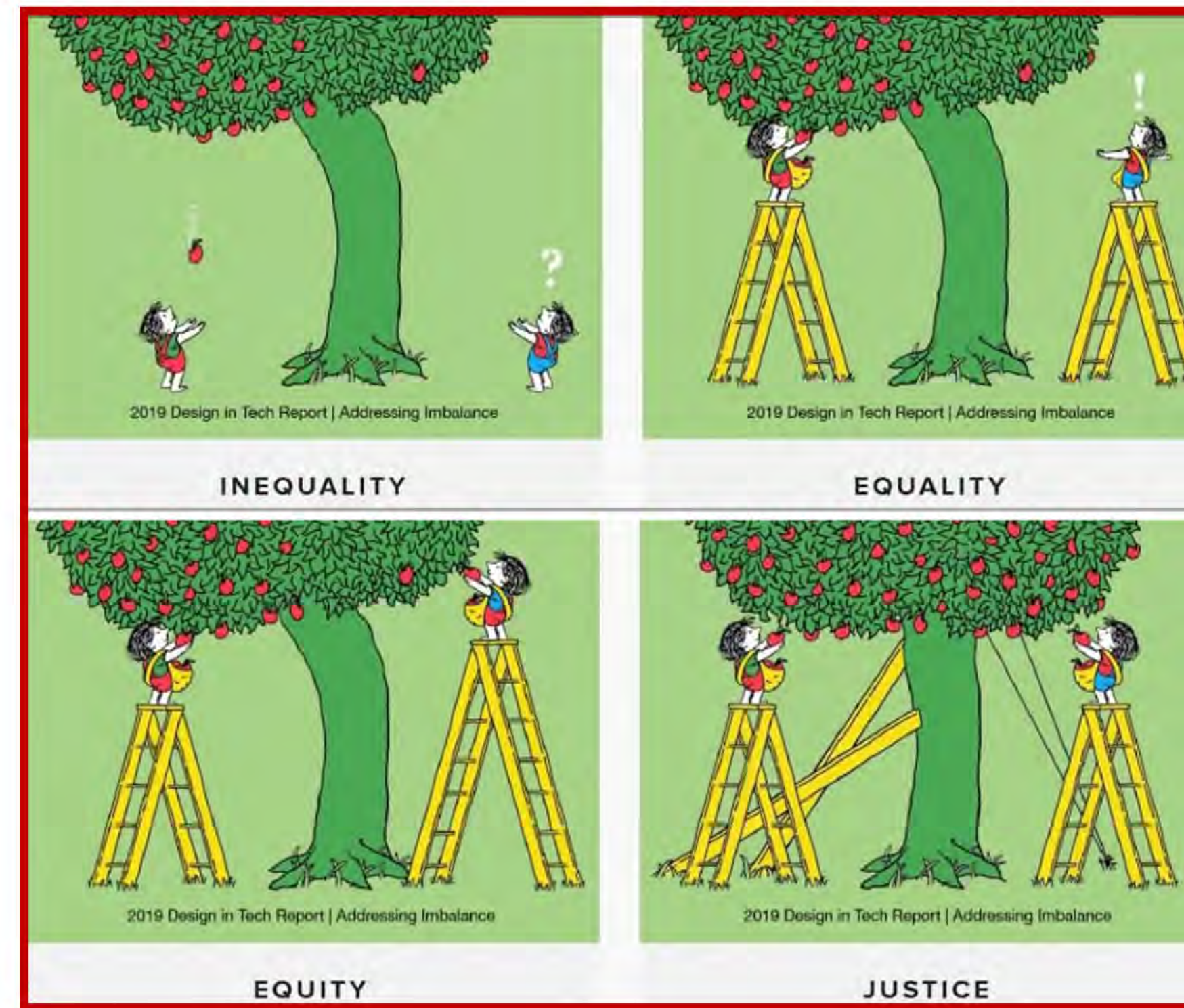
## Statistics on Race and Academic Performance

- State exam grades in Chicago public schools vary more closely with race than with any other measurable factor. African American students in high-minority schools scored 2.21 points below African American students in low-minority schools.
- Black students are more likely to repeat a grade than any other racial group.
- National SAT scores are consistently highest among whites, lowest among blacks.
- National dropout rates are lowest in whites and highest in Latinos.
- Blacks, Latinos, and Native Americans are also more likely to be placed in special education programs and are more likely to be found in lower educational tracts.
- Black students are more likely to repeat a grade than any other racial group.
- In a middle school survey, teachers are more likely to judge their white students as more engaged and ready to learn.

- Regardless of race, students in schools with a larger population of white students consistently outperform those in high-minority schools.
- African American and Hispanic students, were consistently the most underrepresented demographic in gifted education.

## Moving Forward: Socialization

Ethnic-racial socialization is the exposure of children to the history and culture of their race. Socialization increases a child's understanding and awareness of prejudice and discrimination while instilling a sense of identity and pride. A well-developed identity has been shown to positively correlate with high self-esteem and educational achievement. Socialization is strongly correlated with bias preparation, academic achievement, educational aspiration, and cognitive engagement. Cultural socialization was also found to be a direct, positive predictor for GPA, educational aspirations, and cognitive engagement. Socialization also results in vigilance capable of picking up on behaviors in school that may constitute as discrimination. African American and Latinx students exposed to socialization have higher academic aspirations, lower levels of delinquency and substance use, and better socioemotional wellbeing (improved self-esteem, reduced anxiety, and fewer feelings of depression). Data supports the theory that parental ethnic-racial socialization mitigates the detrimental effects of racial discrimination on children of color, but more research needs to be done on socialization in the classroom.

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