Recognizing Systemic Racism in Modern Science
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Talk involves:
1. One medical field case study
2. One AI study
3. And discussion of what we can do as scientists to identify and deal with sources of racism and bias
Overview

See slide 2 for image sources
Should race be used in medicine?

Does the benefit of potentially targeted care outweigh the risk of invoking race?
Impact of race on medical treatment

1. Art on left: Credited: Uncredited | Via: https://choosingwiselycanada.org/bronc-x-rays-before-surgery/
3. Argument against further invoking race: 1966 survey showing 70+ percent of California radiology techs administered higher radiation to Black patients believing their skin is tougher. Immediate sources: Medical Apartheid – Harriet A. Washington/Carolyn Hutson Lecture
Impact of race on medical treatment

1. Art on left: Credit: Alex Nabaum | Via: https://www.nbcnews.com/think/opinion/james-marion-sims-problem-how-doctors-can-avoid-whitewashing-medicine-ncna880816
2. See slide 5 for art on right credits
1. Art on left: Credit: Celia Jacobs | Via: https://www.today.com/health/what-implicit-bias-invisible-racism-hurts-black-women-doctor-s-t189105
2. See slide 5 for art on right credits
3. Argument against invoking race:
   A) In 1972- Boston City Hospital medical students protested the policy of performing unnecessary hysterectomies on black women in order to allow residents to practice. Immediate source: Carolyn Hutson Lecture | Verification: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6167003/ (From: Roberts D. Killing the Black Body: Race, Reproduction and the Meaning of Liberty. New York: Pantheon Books, 1997
   B) Disproportionate maternal mortality rates: https://www.cdc.gov/mmwr/volumes/68/wr/mm6835a3.htm?s_cid=mm6835a3_w & Carolyn Hutson Lecture
   C) Black infants 2x more likely to die than white infants, disparity growing over time. Immediate source: Carolyn Hutson Lecture | Verification: https://www.cdc.gov/nchs/data/nvsr/nvsr69/NVSR-69-7-508.pdf
1. Image on left: Credit: BioRender | Via: https://biorender.com/


3. Purpose of the kidney is to remove waste. Best methods to assess kidney function are time-consuming, expensive, so rapid decisions are made using markers like Creatinine. Higher amounts of Creatinine (waste generated by body) = generally lower kidney function. This marker is imperfect so demographic corrections are added in an equation to improve the Creatinine-based estimate (see next slide).

4. Sources/further info:
   a) https://cjASN.asnjournals.org/content/15/8/1201
   b) https://www.youtube.com/watch?v=P_3KQVIjyss&t=2113s
   c) (Also see refs @ end of this) https://acutecaretesting.org/en/articles/clarifying-the-confusion-of-gfrs-creatinine-and-cystatin-c
Race correction for kidney function estimates

(Levey et al. 1999)
Race correction for kidney function estimates

Table 48. Abbreviated MDRD Study Equation

Estimated GFR (ml/min/1.73m²)

= 186 x (S_Cr)⁻¹¹⁵⁴ x (Age)⁻⁰·²⁰³ x (0.742 if female) x (1.210 if African-American)

= exp(5.228 – 1.154 ln(S_Cr) – 0.203 ln(Age) – (0.299 if female) + (0.192 if African-American))

For explanation, see text and references 17,18.

Levey et al. 1999

(Levey et al. 1999)
* This isn’t the only equation, but another popular equation (from 2009) also uses a race term.
Why were authors able to find a difference in Creatinine for the African American population when race isn’t real?

1. Social determinants of health: studies have shown that you can attenuate the difference between black/white population by correcting for disparities in this area (Example: https://pubmed.ncbi.nlm.nih.gov/26180129/)

2. What of remaining differences 1) racism as a variable 2) social factors we’ve yet to fully count for 3) ancestry

3. Ancestry: Spread of 2 risk variants (associated with kidney function) throughout Africa. Takeaway is that ancestry isn’t race, distribution of variants in Africa varies a lot. Consistent w/ only ~13% of African-Americans being ‘high risk’ wrt variants. Also consistent with the example from Superior that 1 individual of European ancestry may be more genetically similar to 1 individual of Asian ancestry than another individual of European ancestry.

Problems with this use of race

1. Singles out African Americans
2. Suggests that race is a biologic factor
3. Unnecessarily raises estimate for large group of patients
   - Delayed nephrology consult
   - Delayed addition to kidney transplant list

1. Also, this is on top of the faster decline in kidney health in African Americans (over 3x the end stage renal disease incidence in this group; “comprising 32% of the end-stage renal disease population, but only 13% of the general population.5,6”)
3. 32% from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2749005/
4. Image:
   http://kidneyfoundation.cachefly.net/professionals/KDOQI/guidelines_ckd/Gif_Fi le/kck_t33.gif
Proposed solutions

1. Remove race coefficient
2. Update equation
3. Use better biologic markers

1. UW students advocate for removal of race from equation: https://medicine.uw.edu/news/uw-medicine-exclude-race-calculation-egfr-measure-kidney-function
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1. Image/info: https://cjasn.asnjournals.org/content/3/6/1895
Should race be used in medicine?

- The use of race provides a substantial benefit
- The benefit cannot be achieved through other feasible methods
- That patients who reject race categorization can be accommodated fairly
- The use of race is transparent

Eneanya et al. 2019

- Recognition that race is not a biologic risk factor
- Continued research into better risk factors to replace race

1. Paper: https://jamanetwork.com/journals/jama/fullarticle/2735726
Overview

See slide 2 for image sources
Is AI effective in reducing bias where institutional racism exists?
1. AI is involved in everything from predictive policing to sentencing/parole decisions
2. Youtube Video (via CNBC): https://www.youtube.com/watch?v=ZMsSc_utZ40
4. Image (left): From PredPol website
1. Full video link: https://www.youtube.com/watch?v=Gi4YeRqfb24
Correctional Offender Management Profiling for Alternative Sanctions (COMPAS)

- Purpose: tool to predict recidivism
- Inputs: 137 possible risk factors (example: record, living situation)
- Output: 1 risk score
- Consequences: Lower risk scores → shorter sentences
Potential issues with COMPAS

1. Bias in defining criminality
2. Bias in enforcement
3. Data and risk factors track with race because of racism
4. Lack of transparency

COMPAS = Correctional Offender Management Profiling for Alternative Sanctions

2. Before AI was used in the criminal justice system, the system was biased (image in ref to war on drugs where communities of color and poor communities were disproportionately impacted by legislation among other things)
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COMPAS = Correctional Offender Management Profiling for Alternative Sanctions

1. Image: https://rytf.org/rockaways-school-to-prison-pipeline/
2. Age at first arrest, where you live, etc. can all be used as risk factors and these track with race because of systemic racism/segregation. COMPAS and other tools don’t use race directly, but in this way race is involved in the calculation of a risk score
Potential issues with COMPAS

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COMPAS = Correctional Offender Management Profiling for Alternative Sanctions

Is AI effective in reducing bias where institutional racism exists?

Two individuals arrested for drug trafficking

Priors:
1. 1 attempted burglary

Post risk score:
1. Drug trafficking
2. Drug trafficking
3. Drug trafficking

Dylan Fucett
LOW RISK 3

Priors:
1. 1 resisting arrest (nonviolent)

Post risk score: Nothing

Bernard Parker
HIGH RISK 10

Source: ProPublica

How does COMPAS stack up? One analysis from ProPublica

Is AI effective in reducing bias where institutional racism exists?

Two individuals arrested for shoplifting

**James Rivelli**
- **Priors:**
  1. 1 domestic violence
  2. 1 aggravated assault
  3. 1 petty theft
  4. 1 drug trafficking
- **Post risk score:**
  1. 1 grand theft

**Robert Cannon**
- **Priors:**
  1. 1 petty theft
- **Post risk score:**
  Nothing

Source: ProPublica

Is AI effective in reducing bias where institutional racism exists?


Source: ProPublica
Overview

See slide 2 for image sources
What we can do as scientists

Research
• Consider sources of bias
• Consider diversity

Education
• On historical and present racism
• On limitations

Advocacy
• Within institutions
• Outside of institutions

2. Bottom image: Credit: ScAAN | Via: https://scaan.net/
Additional sources of information