Fairness via AI:

Bias Reduction in Medical Information

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An aspirational gap

Most AI Fairness work is inherently limited due to the "Bias In, Bias Out" principle (Mayson, 2018)

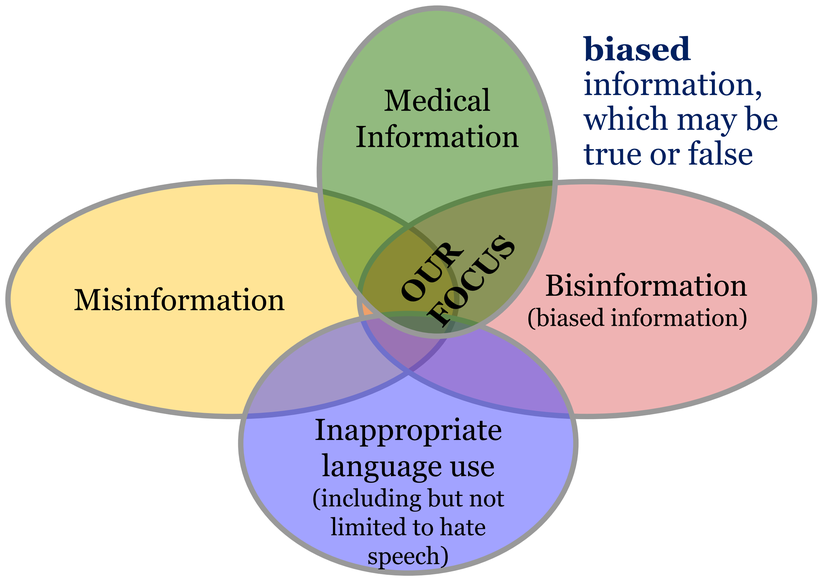
Upper bound is true "fairness", i.e., inequities, in real world

Fairness **via** AI

- Rooted in insights from medical education, sociology, and antiracism
- A broader lens on fairness: greater aspiration
  - Rather than Fairness **in** or **of** AI,
  - Using AI to study & remedy inherently unequal situations in society
  - Accelerate progress
  - Debiasing the world, rather than just debiasing AI

Bisinformation

(\ˌbis-ˌin-fər-ˈmā-shən\)



Venn diagram illustrating the partial overlaps between these issues along with BRIMI's focus

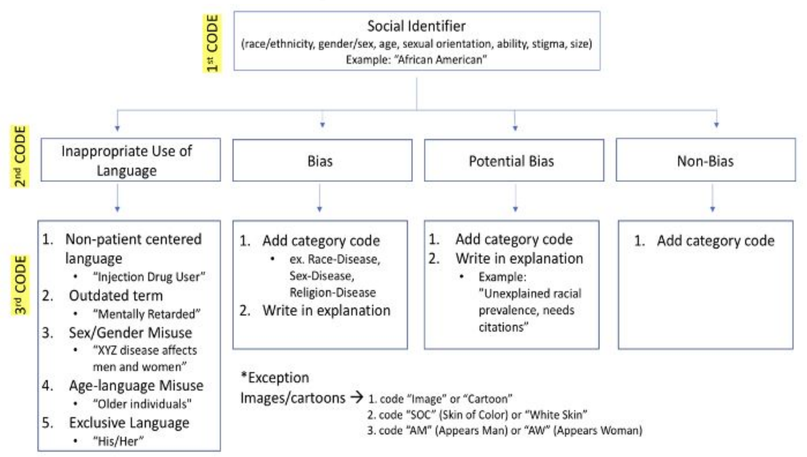
Case Study: Bias in Medical Information

- Bias and language misuse can have detrimental impact on patient outcomes
- Inappropriate usage of social identifiers in a medical context can be harmful, even if strictly true
  - e.g. prevalence of illness in racial category
  - w/o accounting for Social or Structural Determinants of Health
- Similarly for inappropriate language use, e.g.:
  - conflating gender with sex
  - using racial identity as a stand-in for phenotype
- Even more harmful when the information is actually false
  - Example: Long-debunked Salt Gene Hypothesis (still taught)

Reducing bisinformation in medical information

- Bias reduction is critical for accurate evidence-based medicine
- Reducing bisinformation in medical content is a manual and time consuming effort
  - Yet, immense downstream impact
- SOTA AI and NLP can scale up these significantly –
  - But must be undertaken with great care

Medical Experts' Annotation Guidelines



Data collection: complex domain knowledge and extensive training

Prior Results and Work Underway

- Montenegro et al. developed and piloted bias reduction process in med schools
  - Yale, Seattle Children's Hospital, Michigan State University
- Dataset with 10,594 pages of instructional material, with 3,500 annotated examples of bias and related constructs, which will serve as seed data for BRIMI (more constantly added)
- Concurrent grant from NBME's Stemmler Fund with a focus on medical curricula and education - underway
  - Machine learning models to detect bias - under construction by AuCoDe
- NSF FAI grant focuses on online & social media information
  - Data collection - underway

Deliverables

- Traditional research outputs (publications, datasets), plus…:
- Triage guidelines for bis- and misinformation disseminated to public health officials and journalists
- Bias reduction tools integrated in medical schools
- Twitter bot that flags biased or false medical claims

Outreach and Broader Impacts

- BRIMI will embed our research into practice through:
  - outreach to patients
  - integration into existing systems
  - disseminating reports and tools to practitioners
- BRIMI offers outsized promise for improved equity in health for minoritized communities and patients
  - Better patient outcomes
  - Also improves DEI in medical schools!
- Research and Education are integrated
  - by leveraging advances in reducing bias in medical education and applying them to the online information ecosystem.