Exploring algorithmic bias and its impact on health research and clinical practice

March 24th, 2023; 12:00-1:00pm Pacific

Table of Contents

Pre-Event Materials

To be prepared to fully participate in this workshop, we strongly advise participants to:

1. Listen to this ~10 minutes recorded Brookings talk section on algorithms that begins at the 10:37 minute mark.
2. Read this article "Addressing algorithmic bias and the perpetuation of health inequities: An AI bias aware framework" by Agarwal et al (2023).

Event Agenda

Time	Activity	Location	Who
11:55-12:05	Polls open, Breakout rooms prepared	Main room	Amy Laird
12:00-12:15	Introduction	Main room	Sarah Andrea
12:15-12:45	Breakout discussions	Breakout rooms	Everyone
12:45-1:00	Large group discussion: share out and wrap up	Main room	Amy Laird & Sarah Andrea facilitating share out

Poll Questions

1. Have you had a chance to read Agarwal's article?
   - Yes
   - No
2. Have you had a chance to listen to the Brookings recording section on algorithms?
   - Yes
   - No
3. What best describes your relationship/interactions with AI/ML and algorithms in general to date?
   - I'm new to them but excited to learn more
   - I use existing algorithms for research and/or clinical/public health practice
   - I develop algorithms for use in research and/or clinical/public health practice
   - I use AND develop algorithms for use in research and/or clinical/public health practice

Breakout Discussion Guide

1. **Position yourself**
   Before you begin your discussion please take one minute to reflect on who you are and how you "show up" in the context of the work that you do. Consider your positionality, thinking specifically about:
   - Your race, gender, socioeconomic position, ability, and other important aspects of your identity (and their intersections)
   - Your role and "location" within the hierarchies of your program, school, institution, discipline, etc.
   - Your level of privilege (what privilege you do and don't have, and when/where/etc. it manifests)
   - How all of the above have shaped your relationships to the work that you do.

   Now, with your positionality in mind, move forward into the discussion.

2. **Select 1-2 notetakers**
   We will be sharing and using this Google sheet to summarize our talking points. Please enter notes in all 3 boxes: Key themes; Questions for the larger group; Resources to share with others that were brought up in your small group discussion.

3. **Review the poll results**
   Please take a look at the poll results (here) from the poll we took at the beginning of this session. Share any reflections or questions you have with your group and discuss.

4. **Introduce yourselves**
   Briefly share what you are comfortable sharing about who you are and what you are hoping to get out of this conversation

5. **Follow these discussion prompts**
   To help guide the discussion, consider the figure below from Leslie et al., (2021). We provide some discussion prompts for each of the four domains. Your group may be interested in exploring each of the domains together or in taking a deep dive into one or two of the domains.

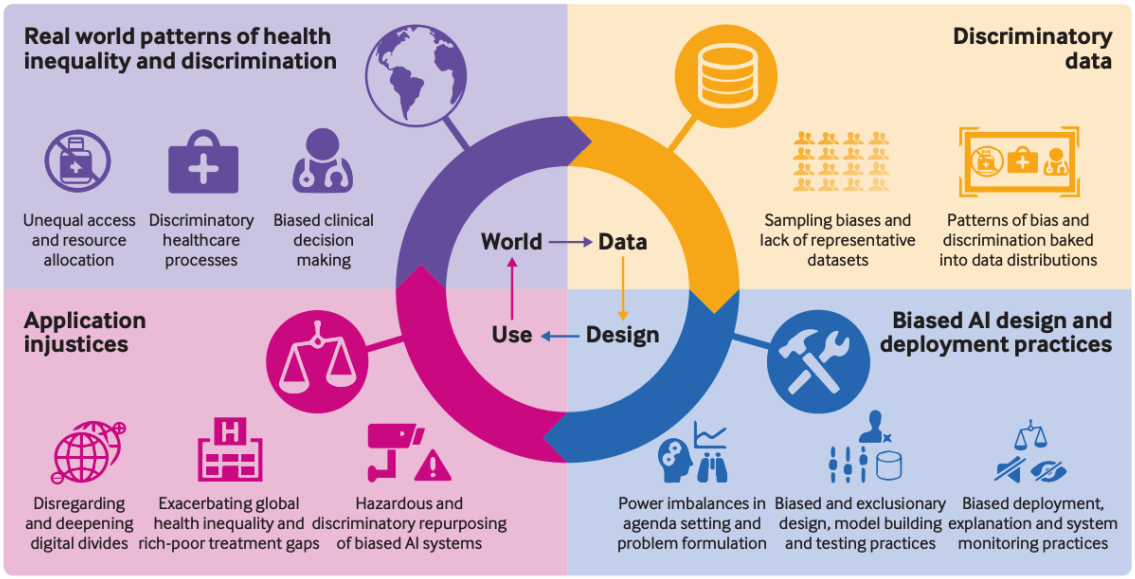

Fig 1 | Cascading effects of health inequality and discrimination manifest in the design and use of artificial intelligence (AI) systems

- **Real world patterns of health inequality and discrimination**
  - How do you see this showing up in your research or clinical/public health practice?
  - How could algorithms, if developed equitably, improve these discriminatory practices?

- **Discriminatory Data**
  - Thinking about the data sources you use for your work, how might historical inequities and structural barriers shape who is in that data?
  - What are ways that you could obtain more representative data in your work?

- **Biased AI design and deployment practices**
  - Thinking about a recent research, clinical, or public health practice project you have been involved with that involved working with AI/ML and/or developing an algorithm:
    - What was the research question/project topic and who is involved in helping to set it? That is, were key stakeholders such as patients and/or members of affected communities involved?
    - If you were developing an algorithm, do you know what components were going into it, or was it a "black box"? What rationale/assumptions were being made about things like race?
    - If you were developing an algorithm, did you have a specific process for evaluating and addressing bias? If yes, what was your process?

- **Application injustices**
  - How do you envision your research being applied in the real-world?
  - What are ways to prevent algorithmic work from exacerbating injustice?

- **Wrapping up:**
  - After doing the pre-session homework and having this conversation, is there anything in particular that you can see applying to your own work?

Resources on Algorithmic Bias

- Medical Algorithms Are Failing Communities Of Color (2021) Health Affairs Forefront
- Vyas DA, Eisenstein LG, Jones DS. Hidden in Plain Sight - Reconsidering the Use of Race Correction in Clinical Algorithms. N Engl J Med. 2020 Aug 27;383(9):874-882. doi: 10.1056/NEJMms2004740. Epub 2020 Jun 17. PMID: 32853499.
- Robinson WR, Renson A, Naimi AI. Teaching yourself about structural racism will improve your machine learning. Biostatistics. 2020 Apr 1;21(2):339-344. doi: 10.1093/biostatistics/kxz040. PMID: 31742353; PMCID: PMC7868043.
- Leslie D, Mazumder A, Peppin A, Wolters M K, Hagerty A. Does "AI" stand for augmenting inequality in the era of covid-19 healthcare? BMJ 2021; 372 :n304 doi:10.1136/bmj.n304
- Obermeyer Z, Powers B, Vogeli C, Mullainathan S. Dissecting racial bias in an algorithm used to manage the health of populations. Science. 2019 Oct 25;366(6464):447-453. doi: 10.1126/science.aax2342.
- Pierson E, Cutler DM, Leskovec J, Mullainathan S, Obermeyer Z. An algorithmic approach to reducing unexplained pain disparities in underserved populations. Nature Medicine. 2021 Jan 13;27:136-140. doi: 10.1038/s41591-020-01192-7.
- Starke, G., De Clercq, E. & Elger, B.S. Towards a pragmatist dealing with algorithmic bias in medical machine learning. Med Health Care and Philos 24, 341–349 (2021). https://doi.org/10.1007/s11019-021-10008-5
- Danton S. Char, Michael D. Abràmoff & Chris Feudtner (2020) Identifying Ethical Considerations for Machine Learning Healthcare Applications, The American Journal of Bioethics, 20:11, 7-17, DOI: 10.1080/15265161.2020.1819469
- Cerrato P, Halamka J, Pencina M. A proposal for developing a platform that evaluates algorithmic equity and accuracy. BMJ Health Care Inform. 2022 Apr;29(1):e100423. doi: 10.1136/bmjhci-2021-100423. PMID: 35410952; PMCID: PMC9003600.
- Xu (2022) Algorithmic fairness in computational medicine
- Algorithmic Bias Playbook
- Algorithms Are Making Decisions About Health Care, Which May Only Worsen Medical Racism (2022) ACLU

General Resources to Learn More About Antiracism in the Context of Research & Public Health/Clinical Practice

- **Antiracism Resources for Epidemiologists & Public Health Researchers**. Crowdsourced list of resources on: critical histories of epidemiologic and public health research, research ethics and epidemiologic knowledge production, epidemiology for social justice, allyship/antiracism in epidemiologic research, subject matter, theoretical frameworks, methods, and data science & equity
- **'Health equity tourists': How white scholars are colonizing research on health disparities**. An important commentary highlighting the ways in which racism is even embedded in the way we approach researching health disparities.
- Anti-Racism and Race Literacy: A Primer and Toolkit for Medical Educators. Definitions and Frameworks
- Gravlee CC. How race becomes biology: embodiment of social inequality. American Journal of Physical Anthropology. 2009;139:47-57.
- Gravlee C. How Whiteness Works: JAMA and the Refusals of White Supremacy
- Bailey Z & Moon R. Learning from Our History to Build a Healthier, More Equitable Society
- Hajat A. Guest lecture at OHSU as part of our Antiracism in Data and Analysis Seminar Series, March 2021 (56 minutes). Reflections on race and ethnicity in epidemiology.
- Praxis podcast with Edwin Lindo - Episode 1. (26 minutes)
- Dorothy Roberts TedMed talk (14 min): The problem with race-based medicine

- Dr. Camara Jones. Allegories on race and racism. TED talk. (20 minutes) Allegories on race and racism | Camara Jones | TEDxEmory
- Excerpt from lecture by Dr. Chandra Ford - Start at minute 9 and stop at minute 19. (10 minutes) Racism is a Public Health Issue; Professor Chandra Ford, UCLA
- Flanagin A, Frey T, Christiansen SL. Updated guidance on the reporting of race and ethnicity in medical and science journals. JAMA 2021;326(7):621-627. doi:10.1001/jama.2021.13304.