FIRE: THE FIRST-YEAR INNOVATION & RESEARCH EXPERIENCE
COMPUTING & SOCIETY

THE TRUTH OF RACIAL BIAS IN PULSE OXIMETERY

Caitlin O'Neill, Mahi Sanghavi, Arshnoor Bhutani, Yashu Bommareddy

Addressing the issue

Pulse oximeters are **racially biased** due to interference between the oximeter's infrared LEDs and **skin melanin**. By gathering insights from medical and technical professionals, this study aims to understand the opinions and insights of key **stakeholders** who use and construct pulse oximetry: medical/ technical professionals and pupils.

Why this matters

This study is vital because it examines **current consciousness** of racial bias in pulse oximetry, which was designed for light-skinned people and may not accurately read darker skin tones. **Black patients have 12% oxygen reading mistakes** compared to 4% for white patients.[1] These errors can cause misdiagnoses and mistreatment, perpetuating **health inequities**. This project seeks to improve pulse oximeter fairness and create a more equitable healthcare system by involving medical and technological specialist input and opportunity for future advancements.

Methods & Survey Design

1. Convergent Parallel Design

2. Qualtrics Survey:

a. Demographic questions
b. Open-ended questions (profession-specific)
c. Likert scale Q's to analyze perspectives

3. Target Groups: Pre-med students, Nurses, Engineers, Computer Scientists

4. Participant Recruitment:

a. Department-specific listservs
b. Classroom announcements
c. Snowball sampling

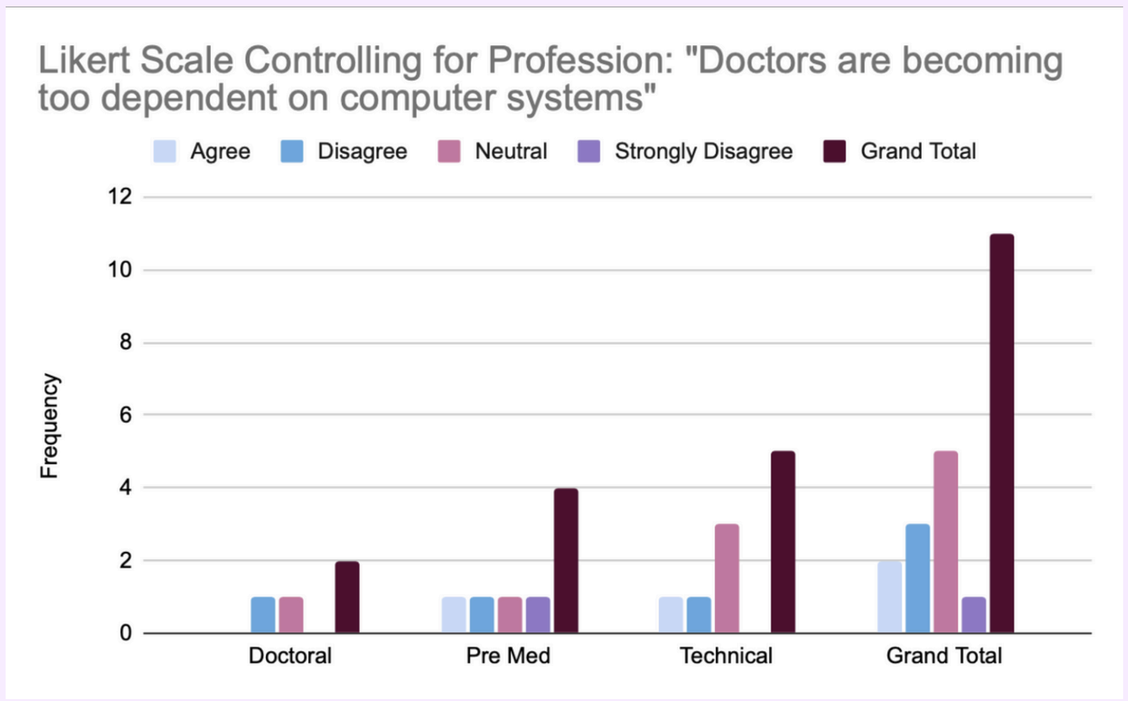
5. Data Collection and Analysis:

a. Gather responses on Demographics, Proposed Solutions, and Professional Perspectives
b. Analyze trends across responses; Control for demographic variables

6. Insights and Solutions: Identify trends to find solutions for reducing pulse oximetry bias and infer findings to generate awareness for future technology and policy formation.

Preliminary Visuals and Findings

Frequency	*Doctors are becoming too dependent on computer systems.*				
Profession	Agree	Disagree	Neutral	Strongly Disagree	Grand Total
Doctoral			1	1	2
Pre Med		1	1	1	4
Technical		1	1	3	5
Grand Total		**2**	**3**	**5**	**1**	**11**



Discussion

Given limited survey data, we conducted **education-specific** case studies (medical/technological major undergraduates and doctoral degree holders) to quantitatively analyze the data and infer qualitative observations from it. It was observed that across all educational backgrounds surveyed, there is a weak but **tangible sense of trust** regarding Doctors and their reliance on tech, emphasizing the **need for clear communication** about its role and reliability.

Conclusions/Next Steps

As of present, our group is applying for grants to continue with our plan of pulse oximetry equity **advocacy**. With these funds, we will conduct a **panel** to present our findings, raise awareness on this issue, and explore potential grant opportunities to expand our outreach. Securing additional funding would allow us to collect more comprehensive survey data and **extend the impact** of our research, ultimately contributing to more equitable healthcare and treatment plans.

About the researchers & references: