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Algorithmic Efficiency in the United States Healthcare System

Introduction

As the current age in big data continues to perpetuate modern technological advancements, data-driven decision making has been heavily dependent on algorithms used in various industries and systems of power in the United States including, but not limited to technology, criminal justice, ecommerce, and healthcare. As a result of the coronavirus pandemic and its negative implications, such as overloading frontline healthcare workers with high demands of patient care, it is most beneficial for policy and decision makers to properly act through agency and use their position of power in order to prioritize new policy implementations and prevent overloaded hospitalization records in the future. In the context of the healthcare system, algorithms are defined as software or risk assessment tools intended to guide healthcare providers during the decision making process by providing the most optimal patient care and supporting diagnostic decisions for medical procedures. However, these algorithms and widespread algorithmic risk assessment tools such as the glomerular filtration rate (GFR) and fracture risk assessment tool (FRAX), to name a few, inherently contain racial biases due to race adjustment coefficients that further perpetuate preexisting race-based health inequalities. Healthcare providers frequently depend on these types of algorithms to not only improve efficiency, but also to make important decisions that are severely consequential and negatively

impact the lives of patients and their families. Due to clinical decision-making biases, algorithms used in the United States healthcare system such as the glomerular filtration rate and fracture risk assessment tool must be improved by the individuals and organizations that implement them. The negative implications caused by these algorithms must be brought to the attention of appropriate policy makers for them to use their position of power and act through agency in order to prevent the spread of preexisting race-based health inequalities and bias towards marginalized communities of color across the nation, especially in a period of time where proper and equal access to healthcare should be of utmost importance for the United States government.

Racial Bias in Healthcare Algorithms

Algorithms used in the healthcare system inherently contain racial bias that disproportionately target marginalized communities of color across the nation. Sarah Kamensky's *Artificial Intelligence and Technology in Health Care: Overview and Possible Legal Implications* claims that approximately 86% of healthcare providers utilize at least one form of artificial intelligence systems in their practices (Kamensky 1). She emphasizes to readers that although these algorithms intend to aid in improving the access, cost, and quality of patient care, AI cannot explain its complicated decision-making process the same way that a healthcare provider or physician would to their patients. Using an algorithm briefly aforementioned as an example, the glomerular filtration rate (GFR) is a test used to determine how well an individual's kidneys are functioning. According to Kaveh Waddell's "Medical Algorithms Have a Race Problem", readers are introduced to a particular case where an African American individual named Eli met with a doctor to treat his kidney disease, but the algorithm used to prioritize Eli's care (GFR) did not allow him to be on the transplant list. The reason for this was because, in addition to measuring an individual's creatinine levels with a blood test, the GFR test also

considers the patient's race and the final score is multiplied by a race adjustment coefficient. Waddell persuades readers that similar race adjustments "crop up in all sorts of clinical algorithms in medicine" (Waddell). However, it should be more importantly emphasized that these race adjustments are unethical and spark controversy. In this particular case, Eli was denied a spot on the transplant list solely due to his race implying that he was not a good candidate for the transplant even though his initial GFR score surpassed the minimal threshold before the race adjustment was factored in. Darshali A. Vyas and other medical doctors argue that the use of race-based clinical algorithms such as the GFR and many others within different subdisciplines of medicine should be reconsidered since there is a lot of existing evidence that race is not a reliable input to predict genetic differences (Vyas, et al.). If these race adjusted widespread clinical algorithms continue to be used in the healthcare system without significant change by the individuals or organizations that implemented them, then policy makers must be accountable for the lack of equal access to healthcare for millions of affected patients.

Similar to the racial bias found in the GFR test, Ziad Obermeyer and other distinguished researchers analyzed an unnamed algorithm in the healthcare system that also proliferates race based inequality. According to a scientific journal article published by these researchers, this algorithm affects millions of patients across the nation and bias exists within it because it uses health costs as a proxy for health needs (Obermeyer, et al.). In other words, even though Black patients are equally and if not more sick than white patients, this algorithm falsely predicts that Black patients are healthier solely due to health costs. In order to support their claim, these researchers obtained algorithmic risk score data for both Black and White patients from an academic hospital and performed statistical analyses that involved studying the differences between the average number of health conditions by race and the risk score predicted by the

algorithm for that respective race. Intended to help insurance companies and hospitals identify which patients will benefit from high-risk care management programs, this widespread algorithm instead reinforces racial bias. Since this algorithm is so widespread, it would not make much sense to remove it entirely from the existing healthcare system, but rather improve its efficiency. This can be accomplished in this particular case by urging the individuals or organization that implemented this algorithm to remove healthcare costs as an input. In the rare case where these individuals or organizations refuse to change the algorithm's inputs, it is then up to local policymakers to use their position of power through agency and intervene with these respective groups in order to prevent the proliferation of racial bias that this algorithm creates.

Improvements and Potential Solutions

In order to minimize racial bias and prevent further harm towards disproportionately affected marginalized patients of color across the nation, algorithms used in the healthcare system must be improved by the individuals or organizations that implement them. One possible solution to this complex problem that policymakers and legislators should be aware of is providing full transparency between patients and their health data when used by clinical algorithms to make a decision about the outcome of a patient's health plan. For example, if a clinical algorithm such as the GFR test determines that a patient's creatinine levels do not surpass the set threshold needed for them to be placed on a transplant list for immediate care, then these patients should be able to see how this score was calculated including the race adjustment coefficient calculation used for the final score. Being transparent with patients within this context should be an ethical obligation required by healthcare providers when discussing treatment options, especially if they know to the slightest extent that racial bias exists within the clinical algorithm being used. In their online academic journal article, postdoctoral fellow

Melissa McCradden and other researchers emphasize that algorithmic transparency must be initiated not only at the point-of-care level but also at the prediction level. These researchers emphasize that the prediction and rationale involved with sensitive input variables such as race must be communicated with patients so that in the future more patients can potentially take action against these biased algorithms and create a structural barrier against health inequalities (McCradden, et al). Although it is unlikely that patients will take action against claims regarding racial bias, transparency is the first step needed to allow patients to become more aware of this issue so that hopefully action can be taken and this issue is brought to the attention of policymakers and legislators. Along with implementing transparency, it is crucial that current law must be enacted regarding the regulation of clinical decision support software, as known as clinical algorithms. According to a research publication written by Michael Matheny and other staff members of the National Academy of Medicine, clinical decision support software is exempt from regulation by the FDA, under section 3060 of the 21st Century Cures Act (Matheny, et al. 185). Given the substantial evidence that clinical algorithms inherently contain racial bias and the fact that some are widespread nationwide, it is incredibly important that these algorithms are often regulated and checked by the FDA to prevent further harm towards marginalized communities.

Conclusion

To conclude, due to clinical decision-making biases, algorithms used in the United States healthcare system such as the glomerular filtration rate and risk assessment tools must be improved by the individuals and organizations that implement, design, and employ them. The negative implications caused by these algorithms must be brought to the attention of appropriate policy makers for them to use their position of power and act through agency in order to prevent

the spread of preexisting race-based health inequalities and bias towards marginalized communities of color across the nation, especially in a period of time where proper and equal access to healthcare should be of utmost importance for the United States government. These algorithms inherently contain racial bias by including race adjusted risk assessment scores for patients and using health costs as a proxy for health needs. In order to prevent further harm towards marginalized people of color across the nation, policy makers and legislators can potentially impose algorithmic transparency and regulation on a federal level to minimize bias and make the healthcare system more efficient.

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