



The COVID-19 Vaccine Efficacy and Fairness in Society

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Description

The distribution of limited vaccines must strike a balance between social utility and equity in order to safeguard against the ongoing COVID-19 pandemic and any subsequent health emergencies. What is the nature of the trade-off between minimizing disparities between communities with more privilege and those with less privilege? In order to assess immunization programmes, we calibrate an epidemic model that explicitly accounts for community demographic and mobility characteristics and their relationships with various COVID-19 risks.

When vaccine access is prioritized for the most disadvantaged communities, results discover that even in places that have a high level of vaccine resistance, social utility and equity can be increased at the same time. However, disparities in equity may exist between distinct demographic characteristics; for instance, the elderly may be less prevalent in low-income neighborhoods. For the purpose of assisting in the development of comprehensive vaccine distribution strategies, community risk and societal risk are two behavior and demographics-aware indices that are developed. These indices capture the risks that communities face as well as those that they impose on society as a whole as a result of not being vaccinated. This study offers a paradigm for integrating utility-based and equity-based considerations in vaccine distribution and throws light on how to reconcile numerous ethical objectives in complicated situations for epidemic control.

Since its outbreak, the COVID-19 pandemic has swept the globe and continues to cause harm and loss to human societies everywhere. Due to systemic disparities in COVID-19 exposure and access to health systems, this has revealed and exacerbated disparities in community health conditions. Vaccines

are considered the most important medical resources in the pandemic fight, but there are still significant shortages in many nations and communities. Because of this, vaccine prioritization has emerged as an essential policy task in every public health system, requiring well-thought-out strategies to strike a balance between various ethical principles. Because the pandemic will shock society as a whole, we contend that all members should have equal rights and chances to receive the best pandemic protection.

In light of this, Humans want to achieve a decent balance between social utility and equity. The social utility is the decrease in mortality across the population, whereas equity is the reduction of mortality disparities in disadvantaged demographic groups. The contrasting ethical values of utilitarianism and egalitarianism serve as the foundation for these two objectives, which are the most widely considered metrics by health authorities and organizations worldwide.

However, increasing equity in one demographic dimension can also lower equity in others, indicating that demographic characteristics alone are insufficient to direct vaccine distribution. People propose two demography and behavior-aware indices, community risk and societal risk, to quantify the impact of prioritizing vaccination for each community to reduce its own mortality risks and the mortality risks it imposes on society as a whole.

Based on these two indices, people create a methodology for vaccine prioritizing that simultaneously improves social utility and equality across all dimensions for a range of immunization rates and scheduling scenarios. Because they offer a wide framework for distinguishing utilitarian and egalitarian values in the distribution of COVID-19 vaccines, our findings have extensive implications for the design of vaccination regimens.