Title
Using a SEIR model to develop bivalent booster allocation strategies against emerging SARS-CoV-2 variants in US cities with large Hispanic communities

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Abstract
COVID-19 is a disease that disproportionately impacts the Hispanic population, due to the prevalence of certain risk factors and the high number of essential workers in this community. In this work, we analyze the vaccination strategies that would minimize the COVID-19 health disparities in El Paso County, TX, in the context of the emergence of a new highly transmissible and immune-escaping SARS-CoV-2 variant. We stratify an age-structure stochastic SEIR model that tracks the evolution of immunity derived from infections and vaccination according to Hispanic vs non-Hispanic ethnicity and parameterize it to the demographic, health and immunization data of El Paso County, TX. We did this using curated data from CDC; modifying the relevant variables, and making stochastic projections in Python. After fitting the model, the results show that increasing vaccination with bivalent boosters by five-fold in anticipation of highly transmissible and immune escaping variants would decrease the cumulative hospital admissions and mortality from Mar 1, 2023, to Dec 31, 2023, by 62.72% and 61.41%, respectively. Additionally, allocating 50% of the doses administered to non-Hispanic individuals to the Hispanic community would eliminate the disparities in hospitalizations. Our findings can guide public health officials in US cities with large Hispanic communities and help them design vaccination strategies that minimize COVID-19 health disparities caused by emerging variants using specific vaccination strategies.