**COVID-19 Mortality Excess and Cost-Effective Analysis of Different Treatments**

**Authors:** Hirvin Diaz-Zepeda1, Jeremy Goldhaber-Fiebert2, Fernando Alarid-Escudero3

1. Center for Research and Teaching in Economics (CIDE), Aguascalientes, Mexico.
2. Center for Health Policy and the Center for Primary Care and Outcomes Research, Department of Medicine, Stanford University School of Medicine, Stanford, CA, USA.
3. Division of Public Administration, Center for Research and Teaching in Economics (CIDE), Aguascalientes, Mexico.

**Word Count: 351**

**Purpose:** Mexico has suffered a particularly severe impact from the COVID-19 pandemic, and there is little information and evidence about pharmacology treatments that could mitigate this burden in the country. Our purpose is to quantify the effectiveness, costs, and cost-effectiveness of different treatments to reduce COVID-19-specific mortality using a microsimulation model.

**Methods:** We used publicly available data for COVID-19 deaths and background age and sex-specific mortality rates to estimate the COVID-19 specific mortality for Mexico’s population aged 45 years and older using relative survival methods. Next, we incorporated these estimations into a decision-analytic microsimulation model, which follows individuals infected with COVID-19 for 50 days, projects the Quality-adjusted life years (QALYs) and lifetime healthcare costs for the surviving population, and evaluates alternative treatment strategies by incorporating the effects of treatments that have demonstrated mortality reductions for people with Covid-19. Specifically, we compared three strategies for a cohort of hospitalized, not intubated patients: 1) Remdesivir, 2) Remdesivir and Baricitinib, and 3) no treatment, and two strategies for a hospitalized, not intubated cohort: 1) Dexamethasone, 2) No Treatment. In addition, we conducted a probabilistic sensitivity analysis to incorporate the uncertainty of hospitalization times and treatment effects. Finally, we estimated the Cost-Effectiveness acceptability curve (CEAC) and frontier (CEAF) with a Willingness to Pay (WTP) threshold of one GDP per capita.

**Results:** COVID-19 specific mortality rate increases according to age and is consistently higher for male patients in both cohorts. The not intubated cohort health effects were 5.57 QALYs for the no treatment strategy, 6.51 for Remdesivir alone, and 7.32 for Remdesivir and Baricitinib. Costs were $203,329 ($ Mexican pesos) on average for no treatment, $271,402 for Remdesivir and $331,172 including Baricitinib. The Incremental Cost-Effectiveness Ratio (ICER) indicates that Remdesivir is a weakly dominated strategy, and the probability of being Cost-effective is higher for Remdesivir and Baricitinib from $87,922. For the intubated cohort, the health effects were 1.52 for not treatment and 2.96 for Dexamethasone. This strategy has the highest probability of being cost-effective from $14,563.

**Conclusions:** Remdesivir and Baricitinib is the most cost-effective strategy for the Non-intubated cohort, while for the intubated cohort is dexamethasone.



