CENTRO DE INVESTIGACIÓN Y DOCENCIA ECONÓMICAS, A.C.



COVID-19 EXCESS MORTALITY AND THE COST-EFFECTIVENESS OF TREATMENTS OPTIONS

TESINA

PARA OBTENER EL GRADO DE

MAESTRÍA EN MÉTODOS PARA EL ANÁLISIS DE POLÍTICAS PÚBLICAS

PRESENTA

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# Introduction

Mexico has experienced one of the worst COVID-19 epidemics worldwide, with high hospitalization and case fatality rates. On March 21, 2021, the Mexican government reported 2,238,887 accumulated cases of COVID-19 and 203,210 deaths1, making Mexico the fourteenth country in the world in confirmed cases and the third in reported deaths.2 Due to this situation, it is essential to study mortality associated with COVID-19 and evaluate treatment options.

Excess mortality during the pandemic has been studied in several countries3–7. These estimates often use public data to estimate expected deaths during the pandemic period and calculate the difference from observed deaths. For example, according to Mexico’s Ministry of Health, the excess mortality for all causes as of March 15, 2021, was 473,581, representing 47.9% more than the expected deaths for this period8. These public data allow us to quantify the COVID-19-specific mortality.

The disease-specific mortality rate is a valuable and essential measure for decision-makers since it allows them to evaluate different strategies to modify and mitigate this outcome. An advantage of this approach is that it provides an opportunity to analyze policies that have not yet been implemented and support decision-making and planning. Obtain this outcome for a cohort with COVID-19 makes it possible to implement an analytic decision model that evaluates different strategies simulating the application of several treatments.

The aims of this analysis are twofold. First, estimate the COVID-19 specific mortality for Mexico’s population aged 45 years and older using relative survival methods. Second, quantify the effectiveness, costs, and cost-effectiveness of different treatments that aim to reduce COVID-19-specific mortality using a microsimulation model.

# Methods

## Relative Survival and Disease-specific Hazard

We used relative survival methods to estimate the COVID-19 specific mortality for Mexico’s population aged 45 years and older. We used data from the Mexican National Epidemiological Surveillance System (SINAVE- Spanish acronym). This dataset includes people tested for SARS-CoV-2 in Mexico. It contains only data obtained from tests performed on those suspected of infection during stays in the medical units of the health sector9. We analyze data only for people with a positive test result, 45 years of age and older, and hospitalized. We classify these patients by sex, age group, and whether they were intubated. We obtained estimates for provide background mortality rates for the Mexican population from the National Population Council demographic indicators in 202010.

A relative survival approach to estimate disease-specific mortality is appropriate when studying data on a cohort of people diagnosed with a specific disease, where follow-up time and information on vital status is available, but the definitive cause of death information is not11. Relative survival is expressed as a time-specific ratio between the survival of the cohort analyzed and the expected survival of a cohort . The relative survival ratio is defined as .11,12 This ratio is similar to the marginal relative survival ratio or net survival 11. This measure is defined as the exponent of the disease-specific hazard : .

The disease-specific hazard or “excess hazard” is derived from the equation of the overall hazard , which is composed of two terms: the previously mentioned excess hazard, and a population hazard,

|  |  |  |
| --- | --- | --- |
|  |  | (1) |

Equation (1) assumes that a the overall mortality hazard of cohort with a specific disease divides has an additive structure with the and , the background hazard often obtained from population’s age- and sex-specific mortality. Another important assumption is that does not change when other causes of death are removed13.

Disease-specific hazard or “excess-hazard” estimates allow for the computation of disease-specific mortality rates and, consequently, the extrapolation of intervention effects derived from RCTs (i.e., hazard rate ratios) in computing survival in the presence of interventions. By deriving the disease-specific mortality rate and the background mortality rate by sex and age () from and , and assuming the hazard is an additive function of each specific mortality rate, the overall mortality rate is then defined as14:

|  |  |  |
| --- | --- | --- |
|  |  | (2) |

Thus, incorporating the effect of an intervention, such as a pharmacological treatment for a disease, involves modifying . Published hazard ratios (HR) from clinical trials , often report modification in the overall mortality making them overall hazard ratios 14. This estimate is then applied to the overall mortality rate which in turn alters the overall total mortality rate and therefore and :

\*

\* \* \*

We estimated the disease COVID-19 specific mortality using the *relsurv* package by Pohar-Perme13 and background hazards for sex and age () over a 50-day follow-up period from time of diagnosis.

## Decision Analytic Model

We used the previously described hazards to compute the daily disease-specific and background mortality probabilities by age group and sex, assuming an exponential distribution of the hazard rate within each year of age.

thatWe used the model to simulate alternative treatment strategies by incorporating the effects of treatments that have demonstrated mortality reductions for people with COVID-19: Dexamethasone15, Remdesivir16, and Remdesivir in combination with Baricitinib17. The overall HR of the clinical trials of these treatments was applied to obtain the COVID-19 specific death probabilities under the effect of different drugs. Because the HR for Remdesivir and Baricitinib is reported in comparison to a group treated with Remdesivir, the effect of Baricitinib is applied to .

We then calculate the conditional probabilities of death specific to the disease and other causes by multiplying the probabilities of death under each treatment by the proportion of the COVID-19-specific mortality rate or the background mortality rate by age and sex.

The model includes two health states: *hospitalized COVID-19 detected infection* and *Dead*. The model tracks whether simulated individuals die from COVID-19 or other causes. After obtaining these results, we projected the quality-adjusted life expectancy (QALE) and lifetime healthcare costs for the surviving population using an age-dependent Markov model with two states: Alive and Dead. The probabilities of transition by age and sex were derived from the background mortality rates and we use specific sex and age group utilities. The table of estimates of these projections can be found in the appendix section. We built tin R

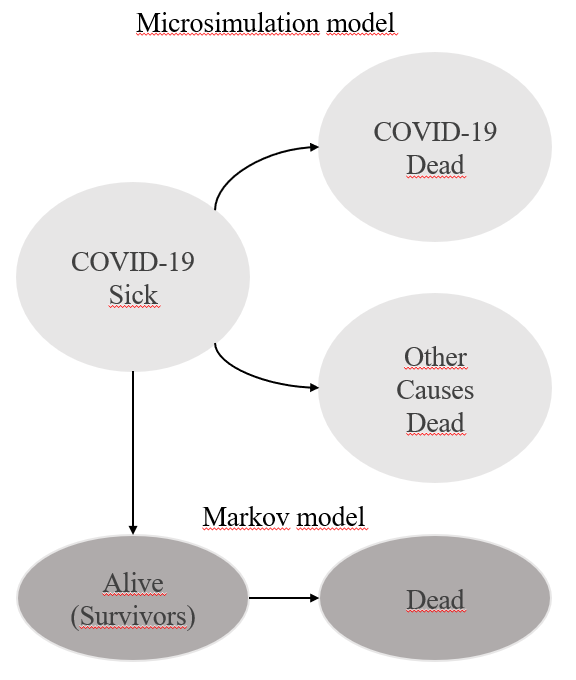


Figure 1: Model structure. States for the microsimulation and markov model.

## Cost-Effectiveness Analysis

Dexamethasone is not recommended for non-intubated patients, and Remdesivir is a drug that has shown more efficacy in less critical states. Thus, we conducted two separate CEA, by whether hospitalized patients were intubated. For hospitalized non-intubated patients, we compared three strategies: *Treat with Remdesivir*, *Treat with Remdesivir and Baricitinib,* and *No treatment*. For hospitalized intubated patients, we evaluated two strategies: *Treat with Dexamethasone* and *No treatment*. The primary outcomes of interest were discounted QALEs and lifetime costs for all strategies and the incremental cost-effectiveness ratio (ICER) between non-dominated strategies W

All costs are reported in 2021 Mexican pesos ($MXN) and health outcomes and costs are discounted at a 5% based on the Mexican Health Supplies Evaluation Guide19.

## Health Outcomes

To get the QALE, we calculated the quality-adjusted life years (QALYs) for the simulated patients. We used age- and sex-specific health utilities reported in a study by Hanmer et al20 to incorporate the associated utility in the different health states of the time-dependent Markov model for each individual that survived after the 50 days simulated with the microsimulation model described above.

## Costs

We obtained hospitalization costs from the Mexican Social Security Institute (IMSS – Spanish acronym) 21. For treatment costs, we used the price of Remdesivir estimated by its ICER22 and an estimation of the most commonly accepted price at U.S. pharmacies for Baricitinib23. Dexamethasone costs were derived from public purchases by IMSS. Lifetime health expenditure comes from the World Health Organization Global Health Expenditure database24 that reports health expenditure per capita. To obtain the age- and sex-specific, we employed specific weights derived from the Mexican budget for disease prevention25.

## Sensitivity Analyses

To incorporate uncertainty in the information on the effectiveness of treatments and hospital costs and time we performed a probabilistic sensitivity analysis (PSA). Using the sensitivity ranges of published sources, we created 1,000 sets of parameters and calculated the health outcomes and costs for each of these sets. Finally, we calculated the average costs and mean QALYs for each strategy. The distribution of parameters is shown in the supplemental material.

We calculated the cost-effectiveness acceptability curves (CEAC) that show the probability that each strategy is cost-effective, the frontier (CEAF) with the probability that the optimal strategy is cost-effective, and the expected loss curves (ELC) over a wide range of WTP thresholds. To quantify the value of additional potential future research on the decision model parameters, we conducted a value of information (VOI) analysis. We calculated the expected value of perfect information (EVPI).

We carried out one- and two-way sensitivity analyses using a linear regression metamodeling approach on the PSA dataset26. Briefly, …(pending deeper explanation)

All calculations, models and graphs were done using R.27 The ICER estimation, and all the sensitivity analysis and visualizations were carried out with *dampack*29package*.*

|  |  |  |  |
| --- | --- | --- | --- |
| Cohorts characteristics | | | |
| Hospitalized, not intubated | | | |
| Sex | Age Group | N | Proportion |
| Male | 45 - 54 yo. | 32,154 | 16% |
| 55 -64 yo. | 35,973 | 18% |
| 65 - 69 yo. | 16,133 | 8% |
| 70 + yo. | 34,915 | 17% |
| Female | 45 - 54 yo. | 19,869 | 10% |
| 55 -64 yo. | 24,948 | 12% |
| 65 - 69 yo. | 11,512 | 6% |
| 70 + yo. | 25,189 | 13% |
| Total |  | 200,693 |  |
| Hospitalized, intubated | | | |
| Sex | Age Group | N | Proportion |
| Male | 45 - 54 yo. | 5,898 | 15% |
| 55 -64 yo. | 7,837 | 20% |
| 65 - 69 yo. | 3,838 | 10% |
| 70 + yo. | 7,295 | 19% |
| Female | 45 - 54 yo. | 2,719 | 7% |
| 55 -64 yo. | 4,451 | 11% |
| 65 - 69 yo. | 2,268 | 6% |
| 70 + yo. | 4,578 | 12% |
| Total |  | 38,884 |  |
| Model Assumptions | | | |
| Markov Model COVID-19 Sick - Dead | | | |
| Time horizon | 50 days | | |
| Number of states | 3 | | |
| Name of states | Cov-19 + | | |
| Cov-19 Dead | | |
| Dead Other causes | | |
| Markov Model COVID-19 Alive - Dead | | | |
| Time horizon | Lifetime | | |
| Number of states | 2 | | |
| Name of states | Alive | | |
| Dead | | |
| Discount rate | 0.05 | | |
| Utilities and Costs | | | |
| Cost (2021 Mexican Pesos) $ | | | |
| Treatment |  | Frequency | |
| Remdesivir Treatment | 6,188 | Daily | |
| Baricitinib Treatment | 3,672 | Daily | |
| Dexamethasone treatment | 4 | Daily | |
| Mean Hospitalization costs, not intubated | 9,272 | Daily | |
| Mean Hospitalization costs, intubated | 44,151 | Daily | |
| Anual Healthcare expenditure by patient | | | |
| Age - Group | Male | Female | |
| 20 - 59 | 10,912 | 13,519 | |
| 60 ≤ | 24,382 | 24382 | |
| Health outcomes | | | |
| Age - Group | Male | Female | |
| 45 - 49 | 0.887 | 0.863 | |
| 50 - 59 | 0.861 | 0.837 | |
| 60 - 69 | 0.84 | 0.811 | |
| 70 - 79 | 0.802 | 0.771 | |
| 80 ≤ | 0.782 | 0.724 | |

Table 1: Decision model values, utilities, costs and healthcare expenditure.

# Results

## Disease-specific hazard

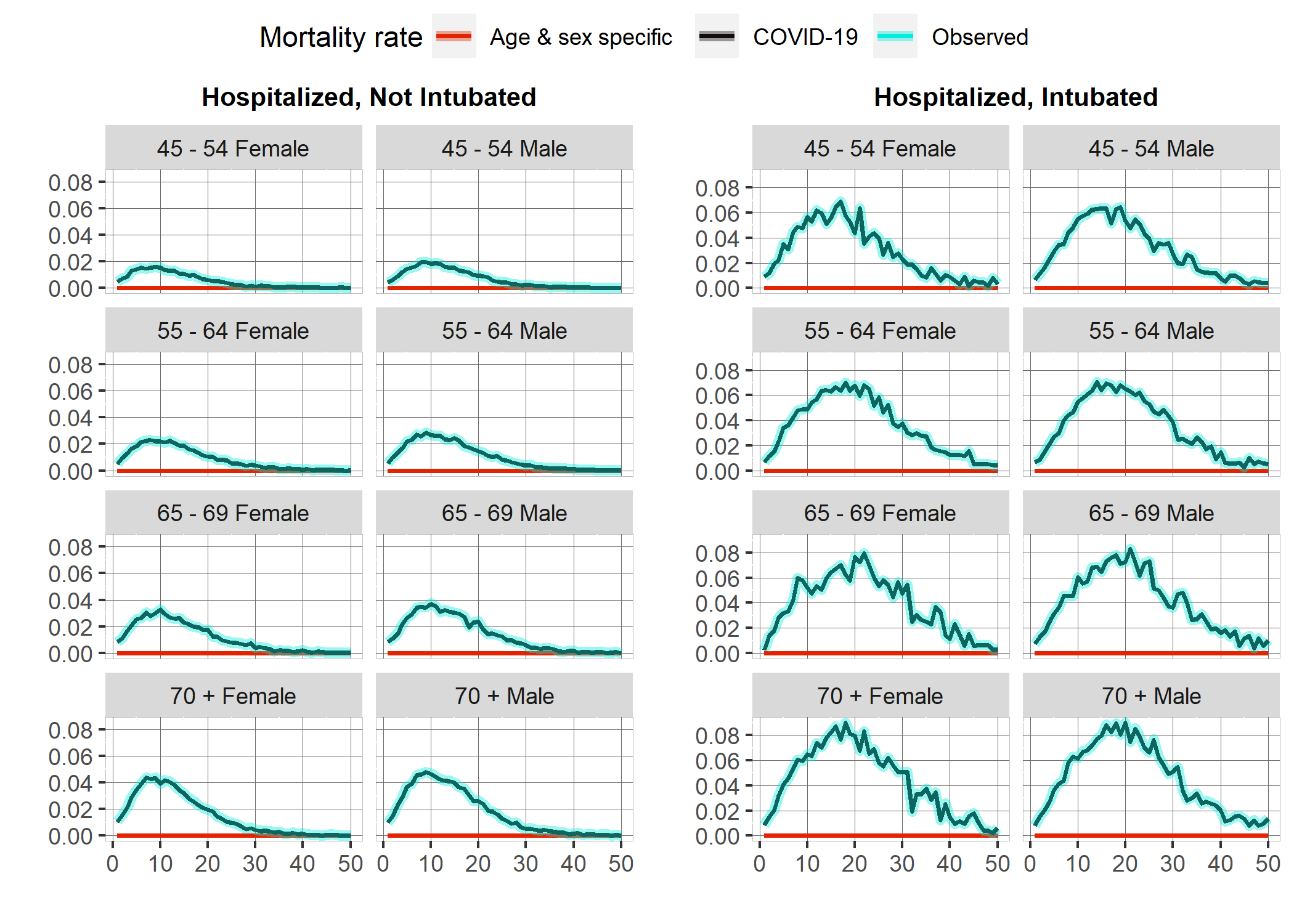
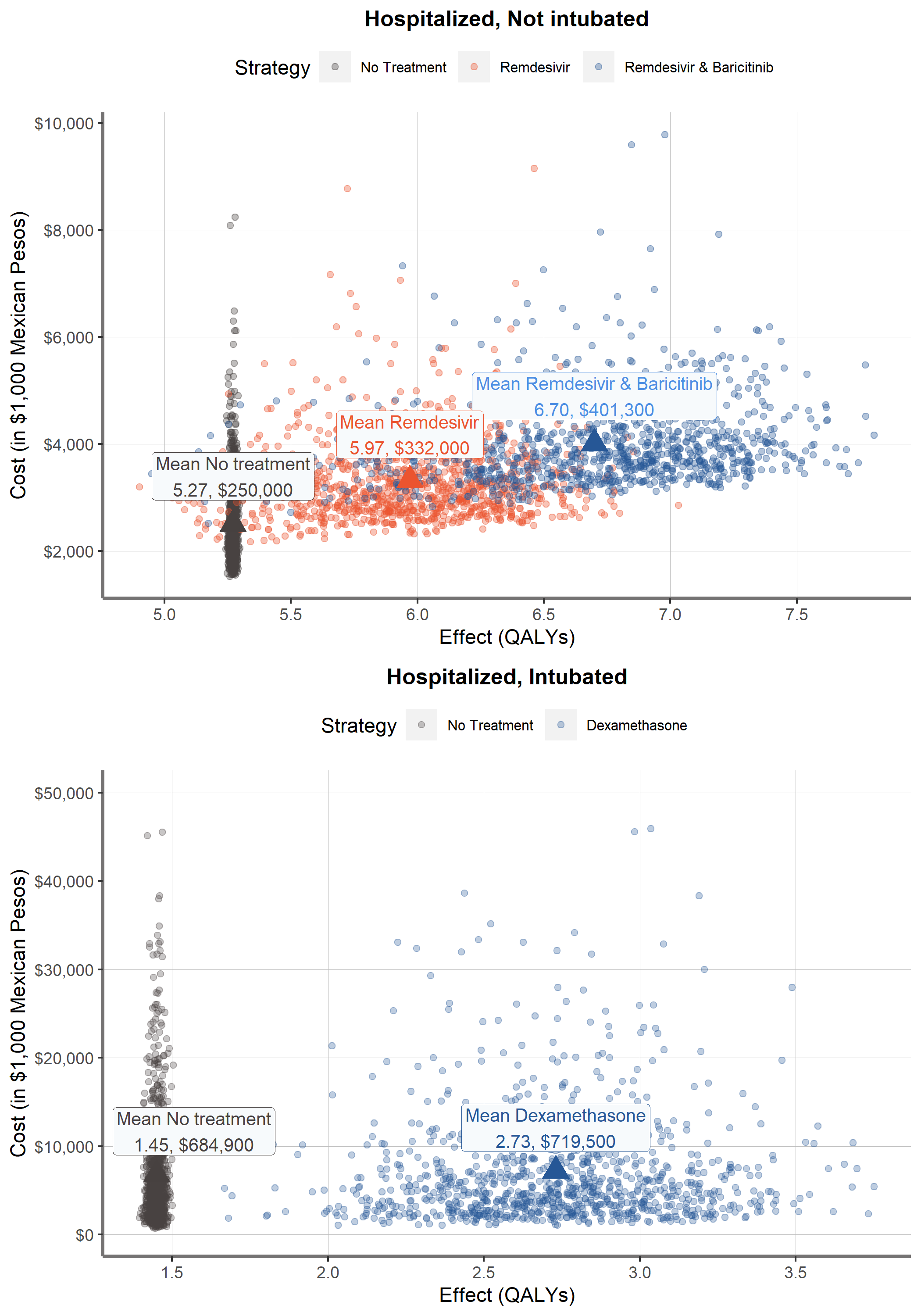


Figure 2: COVID-19 Daily hazards by cohort, age and sex group. Source: Created by authors with information published by Mexico´s Ministry of Health.

The COVID-19-specific mortality rate practically represents the total mortality rate since the daily background population rates are nearly negligible. The highest rates are around day 10 for the non-intubated cohort, extending to 20 days for the intubated. COVID-19-specific mortality rate increases with age: For the non-intubated cohort, 45-54-year-old patients have a COVID-19-specific mortality rate of 507 per 100,000, while for patients 70 + years old, this rate increases to 1,347 per 100,000. For the intubated cohort, these rates are 2,503 and 3,770 per 100,000, respectively (Figure 2).

We estimated that men face higher mortality rates than women. The overall estimated mean COVID-19 mortality rate for men is 2,101 per 100,000, while for women, is 1,967 per 100,000. For non-intubated patients, estimated mortality rates for men are 1,006 per 100,000 and 841 per 100,000 for women. Intubated cohort presents 3,196 and 3,093, respectively. We found that that age is a stronger factor than sex in the COVID-19 mortality rates.

## Cost-effectiveness Analysis

 Figure 3: Probability Sensitivity Analysis results and mean outcomes.

Following current guidelines, we conducted the cost-effectiveness analysis base-case using the expected discounted costs and QALYs across all PSA simulations (Figure 3). For the hospitalized non-intubated, we estimated a mean discounted QALE of 5.27 years and lifetime costs of $250,000 under a strategy without COVID-19 treatment. The strategy of Remdesivir alone generates a mean discounted QALE of 5.97 years and $332,000 lifetime costs. The estimated mean QALYs for Remdesivir and Baricitinib are 6.70 and expected costs $401,300. The ICER reported by this strategy, in comparison to no treatment, is 102,308. Remdesivir alones is a weakly dominated strategy because … “Remdesivir and Baricitinib” strategy is always chosen if the willingness to pay increases above the “No treatment” limit (Figure 4).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Strategy** | **Costs ($)** | **Incremental Costs** | **QALYs** | **Incremental QALYs** | **ICERs ($/QALYs)** |
| Cohort: Hospitalized, Not Intubated | | | | | |
| No treatment | 255,000 | - | 5.27 | - | - |
| Remdesivir & Baricitinib | 401,300 | 146,300 | 6.70 | 1.43 | 102,308 |
| Remdesivir\* | 332,000 | - | 5.97 | - | - |
| Cohort: Hospitalized, Intubated | | | | | |
| No treatment | 684,900 |  | 1.45 | - | - |
| Dexamethasone | 719,500 | 34,600 | 2.73 | 1.28 | 27,031 |
| \* Weakly Dominated Strategy | | | | | |

Table 2: Health outcomes and costs mean estimates from probabilistic sensitivity analysis.

For the hospitalized, intubated cohort, treating with Dexamethasone yields 2.73 discounted QALYs with lifetime costs of $719,500, while no COVID-19 treatment strategy yields 1.45 QALYs and costs of $684,900. The cost of dexamethasone is minimal compared to other treatments, so most of the extra costs are generated by higher hospital costs among the surviving population.

## Sensitivity Analysis

The most influential parameter on the Net Monetary Benefit of the strategies of the non-intubated cohort was the effectiveness of Remdesivir (expressed as hazard ratio). This is expected because it is the most expensive drug and the variation in its effect impacts two of the three strategies evaluated for these patients. In addition, the variation in the effectiveness of dexamethasone also has a high impact on the NMB. However, since the distribution of the HR of XYZ always shows a positive effect in reducing mortality, dexamethasone is always the preferred strategy.

Figure 4 shows the CEACs that displays the probability of a strategy of being cost-effective for a wide range of WTP thresholds. The CEAF indicates which strategy has the highest expected net monetary benefit as a function of WTP threshold. For the hospitalized non-intubated patients, Remdesivir in combination with Baricitinib had the highest probability of being cost-effective for WTP thresholds greater than $102,976/QALY. Dexamethasone is highly likely to be cost-effective, since it has the highest probability of being cost-effective from WTP thresholds greater than $29,308/QALY.

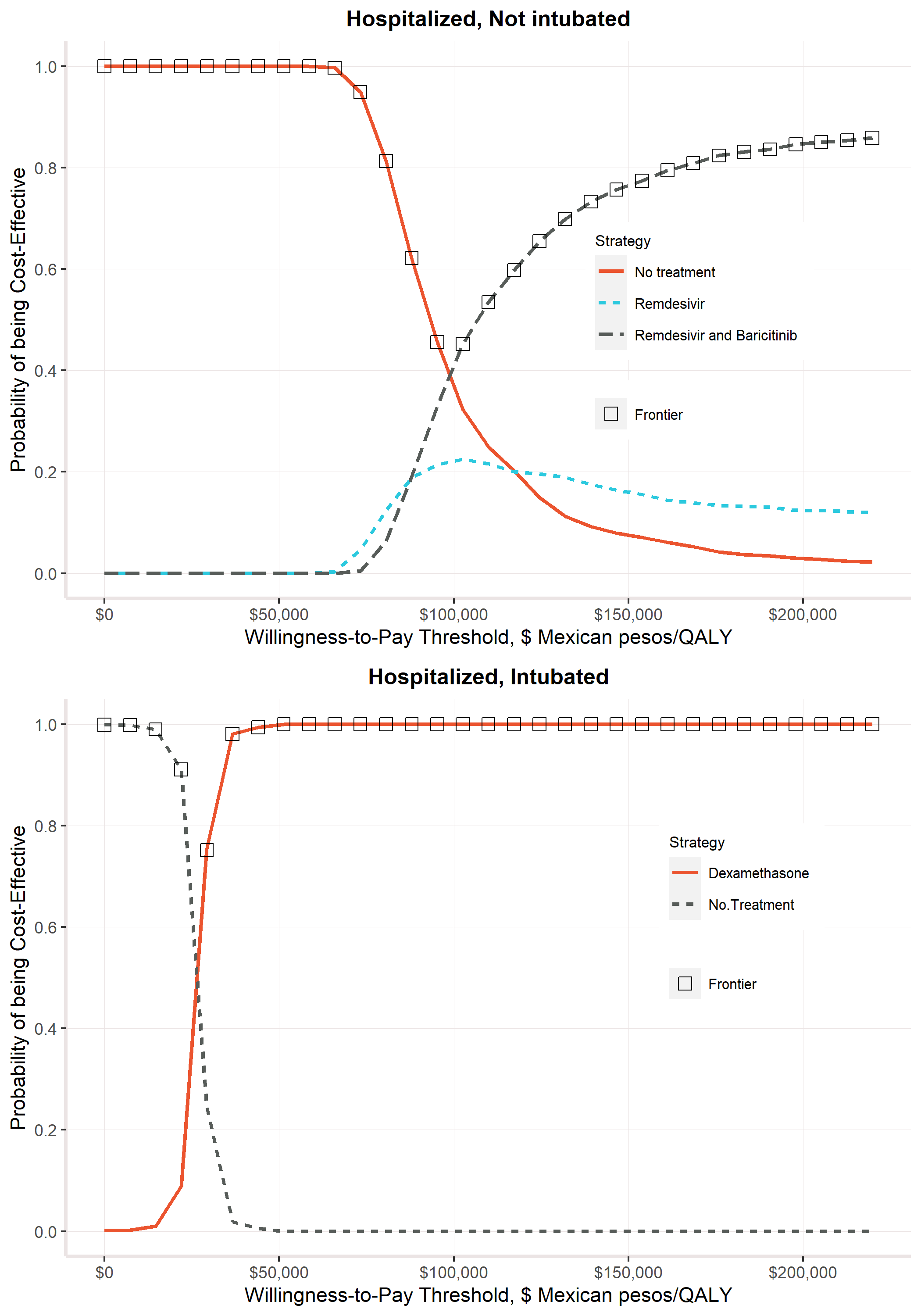


Figure 4: Cost-effectiveness acceptability curve and frontier (CEACs & CEAFs).

# Discussion and Key Points for Decision Makers

Our study used relative survival methods to estimate COIVID-19-specific mortality by age and sex and use these in a decision analysis to quantify the effectiveness, costs, and cost-effectiveness associated with … We found that m, For a cohort of non-intubated people, we found that Remdesivir and Baricitinib is the most cost-effective strategy, while Remdesivir alone is a weakly dominated strategy. For the intubated cohort, we found that Dexamethasone is the cost-effective strategy compared to SoC. Cost-effectiveness acceptability curves with a threshold of one GDP-Per Capita reaffirm that these results are robust to parameter uncertainty.

The lack of specific cost-effectiveness studies for these treatment options means that decision-makers do not have ample evidence or information to choose courses of action during this pandemic. A simulation model that incorporates the uncertainty of various parameters can be a handy tool for public health authorities or managers responsible for managing the public health crisis in Mexico. Although this study does not give certainty about which strategy should be chosen under a limited budget, it could reference if options similar to those addressed in this work are being considered.

More published information resources are needed to improve the accuracy of these analyzes. Counting on these types of inputs is a significant advantage when we have scenarios such as the current pandemic, where the amount of empirical evidence is limited, and we have to rely on simulations to project different scenarios and make evidence-based decisions. As the available public information improves, the estimates of the models of this type of analysis improve, and the quality of evidence to generate health policies improves.

Our analysis has several limitations. The evidence utilized in our decision model is limited and might be sensitive to new information that may emerge on any of the parameters used so far. There is also no specific information for the Mexican case on the effects of treatments or public prices for the Mexican population. The prices used of Remdesivir and Baricitinib are set for high-income countries30; however, it is foreseeable that there will be lower rates for middle-income countries, as in the case of Mexico. Although necessary due to the lack of specific information for the Mexican case, another possible factual discrepancy arises from the assumption that health benefits are similar in Mexico and the United States. Despite these limitations, our analysis provides a robust evaluation of different strategies to reduce the burden of this pandemic in Mexican hospitalized patients using publicly available information without having to rely on clinical trials or empirical evidence for Mexican patients. Although the evidence in favor of the evaluated treatments have been debated31 and is not conclusive, the sensitivity analysis of the decision model allowed us to consider these parameters and give robust results to this uncertainty.

Our study demonstrates that treating covid-19 hospitalized patients in Mexico is a cost-effective compared to no treatment. Remdesivir and Baricitinib is the best strategy for all non-intubated hospitalized and Dexamethasone for intubated patients. The results of this study may provide a starting point for other analysis looking at the best treatment options for COVID-19.

# Links to Original Databases

Mexico´s Ministry of Health:

* Information regarding COVID-19 cases in Mexico

[Datos Abiertos de México - Información referente a casos COVID-19 en México](https://datos.gob.mx/busca/dataset/informacion-referente-a-casos-covid-19-en-mexico)

* Mortality excess in Mexico

[Exceso de Mortalidad en México – Coronavirus](https://coronavirus.gob.mx/exceso-de-mortalidad-en-mexico/)

National Population Council:

* Age and sex specific Mortality rates by age group and sex

Proyecciones de la Población de los Municipios de México, 2015-2030 | Consejo Nacional de Población | Gobierno | gob.mx (www.gob.mx)

World Health Organization:

* Life Health Expenditure in Mexico:

[Current health expenditure per capita (current US$) - Mexico | Data (bancomundial.org)](https://datos.bancomundial.org/indicador/SH.XPD.CHEX.PC.CD?locations=MX)

Scripts and data-frames:

* Own elaboration

[HirvinDiaz/Cov\_19\_specific\_hazard (github.com)](https://github.com/HirvinDiaz/Cov_19_specific_hazard)

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# Appendix

## COVID-19 specific hazard by month

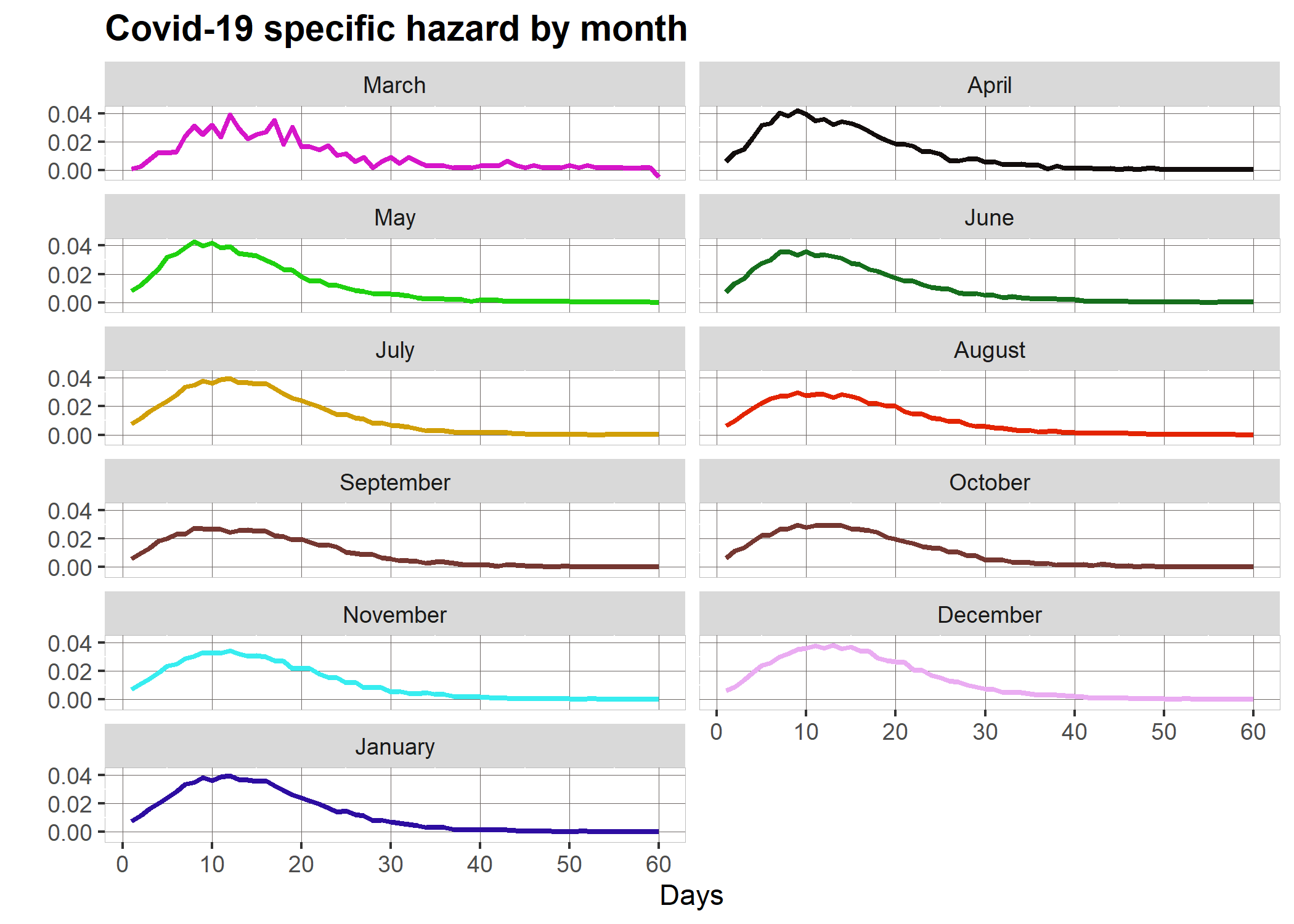
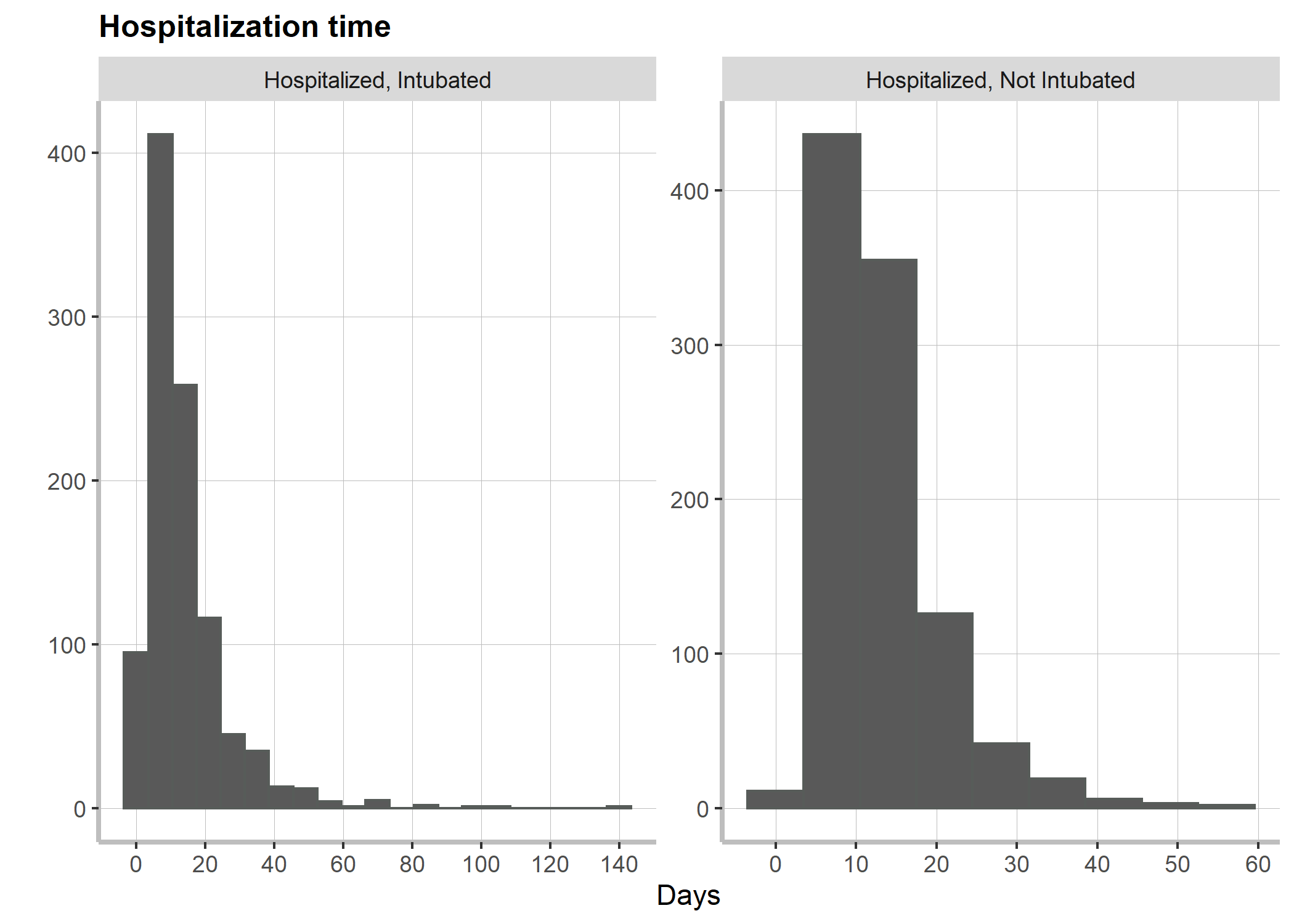


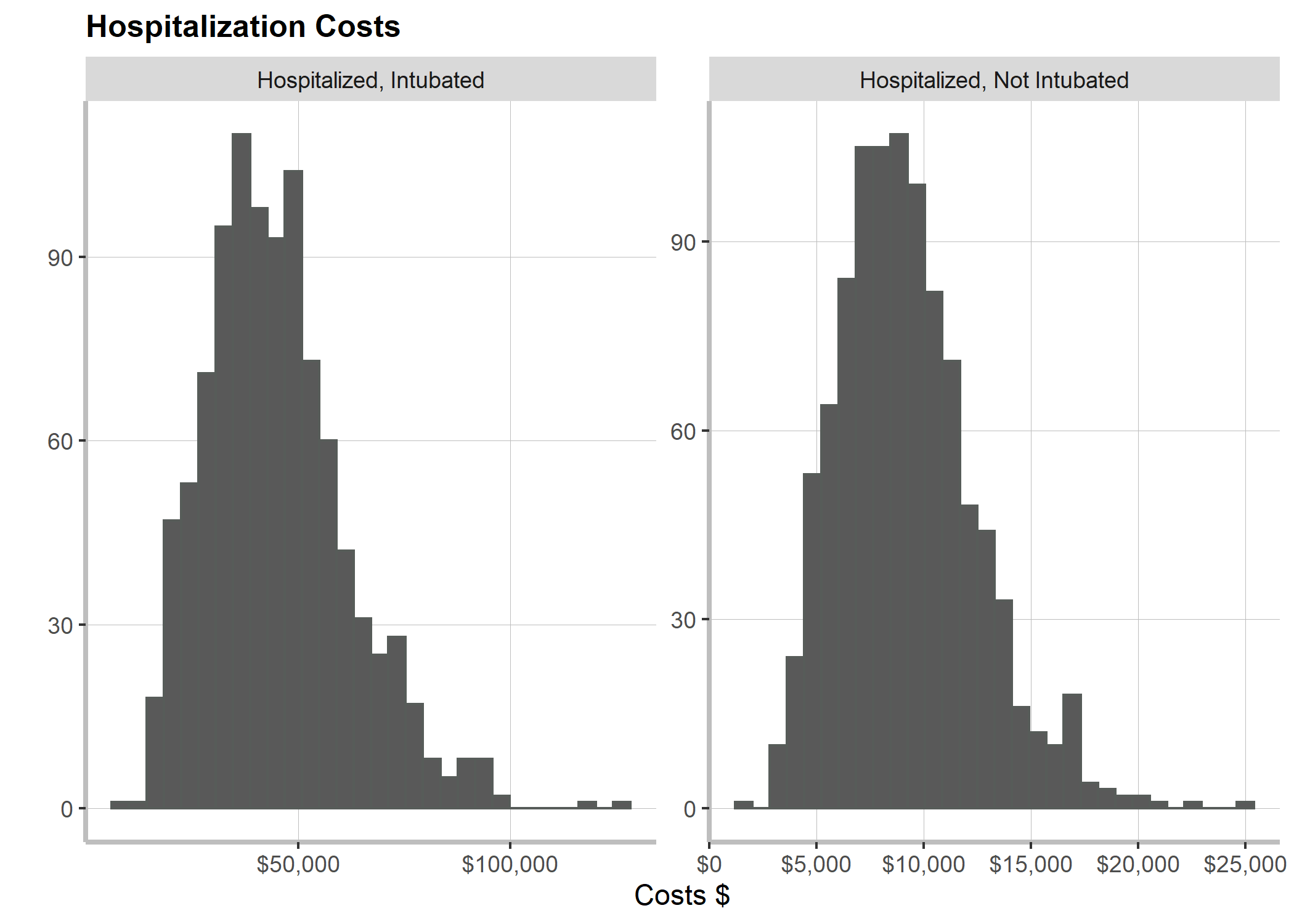
Figure 5: COVID-19 mortality rates by month.

## Parameter distributions

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter Distributions for Probabilistic Sensitivity Analysis** | | | |
| Hospitalization costs, not intubated | Value | Distribution | Source |
| Hospitalization time: Not intubated Cohort | μ = 13.29; SD = 7.17 | Lognormal μ = 2.43, σ = 0.51 | 32 |
| Hospitalization time: Intubated Cohort | μ = 13.89; SD = 13.17 | Lognormal μ = 2.31, σ = 0.80 | 32 |
| Hospitalization costs $: Not intubated Cohort | μ = 9,272; SD = 3278 | Gamma  α = 8, β= 1159 | 21 |
| Hospitalization costs $: Intubated Cohort | μ = 44,151; SD = 15,610 | Gamma  α = 8, β= 5519 | 21 |
| Remdesivir Intervention effect | HR: 0.73, CI: 0.52 - 1.03 | Lognormal μ = 0.73, σ = 0.17 | 16 |
| Baricitinib Intervention effect | HR: 0.65, CI: 0.39 - 1.09 | Lognormal μ = 0.65, σ = 0.26 | 17 |
| Dexamethasone intervention effect | HR: 0.64, CI: 0.51 - 0.81 | Lognormal μ = 0.64, σ = 0.11 | 15 |

Figure 6: Parameter distributions for sensitivity analysis





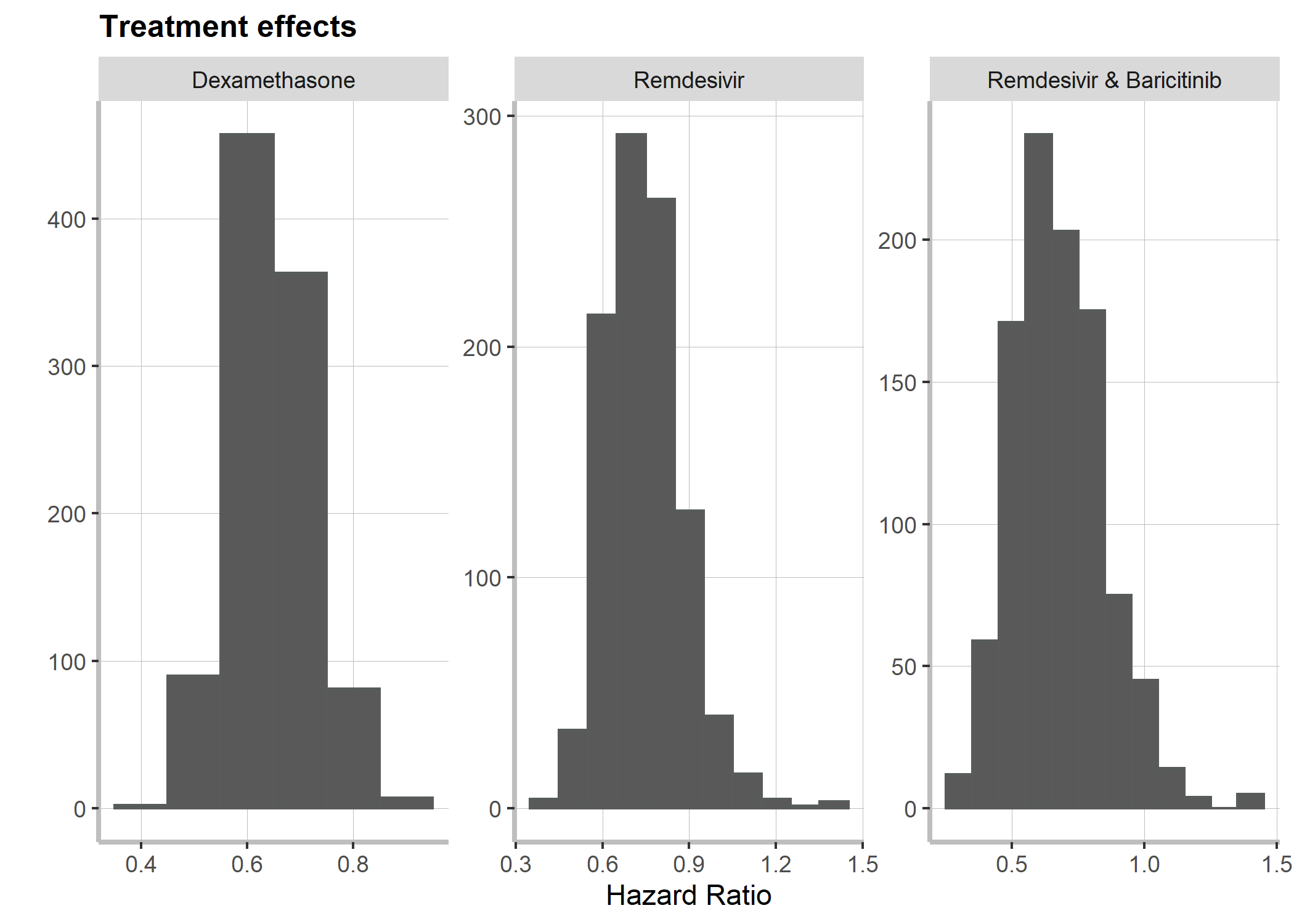


Figure 7: Parameter distribution

## Sensitivity Analysis Results

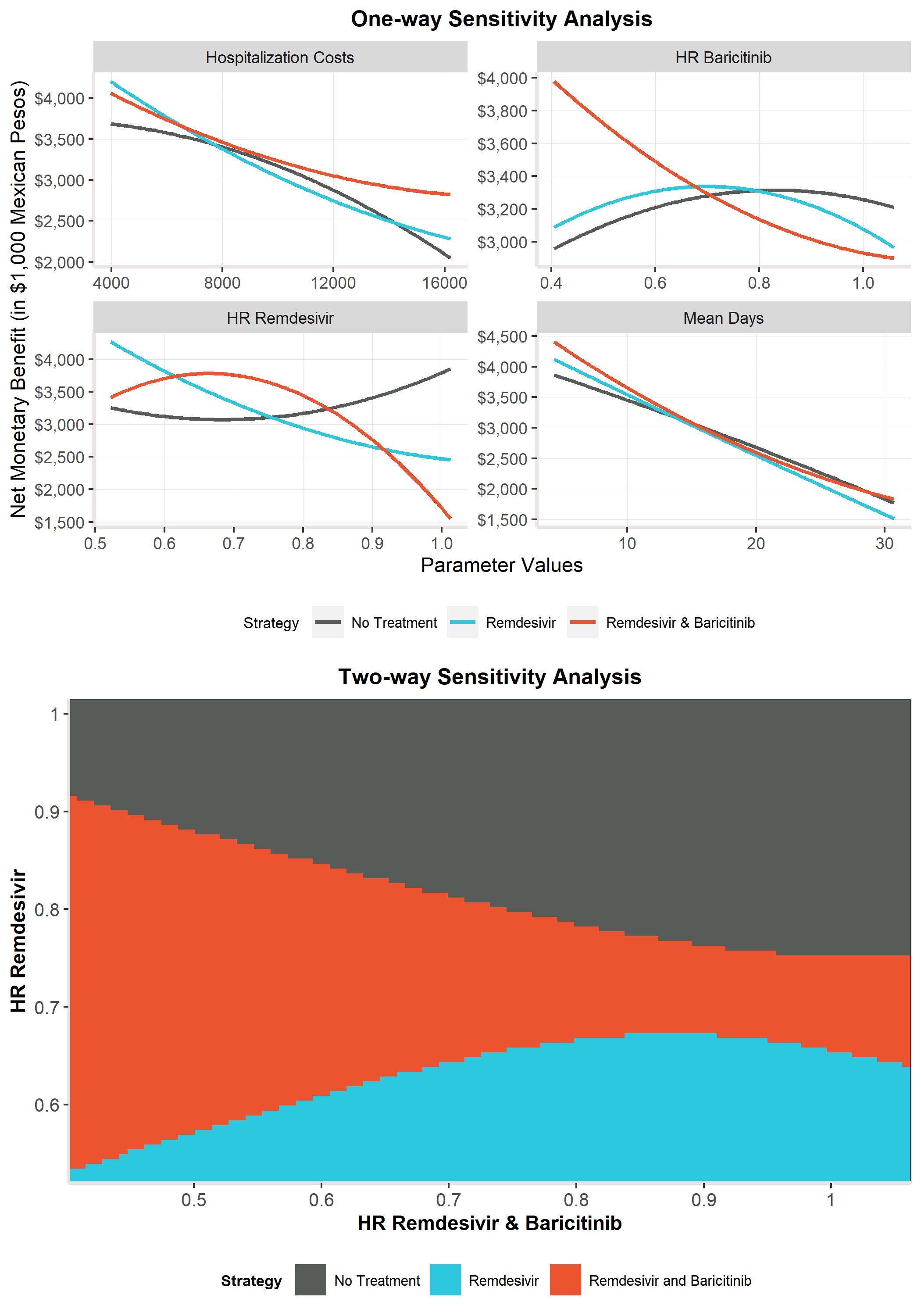


Figure 8: One-way and two-way sensitivity analysis for hospitalized, not intubated cost-effectiveness analysis.

## EVPI and Expected Loss Curves

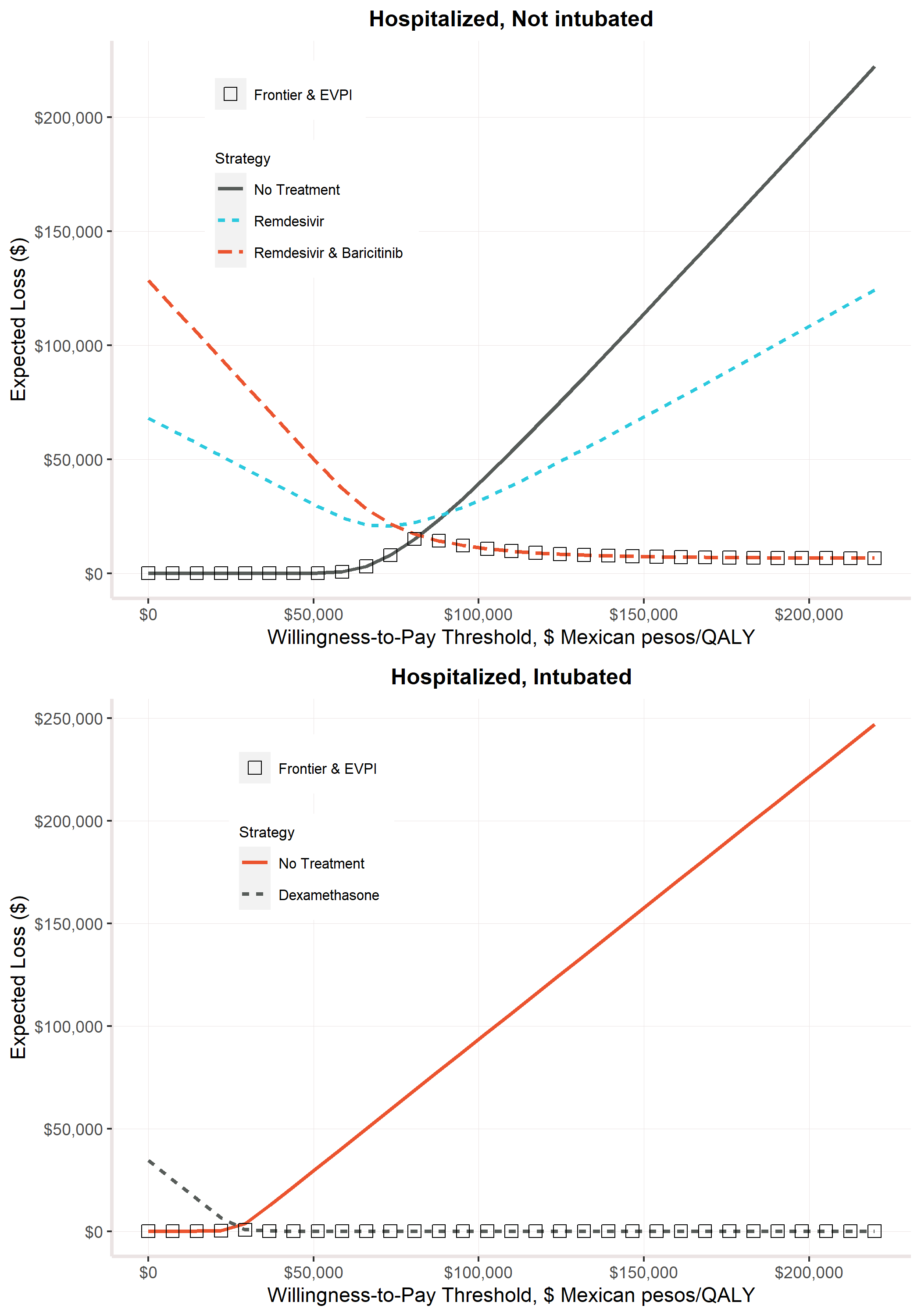


Figure 9: Expected Loss Curves and Expected Value of Perfect Information.

## QALEs Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Age** | **Sex** | **Discounted Costs** | **Quality-Adjusted Life Years** | **Costs** | **Life Years Expected** |
| 45 | male | 224382 | 12.56 | 572265 | 32.31 |
| 46 | male | 225825 | 12.37 | 564111 | 31.46 |
| 47 | male | 227425 | 12.17 | 556105 | 30.62 |
| 48 | male | 229204 | 11.96 | 548264 | 29.78 |
| 49 | male | 231180 | 11.74 | 540606 | 28.95 |
| 50 | male | 233377 | 11.52 | 533146 | 28.13 |
| 51 | male | 235818 | 11.32 | 525897 | 27.32 |
| 52 | male | 238530 | 11.12 | 518880 | 26.51 |
| 53 | male | 241544 | 10.90 | 512110 | 25.72 |
| 54 | male | 244893 | 10.69 | 505607 | 24.93 |
| 55 | male | 248615 | 10.46 | 499394 | 24.15 |
| 56 | male | 252754 | 10.24 | 493494 | 23.39 |
| 57 | male | 257359 | 10.00 | 487936 | 22.63 |
| 58 | male | 262485 | 9.77 | 482749 | 21.88 |
| 59 | male | 268197 | 9.52 | 477967 | 21.15 |
| 60 | male | 274566 | 9.28 | 473626 | 20.42 |
| 61 | male | 268205 | 9.04 | 456296 | 19.71 |
| 62 | male | 261777 | 8.81 | 439276 | 19.02 |
| 63 | male | 255288 | 8.57 | 422574 | 18.33 |
| 64 | male | 248748 | 8.33 | 406196 | 17.66 |
| 65 | male | 242162 | 8.09 | 390148 | 17.00 |
| 66 | male | 235536 | 7.84 | 374434 | 16.36 |
| 67 | male | 228888 | 7.59 | 359071 | 15.73 |
| 68 | male | 222210 | 7.34 | 344042 | 15.11 |
| 69 | male | 215529 | 7.08 | 329378 | 14.51 |
| 70 | male | 208848 | 6.82 | 315075 | 13.92 |
| 71 | male | 202118 | 6.60 | 301052 | 13.35 |
| 72 | male | 195422 | 6.37 | 287423 | 12.79 |
| 73 | male | 188744 | 6.15 | 274153 | 12.24 |
| 74 | male | 182091 | 5.93 | 261242 | 11.71 |
| 75 | male | 175472 | 5.70 | 248692 | 11.20 |
| 76 | male | 168893 | 5.48 | 236497 | 10.70 |
| 77 | male | 162369 | 5.26 | 224669 | 10.21 |
| 78 | male | 155896 | 5.03 | 213189 | 9.74 |
| 79 | male | 149463 | 4.81 | 202033 | 9.29 |
| 80 | male | 143118 | 4.59 | 191251 | 8.84 |
| 81 | male | 136854 | 4.39 | 180819 | 8.42 |
| 82 | male | 130661 | 4.19 | 170716 | 8.00 |
| 83 | male | 124534 | 3.99 | 160920 | 7.60 |
| 84 | male | 118470 | 3.80 | 151419 | 7.21 |
| 85 | male | 112464 | 3.61 | 142195 | 6.83 |
| 86 | male | 106513 | 3.41 | 133235 | 6.46 |
| 87 | male | 100623 | 3.23 | 124539 | 6.11 |
| 88 | male | 94803 | 3.04 | 116107 | 5.76 |
| 89 | male | 89048 | 2.85 | 107921 | 5.43 |
| 90 | male | 83374 | 2.67 | 99994 | 5.10 |
| 91 | male | 77783 | 2.49 | 92314 | 4.79 |
| 92 | male | 72280 | 2.31 | 84875 | 4.48 |
| 93 | male | 66732 | 2.14 | 77514 | 4.18 |
| 94 | male | 61226 | 1.96 | 70323 | 3.88 |
| 95 | male | 55533 | 1.77 | 63037 | 3.59 |
| 96 | male | 49575 | 1.58 | 55571 | 3.28 |
| 97 | male | 43151 | 1.37 | 47714 | 2.96 |
| 98 | male | 35894 | 1.13 | 39093 | 2.60 |
| 99 | male | 27187 | 0.85 | 29109 | 2.19 |
| 100 | male | 15896 | 0.47 | 16690 | 1.68 |
| 45 | female | 270117 | 12.89 | 692372 | 35.88 |
| 46 | female | 270765 | 12.71 | 680469 | 34.96 |
| 47 | female | 271512 | 12.51 | 668690 | 34.05 |
| 48 | female | 272368 | 12.31 | 657047 | 33.14 |
| 49 | female | 273347 | 12.11 | 645550 | 32.24 |
| 50 | female | 274464 | 11.89 | 634209 | 31.35 |
| 51 | female | 275735 | 11.70 | 623038 | 30.46 |
| 52 | female | 277178 | 11.49 | 612048 | 29.58 |
| 53 | female | 278814 | 11.28 | 601253 | 28.70 |
| 54 | female | 280664 | 11.07 | 590668 | 27.84 |
| 55 | female | 282754 | 10.85 | 580308 | 26.98 |
| 56 | female | 285114 | 10.62 | 570192 | 26.14 |
| 57 | female | 287775 | 10.39 | 560339 | 25.30 |
| 58 | female | 290776 | 10.15 | 550772 | 24.47 |
| 59 | female | 294158 | 9.90 | 541514 | 23.65 |
| 60 | female | 297970 | 9.64 | 532594 | 22.84 |
| 61 | female | 291403 | 9.41 | 513177 | 22.05 |
| 62 | female | 284722 | 9.17 | 494046 | 21.26 |
| 63 | female | 277934 | 8.93 | 475215 | 20.49 |
| 64 | female | 271047 | 8.68 | 456692 | 19.73 |
| 65 | female | 264066 | 8.42 | 438487 | 18.98 |
| 66 | female | 257000 | 8.16 | 420610 | 18.25 |
| 67 | female | 249859 | 7.90 | 403072 | 17.53 |
| 68 | female | 242653 | 7.63 | 385887 | 16.83 |
| 69 | female | 235394 | 7.36 | 369062 | 16.14 |
| 70 | female | 228090 | 7.08 | 352608 | 15.46 |
| 71 | female | 220710 | 6.84 | 336467 | 14.80 |
| 72 | female | 213326 | 6.60 | 320742 | 14.15 |
| 73 | female | 205925 | 6.35 | 305404 | 13.53 |
| 74 | female | 198519 | 6.10 | 290456 | 12.91 |
| 75 | female | 191119 | 5.86 | 275908 | 12.32 |
| 76 | female | 183735 | 5.61 | 261758 | 11.74 |
| 77 | female | 176385 | 5.35 | 248021 | 11.17 |
| 78 | female | 169072 | 5.10 | 234686 | 10.62 |
| 79 | female | 161793 | 4.85 | 221739 | 10.09 |
| 80 | female | 154594 | 4.59 | 209226 | 9.58 |
| 81 | female | 147476 | 4.38 | 197134 | 9.08 |
| 82 | female | 140439 | 4.17 | 185446 | 8.61 |
| 83 | female | 133483 | 3.96 | 174148 | 8.14 |
| 84 | female | 126612 | 3.76 | 163233 | 7.69 |
| 85 | female | 119831 | 3.56 | 152689 | 7.26 |
| 86 | female | 113142 | 3.36 | 142506 | 6.84 |
| 87 | female | 106554 | 3.16 | 132683 | 6.44 |
| 88 | female | 100072 | 2.97 | 123212 | 6.05 |
| 89 | female | 93697 | 2.78 | 114078 | 5.68 |
| 90 | female | 87438 | 2.60 | 105279 | 5.32 |
| 91 | female | 81300 | 2.41 | 96803 | 4.97 |
| 92 | female | 75276 | 2.24 | 88630 | 4.63 |
| 93 | female | 69246 | 2.06 | 80606 | 4.31 |
| 94 | female | 63288 | 1.88 | 72811 | 3.99 |
| 95 | female | 57178 | 1.70 | 64982 | 3.67 |
| 96 | female | 50842 | 1.51 | 57038 | 3.34 |
| 97 | female | 44078 | 1.31 | 48764 | 3.00 |
| 98 | female | 36515 | 1.08 | 39781 | 2.63 |
| 99 | female | 27532 | 0.82 | 29482 | 2.21 |
| 100 | female | 16033 | 0.48 | 16834 | 1.69 |

Table 3: Table with discounted costs, quality adjusted life years, costs and life years expected.