

Threshold Price in the US to Achieve Cost-Effective Use of Molnupiravir and Nirmatrelvir for the Prevention of Severe COVID-19 in High-Risk Adults

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BACKGROUND

Oral antivirals, molnupiravir and nirmatrelvir, were shown to prevent hospitalization and death due to COVID-19 in high-risk US adults.^{1,2} As a result, the US government granted emergency use authorization and reached price agreements for access to these treatments.^{3,4}

Objective: To determine a threshold price for cost-effective use of molnupiravir and nirmatrelvir in the prevention of severe COVID-19 in unvaccinated adults with at least one risk factor for progression to severe disease.

METHODS

We developed a decision analysis tree to analyze treatment with antivirals or placebo prevent hospitalization and death due to COVID-19. (Figure 1)

> Key assumptions: all deaths were COVID-19 related, all individuals were hospitalized before death

> From a US payer perspective with a lifetime time horizon

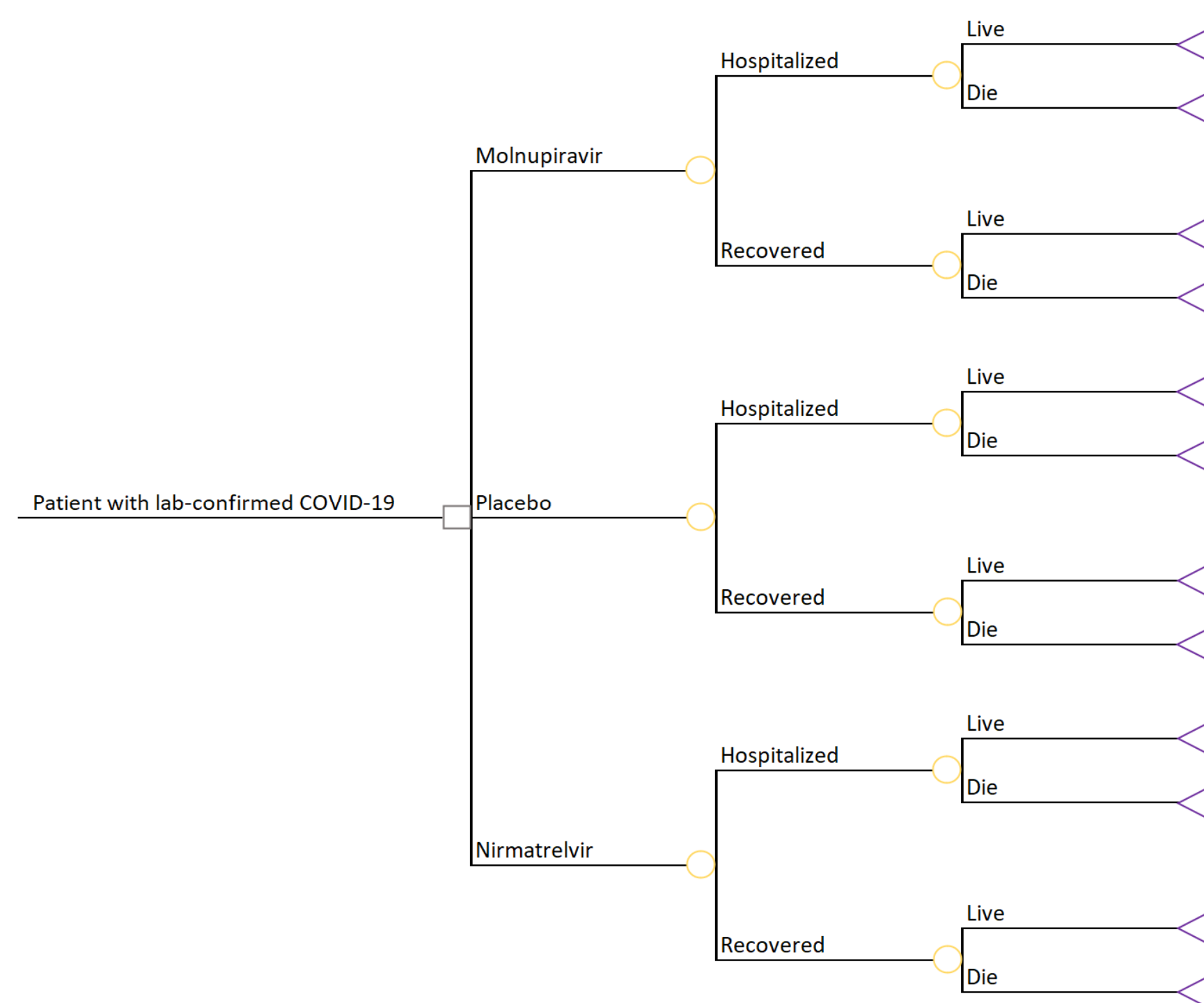


Figure 1. Decision Analysis Tree.

IMPORTANT TAKEAWAYS

> In a decision analysis for the prevention of hospitalization and death due to COVID-19 in unvaccinated individuals, nirmatrelvir dominated placebo and molnupiravir.

> Given a WTP threshold of \$100,000 per QALY, cost-effective use was estimated at \$1,287 for molnupiravir and \$2,643 for nirmatrelvir per treatment course when compared to placebo (Figure 2).

> These estimated threshold prices are notably higher than current government negotiated prices highlighting the public health importance of affordability of these antivirals.

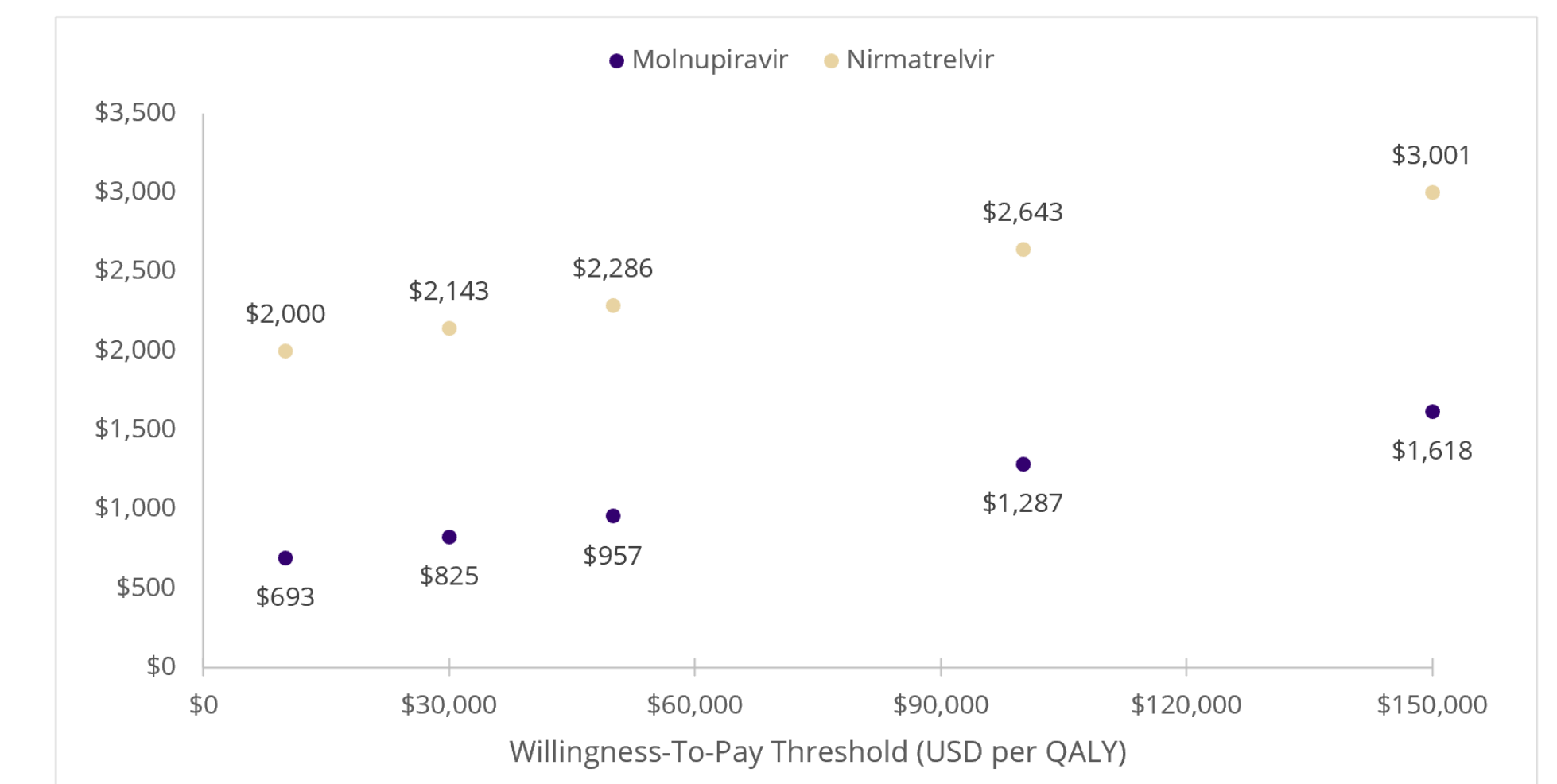


Figure 2. Threshold Prices for Cost-Effective Use at Various WTP Thresholds.

Inputs	Value	Range	Description	Source
Probabilities				
Molnupiravir				
Hospitalization	.05716	0.009 - 0.102	calculated for an absolute effect relative to averaged placebo rate	Jayk Bernal, et al. ¹
Mortality	.0016	0 - 0.002	calculated for an absolute effect relative to averaged placebo rate	Jayk Bernal, et al. ¹
Placebo				
Hospitalization	.08214	0.067 - 0.097	each reported trial placebo rate given equal weight	1,2
Mortality	.01461	0.013 - 0.016	each reported trial placebo rate given equal weight	1,2
Nirmatrelvir				
Hospitalization	.01212	0.005 - 0.068	calculated for an absolute effect relative to averaged placebo rate	Interim analysis ²
Mortality	0	N/A - 0.001	calculated for an absolute effect relative to averaged placebo rate	Interim analysis ²
Outcomes				
QALY lost due to COVID-19 death	5.96	4.76 - 7.62	authors adjusted for age, comorbidities, and discounted using a 3% rate	Briggs, et al. ⁵
Costs				
Molnupiravir treatment course	\$710	\$568 - \$852	agreement with US government for 3.1 million treatment courses	Press Release ³
Nirmatrelvir treatment course	\$529	\$423 - \$635	agreement with US government for 10 million treatment courses	Press release ⁴
Outpatient visit to obtain antiviral	\$95	\$76 - \$114	used HCPCS code 99213 and averaged cost based on CMS physician fee schedule	CMS ⁶
COVID-19 hospitalization	\$28,889	\$16,442 - \$60,958	averaged mean hospitalization cost as stratified by sex	Ohsfeldt, et al. ⁷

Table 1. Model Inputs and Ranges.

RESULTS

> In our base case analysis, the ICER was estimated at \$12,599 per QALY for molnupiravir when compared with placebo. Nirmatrelvir dominated when compared with placebo and molnupiravir.

> Nirmatrelvir dominated when compared with placebo and molnupiravir across all parameter ranges except an increase in nirmatrelvir. (Figure 3)

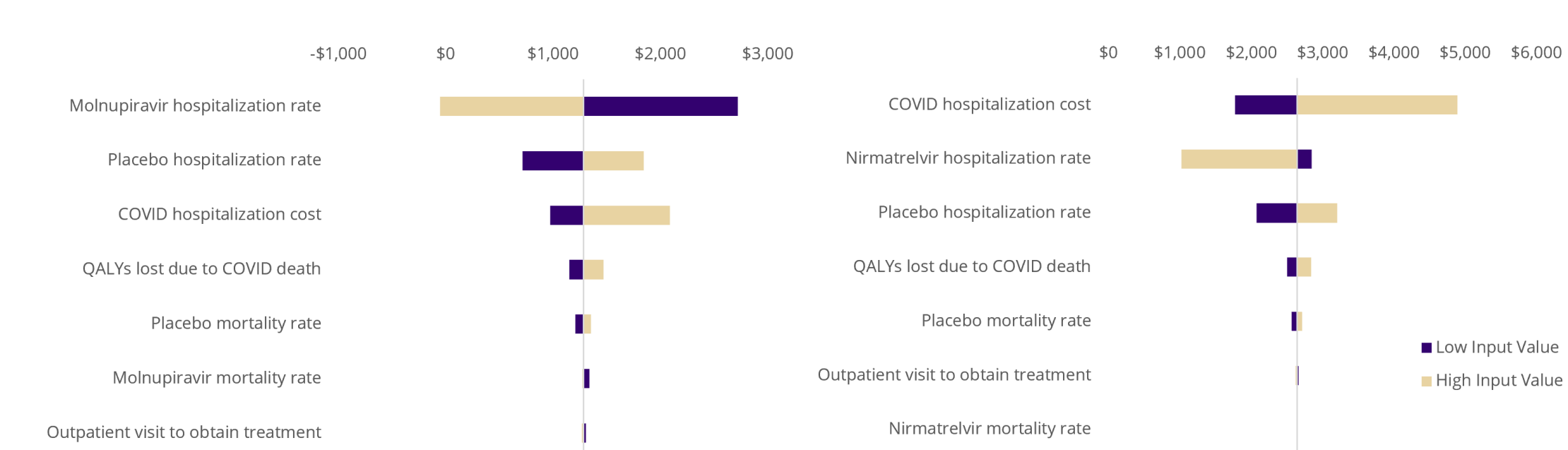


Figure 3. One-way Sensitivity Analysis of Molnupiravir (left) and Nirmatrelvir (right) Threshold Price for Cost-Effective Use at a WTP of \$100,000 per QALY.

DISCUSSION

> These estimated threshold prices are notably higher than current government negotiated prices highlighting the public health importance of affordability of these antivirals.

> These results align with the Institute for Clinical and Economic Review's finding that these medications were cost-effective in US high risk adults.⁸

> **Limitations:** an interim analysis of nirmatrelvir trial data was used for efficacy inputs, more evidence is needed to determine if these antivirals will be useful in vaccinated high-risk adults

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