

Cost-effectiveness analysis of nonpharmaceutical interventions combined with inactivated vaccination and oral medicine in China under COVID-19 pandemic

Fu Y¹, Zhao J¹, Wei X², Han P¹, Yang L^{1*}, Ren T¹, Zhan S¹, Li L^{1,3*}
¹School of Public Health, Peking University, Beijing, China
²London School of Hygiene & Tropical Medicine, Keppel Street, London, UK
³Center for Public Health and epidemic preparedness and response, Peking University, Beijing, China
*Corresponding Author: lyang@bjmu.edu.cn (Yang L); lmlee@vip.163.com (Li L)

Objective

Various interventions were used to control the COVID-19 pandemic and protect population health. This study aims to examine the cost-effectiveness of combinations of vaccination, nonpharmaceutical interventions (NPIs) and oral medicine (Paxlovid) under the Delta and Omicron pandemic in China.

Methods

- A Markov model using Susceptible-Infected-Recovered-Infected (SIRI) structure with a one-week cycle length was developed to estimate the cost-effectiveness of different combinations of nonpharmaceutical interventions (NPIs, including social distancing, mask wearing, tracing-testing-isolation, mass testing, and lockdown), oral medicine (Paxlovid), and vaccination (including two-dose and three-dose vaccination) for combating the COVID-19 pandemic from societal perspective over one-year time horizon.
- Base case analysis was performed to examine the cost-effectiveness of different intervention combinations under the Delta strain pandemic for general population.
- Scenario analyses were performed to examine the cost-effectiveness of for 1) the general population group under the Omicron pandemic; 2) for the elderly aged 60–69, 70–79, and over 80 years old; 3) for the situation when cross-infection was occurred; 4) when 20% concentratedly quarantine was encouraged.

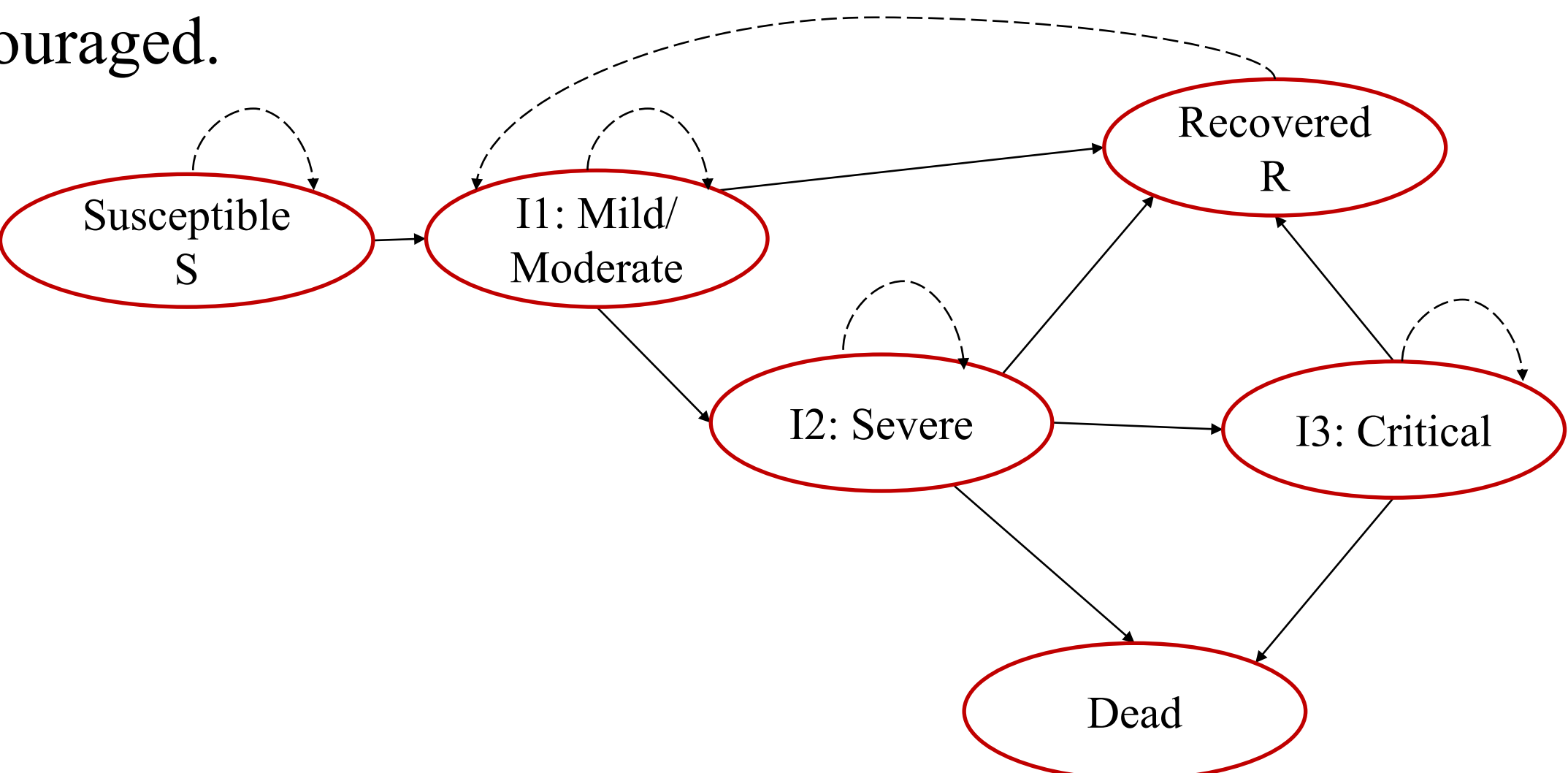


Figure 1: Disease progression of COVID-19 patients with a modified susceptible-infected-recovered-reinfected process

Results

Table 1: Cost-effectiveness analysis of different strategies and combinations under the Omicron pandemic of general population

Table with 6 columns: Strategy, Cost (\$), QALY, Incremental comparisons (Cost (\$), QALY, ICER (\$/QALY)). It lists various intervention strategies and their corresponding costs, quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs).

①Social distancing, ②Mask wearing, ③Tracing-testing-isolation (TTI), ④Mass nucleic testing, ⑥Paxlovid, ⑦Two-dose vaccination, ⑧Three-dose vaccination

Conclusion

- Under the Omicron pandemic, universal three-dose vaccination and self-quarantine can save total cost and should be encouraged.
- Comparing with regular mass nucleic testing, antigen testing is better in saving cost and avoiding cross-infection.
- Oral medicine treatment and lockdown is not cost-effective among general population.

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CE Acceptability Curve

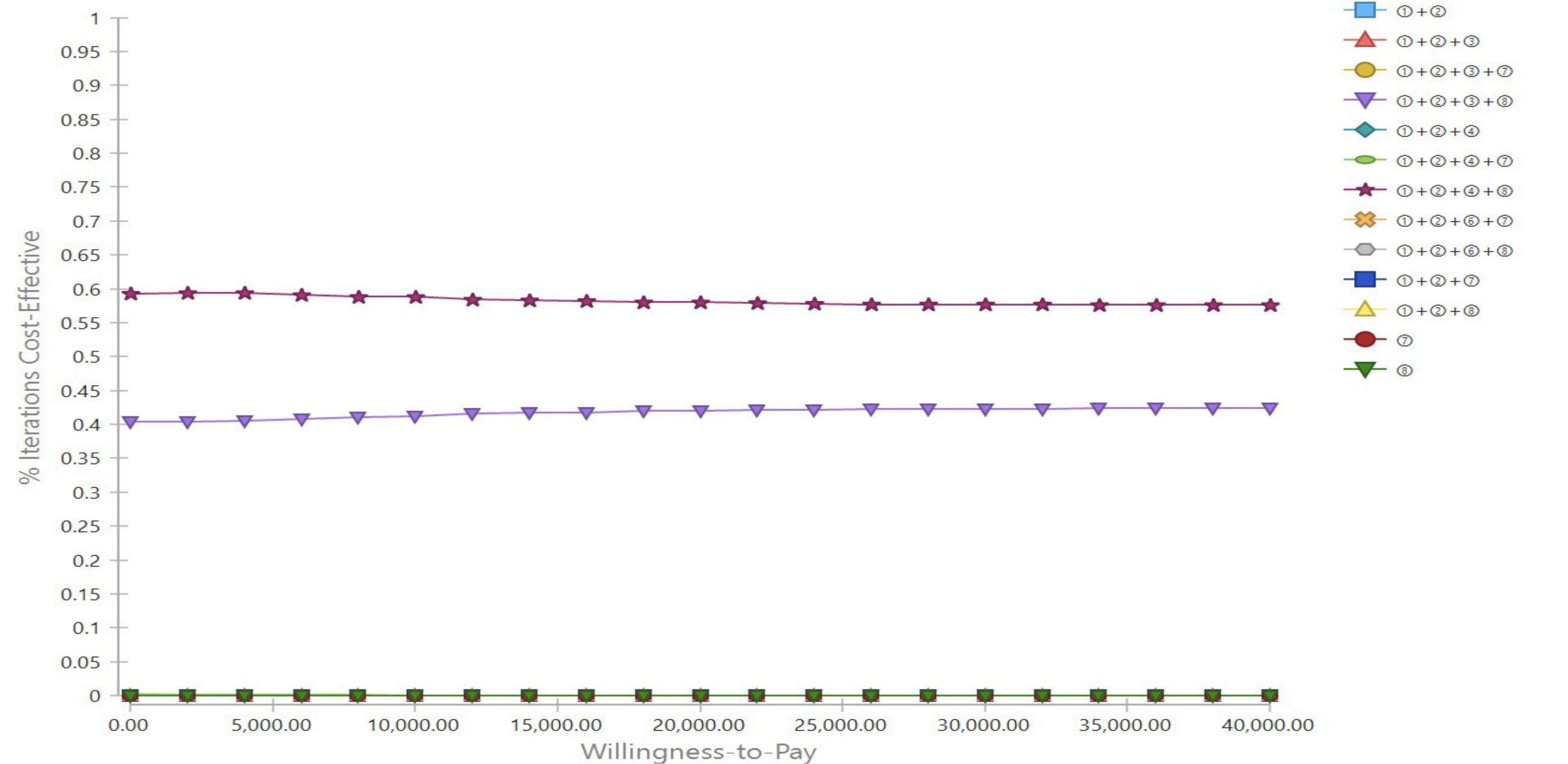


Figure 2: Cost-effectiveness acceptability curve