

Comparison of the Clinical and Economic Impact of Two COVID-19 mRNA Vaccines in High Risk Individuals in the Tokyo Prefecture

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SUPPLEMENTARY MATERIAL

Supplementary Methods

Model Inputs: Population Size and COVID-19 Incidence

- The size of the population aged ≥65 years in Tokyo (n = 2,371,090) was obtained from the Tokyo Statistical Yearbook website¹
- The size of the immunocompromised population (≥18 years, n = 4,675,900) in Japan was assumed based on the number of patients with autoimmune diseases and oncology patients,¹ and was weighted by the distribution of immunocompromised patients by age²
- This number was scaled back to Tokyo (n = 528,044) by dividing the total population in Tokyo aged ≥18 years by the total population in Japan aged ≥18 years and applying the value to the estimated immunocompromised population in Japan by age
- Individuals who did not receive a Moderna or Pfizer-BioNTech Fall 2023 vaccine were considered to have residual protection against infection and hospitalization from past vaccines
 - The population was stratified into groups based on the highest level of prior vaccination received: 1) no vaccination; 2) primary series; 3) first monovalent booster; 4) second monovalent booster; and 5) bivalent booster³⁻⁵
 - Residual vaccine effectiveness (VE) for each strata at the start of the model time horizon was calculated from the initial VE against omicron,⁶⁻⁸ monthly waning,⁹ and average time since vaccination
- Probability of hospitalization in unvaccinated individuals was calculated by varying the age-specific probabilities to ensure that the number of hospitalizations in individuals who did not receive the Fall 2023 formulas matched the expected number of hospitalizations in Japan¹⁰

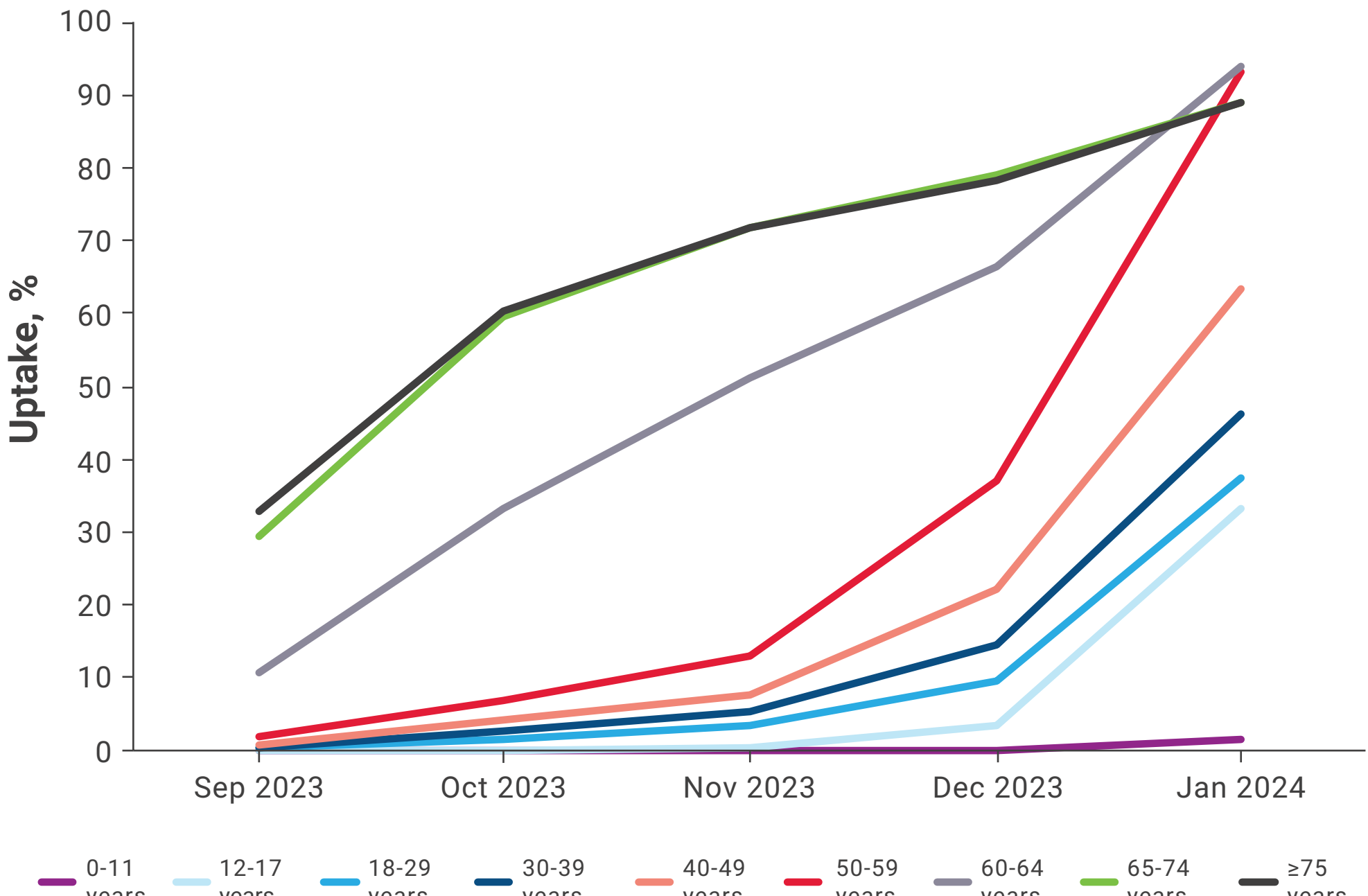
Model Inputs: COVID-19–Associated Outcomes and Vaccine Coverage

Supplementary Table 1. Base-Case Input Probabilities: Adults Aged ≥65 Years and Immunocompromised Population

Age Group	Infection-Related Myocarditis (%) ¹¹	Infection-Related Hospitalization (%) ^{10,a}	Hospital Mortality (%) ^{12,13,b}
Adults ≥65 years			
65-74 years	0.160	23.79	7.07
≥75 years	0.208	39.55	12.91
Immunocompromised adults (≥18 years)			
18-29 years	0.078	2.27	0.22
30-39 years	0.067	3.49	0.22
40-49 years	0.093	3.71	1.58
50-59 years	0.137	7.59	1.58
60-64 years	0.137	20.72	7.02
65-74 years	0.160	23.79	9.87
≥75 years	0.208	39.55	17.59

^aHospitalization data from the general population were adjusted to the immunocompromised population based on the data from a previous study.¹⁴
^bAge-specific death rates given hospitalization (death after hospitalization regardless of location) for the general population were adjusted to the immunocompromised population using the data from a previous study.¹⁵

Supplementary Figure 1. Fall 2023 Vaccine Coverage by Age Group



Model Inputs: Cost and Resource Use

Supplementary Table 2. Base-Case Inputs for Cost and Resource Use

Input	Value	Source
Proportion seeking outpatient care	100%	Assumption that all reported cases have sought medical care
Cost of outpatient care	¥44,991	Average of: <60 years ¹³ ≥60 years ¹²
Cost per hospitalization	¥778,075	Same as above
Myocarditis (induced by vaccine or infection)	¥20,262	Claims analysis conducted by Prof. Igarashi ¹²
Proportion vaccinated with vaccine-induced myocarditis ^a	0.00182%	COVID-19 vaccine safety updates ¹⁶ (males and females weighed equally)

^aOnly applies to individuals aged 18 to 39 years.

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