Potential Public Health Impact of Updated COVID-19 Vaccination Strategies in Thailand: Epidemiological Data Update

Supplementary Material

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1 Supplementary Figures and Tables

Supplementary Table 1. Thailand Population and Proportion of the Population at High Risk by Age Group

Age Group	Revised Population Size [a]	Revised Proportion High Risk [b]	Source Country
6 months to 4 years	2,502,793	2.64%	Thailand
5–11 years	5,203,688	3.53%	
12–17 years	4,761,041	5.01%	
18–29 years	10,541,035	10.89%	
30-49 years	19,557,859	24.99%	
50-64 years	14,235,620	42.53%	
65-74 years	5,600,400	60.43%	
≥75 years	3,360,835	74.67%	

[a] National Statistical Office Thailand

[b] Clark et al. 2020 (1)

Supplementary Table 2. Annual Attack Rate by Age Group

Age Group	Year 1*[a]	Source Country
6 months to 4 years	43.40%	Thailand
5–11 years	16.30%	
12–17 years	19.50%	
18–29 years	37.70%	
30-54 years	41.10%	
55-64 years	29.60%	
65-74 years	38.20%	
≥75 years	43.30%	

* Adjusting for underreporting factor (22.7) from Mustapha et al. 2024 (2)

[a] Data on file. COVID-19 Situation in Thailand (1 Jan – 16 September 2024). Annualized (3)

Supplementary Table 3. Hospitalization Inputs by Age Group

Parameter	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
Probability infection is symptomatic [a]	67.6%	67.6%	67.6%	67.6%	67.6%	67.6%	67.6%	67.6%	Global
Hospitalization rate among symptomatic patients [b]	1.74%	0.72%	0.85%	0.85%	0.85%	2.24%	3.69%	3.69%	Thailand
Revised: Critical care/ICU admission rate among hospitalized patients [b]	1.1%	1.8%	1.4%	0.7%	1.1%	1.5%	1.6%	1.2%	
Revised: Ventilation rate among hospitalized patients on normal ward[b]	1.6%	1.6%	1.8%	2.8%	6.2%	11.4%	15.1%	13.8%	
Revised: Ventilation rate among ICU patients [b]	20.3%	15.44%	16.8%	23.8%	30.4%	36.8%	38.7%	32.33%	

Abbreviations: ICU =intensive care unit

[a] Shang et al. 2022 (4)

[b] WHO Thailand Weekly Situation Update No. 225 (March 02 2022) (3)

Supplementary Table 4. Mortality Inputs by Age Group

Parameter	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
Revised: Probability of death among hospitalized patients [a]	0.1%	0.0%	0.1%	0.1%	0.6%	0.9%	2.0%	7.1%	Thailand
Revised: Probability of death among outpatients [b]	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	1.1%	

[a] Data on file: COVID-19 Situation in Thailand (1 Jan – 16 September 2024) Annualized (3)

[b] Assumption – All deaths are inpatient

Supplementary Table 5. Relative Risk of Complications in the High-risk Population

Risk Ratios	Value	Source Country
Relative Risk of hospitalization [a]	1.83	Global
Relative Risk of severe covid (requiring ICU) [b]	2.07	Malaysia
Relative Risk of mortality [c]	4.54	Indonesia

Abbreviations: ICU = intensive care unit

[a] Mattey-Mora et al. 2022 (5)

[b] Sim et al. 2020 (6)

[c] Surendra et al. 2021 (7)

Supplementary Table 6. Post-COVID Condition Probability by Age Group and Vaccination Status

Parameter	Probabilities [a,b]	Source Country
Probability of long-COVID among asymptomatic patients: susceptible	19.85%	Singapore
Probability of long-COVID among outpatient cases: susceptible	19.85%	
Probability of long-COVID among inpatient cases: susceptible	29.83%	
Probability of long-COVID among asymptomatic patients: vaccinated	13.86%	
Probability of long-COVID among outpatient cases: vaccinated	13.86%	
Probability of long-COVID among inpatient cases: vaccinated	21.65%	

[a] Values have been calculated by combining the base long-covid probability (16.8%) with the odds ratio for long covid given vaccination (0.65)and odds ratio for long covid given hospitalization (1.71).

[b] Li et al. 2023 (8)

Supplementary Table 7. Adverse Event Probabilities and Associated Costs

Adverse Events	Probabilities	Costs [a]	Source Country
Myocarditis	0.00033% [b]	THB 25,326.00 [c]	USA
Pericarditis	0.00024% [b]	THB 25,326.00 [c]	
Myoperiocarditis	0.00017% [b]	THB 25,326.00 [c]	
Acute allergic reaction requiring hospitalisation	0.00014% [b]	THB 25,326.00 [c]	
Disseminated intravascular coagulation	0.00013% [b]	THB 25,326.00 [c]	
Cerebral venous sinus thrombosis with thrombocytopenia	0.00011% [b]	THB 25,326.00 [c]	
Capillary leak syndrome	0.00011% [b]	THB 25,326.00 [c]	
Guillain-Barre syndrome	0.00011% [b]	THB 25,326.00 [c]	
Pulmonary embolism	0.00011% [b]	THB 25,326.00 [c]	
Acute myocardial infarction	0.00000% [d]	THB 25,326.00 [c]	

[a] Costs inflated to 2024 prices

[b] Hause et al. 2022 (9)

[c] Wang et al. (2022) (10)

[d] Klein 2021 (11)

Supplementary Table 8. Treatment Costs

Parameter	Value	Source	Source Country
Price of test	THB 3,500	RT-PCR for SAR-COV-2 fee, Notifications of the Ministry of Public Health (Re: Health service fee for the facilities under MoPH A.D. 2025) (12)	Thailand
Number of tests used for asymptomatic patients	2.00	Assumed to be 2 tests: one for diagnosis and one to confirm that case has been treated.	Assumption
Number of tests used per case in outpatient care	2.00	Assumed to be 2 tests: one for diagnosis and one to confirm that case has been treated.	Assumption
Number of tests used per case in inpatient care	2.00	Assumed to be 2 tests: one for diagnosis and one to confirm that case has been treated.	Assumption
Number of tests used per case in ICU care	2.00	Assumed to be 2 tests: one for diagnosis and one to confirm that case has been treated.	Assumption
Unit cost of GP visit	THB 120	OPD visit fee, Notifications of the Ministry of Public Health (Re: Health service fee for the facilities under MoPH A.D.2025) (12)	Thailand
OTC pain medication	THB 154.95	Average telehealth cost at community pharmacy in 2023 (report from NHSO "Telemedicine: A Temporary Trend or a Long-Term Paradigm Shift")	Thailand

Abbreviations: GP = general practitioner; ICU = intensive care unit; OTC=over-the-counter

[a] Costs inflated to 2024 prices

Supplementary Table 9. Hospitalization Costs

Costs [a]	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
Total cost of treatment for an inpatient admission without ventilation (normal ward) [b]	THB 34,757	THB 30,790	THB 33,089	THB 35,353	THB 37,587	THB 39,640	THB 48,010	THB 48,010	Thailand
Total cost of treatment for an inpatient admission with ventilation (normal ward) [b]	THB 133,459	THB 74,280	THB 96,481	THB 103,083	THB 109,598	THB 115,582	THB 139,987	THB 139,987	
Cost of treatment for an ICU admission for patients not on ventilation. [b]	THB 34,757	THB 30,790	THB 62,671	THB 94,075	THB 101,234	THB 107,810	THB 110,217	THB 110,217	
Cost of treatment for an ICU admission for	THB 129,021	THB 106,985	THB 196,900	THB 286,551	THB 307,401	THB 328,386	THB 325,718	THB 325,718	

Costs [a]	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
patients on ventilation. [b]									

Abbreviations: ICU = intensive care unit

[a] Costs inflated to 2024 prices

[b] Wipatayotin (2022) (13)

Supplementary Table 10. Workforce Participation Rate and Labor Cost

Parameter	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
Workforce participation rate [a]	0%	0%	7%	67.4%	89.6%	69.2%	36.2%	0%	Thailand
Labour cost per week (THB) [b, c]	THB 0	THB 0	THB 1,801	THB 4,569	THB 8,435	THB 8,261	THB 6,611	THB 0	

[a] National Statistical Office Thailand (14)

[b] Trading economics - Thailand average monthly wages (15)

[c] Costs inflated to 2024 prices

Supplementary Table 11. Long COVID Costs

Parameter	Value	Source	Source Country
Number of GP visits for Long-Covid	6.00	A Neglected Burden: The Ongoing Economic Costs of COVID-19 in Singapore (16)	Singapore
Cost of specialist visit for PASC	THB 336 [a]	Assumed to be cost of specialist visits	Thailand
Cost of hospitalization PASC	THB 38,404 [a]	Assumed to be the cost of inpatient admission without ventilation	
Working time lost for long covid (days) – Susceptible	26	Assumption	Assumption
Working time lost for long covid (days) – Vaccinated	7	Assumption	

Abbreviations: GP = general practitioner

[a] Costs inflated to 2024 prices

Supplementary Table 12. Projected Booster Vaccine Coverage

Parameter	Age (years)								Source Country
	6mo-4	5-11	12-17	18-29	30-54	55-64	65-74	≥75	
Percentage of eligible Thailand population receiving booster [a]	0%	0%	0%	36.1 %	36.1 %	32.1 %	23.6 %	23.6 %	Thailand
Percentage of eligible Thailand population without comorbidities receiving booster [b]	20%								Assumption

[a] WHO Thailand Weekly Situational Update No. 225 (Assumed same for each risk group.) (17)

[b] Assumption

Supplementary Table 13. Education Participation

Parameter	Value	Source	Source Country
Value of a lost school day	THB 17.78	World Bank (18)	Thailand
Schooldays lost outpatient	10	Assumed same as working time loss.	Assumption
Schooldays lost for inpatient without ventilation (normal ward)	11	Assumed same as working time loss.	
Schooldays lost for inpatient admission with ventilation (normal ward)	11	Assumed same as working time loss.	
Schooldays lost for ICU admission for patients not on ventilation	20	Assumed same as working time loss.	
Schooldays lost for ICU admission for patients on ventilation	20	Assumed same as working time loss.	

Abbreviations: ICU = intensive care unit

[a] Costs inflated to 2024 prices

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