Assessing the Cost-Effectiveness of an mRNA-Based RSV Vaccine (mRNA-1345) Among Canadian Adults Aged ≥60 Years

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SUPPLEMENTARY MATERIAL

Supplemental Table 1. Model Inputs

Model Parameters	Value (DSA Range)	Data Source
Population size by age group, years[a]		
60-64	2,640,008	Statistics Canada 2022. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501
65-69	2,308,096	
70-74	1,879,942	
75-79	1,381,797	
80-84	878,761	
≥85	882,009	
Vaccine coverage by age group, years		
60-64	43.1%	Canada Seasonal Influenza Vaccination Coverage Survey 2022-2023. https://www.canada.ca/en/public-health/services/immunization-vaccines/vaccination-coverage/seasonal-influenza-survey-results-2022-2023/full-report.html
≥65	73.7%	
Incidence of RSV-ARD with no vaccination		
Symptomatic RSV-ARD[b]	6.7% (±20%)	Derived from Falsey, et al. (2005)[1]
Percentage with RSV-LRTD by age group, years		
60-69	19.7%	Derived via calibration using ElSherif, et al. (2023)[2] adjusted by 1.5 for underdetection as target endpoint[c]
70-79	21.2%	
≥80	45.4%	
Percentage with RSV-LRTD requiring hospitalization by age group, years[c]		
60-64	3.3%	Derived from Tong, et al. (2020)[4]
65-69	8.7%	
70-74	8.7%	
75-79	14.6%	
80-84	14.6%	
≥85	17.7%	
Percentage with RSV-LRTD requiring outpatient treatment by age group, years[d]		
60-64	96.7%	Calculated as 1 – percentage requiring inpatient care
65-69	91.3%	
70-74	91.3%	
75-79	85.5%	
80-84	85.5%	
≥85	82.3%	
Percentage with RSV-No LRTD requiring outpatient treatment by age group, years[e]		
60-64	10.3%	Derived via calibration using McLaughlin, et al. (2022)[3] as target endpoints
≥65	18.8%	
RSV-related inpatient mortality by age group, years[f]		
60-64	7.6%	Derived from Mac, et al. (2023)[5]
65-69	7.6%	
70-74	8.1%	
75-79	8.1%	
80-84	14.0%	
≥85	14.0%	
RSV-related QALY losses requiring:		
Hospitalization	0.11 (SE not reported)	Mangen, et al. (2017)[6]
Outpatient treatment[g]	0.0193 (LL: 0.0095 to UL: 0.0316)	Hutton (2023)[7]
Cost of RSV requiring:		
RSV-LRTD inpatient treatment	CAD 43,074	Derived from Mac, et al. (2023)[5]
RSV No-LRTD inpatient treatment	CAD 0	Derived from Mac, et al. (2023)[5]
RSV-LRTD or RSV No-LRTD outpatient treatment	CAD 430.74	Assumption (1% of hospitalization cost)
mRNA-1345 vaccine	CAD 230.00	Moderna Therapeutics, Inc.

ARD, acute respiratory disease; CAD, Canadian dollar; DSA, deterministic sensitivity analysis; *ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification*; LL, lower limit; LRTD, lower respiratory tract disease; RSV, respiratory syncytial virus; SE, standard error, UL, upper limit.

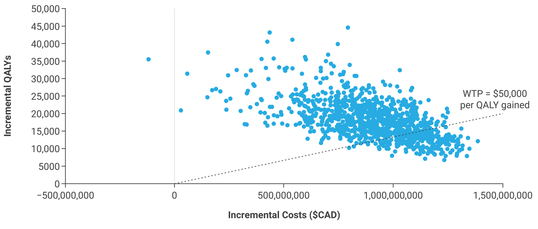
[a]All participants were assumed to be eligible for vaccination.
[b]Falsey, et al.[1] did not publish age-specific incidence; therefore, this estimate was assumed to apply to all age groups, including those aged 60-64 years.
[c]Given the ICD-9-CM codes in the claims analysis, it was assumed that most cases represented RSV-LRTD. Hospitalization rates were adjusted by 1.5 for underdetection, and estimates were used to estimate the age-specific percentages of RSV-LRTD participants requiring inpatient care.
[d]RSV-LRTD participants who did not require inpatient care were assumed to require only outpatient care, and percentages of RSV-LRTD cases requiring no treatment were set to 0% in the reference case.
[e]The lower bound calibration endpoints were based on the 2012-2015 average measures provided by ElSherif et al.,[2] which were adjusted by 1.5 for underdetection, while the upper bound calibration endpoints were based on US data from the meta-analysis by McLaughlin et al.[3]
[f]Mortality was calculated by dividing the number of deaths reported for each age group with the total number of patients within the specific age group diagnoses with RSV-associated hospitalization.
[g]Outpatient treatment also applies to patients who did not seek treatment.

Supplemental Table 2. Cost per Life-Year Saved

Vaccination Strategy	Total Costs ($)	Total LYs Lost	Δ Costs ($)	LYs Saved	ICER (Δ Costs/LY Saved) ($)
Deterministic Analyses					
Reference case incremental cost per LY saved					
No vaccine	1,661,498,061	4,804,231	-	-	Reference
mRNA-1345	2,543,614,161	4,791,037	882,116,101	13,195	66,855
Probabilistic Analyses					
Probabilistic incremental cost per LY saved					
No vaccine	1,657,153,154	4,804,280	-	-	Reference
mRNA-1345	2,557,655,795	4,791,435	900,502,642	12,845	70,106

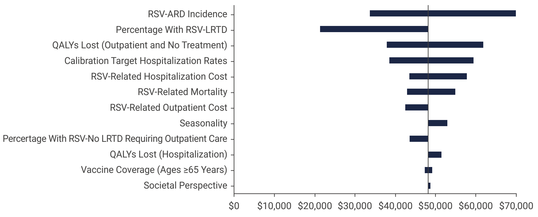
ICER, incremental cost-effectiveness ratio; LY, life-year.

Supplemental Figure 1. Probabilistic Analysis: Cost-Effectiveness Scatter Plot



CAD, Canadian dollar; QALY, quality-adjusted life-year; WTP, willingness-to-pay.

Supplemental Figure 2. Deterministic Sensitivity Analyses



ARD, acute respiratory tract disease; LRTD, lower respiratory tract disease; QALY, quality-adjusted life-year; RSV, respiratory syncytial virus.

Supplemental References

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6. Mangen MJ, et al. *BMC Infect Dis.* 2017;17(1):208.
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