Additional file 2: Further results

Article title: Cost-effectiveness of respiratory syncytial virus vaccination for older adults: a modelling analysis

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Victoria L. Oliver[1]*, Julian B. Carlin[2]*, Yingying Wang[1]*, Violeta Spirkoska[2], Adrian Marcato[2], Kylie S. Carville[2,3], Robert Moss[1], David J. Price[1,2], Patricia T. Campbell[2], Jodie McVernon[2]^, Natalie Carvalho[1]^

*Joint first authors
^ Joint senior authors

[1] Melbourne School of Population and Global Health, University of Melbourne, VIC, Australia
[2] Department of Infectious Diseases, The University of Melbourne at the Peter Doherty Institute for Infection and Immunity, Victoria, Australia
[3] Victorian Infectious Diseases Reference Laboratory, The Royal Melbourne Hospital at the Peter Doherty Institute for Infection and Immunity, Victoria, Australia

Corresponding author: tori.oliver@unimelb.edu.au

Figure 1: Flow chart of studies identified, screened, and included from the literature review.

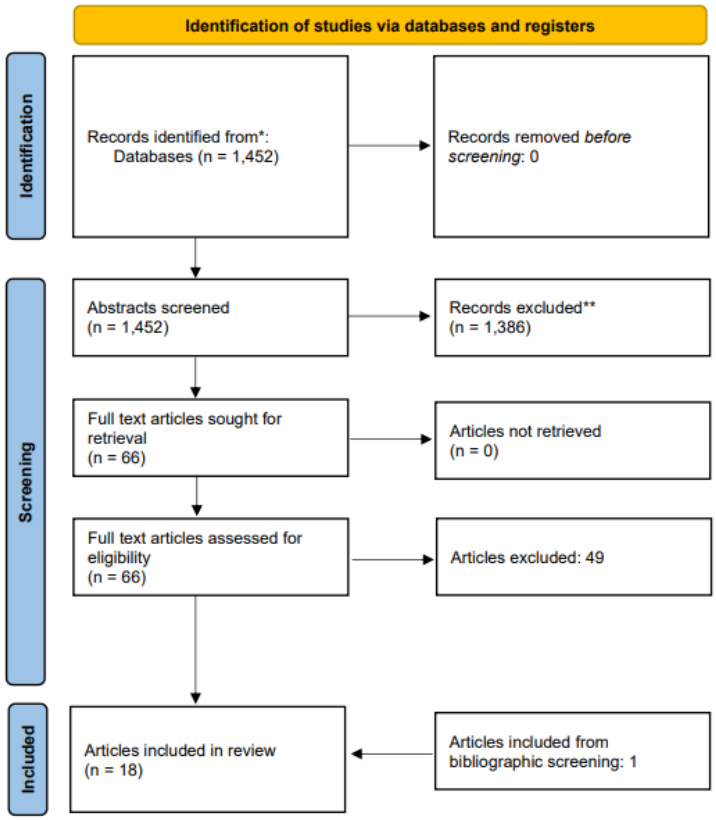

Table 1: Summary of key model inputs and findings of published cost-effectiveness analyses. Our study has been included here to facilitate comparison.

Study, analysis	Country, perspective	Baseline incidence of hospitalisation (per 100,000)[a]	Hospitalised case-fatality risk [a]	Mortality rate (per 100,000)[a]	Duration of protection (against hospitalisation)	Vaccine price (2024 USD)[b]	Number needed to vaccinate to avoid 1 hospitalisation or death	Cost-effectiveness of vaccination strategy[c], ICER (2024 USD/QALY)[b]	WTP threshold (2024 USD/QALY)[b]
Analyses of the cost effectiveness of vaccination for adults aged ≥60 or ≥65 years compared to no vaccination									
This study	Australia, Healthcare	491.3	1.7%	8.4	Waning to reach 0% at 36 months	63	Hospitalisation: 483 Death: 26,220	Not cost-effective, 192,202	10,000 - 33,000
Meijboom et. al., 2013 [59]	Netherlands, Healthcare[d]	46.2[e]	46.0% (≥65)	21.3 (≥65)	1 season (no waning)	66	NR	Not cost-effective, 67,878	66,000
Ortega-Sanchez, 2023 [24], UM-CDC model - Abrysvo	USA, Societal	162 (≥65)	Not reported	Unknown	Waning to 0% at 24 months	200	NR	Not cost-effective, 118,735	102,000
Ortega-Sanchez, 2023 [24], UM-CDC model - Arexvy	USA, Societal	162 (≥65)	Not reported	Unknown	Waning to 0% at 24 months	270	NR	Not cost-effective, 205,638	102,000
Hutton et. al., 2024 [62], Abrysvo	USA, Societal	65.5 (60–64) 93.8 (65–69) 118.7 (70–74) 302.9 (≥75)	3.9% (60–64) 4.3% (65–74) 5.7% (≥75)	2.6 (60–64) 4.0 (65–69) 5.1 (70–74) 17.3 (≥75)	Waning over 14 months	295	Hospitalisation: 440 Death: 9,385	Not cost-effective, 196,842	125,000–190,000
Hutton et. al., 2024 [62], Arexvy	USA, Societal	65.5 (60–64) 93.8 (65–69) 118.7 (70–74) 302.9 (≥75)	3.9% (60–64) 4.3% (65–74) 5.7% (≥75)	2.6 (60–64) 4.0 (65–69) 5.1 (70–74) 17.3 (≥75)	Waning over 18 months	280	Hospitalisation: 478 Death: 8,656	Cost-effective, 176,557	125,000–190,000
Komiya et. al., 2025 [22]	Japan, Healthcare & Societal	413.1	13.6%	56.2	Waning to 0% over 42 months	158	NR	Cost-effective, 9,693 (healthcare) 5,967 (societal)	33,000
Averin et. al. 2025 [57]	Germany, Healthcare & Societal	144.2 (60–69)[e] 433.5 (70–79)[e] 876.4 (≥80)[e]	7.8%	11.2 (60–69) 33.8 (70–79) 68.4 (≥80)	Waning to 0% over 42 months	230	NR	Cost-effective, 42,311 (healthcare) 39,035 (societal)	13,00–54,00
Gourzoulidis et. al., 2024 [44]	Greece, Public payer	206.6 (60–64)[e] 408.3 (65–74)[e] 645.5 (75–84)[e] 921.9 (≥85)[e]	7.4%	15.3 (60–64) 30.2 (65–74) 47.8 (75–84) 68.2 (≥85)	Waning over 41 months	223	NR	Cost-effective, 21,438	46,625

Study, analysis	Country, perspective	Baseline incidence of hospitalisation (per 100,000)[a]	Hospitalised case-fatality risk [a]	Mortality rate (per 100,000)[a]	Duration of protection (against hospitalisation)	Vaccine price (2024 USD)[b]	Number needed to vaccinate to avoid 1 hospitalisation or death	Cost-effectiveness of vaccination strategy[c], ICER (2024 USD/QALY)[b]	WTP threshold (2024 USD/QALY)[b]
La et. al., 2024 [60]	USA, Societal	338.7	5.15%	17.4	Waning to 28.2% at 60 months	294	Hospitalisation: 182 Death: 2,279	Cost-effective, 18,430	50,000
Mizukami et. al., 2024 [23]	Japan, Healthcare & Societal	407.6	4.77%	19.4	Waning over 2 seasons	132	NR	Cost-effective, 27,616 (healthcare) 26,703 (societal)	33,000 – 39,000
Ortega-Sanchez 2023 [24], Pfizer model	USA, Societal	300 (≥65)	Not reported	Unknown	Waning over 43 months	270	NR	Cost-effective, 23,921	102,000
Ortega-Sanchez 2023 [24], GSK model	USA, Societal	256.3 (≥65)	Not reported	Unknown	Waning over 24 months	200	NR	Cost-effective, 64,348	102,000
Gessner et. al., 1999 [66]	USA, Societal	44.0 (≥65)	11% (≥65)	4.8 (≥65)	1 season (no waning)	52	NR	Cost-effective, 5,342	35,000
Wang et. al., 2023 [46], Abrysvo	Hong Kong, Public healthcare provider	141.45	7.7%	10.9	Waning to 75% in season two	50[f]	NR	Cost-effective, 26,843	51,000
Wang et. al., 2023 [46], Arexvy	Hong Kong, Public healthcare provider	141.45	7.7%	10.9	Waning to 52.9% in season two	67.5[f]	NR	Cost-effective, 48,633	51,000
Zeevat et. al., 2022 [58]	Netherlands, Societal	51.1	38.6%	19.7	1 year (no waning)	NMB at dose price of 17–53 USD[h]	NR	Dose price dependent	22,000–55,000

Study, analysis	Country, perspective	Baseline incidence of hospitalisation (per 100,000)[a]	Hospitalised case-fatality risk [a]	Mortality rate (per 100,000)[a]	Duration of protection (against hospitalisation)	Vaccine price (2024 USD)[b]	Number needed to vaccinate to avoid 1 hospitalisation or death	Cost-effectiveness of vaccination strategy[c], ICER (2024 USD/QALY)[b]	WTP threshold (2024 USD/QALY)[b]
Hodgson et al. 2020 [28]	USA, Public healthcare provider	70 (65–74) 245 (≥75)	10% (65–74) 15% (≥75)	7.0 (65–74) 36.8 (≥75)	1 year (no waning)	NMB at dose price of 27 USD	NR	Dose price dependent	34,000
Shoukat et. al., 2024 [35], Abrysvo	Canada, Healthcare & Societal	145	7.6% (60–69) 8.1% (70–79) 14% (≥80)	11.0 (60–69) 11.7 (70–79) 20.3 (≥80)	Waning over 24 months	NMB at dose price of 107-134 USD[g]	NR	Dose price dependent	36,000
Shoukat et. al., 2024 [35], Arexvy	Canada, Healthcare & Societal	145	7.6% (60–69) 8.1% (70–79) 14% (≥80)	11.0 (60–69) 11.7 (70–79) 20.3 (≥80)	Waning over 24 months	NMB at dose price of 104-137 USD[g]	NR	Dose price dependent	36,000
Moghadas et. al., 2023 [63], Abrysvo	USA, Societal	214	8.8%[i]	18.8	Waning over 24 months	NMB at dose price of 197 – 245 USD[j]	Hospitalisation: 281-326[j] Death: 3,384-3,977[j]	Dose price dependent	97,000
Moghadas et. al., 2023 [63], Arexvy	USA, Societal	214	8.8%[i]	18.8	Waning over 24 months	NMB at dose price of 210 – 235 USD[j]	Hospitalisation: 301-325 Death: 3,536-3,984	Dose price dependent	97,000
Zeevat et. al., 2022 [58]	UK, Third party payer	151.4 (≥65)	59.7% (≥65)	90.4 (≥65)	1 year (no waning)	NMB at dose price of 89–135 USD[h]	NR	Dose price dependent	25,000–39,000
Herring et. al., 2022 [65]	USA, Third party payer	335[k]	8.7%	29.1	1 season (no waning)	NMB at dose price of 152 – 299 USD[h]	Hospitalisation: 569 Death: 3,113	Dose price dependent	53,000 – 106,000
Analyses of the cost effectiveness of vaccination for adults aged ≥60 or ≥65 years compared to next best RSV vaccination strategy for adults									
Rudd et. al., 2025 [61] – Public Health Agency of Canada model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000

Study, analysis	Country, perspective	Baseline incidence of hospitalisation (per 100,000)[a]	Hospitalised case-fatality risk [a]	Mortality rate (per 100,000)[a]	Duration of protection (against hospitalisation)	Vaccine price (2024 USD)[b]	Number needed to vaccinate to avoid 1 hospitalisation or death	Cost-effectiveness of vaccination strategy[c], ICER (2024 USD/QALY)[b]	WTP threshold (2024 USD/QALY)[b]
Rudd et. al., 2025 [61] – Public Health Agency of Canada model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000
Rudd et. al., 2025 [61] – Pfizer model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000
Rudd et. al., 2025 [61] – Pfizer model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000
Rudd et. al., 2025 [61] – GSK model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000
Rudd et. al., 2025 [61] – GSK model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Dominated (next best strategy not reported)	37,000
Li et. al., 2025, Denmark	Denmark, Healthcare & Societal	63.3 - 173.7 [e,l]	7.13	4.5 – 12.4	Waning over 24 months	162	NR	Dependent on WTP	Cost-effective compared to vaccination of ≥75-year-olds at WTP = 70,000 [m]
Li et. al., 2025, Finland	Finland, Healthcare & Societal	493.3 - 637.5 [e,l]	7.13	35.2 – 45.5	Waning over 24 months	162	NR	Not cost-effective compared to vaccination of ≥75 year old	162,000
Li et. al., 2025, Netherlands	Netherlands, Healthcare & Societal	213.1 - 859.7 [e,l]	7.13	15.2 – 61.3	Waning over 24 months	162	NR	Dependent on WTP	Cost-effective compared to vaccination of ≥75-year-olds

Study, analysis	Country, perspective	Baseline incidence of hospitalisation (per 100,000)[a]	Hospitalised case-fatality risk [a]	Mortality rate (per 100,000)[a]	Duration of protection (against hospitalisation)	Vaccine price (2024 USD)[b]	Number needed to vaccinate to avoid 1 hospitalisation or death	Cost-effectiveness of vaccination strategy[c], ICER (2024 USD/QALY)[b]	WTP threshold (2024 USD/QALY)[b]
									at WTP = 76,000[m]
Li et. al., 2025, Spain	Valencia - Spain, Healthcare & Societal	427.7 – 836.4 [e,l]	7.13	30.5 – 59.6	Waning over 24 months	162	NR	Dependent on WTP	Cost-effective compared to vaccination of ≥75-year-olds at WTP = 126,000 [m]
Tuite et. al., 2024- Abrysvo	Canada, Healthcare & Societal	71.25 (60-69)[e] 144.6 (70-79)[e] 461.1 (80+)[e]	6.6% (65-74) 10.1% (75+)	Unknown	Waning over 24 months	168	Hospitalization: 338, Death: 4,315	Dominated[n]	NR
Tuite et. al., 2024- Arexvy	Canada, Healthcare & Societal	71.25 (60-69)[e] 144.6 (70-79)[e] 461.1 (80+)[e]	6.6% (65-74) 10.1% (75+)	Unknown	Waning over 24 months	168	Hospitalization: 353, Death: 3,973	Dominated[n]	NR
Analyses of the cost effectiveness of vaccination for adults with elevated risk aged ≥60 or 65 years compared to no vaccination									
This study	Australia, Healthcare	1423.0	1.7%	24.2	36 months	63	Hospitalisation: 104 Death: 5,815	Cost-saving	10,000 - 33,000
Averin et. al. 2025 [57]	Germany, Healthcare & Societal	202.6 (60–69)[e] 501.5 (70–79)[e] 930.3 (≥80)[e]	6.1% (60–69) 9.0% (70–79) 10.6% (≥80)	12.4 (60–69) 45.1 (70–79) 98.6 (≥80)	Waning to 0% over 42 months	230	NR	Cost-effective, 34,998 (healthcare) 31,728 (societal)	13,000–54,000
Gourzoulidis et. al., 2024 [44]	Greece, Public payer	373 (60–64)[e] 558 (65–74)[e] 740 (75–784)[e] 977 (≥85)[e]	7.4%	27.6 (60–64) 41.3 (65–74) 54.8 (75–84) 72.3 (≥85)	Waning over 41 months	223	NR	Cost-effective, 15,242	47,000
Meijboom et. al., 2013 [59]	Netherlands, Healthcare[d]	88.2 (60–64)[e] 93.0 (65–74)[e] 188.3 (75–84)[e] 395.5 (≥85)[e]	23.7% (60–64) 22.5% (65–74) 34.4% (75–84) 53.3% (≥85)	20.9 (60–74) 64.7 (75–84) 210.9 (≥85)	1 season (no waning)	66	NR	Cost-effective, 31,805	87,000
Shoukat et. al., 2024 [35], Abrysvo	Canada, Healthcare & Societal	330.6[e]	7.6% (60–69) 8.1% (70–79) 14% (≥80)	25.1 (60–69) 26.8 (70–79) 46.3 (≥80)	Waning over 24 months	NMB at dose price	NR	Price dependent	36,000

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						of 127 USD[g]			
Shoukat et. al., 2024 [35], Arexvy	Canada, Healthcare & Societal	330.6[e]	7.6% (60–69) 8.1% (70–79) 14% (≥80)	25.1 (60–69) 26.8 (70–79) 46.3 (≥80)	Waning over 24 months	NMB at dose price of 119 USD[g]	NR	Price dependent	36,000
Analyses of the cost effectiveness of vaccination for adults with elevated risk aged ≥60 or 65 years compared to next best RSV vaccination strategy									
Rudd et. al., 2025 [61] – Public Health Agency of Canada model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective or extendedly dominated[o]	37,000
Rudd et. al., 2025 [61] – Public Health Agency of Canada model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective or extendedly dominated[o]	37,000
Rudd et. al., 2025 [61] – Pfizer model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective[p]	37,000
Rudd et. al., 2025 [61] – Pfizer model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective[p]	37,000
Rudd et. al., 2025 [61] – GSK model - Abrysvo	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective or extendedly dominated[o]	37,000
Rudd et. al., 2025 [61] – GSK model - Arexvy	Canada, Health sector	165.4[e]	6.6%	10.9	Waning over 36 months	168	NR	Not cost-effective or extendedly dominated[o]	37,000

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Tuite et. al., 2024- Abrysvo	Canada, Healthcare & Societal	71.25 (60-69)[e] 144.6 (70-79)[e] 461.1 (80+)[e]	6.6% (65-74) 10.1% (75+)	Unknown	Waning over 24 months	168	Hospitalization: 338, Death: 4,315	Not cost-effective or extendedly dominated[o]	NR
Tuite et. al., 2024- Arexvy	Canada, Healthcare & Societal	71.25 (60-69)[e] 144.6 (70-79)[e] 461.1 (80+)[e]	6.6% (65-74) 10.1% (75+)	Unknown	Waning over 24 months	168	Hospitalization: 353, Death: 3,973	Not cost-effective or extendedly dominated[o]	NR

NMB, net monetary benefit; NR, not reported; USD, United States dollars; WTP, Willingness to pay;

[a] Unless otherwise stated, hospitalisation incidence, hospitalised case fatality rate, and mortality rate have been reported for adults ≥60 years in the population eligible for vaccination (general population or adults with elevated risk). Mortality rate has been calculated based on hospitalisation incidence and hospitalised case fatality rate.

[b] Dose price, ICER and WTP thresholds reported in local currency units have been converted to USD using exchange rates for the year of the analysis. Dose price, ICER and WTP have been adjusted to 2024 USD using GDP deflators to express all values in 2024 USD. Thresholds are expressed to the nearest 1,000 USD

[c] Where results from multiple scenario analyses were presented in the published study, ICER for the scenario most closely aligned with our study has been presented. Assessment of cost-effectiveness presented in the table was made based on upper WTP threshold.

[d] Perspective adopted was not explicitly reported, healthcare sector perspective assumed based on included costs

[e] Hospitalisation incidence has been computed based on data reported for those with and without risk conditions in the article.

[f] Four price estimates were explored for each vaccine. Results are reported for the estimate most comparable to the price used in our analysis.

[g] Upper and lower NMB bounds represent results for healthcare and societal perspective respectively

[h] NMB ranges correspond to lower and upper WTP threshold used

[i] Computed from uniform range

[j] Ranges encompass results for different waning curves. Results reflect the two-year horizon scenario analysis.

[k] Study presented alternative analysis scenarios based on two different data sources for hospitalisation incidence. Analysis with hospitalisation incidence most comparable to our study has been presented.

[l] Range represent inputs from three different methods for estimating hospitalisation incidence.

[m] Vaccination of adults ≥65 years was preferred over vaccination of adults ≥75 years for only one estimate of hospitalisation incidence modelled but was not preferred up to a WTP threshold of 162,000 USD otherwise

[n] Vaccination of adults ≥60 years was dominated by vaccination of adults ≥70 years along with at-risk adults ≥50 years. Vaccination of adults ≥65 years was dominated by vaccination of adults ≥75 years along with at-risk adults ≥60 years

[o] Vaccination of at-risk adults ≥60 years was not cost-effective compared to vaccination of at-risk adults ≥70 years. Vaccination of at-risk adults ≥65 years was extendedly dominated.

[p] Vaccination of at-risk adults ≥60 years was not cost-effective compared to vaccination of at-risk adults ≥65 years. Vaccination of at-risk adults ≥65 years was not cost-effective compared to vaccination of at-risk adults ≥70 years.

Table 2: Clinical outcome results for all strategies simulated. All numbers are scaled to a population of 100,000 adults ≥60 years of age. Data show the average number of clinical outcomes in the no vaccination strategy and the number of outcomes averted by each vaccination strategy.

Vaccination strategy	Doses delivered	GP	ED	H	ICU	Deaths
General population						
No intervention, number of cases		4530.8 (4263–4847)	2347.6 (2162–2543)	470.3 (391–551)	12.5 (2–27)	8.6 (1–21)
Year-round vaccination of at-risk ≥60 with others ≥75, number of cases averted	35,343	681.3 (532–834)	483.8 (391–584)	96.6 (61–137)	2.4 (–6–11)	1.9 (0–6)
Seasonal vaccination of at-risk ≥60, others ≥75, number of cases averted	34,533	763.3 (598–937)	544.0 (438–659)	108.9 (71–151)	2.6 (–6–12)	2.2 (0–6)
Seasonal vaccination of at-risk ≥60 with others ≥70, number of cases averted	42,527	859.0 (683–1050)	593.1 (480–716)	118.3 (80–165)	2.9 (–6–13)	2.3 (0–7)
Seasonal vaccination of at-risk ≥60 with others ≥65, number of cases averted	52,774	973.6 (791–1173)	631.1 (513–754)	126.1 (85–170)	3.2 (–6–14)	2.4 (0–10)
Seasonal vaccination of ≥60, number of cases averted	65,549	1128.5 (933–1347)	676.6 (556–810)	135.6 (94–184)	3.5 (–6–14)	2.5 (0–10)
Seasonal vaccination of ≥75, number of cases averted	21,032	432.2 (306–561)	415.6 (325–509)	83.1 (52–118)	1.7 (–18–43)	1.8 (0–5)
Indigenous population						
No intervention, number of cases		13145.4 (12405–13916)	6814.2 (6302–7329)	1363.4 (1151–1585)	35.3 (5–74)	24.3 (2–56)
Seasonal vaccination of ≥60, number of cases averted	37,795	3000.0 (2451–3603)	1803.9 (1473–2167)	362.0 (248–483)	9.2 (–15–38)	6.5 (1–26)

GP = general practitioner visit, ED = emergency department, H = hospitalisation, ICU = intensive care unit admission.

Table 3: Number needed to vaccinate to avert each clinical outcome compared to the no-intervention strategy.

Vaccination strategy	GP	ED	H	ICU	Death
General population					
Year-round vaccination of at-risk ≥60 with others ≥75	52	73	366	14,726	18,602
Seasonal vaccination of at-risk ≥60, others ≥75	45	63	317	13,282	15,697
Seasonal vaccination of at-risk ≥60 with others ≥70	50	72	359	14,664	18,490
Seasonal vaccination of at-risk ≥60 with others ≥65	54	84	419	16,492	21,989
Seasonal vaccination of ≥60	58	97	483	18,728	26,220
Seasonal vaccination of ≥75	49	51	253	12,372	11,684
Indigenous population					
Seasonal vaccination of ≥60	13	21	104	4108	5,815

GP = general practitioner visit, ED = emergency department, H = hospitalisation, ICU = intensive care unit admission.

Figure 2: Cost-effectiveness planes from probabilistic sensitivity analysis of vaccination strategies for the general population (top) and the Indigenous population (bottom) compared to no vaccination. For the general population, vaccination of adults aged ≥75 years and at-risk adults aged ≥60 years was modelled. For the Indigenous population, vaccination of adults aged ≥60 years was modelled.