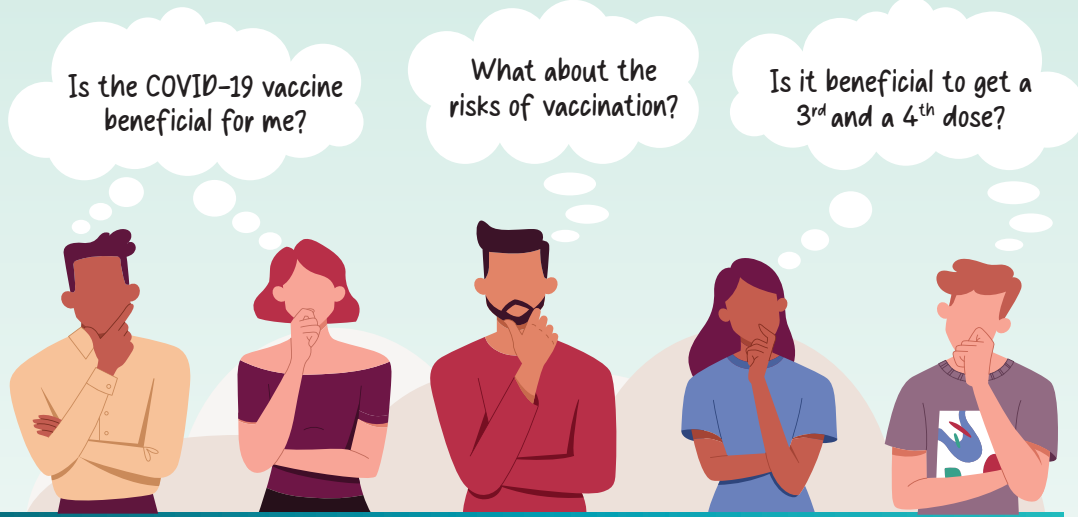


Benefits of mRNA COVID-19 vaccines for Omicron outweigh risks regardless of age, sex, or comorbidities

Vaccine hesitancy is a serious public health concern, hampering the uptake of vaccines to mitigate the spread of COVID-19



COVID-19 Burden in Quality Adjusted Life Years (QALY)^{1#}
 QALY loss/100,000 unvaccinated population

Age (years)	Male with comorbidities	Male without comorbidities	Female with comorbidities	Female without comorbidities
18-29	214.6	176.3	228.4	193.9
30-49	443.0	328.7	451.7	355.3
50-64	1069.3	679.4	1040.6	718.3
≥65	1666.8	1354.8	1745.9	1519.6

¹This study was conducted by the Johns Hopkins School of Medicine and Public Health independently, without any external financial support.

Weighing the benefits of MRNA COVID-19 vaccines vs the risks¹



Benefit-risk Comparison in QALY¹



Benefit-risk difference* per 100,000 vaccines after primary doses vs no vaccines
(Day 14–149 after the second of the two primary doses)¹

Age (years)	Male with comorbidities		Male without comorbidities		Female with comorbidities		Female without comorbidities	
	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2
18-29	98.8	94.2	73.9	71.2	104.6	99.2	82.2	78.5
30-49	226.9	210.8	152.6	142.2	226.7	210.1	164.0	152.3
50-64	605.6	558.2	352.2	324.2	577.5	531.5	368.0	338.1
≥65	912.5	835.2	709.7	647.9	939.8	858.5	792.7	722.7



Benefit-risk difference* per 100,000 vaccines after 3rd dose vs no 3rd dose
(Day 7–119 after 3rd dose vs Day 150–262 since 2nd dose)¹

Age (years)	Male with comorbidities		Male without comorbidities		Female with comorbidities		Female without comorbidities	
	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2
18-29	75.1	62.7	60.1	49.3	78.6	65.7	65.2	53.6
30-49	153.8	131.9	109.1	92.0	154.2	131.9	116.5	98.3
50-64	383.9	336.0	231.6	199.9	367.9	321.2	242.0	208.7
≥65	575.8	503.1	454.0	394.2	594.5	518.5	506.1	439.5



Benefit-risk difference* per 100,000 vaccines after 4th dose vs no 4th dose
(Day 7–119 after 4th dose vs Day 120–232 since 3rd dose)¹

Age (years)	Male with comorbidities		Male without comorbidities		Female with comorbidities		Female without comorbidities	
	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2	mRNA-1237	BNT162b2
18-29	40.1	35.0	31.2	27.4	43.2	37.2	34.9	30.4
30-49	91.8	76.9	64.3	54.1	92.8	77.5	69.6	58.3
50-64	237.5	196.5	143.5	118.8	228.8	189.1	151.2	124.8
≥65	366.4	300.6	291.2	238.4	381.0	312.0	326.5	266.8

*Benefit-risk difference = Incremental QALY gained by vaccination - Decremental QALY lost by vaccination



Takeaway messages

- ✓ The benefits of mRNA vaccines are much larger than the risks, for both the primary series and the booster doses, across all ages, sexes, and the presence or absence of comorbidities, even considering the reduced disease severity of the Omicron variant.
- ✓ The benefit-risk differences were larger for mRNA-1237 than BNT162b2 across all age, sex, and comorbidity groups.

References:

1. Kitano T, et al. Risk and benefit of mRNA COVID-19 vaccines for Omicron variant by age, sex and presence of comorbidity: a quality-adjusted life years analysis. *Am J Epidemiol* 2023; Mar 14;kwad058.

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