Results of COVID-19 Vaccine Effectiveness Studies: An Ongoing Systematic Review

Weekly Summary Tables

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1. Summary of Study Results for Post-Authorization COVID-19 Vaccine Effectiveness#

(Detailed methods available on VIEW-hub Resources page: https://view-hub.org/resources)

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
322	Schrag et al* (September 26, 2022)	USA	Test-negative case control	4517 ED/UC encounters and 975 hospitalizations among pregnant persons (aged 18-45) across 10 states	Omicron^	Included	BNT162b2 or mRNA-1273	Emergency Dept/Urgent Care encounter	16 (-22-42)	14+	~55 weeks
									3 (-49-37)	14-149	
									42 (-16-72)	150+	
								Hospitalization	77 (28-93)	14+	
									86 (41-97)	14-149	
									64 (-102-93)	150+	
					Delta^			Emergency Dept/Urgent Care encounter	83 (68-91)	14+	~45 weeks
									84 (69-92)	14-149	
									75 (5-93)	150+	
								Hospitalization	98 (96-99)	14+	
									99 (96-100)	14-149	
									96 (86-99)	150+	
321	Copur et al* (September 28, 2022)	Turkey	Retrospective cohort	1,911 healthcare workers	Alpha^	Excluded	CoronaVac	Documented infection	65 (50-75)	14+	~15 weeks
320	Más-Bermejo et al* (September 23, 2022)	Cuba	Retrospective cohort	53,638 individuals aged ≥19 years	Delta^	Excluded	Abdala	Severe disease	98.2 (97.9-98.5)	14+	~20 weeks
								Death	98.7 (98.3-99)		
319	Xu et al (September 20, 2022)	Sweden	Retrospective cohort	2,291,504 adults aged 65+	Non-VOC, Alpha, Delta, Omicron^	Included	BNT162b2	Documented infection	85.8 (83.8-88.2)	28+	~51 weeks
									18.2 (2.2-31.6)	350-371	
								Hospitalization	87.2 (83.6-90.0)	28+	
									68.5 (45.5-81.8)	350-371	
							mRNA-1273	Documented infection	94.6 (89.6-97.2)	28+	
									11.8 (-55.5-50.0)	350-371	
								Hospitalization	96.0 (89.5-98.5)	28+	
									21.5 (-89.2-67.4)	350-371	
							AZD1222	Documented infection	43.6 (1.9-67.6)	28+	~39 weeks
									-2.3 (-627.9-85.6)	266-287	
								Hospitalization	74.6 (-5.0-93.9)	28+	
									28.7 (-37.6-63.0)	238-259	
318	Chung et al* (September 7,2022)	Canada	Test-negative case control	1,387,462 individuals aged 16+	Non-VOC, Alpha^	Excluded	BNT162b2 or mRNA-1273	Documented infection	89 (88-90)	7-59	~15 weeks
									80 (75-85)	60-119	
								Symptomatic disease	94 (91-96)	7-59	
									93 (79-98)	60-119	
								Severe disease	95 (90-97)	7-59	
				881,270 individuals aged 16+	Alpha^		BNT162b2 or mRNA-1273	Documented infection	92 (91-93)	7-59	~24 weeks
									82 (79-85)	120-179	
								Symptomatic disease	92 (91-94)	7-59	
									86 (78-91)	120-179	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								Severe disease	94 (92-95)	7-59	
									97 (95-98)	60-119	
							AZD1222	Documented infection	89 (84-93)	7-59	
								Symptomatic disease	94 (84-97)		
								Severe disease	92 (79-97)		
				1,426,940 individuals aged 16+	Delta^		BNT162b2 or mRNA-1273	Documented infection	90 (90-90)	7-59	~42 weeks
									78 (76-80)	≥240	
								Symptomatic disease	94 (94-95)	7-59	
									88 (86-90)	≥240	
								Severe disease	98 (98-99)	7-59	
									98 (95-99)	≥240	
							AZD1222	Documented infection	89 (88-91)	7-59	
									90 (59-98)	180-239	
								Symptomatic disease	95 (93-96)	7-59	
									90 (88-91)	120-179	
								Severe disease	98 (97-99)	7-59	
									98 (97-99)	120-179	
317	Martin et al* (September 10, 2022)	UK	Prospective cohort	1105 patients with end-stage kidney disease undergoing hemodialysis in London	Non-VOC, Alpha, Delta††	Included	BNT162b2	Documented infection	62 (18-82)	14+	~46 weeks
							AZD1222		42 (-22-70)		
316	Collie et al* (September 14, 2022)	South Africa	Test-negative case control	32,883 hospitalized adults (18+)	**Omicron BA.1 or BA.2^**	Included	BNT162b2	Hospitalization	80.3 (62.8-89.5)	14-27	~36 weeks
									38.4 (16.9-54.4)	7-8 mos	
					Omicron BA.4 or BA.5^				47.4 (19.9-65.5)	3-4 mos	~53 weeks
									19.3 (6.3-30.5)	9+ mos	
315	Chatzilena et al (September 12, 2022)	UK	Test-negative case control	8543 hospitalized adults (18+) in Bristol	Delta^	Excluded	BNT162b2	Hospitalization	82.5 (76.2-87.2)	7+	~56 weeks
									91.5 (83.1-96.2)	≤3 months	
									79.5 (71.5-85.3)	>3 months	
314	Mallah et al* (September 10, 2022)	Spain	Test-negative case control	909,636 persons aged 11+ y In Galicia	Alpha, Delta††	Excluded	BNT162b2 or mRNA-1273	Documented infection	72 (71-73)	7+	~42 weeks
								Hospitalization *Note: Includes some booster recipients*	74 (70-77)		
313	Chico-Sanchez et al* (August 31, 2022)	Spain	Test-negative case control	6364 HCW in the Valencian	Non-VOC, Alpha^	Included	BNT162b2	Documented infection	91.6 (89.6-93.2)	12-120	~22 weeks
									71.5 (67-75.5)	>120	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				Autonomous Community			mRNA-1273	Documented infection	95.2 (88.3-98.1)	12-120	
									88.3 (75.7-94.4)	>120	
							BNT162b2 or mRNA-1273	Hospitalization	96.8 (76.1-99.6)	12+	
312	Huang et al (Septmember 9, 2022)	China	Matched case control	612,597 cases aged ≥3 years	Omicron^	Excluded	Ad5-nCoV	Documented infection	13.2 (10.9-15.5)	14+	~62 weeks
								Severe/critical illness	77.9 (15.6-94.2)		
							Inactivated vaccine (BBIBP-CorV or CoronaVac)	Documented infection	16.3 (15.4-17.2)		
								Severe/critical illness	88.6 (85.8-90.9)		
								Death	91.7 (86.9-94.7)		
311	Monge et al* (September 2 ,2022)	Spain	Case cohort	14,777 adults aged 50-59 years	Delta^	Included	BNT162b2	Documented infection	77 (76-77)	14+	~21 weeks
								Symptomatic infection	77 (76-78)		
								Hospitalization	97 (97-98)		
								Death	97 (93-99)		
							mRNA-1273	Documented infection	87 (86-87)		
								Symptomatic infection	89 (88-90)		
								Hospitalization	98 (97-99)		
								Death	94 (75-99)		
							AZD1222	Documented infection	59 (56-61)		
								Symptomatic infection	59 (55-62)		
								Hospitalization	96 (93-98)		
							Ad26.COV2.S	Documented infection	64 (62-66)		
								Symptomatic infection	56 (53-59)		
								Hospitalization	86 (83-89)		
								Death	89 (64-97)		
							AZD1222 + any mRNA	Documented infection	88 (85-91)		
								Symptomatic infection	82 (75-87)		
								Hospitalization	98 (84-100)		
310	Penayo et al* (June 2022)	Paraguay	Test-negative case control	2,458 cases and 2,054 controls 18+ years with severe acute respiratory illness (SARI)	Delta^	Included	BNT162b2	Hospitalization with SARI	91.9 (72.2-97.6)	14+	~37 weeks
							mRNA-1273		76.1 (-127.4-97.5)		
							AZD1222		83.0 (66.3-91.5)		
							Sputnik V		83.2 (48.9-94.5)		
							Hayat vax		31.8 (-41.2-67.1)		
							Covaxin		25.8 (-37.1-59.9)		
					Omicron^		BNT162b2		49.5 (9.9-71.7)	14+	~52 weeks
									78.0 (-97.0-97.5)	14-89	
							mRNA-1273		42.1 (-105.4-83.7)	14+	
							AZD1222		10.1 (-31.0-38.3)	14+	
							Sputnik V		25.7 (-29.9-57.5)	14+	
									64.4 (-44.6-92.2)	14-89	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							Hayat vax		40.4 (-5.1-66.2)	14+	
							Covaxin		13.0 (-45.8-48.0)	14+	
309	Barraza et al* (August 5, 2022)	Chile	Retrospective cohort	3282 cases and 3199 controls	Gamma, Delta and Omicron^	Included	BNT162b2	Hospitalization with severe acute respiratory infection	80.3 (68.9-87.5)	14+	~72 weeks
							AZD1222		72.4 (32.8-88.6)		
							CoronaVac		54.5 (45.2 – 62.3)		
308	Suphanchaimat et al* (July 5,2022)	Thailand	Test-negative case control	558,865 cases and 1,139,723 controls aged 18+	Delta^	Included	BNT162b2	Documented infection	74.2 (71.8-76.3)	15-29	~2 weeks
									57 (43.6-57.2)	90+	~15 weeks
							AZD1222		61.4 (59.6-63.2)	15-29	~2 weeks
									25.8 (19.1- 31.9)	90+	~31 weeks
							CoronaVac		27.9 (0.3-47.9)	15-29	~2 weeks
									49.8 (47.8-51.6)	90+	~40 weeks
							AZD1222 + BNT162b2		79.9 (74-84.5)	15-29	~2 weeks
									77.4 (68.2-84)	90+	~19 weeks
							CoronaVac + AZD1222		57.8 (56.3-59.2)	15-29	~2 weeks
									36.6 (33.6-39.4)	90+	~39 weeks
							CoronaVac + BNT162b2		74.7 (62.8-82.8)	15-29	~2 weeks
									84.6 (64.9-89.3)	90+	~19 weeks
307	Lind et al (August 26,2022)	USA	Test-negative case control	241,654 individuals aged ≥16 years	Alpha^	Excluded	BNT162b2 or mRNA-1273	Documented infection	84.4 (75.5-90.0)	14-89	~29 weeks
									96.5 (75.1-99.5)	90-149	
								Symptomatic disease	86.6 (75.5-92.7)	14-89	
									93.8 (55.0-99.1)	90-149	
								Hospitalization	85.5 (65.5-93.9)	14-89	
									82.2 (-34.5-97.7)	90-149	
					Delta^			Documented infection	68.9 (58.0-77.1)	14-89	
									37.1 (24.0-48.1)	150+	
								Symptomatic disease	74.8 (62.9-82.9)	14-89	
									48.4 (32.8-60.4)	150+	
								Hospitalization	85.4 (60.2-94.6)	14-89	
									66.2 (42.5-80.1)	150+	
306	Lim et al* (August 24,2022)	Malaysia	Test-negative case control	14,199 individuals aged ≥18 years	Alpha, Delta^	Excluded	BNT162b2	Documented infection	58.9 (40.7-71.9)	14-27	~28 weeks
									31.3 (10.8-47.2)	98-111	
								ICU admission	92.5 (72.3-98.8)	14+	
								Death	96.5 (82.3-99.8)		
			Retrospective cohort					Documented infection	87.9 (86.3-89.4)		
								ICU admission	97.5 (81.2-99.6)		
								Death	99.3 (96.3-100)		
305	Cocchio et al* (August 20, 2022)	Italy	Retrospective cohort	122,213 children aged 5-11 years	Omicron^	Excluded	BNT162b2	Documented infection	53 (51-55)	14-34	~38 weeks
									23 (20-26)	70+	
				96,072 adolescents aged 12-17 years					59 (55-62)	14-34	
									8 (5-11)	70+	
							mRNA-1273		55 (49-61)	14-34	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									20 (15-24)	70+	
				141,003 adolescents aged 12-17 years	Delta^		BNT162b2		88 (85-91)	14-34	
									82 (74-88)	70+	
							mRNA-1273		90 (68-97)	14-34	
									96 (86-99)	35-69	
304	Tsang et al (August 25, 2022)	Hong Kong SAR	Prospective cohort	8636 individuals aged 5+ y	**Omicron BA.2^**	Excluded	BNT162b2	Documented infection	27.6 (-6.3-50.7)	14-89	~55 weeks
									1.1 (-22.4-20.1)	90+	
								Symptomatic disease	31.6 (-9.3-57.2)	14-89	
									4.7 (-23.5-26.6)	90+	
							CoronaVac	Documented infection	22.7 (-15.2-48.2)	14-89	
									5.4 (-25.6-28.8)	90+	
								Symptomatic disease	12.2 (-40-44.9)	14-89	
									6.4 (-32.1-33.7)	90+	
303	Wan et al* (August 17, 2022)	Hong Kong SAR	Case-Control	82,587 cases of COVID-19 infection, 10,241 cases of COVID-19 related hospital admission, 539 cases of ICU admission in patients with Diabetes Mellitus (DM) aged ≥12 y	**Omicron BA.2^**	Excluded	BNT162b2	Documented infection	22.1 (20-24.2)	14+	~53 weeks
								Hospitalization	74.2 (71.7-76.4)		
								ICU admission	82.3 (72.1-88.8)		
							CoronaVac	Documented infection	-0.3 (-2.7 -2.1)		
								Hospitalization	64.2 (61.8-66.4)		
								ICU admission	58.1 (45-68.1)		
302	Powell et al (August 22, 2022)	UK	Test-negative case control	1,161,704 tests among adolescents (aged 11-17 y) in England	**Omicron^**	Excluded	BNT162b2	Symptomatic disease	64.5 (63.6-65.4)	14-104	~38 weeks
									25.7 (-4.2-47.0)	280-286	
					Delta^	Excluded	BNT162b2	Symptomatic disease	91.8 (91.2-92.3)	14-104	~37 weeks
									71.9 (67.9-75.4)	175-279	
301	Yan et al* (August 18, 2022)	Hong Kong, SAR	Case control	9021 cases and 89,440 controls among adults aged 18+ y	**Omicron BA.2^**	Excluded	BNT162b2	Severe disease (18-50 y)	73.7 (54.2-84.9)	14+	~52 weeks
								Severe disease (51-64 y)	84.5 (72.2-91.4)		
								Severe disease (65+ y)	81.9 (74.4-87.2)		
								Death (18-50 y)	84.2 (67.3-92.4)		
								Death (51-64 y)	86.9 (80.3-91.3)		
								Death (65+ y)	90.6 (88.5-92.4)		
							CoronaVac	Severe disease (18-50 y)	72.6 (40.1-87.5)		
								Severe disease (51-64 y)	67.8 (48.7-79.7)		
								Severe disease (65+ y)	56.7 (47.4-64.4)		
								Death (18-50 y)	83.7 (57.9-93.7)		
								Death (51-64 y)	78.1 (69.4-84.3)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								Death (65+ y)	72.5 (69.9-74.9)		
300	Kim et al* (Augut 17, 2022)	South Korea	Retrospective cohort	3,203,985 adolescents aged 12-18	Delta, Omicron††	Excluded	BNT162b2	Documented infection (12-15 y)	76.6 (74.3-78.6)	14-29	~6 weeks
									49.6 (45.9-53.2)	30-59	
								Documented infection (16-17 y)	83.5 (81.3-85.4)	14-29	~11 weeks
									41.8 (35.3-47.6)	60-89	
								Documented infection (18 y)	82.8 75.1-88.1)	14-29	~22 weeks
									28.9 (20.6-36.4)	90+	
299	Risk et al* (August 16,2022)	USA	Retrospective cohort	162,805 immunocompetent and 5,609 immunosuppressed individuals aged ≥18 years	Omciron^	Included	BNT162b2	Documented infection (immunosuppressed)	13 (-23-39)	14+	~56 weeks
								Documented infection (immunocompetent)	-6 (-16-4)		
								Hospitalization (all)	67 (51-78)		
							mRNA-1273	Documented infection (immunosuppressed)	57 (29-74)		
								Documented infection (immunocompetent)	16 (5-26)		
								Hospitalization (all)	79 (63-88)		
							BNT162b2 or mRNA-1273	Hospitalization (immunosuppressed)	85 (62-94)		
								Hospitalization (immunocompetent)	68 (53-78)		
								ICU admission	92 (66-98)		
298	Cheng et al* (August 11,2022)	Hong Kong, SAR	Retrospective cohort	103,143 patients with chronic kidney disease (CKD) in Hong Kong	Omicron††	Excluded	BNT162b2 *Note: Includes some 3-dose recipients*	Documented infection	38 (34-41)	14+	~51 weeks
								Hospitalization	64 (57-69)		
								Death	86 (80-90)		
							CoronaVac *Note: Includes some 3-dose recipients*	Documented infection	4 (0-8)		
								Hospitalization	44 (37-91)		
								Death	70 (64-75)		
297	Lewis et al* (July 27, 2022)	USA	Retrospective cohort	94,516 individuals (aged 12+) with prior SARS-CoV-2 infection in Rhode Island	Non-VOC, Alpha, Delta^	Previously infected persons only	BNT162b2 or mRNA-1273	Documented infection	64 (58-69)	14+	~46 weeks
							Ad26.COV2.S		48 (26-63)		
				3124 LTCF residents (12+) with prior SARS-CoV-2 infection in Rhode Island			BNT162b2 or mRNA-1273		49 (26-65)		
							Ad26.COV2.S		57 (-211-94)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				2877 LCTF employess (12+) with prior SARS-CoV-2 infection in Rhode Island			BNT162b2 or mRNA-1273		52 (26-68)		
							Ad26.COV2.S		-68 (-415-45)		
296	El Adam et al* (April 15, 2022)	Canada	Test-negative case control	8722 HCWs (aged 18+) in British Columbia	Alpha, Gamma, Delta^	Excluded	BNT162b2	Documented infection	89 (87-91)	14+	~34 weeks
							mRNA-1273		93 (90-95)		
							Heterologous mRNA		92 (86-95)		
							Any mRNA		90 (88-92)	14+	
									99 (90-100)	14-20	
									82 (75-87)	196+	
295	Zambrano et al* (August 4,2022)	USA	Test-negative case control	160 cases and 272 controls aged 12-18 years	Omicron^	Included	BNT162b2	Hospitalization with MIS-C	92 (71-98)	28+	~40 weeks
					Delta^				94 (83-98)		
					Delta and Omicron^				90 (75-96)	28-120	
									92 (78-97)	≥120	
				144 cases and 230 controls aged 5-11 years					78 (48-90)	28+	~16 weeks
294	Pinto-Álvarez (August 6,2022)	Colombia	Nested cohort	6963 solid organ transplant recipients aged ≥16 years	Mu, Delta and Omicron^	Excluded	BNT162b2	Documented infection	73.4 (68.6-77.5)	15+	~56 weeks
								Hospitalization	85.4 (80.1-89.3)		
								Death	93.4 (89.8-95.7)		
							mRNA-1273	Documented infection	28.1 (0-48.9)		
								Hospitalization	85.2 (64.6-93.8)		
								Death	96.9 (76.5-99.6)		
							AZD1222	Documented infection	67.9 (57.9-75.5)		
								Hospitalization	82.5 (70.9-89.5)		
								Death	93.8 (86.4-97.1)		
							CoronaVac	Documented infection	74.2 (68.3-79.1)		
								Hospitalization	83.3 (75.3-88.7)		
								Death	92.6 (87.5-95.6)		
							Ad26.COV2.S	Documented infection	73.7 (65.2-80.1)		
								Hospitalization	88.4 (77.4-94.0)		
								Death	97.1 (87.9-99.3)		
293	Tartof et al* (August 3, 2022)	USA	Test-negative case control	3168 adolescents aged 12 to 17 years	Omicron specifically^	Included	BNT162b2	ED or UC encounters	73 (54-84)	<60	~44 weeks
									16 (-7-34)	≥180	
						Excluded			72 (52-84)	<60	
									18 (-6-36)	≥180	
					Delta	Included			89 (69-96)	<60	
									49 (27-65)	≥180	
						Excluded			88 (68-96)	<60	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									47 (23-63)	≥180	
292	Arashiro et al* (Augsut 3, 2022)	Japan	Case control	5975 individuals aged 20+	Omicron^	Included	BNT162b2 or mRNA-1273	Symptomatic disease	55 (34-69)	14-89	~54 weeks
									52 (37-63)	180+	
					Delta				88 (80-92)	14-89	
									86 (35-97)	90-180	
291	Piche-Renaud et al (August 1,2022)	Canada	Test-negative case control	12,037 children aged 5-11 years	Omicron specifically^	Included	BNT162b2	Symptomatic disease	67 (60-72)	7-29	~16 weeks
									35 (21-46)	90+	
								Hospitalization or death	94 (56-99)	7-29	
									74 (44-88)	60+	
290	Mayr et al* (June 22, 2022)	USA	Test-negative case control	4.8 million veterans	Non-VOC, Alpha, Delta††	Excluded	BNT162b2	Symptomatic disease (all ages)	76.1 (71.1-80.2)	14 d-1 mo	2 weeks
									0.1 (-10.9-10.1)	7 mos	~26 weeks
								Symptomatic disease (<65 y)	81.6 (75.9-85.9)	14 d-1 mo	2 weeks
									22.5 (7.2-35.2)	7 mos	~26 weeks
								Symptomatic disease (65+ y)	66.3 (55.7-74.4)	14 d-1 mo	2 weeks
									-23.3 (-40.5 to -8.2)	7 mos	~26 weeks
								Hospitalization (all ages)	72.9 (61.7-80.7)	14 d-1 mo	2 weeks
									19.8 (2.5-34.1)	7 mos	~26 weeks
								Hospitalization (<65 y)	85.6 (72.6-92.4)	14 d-1 mo	2 weeks
									57 (31.2-73.2)	7 mos	~26 weeks
								Hospitalization (65+ y)	61 (41.3-74.2)	14 d-1 mo	2 weeks
									1.7 (-22-20.8)	7 mos	~26 weeks
								ICU admission or death (all ages)	74.7 (54.2-86)	14 d-1 mo	2 weeks
									39.5 (17.6-55.6)	7 mos	~26 weeks
								ICU admission or death (<65 y)	87.6 (61-96.1)	14 d-1 mo	2 weeks
									66.4 (7.7-87.8)	7 mos	~26 weeks
								ICU admission or death (65+ y)	67.4 (32.6-84.3)	14 d-1 mo	2 weeks
									29.3 (2.3-48.9)	7 mos	~26 weeks
							mRNA-1273	Symptomatic disease (all ages)	84.6 (80.5-87.8)	14 d-1 mo	2 weeks
									46.6 (40.8-51.9)	7 mos	~26 weeks
								Symptomatic disease (<65 y)	89.7 (84.8-93)	14 d-1 mo	2 weeks
									57.3 (48.4-64.7)	7 mos	~26 weeks
								Symptomatic disease (65+ y)	78.4 (71.1-83.9)	14 d-1 mo	2 weeks
									36.2 (27.7-43.6)	7 mos	~26 weeks
								Hospitalization (all ages)	76.6 (63.9-84.8)	14 d-1 mo	2 weeks
									71.3 (64-77.1)	7 mos	~26 weeks
								Hospitalization (<65 y)	92 (76.1-97.3)	14 d-1 mo	2 weeks
									83.1 (66.8-91.4)	7 mos	~26 weeks
								Hospitalization (65+ y)	66.1 (45.3-79)	14 d-1 mo	2 weeks
									64.7 (55.2-72.3)	7 mos	~26 weeks
									80.5 (64.1-89.4)	14 d-1 mo	2 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								ICU admission or death (all ages)	77.2 (68.4-83.5)	7 mos	~26 weeks
								ICU admission or death (<65 y)	89.2 (49.5-97.7)	14 d-1 mo	2 weeks
									84.4 (59-94.1)	7 mos	~26 weeks
								ICU admission or death (65+ y)	75.4 (51.7-87.5)	14 d-1 mo	2 weeks
									73.8 (62.9-81.5)	7 mos	~26 weeks
							Ad26.COV2.S	Symptomatic disease (all ages)	25.4 (2.9-42.6)	14 d-1 mo	2 weeks
									25.5 (-2.2-45.6)	7 mos	~26 weeks
								Hospitalization (all ages)	55.8 (20.6-75.4)	14 d-1 mo	2 weeks
									16.9 (-90.9-63.8)	7 mos	~26 weeks
								ICU admission or death (all ages)	61.1 (11.9-82.8)	14 d-1 mo	2 weeks
									63.3 (-15.5-88.3)	7 mos	~26 weeks
289	Chemaitelly et al (July 26, 2022)	Qatar	Retrospective cohort	35,806 children aged 12-17 years	Omicron^	Excluded	BNT162b2	Documented infection	51.3 (34.9-63.6)	14+	~25 weeks
									-1.7 (-20- 10)	172+	~73 weeks
				37,456 children aged 5-11 years			BNT162b2		49.6 (28.5-64.5)	14-43	~4 weeks
									-9.5 (-30- 35)	104+	~17 weeks
				46,634 children aged 12-17 years	Alpha and Delta^		BNT162b2		95.3 (92-97.2)	14-30	~4 weeks
									70.6 (18-92)	134+	~41 weeks
288	Mazagatos et al*(July 26,2022)	Spain	Test-negative case control	1772 SARI patients aged 20 and older	Alpha and Delta^	Included	BNT162b2 or mRNA-1273	Hospitalization in 20-59 year olds	92 (78-97)	14+	~19 weeks
									95 (82-98)	<90	
									91 (50-98)	>152	
								Hospitalization in 60-69 year olds	97 (86-99)	14+	
									97 (87-99)	<90	
									96 (47-100)	>152	
								Hospitalization in 70-79 year olds	98 (90-100)	<90	~23 weeks
									91 (24-99)	>152	
								Hospitalization in 80+ year olds	86 (70-94)	<90	~33 weeks
									48 (-51-82)	>152	
							Ad26.COV2.S	Hospitalization in 20-59 year olds	71 (-3 – 92)	14+	~19 weeks
								Hospitalization in 60-69 year olds	82 (-78-98)		
							AZD1222	Hospitalization in 60-69 year olds	89 (25-98)		
287	Tan et al* (July 20,2022)	Singapore	Retrospective cohort	225,280 children aged 5-11 years	Omicron^	Excluded	BNT162b2	All confirmed infections (PCR or antigen)	48.8 (46.9-50.8)	7-14	~9 weeks
									25.6 (19.3-31.5)	>60	
								PCR-confirmed infection	70.6 (65.9-74.7)	7-14	
									42.7 (12-62.7)	>60	
								Hospitalization	87.8 (72.2-94.7)	7-14	
									80.4 (67-88.4)	30-59	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
286	Hatfield et al* (July 20,2022)	USA	Retrospective cohort	4,315 nursing home residents	Non-VOC, Alpha^	Excluded	BNT162b2	Documented infection	67 (40-82)	7-157	~44 weeks
							mRNA-1273		75 (32-91)		
					Delta^		BNT162b2		33 (-2-56)	>157	
							mRNA-1273		77 (48-91)		
285	Cerqueira-Silva et al* (July 18,2022)	Brazil	Test-negative case control	2,471,576 individuals aged 18+	**Omicron^**	Included	CoronaVac	Symptomatic infection	-0.7 (-1.6-0.2)	14-180	~59 weeks
									3.2 (2.1-4.2)	>180	
								Hospitalization or death	64.5 (62.6-66.3)	14-180	
									61.8 (60.3-63.2)	>180	
								Death	67.8 (64-71.3)	14-180	
									63.1 (60.9-65.1)	>180	
284	Link-Gelles et al (July 15,2022)	USA	Test-negative case control	159,432 ED/UC encounters and hospitalizations in adults aged 18+	**Omicron BA.1^**	Excluded	BNT162b2 or mRNA-1273	ED/UC encounter	47 (44-50)	14-140	~44 weeks
									39 (37-41)	≥150	
								Hospitalization	68 (63-73)	14-140	
									61 (58-63)	≥150	
				113,837 ED/UC encounters and hospitalizations in adults aged 18+	**Omicron BA.2^**			ED/UC encounter	59 (40-71)	14-140	
									18 (10-26)	≥150	
								Hospitalization	57 (19-77)	14-140	
									24 (12-35)	≥150	
283	Guedalia et al (July 11, 2022)	Israel	Retrospective cohort	82,803 pregnant women aged 16+	**Omicron BA.1^**	Excluded	BNT162b2	Hospitalization	-12 (-36-8)	0+	~60 weeks
								Hospitalization with moderate disease	51 (-47-84)		
								Severe disease	83 (-47-98)		
					Delta^			Hospitalization	61 (51-69)		~44 weeks
								Hospitalization with moderate disease	97 (92-99)		
								Severe disease	96 (86-99)		
282	Stephenson et al* (July 11, 2022)	USA	Retrospective cohort	2315 hospitalized individuals aged 18+	Non-VOC, Alpha††	Included	BNT162b2 or mRNA-1273	Hospitalization	85 (81-89)	14+	~18 weeks
281	Kerr et al* (July 9,2022)	Scotland	Test-negative case control	269,712 individuals aged 18+	Delta and Delta plus (AY.4.2)^	Unknown	BNT162b2	Symptomatic infection	78.7 (69.9-85)	14+	~38 weeks
							mRNA-1273		93.7 (86.4-97.1)		
							AZD1222		54.5 (35.7-67.8)		
280	Tonnara et al* (July 4, 2022)	Republic of San Marino	Retrospective cohort	18,109 individuals aged ≥18 years	Alpha and Delta^	Excluded	Sputnik V	Documented infections	91.8 (86.3-95.1)	7-59	~27 weeks
									57.8 (42.2-69.2)	120+	
								Hospitalization	95.2 (79.1-98.9)	7-59	
									89.7 (52.7-97.7)	120+	
					Alpha^			Documented infections	97.3 (94.2-98.7)	7+	~15 weeks
								Hospitalization	96.9 (86.5-99.3)	7+	
279	Paternina-Caicedo et al*	Colombia	Retrospective cohort	7,19,735 adults aged ≥40 years	Mu^	Excluded	BNT162b2	Symptomatic disease	13 (5.3-20)	14+	~25 weeks
								Hospitalization	45.5 (29.4-58)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	(July 1, 2022)							Critical care admission	82.2 (60.1-92.1)		
								Death	94.1 (76.4-98.5)		
							CoronaVac	Symptomatic disease	-45.1 (-53.6- -37.1)		
								Hospitalization	-3 (-18-10.2)		
								Critical care admission	13.6 (-13.2-34)		
								Death	20.6 (-0.5-37.3)		
278	Tartof et al (June 30, 2022)	USA	Test-negative case control	29,507 hospital admissions and 36,306 ED admissions in individuals aged ≥18 years	**Omicron BA.1 specifically^**	Included	BNT162b2	Hospitalization	54 (38-65)	<6 months	~70 weeks
									32 (16-45)	≥6 months	
								ED admissions	42 (31-52)	<6 months	
									19 (6-31)	≥6 months	
					Omicron BA.2 specifically^			Hospitalization	56 (-2-81)	<6 months	
									56 (28-73)	≥6 months	
								ED admissions	27 (-11-52)	<6 months	
									12 (-10-31)	≥6 months	
277	Ionescu et al (June 28, 2022)	Canada	Test-negative case control	193,899 tests among adolescents aged 12-17 in Quebec	**Omicron^**	Excluded	BNT162b2	Documented infection	41.9 (37.7-45.8)	14+	~26 weeks
									75.6 (65.8-82.6)	14-27	2 weeks
									33.9 (27.4-39.9)	168-195	~26 weeks
								Symptomatic disease	55.2 (49.5-60.3)	14+	
					Delta, **Omicron^**			Documented infection	82.8 (81-84.4)	14+	~22 weeks
									83.1 (68.9-90.8)	14-27	2 weeks
									75.4 (72.1-78.4)	140-167	~22 weeks
								Symptomatic disease	87.9 (86.1-89.5)	14+	
					Delta^			Documented infection	95.5 (95-96)	14+	~18 weeks
									97.7 (96.2-98.6)	14-27	2 weeks
									92.4 (90.4-94)	112-139	~18 weeks
								Symptomatic disease	97.3 (96.8-97.7)	14+	
				60,903 tests among adolescents aged 12-17 in British Columbia	**Omicron^**			Documented infection	33.9 (25.7-41.1)	14+	~26 weeks
									63.4 (21.4-83)	14-27	2 weeks
									22.2 (8.4-33.9)	168-195	~26 weeks
					Delta, **Omicron^**				88 (85.1-90.3)	14+	~22 weeks
									94.8 (83.7-98.4)	28-55	~6 weeks
									84.2 (77.8-88.8)	140-167	~22 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
					Delta^				95.7 (95.1-96.2)	14+	~18 weeks
									96.8 (94.4-98.2)	14-27	2 weeks
									90.9 (87.7-93.2)	112-139	~18 weeks
276	Cohen-Stavi et al* (June 29, 2022)	Israel	Target trial emulation	94,728 matched pairs of children aged 5-11 years	**Omicron^**	Excluded	BNT162b2	Documented infection	51 (39-61)	7-21	1 week
								Symptomatic disease	48 (29-63)		
275	Carazo et al* (September 21, 2022) *[Published version of June 27 preprint]*	Canada	Test-negative case control	37,732 cases and 73,507 controls amongst HCWs in Quebec aged 18-59 years	**Omicron BA.2 specifically^**	Excluded	BNT162b2 or mRNA-1273	Documented infection	35 (27-42)	14+	~70 weeks
								Symptomatic disease	61 (52-69)		
274	Moline et al* (June 27,2022)	USA	Outbreak investigation	91 residents of skilled nursing facility aged 50+	Beta^	Excluded	BNT162b2 or mRNA-1273	Documented infection	65 (25-84)	14+	~12 weeks
273	Magro et al (June 22, 2022)	USA	Matched case control	4,238 skilled nursing facility healthcare personel aged 18-54 in California	Non-VOC, Alpha††	Included	BNT162b2 or mRNA-1273	Documented infection	71.7 (55.9-81.8)	14+	~10 weeks
						Excluded			72.7 (54.3-83.7)		
272	Adams et al (June 14,2022)	USA	Prospective test-negative case control	3,181 hospitalised patients aged ≥18 years	**Omicron specifically^**	Included	BNT162b2	Hospitalization	46 (30-58)	14+	~64 weeks
							mRNA-1273		47 (30-60)		
							BNT162b2 or mRNA-1273		40 (-668-95)		
							Ad26.COV2.S		41 (9-62)		
271	Gray et al * (June 9,2022) *[Published version of December 29,2021 preprint; see reference #17 in Table 2]*	South Africa	Test-negative case control	93,854 HCWs	**Omicron^**	Excluded	BNT162b2	Hospitalization	88 (62-96)	14-27	~30 weeks
									67 (63-71)	148-207	
								ICU admission	69 (56-79)	14-27	
									71 (65-76)	148-207	
270	Al Kaabi et al* (June 9, 2022)	UAE	Retrospective cohort	1,153,515 vaccinated individuals matched with 1,153,515 unvaccinated individuals (18+ years)	Non-VOC^	Excluded	BBIBP-CorV	Hospitalization	97.3 (95.7-98.3)	14+	~39 weeks
								Critical care admission	98.8 (95.3-99.7)		
								Death	100 (100-100)		
					Alpha^			Hospitalization	73.3 (70.6-75.7)		
								Critical care admission	79.1 (73.1-83.7)		
								Death	81.9 (66.9-90.1)		
					Delta^			Hospitalization	34.6 (14.2-50.2)		
								Critical care admission	49.6 (0-76.4)		
								Death	62.5 (31.4-79.5)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
269	European Centre for Disease Prevention and Control (March 14, 2022)	11 EU countries	Test-negative case control	4,828 hospitalized adults aged 30+	Non-VOC, Alpha†† (pre-Delta^)	Included	BNT162b2	Hospitalization	94 (88-97)	14+	~45 weeks
					Delta^		BNT162b2		82 (76-87)		
							AZD1222		79 (69-86)		
268	European Centre for Disease Prevention and Control (October 8, 2021)	10 EU countries	Test-negative case control	1456 hospitalized adults aged 65+	Non-VOC, Alpha†† (pre-Delta^)	Included	BNT162b2	Hospitalization	91 (80-96)	14+	~22 weeks
267	Lewis et al* (June 8, 2022)	USA	Test-negative case control	6208 adults (18+ years) hospitalized in 21 facilities across the US	Alpha, Delta^	Included	Ad26.COV2.S	Hospitalization: All	70 (63-75)	14+	~39.5 weeks
									73 (60-82)	14-90	
									70 (54-81)	>180	
								Hospitalization: Immunocompromised	55 (31-72)	14+	
					Alpha^			Hospitalization: All	68 (43-83)		
					Delta^				72 (64-78)		
266	et al* (June 8, 2022)	USA	RCT crossover	14,164 placebo and 14,287 vaccinated participants 18+ years	Original & Alpha††	Excluded	mRNA-1273	Symptomatic disease	92.6 (80.5-97.2)	12 days	~0 weeks
									89.6 (41.7-98.2)	172 days	~22.5 weeks
265	Richterman et al* (June 6, 2022)	USA	Test-negative case control	14,520 tests among healthcare workers	Omicron^	Excluded	BNT162b2	Symptomatic disease	41 (-17-87)	14+	~63 weeks
							mRNA-1273		5 (-69-47)		
					Delta^		BNT162b2		75 (52-87)		
							mRNA-1273		73 (56-84)		
264	Spicer et al* (May 26, 2022)	USA	Test-negative case control	89,736 adolescents (aged 12-17 y) in Kentucky	Delta^	Excluded	BNT162b2 or mRNA-1273	Documented infection	81 (79.7-82.3)	14+	~36.5 weeks
						Previously infected only			78.3 (66.7-86.5)		
263	Grewal et al* (July 6, 2022) *[Update to June 1, 2022 preprint]*	Canada	Test-negative case control	13,654 cases and 205,862 controls amongst LTCF residents aged 60+ in Ontario	Omicron specifically^	Included	BNT162b2 or mRNA-1273	Documented infection	6 (-5-15)	0+	~66 weeks
								Symptomatic disease	23 (1-40)		
								Hospitalization or death	52 (33-65)		
262	Carlsen et al* (June 1, 2022)	Norway	Retrospective cohort study	21, 643 newborns	Omicron^	Excluded	BNT162b2 or mRNA-1273	Documented infection during an infant's first 4 months of life (born to	30 (17-41)	14+	~45 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							(~4% of mothers received AZD1222 as first dose)	unvaccinated mothers and mothers vaccinated in 2nd or 3rd trimester)			
					Delta^			Documented infection during an infant's first 4 months of life (born to unvaccinated mothers and mothers vaccinated in 2nd or 3rd trimester)	71 (56-81)		
261	Chin et al (May 27,2022)	USA	Retrospective test-negative case control	15,783 resident and 8,539 staff cases, matched with 180,169 resident and 90,409 staff controls aged 18+	**Omicron^**	Excluded	BNT612b2 or mRNA-1273	Documented infection	14.9 (12.3-19.7)	14+	~ 65 weeks
						Included before July 01/2021			47.8 (46.6-52.8)		
						Included since July 01/2021			73.1 (69.8-80.1)		
260	Amir et al* (September 9, 2022) *[Update to May 25, 2022 preprint]*	Israel	Retrospective cohort	691,921 children 5-10 years	**Omicron^**	Excluded	BNT162b2	Documented infection	58.3 (54.6-61.5)	14-35	~2 weeks
259	Tsundue et al* (May 24, 2022)	India	Prospective cohort	1114 residents of congregate living facilities in Dharamshala (all ages)	Delta^	Included	Covishield	Documented infection	98 (85-99.8)	14+	13 weeks
								Shortness of breath/ use of supplemental oxygen, hospitalisation, or death	99 (90-99.8)		
258	Paranthaman et al* (May 20, 2022)	UK	Retrospective cohort	197,885 LTCF residents aged 65+ in England	Alpha, Delta^	Excluded	BNT162b2	Documented infection	62 (46-73)	7-34	~3 weeks
									47 (32-58)	147+	~37 weeks
								Death	86 (67-94)	7-34	~3 weeks
									69 (51-80)	147+	~37 weeks
							AZD1222	Documented infection	61 (40-74)	7-34	~3 weeks
									29 (10-43)	147+	~24.5 weeks
								Death	83 (58-94)	7-34	~3 weeks
									56 (33-70)	147+	~24.5 weeks
						Previously infected persons only	BNT162b2	Documented infection	79 (15-95)	7-34	~3 weeks
									80 (43-93)	147+	~37 weeks
							AZD1222	Documented infection	37 (-50-73)	7-34	~3 weeks
									65 (14-86)	147+	~24.5 weeks
257	Fano et al* (May 18,2022)	Italy	Retrospective cohort		Alpha, Delta^	Excluded	BNT612b2 or mRNA-1273	Documented infection	70.9 (69.3-72.4)	40-44	~48 weeks
									22.7 (18.5-26.8)	200+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				946,156 individuals aged 12+			AZD1222		76.3 (71.9- 80)	40-44	
									3.8 (0.0-9.2)	125+	
							Ad26.COV2.S		39.4 (28.3-48.8)	40-44	
									2.5 (0.0-9.1)	150+	
							AZD1222+ BNT612b2 or mRNA-1273		81.6 (75.3-86.3)	40-44	
									3.1 (0.0-12.0)	125+	
256	Tenforde et al* (May 17, 2022)	USA	Case-control	10,078 adults (aged 18+) hospitalized at 21 hospitals across 18 states	Alpha, Delta††	Included	BNT162b2	Hospitalization (Overall)	88 (86-90)	14-179	~23.5 weeks
									79 (74-83)	180+	~47 weeks
							mRNA-1273		93 (91-94)	14-179	~23.5 weeks
									87 (83-90)	180+	~47 weeks
							BNT612b2 or mRNA-1273	Hospitalization: Immunocompetent persons	90 (88-91)	14-179	~23.5 weeks
									82 (79-85)	180+	~47 weeks
								Hospitalization: Immunocompromised persons	63 (55-69)	14+	~47 weeks
									65 (57-72)	14-179	~23.5 weeks
									53 (38-65)	180+	~47 weeks
					Delta^			Hospitalization (Overall)	90 (88-91)	14-179	~23.5 weeks
									83 (80-86)	180+	~47 weeks
255	Lan et al* (May 12, 2022)	USA	Retrospective cohort	4615 HCW in Massachusetts	Non-VOC, Alpha, Delta††	Excluded	BNT162b2 or mRNA-1273 *Note: A small proportion (~2.5%) received Ad26.COV2.S*	Documented infection	82.3 (75.1-87.4)	14+	~36 weeks
					Delta^				76.5 (40.9-90.6)		
254	Braeye et al* (May 11, 2022)	Belgium	Retrospective cohort	139,140 contacts of 123,409 index cases among women aged 45-64	Alpha^	Excluded	BNT162b2	Documented infection	72 (70-74)	7-57	~28.5 weeks
							mRNA-1273		82 (79-84)	14-64	
							Ad26.COV2.S		38 (34-44)	21-71	
							AZD1222		56 (51-59)	14-64	
					Delta^		BNT162b2		64 (63-66)	7-57	
									44 (43-44)	157-207	
							mRNA-1273		75 (71-77)	14-64	
									56 (55-58)	164-214	
							Ad26.COV2.S		33 (28-38)	21-71	
									22 (19-25)	171-221	
							AZD1222		49 (45-52)	14-64	
									35 (33-37)	164-214	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
						Previously infected persons only	BNT162b2	Documented infection	87 (84-88)	7-57	
									82 (81-83)	157-207	
							mRNA-1273		87 (83-92)	14-64	
									85 (80-89)	164-214	
							Ad26.COV2.S		88 (85-91)	21-71	
									87 (84-89)	171-221	
							AZD1222		88 (84-94)	14-64	
									83 (81-85)	164-214	
253	Martellucci et al* (April 22, 2022)	Italy	Retrospective cohort	1,279,694 residents of the Abruzzo region (all ages)	Alpha, Delta, **Omicron**††	Excluded	BNT162b2	Documented infection	24 (23-25)	14+	~53 weeks
								Hospitalization	86 (84-88)		
								Death	92 (90-94)		
							mRNA-1273	Documented infection	32 (31-34)		
								Hospitalization	90 (86-93)		
								Death	96 (92-98)		
							AZD1222	Documented infection	4 (1-6)		
								Hospitalization	93 (92-95)		
								Death	98 (96-99)		
							Ad26.COV2.S	Documented infection	12 (7-17)		
								Hospitalization	87 (73-94)		
252	Zahradka et al* (May 3, 2022)	Czech Republic	Retrospective cohort	2101 kidney transplant recipients	Alpha^	Excluded	BNT162b2 or mRNA-1273	Documented infection	45.6 (12.4 -67.6)	14+	~12.5 weeks
251	Simwanza et al* (September 12, 2022) *[Update to June 8, 2022 preprint]*	Zambia	Case-control	180 cases and 202 controls in a correctional facility 18+ y	**Omicron^**	Included	Ad26.COV2.S	Documented infection	63.6 (33.6-80.5)	14+	~13 weeks
								Symptomatic disease	73 (41.6-87.7)		
							AZD1222	Documented infection	89.4 (59.5-97.8)		
								Symptomatic disease	85.1 (19.5-98)		
250	Rennert et al (May 7, 2022)	USA	Propensity matched case control	1,944 students aged 18-64	**Omicron^**	Included	BNT162b2	Documented infection	2.1 (-21.2-21)	14+	~23 weeks
							mRNA-1273		17.3 (-10.8-38.3)		
				658 employees aged 18-65			BNT162b2		30.1 (-24.5-60.8)		
							mRNA-1273		14.4 (-64.2-55.4)		
249	Ma et al* (May 3, 2022)	China	Retrospective cohort/Outbreak investigation	1058 close contacts 18+ years	Delta^	Included	BBIBP-CorV	Symptomatic disease	75.5 (63-93.6)	14+	~8 weeks
								Pneumonia	56.5 (-95.9-90.4)		
							CoronaVac	Symptomatic disease	73 (22.3-96)		
								Pneumonia	84.6 (18.8-97.1)		
							Ad5-nCoV	Symptomatic disease	61.5 (9.5-83.6)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								Pneumonia	67.9 (1.7-89.9)		
								Severe disease	100 (CI omitted)		
248	Carazo et al (May 3, 2022)	Canada	Test-negative case control	224,007 cases and 472,432 controls among individuals (12+ y) in Quebec	Omicron^	Excluded	BNT162b2 or mRNA-1273	Documented infection	42 (41-44)	7+	~51 weeks
								Hospitalization	76 (74-78)		
						Previously infected only		Documented infection	23.2 (21.2-27.4)		
								Hospitalization	68.4 (63.6-73.5)		
247	Kirsebom et al (May 1, 2022)	UK	Test-negative case control	759,450 adults aged 40-64 y	Omicron specifically^	Included	AZD1222	Symptomatic disease	8.0 (6.0-9.9)	175+	~44.5 weeks
				166,720 adults aged 65+ y				Symptomatic disease	19.5 (11.7-26.6		
								Hospitalization	61 (49.8-69.7)		
					Delta specifically^			Hospitalization	73.4 (70.4-76.2)		
246	Florentino et al* (August 13, 2022) *[Update to April 29, 2022 preprint]*	Brazil	Test-negative case control	89,595 cases and 108,363 controls aged 6-11 years	Omicron^	Included	CoronaVac	Symptomatic disease	39.8 (33.7-45.4)	14+	~12 weeks
								Hospitalization	59.2 (11.3-84.5)		
244	Sharma et al* (April 27,2022)	USA	Matched case control	221,267 veterans	Omicron^	Excluded	BNT162b2	Documented infection	25.3 (21.8-28.7)	14+	~42 weeks
								Hospitalization	52.9 (47.8-57.6)		
								Death	50.7 (37.9-61.6)		
							mRNA-1273	Documented infection	39.5 (35.8-43)		
								Hospitalization	66.7 (61.4-71.6)		
								Death	65.6 (52.8-76.3)		
243	Castillo et al* (April 21, 2022)	France	Test-negative case control	761,744 cases 18+ years	Omicron specifically^	Included	BNT162b2 or mRNA-1273 *Note: A small proportion (~3%) received two doses of AZD1222*	Symptomatic infection	43 (41-45)	0-30	~48 weeks
									11 (10-13)	>180	
								Hospitalization	59 (49-70)	0-30	
									56 (51-62)	>180	
								ICU admission	70 (40-97)	0-30	
									72 (63-81)	>180	
								Death	60 (24-92)	0-30	
									54 (41-69)	>180	
				166,009 cases	Delta specifically^			Symptomatic infection	78 (77-80)	0-30	
									63 (62-64)	>180	
								Hospitalization	91 (87-95)	0-30	
									90 (89-91)	>180	
								ICU admission	93 (86-99)	0-30	
									95 (93-97)	>180	
								Death	90 (79-100)	0-30	
									87 (83-91)	>180	
242		USA	Case control			Excluded	BNT162b2	Documented infection	87.6 (86.2-88.9)	14+	~19 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	Eick-Cost et al* (April 20, 2022)			441,379 US military personnel	Pre-Delta^ (Non-VOC, Alpha††)			Asymptomatic infection	80.3 (76.5-83.5)		
								Symptomatic infection	89.9 (88.4-91.2)		
								Hospitalization	88.0 (75.4-94.1)		
							mRNA-1273	Documented infection	93.5 (91.9-94.7)		
								Asymptomatic infection	94.7 (91.9-96.6)		
								Symptomatic infection	93.1 (91.2-94.6)		
								Hospitalization	89.6 (57.5-97.4)		
							Ad26.COV2.S	Documented infection	81.8 (74.2-87.1)		
								Asymptomatic infection	81.4 (62.6-90.8)		
								Symptomatic infection	82.4 (73.9-88.2)		
					Delta^		BNT162b2	Documented infection	69.3 (68.2-70.3)	14+	~35 weeks
								Asymptomatic infection	66.0 (64.0-67.8)		
								Symptomatic infection	71.0 (69.7-72.1)		
								Hospitalization	88.4 (82.1-92.5)		
							mRNA-1273	Documented infection	79.4 (78.3-80.4)		
								Asymptomatic infection	77.0 (75.1-78.8)		
								Symptomatic infection	80.6 (79.4-81.8)		
								Hospitalization	88.1 (75.7-94.2)		
							Ad26.COV2.S	Documented infection	38.3 (34.5-41.9)		
								Asymptomatic infection	19.6 (12.2-26.4)		
								Symptomatic infection	48.9 (45-52.7)		
								Hospitalization	57.7 (2.6-81.6)		
241	Gonzalez et al* (July 16, 2022) *[Published version of April 19 preprint]*	Argentina	Retrospective cohort	1,536,435 children aged 3-17 years in Buenos Aires Province	Delta, **Omicron^**	Included	BNT162b2 or mRNA-1273 (ages 12-17)	Hospitalization	81 (59.9-90.1)	14+	~17 weeks
							BBIBP-CorV (ages 3-11)		83.4 (70.9-90.2)		~9 weeks
					Omicron^		BNT162b2 or mRNA-1273 (ages 12-17)		78.2 (42-90.3)		~25 weeks
							BBIBP-CorV (ages 3-11)		58.6 (4.1-79.7)		16 weeks
240	Cerqueira-Silva et al (April 14, 2022)	Brazil	Test-negative case control	4,219,703 adults (aged 18+)	**Omicron^**	Included	BNT162b2	Symptomatic disease	36.9 (36.2-37.6)	2-9 weeks	7 weeks
									6.9 (5.6-8.2)	20+ weeks	~26 weeks
								Severe disease	74.5 (71.4-77.2)	2-9 weeks	7 weeks
									71.5 (68.5-74.2)	20+ weeks	~26 weeks
							AZD1222	Symptomatic disease	15.9 (14.3-17.4)	2-9 weeks	7 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									-1.4 (-2.2 to -0.6)	20+ weeks	~29 weeks
								Severe disease	66.7 (61-71.6)	2-9 weeks	7 weeks
									57.4 (55.8-58.9)	20+ weeks	~29 weeks
		Scotland		370,556 adults (aged 18+)			BNT162b2	Symptomatic disease	43.7 (37.3-49.5)	2-9 weeks	7 weeks
									-5.7 (-11.3 to -0.4)	20+ weeks	~32 weeks
								Severe disease	68.8 (-87-94.8)	2-9 weeks	7 weeks
									38.8 (-20-68.8)	20+ weeks	~32 weeks
							AZD1222	Symptomatic infection	18.1 (-6.7-37.2)	2-9 weeks	7 weeks
									-31.6 (-40.2 to -23.6)	20+ weeks	~29 weeks
								Severe disease	68.9 (-254.3-97.3)	10-19 weeks	17 weeks
									48.4 (-20.1-77.8)	20+ weeks	~29 weeks
239	Widdifield et al* (April 14, 2022)	Canada	Test-negative case control	36,145 individuals with rheumatoid arthritis	Alpha, Delta^	Included	BNT162b2	Documented infection	82 (78-85)	7+	~44 weeks
							mRNA-1273		86 (80-90)		
							BNT162b2 or mRNA-1273	Documented infection	83 (80-86)		
								Severe outcomes	92 (88-95)		
				7863 individuals with ankylosing spondylitis			BNT162b2	Documented infection	88 (82-93)		
							mRNA-1273		93 (83-97)		
							BNT162b2 or mRNA-1273	Documented infection	89 (83-93)		
								Severe outcomes	97 (83-99)		
				47,199 individuals with psoriasis			BNT162b2	Documented infection	82 (79-85)		
							mRNA-1273		87 (82-91)		
							BNT162b2 or mRNA-1273	Documented infection	84 (81-86)		
								Severe outcomes	92 (86-95)		
				31,311 individuals with inflammatory bowel disease			BNT162b2	Documented infection	82 (79-85)		
							mRNA-1273		87 (82-91)		
								Documented infection	79 (74-82)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							BNT162b2 or mRNA-1273	Severe outcomes	94 (88-97)		
238	Sanchez Ruiz et al* (April 2022)	France	Retrospective cohort	72 LTCF residents in southern France	Delta specifically^	Excluded	BNT162b2	Documented infection	11.2 (0-61.1)	14+	
								Symptomatic disease	88.4 (59.9-96.7)		
								Severe disease	93.5 (67.2-98.7)		
237	Lind et al (April 25,2022) *[Update to April 20, 2022 preprint]*	USA	Test-negative case control	10,676 casesand 92,011 controls	**Omicron specifically^**	Excluded	BNT162b2 or mRNA-1273	Documented infection	28.5 (20-36.2)	14-140	~40 weeks
									15.3 (10.4-20)	≥150	
						Included			36.1 (7.1-56.1)	14-140	
									34 (18.5-46.5)	≥150	
			1:1 Matched case control			Excluded			30.7 (20.6-39.6)	14-140	
									20 (14-25.6)	≥150	
						Included			14.3 (-43.1-48.7)	14-140	
									18.8 (-9- 39.5)	≥150	
236	Gram et al* (September 1,2022) *[Published verson of April 20, 2022 preprint]*	Denmark	Retrospective cohort	4,056,935 individuals aged 12-59 years	**Omicron^**	Excluded	BNT162b2 or mRNA-1273	Documented infection	39.8 (38.4-41.2)	14-30	~56 weeks
									13.2 (12.5-13.9)	>120	
								Hospitalization	62.4 (46.3-73.6)	14-30	
									65.9 (62-69.4)	>120	
					Delta^			Documented infection	92.2 (91.8-92.6)	14-30	
									64.9 (64-65.8)	>120	
								Hospitalization	99.1 (98-99.6)	14-30	
									91.6 (89.5-93.2)	>120	
				1,688,168 adults aged ≥60 years	**Omicron^**			Documented infection	39.9 (26.4-50.9)	14-30	
									4.7 (0.2-8.9)	>120	
					Delta^			Documented infection	82.2 (75.3-87.1)	14-30	
									49.8 (46.5-52.8)	>120	
								Hospitalization	97.7 (95.2-98.9)	31-60	
									86.2 (84.2-87.9)	>120	
					Alpha^			Documented infection	91 (88.5-92.9)	14-30	
									71.5 (54.7-82.1)	>120	
								Hospitalization	96.4 (92.6-98.3	14-30	
									90.5 (67-97.2)	>120	
235	Vokó et al* (July 22,2022) *[Published version of April 18, 2022 preprint]*	Hungary	Retrospective cohort	*6,193,552 individuals aged 18-64 years* *Note: VE for persons aged 65-100 years are also aavailable from publication;*	Delta^	Included	BNT162b2	Documented infection	70.3 (69.2-71.3)	14-120	~47 weeks
									0.6 (-2.3-3.4)	>240	
								Hospitalization	82.6 (80.1-84.7)	14-120	
									69.6 (64.9-73.6)	>240	
								Death	87.4 (81.5-91.5)	14-120	
									73.6 (61.1-82.1)	>240	
							mRNA-1273	Documented infection	76.9 (73.3-80.0)	14-120	
									22.6 (6.1-36.2)	>240	
								Hospitalization	84.9 (75.4-90.8)	14-120	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				estimates are relatively similar across age groups.					42.5 (-4.0, 68.2)	>240	
								Death	77.7 (30.7-92.8)	14-120	
									100 (CI omitted)	>240	
							AZD1222	Documented infection	39.2(36.4-41.9)	14-120	
									-14 (-20.5- -7.9)	>240	
								Hospitalization	76.2 (70.6-80.7)	14-120	
									48.8 (38.2-57.6)	>240	
								Death	90.1 (73.5-96.3)	14-120	
									57.1 (35.2-71.6)	>240	
							Sputnik V	Documented infection	38.3 (31.8-44.3)	14-120	
									-4.6 (-12.5-2.9)	>240	
								Hospitalization	90.4 (78.5-95.7)	14-120	
									78.7 (69.1-85.4)	>240	
								Death	89.3 (79.9-94.3)	121-180	
									79.1 (59.8-89.2)	>240	
							Ad26.COV2.S	Documented infection	39.3 (36.1-42.4)	14-120	
									35.9 (32.5-39.2)	181-240	
								Hospitalization	43.2 (32.9-52)	14-120	
									59.4 (50.1-67.0)	181-240	
								Death	59.8 (35.2-75.1)	14-120	
									76.1 (56.7-86.8)	181-240	
							BBIBP-CorV	Documented infection	10.9 (6.7-15)	14-120	
									-19.9 (-31.9- -9)	>240	
								Hospitalization	53.8 (43.9-61.9)	14-120	
									40.9 (24.4-53.8)	>240	
								Death	67.4 (39.2-82.5)	14-120	
									50.7 (21.4-69.1)	>240	
234	Richardson et al* (June 19, 2022) *[Update to April 17, 2022 preprint]*	Mexico	Prospective cohort	43,925 childcare workers	Non-VOC, Alpha, Gamma and Delta††	Excluded	CanSino	Documented infection	48 (32-61)	14-60	~33 weeks
									-3 (-26-16)	>120	
								Hospitalization	92 (23-99)	14-60	
									24 (-263-84)	>120	
								Death	95 (53-100)	61-120	
									93 (22-99)	>120	
					Alpha and Gamma††			Documented infection	53 (23-71)	14+	
					Delta^			Documented infection	18 (8-28)		
								Hospitalization	74 (38-89)		
								Death	94 (67-99)		
233	Nasreen et al* (August 17,2022)	Canada	Test-negative case control	31,776 hospitalizations	Non-VOC, Alpha, Beta,	Excluded	BNT162b2 or mRNA-1273	Hospitalization or death	98 (95-99)	7-55	~32 weeks
									98 (95-99)	≥112	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Published version of April 13, 2022 preprint]			and 5,842 deaths 18+ years	Gamma, Delta^		AZD1222		96 (88-96)	7-55	~7 weeks
									97 (91-99)	≥56	
							AZD1222+any mRNA		99 (98-100)	14+	
232	Cerqueira-Silva et al* (July 1, 2022) *[Update to April 13, 2022 preprint]*	Brazil	Test-negative case control	468,804 cases and 430,246 controls 18+ years	Omicron ^	Previously infected only	BNT162b2	Symptomatic infection	51.9 (50.0-53.8)	14-69	~59 weeks
									26.2 (22.8-29.4)	140+	
								Hospitalization	59.6 (36.6-74.2)	14-69	
									53.6 (30.2-69.1)	140+	
							AZD1222	Symptomatic infection	25.5 (1.0-29.7)	14-69	
									17 (14.4-19.6)	140+	
								Hospitalization	41 (-8.1-67.8)	14-69	
									55.4 (44.6-64.1)	140+	
							Ad26.COV2.S	Symptomatic infection	16.2 (12.4-19.8)	14+	
								Hospitalization	39.5 (8.3-69)		
							CoronaVac	Symptomatic infection	23.4 (18.2-28.3)	14-69	
									12.3 (9.4-15.1)	140+	
								Hospitalization	34.1 (-28.9-66.3)	14-69	
									34.4 (18.3-47.3)	140+	
			Matched case control			Previously infected only	BNT162b2	Symptomatic infection	54.1 (52.1-55.9)	14-69	
									30.6 (27.3-33.7)	140+	
								Hospitalization	53.6 (-6.4- 79.8)	14-69	
									55.1 (-1.9-80.2)	140+	
							AZD1222	Symptomatic infection	27.2 (22.9-31.3)	14-69	
									15.9 (13.2-18.5)	140+	
								Hospitalization	67.5 (-7.9-90.2)	14-69	
									63.2 (39.0-77.8)	140+	
							Ad26.COV2.S	Symptomatic infection	16.9 (13.2-20.5)	14+	
								Hospitalization	45.4 (-19.6-75.1)		
							CoronaVac	Symptomatic infection	27.3 22.3-31.9)	14-69	
									14.3 (11.4-17.0)	140+	
								Hospitalization	21.4 (-148.4-75.1)	14-69	
									66.4 (37.6-81.9)	140+	
231	Dale et al* (April 12, 2022)	USA	Outbreak investigation	40 cases and 69 controls, 27+ years	Delta specifically^	Excluded	BNT162b2 or mRNA-1273	Documented infection	51(-27-81)	14+	~25 weeks
								Symptomatic infection	67(-7-90)		
								Hospitalization	61(-59-90)		
								Death	80(-10-96)		
230	Plumb et al (April 12,2022)	USA	Test-negative case control	11,283 hospitalized adults	Omicron ^	Included	BNT162b2	Hospitalization	37.3 (25.8–46.9)	14+	~55 weeks
							mRNA-1273		35.9 (21.7–47.4)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
					Delta^		BNT162b2		50.0 (39.0–59.0)		
							mRNA-1273		44.0 (29.9–55.2)		
229	Institute of public health (April 12,2022)	Chile	Test-negative case control	2,181 cases and 979 controls	Lambda, Gamma and Delta^	Included	BNT162b2	Hospitalization with SARI	85.3 (73.5-91.8)	14+	~53 weeks
							CoronaVac		59.5 (49-67.9)		
228	Kildegaard et al* (April 11, 2022)	Denmark	Retrospective cohort	404,975 adolescents aged 12-17 years	Delta^	Excluded	BNT162b2	Documented infection	93 (93-94)	0-59	~13 weeks
227	Kim et al (April 10, 2022)	USA	Test-negative case control	2,208 cases and 1639 controls 18+ years	**Omicron specifically^**	Included	BNT162b2 or mRNA-1273	Symptomatic disease	45 (14-66)	14-149	~58 weeks
									11 (-21-35)	150+	
					Delta specifically^				89 (78-94)	14-149	~48 weeks
									58 (44-68)	150+	
226#	Buchan et al (April 7,2022)	Canada	Test-negative case control	9,202 cases and 19,953 controls 12-17 years old	**Omicron specifically^**	Included	BNT162b2	Symptomatic disease	51 (38-61)	7-59	~41 weeks
									29 (17-38)	180+	
								Severe disease	76 (-10-95)	7-59	
									88 (77-94)	180+	~32 weeks
				502 cases and 19,930 controls aged 12-17 years	Delta specifically^			Symptomatic disease	97 (94-99)	7-59	
									90 (79-95)	180+	
225	Paraguay Ministry of Health and Social Welfare (March 22, 2022)	Paraguay	Test-negative case-control	2953 patients ≥ 16 years with severe acute respiratory infection	Gamma and Delta^	Excluded	BBV152	Hospitalization with SARI	27.7 (-10.2-52.6)	14+	~38 weeks
							AZD1222		85.8 (70.6-93.1)		
							Hayat vax		56.4 (15.5-77.6)		
							Sputnik v		77.0 (30.8-92.3)		
							BNT162b2		95.4 (65.7-99.4)		
224	Kwon et al* (April 6,2022)	USA	Test-negative case control	440 solid organ transplant recipients; 1684 patients with other immunocompromising conditions; 8301 immunocompetent individuals	Alpha and Delta^	Included	BNT162b2 or mRNA-1273	Hospitalization in solid organ transplant recipient (SOTR)	29 (-19-58)	14+	~37 weeks
								Hospitalization in immunocompromised adults	72 (64-79)		
								Hospitalization in immunocompetent adults	88 (87-90)		
								Supplemental oxygen/ oxygen support in SOTR	31 (-27-63)		
								Supplemental oxygen/ oxygen support in immunocompromised	73 (64-80)		
								Supplemental oxygen/	90 (89-92)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								oxygen support in immunocompetent			
223	Yoon et al* (April 6,2022)	USA	Prospective cohort	3241 HCWs	Omicron specifically^	Excluded	BNT162b2 or mRNA-1273	Documented infection	46 (25-61)	14+	~21 weeks
					Delta specifically^				65 (49-76)		
222	Florentino et al* (August 8, 2022) *[Update to April 5, 2022 preprint]*	Brazil	Test-negative case control	503,776 tests among adolescents aged 12-17	Omicron^	Included	BNT162b2	Symptomatic disease	64.7 (63-66.3)	14-27	2 weeks
									5.9 (2.2-9.4)	98+	~21 weeks
								Severe disease	75.6 (58.1-85.8)	14-27	2 weeks
									82.7 (68.8-90.4)	98+	~21 weeks
					Delta^			Symptomatic disease	80.7 (77.8-83.3)	14-27	2 weeks
									26.6 (4.1-43.9)	56-69	~8 weeks
		Scotland		127,168 tests among adolescents aged 12-17	Omicron^			Symptomatic disease	82.6 (80.6-84.5)	14-27	2 weeks
									50.6 (42.7-57.4)	98+	~15.5 weeks
					Delta^			Symptomatic disease	92.8 (85.7-96.4)	14-27	2 weeks
									86.5 (72.2-93.4)	56-69	~8 weeks
221	Ranzani et al (August 16, 2022) *[Updated version of April 1st preprint]*	Brazil	Test-negative case control	2,107,696 matched pairs of adults aged ≥18 years	Omicron^	Included	CoronaVac	Symptomatic disease	28.1 (26.5-29.6)	14-59	~10 weeks
									6.3 (5.3-7.3)	180+	~59 weeks
								Hospitalization or death	56.1 (40.6-67.5)	14-59	~10 weeks
									57.6 (54.4-60.6)	180+	~59 weeks
					Delta^			Symptomatic disease	51.3 (49.9-52.7)	14-59	~10 weeks
									34 (32.3-35.7)	180+	~59 weeks
								Hospitalization or death	86.5 (83.4-88.9)	14-59	~10 weeks
									60.9 (57.3-64.2)	180+	~59 weeks
220	Nordstrom et al* (March 31, 2022)	Sweden	Retrospective cohort	6,530,128 individuals	Non-VOC, Alpha, Delta^	Previously infected only	BNT162b2 or mRNA-1273	Documented infection	68 (63-72)	14+	~38 weeks
							AZD1222		25 (-37-59)		
219	Pardo-Seco et al* (March 29, 2022)	Spain	Test-negative case control	2,280,288 adults (18+ y) in Galicia	Non-VOC, Alpha††	Excluded	BNT162b2	Documented infection	90.8 (88.6-92.7)	14+	~7.5 weeks
218	Starrfelt et al *(September 2, 2022) *[Published version of March 30, 2022 preprint]*	Norway	Retrospective cohort	4,301,995 adults (18+ y)	Delta^	Excluded	BNT162b2	Documented infection	77.7 (76.8-78.5)	2-9 weeks	~7 weeks
									8.2 (3.4-12.8)	>33 weeks	~43 weeks
								Hospitalization	97.5 (95.6-98.6)	2-9 weeks	~7 weeks
									63.9 (54.3-71.5)	>33 weeks	~43 weeks
							mRNA-1273	Documented infection	86.6 (85.6-87.6)	2-9 weeks	~7 weeks
									28.6 (9.6-43.6)	>33 weeks	~43 weeks
								Hospitalization	95.3 (91.5-97.4)	18-25 weeks	~23 weeks
									91.1 (84.9-94.8)	26-33 weeks	~31 weeks
								Documented infection	84.1 (83.2-85)	2-9 weeks	~7 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							Heterologous mRNA		40.7 (23.9-53.8)	18-25 weeks	~23 weeks
217	Marra et al* (March 30, 2022)	Brazil	Retrospective cohort	13,813 HCWs (aged 18+)	Gamma^	Excluded	CoronaVac	Documented infection	51.3 (34.6-63.7)	14+	~23 weeks
							AZD1222		88.1 (82.8-91.7)		~15 weeks
216	Price et al* (March 30, 2022)	USA	Test-negative case control	2812 children aged 5-18	Omicron^	Included	BNT162b2	Hospitalization (12-18 years)	40 (9-60)	14+	~42 weeks
									43 (-1-68)	14-160	~20 weeks
									38 (-3-62)	161-314	~42 weeks
								Hospitalization (5-11 years)	68 (42-82)	14+	~11 weeks
					Delta^			Hospitalization (12-18 years)	92 (89-95)	14+	~42 weeks
									93 (89-95)	14-160	~20 weeks
									92 (80-97_	161-314	~42 weeks
215	Hansen et al (March 30, 2022)	Denmark	Retrospective cohort	3,090,833 participants aged 12+	Omicron^	Excluded	BNT162b2	Documented infection	37 (35.6-38.3)	14-30	~2 weeks
									9.8 (9.2-10.4)	121+	~30 weeks
								Hospitalization	50.5 (33.9-63)	14-30	~2 weeks
									51.6 (47.2-55.6)	121+	~30 weeks
							mRNA-1273	Documented infection	37.9 (34.4-41.2)	14-30	~2 weeks
									13.2 (12.3-14.2)	121+	~30 weeks
214	Natarajan et al (March 29, 2022)	USA	Test-negative case control	80,287 ED/UC encounters and 25,244 hospitalizations among adults with COVID-19 like illness	Omicron^	Included	Ad26.COV2.S	Emergency Dept/ Urgent Care Visits	24 (18-29)	14+	40 weeks
								Hospitalization	31 (21-40)		
213	Wang et al (March 25, 2022)	USA	Test-negative case control	249,070 patients	Omicron^	Included	Any mRNA vaccine	Documented infection	26 (22-30)	14-179	~23.5 weeks
									7 (4-10)	180+	54 weeks
					Delta^				70 (68-72)	14-179	~23.5 weeks
									53 (52-55)	180+	54 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
212	Veneti et al (March 25,2022)	Norway	Retrospective cohort	117,681 children aged 16-17 years	Omicron^	Excluded	BNT162b2	Documented infections	53.1 (42·6-61.7)	7-34	~12 weeks
									23.3 (2·7–39.5)	≥63	
					Delta^				89.9 (82.8-94.1)	7-34	
									80.3 (60.0-90.3)	≥63	
211	Tenforde et al (March 25,2022)	USA	Case-control	7,544 hospitalised patients	Omicron^	Included	BNT162b2 & mRNA-1273	Invasive mechanical ventilation or in-hospital death	79 (66-87)	14+	~45 weeks
					Delta^				88 (86-90)		
					Alpha, Delta, Omicron^				92 (90-94)	14-150	
									84 (80-87)	>150	
210	Stowe et al (April 1, 2022)	UK	Test-negative case control	115,720 cases and 294,265 controls	Omicron^	Included	BNT162b2	Hospitalisation with ARI in 18-64 year olds	73.8 (62.5-81.7)	14-174	~43 weeks
									65.1 (51.3-74.9)	175+	
								Hospitalisation with ARI in 65+ year olds	87.6 (79.4-92.5)	14-174	
									65.4 (56.6-72.5)	175+	
							AZD1222	Hospitalisation with ARI in 18-64 year olds	59 (31.9-75.3)	14-174	
									53 (41.7-62)	175+	
								Hospitalisation with ARI in 65+ year olds	71.2 (50-83.4)	14-174	
									53.1 (43.4-61.2)	175+	
209	Horne et al* (July 20, 2022) *[Published version of March 23, 2022 preprint]*	UK	Retrospective cohort	2,041,550 aged 18-39 years	Alpha, Delta, Omicron^	Excluded	BNT162b2	Documented infection	76 (75-77)	21-42	~30 weeks
									-53 (-118- -7)	161-182	
								Hospitalization	96 (94-98)	21-42	
									82 (71-90)	133-154	
				1,161,649 aged 40-64 years			BNT162b2	Documented infection	73 (69-77)	21-42	
									-3 (-15-7)	161-182	
							AZD1222	Documented infection	21 (18-24)	21-42	
									-99 (-105- -94)	161-182	
								Hospitalization	95 (93-96)	21-42	
									86 (83-88)	161-182	
								Death	55 (-5-81)	105-126	
									41 (-7-68)	161-182	
				1,318,688 aged 18-64 years and clinically vulnerable			BNT162b2	Documented infection	34 (30-39)	21-42	
									4 (-1-8)	161-182	
								Hospitalization	95 (94-97)	49-70	
									91 (88-93)	161-182	
								Death	96 (91-98)	77-98	
									92 (86-96)	161-182	
							AZD1222	Documented infection	34 (30-39)	21-42	
									-45 (-50- -40)	161-182	
								Hospitalization	92 (88-95)	21-42	
									75 (71-78)	161-182	
								Death	92 (88-95)	77-98	
									87 (81-92)	161-182	
							BNT162b2	Documented infection	81 (74-86)	21-42	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				2,072,308 aged 65+ years					15 (8-22)	161-182	
								Hospitalization	91 (86-95)	21-42	
									80 (76-82)	161-182	
								Death	98 (93-99)	21-42	
									88 (84-91)	161-182	
							AZD1222	Documented infection	53 (41-62)	21-42	
									-21 (-30- -13)	161-182	
								Hospitalization	88 (85-90)	21-42	
									75 (71-79)	161-182	
								Death	90 (84-94)	21-42	
									83 (77-88)	161-182	
207	Altarawneh et al* (June 15, 2022) *[Update to March 31, 2022 study]*	Qatar	Test-negative case control	158,484 individuals, all ages	**Omicron BA.1 specifically^**	Previously infected only	BNT162b2	Symptomatic infection	51.7 (43.5-58.7)	14+	44 weeks
								Hospitalization and death	96.2 (37.7-99.8)		
							mRNA-1273	Symptomatic infection	44.3 (30.4-55.4)		
								Hospitalization and death	100 (-51.5-100)		
						Excluded	BNT162b2	Symptomatic infection	-4.9 (-16.4-5.4)		
								Hospitalization and death	96.8 (71.1-99.6)		
							mRNA-1273	Symptomatic infection	-2.7 (-16.8-9.7)		
								Hospitalization and death	88.8 (-1.7-98.8)		
					Omicron BA.2 specifically^	Previously infected only	BNT162b2	Symptomatic infection	55.1 (50.9-58.9)		
								Hospitalization and death	97.8 (82.6-99.7)		
							mRNA-1273	Symptomatic infection	47.9 (40.8-54.1)		
								Hospitalization and death	100 (55.4-100)		
						Excluded	BNT162b2	Symptomatic infection	-1.1 (-7.1-4.6)		
								Hospitalization and death	76.8 (58-87.1)		
							mRNA-1273	Symptomatic infection	-7.3 (-15.6-0.3)		
								Hospitalization and death	84.8 (47.9-95.6)		
					Omicron specifically	Previously infected only	BNT162b2	Symptomatic infection	55.5 (51.8-59)		
								Hospitalization and death	94.3 (81.3-98.3)		
							mRNA-1273	Symptomatic infection	52 (45.8-57.4)		
								Hospitalization and death	100 (CI omiited)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
						Excluded	BNT162b2	Symptomatic infection	-0.2 (-5.5-4.9)		
								Hospitalization and death	73.5 (60.5-82.2)		
							mRNA-1273	Symptomatic infection	2.2 (-4.6-8.5)		
								Hospitalization and death	66.3 (38.3-81.6)		
206	Can et al* (March 19, 2022)	Turkey	Retrospective cohort	4067 HCWs	Alpha^	Excluded	CoronaVac	Documented infection	39 (20-64)	14+	13 weeks
205	Rearte et al* (March 15, 2022)	Argentina	Test-negative case control	95,519 cases and 141,811 controls	Alpha, Gamma and Delta††	Excluded	AZD1222	Documented infection	68.5 (67-69)	21+	~26 weeks
								Death	93.7 (93.2-94.3)		
							BBIBP-CorV	Documented infection	43.6 (42-45)		
								Death	85 (84-86)		
							Sputnik-V	Documented infection	64 (63-65)		
								Death	93.1 (92.6-93.5)		
204	Jara et al* (May 23, 2022) *[Published version of March 15, 2022 preprint]*	Chile	Retrospective cohort	490,064 children aged 3-5 years	**Omicron specifically^**	Excluded	CoronaVac	Documented infection	37.9 (36.1-39.6)	14+	~12 weeks
								Hospitalization	65.2 (50.4-75.6)		
								ICU admission	68.8 (18-88.1)		
203	Baum et al (July 6, 2022) *[Update to March 13, 2022 preprint]*	Finland	Retrospecitve cohort	896,220 older adults (aged 70+)	Non-VOC, Alpha, Delta, Omicron^	Excluded	BNT162b2	Hospitalization	93 (89-95)	14-90	~56 weeks
									69 (63-74)	181+	
								ICU admission	98 (92-99)	14-90	
									79 (65-87)	181+	
							mRNA-1273	Hospitalization	93 (82-97)	14-90	
									73 (59-83)	181+	
								ICU admission	100 (CI omitted)	14-90	
									93 (46-99)	181+	
							AZD1222	Hospitalization	81 (49-93)	14-90	
									48 (17-68)	181+	
								ICU admission	78 (2-95)	14-90	
									64 (-14-89)	181+	
					Delta^		BNT162b2	Hospitalization	90 (78-96)	14-90	~48.5 weeks
									79 (71-84)	181+	
							mRNA-1273		92 (42-99)	14-90	
									87 (70-94)	181+	
							AZD1222		79 (67-87)	91-180	
									23 (-76-67)	181+	
					Omicron^		BNT162b2	Hospitalization	91 (83-95)	14-90	~56 weeks
									58 (48-66)	181+	
							mRNA-1273		79 (43-92)	14-90	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									60 (34-75)	181+	
							AZD1222		37 (-154-85)	91-180	
									51 (12-73)	181+	
202	Shrotri et al (March 12, 2022)	UK	Prospective cohort	15,518 long-term care facility residents	Alpha and Delta^	Excluded	BNT162b2 & mRNA-1273	Documented infection	25.5 (-57.5-64.7)	14-83	45 weeks
									26.3 (-21.7-55.4)	84+	
								Hospitalization	88.8 (16.8-98.5)	14-83	
									65.1 (33.6-81.6)	84+	
								Deaths	100	14-83	
									66.1 (26-84.4)	84+	
							AZD1222	Documented infection	62.1 (12.1-83.6)	14-83	
									13.6 (-33.2-43.9)	84+	
								Hospitalization	82.7 (46.4-94.4)	14-83	
									48.7 (12.5-70)	84+	
								Deaths	91.7 (65.1-98)	14-83	
									61.1 (26.2-79.5)	84+	
				19,515 staff			BNT162b2 & mRNA-1273	Documented infection	60.7 (44.2-72.4)	14-83	
									45.1 (31.3-56.2)	84+	
								Hospitalization	100	14-83	
									92.1 (69.3-97.9)	84+	
							AZD1222	Documented infection	29 (-10.3-54.3)	14-83	
									36.9 (20.6-49.9)	84+	
								Hospitalization	100 (CIs omitted)	14-83	
									89.6 (64.4-96.9)	84+	
201#	Fowlkes et al (March 11,2022)	USA	Prospective cohort	1052 children aged 5-11 years, 312 children aged 12-15 years	**Omicron specifically ^**	Excluded	BNT162b2	Documented infection 5-11 years	31 (9-48)	14-82	~29 weeks
								Documented infection, 12-15 years	59 (24-78)	14+	
									59(22-79)	14-149	
									62 (-28-89)	≥150	
					Delta specifically ^			Documented infection, 12-15 years	81 (51-93)	14+	
									87(49-97)	14-149	
									60 (-35-88)	≥150	
200	Ashmawy et al (March 11,2022)	Egypt	Ambispective cohort	1,228 HCWs	Delta^	Included	BBIBP-CorV	Symptomatic infection	67 (43-80)	14+	~29 weeks
								Infection	46 (24-62)		
								Hospitalization	65 (-8-88)		
199	Oliveira et al* (March 3,2022)	USA	Matched-case control	186 case participants and	Delta^	Excluded	BNT162b2	Documented infection	91 (33-99)	1-4 wk	~11 weeks
									83 (34-95)	13-17 wk	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				356 matched control participants aged 12 to 18 years				Symptomatic infection	93 (81-97)	14+	
								Asymptomatic infections	85 (57-95)	14+	
198	Oliver et al* (March 9,2022)	Canada	Retrospective cohort	13,579 individuals in hemodialysis	Alpha^	Excluded	BNT162b2 & mRNA-1273	Documented infection	69 (58-78)	7+	~22 weeks
								Severe disease	83 (70-90)		
								Hospitalization	82 (69-90)		
								Deaths	85 (59-95)		
197	Perry et al* (March 3, 2022)	UK	Retrospective cohort	1,262,689 adults aged 50 or older in Wales	Alpha, Delta^	Included	BNT162b2	Documented infection	50 (44-55)	>6	~26.5 weeks
								Hospitalization	88 (81-93)		
							AZD1222	Documented infection	25 (15-33)		~18 weeks
								Hospitalization	81 (71-88)		
196	Wright et al* (February 25, 2022)	USA	Case control	9667 cases and 38,668 controls (18 years or older)	Alpha,†† Delta^	Included	BNT162b2	Severe disease	87.9 (86.7-89)	14+	~40 weeks
							mRNA-1273		92.9 (92-93.7)		
							Ad26.COV2.S		73 (68.8-76.6)		
195	Klein et al (March 1,2022)	USA	Test-negative case control	39,217 ED and UC encounters and 1,699 hospitalizations a mong persons aged 5–17 years	**Omicron^**	Unknown	BNT162b2	ED or UC encounters in 5-11 years	51 (30–65)	14-67	~33 weeks
								ED or UC encounters in 12-15 years	45 (30-57)	14-149	
									-2 (-25-17)	150+	
								ED or UC encounters in 16-17 years	34 (8-53)	14-149	
									-3 (-30-18)	150+	
					Delta^	Unknown	BNT162b2	ED or UC encounters in 12-15 years	92 (89-94)	14-149	~33 weeks
									79 (68-86)	150+	
								ED or UC encounters in 16-17 years	85 (81-89)	14-149	
									77 (67-84)	150+	
					Omicron or Delta^			Hospitalizations in 5-11 years	74 (-35-95)	14-67	
								Hospitalizations 12-15 years	92 (79-97)	14-149	
									73 (43-88)	150+	
								Hospitalizations 16-17 years	94 (87-97)	14-149	
									88 (72-95)	150+	
194	Šmíd et al (February 25, 2022)	Czech Republic	Retrospective cohort	8,173,828 individuals, all ages	**Omicron^**	Included	BNT162b2	Documented infection	49 (48-50)	14-74	~54 weeks
									11 (10-12)	135+	
								Hospitalisation	46 (28-60)	14-74	
									34 (24-42)	135+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							mRNA-1273	Documented infection	48 (44-52)	14-74	
									20 (17-22)	135+	
								Hospitalisation	51 (-20-80)	14-74	
									31 (9-49)	135+	
							AZD1222	Documented infection	51 (23-69)	75-135	
									5 (1-9)	135+	
								Hospitalisation	-139 (-861-41)	75-135	
									13 (-8-30)	135+	
							Ad26.COV2.S	Documented infection	47 (45-49)	14-74	
									35 (33-38)	135+	
								Hospitalisation	28 (-22-57)	14-74	
									38 (8-58)	135+	
					Delta^	Included	BNT162b2	Documented infection	82 (81-83)	14-74	~54 weeks
									54 (53-55)	135+	
								Hospitalisation	80 (72-85)	14-74	
									81 (79-82)	135+	
							mRNA-1273	Documented infection	71 (65-76)	14-74	
									68 (66-69)	135+	
								Hospitalisation	100 (CI omitted)	14-74	
									82 (78-85)	135+	
							AZD1222	Documented infection	65 (57-72)	75-135	
									45 (43-48)	135+	
								Hospitalisation	80 (62-89)	75-135	
									68 (64-71)	135+	
							Ad26.COV2.S	Documented infection	60 (57-63)	14-74	
									54 (50-57)	135+	
								Hospitalisation	54 (39-65)	14-74	
									61 (51-69)	135+	
193	Cura-Bilbao et al* (February 2, 2022)	Spain	Prospective cohort	925,915 residents of Aragon, Spain	Non-VOC, Alpha††	Excluded	BNT162b2	Documented infection	70 (65.3-74.1)	7+	~16 weeks
							mRNA-1273		70.3 (52.2-81.5)	14+	
192	Shen et al* (February 23, 2022)	USA	Retrospective cohort	5,536 immuno-suppressed individuals	Non-VOC, Alpha,†† Delta^	Excluded	BNT162b2	Documented infection	41 (9-62)	14+	~36 weeks
							mRNA-1273		48 (18-67)		
							Ad26.COV2.S		66 (-30-91)		
191	Mallow et al* (February 9, 2022)	USA	Test-negative case control	13,203 emergency department patients (aged 18+)	Non-VOC, Alpha,†† Delta^	Unknown	BNT162b2	Emergency department visit	73.9 (66.3-79.8)	14+	~31 weeks
							mRNA-1273		78 (68.1-84.9)		
190	Wu et al	China			Delta^	Excluded	BBIBP-CorV	Symptomatic disease	50.5 (3.8-74.6)	14+	~24 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	(January 10,2022)		Retrospective cohort	1,462 close contacts					39.3 (-20.4-69.4)	≤3 mos.	
									82 (-25.7-97.4)	4-6 mos.	
								Pneumonia	54.7 (-3.4-80.2)	14+	
									39.6 (-35.4-73.1)	≤3 mos.	
							CoronaVac	Symptomatic disease	39.1 (-0.9-63.3)	14+	
									45.5 (-5.9-71.9)	≤3 mos.	
									29.8 (-41.1-65.1)	4-6 mos.	
								Pneumonia	64.9 (22.8-84.0)	14+	
									73.8 (17.9-91.6)	≤3 mos.	
									47.4 (-44.3-80.8)	4-6 mos.	
189	Filon et al* (February 15, 2022)	Italy	Retrospective cohort	4251 HCWs	Non-VOC and Alpha††	Excluded	BNT162b2	Documented infection (March)	95 (92-98)	7+	~16 weeks
								Documented infection (April)	95 (92-98)		
								Documented infection (May)	80 (70-84)		
187	Halasa et al* (June 22, 2022) *[Update to February 15, 2022 preprint]*	USA	Test-negative case control	537 case-infants and 512 control-infants< 6 months hospitalized in 20 pediatric hospitals	Delta, **Omicron^**	Included	BNT162b2 & mRNA-1273	Hospitalization in infants with maternal vaccination anytime during pregnancy up to 14 days before delivery	52 (33-65)	14+	~33 weeks
								Hospitalization in infants with maternal vaccination in first 20 weeks of pregnancy	38 (3-60)		
								Hospitalization in infants with maternal vaccination from 21 weeks up to 14 days before delivery	69 (50-80)		
					Omicron^			Hospitalization in infants with maternal vaccination anytime during pregnancy up to 14 days before delivery	38 (8-58)		
								Hospitalization in infants with maternal vaccination in first 20 weeks of pregnancy	25 (-26-56)		
								Hospitalization in infants with maternal vaccination from 21	57 (25-75)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								weeks up to 14 days before delivery			
					Delta^			Hospitalization in infants with maternal vaccination anytime during pregnancy up to 14 days before delivery	80 (60-90)		
								Hospitalization in infants with maternal vaccination in first 20 weeks of pregnancy	68 (19-87)		
								Hospitalization in infants with maternal vaccination from 21 weeks up to 14 days before delivery	88 (68-96)		
186	Jara et al (February 15, 2022)	Chile	Prospective cohort	1,976,344 children aged 6-16 years	Delta^	Excluded	CoronaVac	Documented infection (6-16 years)	74.8 (74.1-75.5)	14+	~28 weeks
								Hospitalization (6-16 years)	91.3 (88.1-93.6)		
								ICU admission (6-16 years)	93.8 (85.7-97.3)		
							BNT162b2	Documented infection (12-16 years)	84.4 (83.7-85.0)		~30 weeks
								Hospitalization (12-16 years)	93.5 (90.4-95.6)		
								ICU admission (12-16 years)	98.0 (89.9-99.6)		
185	Ferdinands et al (February 11, 2022)	USA	Test-negative case control	241,204 ED/UC encounters and 93,408 hospitalizations	Omicron^	Included	BNT162b2 & mRNA-1273	ED or UC encounters	69 (62–75)	< 2 mos	~25 weeks
									37 (34–40)	≥5 mos	
								Hospitalization	71 (51–83)	< 2 mos	
									54 (48–59)	≥5 mos	
					Delta^			ED or UC encounters	92 (91–94)	< 2 mos	
									77 (76–78)	≥5 mos	
								Hospitalization	94 (92–96)	< 2 mos	
									82 (82–83)	≥5 mos	
184	Goldin et al* (February 8, 2022)	Israel	Retrospective cohort	43,596 residents of long-term care	Non-VOC, Alpha††	Excluded	BNT162b2	Documented infection	81.2 (78.6-83.5)	7+	~16.5 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				facilities (65+ years)				Death	85.3 (80.4-88.9)	7+	
183	Hayek et al* (January 27, 2022)	Israel	Retrospective cohort	155,305 households with 400,733 children	Alpha^	Excluded	BNT162b2	Documented infection	94.4 (93.2-95.4)	7+	~12 weeks
182	ECDC (January 20, 2022)	Belgium, Croatia, Czechia, France, Greece, Malta, Portugal and Spain	Test-negative case control	1893 hospitalised patients	Alpha^	Excluded	BNT162b2	Hospitalization	94 (88-97)	14+	~28 weeks
181	Butt et al* (February 9, 2022)	USA	Test-negative case control	4,229 cases and controls on haemodialysis	Delta^	Excluded	BNT162b2	Documented infection	68.9 (61.9-74.7)	14+	~31 weeks
							mRNA-1273		66.7 (58.9-73.0)		
180	Cerqueira-Silva et al* (February 9,2022)	Brazil	Test-negative case control	7,747,121 individuals	Gamma and Delta^	Excluded	CoronaVac	Documented infection	55 (54.3-55.7)	14-30	~30 weeks
									34.7 (33.1-36.3)	>180	
								Severe disease	82.1 (81.4-82.8)	14-30	
									72.6 (71.0-74.2)	>180	
								Hospitalization	82.1 (81.4-82.8)	14-30	
									72.4 (70.7-73.9)	>180	
								Death	82.7 (81.7-83.6)	14-30	
									74.8 (72.2-77.2)	>180	
179#	Chemaitelly et al* (June 2, 2022) *[Published version of March 13,2022 preprint]*	Qatar	Test-negative case control	2,706,008 individuals	**Omicron BA.1 specifically^**	Included	BNT162b2	Symptomatic disease	46.6(33.4-57.2)	1-3 mo	~58 weeks
									-17.8(-28.2- -8.2)	7+ mo.	
							mRNA-1273		71.0 (24.0- 89.0)	1-3 mo	
									-10.2 (-23.1-1.3)	7+ mo.	
					Omicron BA.2 specifically^		BNT162b2		51.7 (43.2-58.9)	1-3 mo	
									-12.1 (-19.1-5.5)	7+ mo.	
							mRNA-1273		35.9 (-5.9-61.2)	1-3 mo	
									-20.4 (-30.2-1.2)	7+ mo.	
					Omicron specifically^		BNT162b2	Symptomatic disease	51.7(43.2-58.9)	1-3 mo	
									-9.0 (-14.5- -3.7)	7+ mo.	
							mRNA-1273		43.2(15-62.1)	1-3 mo	
									-13.7(-21.3- -6.6)	7+ mo.	
							BNT162b2	Severe, critical or fatal	70.4 (45.0-84.0))	1-6 mo	
									77.5 (67.8-84.3)	7+ mo.	
							mRNA-1273		87.1 (40.2-97.2)	1-6 mo	
									68.4 (46.1-81.5)	7+ mo.	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
178	Lauring et al* (March 9, 2022) [February 7,2022]	USA	Test-negative case control	5582 COVID-19 cases and 5962 test-negative and syndrome negative controls	**Omicron specifically^**	Excluded	BNT162b2 & mRNA-1273	Hospitalization	65 (51-75)	14+	~3 weeks
					Delta specifically^		BNT162b2 & mRNA-1273		85 (83-87)	≤150	~27 weeks
									90 (85-93)	>150	
							BNT162b2		82 (80-84)	14+-	
							mRNA-1273		88 (86-90)		
					Alpha specifically^		BNT162b2		82 (77-86)		~44 weeks
							mRNA-1273		90 (85-93)		
177	Suryatma et al (March 11,2022) *[Update to February 3 preprint]*	Indonesia	Test-negative case control	14,168 adults aged ≥18	Non-VOC, Alpha††	Excluded	CoronaVac	Documented infection	66.7 (58.1-73.5)	14+	~24 weeks
								Hospitalization	71.1 (62.9-77.6)		
								Death	87.4 (65.1-95.4)		
176	Sritipsukho et al* (February 3,2022)	Thailand	Test-negative case control	1,118 cases and 2,235 controls	Delta^	Excluded	AZD1222	Documented infection	83 (70-90)	14+	~13 weeks
							CoronaVac		60 (49-69)		
							CoronaVac + AZD1222		74 (43-88)		
175	Roberts et al (January 31,2022)	USA	Test-negative case control	74,060 adults	Non-VOC, Alpha, Delta††	Included	BNT162b2	Documented infection (Overall)	83 (81-84)	<3 mos.	~48 weeks
									60 (58-62)	≥3 mos.	
								Documented infection (Jan-March)	80 (74-85)	<3 mos.	
									80.5 (74-86)	≥3 mos.	
								Documented infection (Oct-Dec)	75 (64-81)	<3 mos.	
									60 (55-62)	≥3 mos.	
								Severe disease (Overall)	88 (80-91)	<3 mos.	
									75 (70-80)	≥3 mos.	
								Severe disease (Jan-March)	90 (49-99)	<3 mos.	
									90 (50-99)	≥3 mos.	
								Severe disease (Oct-Dec)	69 (22-88)	<3 mos.	
									78 (70-82)	≥3 mos.	
							mRNA-1273	Documented infection (Overall)	88 (85-90)	<3 mos.	
									65 (62-68)	≥3 mos.	
								Documented infection (Jan-March)	89 (73-95)	<3 mos.	
									89 (74-93)	≥3 mos.	
								Documented infection (Oct-Dec)	82 (69-91)	<3 mos.	
									68 (64-69)	≥3 mos.	
								Severe disease (Overall)	85 (75-90)	<3 mos.	
									72 (65-78)	≥3 mos.	
								Severe disease (Jan-March)	70 (0-95)	<3 mos.	
									70 (0-93)	≥3 mos.	
								Severe disease (Oct-Dec)	91 (5-99)	<3 mos.	
									80 (72-88)	≥3 mos.	
174	Lytras et al*	Greece			Delta^	Included	BNT162b2	Intubation	98.1 (97.5-98.6)	14+	~ 48 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	(June 14, 2022) *[Published version of January 29,2022 preprint]*		Retrospective cohort	9100 COVID-19 intubations and 14755 COVID-19 deaths in Greece aged ≥15 years				(age 15-59)	95.5 (94.3–96.5)	6 mos	
								Intubation (age 60-79)	96.7 (95.9–97.4)	14+	
									92 (91.0–92.9)	6 mos	
								Intubation (age 80+)	94.2 (92.0–95.7)	14+	
									85.9 (83.5–88.0)	6 mos	
								Death (age 15-59)	96.5 (94.8–97.6)	14+	
									93.8 (91.0–95.7)	6 mos	
								Death (age 60-79)	94.1 (92.7–95.2)	14+	
									89.4 (87.9–90.8)	6 mos	
								Death (age 80+)	91 (88.4–93.0)	14+	
									84 (82.2–85.6)	6 mos	
							mRNA-1273	Intubation (age 15-59)	99.4 (98.2-99.8)	14+	
									97.3 (93.1-98.9)	6 mos	
								Intubation (age 60-79)	98.9 (97.3–99.5)	14+	
									95.1 (93-96.5)	6 mos	
								Intubation (age 80+)	97.9 (90.2–99.5)	14+	
									90.6 (67-97.3)	6 mos	
								Death (age 15-59)	99.3 (94.7-99.9)	14+	
									98.3 (88.3-99.8)	6 mos	
								Death (age 60-79)	98.4 (95.5–99.5)	14+	
									96.2 (93.6–97.7)	6 mos	
								Death (age 80+)	96.7 (87.9–99.1)	14+	
									92 (80–96.8)	6 mos	
							AZD1222	Intubation (age 15-59)	97.8 (95.3-99)	14+	
									92.4 (84-96.4)	6 mos	
								Intubation (age 60-79)	97.2 (95.3–98.3)	14+	
									90.3 (87.4-92.5)	6 mos	
								Intubation (age 80+)	97.8 (91.7–99.4)	14+	
									92.4 (72.7–97.9)	6 mos	
								Death (age 15-59)	97.5 (89.7-99.4)	14+	
									94.5 (77.2-98.7)	6 mos	
								Death (age 60-79)	95.4 (91.2–97.6)	14+	
									89.8 (85.2–93.0)	6 mos	
								Death (age 80+)	92.6 (84.2–96.5)	14+	
									83.4 (69.6–90.9)	6 mos	
							Ad26.COV2.S	Intubation (age 15-59)	85.0 (73.9–91.4)	14+	
									91.7 (84.4-95.6)	6 mos	
								Intubation (age 60-79)	79.6 (65.2–88.0)	14+	
									88.7 (78.7-94)	6 mos	
								Intubation	85.0 (62.3–94.0)	14+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								(age 80+)	91.7 (75.5-97.2)	6 mos	
								Death (age 15-59)	81.7 (57.5–92.1)	14+	
									90.7 (77.2-96.2)	6 mos	
								Death (age 60-79)	69.1 (43.2–83.2)	14+	
									84.3 (67.9-92.3)	6 mos	
								Death (age 80+)	61.9 (43.2–74.4)	14+	
									80.6 (59.7–90.7)	6 mos	
173	Tenforde et al* (January 28, 2022)	USA	Test-negative case control	2952 hospitalized adults (18+ y)	Delta^	Included	BNT162b2 or mRNA-1273	Hospitalization: Immunocompromised	69 (57-78)	14+ up to <7 days pose dose 3	~47 weeks
								Hospitalization: Non-immunocompromised	82 (77-86)		
172	Belayachi et al (January 27, 2021)	Morocco	Test-negative case control	25,768 Moroccan patients	Non-VOC, Alpha, Delta††	Included	BBIBP-CorV	Severe hospitalisation	73 (71-76)	1-273	~39 weeks
									88 (84-91)	1-30	
									64 (59-69)	150+	
171#	Willet et al (January 26,2021)	Scotland	Test-negative case control	6166 Omicron cases and 4911 Delta cases	**Omicron specifically^**	Included	BNT162b2	Documented infection	26.0 (13.9-36.4)	14+	~11 weeks
							mRNA-1273		23.7 (4.4-39.4)		
							AZD1222		11.4 (-18.8-34.6)		
					Delta specifically^		BNT162b2		83.5 (78.6-87.3)		
							mRNA-1273		87.8 (79.8-92.7)		
							AZD1222		78.9 (66.6-86.7)		
170	Spensley et al* (January 26, 2022)	UK	Prospective cohort	1121 end stage kidney disease patients receiving in-center haemodialysis	**Omicron specifically^**	Included	BNT162b2	Documented infection	17 (-62-57)	14+	~52.5 weeks
							AZD1222		-4 (-97-43)		
169	Botton et al* (January 24, 2022)	France	Retrospective cohort	4,053,569 elderly adults (aged 75+)	Non-VOC, Alpha††	Unknown	BNT162b2 & mRNA-1273	Hospitalization	86 (83-89)	7+	~7 weeks
168	Bedston et al* (January 21, 2022)	UK	Prospective cohort	93,292 HCWs	Alpha^	Excluded	BNT162b2	Documented infection	86 (74-91)	2-5 weeks	~37 weeks
									45 (39-51)	26+ weeks	
167	Thompson et al (January 21,2022)	USA	Test-negative case control	222,772 ED encounters and 87,904 hospitalization	**Omicron^**	Unknown	BNT162b2 & mRNA-1273	ED or UC encounters	52 (46-58)	14-179	~32 weeks
									38 (32-43)	≥180	
								Hospitalisation	81 (65-90)	14-179	
									57 (39-70)	≥180	
					Delta^			ED or UC encounters	86 (85-87)	14-179	
									76 (75-77)	≥180	
								Hospitalisation	90 (89-90)	14-179	
									81(80-82)	≥180	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
166	Amodio et al* (March 11,2022) [Published version od January 13,2022 preprint]	Italy	Retrospective cohort	3,966,976 adults aged≥ 18 years	Alpha, Delta††	Excluded	BNT162b2 & mRNA-1273	Documented infection	81.3 (80.3-82.3)	2 months	~37 weeks
									57.8 (55.4-60.2)	8 months	
								Severe disease	96.1 (94.5-97.7)	2 months	
									90.3 (86.2-94.4)	8 months	
								Death or intubation	93.4 (91.2-95.6)	2 months	
									83.7 (75.1-92.3)	8 months	
165#	Tartof et al* (April 22, 2022) *[Update to January 18, 2022 preprint]*	USA	Test-negative case control	11,123 patients with ED or hospital encounter in Southern California	**Omicron specifically^**	Included	BNT162b2	ED admission	47 (40-54)	7+	~47 weeks
									64 (51-73)	7 to <3 mos	
									31 (16-43)	≥9 mos	
								Hospitalisation	62 (53-69)	7+	
									68 (48-80)	7 to <3 mos	
									41 (21-55)	≥9 mos	
					Delta specifically^			ED admission	61 (55-66)	7+	
									78 (69-85)	7 to <3 mos	
									57 (45-66)	≥9 mos	
								Hospitalisation	76 (69-82)	7+	
									78 (55-89)	7 to <3 mos	
									73 (58-83)	≥9 mos	
164	Young-Xu et al* (August 3, 2022) *[Update to March 13, 2022 preprint]*	USA	Matched test-negative case control	37,117 veterans 18 years or older as cases and 434,096 as controls	**Omicron specifically^**	Excluded	BNT162b2 & mRNA-1273	Documented infection	12 (10-15)	14+	~~48 weeks
								Hospitalization	63 (58-67)		
								Death	77 (67-83)		
					Delta specifically^			Documented infection	54 (50-57)		
								Hospitalization	75 (69-80)		
								Death	92 (83-96)		
163	Suah et al* (March 21, 2022) *[Update to (January 16,2022 preprint]*	Malaysia	Retrospective cohort	9,926,361 vaccinated individuals aged ≥15, and unvaccinated controls	Delta^	Excluded	BNT162b2	Documented infection: Vaccinated April to June	79.3 (76.1-82.1)	9-26 weeks	~26 weeks
								Documented infection: Vaccinated July to August	90.8 (89.4-92.1)	2-13 weeks	
							CoronaVac	Documented infection: Vaccinated April to June	30.4 (18.8-40.3)	9-26 weeks	
								Documented infection: Vaccinated July to August	74.5 (70.6-78)	2-13 weeks	
162	Gazit et al* (November 24, 2021)	Israel	Retrospective cohort	4024 adult household members of SARS-CoV-2 index cases	Alpha^	Excluded	BNT162b2	Documented infection	80.3 (73.5-85.4)	7+	~7.5 weeks
161	Olson et al* (January 12,2022)	USA	Case control	445 case patients and 777 control	Delta^	Unknown	BNT162b2	Hospitalization	94 (90-96)	14+	~18 weeks
								ICU admission	98 (93-99)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
			Test-negative case control	patients aged 12-18 years				Hospitalization	95 (91-97)		
								ICU admission	98 (94-100)		
160	Chiew et al (January 8, 2022)	Singapore	Retrospective cohort	307,587 adolescents aged 12-18	Delta^	Unknown	BNT162b2	Documented infection	59 (55-63)	14+	~20 weeks
									78 (70-84)	14-30	~2 weeks
									54 (45-62)	120+	~20 weeks
								Symptomatic infection	62 (57-66)	14+	
									80 (70-86)	14-30	~2 weeks
									53 (5-77)	120+	~20 weeks
159#	Tseng et al* (February 21, 2022) *[update from January 21 preprint]*	USA	Test-negative case control	26,683 cases and 109,662 controls among Kaiser Permanente Southern California members aged 18+	**Omicron specifically^**	Included	mRNA-1273	Documented infection	13.9 (10.5-17.1)	14+	~47.5 weeks
									44 (35.1-51.6)	14-90	~11 weeks
									5.9 (0.4-11.0)	>270	~47.5 weeks
								Hospitalization	84.5 (23-96.9)	14+	
					Delta specifically^			Documented infection	63.6 (59.9-66.9)	14+	
									80.2 (68.2-87.7)	14-90	~11 weeks
									61.3 (55-66.7)	>270	~47.5 weeks
								Hospitalization	99 (93.3-99.9)	14+	
158	Zambrano et al (January 7,2022)	USA	Test-negative case control	102 MIS-C case-patients and 181 hospitalized controls aged 12-18 years	Delta^	Included	BNT162b2	MIS-C	86 (70-93)	14+	~23 weeks
									91 (78-97)	28+	
						Excluded			90 (75-96)		
157	Prunas et al (January 5,2022)	Israel	Matched Case-control	11,822 cases and 226,201 controls aged 12-16 years	Delta^	Excluded	BNT162b2	Documented infection	85 (84-86)	14-89	~25 weeks
									58 (52-64)	150-180	
								Symptomatic disease	90 (89-91)	14-89	
									65 (58-71)	150-180	
			Test negative case control					Documented infection	84 (82-85)	14-89	
									50 (43-57)	150-180	
156	Petráš et al* (December 22, 2021)	Czech Republic	Retrospective cohort	11,016 staff of three hospitals in Prague	Alpha, Delta††	Excluded	BNT162b2	Documented infection: Overall	88.3 (83.2-91.8)	>14	~30 weeks
								Symptomatic disease: Overall	91.7 (85.7-95.2)		
					Alpha††			Documented infection: February 2021	96.2 (91.6-98.7)		4 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
					Delta††			Documented infection: June-Aug 2021	65 (<0-96.6)		~30 weeks
155	Cerqueira-Silva et al* (March 31, 2022) *(Update to December 27, 2021 preprint]*	Brazil	Test negative case control	22,566 cases and 68,426 test-negative individuals aged 18+ with prior SARS-CoV-2 infection	Non-VOC, Gamma, Delta^	All participants had confirmed prior infection	CoronaVac	Symptomatic reinfection	39.4 (36.1-42.6)	14+	~37 weeks
									40.5 (36.4-44.3)	14-90	~11 weeks
									38 (33.1-42.5)	>90	~37 weeks
								Hospitalization or death	81.3 (75.3-85.8)	14+	
									86.6 (79.8-90.3)	14-90	~11 weeks
									74.4 (63.3-82.2)	>90	~37 weeks
							AZD1222	Symptomatic reinfection	56 (51.4-60.2)	14+	
									55.5 (50.5-60.1)	14-90	~11 weeks
									56.8 (46.6-65.1)	>90	~37 weeks
								Hospitalization or death	89.9 (83.5-93.8)	14+	
									86.6 (77.6-92.0)	14-90	~11 weeks
									95.1 (84.8-98.4)	>90	~37 weeks
							BNT162b2	Symptomatic reinfection	64.8 (54.9-72.4)	14+	
									64.2 (54.2-72)	14-90	~11 weeks
									100 (CI omitted)	>90	~37 weeks
								Hospitalization or death	89.7 (54.3-97.7)	14+	
									88.8 (50-97.5)	14-90	~11 weeks
									100 (CI omitted)	>90	~37 weeks
							Ad26.COV2.S	Symptomatic reinfection	44 (31.5-54.2)	14+	
									46.1 (32.7-56.7)	14-90	~11 weeks
									30.6 (-12.4-57.1)	>90	~37 weeks
								Hospitalization or death	57.7 (-2.6-82.5)	14+	
									60.2 (-10.8-85.7)	14-90	~11 weeks
									41 (-240.9-89.9)	>90	~37 weeks
154#	Buchan et al (January 28,2022)	Canada	Test negative case control	16,087 Omicron-positive cases, 4261 Delta-	**Omicron specifically^**	Excluded	Any mRNA vaccine	Symptomatic disease	36 (24–45)	7-59	~34 weeks
									2 (-17-17)	240+	
								Severe outcomes	55 (-106-90)	7-59	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Updated version of previous January 1st preprint]			positive cases, and 114,087 test-negative controls aged ≥18 years					86(-12-98)	240+	
					Delta^		Any mRNA vaccine	Symptomatic disease	89 (86-92)	7-59	
									80 (74-84)	240+	
								Severe outcomes	94(84-98)	7-59	
									95(85-99)	240+	
153	Chung et al* (January 1,2022)	USA	Test negative case control	3,384 individuals aged ≥12 years	Non-VOC, Alpha, Delta^	Included	BNT162b2	Symptomatic disease	66(56-73)	14+	~34 weeks
							mRNA-1273		81(73-86)		
152	Lutrick et al (December 31,2021)	USA	Prospective cohort	243 individuals aged 12-17 years	Delta^	Excluded	BNT162b2	Documented infection	92(79-97)	14+	~17 weeks
151#	Collie et al* (December 29, 2021)	South Africa	Test negative case control	211,610 PCR tests of individuals In Gauteng Province	**Omicron specifically^**	Included	BNT162b2	Hospitalization	69 (48-81)	14+	~24 weeks
					Delta^				93 (90-94)		~19 weeks
150	Mendola et al* (December 23, 2021)	Italy	Retrospective cohort	2,478 HCWs 18+ years at a public hospital	Alpha††	Excluded	BNT162b2	Documented infection	89 (78-95)	8-98	~12 weeks
149	Alali et al* (December 7, 2021)	Kuwait	Retrospective cohort	3,246 HCWs 20+ years at a secondary hospital	Alpha††	Excluded	AZD1222	Symptomatic disease	94.5 (89.4 – 97.2)	14+	~20 weeks
148	Ostropolets et al* (August 23, 2022) *[Update to December 25, 2021 preprint]*	USA	Retrospective cohort	179,666 patients of Columbia University Medical Center	Non-VOC, Alpha, Delta††	Excluded	BNT162b2	Documented infection	94 (91-95)	14+	52 weeks
								Hospitalization	95 (92-97)		
							mRNA-1273	Documented infection	97 (94-98)		
								Hospitalization	96 (92-99)		
							Ad26.COV2.S	Documented infection	81 (50-94)		
								Hospitalization	92 (58-100)		
147	Amir et al (December 21, 2021)	Israel	Quasi-experimental	348,468 individuals aged 16-18 and 361,050 individuals aged 12-14	Delta^	Excluded	BNT162b2	Documented infection: 12-14 years	92 (91.1-92.8)	14-60	~6.5 weeks
								Documented infection: 16-18 years	89.8 (80-93.8)		
146	Katikireddi et al* (December 20, 2021)	Scotland	Retrospective cohort	2,534,527 adults (aged 18+)	Delta^	Excluded	AZD1222	Hospitalization or death	83.7 (79.7-87.0)	14-27	~20 weeks
									53.6 (48.4-58.3)	140-153	
145	Kissling et al* (May 26,2022)	Croatia, France, Ireland, Netherlands	Test negative case control	2,725 cases and 11,557 controls aged 30+	Delta^	Included	BNT162b2	Symptomatic disease (30-59 years)	87 (83–89)	14-29	~30 weeks
									65 (56–71)	90+	
								Symptomatic disease (60+ years)	65 (37-80)	30-59	
									64 (44-77)	90+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Published version of December 23,2021 preprint]	, Portugal, Romania, Spain, and the UK					mRNA-1273	Symptomatic disease (30-59 years)	98 (93–100)	14-29	
									90 (76–96)	60-89	
							AZD1222		72 (52–83)	14-29	
									65 (48–76)	60-89	
							Ad26.COV2.S		50 (36–62)	30–59	
									52 (33–66)	60-89	
144#	Hansen et al (December 23,2021)	Denmark	Retrospective cohort	41,684 Danish residents aged ≥12 years	**Omicron specifically^**	Excluded	BNT162b2	Documented infection	55.2 (23.5-73.7)	15-44	21 weeks
									-76.5 (-95.3, -59.5)	105-164	
							mRNA-1273		36.7 (-69.9-76.4)	15-44	
									-39.3 (-61.6, -20)	105-164	
					Delta specifically^		BNT162b2		86.7 (84.6-88.6)	15-44	
									53.8 (52.9-54.6)	105-164	
							mRNA-1273		88.2 (83.1–91.8)	15-44	
									65.0 (63.6- 66.3)	105-164	
143	Ioannou et al (December 21,2021)	USA	Target trial emulation study	4,199,742 individuals	Non-VOC and Alpha ††	Excluded	BNT162b2 & mRNA-1273	Documented infection (March 31st 2021)	65 (63–68)	7+	~28 weeks
								Documented infection (June 30tht 2021)	69 (67–70)		
								Death (March 31st 2021)	89 (84–92)		
								Death (June 30tht 2021)	86 (82–89)		
142	Lewis et al* (December 21,2021)	USA	Test negative case control	3,619 adults	Alpha and Delta††	Included	BNT162b2 & mRNA-1273	Hospitalization with no underlying conditions	96 (93-98)	14+	~30 weeks
								Hospitalization with one underlying conditions	93 (89-95)		
								Hospitalization with 2 underlying conditions	87 (92-91)		
								Hospitalization with 3+ underlying conditions	83 (72-88)		
141	Tartof et al* (February 14, 2021) *[Updated version of previous December 21st preprint]*	USA	Retrospective matched cohort	3,133,075 adults ≥ 18 years	Non-VOC, Alpha and Delta††	Included	BNT162b2	Documented infection	85 (83-86)	7-36	~48 weeks
									49 (46-51)	217+	
								Hospitalization	90 (86-92)	7-36	
									88 (85-90)	217+	
140#	Bekker et al*(March 19,2022)	South Africa	Retrospective matched cohort	477,234 HCWs	Beta, Delta, Kappa^	Included	Ad26.COV2.S	Hospitalization	67 (62-71)	28+	16 weeks
								ICU/CCU admission	75 (69-82)		
					Beta^			Death	83 (75-89)		
								Hospitalization	62 (42-76)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Published version of December 20,2021]							ICU/CCU admission	49 (8-77)		
								Death	86 (57-100)		
					Delta^			Hospitalization	67 (62-71)		
								ICU/CCU admission	78 (71-88)		
								Death	82 (74-89)		
139	Abu-Raddad et al* (January 21, 2022) Published version of December 16,2021	Qatar	Test negative case control	107,099 test-positive cases and 658,564 test-negative controls	Beta and Delta^	Excluded	mRNA-1273	Documented infection	85.3 (83.5-86.9)	30+	~35 weeks
									-29.5 (-84-8.8)	240+	
								Symptomatic disease	94.4 (92.8-95.6)	30+	
									20 (-29-59.3)	240+	
								Asymptomatic disease	79.9 (75.5-83.4)	30+	
									-28.4 (-129.3-28.1)	240+	
								Hospitalization and death	97.2 (92.4-99)	30+	
									61 (-225.5-95.3)	180+	
138	McLean et al* (February 18,2022) *Published version of pre-print from December 16,2021*	USA	Prospective cohort	1,518 individuals aged ≥12 years	Non-VOC, Alpha and Delta††	Included	BNT162b2	Symptomatic and asymptomatic infections	50 (21-69)	14+	~52 weeks
							mRNA-1273		65 (37-81)		
							BNT162b2	Symptomatic infections	54 (26-71)		
							mRNA-1273		65 (38-81)		
						Excluded	BNT162b2	Symptomatic and asymptomatic infections	51 (22-70)		
							mRNA-1273		66 (38-82)		
					Delta specifically^	Excluded	BNT162b2	Symptomatic and asymptomatic infections	52 (20-71)		
							mRNA-1273		59 (24-78)		
137	Castillo-Arregoces et al (December 16,2021)	Colombia	Retrospective matched cohort	2,828,294 individuals aged 60+	Mu^	Excluded	BNT162b2	Hospitalization without death	83 (78.4-86.6)	14+	32 weeks
								Post-hospitalization death	94.8 (93.3 – 96)		
								Death	88.3 (84.1-91.4)		
							AZD1222	Hospitalization without death	90.8 (85.5-94.2)		
								Post-hospitalization death	97.5 (95.8-98.5)		
								Death	93.9 (89.3-96.6)		
							Ad26.COV2.S	Hospitalization without death	60.9 (36.8-75.8)		
								Post-hospitalization death	85.8 (77.1-91.2)		
								Death	95.5 (82.0- 98.9)		
							CoronaVac	Hospitalization without death	47.3 (41.9-52.3)		
								Post-hospitalization death	72.1 (70.1-73.9)		
								Death	64.9 (61.2-68.9)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
136	Young-Xu et al* (December 15, 2021) *Updated analysis of reference #45*	USA	Test negative case control	71,190 male veterans aged 65+ in the Veterans Health Administration	Non-VOC and Alpha †† (pre-Delta)^	Excluded	BNT162b2 & mRNA-1273	Documented infection	94.5 (90.7-96.7)	14-43	4 weeks
									87.9 (85.9-89.5)	74-103	12 weeks
					Alpha, Delta†† (rising Delta)^				92.1 (87.2-95.1)	14-43	4 weeks
									67.3 (63.2-70.9)	134-163	20 weeks
					Delta^				62.0 (45.6-73.5)	14-43	4 weeks
									24.8 (18.8-30.4)	224-253	32 weeks
135	Florea et al* (April 28, 2022) *Updated interim analysis of reference #86*	USA	Prospective cohort	927,004 matched pairs of adult (18+) Kaiser Permanente members in Southern California	Non-VOC, Alpha, Delta††	Included	mRNA-1273	Documented infection	82.8 (82.2-83.3)	14+	~35 weeks
									88.0 (86.8-89.1)	14-60	~6.5 weeks
									75.5 (70.4-79.7)	180-240	~35 weeks
								Hospitalization	96.1 (95.5-96.6)	14+	
									95.9 (93.5-97.4)	14-60	~6.5 weeks
									94.5 (90.9-96.7)	180-240	~35 weeks
								Death in hospital	97.2 (94.8-98.4)	14+	
					Delta^			Documented infection	86.5 (84.8-88.0)	14+	~15 weeks
134	Machado et al* (September 13, 2022) [Update to December 14,2021 preprint]	Portugal	Retrospective cohort	1,884,932 adults aged 65+	Alpha and Delta^	Excluded	BNT162b2 and mRNA-1273	Symptomatic infection in 65-79 years old	79 (76-83)	14-41	~29 weeks
									39 (29-48)	98+	
								Symptomatic infection in 80+ years old	72 (61-79)	14-41	
									34 (29-48)	124+	
								Hospitalization in 65-79 years old	95 (90-97)	14-41	
									93 (86-96)	70+	
								Hospitalization in 80+ years old	83 (68-91)	14-41	
									63 (37-78)	124+	
								Death in 65-79 years old	95 (88-98)	14-41	
									93 (87-96)	70+	
								Death in 80+ years old	87 (71-93)	14-41	
									75 (64-82)	124+	
							AZD1222	Symptomatic infection in 65-79 years old	95 (90-97)	14-41	
									93 (86-96)	70+	
								Hospitalization in 65-79 years old	89 (52-94)	14+	
								Death in 65-79 years old	95 (90-97)		
133	Berec et al* (July 8,2022)	Czech Republic	Retrospective cohort		Alpha and Delta^	Included	BNT162b2	Documented infection	87 (86-87)	0-2 mos.	~35 weeks
									53 (52-54)	7-8 mos.	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Published version of December 12th preprint]			6,287,356 individuals ≥ 12 years				Hospitalization	90 (89-91)	0-2 mos.	
									75 (73-76)	7-8 mos.	
								Death	92 (90-93)	0-2 mos.	
									83 (81-86)	7-8 mos.	
							mRNA-1273	Documented infection	90 (89-91)	0-2 mos.	
									65 (63-67)	7-8 mos.	
								Hospitalization	94 (92-96)	0-2 mos.	
									81 (78-84)	7-8 mos.	
								Death	96 (91-98)	0-2 mos.	
									88 (82-92)	7-8 mos.	
							AZD1222	Documented infection	83 (80-85)	0-2 mos.	
									55 (54-56)	5-6 mos.	
								Hospitalization	87 (81-91)	0-2 mos.	
									70 (68-72)	5-6 mos.	
								Death	93 (77-98)	0-2 mos.	
									82 (78-85)	5-6 mos.	
							Ad26.COV2.S	Documented infection	68 (66-70)	0-2 mos.	
									67 (65-69)	5-6 mos.	
								Hospitalization	68 (60-75)	2 months	
									67 (62-72)	5-6 mos.	
								Death	68 (42-82)	2 months	
									68 (53-78)	5-6 mos.	
132	Powell et al* (March 21, 2022) *[Update to February 18, 2022 preprint]*	UK	Test-negative case control	617,259 eligible tests for 12-15-year-olds and 225,670 for 16-17-year-olds	**Omicron specifically^**	Excluded	BNT162b2	Symptomatic disease(12-15 years)	73(66.4-78.3)	14+	~33 weeks
								Symptomatic disease(16-17 years)	71.3(69.3-73.1)	14-34	
									22.6(14.5-29.9)	70+	
					Delta specifically^			Symptomatic disease(12-15 years)	87.2(73.7-93.8)	14+	
								Symptomatic disease(16-17 years)	93.1 (91.6-94.4)	14-34	
									83.7(72-90.5)	70+	
131	Bajema et al* (December 10,2021) *Updated analysis of reference #94*	USA	Test-negative case control	755 cases and 1,141 controls	Non-VOC, Alpha, Delta††	Excluded	BNT162b2	Hospitalization	86 (77.6-91.3)	14-119	~36 weeks
									75.1 (64.6-82.4)	120+	
							mRNA-1273		89.6 (80.1-94.5)	14-119	
									86.1 (77.7-91.3)	120+	
130#	UKHSA (January 27 2022)	England	Test-negative case control	760,647 Omicron cases, 236,023 Delta cases, and test negative	**Omicron specifically^**	Excluded	BNT162b2	Symptomatic Infection	65.8 (64.4-67.2)	2-4 weeks	~32 weeks
									9.4 (7.8-11.1)	25+ weeks	
							AZD1222		49.8 (40.7-57.5)	2-4 weeks	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Update to Jan 14, 2022 briefing] *[March 2, 2022 publication by Andrews et al with VE estimated till January 12, 2022 can be accessed here]*			controls aged 18+					-1 (-2.4-0.3)	25+ weeks	
							mRNA-1273		76 (72-79)	2-4 weeks	
									13 (3-22)	25+ weeks	
					Delta specifically^		BNT162b2		90.9 (89.6-92)	2-4 weeks	
									62.7 (61.6-63.7)	25+ weeks	
							AZD1222		82.8 (74.5-88.4)	2-4 weeks	
									43.5 (42.4-44.5)	25+ weeks	
							mRNA-1273		94.5 (90.5-96.9)	2-4 weeks	
									80.4 (67.3-88.2)	25+ weeks	
					Omicron specifically^		BNT162b2	Hospitalization	73.6 (40.7-88.3)	2-4 weeks	
									34.9 (17.7-48.4)	25+ weeks	
							AZD1222		55.8 (34.1-70.3)	20-24 weeks	
									32.7 (19.7-43.6)	25+ weeks	
					Delta specifically^		BNT162b2		94.1 (81.6-98.1)	2-4 weeks	
									95.3 (93.9-96.5)	25+ weeks	
							AZD1222		92.9 (91.3-94.2)	20-24 weeks	
									90.6 (89.3-91.8)	25+ weeks	
129	Yassi et al (December 6, 2021)	Canada	Retrospective cohort	21,242 HCWs in Vancouver, BC	Non-VOC, Alpha, Delta††	Unknown	BNT162b2 & mRNA-1273	Documented infection	74.1 (62.5-82.1)	7+	~40.5 weeks
			Test-negative case control						82.8 (74.0-88.6)		
128	Muhsen et al* (October 28, 2021)	Israel	Prospective cohort	9162 HCWs (aged 16-65 y) working in long-term care facilities	Alpha^	Excluded	BNT162b2	Documented infection	89 (83-93)	>14	~11 weeks
127	Wu et al* (December 2, 2021)	USA	Retrospective cohort	29,152 matched pairs of cancer patients in the Veterans Affairs health system	Non-VOC, Alpha††	Excluded	BNT162b2 & mRNA-1273	Documented infection	58 (39-73)	14+	15 weeks
126	Vokó et al* (November 24, 2021)	Hungary	Retrospective cohort	3.7 million Hungarian residents aged 16+	Alpha^	Included	BNT162b2	Documented infection	84.0 (83.3-84.7)	14+	~19 weeks
								Death	90.3 (88.9-91.5)		
							Sinopharm	Documented infection	72.8 (71.2-74.4)		~10.5 weeks
								Death	86.0 (83.7-87.9)		
							Sputnik V	Documented infection	88.1 (86.5-84.9)		~11 weeks
								Death	97.8 (95.5-98.9)		
							AZD1222	Documented infection	73.7 (71.1-76.0)		~11.5 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								Death	85.8 (73.5-92.4)		
							mRNA-1273	Documented infection	88.2 (85.8-90.3)		~15 weeks
								Death	93.8 (90.3-96.1)		
125	Hall et al* (February 16, 2022) *[Update to December 1, 2021 preprint]*	United Kingdom	Prospective cohort	35,768 HCWs (18+ years) undergoing routine asymptomatic testing	Non-VOC, Alpha, Delta^	Excluded	BNT162b2	Documented infection	Dose interval <6 weeks: 89 (78-94)	14-73	~8 weeks
									Dose interval <6 weeks: 53 (28-69)	194-265	~36 weeks
									Dose interval 6+ weeks: 85 (72-92)	14-73	~8 weeks
									Dose interval 6+ weeks: 51 (22-69)	194-239	~32 weeks
							AZD1222	Documented infection	58 (23-77)	14-73	~8 weeks
									72 (39-87)	134-220	~29 weeks
124	Thiruvengadam et al (November 25,2021)	India	Test-negative case control	2766 cases and 2377 controls	Delta^	Excluded	AZD1222	Documented infection	63.1 (51.5-72.1)	14+	~10 weeks
123	Desai et al (November 23,2021)*	India	Test-negative case control	1068 matched case-control HCW pairs	Delta^	Included	BBV152	Symptomatic disease	50 (33-62)	14+	~4 weeks
									46 (22-62)	28+	
									57 (21-76)	42+	
						Excluded			47 (29-61)	14+	
122	Paixao et al* (April 5, 2022) *[Update to November 12 preprint]*	Brazil	Test-negative case control	Pregnant women aged 18-49	Gamma and Delta††	Included	CoronaVac	Symptomatic disease	41.0 (27.0-52.2)	14+	~25 weeks
								Severe disease	85.4 (59.4-94.8)		
121	Ng et al* (November 1, 2021)	Singapore	Retrospective cohort	1204 household contacts of 301 index cases	Delta index cases, specifically	Unknown	BNT162b2 & mRNA-1273	Documented infection	61.6 (37.5-80.4)	15+	~16.5 weeks
								Symptomatic infection	67.9 (41.3-87.8)		
								Severe disease	100 (CI omitted, no events among vaccinated)		
120	Al Hosani et al*(March 18,2022) *[Published version of October 27,2021 preprint]*	United Arab Emirates	Retrospective cohort	176,640 individuals aged 15+	Non-VOC and Alpha^	Included	BBIBP-CorV	Hospitalization	79.8(78-81.4)	14+	~34 weeks
								ICU admissions	92.2(89.7-94.1)		
								Deaths	97.1(83-99.9)		
119		Finland				Excluded	BNT162b2	Documented infection	83 (80-85)	14-90	~11 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	Poukka et al* (January 31, 2022) *[Published version of November 8, 2021]*		Retrospective cohort	427,905 HCWs aged 16-69 years	Non-VOC, Alpha, Delta^				55 (45-64)	181+	~29.5 weeks
								Hospitalization	99 (97-100)	14-90	~11 weeks
									98 (89-100)	181+	~38 weeks
							mRNA-1273	Documented infection	84 (68-92)	14-90	~11 weeks
									69 (-124-96)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~34 weeks
							Heterologous mRNA	Documented infection	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~29.5 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~38 weeks
							AZD1222	Documented infection	89 (73-95)	14-90	~11 weeks
									63 (-166-95)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~25 weeks
							Heterologous AZD1222 + mRNA	Documented infection	80 (72-86)	14-90	~11 weeks
									62 (30-79)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~25 weeks
					Non-VOC, Alpha^		BNT162b2 & mRNA-1273 (homologous or heterologous)	Documented infection	77 (71-82)	14-90	~11 weeks
									55 (34-69)	91-180	~24 weeks
								Hospitalization	95 (64-99)	14-90	~11 weeks
									100 (CI omitted)	91-180	~24 weeks
							AZD1222	Documented infection	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
							Heterologous AZD1222 + mRNA	Documented infection	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
					Delta^		BNT162b2 & mRNA-1273 (homologous or heterologous)	Documented infection	85 (81-88)	14-90	~11 weeks
									56 (46-65)	181+	~29.5 weeks
								Hospitalization	100 (97-100)	14-90	~11 weeks
									98 (88-100)	181+	~38 weeks
							AZD1222	Documented infection	88 (71-95)	14-90	~11 weeks
									62 (-177-95)	91-180	~24 weeks
								Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted))	181+	~25 weeks
								Documented infection	80 (72-86)	14-90	~11 weeks
									63 (33-80)	91-180	~24 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							Heterologous AZD1222 + mRNA	Hospitalization	100 (CI omitted)	14-90	~11 weeks
									100 (CI omitted)	181+	~25 weeks
118	Embi et al* (December 30, 2021) *[Updated version of Embi et al November 5, 2021]*	USA	Test-negative case control	20,101 immunocompromised and 69,116 immunocompetent adults (18+) in nine states	Non-VOC, †† Alpha, †† Delta^	Included	BNT162b2	Hospitalization: immunocompromised	71 (65-76)	14+	~33 weeks
								Hospitalization: immunocompetent	88 (86-89)		
							mRNA-1273	Hospitalization: immunocompromised	81 (76-85)		
								Hospitalization: immunocompetent	93 (92-94)		
					Non-VOC, Alpha††		BNT162b2 & mRNA-1273	Hospitalization: immunocompromised	76 (69-81)		
								Hospitalization: immunocompetent	91 (90-93)		
					Delta^			Hospitalization: immunocompromised	79 (74-83)		
								Hospitalization: immunocompetent	90 (89-91)		
117	Sheikh et al* (October 20,2021)	Scotland	Retrospective cohort	1,563,818 adults	Alpha and Delta^	Unknown	BNT162b2	Death in 40-59 years	95 (79-99)	14+	~25 weeks
								Death in ≥ 60 years	87 (77-93)		
							AZD1222	Death in 40-59 years	88 (76-93)		
								Death in ≥ 60 years	90 (84-94)		
					Delta specifically^		BNT162b2	Death	90 (83-94)		
							AZD1222		91 (86-94)		
116	Reis et al* (October 20,2021)	Israel	Retrospective cohort	94,354 vaccinated adolescents aged 12-18 matched with 94,354 controls	Delta^	Excluded	BNT162b2	Documented infection	90 (88-92)	7-21	~12 weeks
								Symptomatic disease	93 (88-97)		
115	Nordström et al* (October 18, 2021)	Sweden	Retrospective cohort	541,071 vaccinated individuals and 180,716 unvaccinated matched individuals	Delta^	Excluded	BNT162b2	Symptomatic disease	78 (78-79)	14+	~11 weeks
							mRNA-1273		87 (84-88)		
							AZD1222		50 (41-58)		
							AZD1222/ BNT162b2		67 (59-73)		
							AZD1222/ mRNA-1273		79 (62-88)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
114#	Skowronski et al* (April 19, 2022) *[Update to Oct 26,2021 preprint]*	Canada	Test-negative case control	707,566 specimens in British Columbia including 44,964 cases (estimates also available for Quebec, but not included here)	Non-VOC, Alpha, Delta, Gamma^	Excluded	BNT162b2	Documented infection	89 (89-89)	14+	~38 weeks
									93 (92-94)	14-27	
									80 (75-83)	252-279	
								Hospitalization	97 (97-98)	14+	
									98 (96-99)	14-27	
									96 (86-99)	252-279	
							mRNA-1273	Documented infection	90 (89-90)	14+	
									95 (94-96)	14-27	
									55 (40-66)	252-279	
								Hospitalization	97 (97-98)	14+	
									99 (95-100)	14-27	
									95 (65-99)	252-279	
							AZD1222	Documented infection	74 (72-76)	14+	
									77 (57-87)	14-27	
									67 (48-80)	168-195	
								Hospitalization	95 (94-97)	14+	
									97 (71-97)	28-55	
									91 (35-99)	168-195	
							Heterologous mRNA	Documented infection	90 (89-90)	14+	
									95 (91-97)	14-27	
									96 (73-99)	168-195	
								Hospitalization	98 (97-98)	14+	
									96 (75-100)	14-27	
									96 (92-98)	140-167	
							Heterologous AZD1222 + mRNA	Documented infection	89 (88-89)	14+	
									94 (89-97)	14-27	
									82 (78-85)	140-167	
								Hospitalization	99 (99-100)	14+	
									93 (48-99)	14-27	
									98 (91-99)	140-167	
					Delta specifically^		BNT162b2	Documented infection	89 (89-89)	14+	
									93 (93-94)	14-27	
									79 (75-83)	252-279	
								Hospitalization	98 (97-98)	14+	
									98 (95-99)	14-27	
									94 (87-97)	196-223	
							mRNA-1273	Documented infection	90 (89-90)	14+	
									95 (94-96)	14-27	
									55 (41-66)	196-223	
								Hospitalization	97 (97-98)	14+	
									98 (94-100)	14-27	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									95 (80-99)	196-223	
							AZD1222	Documented infection	73 (72-75)	14+	
									70 (39-86)	14-27	
									67 (48-80)	168-195	
								Hospitalization	95 (93-97)	14+	
									89 (67-97)	28-55	
									91 (34-99)	168-195	
							Heterologous mRNA	Documented infection	90 (89-90)	14+	
									94 (90-97)	14-27	
									96 (73-99)	168-195	
								Hospitalization	98 (97-98)	14+	
									97 (93-99)	28-55	
									96 (92-98)	140-167	
							Heterologous AZD1222 + mRNA	Documented infection	88 (88-89)	14+	
									94 (88-97)	14-27	
									82 (77-85)	140-167	
								Hospitalization	99 (99-100)	14+	
									91 (33-99)	14-27	
									98 (91-99)	140-167	
					Alpha specifically^		BNT162b2	Documented infection	96 (92-98)	14+	
								Hospitalization	96 (83-99)		
							mRNA-1273	Documented infection	95 (84-98)		
							AZD1222	Documented infection	75 (33-91)		
							Heterologous mRNA	Documented infection	96 (73-99)		
					Gamma specifically^		BNT162b2	Documented infection	92 (88-95)		
								Hospitalization	95 (82-98)		
							mRNA-1273	Documented infection	95 (85, 98)		
							AZD1222	Documented infection	91 (63-98)		
							Heterologous mRNA	Documented infection	94 (76-99)		
							Heterologous AZD1222 + mRNA	Documented infection	96 (69-99)		
113	Lin et al* (March 10, 2022) *[Update to October 26,2021 preprint]*	USA	Retrospective cohort	10,600,823 cases registered in North Carolina	Alpha and Delta^	Unknown	BNT162b2	Symptomatic disease	94.5 (94.1-94.9)	1.25 months	~27 weeks
									67.8 (65.9-69.7)	7.25 months	
								Hospitalization	96.4 (95.1-97.4)	1.25 months	
									92.4 (89.7-94.4)	7.25 months	
								Death	98 (95.5-99.1)	1.25 months	
									95.5 (92.2-97.4)	7.25 months	~32 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							mRNA-1273	Symptomatic disease	95.9 (95.5-96.2)	1 month	
									77.8 (75.9-79.6)	7 months	
								Hospitalization	97.2 (96.1-98)	1 months	
									94.9 (92.4-96.6)	7 months	
								Death	98.6 (97.3-99.3)	1 months	
									96.0 (92.8-97.8)	7 months	~22 weeks
							Ad26.COV2.S	Symptomatic disease	71.4 (68.3-74.2)	2 mo	
									64.0 (60.3-67.4)	6 mo	
								Hospitalization	85.8 (74.9-91.9)	2 mo	
									81.7 (68.6-89.3)	6 mo	
								Death	82.2 (46.3-94.1	2 mo	
									71.2 (40.8-86)	6 mo	
112	Nordstrom et al* (February 4,2022) *[Published version of October 25 preprint]*	Sweden	Retrospective cohort	842,974 pairs of vaccinated and unvaccinated Swedish individuals	Delta^	Excluded	BNT162b2	Symptomatic disease	92 (92-93)	15-30	~30 weeks
									23 (-2 – 41)	210+	
							mRNA-1273		96 (94-97)	15-30	
									59 (18-79)	180+	
							AZD1222		68 (52-79)	15-30	
									-19 (-97 – 28)	120+	
							AZD1222 and any mRNA vaccine		89 (79-94)	15-30	
									66 (41-80)	120+	
111	Ranzani et al* (February 9, 2022) *[Update to (October 20,2021 preprint]*	Brazil	Test-negative case control	10,077 individuals residing in a favela in Rio De Janeiro	Gamma and Delta^	Excluded	AZD1222	Documented infection	59 (33.1-74.8)	14+	~31 weeks
								Symptomatic disease	65.1 (40.9-79.4)		
110	Chin et al* (October 20, 2021)	USA	Retrospective cohort	827 propensity matched incarcerated men	Delta^	Included	mRNA-1273	Documented infection	56.6 (42.0-67.5)	14+	~27 weeks
								Symptomatic disease	84.2 (56.4-94.3)		
						Previously infected only		Documented infection	80.5 (52.8-92.0)		
						Excluded		Documented infection	49.5 (31.5-62.7)		
109	Irizarry et al (November 17, 2021)	Puerto Rico	Retrospective cohort	87,704 PCR confirmed infections for individuals 12 years or older	Non-VOC, Alpha, Beta and Delta^^	Unknown	BNT162b2	Hospitalization (45-74y)	92 (90.8-93)	14+	~20 weeks
								Hospitalization (75-84y)	93.3 (91.3-95)		
								Hospitalization (85+y)	97.1 (95.8-98)		
								Death (45-74y)	86 (81-89)		
								Death (75-84y)	87 (80-92)		
								Death (85+y)	95.2 (91.5-97)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Updated version of Robles-Fontan et al (October 20,2021)]						mRNA-1273	Hospitalization (45-74y)	82 (78-85)		
								Hospitalization (75-84y)	91.5 (89-94)		
								Hospitalization (85+y)	97.2 (96-98)		
								Death (45-74y)	69 (52-79)		
								Death (75-84y)	87 (79-92)		
								Death (85+y)	96.2 (93.9-98)		
							Ad26.COV2.S	Hospitalization (45-74y)	96.1 (95-97)		
								Hospitalization (75-84y)	98 (96.7-99)		
								Hospitalization (85+y)	99.2 (98.6-99.5)		
								Death (45-74y)	93.8 (90-96)		
								Death (75-84y)	96.6 (91.7-98)		
								Death (85+y)	99.3 (98.6-99.6)		
							BNT162b2	Documented infection[xx]	87 (85-89)	14+	
									57 (53-60)	144+	
								Hospitalisation	92 (85-95)	14+	
									80 (73-85)	144+	
								Death	97 (86-100)	14+	
									86 (75-92)	144+	
							mRNA-1273	Documented infection[xx]	90 (88-91)	14+	~18 weeks
									73 (70-76)	144+	
								Hospitalisation	95 (89-97)	14+	
									90 (84-94)	144+	
								Death	99 (89-100)	14+	
									93 (81-97)	144+	
							Ad26.COV2.S	Documented infection[xx]	62 (54-68)	14+	~22 weeks
									36 (30-42)	144+	
								Hospitalisation	81 (60-91)	14+	
									67 (53-76)	144+	
								Death	78 (16-94)	14+	
									72 (49-85)	144+	
							BNT162b2	Documented infection[xx]	56 (53-59)	at day 137	~20 weeks
							mRNA-1273		71 (68-74)	at day 139	~18 weeks
							Ad26.COV2.S		27 (17-37)	at day 158	~22 weeks
108	Olson et al* (October 19, 2021)	USA	Test-negative case control	179 case patients and 285 controls aged 12-18 years	Delta^	Unknown	BNT162b2	Hospitalization (12-15y)	91 (74-97)	14+	~12 weeks
								Hospitalization (16-18y)	94 (78-99)		
107	Arregoces et al (October 19, 2021)	Colombia	Matched-pair cohort study		Mu^	Excluded	BNT162b2	Hospitalization	90.3 (87.1-92.7)	14+	~9 weeks
								Post-hospitalization death	98.5 (97.8-98.9)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				3,346,826 adults aged 60+ in Colombia				Death without prior hospitalization	89.2 (85.6-91.9)		
							CoronaVac	Hospitalization	67.2 (63.7-70.4)		~11 weeks
								Post-hospitalization death	77.1 (75.5-78.6)		
								Death without prior hospitalization	69.8 (66.7-72.6)		
							AZD1222	Hospitalization	75.4 (48.2-88.3)		~7 weeks
								Post-hospitalization death	96.3 (88.4-98.8)		
								Death without prior hospitalization	88.7 (64.8-96.4)		
							Ad26.COV2.S	Hospitalization	80(19.9-95.0)		~4 weeks
								Death without prior hospitalization	75(0.0-93.8)		
106	Ranzani et al (October 18, 2021)	Brazil	Test-negative case control	11,817 adults In Mato-Grosso do Sul	Gamma^	Excluded	Ad26.COV2.S	Symptomatic disease	50.9 (35.5-63.0)	28+	~10 weeks
								Hospitalization	72.9 (35.1-91.1)		
								ICU Admission	92.5 (54.9-99.6)		
								Death	90.5 (31.5-99.6)		
105	Liu et al* (May 24, 2022) *[Published version of October 7, 2021 preprint]*	USA	Test-negative case control	10,283 matched adult residents (18+) of New York City	Alpha, Delta^	Excluded	BNT162b2 & mRNA-1273	Overall: Documented infection	59 (52-65)	14+	~35 weeks
								Immunocompromised: Documented infection	57 (45-66)		
104	Bruxvoort et al* (December 15,2021) *[Update to October 1, 2021 preprint]*	USA	Test-negative case control	8,153 cases and matched controls among Kaiser Permanente patients (aged 18+) in Southern California	Delta specifically^	Excluded	mRNA-1273	Documented infection	86.7 (84.3-88.7)	14+	~25 weeks
									94.1 (90.5-96.3)	14-60	~6.5 weeks
									80.0 (70.2-86.6)	151-180	~23.5 weeks
								Hospitalization	97.5 (92.7-99.2)	14+	~25 weeks
					Non-Delta specifically^			Documented infection	98.6 (97.3-99.3)	14-60	~6.5 weeks
									88.7 (73.2-95.2)	121-150	~19.5 weeks
					Alpha specifically^			Documented infection	98.4 (96.9-99.1)	14+	~25 weeks
					Gamma specifically^			Documented infection	95.5 (90.9-97.8)	14+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
103	Martinez-Baz et al (September 30,2021)	Spain	Prospective cohort	30,240 close contacts of 12,263 index cases	Non-VOC, Alpha and Delta^	Excluded	BNT162b2	Documented infection	69 (66-72)	14+	~31 weeks
									70 (67-73)	<90	~11 weeks
									63 (58-68)	≥ 90	~18 weeks
								Symptomatic disease	72 (69-75)	14+	~31 weeks
								Hospitalization	93 (88-96)		
							mRNA-1273	Documented infection	82 (78-86)	14+	~28 weeks
									67 (50-78)	≥ 90	~15 weeks
								Symptomatic disease	85 (80-89)	14+	~28 weeks
								Hospitalization	98 (82-100)		
							AZD1222	Documented infection	54 (48-60)	14+	~16 weeks
									54 (47-60)	<90	~11 weeks
								Symptomatic disease	56 (48-63)	14+	16 weeks
								Hospitalization	95 (79-99)		
							Ad26.COV2.S	Documented infection	50 (42-57)	14+	~23 weeks
									52 (44-59)	<90	~11 weeks
									28 (-8–53)	≥ 90	~10 weeks
								Symptomatic disease	54 (45-62)	14+	~23 weeks
								Hospitalization	74 (43-88)		
							1 dose of AZD1222+ 1 dose of BNT162b2	Documented infection	86 (70-93)	14+	~21 weeks
									85 (69-93)	<90	~11 weeks
								Symptomatic disease	91 (71-97)	14+	~21 weeks
								Hospitalization	95 (79-99)		
					Alpha^ specifically		BNT162b2	Documented infection	71 (61-78)	14+	~31 weeks
							mRNA-1273		86 (56-95)		~28 weeks
							AZD1222		38 (-42–73)		16 weeks
							Ad26.COV2.S		77 (27-93)		~23 weeks
					Delta^ specifically		BNT162b2	Documented infection	67 (59-74)	14+	~31 weeks
							mRNA-1273		77 (64-85)		~28 weeks
							AZD1222		55 (39-67)		16 weeks
							Ad26.COV2.S		42 (18-59)		~23 weeks
							1 dose of AZD1222+ 1 dose of BNT162b2		86 (45-97)		~21 weeks
102#	Eyre et al* (January 5, 2022) *[Update to Sept 29, 2021 preprint]*	England	Retrospective cohort	146,243 household contacts of 108,498 index cases	Alpha^ specifically	Included	BNT162b2	Documented infection	85 (79-89)	14+	~20.5 weeks
							AZD1222		60 (41-73)		~8 weeks
					Delta^ specifically	Included	BNT162b2	Documented infection	81 (77-84)		~29 weeks
							AZD1222		58 (55-62)		~16 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
101	Glatman-Freedman et al (September 27, 2021)	Israel	Retrospective cohort	Adolescents aged 12-15 y	Delta^	Excluded	BNT162b2	Documented infection	91.5 (88.2-93.9)	8-28	2 weeks
100	Meyer et al* (September 9, 2022) [*Update to September 23,2021 preprint*]	Germany	Retrospective cohort	252 residents and staff of a nursing home Non-household close contacts	Alpha^	Unknown	BNT162b2	Documented infection	56 (15-77)	7+	~11 weeks
99	Pilishvili et al* (September 22, 2021)	USA	Test-negative case control	1482 HCPs as cases and 3449 HCPs as control	Alpha††	Excluded	BNT162b2 & mRNA-1273	Symptomatic disease	88.9 (84.7-92.0)	14+	~14 weeks
									96.3 (92.5-98.2)	15-28	
									80.7 (61.0-90.4)	85-98	
							BNT162b2	Symptomatic disease	88.8 (84.6-91.8)	7+	
							mRNA-1273		96.3 (91.3-98.4)		
97	Self et al* (September 17, 2021)	USA	Test-negative case control	1,682 case-patients and 2,007 control-patients ≥18 years without immunocompromising conditions	Alpha and Delta††	Excluded	BNT162b2	Hospitalization	88 (85-91)	14+	~20 weeks
									91 (88–93)	14-120	
									77 (67–84)	>120	
							mRNA-1273		93 (91-95)	14+	
									93 (90–95)	14-120	
									92 (87–96)	>120	
							Ad26.COV2.S		71 (56–81)	14+	
									68 (49–80)	>28	
96	Glatman-Freedman et al* (September 16, 2021)	Israel	Retrospective longitudinal cohort	All Israeli residents aged 16+	Alpha^	Excluded	BNT162b2	Documented infection	97.3 (96.7-97.8)	22-28	2 weeks
								Symptomatic disease	97.9 (97.4-98.3)		
								Hospitalization	99.0 (98.4-99.3)		
								Severe/critical disease	99.2 (98.6-99.5)		
								Death	98.6 (97.0-99.3)		
95#	Andrews et al* (January 12,2022) [*Update to September 14, 2021 preprint*]	England	Test-negative case control	1,706,743 symptomatic cases and 3,763,690 test-negative control patients among adults (16+)	Alpha specifically^	Excluded	BNT162b2	Symptomatic disease	94.9 (93.6-95.9)	14-63	~33.5 weeks
									94.8 (88.4-97.7)	70+	~33.5 weeks
								Hospitalization	97.7 (90.8-99.4)	14-63	~33.5 weeks
								Death	96.6 (94.4.-96.5)	14+	~33.5 weeks
							AZD1222	Symptomatic disease	82.1 (79.4-84.5)	14+	~20.5 weeks
									82.4 (79.6-84.7)	14-63	~8 weeks
									76.2 (49.8-88.7)	70+	~20.5 weeks
								Hospitalization	95.1 (86.7-98.2)	14-63	~20.5 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									100 (CI omitted, no deaths among vaccinated)	70+	~20.5 weeks
								Death	100 (CI omitted, no deaths among vaccinated)	14+	~20.5 weeks
					Delta specifically^		BNT162b2	Symptomatic disease	83.3 (83.1-83.5)	14+	~33.5 weeks
									89.8 (89.6-90)	14-63	~8 weeks
									69.7 (68.7-70.5)	140+	~33.5 weeks
								Hospitalization	96.6 (96.2-96.9)	14+	~33.5 weeks
									98.4 (97.9-98.8)	14-63	~8 weeks
									92.7 (90.3-94.6)	140+	~33.5 weeks
								Death	95.6 (94.4-96.6)	14+	~33.5 weeks
									98.2 (95.9-99.2)	14-63	~8 weeks
									90.4 (85.1-93.8)	140+	~33.5 weeks
							AZD1222	Symptomatic disease	64.2 (63.9-64.5)	14+	~20.5 weeks
									66.7 (66.3-67)	14-63	~8 weeks
									47.3 (45-49.6)	140+	~20.5 weeks
								Hospitalization	92.5 (92-93)	14+	~20.5 weeks
									95.2 (94.6-95.6)	14-63	~8 weeks
									77 (70.3-82.3)	140+	~20.5 weeks
								Death	93.2(91.7-94.5)	14+	~20.5 weeks
									94.1 (91.8-95.8)	14-63	~8 weeks
									78.7 (52.7-90.4)	140+	~20.5 weeks
							mRNA-1273	Symptomatic disease	94.8 (94.4-95.2)	14+	~7 weeks
									93.8(93.4-94.1)	14-63	
									85.6(83.8-87.2)	70-104	
								Hospitalization	100 (CI omitted, no events among vaccinated)	14-63	~7 weeks
94	Bajema et al (September 10,2021)	USA	Test-negative case control	388 case-patients and 787 controls from 5 Veterans Affair Medicals Centers	Alpha, Delta, Non-VOC††	Excluded	BNT162b2 & mRNA-1273	Hospitalization	86.1 (76.5-91.8)	<104 days	~13 weeks
								Hospitalization	87.2 (78.2-92.5)	≥104 days	~28.5 weeks
							BNT162b2	Hospitalization	83.4 (74.0-89.4)	14+	~28.5 weeks
							mRNA-1273	Hospitalization	91.6 (83.5-95.7)		~26.5 weeks
					Alpha^		BNT162b2 & mRNA-1273	February-June: Hospitalization	84.1 (74.1-90.2)		~23 weeks
					Delta^			July-August: Hospitalization	89.3 (80.1-94.3)		~28.5 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
93	Polinski et al* (March 17,2022) *[Published version of previous September 10,2021 preprint]*	USA	Retrospective Cohort	2,076,065 individuals ≥18 years	Alpha††	Excluded	Ad26.COV2.S	Documented infection	76(75-77)	14+	~14 weeks
								Hospitalization	81(78-82)		
								Immunocompromised: Documented infection	64 (59-68)		
								Immunocompromised: Hospitalization	67 (57-74)		
					Delta^			June-August: Documented infection	74(71-77)		
								June-August: Hospitalization	81(75-86)		
92	Grannis et al (September 10,2021)	USA	Test-negative	32,867 events from 187 hospitals and 221 emergency departments/urg ent care visits	Delta^	Included	BNT162b2	Hospitalization	80 (73-85)	14+	4 weeks
								Emergency/Urgent care visit	77 (74–80)		
							mRNA-1273	Hospitalization	95 (92-97)		
								Emergency/Urgent care visit	92 (89-93)		
							Ad26.COV2.S	Hospitalization	60 (31-77)		
								Emergency/Urgent care visit	65 (56-72)		
91	Dagan et al* (September 7,2021)	Israel	Prospective Cohort	10,861 vaccinated pregnant females matched with 10,861 controls	Alpha^	Excluded	BNT162b2 & mRNA-1273	Documented infection	96 (89-100)	7-56	~11 weeks
								Symptomatic infection	97 (91-100)		
								Hospitalization	89 (43-100)		
90	Thompson et al* (September 8, 2021)	USA	Test-negative case control	58,904 adults aged 50+ with Covid-like illness who were hospitalized or visited emergency/ urgent care facilities	Non-VOC, Alpha^††	Excluded	BNT162b2	Hospitalization	87 (85-90)	14+	~22 weeks
								Emergency department or urgent care visit	89 (85-91)		
							mRNA-1273	Hospitalization	91 (89-93)		20 weeks
								Emergency department or urgent care visit	92 (89-94)		
							Ad26.COV2.S	Hospitalization	68 (50-79)		14 weeks
								Emergency department or urgent care visit	73 (59-82)		
							BNT162b2 & mRNA-1273	Hospitalization, patients with ≥ 1 chronic respiratory condition	90 (88-92)	14+	~22 weeks
								Hospitalization, patients with ≥ 1 chronic non-respiratory condition	88 (86-90)		
								Hospitalization, overall	88 (84-92)	14-27	~2 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									86 (74-93)	112+	~22 weeks
								Emergency department or urgent care visit	92 (88-95)	14-27	~2 weeks
									86 (74-93)	112+	~22 weeks
89	Iliaki et al* (October 18, 2021) *[Update to September 6 preprint]*	USA	Retrospective Cohort	4,317 HCWs	Alpha††	Excluded	BNT162b2 & mRNA-1273	Documented infection	95.2(80.0-98.8)	14+	~10 weeks
88	Tande et al* (September 6,2021)	USA – Mayo Clinic, Minnesota	Retrospective Cohort	Asymptomatic screening of 46,008 patients: pre-surgical, pre-op PCR tests	Non-VOC^††	Included	BNT162b2 & mRNA-1273	Asymptomatic infection (January-March)	91 (72-98)	14+	~10 weeks
					Alpha^††			Asymptomatic infection (April-May)	71 (53-83)		~19 weeks
					Delta^††			Asymptomatic infection (June-August)	63 (44-76)		~32 weeks
87	Barlow et al (September 3,2021)	USA	Test-negative case control	500 matched pairs aged 15 years and above	Delta^	Excluded	BNT162b2 and mRNA-1273	Documented infection	74(65-82)	14+	~4 weeks
							Ad26.COV2.S		51(-2 – 76)		
86	Bruxvoort et al* (November 24, 2021) *[Update to September 2,2021 Preprint]*	USA	Matched prospective cohort	352,878 vaccinated 352,878 unvaccinated individuals	Delta and Alpha^	Included	mRNA-1273	Documented infection	87.4 (85.6-89.1)	14+	~20 weeks
								Asymptomatic infection	72.7 (57.6-82.4)		
								Symptomatic infection	88.3 (86.5-89.9)		
								Hospitalization	95.8 (92.5-97.6)		
								Death	97.9 (84.5-99.7)		
85	Giansante et al* (September 2, 2021)	Italy	Retrospective cohort	9839 staff and HCWs	Delta and Alpha^	Excluded	BNT162b2 and mRNA-1273	Documented infection	84.8 (73.2-91.4)	14+	~16 weeks
								Symptomatic infection	87.1 (69.3-94.6)		
				Only 7190 HCWs				Documented infection	84.4 (69.7-92.0)		
								Symptomatic infection	86.5 (62.9-95.1)		
84	Katz et al* (December 10,2021)	Israel	Prospective cohort	1,250 HCWs from six Israeli hospitals	Alpha^	Included	BNT162b2	Documented infection	94.5(82.5-98.2)	14+	~18 weeks
								Symptomatic infection	97 (72-99.7)	7+	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Published version of September 2 pre-print]										
83	Nunes et al* (September 23, 2021)	Portugal	Retrospective cohort	1,880,351 older adults (65+) in Portugal	Alpha^ (Feb-Mar) then Delta^ (May-onward)	Excluded	BNT162b2 and mRNA-1273	Hospitalization, 65-79 y	94 (88-97)	14+	~14.5 weeks
								Death, 65-79 y	96 (92-98)		
								Hospitalization, 80+ y	82 (72-89)	14+	~22.5 weeks
								Death, 80+ y	81 (74-87)	14+	
82#	Chemaitelly et al* (October 6, 2021) *[Update to Aug 27 preprint]* *Note: See Duration of Protection Table for further context*	Qatar	Test-negative case control	142,300 cases and 848,240 controls among residents of Qatar (12+)	Alpha^ then Beta^ (Jan-Jun), then Delta^ (Jul-Sep)	Included	BNT162b2	Documented infection	73.2 (71.3-75.0)	28-63	7 weeks
									22.3 (-1.7-40.7)	175+	~32 weeks
								Symptomatic infection	72.5 (69.6-75.1)	28-63	7 weeks
									27.8 (-1.4-48.7)	175+	~32 weeks
								Asymptomatic infection	66.9 (61.9-71.3)	28-63	7 weeks
									-33.3 (-181.8-36.9)	175+	~32 weeks
								Severe, critical, or fatal disease	96.8 (93.9-98.3)	28-63	7 weeks
									55.6 (-44.3-86.3)	175+	~32 weeks
					Alpha specifically^		BNT162b2	Documented infection	88.6 (79.2-93.7)	28-63	7 weeks
									80.0 (-71.2-97.7)	147+	~32 weeks
					Beta specifically^		BNT162b2	Documented infection	63.9 (52.6-72.5)	28-63	7 weeks
									40.0 (-151.1-85.7)	147+	~32 weeks
					Delta specifically^		BNT162b2	Documented infection	73.3 (63.6-80.4)	28-63	7 weeks
									17.9 (-12.9-40.3)	147+	~32 weeks
81	Goldberg et al (October 27, 2021) *[Update to Aug 25 preprint]* *Note: See Duration of Protection Table for further context*	Israel	Retrospective cohort	9,395,923 adults (16+) in Israel	Delta^	Excluded	BNT162b2	Documented infection, 16-39 y fully vaccinated May 2021 (~2 mos prior)	80 (75-84)	55-98	13 weeks
								Documented infection, 16-39 y fully vaccinated Jan 2021 (~6 mos prior)	55 (50-60)	168-203	28 weeks
								Documented infection, 40-59 y fully vaccinated May 2021 (~2 mos prior)	83 (75-88)	55-98	13 weeks
								Documented infection, 40-59 y fully vaccinated Jan 2021 (~6 mos prior)	57 (53-61)	168-203	28 weeks
								Documented infection, 60+ y fully vaccinated May 2021 (~2 mos prior)	82 (70-89)	55-98	13 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								Documented infection, 60+ y fully vaccinated Jan 2021 (~6 mos prior)	57 (52-62)	168-203	28 weeks
								Severe disease, 40-59 y fully vaccinated Mar 2021 (~4 mos prior)	98(94-99)	109-159	22 weeks
								Severe disease, 40-59 y fully vaccinated Jan 2021 (~6 mos prior)	93 (86-97)	168-203	28 weeks
								Severe disease, 60+ y fully vaccinated Mar 2021 (~4 mos prior)	92 (87-95)	109-159	22 weeks
								Severe disease, 60+ y fully vaccinated Jan 2021 (~6 mos prior)	85(81-88)	168-203	28 weeks
80#	Tartof et al* (October 16, 2021) *[Update to Aug 23 preprint]*	USA	Retrospective cohort	3,436,957 members (12+) of Kaiser Permanente Southern California healthcare system	Epsilon (Jan-Mar), Alpha (Apr-May), Delta (Jun-Jul)^	Included	BNT162b2	Documented infection	73 (72-74)	7+	~29 weeks
									88 (86-89)	7-36	~3 weeks
									47 (43-51)	157+	~29 weeks
								Hospitalization	90 (89-92)	7+	~29 weeks
									87 (82-91)	7-36	~3 weeks
									88 (82-92)	157+	~29 weeks
					Delta specifically^			Documented infection	75 (71-78)	7+	~29 weeks
									93 (85-97)	7-36	~3 weeks
									53 (39-65)	127+	~29 weeks
								Hospitalization	93 (84-96)	7+	~29 weeks
					Non-Delta variants specifically^			Documented infection	91 (88-92)	7+	~29 weeks
									97 (95-99)	7-36	~3 weeks
									67 (45-80)	127+	~29 weeks
								Hospitalization	95 (90-98)		~29 weeks
79	Prasad et al (August 19,2021)	USA	Retrospective cohort	3,104 surgery patients and 7,438 propensity-matched controls	Non-VOC††	Included	BNT162b2 or mRNA-1273	Post-operative documented infection	91 (56-99)	14+	~8 weeks
78	Pouwels et al* (October 14, 2021)	UK	Prospective cohort	384,543 individuals aged 18 years or older	Alpha^ (December - May)	Included	BNT162b2	Documented infection	78 (68-84)	14+	~28 weeks
								Ct<30	94 (91-96)		
							AZD1222	Documented infection	79 (56-90)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	[Update to Aug 18 preprint]							Ct<30	86 (71-93)		
				358,983 individuals	Delta^ (May - August)		BNT162b2	Documented infection	80 (77-83)		
								Ct<30	84 (82-86)		
							AZD1222	Documented infection	67 (62-71)		
								Ct<30	70 (65-73)		
77	Tenforde et al* (November 4, 2021) *[Update to Aug 18 MMWR)*	USA	Test-negative case control	4513 hospitalized adults (18+)	Alpha and Delta^	Included	BNT162b2	Hospitalization, all	81 (77-84)	14+	~30 weeks
									85 (82-88)	14-120	~15 weeks
									64 (51-73)	120+	~30 weeks
							mRNA-1273	Hospitalization, all	89 (86-92)	14+	~28 weeks
									91 (87-93)	14-120	~15 weeks
									85 (77-91)	120+	~28 weeks
							BNT162b2 or mRNA-1273	Hospitalization, Immunocompetent	90 (87-91)	14+	~30 weeks
								Hospitalization, Immunocompromised	51 (31-65)		
					Alpha specifically^		BNT162b2 or mRNA-1273	Hospitalization, all	90 (84-94)		
					Delta specifically^			Hospitalization, all	86 (79-90)		
76	Chin et al* (January 27, 2022) *[Published version of August 18, 2021 preprint]*	USA	Retrospective cohort	60,707 incarcerated people in California prisons	Non-VOC^	Excluded	BNT162b2 or mRNA-1273	Documented infection, all	97 (88-99)	14+	~5 weeks
								Documented infection, cohort at moderate/high risk for severe COVID-19	92 (74-98)		
							mRNA-1273	Documented infection, all	96 (67-99)		
75	Nanduri et al (August 18,2021)	USA	Retrospective cohort	10,428,783 residents of skilled nursing facilities	Non-VOC and Alpha†† (Pre-Delta circulation) ^	Unknown	BNT162b2	Documented infection	74.2 (69–78.7)	14+	~16 weeks
							mRNA-1273		74.7(66.2-81.1)		
					Alpha†† (Delta circulating but not dominant) ^		BNT162b2	Documented infection	66.5 (58.3-73.1)		~22 weeks
							mRNA-1273		70.4 (60.1-78.0)		
					Delta^		BNT162b2	Documented infection	52.4 (48–56.4)		~28 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							mRNA-1273		50.6 (45–55.7)		
74#	Tang et al* (November 2, 2021) *[Update to Aug 11 preprint]*	Qatar	Test-negative case control	Cases with confirmed Delta (~2800 per analysis) or Beta infection and matched controls (~11,200) among residents of Qatar of all ages	Delta specifically^	Included	BNT162b2	Documented infection	50.6 (45.4-55.3)	14+	~25 weeks
							mRNA-1273		72.0 (66.1-76.9)		
							BNT162b2	Severe, critical, or fatal disease	94.1 (85.9-97.6)		
							mRNA-1273		96.1 (71.4-99.5)		
							BNT162b2	Symptomatic COVID-19	44.4 (37.0-50.9)		
							mRNA-1273		73.9 (65.9-79.9)		
							BNT162b2	Asymptomatic COVID-19	46.0 (32.3-56.9)		
							mRNA-1273		53.6 (33.4-67.6)		
					Beta specifically^		BNT162b2	Documented infection	74.3 (70.3-77.7)		
							mRNA-1273		80.8 (69.0-88.2)		
							BNT162b2	Severe, critical, or fatal disease	92.7 (81.5-97.1)		
							mRNA-1273		100.0 (CI omitted due to zero events among vaccinated)		
73	Chemaitelly et al (August 9, 2021)	Qatar	Retrospective cohort	782 kidney transplant recipients	Alpha and Beta^	Excluded	BNT162b2 and mRNA-1273	Documented infection	46.6 (0.0-73.7)	14+	~17 weeks
									66.0 (21.3-85.3)	42+	
									73.9 (33-89.9)	56+	
								Severe infection	72.3 (0.0-90.9)	14+	
									85.0 (35.7-96.5)	42+	
									83.8 (31.3-96.2)	56+	
72	Puranik et al (August 9, 2021)	USA	Retrospective cohort	77,607 adults	Alpha and Delta ^	Excluded	BNT162b2	Documented infection	76 (69-81)	14+	~ 26 weeks
								Hospitalization	85 (73-93)		
								ICU admission	87 (46-98.6)		
							mRNA-1273	Documented infection	86 (81-90.6)		
								Hospitalization	91.6 (81-97)		
								ICU admission	93.3 (57-99.8)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
71	de Gier et al* (August 5, 2021)	Netherlands	Retrospective cohort	184,672 household and other close contacts (aged 18+) of 113,582 index cases (aged 18+)	Alpha^	Unknown	AZD1222	Documented infection among household contacts (adj. for vaccination status of index case)	87 (77-93)	7+	~15 weeks
							BNT162b2		65 (60-70)		
							mRNA-1273		91 (79-97)		
							Ad26.COV2.S		12 (-71-54)	14+	
70	Lefèvre et al (July 31,2021)	France	Retrospective cohort	378 LTCF residents	Beta specifically^	Included	BNT162b2	Documented infection	49 (14-69)	7+	~16 weeks
								Hospitalization and death	86 (67-94)		
69	Alali et al (July 29,2021)	Kuwait	Retrospective cohort	3,246 HCWs	Alpha^	Excluded	BNT162b2	Documented infection	94.5 (89.4-97.2)	7+	~18 weeks
68	Gram et al* (December 17, 2021) *[Published version of July 28 pre-print]*	Denmark	Retrospective cohort	5,542,079 adults	Alpha^	Excluded	Heterologous: AZD1222 (1st dose) BNT162b2 or mRNA-1273(2nd dose)	Documented infection	88 (83-92)	14+	~20 weeks
67	Amirthalingam et al (December 10,2021) *[Published version of July 28 pre-print]*	UK	Test-negative case control	750 participants aged 50-89 years	Alpha^	Excluded	BNT162b2	Documented infection, 80 y+	77 (56-88)	14+, dose interval 19-29 days	~16 weeks
									90 (83-94)	14+, dose interval 65-84 days	
								Documented infection, 65-79 y	77 (66-85)	14+, dose interval 19-29 days	
									89 (86-92)	14+, dose interval 65-84 days	
								Documented infection, 50-64 y	88 (67-96)	14+, dose interval 19-29 days	
									92 (91-94)	14+, dose interval 65-84 days	
							AZD1222	Documented infection, 80 y+	96(68-99)	14+, dose interval 45-64 days	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
									82 (68-89)	14+, dose interval 65-84 days	
								Documented infection, 65-79 y	73 (25-90)	14+, dose interval 30-44 days	
									74 (69-79)	14+, dose interval 65-84 days:	
								Documented infection, 50-64 y	55 (34-69)	14+, dose interval 30-44 days	
									77 (74-79)	14+, dose interval 65-84 days	
66	Kissling et al (July 22,2021)	UK, France, Ireland, Netherlands, Portugal, Scotland, Spain, Sweden	Test-negative	592 cases and 4,372 controls aged 65+	Alpha^	Excluded	BNT162b2	Symptomatic COVID-19	87(74-93)	14+	~16 weeks
65#	Carazo et al* (August 30, 2021) *[Update to July 22 preprint]*	Canada	Test-negative case control	5316 cases and 53,160 test negative controls among HCWs	Non-VOC and Alpha^	Excluded	BNT162b2	Documented infection	85.5 (80.4-89.3)	7+	~20 weeks
								Symptomatic COVID-19	92.2 (87.8-95.1)		
							mRNA-1273	Documented infection	84.1 (34.9-96.1)	7+	
					Alpha specifically^	Excluded	BNT162b2 and mRNA-1273	Documented infection	92.6 (87.1-95.8)	7+	
					Non-VOC specifically^	Excluded	BNT162b2 and mRNA-1273	Documented infection	86.5 (56.8-95.8)		
64	Hitchings et al (October 28, 2021) *[Update to July 22 preprint]*	Brazil	Test-negative case control	30,680 matched pairs of adults aged 60+ in Sao Paolo, Brazil	Gamma^	Included (except in previous 90 days)	AZD1222	Symptomatic COVID-19	77.9 (69.2-84.2)	14+	~9.5 weeks
								Hospitalization	87.6 (78.2-92.9)		
								Death	93.6 (81.9-97.7)		
63	Kim et al* (September 8, 2021) *[Update to July 22 preprint]*	USA	Test-negative case control	812 US adults aged 16+ with COVID-19-like illness	Non-VOC and Alpha††	Unknown	BNT162b2 and mRNA-1273	Symptomatic COVID-19	91 (83-95)	14+	~18.5 weeks
62#	Lopez Bernal et al*	UK				Excluded	BNT162b2	Symptomatic COVID-19	93.7 (91.6–95.3)	14+	~17 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
	(July 21, 2021)		Test-negative case control	19,109 cases and 171,834 test negative controls aged 16+	Alpha specifically^		AZD1222	Symptomatic COVID-19	74.5 (68.4–79.4)		
					Delta specifically^		BNT162b2	Symptomatic COVID-19	88.0 (85.3–90.1)		
							AZD1222	Symptomatic COVID-19	67.0 (61.3–71.8)		
61	Butt et al* (July 20, 2021)	USA	Test-negative case control	54,360 propensity-matched pairs of veterans	Original and Alpha ††	Excluded	BNT162b2 and mRNA-1273	Documented infection	97.1 (96.6-97.5)	7+	~6.5 weeks
							BNT162b2	Documented infection	96.2 (95.5-96.9)		
							mRNA-1273	Documented infection	98.2 (97.5-98.6)		
60	Layan et al* (March 03, 2022) *[Published version of July 16,2021 preprint]*	Israel	Prospective cohort	215 index cases and 687 household contacts (HHCs) from 210 Israeli households	Original and Alpha¶	Included	BNT162b2	Documented infection among HHCs vaccinated and not isolated (relative to HHCs not vaccinated and not isolated)	79 (56-92)	7+	~12 weeks
59	Balicer et al* (September 7,2021) *[Update to July 12 preprint]*	Israel	Prospective Cohort	21722 pregnant women	Original and Alpha^	Excluded	BNT162b2	Documented infection	96 (89-100)	7-56	~18 weeks
								Symptomatic COVID-19	97 (91-100)		
								Hospitalization	89 (43-100)		
58	Butt et al* (October 7, 2021) *[Update to June 22 preprint]*	Qatar	Retrospective cohort	814pregnant women	Alpha and Beta^	Excluded	BNT162b2	Documented infection	87.7 (43.5-97.3)	14+	~17 weeks
							mRNA-1273		100.0 (0-100.0)		
57	Prunas et al* (January 27, 2022) *[Update to July 16, 2021 preprint]*	Israel	Retrospective cohort	2,472,502 Israeli individuals from 1,327,647 households	Original and Alpha¶ (pre-Delta^)	Excluded	BNT162b2	Documented infection among household contacts	89.4 (88.7-90)	10-90	~11 weeks
									58.3 (45.8-67.9)	90+	~26.5 weeks
					Delta^				72 (65.9-77)	10-90	~11 weeks
									40.2 (37.6-42.6)	90+	~26.5 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
56	Whitaker et al* (January 2, 2022) [*Update to July 9,2021 preprint*]	UK	Prospective cohort	5,591,142 patients reporting to 718 English general practices	Alpha^	Included	BNT162b2	Symptomatic COVID-19: Ages 16-64	48.6 (-61.5-83.7)	14-69	~8 weeks
								Symptomatic COVID-19: Ages 65+	84.7 (77.7-89.5)		
								Immunosuppressed	59.6 (-35.5-86.3)		
							AZD1222	Symptomatic COVID-19: Ages 16-64	67.9 (-1.1-89.8)		
								Symptomatic COVID-19: Ages 65+	81.7 (59.6-91.7)		
								Symptomatic COVID-19: Immunosuppressed	60.0 (-63.6-90.2)		
55	John et al* (July 13,2021)	USA	Retrospective cohort	40,074 patients with cirrhosis within Veterans Health Administration, propensity matched	Original and Alpha ††	Excluded	BNT162b2 and mRNA-1273	Documented infection	78.6 (25.5-93.8)	7+	~10 weeks
								Hospitalization	100.0 (99-100)		
								COVID-19 related death	100.0 (99-100)		
54	Bertollini et al (July 13, 2021)	Qatar	Prospective cohort	10,092 matched pairs of Qatari adults arriving at an international airport.	Original, Alpha and Beta^	Included	BNT162b2 and mRNA-1273	Documented infection	78 (72-83)	14+	~4 weeks
52#	Chemaitelly et al* (July 9, 2021)	Qatar	Test-negative case-control	25,034 matched pairs of adults	Alpha specifically^	Unknown	mRNA-1273	Documented infection	100.0 (CI omitted since there were no events among vaccinated persons)	14+	13 weeks
				52,442 matched pairs of adults	Beta specifically^	Unknown	mRNA-1273	Documented infection	96.0 (90.9-98.2)		
				4,497 matched pairs of adults	Alpha and Beta^	Unknown	mRNA-1273	Severe, critical or fatal disease	89.5 (18.8-98.7)		
								Symptomatic infection	98.6 (92.0-100)		
								Asymptomatic infection	92.5 (84.8-96.9)		
			Retrospective cohort	2520 vaccinated and 73,853	Alpha specifically^	Excluded	mRNA-1273	Documented infection	100.0 (82.5-100.)	14+	13 weeks

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				unvaccinated, antibody-negative controls	Beta specifically ^	Excluded	mRNA-1273	Documented infection	87.8 (73.4-95.5)		
51#	Tenforde et al* (August 6, 2021) *[Update to July 8 preprint]*	USA	Test-negative case-control	1212 hospitalized adults from 18 hospitals	Original and Alpha^	Included	BNT162b2/ mRNA-1273	Hospitalization	86.6 (79.0-91.4)	14+	~2 weeks
							BNT162b2		84.7 (74.1-91.0)		
							mRNA-1273		88.9 (78.7-94.)		
					Alpha^	Included	BNT162b2/ mRNA-1273		92.1 (82.3-96.5)		
50	Jara et al (July 7,2021)	Chile	Prospective cohort	10,187,720 adults	Alpha and Gamma^	Excluded	CoronaVac	Documented infection	65.9 (65.2-66.6)	14+	8 weeks
								Hospitalization	87.5 (86.7-88.2)		
								ICU admission	90.3 (89.1-91.4)		
								Death	86.3 (84.5-87.9)		
49#	Nasreen et al* (February 7,2022) *[Published version of September 30 preprint]*	Canada	Test-negative Case Control	682,071 symptomatic community-dwelling individuals (age 16+) in Ontario	Non-VOC specifically^	Excluded Unknown	BNT162b2	Symptomatic infection	92 (87-95)	14+	~28 weeks
								Hospitalization or death	97 (88-99)		
							mRNA-1273	Symptomatic infection	98 (83-100)		~25 weeks
								Hospitalization or death	100 (no CI provided)		
							AZD1222	Symptomatic infection	100 (no CI provided)		~3 weeks
								Hospitalization or death	100 (no CI provided)		
					Alpha specifically^		BNT162b2	Symptomatic infection	88 (86-90)		~28 weeks
								Hospitalization or death	96 (94-97)		
							mRNA-1273	Symptomatic infection	92 (87-95)		~25 weeks
								Hospitalization or death	95 (92-97)		
							AZD1222	Symptomatic infection	87 (47-97)		~3 weeks
								Hospitalization or death	92 (41-99)		
					Beta specifically^		BNT162b2	Symptomatic infection	86 (0-98)		~28 weeks
								Hospitalization or death	92 (39-99)		
							mRNA-1273	Symptomatic infection	100 (no CI provided)		~25 weeks
								Hospitalization or death	100 (no CI provided)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							AZD1222	Symptomatic infection	100 (no CI provided)		~3 weeks
					Gamma specifically^		BNT162b2	Symptomatic infection	90 (76-96)		~28 weeks
								Hospitalization or death	94 (59-99)		
							mRNA-1273	Symptomatic infection	100 (no CI provided)		~25 weeks
								Hospitalization or death	100 (no CI provided)		
							AZD1222	Symptomatic infection	100 (no CI provided)		~3 weeks
								Hospitalization or death	100 (no CI provided)		
					Delta specifically^		BNT162b2	Symptomatic infection	92 (89-94))		~28 weeks
								Hospitalization or death	98 (96-99)		
							mRNA-1273	Symptomatic infection	94 (90-97)		~25 weeks
								Hospitalization or death	98 (93-100)		
							AZD1222	Symptomatic infection	88 (68-96)		~3 weeks
								Hospitalization or death	90 (67-97)		
48	Baum et al* (November 18,2021) *[Update to June 28 preprint]*	Finland	Prospective cohort	Two study cohorts: 901,092 Finnish elderly aged 70 years and 774,526 chronically ill aged 16-69 years	Original and Alpha^	Excluded	BNT162b2 & mRNA-1273 (elderly cohort)	Documented infection	75 (65-82)	7+	16 weeks
								Hospitalization	93 (70-98)		
							BNT162b2 & mRNA-1273 (Chronically ill cohort)	Documented infection	77 (65-85)		
								Hospitalization	90 (29-99)		
47	Saciuk et al* (December 30,2021) *[Update to June 27, 2021 preprint]*	Israel	Retrospective cohort	1.6 million members of Maccabi HealthCare HMO ≥16	Original and Alpha¶	Excluded	BNT162b2	Documented infection	93.0 (92.6-93.4)	7+	14 weeks
								Hospitalization	93.4 (91.9-94.7)	7+	
								Death	91.1 (86.5-94.1)	7+	
46	Pawlowski et al.* (June 17, 2021) *[Update to Feb. 18, 2021 preprint]*	USA – Mayo Clinic	Retrospective Cohort	68,266 – propensity matched on, zip, # of PCRs, demographics	Original & Alpha ¥	Excluded	BNT162b2	Documented Infection	88.0 (84.2-91.0)	≥14	~17 weeks (120 days)
								Hospitalization	88.3 (72.6-95.9)	≥14	
								ICU Admission	100.0 (18.7-100)	≥14	
							mRNA-1273	Documented Infection	92.3 (82.4-97.3)	≥14	
								Hospitalization	90.6 (76.5-97.1)	≥14	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
								ICU Admission	100.0 (17.9-100)	≥14	
45	Young-Xu et al (October 6, 2021)* *[Update to Jul 14 preprint]*	USA	Test negative case control	77014 veterans aged 65+ within Veterans Health Administration	Original and Alpha ††	Excluded	BNT162b2 & mRNA-1273	Documented infection	94 (92-95)	7+	~8 weeks
								Hospitalization	89 (81-93)		
								Death	98.5 (86.6-99.8)		
								Asymptomatic infection	69.7 (47.7-82.5)		
								Hospitalization	88.4 (74.9-94.7)		
								Deaths	97.0 (91.7-98.9)		
43#	Stowe et al (June 14, 2021)	UK	TND Case-control	Patients seeking emergency care services with subsequent hospitalization	Alpha specifically^	Included	BNT162b2	Hospitalization	95 (78-99)	14+	~20 weeks (but most much less)
							AZD1222		86 (53-96)		
					Delta specifically^		BNT162b2		96 (86-99)		
							AZD1222		92 (75-97)		
42#	Sheikh et al (June 14, 2021)	Scotland	TND	Scottish population	Alpha^	Unknown	BNT162b2	Documented infection	92 (90–93)	14+	~20 weeks (but most much less)
						Unknown	AZD1222	Documented infection	73 (66–78)	14+	
					Delta^	Unknown	BNT162b2	Documented infection	79 (75–82)	14+	
						Unknown	AZD1222	Documented infection	60 (53–66)	14+	
41	Flacco, Maria et al* (June 10, 2021)	Italy	Retrospective cohort	245,226 individuals	Original and Alpha††	Excluded	BNT162b2	Documented infection	98 (97-99)	14+	~14 weeks
								Hospitalization	99 (96-100)	14+	
								Death	98 (87-100)	14+	
39	Emborg et al. (June 2, 2021) *[Update of Houston-Melms below]*	Denmark	Cohort	46,101 long-term care facility (LTCF) residents, 61,805 individuals 65 years and older living at home but requiring practical help and personal care (65PHC), 98,533 individuals ≥85 years of age (+85), 425,799 health-care workers (HCWs), and 231,858 individuals with comorbidities that predispose	original & Alpha¶¶	Excluded	BNT162b2	Documented infection	82 (79-84)	>7	10 weeks
								COVID-Hospitalization	93 (89-96)	>7	
								COVID-Mortality	94 (90-96)	>7	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
				for severe COVID-19 disease (SCD)							
38	Thompson et al* *[updated on June 30,2021]*	USA	Cohort	3975 health care personnel, first responders, and other essential and frontline workers in 8 locations in US	Original	Excluded	BNT162b2	Documented infection	93 (78-98)	≥14	13 weeks
							mRNA-1273	Documented infection	82 (20-96)	≥14	
36	Khan et al (May 31, 2021)	USA	Retrospective cohort	14,697 IBD patients in VA hospitals	Unknown	Included	BNT162b2 & mRNA-1273	Documented infection	69 (44-83)	7+	
								Hospitalization/death	49 (-36-81)	7+	
35	Martinez-Bas et al* (May 27, 2021)	Spain	Prospective Cohort	20,961 close contacts of confirmed cases	Alpha	Excluded	BNT162b2	Documented infection	65 (56-73)	14+	12 weeks
								Symptomatic infection	82 (73-88)		
								Hospitalization	94 (60-99)		
34#	Chung et al* (Aug 20, 2021) *[Update to July 26 preprint]*	Canada	Test negative design case control	Adults (16+) in Ontario: 53,270 cases 270,763 controls	Non-VOC^	Excluded	BNT162b2	Symptomatic infection	91 (88-93)	7+	15 weeks
								Hospitalization and Death	96 (82-99)	0+	
							mRNA-1273	Symptomatic infection	94 (86-97)	7+	
								Hospitalization and Death	96 (74-100)	0+	
					Alpha specifically^		BNT162b2 & mRNA-1273	Symptomatic infection	90 (85-94)	7+	
								Hospitalization and Death	94 (59-99)	0+	
					Beta or Gamma specifically^		BNT162b2 & mRNA-1273	Symptomatic infection	88 (61-96)	7+	
							BNT162b2 & mRNA-1273	Hospitalization and Death	100	0+	
33	PHE (May 20, 2021)	UK	Test-negative case control	≥65 years	Alpha	Excluded	BNT162b2	Symptomatic infection	90 (82-95)	≥14	
							AZD1222	Symptomatic infection	89 (78-94)	≥14	
32#	Ranzani et al.* (Aug 20, 2021) *[update to Jul 21 preprint]*	Brazil	Test-negative case control	22,177 70+ year olds in Sao Paulo	Gamma^	Included	Coronavac	Symptomatic infection	46.8 (38.7-53.8)	≥14	~10.5 weeks
								Hospitalization	55.5 (46.5-62.9)		
								Death	61.2 (48.9-70.5)		
31	Ismail et al. (May 12, 2021)	UK	Screening method	13,907 ≥70	Alpha	Included	BNT162b2	Hospitalization in 80+	93 (89-95)	≥14	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
30	Pilishvili et al.* (May 14, 2021)	US	Test-negative case control	HCP at 33 U.S. sites across 25 U.S. states	Unknown	Excluded	BNT162b2 & mRNA-1273	Symptomatic infection	94 (87-97)	≥7	
29	Lopez-Bernal et al.* (May 13, 2021) *[Update to Mar 1 preprint]*	UK	Test-negative case control	156,930 UK population over age 70	Alpha^	Included	BNT162b2 AZD1222	Over 80 years: Symptomatic infection	79 (68-86)	≥7	
28	Angel et al.* (May 6, 2021)	Israel	Retrospective cohort	6710 HCWs at a single tertiary care center in	Alpha[¶]	Excluded	BNT162b2	Symptomatic	97 (94-99)	>7 days	
								Asymptomatic	86 (69-97)		
27#	Abu-Raddad et al.* (July 8, 2021)	Qatar	Test-negative case-control	Qatari adults	Alpha specifically^	Unknown	BNT162b2	CC Alpha documented infection	90 (86-92)	≥14	
								CC Alpha severe/fatal infection	100 (82-100)		
					Beta specifically^			CC Beta documented infection	75 (71-79)		
								CC Beta severe/fatal infection	100 (74-100)		
			Retrospective cohort	Qatari adults	Alpha specifically^	Unknown	BNT162b2	Cohort documented infection Alpha	87 (82-91)		
					Beta specifically^			Cohort documented infection Beta	72 (66-77)		
26	Haas et al. * (May 5, 2021) *[Update to Mar 24 preprint]*	Israel	Retrospective cohort	Israeli population ≥16 years	Alpha^	Excluded	BNT162b2	Documented infection	95.3 (94.9-95.7)	≥7 days	
								Asymptomatic infection	91.5 (90.7-92.2)		
								Symptomatic infection	97.0 (96.7-97.2)		
								Hospitalization	97.2 (96.8-97.5)		
								Severe/ critical hospitalization	97.5 (97.1-97.8)		
								Death	96.7 (96.0-97.3)		
25	Corchado-Garcia et al.* (November 2, 2021) *[Update to April 30 preprint]*	USA	Retrospective cohort	97,787 adults in the Mayo Clinic Network	Alpha and Delta^	Excluded	Ad26.COV2.S	Documented infection	74.2 (64.9-81.6)	≥15	
24	Fabiani et al.* (Apr 29, 2021)	Italy	Retrospective cohort	9,878 HCWs	Unknown	Excluded	BNT162b2	Documented infection	95 (62-99)	≥7 days	
								Symptomatic infection	94 (51-99)		

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
22	Tenforde et al.* (Apr 28, 2021)	USA	Test-negative case-control	Hospitalized adults ≥65 years	Original and Alpha¥	Unknown	BNT162b2 & mRNA-1273	Hospitalization	94 (49-99)	≥14 days	
21	Goldberg et al.* (March 30, 2022) *[Update to Apr 24, 2021 preprint]*	Israel	Prospective cohort	5,600,000+ individuals ≥16 years	Alpha^	Excluded	BNT162b2	Documented infection	94.5 (94.3-94.7)	≥14 days	~8 weeks
								Hospitalization	95.8 (95.2-96.2)		
								Severe disease	96.3 (95.7-96.9)		
								Death	96 (94.9-96.9)		
20	Pritchard et al.* (Jun 9, 2021) *[Update to Apr 23 preprint]*	UK	Prospective cohort	373,402 individuals ≥16 years	Alpha & Original^	Excluded	BNT162b2	Documented infection	80 (74-85)	≥0 days	
								Symptomatic disease	95 (91-98)		
							AZD1222	Documented infection	79 (65-88)		
								Symptomatic disease	92 (78-97)		
18	Hall et al.* (Apr 23, 2021) *[Update to Feb 21 preprint]*	UK – SIREN study	Prospective Cohort (Person-time)	23,324 healthcare workers	Alpha^	Excluded	BNT162b2	Documented infection	86 (76-97)	≥7	
17	Mason et al.* (October 18, 2021) *[Update to Apr 22 preprint]*	UK - England	Case-control	170,226 80-83-year-olds	Alpha^	Excluded	BNT162b2	Documented infection	70 (55- 80)	35-41	
								Hospitalization	75 (52-87)	35-41	
								Emergency visit	79(60-90)		
16	Bjork et al.* (September 29, 2021) *[Update to Apr 21 preprint]*	Sweden	Retrospective cohort	805,741 Swedish adults aged 18-64 years	Original & Alpha^	Unknown	BNT162b2	Documented infection	86 (72-94)	≥7	4 weeks
14	Andrejko et al.* (Jul 20, 2021) *[update to May 25 preprint]*	USA	Test-negative case control	1023 California adults ≥18 years	B.1.427/ B.1.429 & Alpha^	Excluded	BNT162b2 & mRNA-1273	Documented infection	87.4 (77.2-93.1)	≥15	~14 weeks
								Asymptomatic infection	68.3 (27.9-85.7)	≥15	
								Symptomatic infection	91.3 (79.3-96.3)	≥15	
								Hospitalization	100	≥15	
							BNT162b2	Documented infection	87.0 (68.6-94.6)	≥15	

No.	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Primary Series VE % (95% CI)	Days post Final dose	Max Duration of follow up after fully vaccinated
							mRNA-1273	Documented infection	86.2 (68.4-93.9)	≥15	
13	Regev-Yochay et al.* (July 7,2021) [*Update to April 9 preprint]*	Israel	Prospective cohort	3578 HCWs in one Israeli health system	Alpha¶	Included	BNT162b2	Asymptomatic infection	65 (45-79)	≥11	
								Asymptomatic infection presumed infectious (Ct< 30)	70 (43-84)	≥11	
								Symptomatic infection	90 (84-94)	≥11	
								Symptomatic infection presumed infectious (CT<30)	88 (80-94)	≥11	
11	Thompson et al.* (Mar 29, 2021)	USA	Prospective cohort	3,950 healthcare workers in eight US sites	Original¥	Excluded	BNT162b2 & mRNA1273	Documented infection	90 (68-97)	≥14	
6	Tande et al.* (Mar 10, 2021)	USA – Mayo Clinic	Retrospective Cohort	Asymptomatic screening of 39,156 patients: pre-surgical, pre-op PCR tests	original¥	Included	BNT162b2 & mRNA-1273	Asymptomatic infection	80 (56-91)	>0	
							BNT162b2	Asymptomatic infection	80 (56-91)	>0	
5	Mousten-Helms et al. (Mar 9, 2021)	Denmark	Retrospective Cohort	Long term care facilities in Denmark - 39,040 residents, 331,039 staff	original & Alpha¶¶	Excluded	BNT162b2	LTCF Resident: Documented Infection	64 (14-84)	>7	
								LTCF Staff: Documented Infection	90 (82-95)	>7	
3	Dagan et al.* (Feb. 24, 2021)	Israel – Clalit Health System	Retrospective Cohort	596,618 – matched on demographics, residence, clinical characteristics	original & Alpha^	Excluded	BNT162b2	Documented infection	92 (88-95)	>7	
								Symptomatic infection	94 (87-98)	>7	
								Hospitalization	87 (55-100)	>7	
								Severe disease	92 (75-100)	>7	
2	Public Health England – Feb. (Feb. 22, 2021)	UK - England	Screening Method	43,294 cases, with England as source population	Alpha^	Included	BNT162b2	Over 80 years: Symptomatic infection	88 (84-90)	7	

Purple text indicates new or updated study.
Product Manufacturers: BNT162b2 (Pfizer), mRNA-1273 (Moderna), AZD1222 (Astra-Zeneca), Ad26.COV2.S (Janssen), Coronavac
±Unless noted otherwise, days post 1st dose are prior to receiving dose 2.
‡Unclear if 1st dose VE estimates includes any individuals who received a second dose.
*Manuscripts with an asterisk (*) are peer-reviewed publications.
^Indicates predominant variant identified by study authors. If no ^ then variants identified through secondary source when possible. Please see additional footnotes.

[¶]The rise of SARS-CoV-2 variant Alpha in Israel intensifies the role of surveillance and vaccination in elderly | medRxiv
[¥]CDC Says More Virulent British Strain Of Coronavirus Now Dominant In U.S. : Coronavirus Updates : NPR
[£]Coronavirus (COVID-19) Infection Survey, UK - Office for National Statistics
[¶¶]Denmark logs more contagious COVID variant in 45% of positive tests | Reuters
[¥¥]COVID variant first detected in UK now dominant strain in Spain
[££]Reporte-circulacion-variantes-al-9.04.21-PUBLICADO-FINAL.pdf (minsal.cl)
[††]Based on https://outbreak.info/location-reports
[ɣ]https://www.gov.uk/government/publications/covid-19-variants-genomically-confirmed-case-numbers/variants-distribution-of-cases-data
[#] Manuscripts that are cited in the WHO COVID-19 Weekly Epidemiological Updates (see Special Focus Update on SARS-CoV-2 Variants of Interest and Variants of Concern, Table 3, included in every other Weekly Epidemiological Update): https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.
[ɣɣ]VE estimate presented with 99% CIs.

1.1 Inclusion criteria for VE studies

Note: All VE studies now must meet these criteria to be in the VE table:

- Published or preprint studies (not press release, presentations, media)
- Must have confidence intervals around VE, except in instances where it is not possible to calculate
    - Needs to include persons with & without infection or disease and with and without vaccination (ie a proper comparison group). This excludes case only studies (e.g., impact studies, risk of progression to severe disease (i.e. PHE)).
- No modeled comparison group nor comparison to historical cohort
    - The study design should account for confounding and/or VE estimate should be adjusted or state adjustment made no difference
- Outcomes must be lab confirmed, not syndromic
- At least 90% of participants must have documented vaccination status rather than relying on recall
    - VE must be for one vaccine, not for >1 vaccine combined (with exception for studies accessing Pfizer + Moderna vaccines and studies of heterologous schedules, but all participants included in a VE estimate should receive same brands of vaccines in the same order
- No significant bias that likely affects results
- Cannot include day 0-12 in unvaccinated definition
- Cannot compare to early post vaccination to calculate VE (e.g. day 0-12 vs day 12-21)

1.2 VE Studies that do not meet criteria (in case of interest):

1. Hunter P and Brainard J. Estimating the effectiveness of the Pfizer COVID-19 BNT162b2 vaccine after a single dose. A reanalysis of a study of 'real-world' vaccination outcomes from Israel. *medRxiv*. Published online 2021:2021.02.01.21250957. doi: 10.1101/2021.02.01.21250957

2. Institut National de Santé Publique du Québec. Preliminary Data on Vaccine Effectiveness and Supplementary Opinion on the Strategy for Vaccination Against COVID-19 in Quebec in a Context of Shortage. Gouvernement du Québec. 2021:Publication No 3111. Available at: https://www.inspq.qc.ca/sites/default/files/publications/3111-vaccine-effectiveness-strategy-vaccination-shortage-covid19.pdf.
3. Weekes M, Jones NK, Rivett L, et al. Single-dose BNT162b2 vaccine protects against asymptomatic SARS-CoV-2 infection. *Authorea*. Published online Feb 24, 2021. doi: 10.22541/au.161420511.12987747/v1
4. Aran D. Estimating real-world COVID-19 vaccine effectiveness in Israel using aggregated counts. Published online Mar 4, 2021. Available at: https://github.com/dviraran/covid_analyses/blob/master/Aran_letter.pdf.
5. Shah ASV, Gribben C, Bishop J, et al. Effect of vaccination on transmission of COVID-19: an observational study in healthcare workers and their households. *medRxiv*. Published online 2021:2021.03.11.21253275. doi: 10.1101/2021.03.11.21253275
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12. Tang L, Hijano DR, Gaur AH, et al. Asymptomatic and Symptomatic SARS-CoV-2 Infections After BNT162b2 Vaccination in a Routinely Screened Workforce. *JAMA.* Published online May 6, 2021:2021;325(24):2500-2502. doi: 10.1001/jama.2021.6564
13. Chodick G, Tene L, Rotem Ran S, et al. The Effectiveness of the Two-Dose BNT162b2 Vaccine: Analysis of Real-World Data. *Clin Infect Dis.* Published online May 17, 2021:2021;ciab438. doi: 10.1093/cid/ciab438
14. Lopez Bernal J, Andrews N, Gower C, et al. Effectiveness of BNT162b2 mRNA vaccine and ChAdOx1 adenovirus vector vaccine on mortality following COVID-19. *medRxiv*. Published online 2021:2021.05.14.21257600 doi: 10.1101/2021.05.14.21257218

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2. Summary of Study Results for Post-Authorization COVID-19 Booster Dose Vaccine Effectiveness

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
130	Gonzalez et al (September 27, 2022)	Argentina	Test-negative case control	422,144 individuals ≥50 years in Buenos Aires	Omicron^	Included	AZD1222 primary + BNT162b2 or mRNA-1273 booster	Documented infection	Complete vaccination at least 120 days prior	36 (33-39)	<60	~18 weeks
										8 (-4-19)	60+	
								Hospitalization		78 (65-86)	<60	
										86 (23-97)	60+	
								Death		80 (68-87)	<60	
										75 (-17-95)	60+	
							Sinopharm primary + BNT162b2 or mRNA-1273 booster	Documented infection		38 (31-45)	<60	
										36 (16-50)	60+	
								Hospitalization		78 (49-91)	<60	
								Death		73 (49-85)	<60	
										76 (-85-97)	60+	
							Sputnik V primary + BNT162b2 or mRNA-1273 booster	Documented infection		34 (31-37)	<60	
										-2 (-16-10)	60+	
								Hospitalization		76 (68-83)	<60	
										66 (16-86)	60+	
								Death		88 (83-92)	<60	
										84 (46-95)	60+	
129	Schrag et al* (September 26, 2022)	USA	Test-negative case control	4517 ED/UC encounters and 975 hospitalizations among pregnant persons (aged 18-45) across 10 states	Omicron^	Included	BNT162b2 or mRNA-1273	Emergency Dept/Urgent Care encounter	Unvaccinated	65 (41-79)	7+	~20 weeks
										79 (59-89)	7-119	
										-124 (-414-2)	120+	
								Hospitalization		76 (27-92)	7+	
										86 (28-97)	7-119	
										-53 (-1254-83)	120+	
					Delta^			Emergency Dept/Urgent Care encounter		81 (33-95)	7+	~15 weeks
								Hospitalization		97 (79-100)	7+	
128	Collie et al* (September 14, 2022)	South Africa	Test-negative case control	32,883 hospitalized adults (18+)	Omicron BA.1 or BA.2^	Included	BNT162b2	Hospitalization	Unvaccinated	81.6 (68.1-89.4)	14-27	~23 weeks
										50 (4.4-73.0)	3-4 mos	
					Omicron BA.4 or BA.5^					68.8 (59.5-76)	1-2 mos	
										46.8 (35.3-56.2)	3-4 mos	
127	Chatzilena et al (September 12, 2022)	UK	Test-negative case control	8543 hospitalized adults (18+) in Bristol	Omicron^	Excluded	BNT162b2	Hospitalization	Unvaccinated	30.9 (6-50)	7+	~42 weeks
										31 (-15-59)	≤3 months	
										33.9 (8-52)	>3 months	
126		Singapore			Omicron^	Excluded		Symptomatic disease		22.2 (19.6-24.7)	8+	~13 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	Tan et al* (September 13, 2022)		Target trial emulation	79,966 persons aged 80+ y			BNT162b2 or mRNA-1273 **(4 doses)**		Complete vaccination with 3 doses of BNT162b2 or mRNA-1273 at least 5 months prior	35 (31-40)	8-30	
										16 (12-20)	>60	
								Hospitalization		55 (51.8-58.3)	8+	
										58 (50-64)	8-30	
										52 (47-57)	>60	
								Severe disease		63 (56.3-68.5)	8+	
										58 (42-69)	8-30	
										57 (46-66)	>60	
125	Mallah et al* (September 10, 2022)	Spain	Test-negative case control	909,636 persons aged 11+ y In Galicia	Alpha, Delta††	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	88 (85-90)	7+	~5 weeks
124	Huang et al (September 9, 2022)	China	Matched case control	612,597 cases aged ≥3 years	**Omicron^**	Excluded	Ad5-nCoV	Documented infection	Unvaccinated	16.0 (1.5-28.4)	13-24 weeks	23 weeks
							Inactivated vaccine (BBIBP-CorV or CoronaVac)	Documented infection		19.2 (18.2-20.2)	24 weeks	
								Severe disease		92.7 (90.1-94.6)	14+	
								Death		95.9 (91.4-98.1)		
123	Kim et al* (August 29,2022)	South Korea	Matched case control	281 cases and 281 controls amongst HCWs	**Omicron^**	Excluded	AZD1222 primary + BNT162b2 booster	Documented infection	Complete vaccination with 2 doses of AZD1222 vaccine	48.3 (30.0-72.5)	14+	~15 weeks
							BNT162b2 or mRNA-1273		Complete vaccination with 2 doses of any mRNA vaccine	53.1 (13.2-74.7)		
122	Barraza et al* (August 5, 2022)	Chile	Retrospective cohort	3282 cases and 3199 controls	Gamma, Delta and Omicron^	Included	BNT162b2	Hospitalization with severe acute respiratory infection	Unvaccinated	84 (71-91.2)	14+	~41 weeks
							BNT162b2 **(4 doses)**			96.2 (83.5-99.1)		~20 weeks
							CoronaVac			69.1 (53.6-79.4)		~41 weeks
121	Suphanchaimat et al* (July 5,2022)	Thailand	Test-negative case control	558,865 cases and 1,139,723 controls aged 18+	Delta^	Included	CoronaVac primary + AZD1222 booster	Documented infection	Unvaccinated	99.1 (93.6-99.9)	30-59	~6 weeks
										97.9 (91.4-99.5)	60-89	~11 weeks
							CoronaVac primary + BNT162b2 booster			97.2 (79.8-99.6)	15-29	~2 weeks
										98.7(90.6-99.8)	90+	~19 weeks
120	Cocchio et al* (August 2022)	Italy	Retrospective cohort	19,817 adolescents aged 12-17 years	**Omicron^**	Excluded	BNT162b2	Documented infection	Unvaccinated	72 (70-73)	14-34	~15 weeks
										30 (27-33)	35-69	
							mRNA-1273 primary + BNT162b2 booster			71 (66-74)	14-34	
										32 (26-38)	35-69	
119	Ng et al*	Singapore			**Omicron^**	Excluded	BNT162b2 (3 doses)	Documented infection		31.7 (30-33.4)	15-60	~45 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	(August 26, 2022)		Retrospective cohort	2,441,581 adults aged 30+ y					Complete vaccination with 2 doses of any mRNA vaccine 5 months prior	-2.83 (-5.4-0.3)	121-330	
								Severe disease		85.2 (80.2-88.9)	15-60	
										87.3 (84.2-89.8)	121-330	
							mRNA-1273 (3 doses)	Documented infection		41.3 (39.4-43.1)	15-60	
										14.6 (11-18)	121-330	
								Severe disease		97.5 (89.7-99.4)	15-60	
										89.0 (78.9-94.2)	121-330	
							BNT162b2 primary + mRNA-1273 booster	Documented infection		34.9 (33-36.8)	15-60	
										3.69 (0.03-7.21)	121-330	
								Severe disease		87.3 (72.8-94.1)	15-60	
										84.4 (73.4-90.9)	121-330	
							mRNA-1273 primary + BNT162b2 booster	Documented infection		35.6 (32.8-38.3)	15-60	
										9.7 (2.7-16.3)	121-330	
								Severe disease		100 (-inf-100)	15-60	
										86.3 (44.7-96.6)	121-330	
118	Tsang et al (August 25, 2022)	Hong Kong SAR	Prospective cohort	8636 individuals aged 5+ y	Omicron BA.2^	Excluded	BNT162b2	Documented infection	Unvaccinated	41.4 (23.2-55.2)	14+	~25 weeks
								Symptomatic disease		50.9 (31-65)		
							CoronaVac	Documented infection		32.4 (9-49.8)		
								Symptomatic disease		41.6 (15-59.8)		
							CoronaVac primary + BNT162b2 booster	Documented infection		31.3 (-1-53.3)		
								Symptomatic disease		55.8 (22.9-74.6)		
117	Wan et al* (August 17, 2022)	Hong Kong SAR	Case-Control	82,587 cases of COVID-19 infection, 10,241 cases of COVID-19 related hospital admission, 539 cases of ICU admission in patients with Diabetes Mellitus (DM) aged ≥12 y	Omicron BA.2^	Excluded	BNT162b2 (3 doses)	Documented infection	Unvaccinated	54.2 (52.4-55.9)	14+	~23 weeks
								Hospitalization		91.4 (89.5-92.9)		
								ICU admission		86.3 (71.5-93.4)		
							CoronaVac (3 doses)	Documented infection		19.8 (17.2-22.3)		
								Hospitalization		85.4 (83.2-87.3)		
								ICU admission		94.8 (85.8-98.1)		
							BNT162b2 primary + CoronaVac booster	Documented infection		12.1 (-15.8-33.3)		
							CoronaVac primary + BNT162b2 booster	Documented infection		39.9 (36.6-42.9)		
								Hospitalization		89.5 (85.9-92.2)		
								ICU admission		95.9 (70.3-99.4)		
116	Cheng et al* (August 11,2022)	Hong Kong, SAR	Retrospective cohort	103,143 patients with	Omicron††	Excluded	BNT162b2	Documented infection	Unvaccinated	77 (72-82)	14+	~45 weeks
								Hospitalization		85 (73-92)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				chronic kidney disease aged ≥ 18 years				Death		95 (78-99)		
							CoronaVac	Documented infection		61 (48-72)		
								Hospitalization		65 (5-87)		
								Death		97 (92-99)		
115	Powell et al (August 22, 2022)	UK	Test-negative case control	1,161,704 tests among adolescents (aged 11-17 y) in England	Omicron^	Excluded	BNT162b2 primary + BNT162b2 or mRNA-1273 booster	Symptomatic disease	Unvaccinated	62.9 (60.5-65.1)	14-104	~23 weeks
										33.6 (14.6-48.3)	105-174	
					Delta^	Excluded		Symptomatic disease	Unvaccinated	96 (92.2-97.9)	14-104	~13 weeks
114	Yan et al* (August 18, 2022)	Hong Kong, SAR	Case control	9021 cases and 89,440 controls among adults aged 18+ y	Omicron BA.2^	Excluded	BNT162b2 (3 doses)	Severe disease (18-50 y)	Unvaccinated	76.1 (24.8-92.4)	14+	18 weeks
								Severe disease (51-64 y)		90.5 (72.6-96.7)		
								Severe disease (65+)		86.7 (74.8-93)		
								Death (18-50 y)		82.1 (35.5-95)		
								Death (51-64 y)		98.1 (92.3-99.5)		
								Death (65+ y)		97.5 (95.1-98.7)		
							CoronaVac (3 doses)	Severe disease (18-50 y)		81 (10.7-96)		
								Severe disease (51-64 y)		84.6 (62-93.7)		
								Severe disease (65+ y)		83.6 (73-90.1)		
								Death (18-50 y)		89.5 (46-97.9)		
								Death (51-64 y)		97 (90.3-99.1)		
								Death (65+ y)		94.2 (91.5-96.1)		
							CoronaVac primary + BNT162b2 booster	Severe disease (18-50 y)		56.9 (-256-94.8)		
								Severe disease (51-64 y)		91.7 (37.5-98.9)		
								Severe disease (65+ y)		92.8 (70.8-98.2)		
								Death (18-50 y)		66.3 (-218.8-96.4)		
								Death (65+ y)		95.8 (90.6-98.1)		
113	Kim et al* (Augut 17, 2022)	South Korea	Retrospective cohort	3,203,985 adolescents aged 12-18	Delta, Omicron††	Excluded	BNT162b2	Documented infection (18 y)	Unvaccinated	56.3 (50-61.7)	14-29	~6 weeks
										55.2 (47.3-61.9)	30-59	
112	Risk et al* (August 16,2022)	USA	Retrospective cohort	162,805 immunocompetent and 5,609 immunosuppressed	Omciron^	Included	BNT162b2	Documented infection (immunosuppressed)	Unvaccinated	50 (31-64)	7+	~22 weeks
								Documented infection (immunocompetent)		35 (29-41)		
								Hospitalization (all)		89 (84-93)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				individuals aged ≥18 years			mRNA-1273	Documented infection (immunosuppressed)		60 (42-73)		
								Documented infection (immunocompetent)		57 (51-62)		
								Hospitalization (all)		92 (86-96)		
							BNT162b2 or mRNA-1273	Hospitalization (immunosuppressed)		87 (74-93)		
								Hospitalization (immunocompetent)		92 (87-95)		
								ICU admission (all)		91 (75-97)		
111	Low et al* (August 10,2022)	Malaysia	Retrospective cohort	13,840,240 individuals aged ≥18 years	Delta^	Excluded	BNT162b2	Symptomatic disease	Complete vaccination with 2 doses of BNT162b2 at least 3 months prior	99 (99-100)	14+	~14 weeks
							CoronaVac primary + BNT162b2 booster			94 (94-95)		
							CoronaVac			92 (90-94)		
110	Stirrup et al (August 9, 2022)	UK	Prospective cohort	19,973 staff of LTCFs in England *Note: a small proportion of participants received AZD1222 as first booster dose (0.1%) or second booster dose (0.4%) rather than an mRNA vaccine.*	**Omicron^**	Excluded	AZD1222 primary + BNT162b2 or mRNA-1273 booster	Documented infection	Complete vaccination with 2 doses at least 84 days prior	72 (67-76)	14-48	~26 weeks
										-12 (-29-3)	84+	
							BNT162b2 or mRNA-1273 (3 doses total)			63 (54-70)	14-48	
										-26 (-45 to -9)	84+	
						Individuals with prior infection only	AZD1222 + BNT162b2 or mRNA-1273	Documented infection		80 (67-88)	14-48	
										-8 (-41-18)	84+	
							BNT162b2 or mRNA-1273			75 (52-87)	14-48	
										-36 (-83 to -1)	84+	
109	Pinto-Álvarez (August 6,2022)	Colombia	Nested cohort	6963 solid organ transplant recipients aged ≥16 years	Mu, Delta and Omicron^	Excluded	BNT162b2	Documented infection	Unvaccinated	72.5 (59.5-81.4)	15+	~26 weeks
								Hospitalization		82.9 (63.5-92.1)		
								Death		89.8 (73.7-96.1)		
							CoronaVac	Documented infection		58.1 (35.9-72.7)		
								Hospitalization		67.9 (35.1-84.2)		
								Death		91.9 (76.2-97.2)		
							Ad26.COV2.S	Documented infection		80.7 (0-97.3)		
							AZD1222	Documented infection		76.2 (50.5-88.5)		
							BNT162b2 primary + mRNA-1273 booster	Documented infection		75.1 (61.2-83.9)		
								Hospitalization		91.6 (72.8-97.4)		
								Death		97.3 (80.5-99.6)		
								Hospitalization		70.2 (37.6-85.8)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							CoronaVac primary + BNT162b2 booster	Death		90.8 (31.9-98.8)		
							BNT162b2 primary + AZD1222 booster	Documented infection		80.1 (63.7-89.1)		
								Hospitalization		95.3 (65.7-99.4)		
								Death		93.4 (51.3-99.1)		
108	Tartof et al* (August 3, 2022)	USA	Test-negative case control	3168 adolescents aged 12 to 17 years	**Omicron specifically^**	Included	BNT162b2	ED or UC encounters	Unvaccinated	87 (72-94)	14+	~10 weeks
						Excluded				87 (71-95)		
107	Arashiro et al* (Augsut 3, 2022)	Japan	Case control	5975 individuals aged 20+	**Omicron^**	Included	BNT162b2 or mRNA-1273	Symptomatic disease	Unvaccinated	78 (67-86)	14+	~21 weeks
										51 (29-66)	180+	
106	Cerqueira-Silva et al* (July 18,2022)	Brazil	Test-negative case control	2,471,576 individuals aged 18+	**Omicron^**	Included	CoronaVac primary + BNT162b2 booster	Symptomatic infection	Unvaccinated	63.6 (62.8-64.3)	14-30	~22 weeks
										1.7 (0.1-3.2)	>120	
								Hospitalization or death		89.4 (87.8-90.7)	14-30	
										84.1 (83.2-84.9)	>120	
								Death		90.2 (87.6-92.3)	14-30	
										87 (85.9-88.0)	>120	
								Symptomatic infection	Complete vaccination with 2 doses at least 4 months prior	62.9 (62.1-63.7)	14-30	
										-2.9 (-1.3- -4.5)	>120	
								Hospitalization or death		71.2 (67.1-74.9)	14-30	
										59.8 (57.8-61.8)	>120	
105	Hertz et al (August 15, 2022) *[Update to July 17,2022 preprint]*	Israel	Prospective cohort	608 healthcare workers aged 18+	**Omicron BA.1^**	Excluded	BNT162b2 **(4 doses)**	Symptomatic disease	Complete vaccination with 3 doses of BNT162b2 at least 3 months prior	45.5 (19-63)	8-30	~11 weeks
										37 (15-53)	60-90	
104	Link-Gelles et al (July 15,2022)	USA	Test-negative case control	159,432 ED/UC encounters and hospitalizations in adults aged 18+	**Omicron BA.1^**	Excluded	BNT162b2 or mRNA-1273	ED/UC encounter	Unvaccinated	84 (83-85)	7-119	~20 weeks
										73 (68-77)	≥120	
								Hospitalization		92 (91-93)	7-119	
										85 (81-89)	≥120	
				113,837 ED/UC encounters and hospitalizations in adults aged 18+	**Omicron BA.2^**			ED/UC encounter		56 (51-61)	7-119	
										26 (21-30)	≥120	
								Hospitalization		69 (58-76)	7-119	
										52 (44-59)	≥120	
				14,776 ED/UC encounters			BNT162b2 or mRNA-1273	ED/UC encounter		66 (60-71)	7+	~6 weeks
								Hospitalization		80 (71-85)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				and hospitalization in adults aged 50+			(4 doses)					
103	Lee et al* (July 12,2022)	UK	Test-negative case control	230,666 cancer patients aged 18+	Delta^	Included	BNT162b2 primary + BNT162b2 booster	Documented infections	Unvaccinated	59.3 (58.8-59.8)	84+	~12 weeks
								Symptomatic disease		61.9 (61.4-62.4)		
								Hospitalization		81.1 (76.8-84.6)		
								Death		94.6 (92.6-96.1)		
							AZD1222 primary + BNT162b2 booster	Documented infections		58.3 (57.7-58.9)		
								Symptomatic disease		63.2 (62.6-63.8)		
								Hospitalization		79.2 (73.9-83.4)		
								Death		94.3 (91.9-96)		
102	Guedalia et al (July 11, 2022)	Israel	Retrospective cohort	82,803 pregnant women aged 16+	Omicron BA.1^	Excluded	BNT162b2	Hospitalization	Complete vaccination at least 5 months prior	48 (37-57)	0+	~31 weeks
								Hospitalization with moderate disease		92 (26-99)		
								Hospitalization	Unvaccinated	43 (31-53)		
								Hospitalization with moderate disease		97 (72-100)		
								Severe disease		94 (43-99)		
					Delta^			Hospitalization	Complete vaccination at least 5 months prior	92 (83-96)		~15.5 weeks
								Hospitalization	Unvaccinated	97 (95-99)		
								Hospitalization with moderate disease		99 (93-100)		
								Severe disease		99 (89-100)		
101	Muhsen et al* (July 1, 2022)	Israel	Prospective cohort	18,611 residents of 640 LTCF (aged 60+)	Delta^	Excluded	BNT162b2	Documented infection	Complete vaccination at least 5 months prior	89 (85-93)	>7	~10 weeks
								Mild/Moderate hospitalization		93 (86-97)		
								Severe hospitalization		90 (76-96)		
								Death		96 (84-99.1)		
100	Tartof et al (June 30, 2022)	USA	Test-negative case control	29,507 hospital admissions and 36,306 ED admissions in individuals aged ≥18 years	Omicron BA.1 specifically^	Included	BNT162b2	Hospitalization	Unvaccinated	80 (74-84)	<3 mos.	~29 weeks
										76 (69-82)	≥ 3 mo	
								ED admissions		74 (69-78)	<3 mos.	
										65 (56-73)	≥ 3 mo	
					Omicron BA.2 specifically^			Hospitalization		74 (47-87)	<3 mos.	
										70 (53-81)	≥ 3 mo	
								ED admissions		59 (40-72)	<3 mos.	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
										5 (-21-25)	≥ 3 mo	
99	Breznik et al (June 29, 2022)	Canada	Prospective cohort study	997 residents of nursing and retirement homes in Ontario	Omicron^	Included	BNT162b2 or mRNA-1273 (4 doses)	Documented infection	Complete vaccination with 3 doses	81 (70-88)	60-120	~15 weeks
98	Ionescu et al (June 28, 2022)	Canada	Test-negative case control	193,899 tests among adolescents aged 12-17 in Quebec	Omicron^	Excluded	BNT162b2	Documented infection	Unvaccinated	60.8 (40.8-74.1)	14+	~26 weeks
				60,903 tests among adolescents aged 12-17 in British Columbia						63.7 (41.1-77.7)		
97	Carazo et al* (September 21, 2022) *[Published version of June 27 preprint]*	Canada	Test-negative case control	37,732 cases and 73,507 controls amongst HCWs in Quebec aged 18-59 years	Omicron BA.2 specifically	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated, no prior infection	46 (40-52)	14+	~39 weeks
								Symptomatic disease		70 (62-75)		
96	Muhsen et al* (June 23, 2022)	Israel	Retrospective cohort	43,775 residents of LTCF aged 60+	Omicron^	Excluded	BNT162b2 (4 doses)	Documented infection	Complete vaccination with 3 doses of BNT162b2 at least 4 months prior	36 (31-40)	14+	~12 weeks
								Mild-moderate hospitalization		66 (57-73)		
								Severe hospitalization		72 (61-80)		
								Death		76 (58-87)		
95	Liu et al (June 21, 2022)	Australia	Prospective cohort study	2,053,123 adults in Sydney (aged 40+)	Omicron^	Excluded	BNT162b2	Hospitalization or death among persons 50-69 years old	Complete vaccination with 2 doses 8-89 days prior	49.4 (30.8-63.0)	8+	~13 weeks
94	Ioannou et al (June 16, 2022)	USA	Target trial emulation	490,838 matched pairs of veterans (aged 18+)	Omicron^	Excluded	Any mRNA primary + Any mRNA booster	Documented infection	Complete vaccination at least 5 months prior	39 (36.4-41.6)	>10	~15 weeks
								Hospitalization		53.3 (48.1-58)		
								Death		79.1 (71.2-84.9)		
								Documented infection	Complete vaccination 5-9 months prior	36.4 (33.3-39.4)		
								Hospitalization		43.8 (35.2-51.3)		
								Death		78.1 (67.5-85.3)		
								Documented infection		46.5 (44.1-48.7)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
								Hospitalization	Complete vaccination >9 months prior	63.2 (56.4-69)		
								Death		81.6 (67.8-89.4)		
							Any mRNA primary + BNT162b2 booster	Documented infection	Complete vaccination at least 5 months prior	39 (36.4-41.6)		
								Hospitalization		54 (46.1-60.8)		
								Death		85.5 (73.9-92)		
							Any mRNA primary + mRNA-1273 booster	Documented infection		44.6 (42.5-46.6)		
								Hospitalization		52.9 (45.6-59.2)		
								Death		75.2 (62.9-83.4)		
							BNT162b2 primary + Any mRNA booster	Documented infection		39.6 (36.9-42.1)		
								Hospitalization		53.7 (45.8-60.4)		
								Death		84.8 (73.7-91.2)		
							mRNA-1273 primary + Any mRNA booster	Documented infection		44.3 (42.2-46.3)		
								Hospitalization		53.1 (45.7-59.5)		
								Death		75 (62.3-83.4)		
93	Adams et al (June 14,2022)	USA	Prospective test-negative case control	3,181 hospitalised patients aged ≥18 years	**Omicron specifically^**	Included	BNT162b2 primary + BNT162b2 booster	Hospitalization	Unvaccinated	80 (73-85)	7+	~39 weeks
							mRNA-1273 primary + mRNA booster			77 (67-83)		
							BNT162b2 or mRNA-1273			70 (34-86)		
							Ad26.COV2.S primary + Ad26.COV2.S booster			30 (-85-74)		
							Ad26.COV2.S primary + BNT162b2 or mRNA-1273 booster			64 (35-80)		
92	Richterman et al* (June 6, 2022)	USA	Test-negative case control	14,520 tests among healthcare workers	Delta^	Excluded	BNT162b2 primary + BNT162b2 booster	Symptomatic disease	Complete vaccination with 2 doses of BNT162b2 within last 6 months	78 (63-87)	14+	~32 weeks
							mRNA-1273 primary + mRNA booster			96 (82-99)		
					Omicron^		BNT162b2 primary + BNT162b2 booster			50 (42-56)		
							mRNA-1273 primary + mRNA booster			56 (45-65)		
							BNT162b2 primary + BNT162b2 booster			66 (51-76)	<56	
										55 (19-76)	>112	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
					Delta^		BNT162b2 primary + BNT162b2 booster		Unvaccinated	93 (78-98)	14+	
							mRNA-1273 primary + mRNA booster			96 (82-99)		
					Omicron^		BNT162b2 primary + BNT162b2 booster			54 (23-73)		
							mRNA-1273 primary + mRNA booster			46 (6-69)		
							BNT162b2 primary + BNT162b2 booster			75 (50-87)	<56	
										55 (5-69)	>112	
91	Hulme et al (June 6,2022)	UK	Retrospective cohort	6,990,219 adults aged ≥18 years	Delta	Included	BNT162b2 primary + BNT162b2 booster	Documented infection	Complete vaccination with 2 doses of AZD1222 or BNT162b2	49.6 (48.3-50.8)	1-28	~11 weeks
										49.7 (47.8-51.5)	29-70	
								Hospitalization		73.8 (68.9-77.9)	1-28	
										86.1 (81.9-89.4)	29-70	
								Death		92.6 (86.5-96)	29-70	
							AZD1222 primary + BNT162b2 booster	Documented infection		49.2 (48.4-50)	1-28	
										54.8 (53.3-56.3)	29-70	
								Hospitalization		78.2 (75.2-80.8)	1-28	
										83.9 (80-87.1)	29-70	
								Death		77.4 (66.3-84.9)	1-28	
										93.5 (87.6-96.6)	29-70	
90	Carlsen et al* (June 1, 2022)	Norway	Retrospective cohort study	21,643 newborns	Omicron^	Excluded	BNT162b2 or mRNA-1273 *(~4% of mothers received AZD1222 as first dose)*	Documented infection during an infant's first 4 months of life (born to unvaccinated mothers and mothers vaccinated in 2nd or 3rd trimester)	Unvaccinated	78 (57-88)	14+	~45 weeks
89	Marra et al (May 27, 2022)	Brazil	Retrospective cohort study	11,427 HCWs 18 years and older	Delta^	Excluded	CoronaVac primary + BNT162b2 booster	Documented infection	Complete vaccination with 2 doses CoronaVac	92.0 (89.1-94.3)	14+	~11 weeks
							AZD1222 primary + BNT162b2 booster		Complete vaccination with 2 doses AZD1222	60.5 (44.9-72.4)		
88	Chin et al (May 27,2022)	USA	Retrospective test-negative case control	15,783 resident and 8,539 staff cases, matched	Omicron^	Excluded	BNT612b2 or mRNA-1273	Documented infection	Unvaccinated with no prior infection	43.2 (42.2-47.4)	14+	~32 weeks
						Included before July 01/2021				61.3 (60.7-64.8)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				with 180,169 resident and 90,409 staff controls aged 18+		Included since July 01/2021				86.8 (82.1-92.7)		
87	Amir et al* (September 9, 2022) *[Update to May 25, 2022 preprint]*	Israel	Retrospective cohort	452,485 children 12-15 years of age	Omicron^	Excluded	BNT612b2	Documented infection	Unvaccinated	80.0 (76.7-83.1)	14-60	~7 weeks
									Complete vaccination with 2 doses 120+ days prior	76.2 (72.2-79.6)		
86	Fano et al* (May 18,2022)	Italy	Retrospective cohort	946,156 individuals aged 12 +	Alpha, Delta^	Excluded	BNT612b2 or mRNA-1273 (3 doses)	Documented infection	Unvaccinated	69.1 (67.5-70.7)	15-19	~26 weeks
										50.8 (46.0-55.1)	75+	
							AZD1222 primary + BNT162b2 or mRNA-1273 booster			59.9 (56.4-63.0)	15-19	
										23.4 (12.1-33.3)	40+	
							Ad26.COV2.S primary + BNT162b2 or mRNA-1273 booster			52.8 (47.2- 57.9)	15-19	
										26.9 (16.3-36.3)	40+	
							Heterologous primary (AZD1222+ BNT612b2 or mRNA-1273) + BNT162b2 or mRNA-1273 booster			28.0 (0.0-48.5)	10-14	
										28.8 (12.9-41.8)	15+	
85	Rennert et al (May 7, 2022)	USA	Propensity matched case control	1,944 students aged 18+	Omicron^	Included	BNT162b2	Documented infection	Unvaccinated	42.8 (22.7-57.6)	7+	~16 weeks
							mRNA-1273			48.5 (25-64.7)		
				658 employees aged 18-65			BNT162b2			74.3 (42.1-88.6)		
							mRNA-1273			60.4 (32.4-76.8)		
84	Amir et al (May 5,2022)	Israel	Restrospective cohort	1,178,090 adults aged 60+	Omicron^	Excluded	BNT162b2 (3 doses)	Hospitalization and death	Complete vaccination with 2 doses of BNT162b2 at least 4 months prior	57.0 (37.5-71.0)	0-30	~31 weeks
										67.8 (59-75.6)	180-210	
							BNT162b2 (4 doses)			89.2 (88.0-91.0)	0-60	
83	Butt et al* (May 3, 2022)	USA	Retrospective cohort	2,384,272 veterans (aged 21+)	Omicron^	Excluded	BNT162b2	Documented infection	Complete vaccination with 2 doses of BNT162b2 by April 30, 2021	11 (7-14)	>7	~19.5 weeks
										30 (23-36)	<28	
										-9 (-22-2)	>84	
								Hospitalization		50 (41-57)	>7	
										62 (43-75)	<28	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
										45 (18-63)	>84	
								ICU admission or death		88 (68-96)	>7	
										90 (22-99)	28-56	
										79 (-78-98)	>84	
							mRNA-1273	Documented infection	Complete vaccination with 2 doses of mRNA-1273 by April 30, 2021	27 (24-30)	>7	
										40 (35-44)	<28	
										-23 (-65-9)	>84	
								Hospitalization		55 (46-61)	>7	
										55 (38-67)	<28	
										83 (24-96)	>84	
								ICU admission or death		72 (24-90)	>7	
										86 (-17-98)	<28	
										50 (-68-85)	28-56	
							BNT162b2 or mRNA-1273	Documented infection	Complete vaccination with 2 doses of BNT162b2 or mRNA-1273 by April 30, 2021	19 (17-22)	>7	
								Hospitalization		52 (46-57)	>7	
								ICU admission or death		83 (65-92)	>7	
					Delta^		BNT162b2	Documented infection	Complete vaccination with 2 doses of BNT162b2 by April 30, 2021	73 (70-76)		~9.5 weeks
								Hospitalization		79 (71-85)		
								ICU admission or death		90 (21-99)		
							mRNA-1273	Documented infection	Complete vaccination with 2 doses of mRNA-1273 by April 30, 2021	74 (70-78)		
								Hospitalization		80 (68-88)		
							BNT162b2 or mRNA-1273	Documented infection	Complete vaccination with 2 doses of BNT162b2 or mRNA-1273 by April 30, 2021	73 (71-76)		
								Hospitalization		80 (73-85)		
								ICU admission or death		94 (52-99)		
82	Carazo et al (May 3, 2022)	Canada	Test-negative case control	224,007 cases and 472,432 controls	**Omicron^**	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	73 (72-73)	7+	~24 weeks
								Hospitalization		91 (91-92)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				among individuals (12+ y) in Quebec		Previously infected only		Documented infection		68 (67-68)		
								Hospitalization		84 (82-91)		
81	Suah et al* (May 2, 2022)	Malaysia	Test-negative case control	319,127 tests	Omicron^	Unknown	BNT162b2	Documented infection	Complete vaccination with 2 doses of BNT162b2 4-6 months prior	52 (50.3-51.9)	14+	~12 weeks
				306,483 tests	Delta^					89.4 (89.2-89.7)		
80	Kirsebom et al (May 1, 2022)	UK	Test-negative case control	759,450 adults aged 40-64 y	Omicron specifically^	Included	AZD1222	Symptomatic disease	Unvaccinated	51.7 (38.9-61.8)	14-34	~3 weeks
										37.2 (-44.1-72.6)	105+	~20 weeks
							AZD1222 + BNT162b2	Symptomatic disease		63.8 (63.0-64.5)	14-34	~3 weeks
										30.6 (26.8-34.3)	105+	~20 weeks
				166,720 adults aged 65+ y	Omicron specifically^		AZD1222	Symptomatic disease		51.6 (20.8-70.4)	14-34	~3 weeks
										-27.2 (-131.6-30.1)	70-104	~13 weeks
								Hospitalization		82.3 (64.2-91.3)	7+	~20 weeks
							AZD1222 + BNT162b2	Symptomatic disease		58.1 (51.6-63.8)	14-34	~3 weeks
										23.1 (15.1-30.5)	105+	~20 weeks
								Hospitalization		90.9 (88.7-92.7)	7+	~20 weeks
					Delta specifically^		AZD1222	Hospitalization	Unvaccinated	80.9 (15.6-95.7)	7+	~15 weeks
							AZD1222 + BNT162b2			93.9 (92.8-94.9)		
79	Sharma et al (April 27,2022)	USA	Matched case control	221,267 veterans	Omicron^	Excluded	BNT162b2	Documented infection	Complete vaccination with two doses at least ≥5 months prior	30.1 (26.2-33.7)	14+	~27 weeks
								Hospitalisation		61.4 (55-67.1)		
								Death		78.8 (67.9-87.5)		
								Documented infection	Unvaccinated	47.8 (45.2-50.3)		
								Hospitalisation		81.8 (79.2-84.2)		
								Death		89.6 (85-93.6)		
				187,507 veterans			mRNA-1273	Documented infection	Complete vaccination with two doses at least ≥5 months prior	37.1 (32.2-41.7)		
								Hospitalisation		63.5 (53.7-71.6)		
								Death		75.0 (55.4-88.0)		
								Documented infection	Unvaccinated	61.9 (59.4-64.4)		
								Hospitalisation		87.9 (85.3-90.2)		
								Death		91.4 (86.4-95.6)		
78	Castillo et al	France				Included		Symptomatic infection		64 (63-64)	8-14	~22 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	(April 21, 2022)		Test-negative case control	761,744 cases, 18+ years	Omicron specifically^		BNT162b2 or mRNA-1273 *Note: A small proportion(~1%) received an undetermined vaccine product*		Unvaccinated without prior infection	50 (48-51)	>90	
								Hospitalisation		90 (87-92)	8-14	
										93 (92-94)	>90	
								ICU admission		96 (92-99)	8-14	
										97 (95-99)	>90	
								Death		95 (89-100)	8-14	
										93 (91-96)	>90	
				166,009 cases, 18+ years	Delta specifically^			Symptomatic infection		84 (79-88)	8-14	
										90 (85-94)	>90	
								Hospitalisation		98 (98-99)	8-14	
										99 (99-100)	>90	
								ICU admission		99 (98-99)	8-14	
										99 (99-100)	>90	
								Death		98 (96-100)	8-14	
										99 (99-100)	>90	
77	Cerqueira-Silva et al (April 14, 2022)	Brazil	Test-negative case control	4,219,703 adults, 18+ years	Omicron^	Included	AZD1222 + BNT162b2	Symptomatic disease	Unvaccinated	42.8 (42.1-43.5)	2-4 weeks	2 weeks
										4.9 (2.7-7)	13+ weeks	~21 weeks
								Severe disease		89.9 (88.9-90.7)	2-4 weeks	2 weeks
										80.2 (77.9-82.2)	13+ weeks	~21 weeks
							BNT162b2 (3 doses)	Symptomatic disease		35.2 (33.7-36.7)	2-4 weeks	2 weeks
										36.3 (29.9-42.2)	9-12 weeks	10 weeks
								Severe disease		88.3 (85.1-90.7)	2-4 weeks	2 weeks
										82.5 (64-91.5)	9-12 weeks	10 weeks
		Scotland		370,556 adults, 18+ years			AZD1222 + BNT162b2	Symptomatic disease		49 (45.3-52.4)	2-4 weeks	2 weeks
										18.2 (7.2-28)	13+ weeks	~22 weeks
								Severe disease		81.8 (55-92.6)	2-4 weeks	2 weeks
										93.4 (69.6-98.6)	13+ weeks	~22 weeks
							AZD1222 + mRNA-1273	Symptomatic disease		55.3 (50.9-59.3)	2-4 weeks	2 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
										26.2 (10.3-39.2)	13+ weeks	~22 weeks
								Severe disease		95.4 (80.9-98.9)	5-8 weeks	6 weeks
										90.2 (-88.4-99.5)	13+ weeks	~22 weeks
							BNT162b2 (3 doses)	Symptomatic disease		52.9 (49.3-56.3)	2-4 weeks	2 weeks
										30.1 (23.5-36.1)	13+ weeks	~22 weeks
								Severe disease		81.6 (29.9-95.2)	2-4 weeks	2 weeks
										75.7 (33.9-91)	13+ weeks	~22 weeks
							BNT162b2 + mRNA-1273	Symptomatic disease		60.1 (55.3-64.3)	2-4 weeks	2 weeks
										23.4 (3.4-39.3)	13+ weeks	~22 weeks
								Severe disease		32.7 (-184.5-84.1)	2-4 weeks	2 weeks
										93.7 (31.6-99.4)	13+ weeks	~22 weeks
76	Widdifield et al* (April 14, 2022)	Canada	Test-negative case control	36,145 individuals with rheumatoid arthritis	Alpha, Delta^	Included	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	86 (70-94)	7+	~9.5 weeks
								Severe outcomes		88 (48-97)		
				7863 individuals with ankylosing spondylitis				Documented infection		82 (20-96)		
				47,199 individuals with psoriasis				Documented infection		96 (72-99)		
				31,311 individuals with inflammatory bowel disease				Documented infection		76 (47-89)		
75	Lind et al (April 25, 2022)	USA	Test-negative case control	10,676 cases and 92,011	**Omicron specifically^**	Excluded	BNT162b2 or mRNA-1273	Documented infection	Complete vaccination with two	54 (48-60)	14-59	~14 weeks
										28 (9-43)	90+	
						Included				45.8 (20-63.2)	14+	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	[Update to April 20, 2022 preprint]		1:1 Matched case control	controls, 5+ years		Excluded			doses at least ≥5 months prior	58.5 (52.7-63.5)		
						Included				35.1 (-7.5-60.8)		
74	Gram et al* (September 1,2022) *[Published verson of April 20, 2022 preprint]*	Denmark	Retrospective cohort	2,191,080 individuals aged 12-59 years	Omicron^	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	55.2 (54.7-55.6)	14-30	~24 weeks
										49.9 (46.5-53.1)	120+	
								Hospitalisation		89.8 (87.9-91.3)	14-30	
										33.3 (0.9-55.1)	120+	
					Delta^			Documented infection		89.5 (87.7-91)	14-30	
										83.5 (69.4-91.1)	61-90	
								Hospitalisation		94.8 (85.9-98.1)	14-30	
										68.4 (41.4-83)	31-60	
				758,187 adults aged ≥60 years	Omicron^			Documented infection		57.6 (55.8-59.4)	14-30	
										52.8 (49.3-56)	120+	
								Hospitalisation		94.4 (93-95.5)	14-30	
										77.3 (70.9-82.3)	120+	
					Delta^			Documented infection		86.0 (83.3-88.3)	14-30	
										81.2 (72.9-87.0)	61-90	
								Hospitalisation		96.6 (93.9-98.1)	31-60	
										91.4 (79.8-96.4)	91-120	
73	Grewal et al* (July 6, 2022) *[Update to June 1, 2022 preprint]*	Canada	Test-negative case control	13,654 cases and 205,862 controls amongst LTCF residents aged 60+ in Ontario	**Omicron specifically^**	Included	mRNA-1273 (3 doses)	Documented infection	Unvaccinated	44 (38-49)	0+	~34 weeks
								Symptomatic disease		61 (50-69)		
								Hospitalization or death		81 (74-86)		
							BNT162b2 (3 doses)	Documented infection		32 (24-38)		
								Symptomatic disease		53 (39-63)		
								Hospitalization or death		77 (67-83)		
							BNT162b2 primary + mRNA-1273 booster	Documented infection		36 (28-44)		
								Symptomatic disease		57 (40-69)		
								Hospitalization or death		81 (67-89)		
							BNT162b2 or mRNA-1273 (any 3 doses)	Documented infection		39 (33-45)	<84	
										37 (31-43)	≥84	
								Symptomatic disease		62 (51-71)	<84	
										55 (45-64)	≥84	
								Hospitalization or death		80 (72-86)	<84	
										77 (69-82)	≥84	
							mRNA-1273 (**4 doses**)	Documented infection		51 (43-58)	≥7	~15 weeks
								Symptomatic disease		73 (63-80)		
								Hospitalization or death		88 (82-92)		
								Documented infection		51 (42-58)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							3 doses BNT162b2 + 1 dose mRNA-1273 (**4 doses**)	Symptomatic disease		69 (56-78)		
								Hospitalization or death		87 (78-92)		
							2 doses BNT162b2 + 2 doses mRNA-1273 (**4 doses**)	Documented infection		52 (35-64)		
								Symptomatic disease		59 (28-77)		
								Hospitalization or death		83 (54-94)		
							BNT162b2 or mRNA-1273 (any **4 doses**)	Documented infection		49 (43-54)		
								Symptomatic disease		69 (61-76)		
								Hospitalization or death		86 (81-90)		
								Documented infection	Vaccination with third dose ≥84 days ago	19 (12-26)		
								Symptomatic disease		31 (20-41)		
								Hospitalization or death		40 (24-52)		
72	Vokó et al* (July 22,2022) *[Published version of April 18, 2022 preprint]*	Hungary	Retrospective cohort	6,193,552 individuals aged 18-64 years *Note: VE for persons aged 65-100 years are also aavailable from publication; estimates are relatively similar across age groups.*	Delta^	Included	BNT162b2 (3 doses)	Documented infection	Unvaccinated	82.2 (81.5-82.8)	14-120	~20 weeks
							BNT162b2 + mRNA-1273			85.8 (82.6-88.4)		
							BNT162b2 + BBIBP-CorV			24.5 (15.4-32.5)		
							BNT162b2 + Ad26.COV2.S			82.4 (78.9-85.3)		
							BNT162b2 (3 doses)	Hospitalisation		94.3 (93.3-95.1)		
							BNT162b2 + mRNA-1273			93.3 (85.2-97.0)		
							BNT162b2 + BBIBP-CorV			76.0 (60.9-85.3)		
							BNT162b2 + Ad26.COV2.S			96.8 (90-99)		
							BNT162b2 (3 doses)	Death		96.8 (95.2-97.9)		
							BNT162b2 + mRNA-1273			95.5 (67.9-99.4)		
							BNT162b2 + BBIBP-CorV			100 (CI omitted)		
							BNT162b2 + Ad26.COV2.S			100 (CI omitted)		
							mRNA-1273 (3 doses)	Documented infection		88.9 (86.9-90.6)		
							mRNA-1273 + BNT162b2			87.7 (85.1-88.4)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							mRNA-1273 + BBIBP-CorV			69.5 (52.1-80.5)		
							mRNA-1273 + Ad26.COV2.S			82.1 (73-88.1)		
							mRNA-1273 (3 doses)	Hospitalisation		96.5 (92.5-98.3)		
							mRNA-1273 + BNT162b2			97.3 (92.7-99)		
							mRNA-1273 + BBIBP-CorV			92.0 (43.0-98.9)		
							mRNA-1273 + Ad26.COV2.S			100 (CI omitted)		
							mRNA-1273 + BBIBP-CorV	Death		70.7 (-107.9-95.9)		
							mRNA-1273 (3 doses)			100 (CI omitted)		
							mRNA-1273 + BNT162b2			100 (CI omitted)		
							mRNA-1273 + Ad26.COV2.S			84.1 (-12.6-97.8)		
							AZD1222 + BNT162b2	Documented infection		82.9 (81.9-83.8)		
							AZD1222 + mRNA-1273			84.1 (81.2-86.5)		
							AZD1222 + BBIBP-CorV			35.8 (14.2-51.9)		
							AZD1222 + BNT162b2	Hospitalization		95.1 (93.8-96.2)		
							AZD1222 + mRNA-1273			98.5 (93.9-99.6)		
							AZD1222 + BBIBP-CorV			84.7 (38.9-96.2)		
							AZD1222+ BNT162b2	Death		98.4 (96.5-99.3)		
							AZD1222 + mRNA-1273			100 (CI omitted)		
							AZD1222 + BBIBP-CorV			100 (CI omitted)		
							Sputnik + BNT162b2	Documented infection		83.6 (82.8-84.4)		
							Sputnik + mRNA-1273			84.0 (81.5-86.2)		
							Sputnik + BBIBP-CorV			38.9(22.2-52.0)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							Sputnik + Ad26.COV2.S			47.2 (41.2-52.6)		
							Sputnik + BNT162b2	Hospitalization		98.0 (97.1-98.6)		
							Sputnik + mRNA-1273			97.0 (92.1-98.9)		
							Sputnik + BBIBP-CorV			66.8 (20.1-86.2)		
							Sputnik + Ad26.COV2.S			95.1 (84.8-98.4)		
							Sputnik + BNT162b2	Death		99.2 (97.4-99.7)		
							Sputnik + mRNA-1273			100 (CI omitted)		
							Sputnik + Ad26.COV2.S			100 (CI omitted)		
							BBIBP-CorV (3 doses)	Documented infection		60.6 (53.4-66.7)		
							BBIBP-CorV + BNT162b2			88.0 (87.2-88.7)		
							BBIBP-CorV + mRNA-1273			91.0 (88.2-93.1)		
							BBIBP-CorV + Ad26.COV2.S			78.1 (74.7-81)		
							BBIBP-CorV (3 doses)	Hospitalization		77.5 (58.2-87.9)		
							BBIBP-CorV + BNT162b2			94.6 (93.3-95.6)		
							BBIBP-CorV + mRNA-1273			94.8 (87.6-97.9)		
							BBIBP-CorV + Ad26.COV2.S			95.3 (88.7-98)		
							BBIBP-CorV (3 doses)	Death		91.1 (36.4-98.7)		
							BBIBP-CorV + BNT162b2			95.9 (93.4-97.5)		
							BBIBP-CorV + Ad26.COV2.S			95.8 (70-99.4)		
							BBIBP-CorV + mRNA-1273			100 (CI omitted)		
							Ad26.COV2.S (2 doses)	Documented infection		78.1 (74.7-81)		
							Ad26.COV2.S + BNT162b2			90.9 (84.6-94.6)		
							Ad26.COV2.S	Hsopitalization		76.7 (-65.9-96.7)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							(2 doses)					
							Ad26.COV2.S + BNT162b2			92.2 (68.8-98)		
71	Petrie et al (April 16, 2022)	USA	Prospective cohort	884 participants >12 years	Omicron^	Included	BNT162b2 or mRNA-1273	Documented infection	Complete vaccination with two doses at least ≥5 months prior	66 (46-79)	14+	~ 25 weeks
						Excluded				70 (51-81)		
70	Magen et al* (April 13,2022)	Israel	Target trial	364,244 individuals aged ≥60	Omicron^	Excluded	BNT162b2 (4 doses)	Documented infection	Complete vaccination with three doses of BNT162b2 at least 4 months prior	52 (49-54)	14-30	~4 weeks
								Symptomatic disease		61 (58-64)		
								Hospitalization		72 (63-79)		
								Severe disease		64 (48-77)		
								Death		76 (48-91)		
69	Cerqueira-Silva et al* (July 1, 2022) *[Update to April 13, 2022 preprint]*	Brazil	Test-negative case control	468,804 cases and 430,246 controls 18+ years	Omicron ^	Previously infected only	BNT162b2	Symptomatic infection	Unvaccinated, previously infected	56.4 (53.7-59.0)	14-69	~28 weeks
										43.3 (25.8-56.6)	70+	
								Hospitalization		75.0 (53.3-86.7)	14-69	
							AZD1222	Symptomatic infection		60.5 (59.1-61.9)	14-69	
										32.6 (29.4-35.7)	70+	
								Hospitalization		84.5 (79.4-88.4)	14-69	
										81.2 (72.5-87.1)	70+	
							Ad26.COV2.S	Symptomatic infection		22.8 (18.8-26.6)	14-69	
								Hospitalization		84 (56.5-94.1)	14-69	
							CoronaVac	Symptomatic infection		62.7 (61.0-64.3)	14-69	
										37.9 (35.8-40.0)	70+	
								Hospitalization		76.6 (68.1-82.8)	14-69	
										75.7(69.6-80.7)	70+	
			Matched case control			Previously infected only	BNT162b2	Symptomatic infection		58.1 (55.3-60.6)	14-69	
										29.8 (3.3-49.0)	70+	
								Hospitalization		85.2 (55.7-95.1)	14-69	
							AZD1222	Symptomatic infection		61.3 (59.9-62.7)	14-69	
										36.4 (33.3-39.4)	70+	
								Hospitalization		89.7 (81.5-94.3)	14-69	
										86.3 (71.6-93.4)	70+	
							Ad26.COV2.S	Symptomatic infection		24.5 (20.6-28.2)	14-69	
										16.2 (-4.7-33.0)	70-139	
								Hospitalization		92.3(64.7-98.3)	14-69	
							CoronaVac	Symptomatic infection		62.9 (61.2-64.5)	14-69	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
										41.1 (39.1-43.1)	70+	
								Hospitalization		81.0 (64.0-90.0)	14-69	
										84.5 (74-90.8)	70+	
68	Cohen et al* (August 2, 2022) *[Published version of April 13 preprint]*	Israel	Retrospective cohort	29,612 HCWs	Omicron^	Excluded	BNT162b2 (4 doses)	Documented infection	Complete vaccination with three doses of BNT162b2 at least 4 months prior	44 (37-50)	7+	~4 weeks
67	Institute of pubic health (April 12,2022)	Chile	Test-negative case control	2,181 cases and 979 controls	Gamma and Delta^	Included	BNT162b2	Hospitalization	Unvaccinated	88.3(79.5-93.3)	14+	~24 weeks
							Sinovac			67.2(59.1-73.7)		
66	Plumb et al (April 12,2022)	USA	Test-negative case control	11,283 hospitalized adults	Omicron ^	Included	BNT162b2 or mRNA-1273	Hospitalization	Unvaccinated	67.6 (61.4–72.8)	14+	~25 weeks
					Delta ^					57.8 (32.1–73.8)		
65	Kim et al (April 10, 2022)	USA	Test-negative case control	2,208 cases and 1639 controls	Omicron specifically^	Included	BNT162b2 or mRNA-1273	Symptomatic infection	Complete vaccination with two doses at least 150 days prior	62 (48-72)	7+	~33 weeks
					Delta specifically^					96 (93-98)		
64	Buchan et al (April 7,2022)	Canada	Test-negative case control	29,855 individuals, 12-17 years	Omicron specifically^	Included	BNT162b2	Symptomatic infection	Unvaccinated	56 (34-70)	0-6	~3 weeks
										62 (49-72)	7+	
63	Kwon et al (April 6,2022)	USA	Test-negative case control	440 solid organ transplant recipients; 1684 patients with other immunocompromising conditions; 8301 immunocompetent individuals	Alpha and Delta^	Included	BNT162b2 or mRNA-1273	Hospitalization in solid organ transplant recipient (SOTR)	Unvaccinated	77 (48-90)	7+	~16 weeks
								Hospitalization in immunocompromised adults		92 (85-95)		
								Hospitalization in immunocompetent adults		96 (94-98)		
								Supplemental oxygen/oxygen support in SOTR		84 (57-94)		
								Supplemental oxygen/oxygen support in immunocompromised		93 (85-97)		
								Supplemental oxygen/oxygen support in immunocompetent		97 (94-98)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
62	Yoon et al (April 6,2022)	USA	Prospective cohort	3241 HCWs	Omicron specifically^	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	60 (42-72)	7+	~21 weeks
									Complete vaccination with two doses	60 (40-73)		
					Delta specifically^				Unvaccinated	91 (84-95)		
									Complete vaccination with two doses	86 (69-94)		
61	Ranzani et al (August 16, 2022) *[Updated version of April 1st preprint]*	Brazil	Test-negative case control	2,107,696 matched pairs of adults aged ≥18 years	Omicron^	Included	CoronaVac	Symptomatic disease	Complete vaccination with two doses of CoronaVac at least 6 months prior	4.9 (1.5-8.1)	8-59	~10 weeks
										-24.8 (-28- -21.6)	120+	~28 weeks
								Hospitalization or death		47.1 (27.8-61.2)	8-59	~10 weeks
										20.7 (10.1-30)	120+	~28 weeks
							CoronaVac primary + BNT162b2 booster	Symptomatic disease		53.5 (52.9-54.2)	8-59	~10 weeks
										15.7 (14.2-17.1)	120+	~28 weeks
								Hospitalization or death		67.3 (63.9-70.4)	8-59	~10 weeks
										62.8 (59.3-65.9)	120+	~28 weeks
							CoronaVac	Symptomatic disease	Unvaccinated	8.6 (5.6-11.5)	8-59	~10 weeks
										-2.9 (-5.2- -0.6)	60+	~28 weeks
								Hospitalization or death		73.6 (63.9-80.7)	8-59	~10 weeks
										67.8 (64.3-71)	60+	~28 weeks
							CoronaVac primary + BNT162b2 booster	Symptomatic disease		56.8 (56.3-57.3)	8-59	~10 weeks
										33.8 (33.2-34.4)	60+	~28 weeks
								Hospitalization or death		86 (84.5-87.4)	8-59	~10 weeks
										86.4 (85.4-87.3)	60+	~28 weeks
					Delta^		CoronaVac	Symptomatic disease		57.1 (50.4-62.9)	8-59	~10 weeks
										53.5 (30.9-68.6)	60+	~28 weeks
								Hospitalization or death		75.9 (67.8-81.9)	8-59	~10 weeks
										75.6 (52.8-87.4)	60+	~28 weeks
							CoronaVac primary + BNT162b2 booster	Symptomatic disease		86.7 (86-87.4)	8-59	~10 weeks
										83.2 (79.8-86.1)	60+	~28 weeks
								Hospitalization or death		92.3 (91-92.9)	8-59	~10 weeks
										90.8 (84.8-94.4)	60+	~28 weeks
60	Glatman-Freedman et al* (March 31, 2022)	Israel	Retrospective cohort	1,561,812 booster recipients aged 16+, and unvaccinated controls	Delta, Omicron^	Excluded	BNT162b2	Documented infection: 16-59 y	Unvaccinated	96.8 (96-97.5)	15-21	14 weeks
										77.6 (68.4-84.2)	106-112	
								Documented infection: 60+ y		93.1 (91.8-94.2)	15-21	18 weeks
										61.3 (52.5-68.4)	134-140	
59		Norway	Retrospective cohort	4,301,995 adults (18+ y)	Delta^	Excluded	BNT162b2	Documented infection	Unvaccinated	75.3 (72.5-77.8)	7+	~6.5 weeks
								Hospitalization		95.6 (93.1-97.2)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	Starrfelt et al *(September 2, 2022) *[Published version of March 30, 2022 preprint]*						BNT162b2 primary + mrNA-1273 booster	Documented infection		68.2 (57.6-76.1)		
								Hospitalization		73.5 (45.7-87.1)		
							mRNA-1273	Documented infection		84.9 (71.8-91.9)		
							mRNA-1273 primary + BNT162b2 booster	Documented infection		87.1 (80.1-91.6)		
58	Hansen et al (March 30, 2022)	Denmark	Retrospective cohort	3,090,833 participants aged 12+	Omicron^	Excluded	BNT162b2	Documented infection	Unvaccinated	47.9 (47.4-48.2)	14-30	~2 weeks
										40.5 (38.9-42.2)	121+	~20 weeks
								Hospitalization		88.8 (87.3-90.1)	14-30	~2 weeks
										66.2 (61.1-70.7)	121+	~20 weeks
							mRNA-1273	Documented infection		47.7 (47-48.3)	14-30	~2 weeks
										37.9 (33.4-42)	121+	~18 weeks
								Hospitalization		90.2 (87.3-92.5)	14-30	~2 weeks
										77.3 (63.1-86.1)	121+	~18 weeks
57	Natarajan et al (March 29, 2022)	USA	Test-negative case control	80,287 ED/UC encounters and 25,244 hospitalizations among adults with COVID-19 like illness	Omicron^	Included	Ad26.COV2.S	Emergency Dept/ Urgent Care visit	Unvaccinated	54 (43-63)	7+	~15 weeks
								Hospitalization		67 (52-77)		
							Ad26.COV2.S primary + any mRNA booster	Emergency Dept/ Urgent Care visit		79 (74-82)		
								Hospitalization		78 (70-84)		
							Any mRNA primary + any mRNA booster	Emergency Dept/ Urgent Care visit		83 (82-84)		
								Hospitalization		90 (88-91)		
56	Wang et al (March 25, 2022)	USA	Test-negative case control	249,070 patients	Omicron^	Included	Any mRNA primary + any mRNA booster	Documented infection	Unvaccinated	65 (63-66)	14-179	~23.5 weeks
										50 (45-55)	180+	unknown
					Delta^					91 (90-92)	14-179	~23.5 weeks
										71 (67-74)	180+	xx
55	Arbel et al* (April 25, 2022) *[update to Mar 24, 2022 preprint]*	Israel	Retrospecitve cohort	563,465 older adults (aged 60+)	Omicron^	Excluded	BNT162b2 (4 doses)	Death	Complete vaccination with three doses of BNT162b2 at	78 (72-83)	7+	~5 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
									least 4 months prior			
54	Gazit et al* (May 24, 2022) *[Update to March 24 preprint]*	Israel	Matched test-negative case control	97,499 adults aged ≥60 years	Omicron^	Excluded	BNT162b2(4 doses)	Documented infection	Complete vaccination with three doses of BNT162b2 at least 4 months prior	57.7 (55.6-59.7)	7-13	~10 weeks
										22 (4.9-36.1)	63-69	
								Severe COVID-19		77.5 (69.7-83.2)	7-27	
										86.5 (63.4-95)	49-69	
			Unmatched multiple test analysis					Documented infection		46 (43.7-48.3)	7-13	
										29.5 (18.1-39.2)	63-69	
								Severe COVID-19		73.3 (66.3-78.9)	7-27	
										86.1 (73.4-92.8)	49-69	
53	Stowe et al (April 1, 2022)	UK	Test-negative case control	Overall: 115,720 cases and 294,265 controls 18-64 years	Omicron^	Included	AZD1222 primary + BNT162b2 booster	Hospitalization with ARI	Unvaccinated	90.2 (78.1-95.6)	7-13	~22 weeks
										69.0 (50.3-80.7)	105+	
							AZD1222 primary + mRNA-1273 booster	Hospitalization with ARI		97.2 (86.1-99.4)	7-13	
										89.2 (82.5-93.3)	36-69	
							BNT162b2 primary + BNT162b2 booster	Hospitalization with ARI		85.2 (47.1-95.8)	7-13	
										66.0 (44.5-79.2)	105+	
							BNT162b2 primary + mRNA-1273 booster	Hospitalization with ARI		94.3 (85-97.8)	14-34	
										89.8 (77.9-95.3)	70+	
				Adults aged 65+			AZD1222 primary + BNT162b2 booster	Hospitalization with ARI		85.4 (73.4-92)	7-13	
										86.1 (82.5-88.9)	105+	
							AZD1222 primary + mRNA-1273 booster	Hospitalization with ARI		92.9 (87.7-95.9)	14-34	
										91.8 (85.9-95.3)	70+	
							BNT162b2 primary + BNT162b2 booster	Hospitalization with ARI		86.4 (69.1-94)	7-13	
										85.2 (82.1-87.7)	105+	
							BNT162b2 primary + mRNA-1273 booster	Hospitalization with ARI		92.9 (50.2-99)	7-13	
										97.3 (90.8-99.2)	70+	
52	Tenforde et al (March 25,2022)	USA	Case-control	7,544 hospitalised patients	Omicron^	Included	BNT162b2 or mRNA-1273 primary series + BNT162b2 or mRNA-1273 booster	Invasive mechanical ventilation or in-hospital death	Unvaccinated	94 (88-97)	7+	~20 weeks
					Delta^					95 (91-97)		
					Alpha^					94 (91-96)		
51	Altarawneh et al* (June 15, 2022) *[Update to March 31, 2022 study]*	Qatar	Test-negative case control	158,484 individuals	Omicron BA.1 specifically^	Previously infected only	BNT162b2	Symptomatic infection	Unvaccinated	74.4 (63.4-82.2)	7+	~19 weeks
								Hospitalization and death		100 (30.6-100)		
							mRNA-1273	Symptomatic infection		77.2 (38.5-91.5)		
								Hospitalization and death		100 (CI omitted)		
						Excluded	BNT162b2	Symptomatic infection		59.6 (52.9-65.3)		
								Hospitalization and death		97.5 (71.7-99.8)		
							mRNA-1273	Symptomatic infection		56.5 (38.1-69.4)		
								Hospitalization and death		100 (-432.5-100)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
					Omicron BA.2 specifically^	Previously infected only	BNT162b2	Symptomatic infection		77.3 (72.4-81.4)		
								Hospitalization and death		100 (82.6-100)		
							mRNA-1273	Symptomatic infection		69.8 (50.1-81.7)		
								Hospitalization and death		100 (CI omitted)		
						Excluded	BNT162b2	Symptomatic infection		52.2 (48.1-55.9)		
								Hospitalization and death		98.2 (91.9-99.6)		
							mRNA-1273	Symptomatic infection		52.9 (43-61.2)		
								Hospitalization and death		100 (-3800-100)		
					Omicron specifically	Previously infected only	BNT162b2	Symptomatic infection		76.3 (71.7-80.1)		
								Hospitalization and death		100 (91.8-100)		
							mRNA-1273	Symptomatic infection		79.4 (66.1-87.5)		
								Hospitalization and death		100 (-51.5-100)		
						Excluded	BNT162b2	Symptomatic infection		54 (50.4-57.3)		
								Hospitalization and death		92.5 (84.4-96.3)		
							mRNA-1273	Symptomatic infection		61.3 (53.3-67.9)		
								Hospitalization and death		82.7 (-80.2-98.3)		
50	Montez-Rath et al (March 18,2022)	USA	Prospective cohort	3,576 patients receiving dialysis	Omicron specifically^	Included	BNT162b2 or mRNA-1273 primary series + BNT162b2 or mRNA-1273 booster	Documented infection	Unvaccinated	53 (38-65)	21+	~14 weeks
49	Baum et al (July 6, 2022) *[Update to March 13, 2022 preprint*	Finland	Retrospective cohort	896,220 older adults (aged 70+)	Non-VOC, Alpha, Delta, Omicron^ Delta^	Excluded	BNT162b2 (3 doses)	Hospitalization	Unvaccinated	95 (94-96)	14-60	~20.5 weeks
										89 (87-91)	61+	
								ICU admission		98 (95-99)	14-60	
										95 (92-97)	61+	
							BNT162b2 primary + mRNA-1273 booster	Hospitalization		91 (87-94)	14-60	
										85 (78-89)	61+	
								ICU admission		92 (79-97)	14-60	
										96 (84-99)	61+	
							mRNA-1273 primary series + BNT162b2 booster	Hospitalization		91 (81-96)	14-60	
										90 (80-94)	61+	
							mRNA-1273 (3 doses)	Hospitalization		97 (93-98)	14-60	
										87 (82-91)	61+	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							AZD1222 primary series + BNT162b2 booster	Hospitalization		98 (91-99)	14-60	
										88 (78-93)	61+	
								ICU admission		96 (71-99)	61+	
							AZD1222 primary series + mRNA-1273 booster	Hospitalization		94 (82-98)	14-60	
										87 (70-95)	61+	
								ICU admission		89 (22-99)		
					Delta^		BNT162b2 (3 doses)	Hospitalization		96 (93-97)	14-60	~13 weeks
										94 (75-99)	61+	
							BNT162b2 primary series + mRNA-1273 booster			75 (-3-94)	14-60	
							mRNA-1273 primary series + BNT162b2 booster			82 (28-96)	14-60	
										100 (CI omitted)	61+	
							mRNA-1273 (3 doses)			100 (CI omitted)	14-60	
										100 (CI omitted)	61+	
							AZD1222 primary series + BNT162b2 booster			84 (-16-98)	14-60	
					Omicron^		BNT162b2 (3 doses)	Hospitalization		94 (92-95)	14-60	~20.5 weeks
										87 (85-89)	61+	
							BNT162b2 primary series + mRNA-1273 booster			91 (87-94)	14-60	
										83 (76-88)	61+	
							mRNA-1273 primary series + BNT162b2 booster			92 (80-97)	14-60	
										88 (77-94)	61+	
							mRNA-1273 (3 doses)			96 (91-98)	14-60	
										85 (78-89)	61+	
							AZD1222 primary series + BNT162b2 booster			99 (91-100)	14-60	
										86 (75-92)	61+	
							AZD1222 primary series + mRNA-1273 booster			94 (81-98)	14-60	
										87 (68-95)	61+	
48	Shrotri et al (March 12, 2022)	UK	Prospective cohort	15,518 long-term care facility residents	Alpha and Delta^	Excluded	BNT162b2 or mRNA-1273	Documented infection	Unvaccinated	71.4 (49.7-83.8)	0+	11 weeks
								Hospitalization		83.6 (63.4-92.7)		
								Death		98.7 (90-99.8)		
							AZD1222	Documented infection		71.4 (49-84)		
								Hospitalization		93.3 (82.8-97.4)		
								Death		95.3 (79.4-98.9)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				19,515 long-term care facility staff			BNT162b2 or mRNA-1273	Documented infection		79.3 (70-85.7)		
								Hospitalization		100 (no CIs)		
							AZD1222	Documented infection		75.9 (61.5-84.8)		
								Hospitalization		93.4 (25.2-99.4)		
47	Butt et al* (March 4, 2022)	USA	Retrospective cohort	395,686 matched pairs of veterans	Delta^	Excluded	BNT162b2	Symptomatic disease	Complete vaccination with two doses of BNT162b2 at least 4.5 months prior	84 (78-88)	14+	7 weeks
								Hospitalization		77 (65-85)		
							mRNA-1273	Symptomatic disease	Complete vaccination with two doses of mRNA-1273 at least 4.5 months prior	87 (83-90)		
								Hospitalization		94 (93-95)		
46	Norddahl et al (March 1, 2022)	Iceland	Retrospective cohort	227,461 adults (18-80 years)	Omicron specifically^	Excluded	BNT162b2 + BNT162b2	Documented infection	Complete vaccination with two doses of BNT162b2 at least 6 months prior	47 (36-56)	0+	~5.5 weeks
							BNT162b2 + mRNA-1273			50 (34-62)		
					Delta specifically^		BNT162b2 + BNT162b2			52 (28-69)		
							BNT162b2 + mRNA-1273			73 (29-90)		
45	Klein et al (March 1,2022)	USA	Test-negative case control	39,217 ED and UC encounters and 1,699 hospitalizations among persons aged 5–17 years	Omicron^	Included	BNT162b2 primary + BNT162b2 booster	ED or UC encounters in children aged 16-17 years	Unvaccinated	81 (59-91)	7+	~4 weeks
					Omicron or Delta^			ED or UC encounters in children aged 16-17 years		86 (73-93)		
44	Šmíd et al (February 25, 2022)	Czech Republic	Retrospective cohort	8,173,828 individuals	Omicron^	Included	BNT162b2	Documented infection	Unvaccinated	58 (58-59)	14-74	~24 weeks
										24 (22-26)	75+	
								Hospitalization		86 (84-89)	14-74	
										79 (74-82)	75+	
							mRNA-1273	Documented infection		61 (60-62)	14-74	
										33 (29-38)	75+	
								Hospitalization		89 (84-93)	14-74	
										84 (72-91)	75+	
					Delta^		BNT162b2	Documented infection		90 (90-91)	14-74	
										80 (78-83)	75+	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
								Hospitalization		98 (97-98)	14-74	
										96 (94-97)	75+	
							mRNA-1273	Documented infection		93 (92-94)	14-74	
										91 (83-96)	75+	
								Hospitalization		98 (97-99)	14-74	
										98 (86-99.8)	75+	
43	Patalon et al * (June 9, 2022) *[Published version of February 26, 2022 preprint]*	Israel	Test-negative case control	351,120 individuals	Omicron^	Excluded	BNT162b2 primary + BNT162b2 booster	Documented infection	Complete vaccination with two doses of BNT162b2 at least 5 months prior	53.4 (47.7-58.6)	1-51	~21 weeks
										3.6 (0.6-6.5)	93-142	
42	Monge et al* (June 2, 2022) *[Published version of February 14, 2022 preprint]*	Spain	Retrospective cohort	2,083,857 matched pairs among adults aged 40+	Omicron^	Excluded	BNT162b2 primary + BNT162b2 or mRNA-1273 booster	Documented infection	Complete vaccination with two doses (or one dose for Ad26.COV2.S) ≥3 months prior	49.7 (48.3-51.1)	7-34	~3 weeks
							mRNA-1273 primary + BNT162b2 or mRNA-1273 booster			55.3 (52.3-58.2)		
							AZD1222 primary + BNT162b2 or mRNA-1273 booster			58.6 (55.5-61.6)		
							Ad26.COV2.S primary + BNT162b2 or mRNA-1273 booster			48 (42.5-53.7)		
41	Regev-Yochay (February 15, 2022)	Israel	Open-label, non-randomized clinical trial	1,050 HCWs	Omicron^	Excluded	BNT162b2 **(4 doses)**	Infection	**Complete vaccination with three doses of BNT162b2 at least 4 months prior**	30 (-9 to 55)	8-29	~2 weeks
								Symptomatic disease		43 (7 to 65)	8-29	
							BNT162b2 (3 doses) + mRNA-1273 **(4th dose)**	Infection		11 (-43 to 43)	8-23	~1 week
								Symptomatic disease		31 (-18 to 60)	8-23	
40	Ferdinands et al (February 11, 2022)	USA	Test-negative case control	241,204 ED/UC encounters and 93,408 hospitalizations	Omicron^	Included	BNT162b2, mRNA-1273 primary series + BNT162b2 and mRNA-1273 booster	ED/UC encounter	Unvaccinated	87 (85–88)	<2 mos	~25 weeks
										31 (–50–68)	≥5 mos.	
								Hospitalization		91 (88–93)	<2 mos.	
										78 (67–85)	≥4 mos	
					Delta^			ED/UC encounter		97 (96-97)	<2 mos.	
										89 (64-97)	≥4 mos	
								Hospitalization		96 (95-97)	<2 mos.	
										76 (14-93)	≥4 mos	
49	Hayek et al* (January 27, 2022)	Israel	Retrospective cohort	76,621 households	Delta^	Excluded	BNT162b2	Documented infection	Complete vaccination	86.3 (83.4-88.6)	7+	~11 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				with 181,307 children					with two doses of primary mRNA series at least 5 months prior			
38	Cerqueira-Silva et al (February 9, 2022)	Brazil	Test-negative case control	7,747,121 individuals	Gamma and Delta^	Excluded	CoronaVac primary dose + BNT162b2 booster	Documented infection	Unvaccinated	80.2 (77-82.9)	7-13	~5 weeks
										82.6 (76.9-86.9)	>30	
								Severe disease		91 (88.5-93.5)	7-13	
										96.8 (94.1-98.3)	>30	
								Hospitalisation		91.2 (88.3-93.4)	7-13	
										96.7 (93.9-98.2)	>30	
								Death		92.2 (87.4-95.2)	7-13	
										97.1 (90.5-99.1)	>30	
					Delta^			Documented infection	Complete vaccination with CoronaVac 2nd dose >180 days	76.1 (73.7- 78.4)	7-13	
										84.5 (81.0- 87.4)	>30	
								Death or hospitalizations		72.4 (65.5-77.9)	7-13	
										87.7 (80.5-92.3)	>30	
37	Chemaitelly et al (March 13, 2022) *[Update to February 8 preprint]*	Qatar	Test-negative case control	138,182 individuals	**Omicron BA.1 specifically^**	Included	BNT162b2	Symptomatic infections	Unvaccinated	59.9 (51.2-67)	<1 mo.	~19 weeks
										40.5 (30.8-48.8)	≥1 mo.	
							mRNA-1273			51.5 (32.3- 65.2)	<1 mo.	
										45.3 (17.8 -63.5)	≥1 mo.	
					Omicron BA.2 specifically^		BNT162b2			43.7 (36.5- 50.0)	<1 mo.	
										40.2 (34.2- 45.7)	≥1 mo.	
							mRNA-1273			39.4 (24.8- 51.2)	<1 mo.	
										41.9 (23.4 -56.0)	≥1 mo.	
					Omicron specifically^		BNT162b2			49.5(44.3-54.1)	<1 mo.	
										39.4(34.4-44.0)	≥1 mo.	
							mRNA-1273			43.6(33.2-52.4)	<1 mo.	
										47.5(34.1-58.1)	≥1 mo.	
							BNT162b2	Severe, critical or fatal disease		90.9 (78.6- 96.1)	1-6 weeks	
										90.1 (80.6-95.0)	≥7 weeks	
							mRNA-1273			81.8 (-49.5- 97.8)	1-6 weeks	
										100.0 (Omitted)	≥7 weeks	
36	Lauring et al* (March 9, 2022) [February 7,2022]	USA	Test-negative case control	5582 COVID-19 cases and 5962 test negative and syndrome	**Omicron specifically^**	Excluded	BNT162b2, mRNA-1273 primary series + BNT162b2 and mRNA-1273 booster	Hospitalization(overall)	Unvaccinated	86 (77-91)	7+	~3 weeks
					Delta specifically^			Hospitalization (overall)		94 (92-95)		~25 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				negative controls				Hospitalization (immune-compromised)		87 (78-92)		
35	Sritipsukho et al (February 3,2022)	Thailand	Test-negative case control	1,118 cases and 2,235 controls	Delta^	Excluded	CoronaVac primary dose + AZD1222 booster	Documented infection	Unvaccinated	86 (74-93)	7+	~6 weeks
							CoronaVac primary dose + BNT162b2 booster			98 (87-100)		~8 weeks
34	Bar-On et al (April 5, 2022) *[Update to February 1, 2022 preprint]*	Israel	Retrospective cohort	1,252,331 persons aged over 60 years	Omicron^	Excluded	BNT162b2 (four doses)	Documented infections	Complete vaccination with three doses at least 4 months prior	33.3 (33.3-37.5)	8-14	2 weeks
										9.2 (0-16.7)	50-56	
								Severe illness		58.3 (50.0-65.5)	8-14	
										76.7 (61.5-85.9)	36-42	
33	Roberts et al (January 31,2022)	USA	Test-negative case control	74,060 adults	Non-VOC, Alpha, Delta††	Included	BNT162b2, mRNA-1273 primary series + BNT162b2 and mRNA-1273 booster	Documented infection	Complete vaccination with two doses of primary mRNA series at least 6 months prior	87.3(85-89.2)	14+	~20 weeks
								Severe		94(89.5-96.6)		
32	Lytras et al* (June 14, 2022) *[Published version of January 29,2022 preprint*	Greece	Retrospective cohort	9100 COVID-19 intubations and 14755 COVID-19 deaths in Greece	Non-VOC, Alpha, Delta^	Included	BNT162b2	Intubation (15-79y)	Unvaccinated	98.2 (97.2–98.9	14+	~12 weeks
								Intubation (80+ y)		97.5 (95.5–98.6)		
								Death (15-79y)		98.3 (96.8–99.1)		
								Death (80+y)		98.4 (97.4–99.0)		
31	Willet et al (Janaury 26,2022)	Scotland	Test-negative case control	6166 Omicron cases and 4911 Delta cases	Omicron specifically^	Included	BNT162b2	Documented infection	Unvaccinated	43.2 (38.1-47.8)	14+	~11 weeks
							mRNA-1273			46.3 (41.3-51.0)		
					Delta specifically^		BNT162b2			85.9 (84.2-87.4)		
							mRNA-1273			86.5 (84.8-88.0)		
30	McConeghy et al (January 28,2022)	USA	Nested trial	200 Nursing homes	Delta††	Excluded	BNT162b2, mRNA-1273 primary series + BNT162b2 and mRNA-1273 booster	Documented infection	Complete vaccination with two doses of primary mRNA series	50.4 (29.4-64.7)	≤42	~12 weeks
								Hospitalization		47.7 (-377.7-88.9)		
								Death		97.2 (88.1-100)		
								Combined death or hospitalization		82 (55.5-94)		
								Documented infection		58.2 (32.3-77.8)		
								Hospitalization		36.6 (-35.4-77.3)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				127 VA Community living centers				Combined death or hospitalization	at least 6 months prior	45.8 (-15.5-79.1)		
29	Tenforde et al* (January 28, 2022)	USA	Test-negative case control	2952 hospitalized adults (18+ y)	Delta^	Included	BNT162b2 or mRNA-1273	Hospitalization: Immunocompromised	Unvaccinated	88 (81-93)	7+	~16 weeks
								Hospitalization: non-immunocompromised		97 (95-99)		~10 weeks
28	Spensley et al (January 26, 2022)	UK	Prospective cohort	1121 end stage kidney disease patients receiving in-center haemo-dialysis patients	**Omicron specifically^**	Included	BNT162b2 primary + BNT162b2 booster	Documented infection	Unvaccinated	66 (36-81)	14+	~15 weeks
							AZD1222 + BNT162b2 booster			47 (2-70)		
27	Abu-Raddad et al* (May 12, 2022) *[Update to Jan 24, 2022 preprint]*	Qatar	Matched retrospective cohort	2,239,193 individuals in Qatar	**Omicron specifically^**	Excluded	BNT162b2	Symptomatic infection	Complete vaccination at least 6-8 months prior	49.4 (47.1-51.6	>7	~10 weeks
										49.9 (47.6-52.2)	>14	
								Hospitalization or death		76.5 (55.9-87.5)		
								Symptomatic infection	Complete vaccination ≤8 months prior	38 (28.8-46)	>7	
									Complete vaccination >8 months prior	50.5 (48.2-52.8)	>7	
							mRNA-1273	Symptomatic infection	Complete vaccination at least 6-8 months prior	47.3 (40.7-53.3)	>7	
										52 (45.1-57.9)	>14	
									Complete vaccination ≤8 months prior	41.5 (32.3-49.5)	>7	
									Complete vaccination >8 months prior	56.8 (47-64.8)	>7	
					Delta specifically^		BNT162b2	Symptomatic infection	Complete vaccination with BNT162b2 at least 6-8 months prior	86.1(67.3-94.1)	>7	
26	Thompson et al (January 21,2022)	USA	Test-negative case control	222,772 ED encounters	**Omicron specifically^**	Excluded	BNT162b2 or mRNA-1273	ED or UC encounters	Unvaccinated	94 (93-95)	14+	~18 weeks
								Hospitalisation		90 (80-94)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
				and 87,904 hospitalization								
					Delta specifically^			ED or UC encounters		94 (93-94)		
								Hospitalisation		94 (93-95)		
25	Tartof et al* (April 22, 2022) *[Update to January 18, 2022 preprint]*	USA	Test-negative case control	11,123 patients with ED or hospital encounter in Southern California	**Omicron specifically^**	Included	BNT162b2	ED admission	Unvaccinated	75 (70-79)	14+	~23 weeks
										77 (72-81)	14 to <3 mos	
										53 (36-66)	≥ 3 mos	
								Hospitalization		82 (77-87)	14+	
										85 (80-89)	14 to <3 mos	
										55 (28-71)	≥ 3 mos	
					Delta specifically^			ED admission		83 (79-86)	14+	
										84 (80-87)	14 to <3 mos	
										72 (58-82)	≥ 3 mos	
								Hospitalization		87 (81-92)	14+	
										89 (83-93)	14 to <3 mos	
										71 (40-86)	≥ 3 mos	
24	Young-Xu et al* (August 3, 2022) *[Update to March 13, 2022 preprint]*	USA	Matched test-negative case control	37,117 veterans 18 years or older as cases, 434,096 as controls	**Omicron specifically^**	Excluded	Any mRNA vaccine	Documented infection	Unvaccinated	64 (63-65)	14+	~20 weeks
								Hospitalization		89 (88-91)		
								Death		94 (90-96)		
					Delta specifically^			Documented infection		90 (88-92)		
								Hospitalization		94 (90-96)		
								Death		96(87-99)		
23	Jara et al* (April 23, 2022) *[Update to January 13,2022 preprint]*	Chile	Prospective cohort	11,174,257 Chilean residents aged ≥ 16 years	Delta and Gamma^	Excluded	CoronaVac primary series + CoronaVac booster	Documented infection	Unvaccinated	78.8 (76·8–80.6)	14+	~11 weeks
								Hospitalization		86.3 (83.7-88.5)		
								ICU admission		92.2 (88.7-94.6)		
								Death		86.7 (80.5-91.0)		
							CoronaVac primary series + BNT162b2 booster	Documented infection		96.3 (96·1–96·5)		
								Hospitalization		96.1 (95.3-96.9)		
								ICU admission		96.2 (94.6-97.3)		
								Death		96.8 (93.9-98.3)		
							CoronaVac primary series + AZD1222 booster	Documented infection		93.2 (92.9-93.6)		
								Hospitalization		97.7 (97.3-98)		
								ICU admission		98.9 (98.5-99.2)		
								Death		98.1 (97.3-98.6)		
22	Waxman et al* (April 22, 2022) *[update of Jan 11, 2022 preprint]*	Israel	Retrospective cohort	2,412,755 members of Clalit Health Services aged 16+	Delta^	Excluded	BNT162b2	Hospitalization	Complete vaccination with two doses of BNT162b2 at	89 (87-91)	7+	~15.5 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
									least 5 months prior			
21	Spitzer et al* (January 10, 2022)	Israel	Prospective cohort	1928 healthcare workers at a tertiary medical center in Tel Aviv	Delta^	Excluded	BNT162b2	Documented infection	Complete vaccination with two doses of BNT162b2 at least 1 month prior	93 (80-98)	7+	~4 weeks
								Symptomatic infection		93 (75-98)		
								Asymptomatic infection		92 (52-99)		
20	Tseng et al* (February 21, 2022) *[update from January 21 preprint]*	USA	Test-negative case control	26,683 cases and 109,662 controls among Kaiser Permanente Southern California members aged 18+	**Omicron specifically^**	Included	mRNA-1273	Documented infection: All	Unvaccinated	70 (68-71.9)	14+	8 weeks
										71.6 (69.7-73.4)	14-60	~6.5 weeks
										47.4 (40.5-53.5)	>60	8 weeks
								Hospitalization: All		99.2 (76.3-100)	14+	
								Documented infection: Immuno-compromised		29.4 (0.3-50)	14+	
					Delta specifically^			Documented infection: All		94.5 (92.9-95.7)	14+	8 weeks
										93.7 (92.2-94.9)	14-60	~6.5 weeks
										86 (78.1-91.1)	>60	8 weeks
								Documented infection: Immuno-compromised		70.6 (31-87.5)		
								Hospitalization: All		99.7 (96.5-100)		
19	Tan et al* (February 11,2022) *[Published version of January 5,2022 preprint]*	Singapore	Retrospective cohort	703,209 individuals aged 60 years and above	Delta††	Excluded	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses of BNT162b2 primary series at least 5 months prior	73 (72-75)	12+	~6 weeks
								Symptomatic disease		72 (71-74)		
								Severe disease		95 (92-97)		
							BNT162b2 primary series + mRNA-1273 booster	Documented infection		82 (77-86)		
								Symptomatic disease		82 (76-87)		
								Severe disease		92 (44-99)		
							mRNA-1273 primary series + mRNA-1273 booster	Documented infection		86 (81-90)		
								Symptomatic disease		85 (79-89)		
							mRNA-1273 primary series + BNT162b2 booster	Documented infection		90 (73-96)		
								Symptomatic disease		90 (69-97)		
18	Buchan et al (January 28,2022) [Update to January 1 pre-print]	Canada	Test negative case control	16,087 Omicron-positive cases, 4,261 Delta-positive cases, and 114,087 test-negative controls	**Omicron specifically^**	Excluded	mRNA primary + BNT162b2 booster	Symptomatic disease	Unvaccinated	60 (55-65)	7+	~9 weeks
							mRNA primary + mRNA-1273 booster			65 (55-72)		
							mRNA primary + BNT162b2 booster	Severe disease		95 (87-98)		
							mRNA primary + mRNA-1273 booster			93 (74-98)		
					Delta specifically^		mRNA primary + BNT162b2 booster	Symptomatic disease	Unvaccinated	97 (96-98)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							mRNA primary + mRNA-1273 booster			97 (95-98)		
							mRNA primary + BNT162b2 booster	Severe disease		99 (98-99)		
							mRNA primary + mRNA-1273 booster			100 (98-100)		
17	Gray et al *(June 9,2022) *[Published version of December 29,2021 preprint]*	South Africa	Test-negative case control	69,092 HCWs	Omicron^	Excluded	Ad26.COV.2	Hospitalization	Unvaccinated	84 (67-92)	14-27	~13 weeks
										85 (54-95)	1-2 months	
								ICU admission		69 (26-87)	14-27	
										82 (57-93)	28-87	
16	Lustig et al* (May 09, 2021) *[Published version of December 21, 2021 preprint]*	Israel	Prospective cohort	12,413 HCW in a large tertiary care center	Delta^	Excluded	BNT162b2	Documented infection	Complete vaccination with two doses of primary series at least 5 months prior	85.6 (79.2-90.1)	10+	~7 weeks
15	Amir et al (December 21, 2021)	Israel	Quasi-experimental	348,468 individuals aged 16-18 (booster group) and 361,050 individuals aged 12-14 recently fully vaccinated	Delta^	Excluded	BNT162b2	Documented infection	Individuals aged 12-14 recently vaccinated (<60 days) with 2 doses	73.4 (67.1-78.9)	14+	~4 weeks
									Unvaccinated individuals aged 16-18	96.2 (94.8-97.2)		
14	Hansen et al (December 23,2021)	Denmark	Retrospective cohort	41,684 Danish residents aged ≥12 years (booster analysis among 60+ years only)	Omicron specifically^	Excluded	BNT162b2	Documented infection	Complete vaccination with two doses of primary series at least 140 days prior, for 60+ year olds	54.6 (30.4-70.4)	1-30	~4 weeks
					Delta specifically^		BNT162b2			81.2 (79.2-82.9)		
							mRNA-1273			82.8 (58.8-92.9)		
13	Tartof et al* (February 14, 2021)	USA	Retrospective matched cohort	3,133,075 individuals ≥ 18 years	Delta specifically^	Included	BNT162b2	Documented infection	Unvaccinated	88 (86-89)	14+	~12 weeks
								Hospitalization		97 (95-98)		
								Documented infection	Complete vaccination with two doses of primary	75 (71-78)		
								Hospitalization		70 (48-83)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	[Updated from December 21st preprint]								series at least 6 months prior			
12	Berec et al (December 12,2021)	Czech Republic	Retrospective cohort	6,287,356 individuals	Delta^	Included	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses of primary series at least 6-8 months prior	92 (91-92)	7+	~8 weeks
							mRNA-1273 primary series+ BNT162b2 booster			94 (91-96)		
							AZD1222 primary series + BNT162b2 booster			82 (68-90)		
							BNT162b2 primary series+ mRNA-1273 booster			92 (88-95)		
							mRNA-1273 primary series + mRNA-1273 booster			94 (91-95)		
							AZD1222 primary series+ mRNA-1273 booster			91 (63-98)		
11	UKHSA/Andrews et al (January 14, 2022) *[Update to Dec 31, 2021 briefing]*	England	Test-negative case control	760,647 Omicron cases, 236,023 Delta cases, and test negative controls aged 18+	**Omicron specifically**^	Included	BNT162b2 primary series + BNT162b2 booster	Symptomatic disease	Unvaccinated	68.7 (67.9-69.5)	2-4 weeks	~14 weeks
										50.1 (49-51.2)	10+ weeks	
							BNT162b2 primary series + mRNA-1273 booster			74.7 (73.7-75.7)	2-4 weeks	
										65.3 (63.1-67.4)	5-9 weeks	
							AZD1222 primary series + BNT162b2 booster			62.7 (62-63.4)	2-4 weeks	
										44.1 (42.2-45.9)	10+ weeks	
							AZD1222 primary series + mRNA-1273 booster			70.3 (69.5-71)	2-4 weeks	
										61.6 (60-63.1)	5-9 weeks	
							mRNA-1273 primary series + BNT162b2 booster			67 (63-70)	2-4 weeks	

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
							mRNA-1273 primary series + mRNA-1273 booster			68 (64-72)	2-4 weeks	
					Delta specifically^		BNT162b2 primary series + BNT162b2 booster			95.2 (94.9-95.5)	2-4 weeks	
										90.2 (89.6-90.8)	10+ weeks	
							BNT162b2 primary series + mRNA-1273 booster			96.8 (96.2-97.3)	2-4 weeks	
										94.7 (92.7-96.2)	5-9 weeks	
							AZD1222 primary series + BNT162b2 booster			95.4 (95.2-95.7)	2-4 weeks	
										88.5 (87-89.7)	10+ wee ks	
							AZD1222 primary series + mRNA-1273 booster			97.1 (96.8-97.4)	2-4 weeks	
										94.9 (93.6-95.9)	5-9 weeks	
							mRNA-1273 primary series +BNT162b2 booster			97.3 (91.5-99.1)	2-4 weeks	
							mRNA-1273 primary series + mRNA-1273 booster			95.8 (88.8-98.4)	2-4 weeks	
10	Arbel et al (December 8,2021)*	Israel	Prospective cohort	843,208 individuals	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	Death	Receipt of 2 doses at least 5 months prior	90 (86-93)	7-54	~8 weeks
								Documented infection		83 (82-94)		
9	Goldberg et al (December 5, 2021)	Israel	Retrospective cohort	5.7 million Israeli individuals	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	16-39: Documented infection	Receipt of 2 doses at least 5 months prior	91 (90.1-91,3)	12+	~8 weeks
								40-59: Documented infection		89 (88.3-89.3)		
								60+: Documented infection		82.2 (81.5-82.8)		
8	Sharma et al (November 30, 2021)	USA	Matched retrospective cohort	129,130 matched pairs of veterans who received a second dose at least 6 months prior	Delta††	Included	BNT162b2 primary series + BNT162b2 booster	Documented infection	Receipt of 2 doses at least 180 days prior	45.7 (37.9-52.5)	0+	~7 weeks
								Hospitalization		44.8 (26.6-58.4)		
							mRNA-1273 primary series + mRNA-1273 booster	Documented infection		46.6 (36.4-55.3)		
								Hospitalization		50.0 (26.2-66.1)		

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
7	Andrews et al (December 17, 2021) *[Update to November 15, 2021 Preprint]*	England	Test-negative case control	462,591 adults aged 50+ years in England	Delta††	Included (if >90 days prior)	BNT162b2 primary series + BNT162b2 booster	Symptomatic disease	Complete vaccination with two doses of primary series at least 140 days prior	84.5 (83.7-85.3)	14+	~7.5 weeks
							AZD1222 primary series + BNT162b2 booster			89.1 (88.3-89.9)		
							BNT162b2 primary series + BNT162b2 booster		Unvaccinated individuals	94.3 (93.9-94.6)		
							AZD1222 primary series + BNT162b2 booster			93.8 (93.3-94.3)		
6	Barda et al*(October 29, 2021)	Israel	Retrospective cohort	1158269 Israeli individuals	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses at least 5 months ago	88 (87-90)	7+	~7 weeks
								Symptomatic disease		91 (89-92)		
								Hospitalization		93 (88-97)		
								Severe disease		92 (82-97)		
								Death		81 (59-97)		
5	Saciuk et al* (November 2, 2021)	Israel	Retrospective cohort	947,131 persons fully vaccinated at least 6 months prior (Jan-Feb 2021) among active members of the Maccabi HMO	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses at least 5 months prior	89.1 (87.5-90.5)	7+	10 weeks
4	Hardt et al (January 31,2022)	North and South America, Africa, Asia and Europe	Randomized-placebo control trial	14,492 participants in the per-protocol analysis	Non-VOC, Alpha, Delta	Unknown	Ad26.COV2.S primary series + Ad26.COV2.S booster dose	Documented infection	Complete vaccination one dose	51.1 (29.5-66.5)	7+	~8 weeks
								Asymptomatic infection		34.2 (-6.4–59.8)		
								Moderate Symptomatic infection		70.7 (45.5-85.2)		
								Moderate and severe/critical infection		75.2 (54.6-87.3)		
					Alpha^			Documented infection		94.2 (62.9-99.9)		
					Mu^					63.1 (-27.9–91.6)		
3	Bar-On et al * (December 8, 2021)	Israel	Retrospective cohort	4,629,865 Israeli residents (16+) who had been	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	16-29 y: Documented infection	Complete vaccination with two doses at least	94.2 (93.6-94.9)	12+	~3.5 weeks
								30-39 y: Documented infection		88.6 (87.8-89.5)		~4.5 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
	[Published version of October 7 pre-print]			fully vaccinated at least 5 months prior				40-49 y: Documented infection	5 months prior	89.7 (89.1-90.4)		5 weeks
								50-59 y: Documented infection		91.8 (91.2-92.4)		6 weeks
								60+ y: Documented infection		91.9 (91.6-92.2)		8 weeks
								40-59: Severe disease		95.4 (90.6-97.8)		6 weeks
								60+: Severe disease		94.5 (93.4-95.3)		8 weeks
								60+: Death		93.2 (89.4-95.7)		
2	Patalon et al* (November 30, 2021) *[Update to August 31 preprint]*	Israel	Test-negative case control	306,710 Israeli adults ≥ 40 years with either 2 or 3 doses	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses at least 5 months prior	85 (83-86)	14-20	~7 weeks
										86 (85-87)	28-65	
			Matched case-control					Documented infection		87 (85-88)	14-20	
										83 (82-85)	28-65	
								Hospitalization		92 (87-95)	14-20	
										97 (95-98)	28-65	
1	Bar-On et al* (October 7,2021) *[Update to August 31 Preprint]*	Israel	Retrospective cohort	1,144,690	Delta^	Excluded	BNT162b2 primary series + BNT162b2 booster	Documented infection	Complete vaccination with two doses at least 5 months prior	92 (90- 93)	12+	~3 weeks
								Severe disease		94 (91-96)		

*Bar-On et al presented adjusted risk difference instead of VE

2.1 Booster studies that do not meet criteria

1. Bomze D, Sprecher E, Gamzu R. Effect of a nationwide booster vaccine rollout in Israel on SARS-CoV-2 infection and severe illness in young adults. *Travel Med Infect Dis*. Published online 2021 October 30. doi: https://doi.org/10.1016/j.tmaid.2021.102195
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3. Summary of Study Results for Primary Series COVID-19 Vaccine Effectiveness Against Transmission§

#	Reference (date)	Country	Design	Population	Dominant Variants (Alpha=B.1.1.7 Beta=B.1351 Gamma=P.1 Delta=B.1617.2	History of COVID	Vaccine Product	Outcome Measure	2nd Dose VE % (95% CI)	Days post 2nd dose	Max Duration of follow up after fully vaccinated
22	Summer et al* (August 9, 2022)	USA	Prospective cohort	61 participants in 61 households	Non-VOC, Alpha and Delta^	Included	BNT162b2, mRNA-1273, or Ad26.COV2.S	Transmission to household contacts from infected cases	56 (-157-94)	14+	~39 weeks
21	Lopez-Munoz et al* (August 29, 2022)	Spain	Prospective cohort	227 symptomatic index cases and 466 household contacts in Barcelona	**Omicron^** Delta^	Included	AZD1222, BNT162b2, mRNA-1273, Ad26.COV2.S *Note: includes some 1-dose and 3-dose recipients*	Transmission to household contacts	-2.0 (-400-74.4) -233 (-900 to -25)		
20	Tadesse et al (August 22, 2022)	Phillipines	Prospective cohort	154 index cases and 384 household contacts	Delta^	Included	SCB-2019	Symptomatic infection in close contacts	84 (28-97)	14+	~ 21 weeks
19	McCormick et al* (August 5,2022)	USA	Prospective cohort	127 households and 449 individuals	Alpha^	Included	BNT162b2, mRNA-1273, or Ad26.COV2.S	Documented infection of close contacts	60 (-3-84)	14+	~14 weeks
18	Tan et al (August 31, 2022) *[Update to Aug 9 preprint]*	USA	Retrospective cohort	1261 index cases and their close contacts among residents of 35 prisons in California	**Omicron^**	Included	BNT162b2, mRNA-1273, or Ad26.COV2.S	Documented infection of close contacts	22.5 (12-31.7)	14+	~69 weeks
17	Braeye et al* (May 11, 2022)	Belgium	Retrospective cohort	123,409 index cases and 139,140 contacts among women aged 45-64	Alpha^ Delta^	Excluded	BNT162b2 mRNA-1273 Ad26.COV2.S AZD1222 BNT162b2 mRNA-1273 Ad26.COV2.S AZD1222	Documented infection of high risk exposure contacts	71 (68-74) 76 (72-79) 44 (41-48) 53 (49-57) 46 (44-48) 34 (32-35) 51 (48-54) 48 (47-50) 25 (23-27) 25 (22-27) 32 (29-35) 31 (29-33)	7-57 14-64 21-71 14-64 7-57 157-207 14-64 164-214 21-71 171-221 14-64 164-214	~28.5 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants (Alpha=B.1.1.7 Beta=B.1351 Gamma=P.1 Delta=B.1617.2	History of COVID	Vaccine Product	Outcome Measure	2nd Dose VE % (95% CI)	Days post 2nd dose	Max Duration of follow up after fully vaccinated
						Previously infected persons only	BNT162b2		74 (69-80)	7-57	
									62 (60-67)	157-207	
							mRNA-1273		72 (60-83)	14-64	
									61 (49-68)	164-214	
							Ad26.COV2.S		71 (61-79)	21-71	
									63 (54-76)	171-221	
							AZD1222		74 (66-81)	14-64	
									60 (55-68)	164-214	
16	Ng et al (March 24,2022)*	Singapore	Retrospective cohort	8,470 contacts linked to Delta variant index cases	Delta^	Unknown	BNT162b2	Documented infection of household contacts	44 (29-56)	14+	~26 weeks
							BNT162b2	Symptomatic disease of household contacts	39 (21-53)		
							mRNA-1273	Documented infection of household contacts	49 (4-73)		
							mRNA-1273	Symptomatic disease of household contacts	35 (-40-70)		
15	Jalali et al (February 18, 2022)	Norway	Retrospective cohort	1122 primary cases and 2169 household contacts (aged 16+)	**Omicron specifically^**	Excluded	BNT162b2, mRNA-1273, heterologous AZD1222 + BNT162b2/ mRNA-1273	Transmission to household contacts	-4 (-49-21)	7+	~51 weeks
					Delta specifically^				37 (11-54)		
14	Hayek et al*(January 27,2022)	Israel	Retrospective cohort	231,926 households with 582,050 children	Alpha^	Excluded	BNT162b2	Transmission to unvaccinated child from one vaccinated parent	26(14-36.2)	7+	~36 weeks
								Transmission to unvaccinated child from two	71.7(68.6-74.6)		

#	Reference (date)	Country	Design	Population	Dominant Variants (Alpha=B.1.1.7 Beta=B.1351 Gamma=P.1 Delta=B.1617.2	History of COVID	Vaccine Product	Outcome Measure	2nd Dose VE % (95% CI)	Days post 2nd dose	Max Duration of follow up after fully vaccinated
								vaccinated parents			
13	Lyngse et al* (June 30, 2022) *[Update to January 6, 2022 preprint]*	Denmark	Retrospective cohort	24,693 primary cases and their 53,584 household members	Delta^	Excluded	BNT162b2, mRNA-1273, AZD1222, Ad26.COV2.S	Transmission to fully vaccinated household member	28 (20-35)	7+ (BNT162b2), 14+ (mRNA-1273 or after 1 dose of Ad26.COV2.S), 15+ (AZD1222)	~40 weeks
								Transmission to unvaccinated household member	36 (32-40)		
12	Clifford et al (November 24,2021)	UK	Prospective cohort	195 index cases and their 278 contacts	Alpha specifically ^	Unknown	BNT162b2	Transmission to contacts	57 (5- 85)	7+	~31 weeks
							AZD1222		35 (-26-74)		
					Delta specifically^		BNT162b2		31 (-3- 61)		
							AZD1222		42 (14- 69)		
11	Ng et al* (November 1, 2021)	Singapore	Retrospective cohort	301 index cases and 1204 household contacts	Delta index cases, specifically	Unknown	BNT162b2 & mRNA-1273	Documented infection of household contacts	27 (-40-62)	15+	~16.5 weeks
10	Singanayagam et al*(October 28,2021)	England	Prospective cohort	233 contacts (arising from 163 index notifications) and 19 index cases	Delta^	Included	BNT162b2 and AZD1222	Documented infection	34 (-15–60)	7+	~10.5 weeks
9	de Gier et al* (October 14, 2021)	Netherlands	Retrospective cohort	4921 index cases and 7771 household contacts (aged 12+)	Delta^	Unknown	BNT162b2, AZD1222, mRNA-1273, & Ad26.COV2.S	Transmission to unvaccinated household contacts	63 (46-75)	14+ (or 28+ after a single dose of Ad26.COV2.S)	~32 weeks
								Transmission to fully vaccinated household contacts	40 (20-54)		
8	Eyre et al* (January 5, 2022) *[Update to Sept 29, 2021 preprint]*	England	Retrospective cohort	108,498 index cases and 146,243 contacts of all ages	Alpha^ specifically	Included	BNT162b2	Transmission to contacts	68 (52-79)	14+	~20.5 weeks
							AZD1222		52 (22-70)		~8 weeks
					Delta^ specifically		BNT162b2		50 (35-61)		~29 weeks
							AZD1222		24 (18-30)		~16 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants (Alpha=B.1.1.7 Beta=B.1351 Gamma=P.1 Delta=B.1617.2	History of COVID	Vaccine Product	Outcome Measure	2nd Dose VE % (95% CI)	Days post 2nd dose	Max Duration of follow up after fully vaccinated
7	Meyer et al* (September 9, 2022) *[Update to September 23,2021 preprint]*	Germany	Retrospective cohort	Households of 14 SARS-CoV-2 positive nursing home staff (5 vaccinated, 9 unvaccinated)	Alpha^	Unknown	BNT162b2	Documented infection of household members	67.2 (no CI available)	7+	~11 weeks
6	Braeye et al* (August 19,2021)	Belgium	Retrospective cohort	131,283 index cases and 301,741 high risk contacts	Alpha^	Included	BNT162b2 mRNA-1273	Transmission	62 (57-67) 52 (33-69)	14+	~20 weeks
5	de Gier et al* (August 5, 2021)	Netherlands	Retrospective cohort	113,582 index cases (aged 18+) and 253,168 household and other close contacts (all ages)	Alpha^	Unknown	AZD1222 BNT162b2 mRNA-1273 Ad26.COV2.S	Transmission to any household contacts (adjusted for contact vaccination status)	58 (−12-84) 70 (61-77) 88 (50-97) —	7+	~15 weeks
4	Layan, Gilboa et al* (March 03, 2022) *[Published version of July 16,2021 preprint]*	Israel	Prospective cohort	215 index cases and 687 household contacts from 210 Israeli households	Original and Alpha¶	Included	BNT162b2	Transmission to HHC by vaccinated vs. unvaccinated cases	75(23-94)	7+	~12 weeks
3	Prunas et al* (January 27, 2022) *[Update to July 16, 2021 preprint]*	Israel	Retrospective cohort	2,472,502 Israeli individuals from 1,327,647 households	Original and Alpha¶ (pre-Delta^) Delta^	Excluded	BNT162b2	Infectiousness given Infection Transmission Infectiousness given Infection Transmission	23 (-11.3-46.7) 6.9 (-124.8-61.4) 91.8 (88.1-94.3) 61.1 (5.2-84.1) -27.9 (-248.9-53.1) -27.9 (-53.7 to -6.5) 65.6 (4.9-87.6)	10-90 90+ 10-90 90+ 10-90 90+ 10-90	~11 weeks ~26.5 weeks ~11 weeks ~26.5 weeks ~11 weeks ~26.5 weeks ~11 weeks

#	Reference (date)	Country	Design	Population	Dominant Variants (Alpha=B.1.1.7 Beta=B.1351 Gamma=P.1 Delta=B.1617.2	History of COVID	Vaccine Product	Outcome Measure	2nd Dose VE % (95% CI)	Days post 2nd dose	Max Duration of follow up after fully vaccinated
									24.2 (9-36.9)	90+	~26.5 weeks
2	Harris et al* (June 23, 2021) *[Update to Apr 28 preprint]*	UK	Retrospective cohort, case-control	970,128 household contacts of index case (unvaccinated, vaccinated with AZD1222 or BNT162b)	Alpha[£]	Unknown	AZD1222	Documented infection	—		
							BNT162b2				
1	Salo et al* (March 4, 2022) *[Update to July 10, 2021 preprint]*	Finland	Retrospective cohort	265,326 HCW and their 298,100 unvaccinated spouses and children (3-18 years)	Alpha[††]	Excluded	BNT162b2 & mRNA-1273	Documented infection in HCW's unvaccinated spouses	—	—	
								Documented infection in HCW's unvaccinated spouses	—	—	
								Documented infection in unvaccinated children of HCWs	—	—	
								Documented infection in unvaccinated children of HCWs	—	—	

[§]Study results captured during literature search of vaccine effectiveness studies. Note this is not an exhaustive list of transmission studies.
Purple text indicates new or updated study.
Product Manufacturers: BNT162b2 (Pfizer), mRNA-1273 (Moderna), AZD1222 (Astra-Zeneca), Ad26.COV2.S (Janssen), Coronavac
[±]Unless noted otherwise, days post 1st dose are prior to receiving dose 2.
‡Unclear if 1st dose VE estimates includes any individuals who received a second dose.
*Manuscripts with an asterisk (*) are peer-reviewed publications.
^Indicates predominant variant identified by study authors. If no ^ then variants identified through secondary source when possible. Please see additional footnotes.
[¶]The rise of SARS-CoV-2 variant Alpha in Israel intensifies the role of surveillance and vaccination in elderly | medRxiv
[£]Coronavirus (COVID-19) Infection Survey, UK - Office for National Statistics
[††]Based on https://outbreak.info/location-reports

4. Summary of Study Results for Booster Dose COVID-19 Vaccine Effectiveness Against Transmission

#	Reference (date)	Country	Design	Population	Dominant Variants	History of COVID	Vaccine Product	Outcome Measure	Reference group	Booster Dose VE % (95%CI)	Days post Booster dose	Max Duration of follow up after fully vaccinated
5	Tan et al (August 31, 2022) [*Update to Aug 9 preprint*]	USA	Retrospective cohort	1261 index cases and their close contacts among residents of 35 prisons in California	**Omicron^**	Included	BNT162b2, mRNA-1273, or Ad26.COV2.S (3+ doses)	Documented infection of close contacts	Unvaccinated index cases	31.7 (17.5-43.5)	14+	~32 weeks
4	Jalali et al (February 18, 2022)	Norway	Retrospective cohort	1122 primary cases and 2169 household contacts (aged 16+)	**Omicron specifically^**	Excluded	BNT162b2, mRNA-1273, heterologous AZD1222 + BNT162b2/mRNA-1273 primary + BNT162b2 or mRNA-1273 booster	Transmission to household contacts	Unvaccinated primary cases	1 (-49-32)	7+	~13.5 weeks
					Delta specifically^					82 (30-99)		
3	Allen et al (February 17,2022)	UK	Retrospective cohort	23,667 cases and 40,123 contacts	**Omicron specifically^**	Excluded	BNT162b2, mRNA-1273, AZD1222, Ad26.COV2.S primary + BNT162b2 or mRNA-1273 booster	Transmission in contacts in household setting	Complete vaccination with two doses of primary series	12(3-21)	14+	~16 weeks
								Transmission in contacts in non-household setting		24(6-39)		
				59,031 cases and 111,469 contacts	Delta specifically^			Transmission in contacts in household setting		32(26-38)		
								Transmission in contacts in non-household setting		49(34-61)		
2	Hayek et al* (January 27,2022)	Israel	Retrospective cohort	231,926 households with 582,050 children	Delta^	Excluded	BNT162b2	Transmission to unvaccinated child from one boosted parent	Fully vaccinated primary cases	20.8(11.4-29.1)	7+	~9.5 weeks
								Transmission to unvaccinated child from two boosted parents		58.1(53.1-62.6)		
1	Lyngse et al (December 27, 2021)	Denmark	Retrospective cohort	11,937 primary cases and their household members	**Omicron** and Delta^	Included	BNT162b2, mRNA-1273, AZD1222, Ad26.COV2.S	Transmission to household members	Fully vaccinated primary cases	46 (29-60)	7+	~7 weeks

5. Review Papers and Meta-analyses

1. Real-world effectiveness of BNT162b2 mRNA vaccine: a meta-analysis of large observational studies
2. Efficacy estimates for various COVID-19 vaccines: What we know from the literature and reports
3. Efficacy and effectiveness of COVID-19 vaccines against SARS-CoV-2 infection: interim results of a living systematic review, 1 January to 14 May 2021
4. Progress of the COVID-19 vaccine effort: viruses, vaccines and variants versus efficacy, effectiveness and escape
5. Accelerated COVID-19 vaccine development: milestones, lessons, and prospects
6. SARS-CoV-2 (Covid-19) vaccines structure, mechanisms and effectiveness: A review
7. A systematic review of Coronavirus Disease 2019 vaccine efficacy and effectiveness against Severe Acute Respiratory Syndrom Coronavirus 2 infection and disease
8. SARS-CoV-2 new variants: Characteristic features and impact on the efficacy of different vaccines
9. Effectiveness of COVID-19 vaccines against SARS-CoV-2 variants of concern: a systematic review and meta-analysis
10. Efficacy and effectiveness of SARS-CoV-2 vaccine: A systematic review and a meta-analysis
11. COVID-19 Living Evidence Synthesis #6: What is the efficacy and effectiveness of available COVID-19 vaccines for variants of concern?
12. Efficacy of COVID-19 vaccines in immunocompromised patients: A systematic review and meta-analysis
13. Comparative immunogenicity and effectiveness of mRNA-1273, BNT162b2 and AD26.COV2.S COVID-19 vaccines
14. Postvaccination SARS-CoV-2 infection among healthcare workers: A systematic review and meta-analysis
15. Effectiveness of COVID-19 vaccines against SARS-CoV-2 infection with the Delta (B.1.617.2) variant: second interim results of a living systematic review and meta-analysis, 1 January to 25 August 2021
16. Effectiveness of COVID-19 vaccines and their challenges (Review)
17. Effectiveness of COVID-19 vaccines and post-vaccination SARS-CoV-2 infection, hospitalization, and mortality: A systematic review and meta-analysis of observational studies
18. SARS-CoV-2 variants and effectiveness of vaccines: A review of current evidence
19. Effectiveness and safety of SARS-CoV-2 vaccine in real-world studies: a systematic review and meta-analysis
20. SARS-CoV-2 variants of concern
21. Duration of Effectiveness of Vaccines Against SARS-CoV-2 Infection and COVID-19 Disease: Results of a Systematic Review and Meta-Regression
22. Real-world effectiveness of COVID-19 vaccines: a literature review and meta-analysis
23. Vaccine versus Variants (3Vs): Are the COVID-19 vaccines effective against the variants? A systematic review
24. Effectiveness of COVID-19 vaccines against delta variant (B.1.617.2): A meta-analysis
25. Diverse vaccine platforms safeguarding against SARS-CoV-2 and its variants

26. Vaccines provide disproportional protection to the increased hospitalisation risk posed by the Delta variant of SARS-CoV2: a meta-analysis
27. COVID-19 phase 4 vaccine candidates, effectiveness on SARS-CoV-2 variants, neutralizing antibody, rare side effects, traditional and nano-based vaccine platforms: a review
28. Effectiveness of the WHO-authorized COVID-19 vaccines: A rapid review of global reports till 30 June 2021
29. COVID-19 vaccine effectiveness among immunocompromised populations: a targeted literature review of real-world studies
30. Effectiveness of COVID-19 vaccines against Delta (B.1.617.2) variant: A systematic review and meta-analysis of clinical studies
31. The effectiveness of mRNA-1273 vaccine against COVID-19 caused by Delta variant: A systematic review and meta-analysis
32. Household secondary attack rates of SARS-CoV-2 by variant and vaccination status: an updated systematic review and meta-analysis
33. Systematic review and meta-analysis of COVID-19 vaccines safety, tolerability, and efficacy among HIV-infected patients
34. A systematic review of methodological approaches for evaluating real-world effectiveness of COVID-19 vaccines: Advising resource-constrained settings
35. Immunological and clinical efficacy of COVID-19 vaccines in immunocompromised populations: A systematic review
36. Waning effectiveness of SARS-CoV-2 mRNA vaccines in older adults: A rapid review
37. Short-term effectiveness of COVID-19 vaccines in immunocompromised patients: A systematic literature review and meta-analysis
38. Effectiveness of vaccination against SARS-CoV-2 infection in the Pre-Delta era: A systematic review and meta-analysis
39. Update on COVID-19 vaccination in pediatric solid organ transplant recipients
40. Comparing COVID-19 vaccines for their characteristics, efficacy and effectiveness against SARS-CoV-2 and variants of concern: a narrative review
41. Efficacy of mRNA, adenoviral vector, and perfusion protein COVID-19 vaccines
42. Immunological and clinical efficacy of COVID-19 vaccines in immunocompromised populations: a systematic review
43. Implication of the emergence of the delta (B.1.617.2) variants on vaccine effectiveness
44. The effectiveness of mRNA-1273 vaccine against COVID-19 caused by Delta variant: A systematic review and meta-analysis
45. A review of the safety and efficacy of current COVID-19 vaccines
46. Emerging COVID-19 variants and their impact on SARS-CoV-2 diagnosis, therapeutics and vaccines
47. The efficacy and effectiveness of the COVID-19 vaccines in reducing infection, severity, hospitalization, and mortality: a systematic review
48. The effectiveness of vaccination against long COVID: A rapid evidence briefing
49. Effectiveness and Safety of COVID-19 Vaccine among Pregnant Women in Real-World Studies: A Systematic Review and Meta-Analysis
50. Effectiveness and Durability of COVID-19 Vaccination in 9447 Patients with IBD: A Systematic Review and Meta-Analysis
51. Insight into the biological impact of COVID-19 and its vaccines on human health
52. The Burden of Coronavirus Disease 2019–Related Cases, Hospitalizations, and Mortality Based on Vaccination Status and Mandated Mask Use: Statewide Data From Wisconsin and Narrative Review of the Literature
53. Vaccination for SARS-CoV-2 in hematological patients.

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