

Supplementary materials for the article “Impact of COVID-19 vaccination on long COVID: a systematic review and meta-analysis” (manuscript BMJMED-000385)

Supplement 1. Search strategies

Supplement 2. Excluded studies following full text screening with reasons

Supplement 3. Ratios used for the Forest plot

Supplement 4. Detailed methodology characteristics of included studies

Supplement 1. Search Strategies

PubMed - run [no date specified]

PubMed

("Post-acute COVID-19 syndrome"[NM] OR "COVID-19/complications"[Mesh] OR "Long covid"[tiab] OR Long-covid[tiab] OR "COVID-19 sequelae"[tiab] OR "COVID 19 sequelae"[tiab] OR "Post-acute COVID-19"[tiab] OR "Post Covid"[tiab] OR ((Post-vaccination[tiab] OR Post vaccination[tiab]) AND (SARS-CoV-2[tiab] OR Covid-19[tiab] OR "Covid 19"[tiab])))

AND

("COVID-19 Vaccines"[Mesh] OR "Vaccination"[Mesh] OR Vaccination[tiab] OR Vaccinated[tiab] OR Vaccines[tiab] OR Inoculated[tiab] OR Inoculation[tiab])

AND

(Symptoms[tiab] OR Symptom[tiab] OR "Post-acute outcomes"[tiab] OR "Post acute outcomes"[tiab] OR Long-term[tiab] OR "Long term"[tiab])

AND

("Morbidity"[Mesh] OR Epidemiology[sh] OR Incidence[tiab] OR Incidences[tiab] OR Prevalence[tiab] OR Trajectory[tiab] OR Persistent[tiab] OR "Risk factor"[tiab])

The Cochrane Library for clinical trials in CENTRAL - run [no date specified]

Cochrane CENTRAL

("Post-acute COVID-19 syndrome":kw OR "Long covid":ti,ab OR "COVID 19 sequelae":ti,ab OR "COVID 19 sequelae":ti,ab OR "Post acute COVID 19":ti,ab OR "Post Covid":ti,ab OR ((Post vaccination:ti,ab OR "Post vaccination":ti,ab) AND (SARS CoV 2:ti,ab OR "Covid 19":ti,ab))

AND

([mh "COVID-19 Vaccines"] OR [mh Vaccination] OR Vaccination:ti,ab OR Vaccinated:ti,ab OR Vaccines:ti,ab OR Inoculated:ti,ab OR Inoculation:ti,ab)

AND

(Symptoms:ti,ab OR Symptom:ti,ab OR "Post-acute outcomes":ti,ab OR "Post acute outcomes":ti,ab OR Long-term:ti,ab OR "Long term":ti,ab)

AND

([mh Morbidity] OR [mh /EP] OR Incidence:ti,ab OR Incidences:ti,ab OR Prevalence:ti,ab OR Trajectory:ti,ab OR Persistent:ti,ab OR "Risk factor":ti,ab)

Embase via Elsevier - run [no date specified]

Embase

("long COVID"/exp OR "Long covid":ti,ab OR Long-covid:ti,ab OR "COVID-19 sequelae":ti,ab OR "COVID 19 sequelae":ti,ab OR "Post-acute COVID-19":ti,ab OR "Post Covid":ti,ab OR ((Post-vaccination:ti,ab OR "Post vaccination":ti,ab) AND (SARS-CoV-2:ti,ab OR Covid-19:ti,ab OR "Covid 19":ti,ab)))

AND

("SARS-CoV-2 vaccine"/exp OR Vaccination/exp OR Vaccination:ti,ab OR Vaccinated:ti,ab OR Vaccines:ti,ab OR Inoculated:ti,ab OR Inoculation:ti,ab)

AND

(Symptoms:ti,ab OR Symptom:ti,ab OR "Post-acute outcomes":ti,ab OR "Post acute outcomes":ti,ab OR Long-term:ti,ab OR "Long term":ti,ab)

AND

(Morbidity/exp OR "Epidemiology":ti,ab OR Incidence:ti,ab OR Incidences:ti,ab OR Prevalence:ti,ab OR Trajectory:ti,ab OR Persistent:ti,ab OR "Risk factor":ti,ab)

EuropePMC (preprints) - run [no date specified]

Preprints – via Europe PMC

(TITLE:"Long covid" OR TITLE:Long-covid OR ABSTRACT:"Long covid" OR ABSTRACT:Long-covid OR TITLE:"COVID-19 sequelae" OR ABSTRACT:"COVID-19 sequelae")

AND

(TITLE:Vaccination OR TITLE:Vaccination OR TITLE:Vaccinated OR TITLE:Vaccines OR TITLE:Inoculated OR TITLE:Inoculation OR ABSTRACT:Vaccination OR ABSTRACT:Vaccination OR ABSTRACT:Vaccinated OR ABSTRACT:Vaccines OR ABSTRACT:Inoculated OR ABSTRACT:Inoculation)

AND

(TITLE:Symptoms OR ABSTRACT:Symptoms OR TITLE:"Post-acute outcomes" OR ABSTRACT:"Post-acute outcomes" OR TITLE:Incidence OR ABSTRACT:Incidence OR TITLE:Incidences OR ABSTRACT:Incidences OR TITLE:Trajectory OR ABSTRACT:Trajectory OR TITLE:Persistent OR ABSTRACT:Persistent)

Supplement 2. Excluded studies following full text screening with reasons

No.	Excluded articles	Reason
1.	Arjun MC, Singh AK, Pal D, Das K, Gajjala A, Venkateshan M, et al. Prevalence, characteristics, and predictors of Long COVID among diagnosed cases of COVID-19. medRxiv. 2022:2022.01.04.21268536.	Cross sectional
2.	Arnold DT, Milne A, Samms E, Staddon L, Maskell NA, Hamilton FW. Are vaccines safe in patients with Long COVID? A prospective observational study. 2021.	No outcome of interest
3.	Budhiraja S, Indrayan A, Mahajan M. Effect of COVID-19 vaccine on long-COVID: A 2-year follow-up observational study from hospitals in north India. 2022.	Cross sectional
4.	El Otmani H, Nabili S, Berrada M, Bellakhdar S, El Moutawakil B, Abdoh Rafai M. Prevalence, characteristics and risk factors in a Moroccan cohort of Long-Covid-19. Neurological Sciences. 2022.	Cross sectional, no outcome of interest
5.	Emecen AN, Keskin S, Turunc O, Suner AF, Siyve N, Basoglu Sensoy E, et al. The presence of symptoms within 6 months after COVID-19: a single-center longitudinal study. Irish Journal of Medical Science. 2022.	Cross sectional
6.	Gaber TA-ZK, Ashish A, Unsworth A, Martindale J. Are mRNA Covid 19 vaccines safe in Long Covid patients? A Health Care Workers perspective. British Journal of Medical Practitioners. 2021;14(1).	No comparison group
7.	Geong Taat F, Hansen JK, Wan Hazlina WM, B. Sunita VB. POS-852 HEALTH CARE WORKERS WITH LONG COVID SYMPTOMS: A RETROSPECTIVE OBSERVATIONAL STUDY, NEPHROLOGY DEPARTMENT HOSPITAL KUALA LUMPUR. Kidney International Reports. 2022;7(2):S368-undefined.	Cross sectional
8.	Herman B, Viwattanakulvanid P, Dzulhadj A, Oo AC, Patricia K, Pongpanich S. Effect of full vaccination and post-covid olfactory dysfunction in recovered COVID-19 patient. A retrospective longitudinal study with propensity matching. medRxiv. 2022:2022.01.10.22269007.	No outcome of interest
9.	Jeyaraman M, Selvaraj P, Jeyaraman N, Prajwal GS, Muthu S. Assessment of risk factors in post- COVID-19 patients and its associated musculoskeletal manifestations: A cross-sectional study in India. J Orthop. 2022.	No outcome of interest
10.	Krishna BA, Metaxaki M, Wills MR, Sithole N. Reduced incidence of Long COVID referrals to the Cambridge University Teaching Hospital Long COVID clinic. Clinical Infectious Diseases. 2022.	No comparison group
11.	Kuodi P, Gorelik Y, Zayyad H, Wertheim O, Wiegler KB, Jabal KA, et al. Association between vaccination status and reported incidence of post-acute COVID-19 symptoms in Israel: a cross-sectional study of patients tested between March 2020 and November 2021. 2022.	Unclear vaccination status at time of infection
12.	Massey D, Berrent D, Akrami A, Assaf G, Davis H, Harris K, et al. Change in Symptoms and Immune Response in People with Post-Acute Sequelae of SARS-Cov-2 Infection (PASC) After SARS-Cov-2 Vaccination. 2021.	No long COVID data, protocol

13.	Nehme M, Brillard O, Salamun J, Jacquieroz F, Courvoisier DS, Spechbach H, et al. Symptoms After COVID-19 Vaccination in Patients with Post-Acute Sequelae of SARS-CoV-2. <i>Journal of General Internal Medicine</i> . 2022.	Cross sectional
14.	Nygaard U, Holm M, Hartling UB, Glenthøj J, Schmidt LS, Nordly SB, et al. Incidence and clinical phenotype of multisystem inflammatory syndrome in children after infection with the SARS-CoV-2 delta variant by vaccination status: a Danish nationwide prospective cohort study. <i>Lancet Child Adolesc Health</i> . 2022;6(7):459-65.	No outcome of interest
15.	Peghin M, De Martino M, Palese A, Gerussi V, Bontempo G, Graziano E, et al. Post-COVID-19 syndrome and humoral response association after 1 year in vaccinated and unvaccinated patients. <i>Clinical Microbiology and Infection</i> . 2022;28(8):1140-8.	Unusable analysis (this study potentially has the data to answer our question, however, they didn't do the right analysis and we couldn't obtain raw data by the time we submitted.)
16.	Scherlinger M, Pijnenburg L, Chatelus E, Arnaud L, Gottenberg JE, Sibilia J, et al. Effect of SARS-CoV-2 Vaccination on Symptoms from Post-Acute Sequelae of COVID-19: Results from the Nationwide VAXILONG Study. <i>Vaccines</i> . 2022;10(1).	No comparison group
17.	Senjam S, Singh B, Parmeshwar K, Nichal N, Manna S, Madan K, et al. Assessment of Post COVID-19 Health Problems and its Determinants in North India: A descriptive cross section study. 2021.	Cross sectional
18.	Sheikh A, McMenamin J, Taylor B, Robertson C. SARS-CoV-2 Delta VOC in Scotland: demographics, risk of hospital admission, and vaccine effectiveness. <i>Lancet (London, England)</i> . 2021;397:2461-2.	No long COVID data
19.	Strahm C, Seneghini M, Güsewell S, Egger T, Leal-Neto O, Brucher A, et al. Symptoms Compatible With Long Coronavirus Disease (COVID) in Healthcare Workers With and Without Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection—Results of a Prospective Multicenter Cohort. <i>Clinical Infectious Diseases</i> . 2022.	No outcome of interest
20.	Strain WD, Sherwood O, Banerjee A, van der Togt V, Hishmeh L, Rossman J. The Impact of COVID Vaccination on Symptoms of Long COVID. An International Survey of People with Lived Experience of Long COVID. 2021.	No comparison group
21.	Tsuchida T, Hirose M, Inoue Y, Kunishima H, Otsubo T, Matsuda T. Relationship between changes in symptoms and antibody titers after a single vaccination in patients with Long COVID. <i>Journal of Medical Virology</i> . 2022;94(7):3416-20.	No comparison group
22.	Wanga V, Chevinsky J, Dimitrov L, Gerdes M, Whitfield G, Bonacci R, et al. Long-Term Symptoms Among Adults Tested for SARS-CoV-2 — United States, January 2020–April 2021. 2021.	No comparison group
23.	Whittaker H, Gulea C, Koteci A, Kallis C, Morgan A, Iwundu C, et al. GP consultation rates for sequelae after acute covid-19 in patients managed in the community or hospital in the UK: population based study. <i>BMJ (Clinical research ed)</i> . 2021;375:e065834.	No comparison group
24.	Yousaf AR, Cortese MM, Taylor AW, Broder KR, Oster ME, Wong JM, et al. Reported cases of multisystem inflammatory syndrome in children aged 12-20 years in the USA who received a COVID-19 vaccine, December, 2020, through August, 2021: a surveillance investigation. <i>Lancet Child Adolesc Health</i> . 2022;6(5):303-12.	No outcome of interest

Supplement 3: Ratios used for the Forest plot

Study ID	Vaccine effect on Long COVID (LC)					Assessment timepoint
	Type of ratio	Ratio	LCL	UCL	Outcome	
COVID vaccination BEFORE infection						
Al-Aly 2021	HR	0.85	0.82	0.88	risk of at least 1 post-acute sequelae with complete vaccination before COVID (2 doses of Pfizer, Moderna, 1 dose of Johnson&Johnson)	6 months
Antonelli 2022	OR	1.03	0.85	1.24	long-duration (≥28 days) symptoms following 1 dose before COVID	≥ 1 month
	OR	0.51	0.32	0.82	long-duration (≥28 days) symptoms following 2 doses before COVID	
Ayoubkhani 2022 (a)	aOR	0.59	0.50	0.69	LC of any severity after 2 doses before COVID	≥3 months
Azzolini 2022	OR	0.86	0.21	3.49	odds of having LC with 1 dose of vax before infection	>1month
Azzolini 2022	OR	0.25	0.07	0.87	odds of having LC with 2 doses of vax before infection	>1month
Azzolini 2022	OR	0.16	0.03	0.84	odds of having LC with 3 doses of vax before infection	>1month
Ioannou 2022	aOR	0.78	0.68	0.90	odds of having LC care with 2 doses of vax before infection	>3 months
Ioannou 2022	aOR	1.03	0.95	1.10	odds of having LC care with 1 dose of vax before infection	>3 months
Mohr 2022	aRR	0.70	0.58	0.84	risk of having COVID like symptoms at 6 weeks with 2 doses	1.5 months
Pell 2022	aHR	0.76	0.61	0.94	confusion/difficulty concentrating	>6 months
Simon 2021	OR	0.22	0.20	0.25	odds of having any LC symptom with 1st dose before COVID	3-5 months
Tannous 2022	aOR	0.58	0.52	0.66	odds of developing long COVID with 2 doses of mRNA or 1 dose of J&J	>1 month
Taquet 2021	HR	0.96	0.89	1.03	odds of having any long covid symptom if vaccinated with 1 dose	within 6 months
	HR	1.00	0.95	1.06	odds of having any long covid symptom if vaccinated with 2 doses	
	HR	1.01	0.96	1.05	odds of having any long covid symptom if vaccinated with 1 or 2 doses	
van der Maaden 2022	OR	1.02	0.85	1.22	odds of getting at least 1 long COVID symptoms if fully vaccinated	>2 months
Zisis 2022	RR	0.48	0.43	0.52	risk of developing fatigue after COVID at 90 days after COVID	3 months
COVID vaccination AFTER infection or after Long COVID diagnosis						
Ayoubkhani 2021 (b)	aOR	0.87	0.81	0.93	long covid of any severity with 1st dose after COVID	≥ 3 months
	aOR	0.91	0.86	0.97	long covid of any severity with 2nd dose after COVID	
Peghin 2022	OR	0.90	0.48	1.64	odds of having LC with any dose after COVID	12 months
Simon 2021	OR	0.38	0.35	0.41	odds of having any LC symptom with 1st dose 0-4 weeks after COVID	3-5 months
	OR	0.54	0.51	0.57	odds of having any LC symptom with 1st dose 4-8 weeks after COVID	
	OR	0.75	0.71	0.78	odds of having any LC symptom with 1st dose 8-12 weeks after COVID	
Tran 2021	HR	1.97	1.23	3.15	remission of all long covid symptoms with 1st dose of vaccine	4 months
(conversion)	OR	0.51	0.32	0.81		

Wisnivesky 2021	OR	0.71	0.28	1.82	odds of having fatigue with 1 dose	6 months
(calculated from SMD)	OR	0.66	0.31	1.4	odds of having fatigue with 2 doses	
Wynberg 2022	OR	1.57	0.46	5.84	odds of full recovery from long COVID within 3 months with 2 doses	>3 months
(conversion)		0.64	0.17	2.17	odds of not fully recovering from Long COVID within 3 months with 2 doses of vaccine	

Supplement 4: Detailed methodology characteristics of included studies

Study ID	Design	Adjustments for confounders						Bias in outcome measurement (and main reason for high risk of bias) + outcome determination method	Comprehensive outcomes
		age	sex	BMI	Initial disease severity	Co-morbidity	Vaccine hesitancy		
COVID vaccination before infection									
Al-Aly 2022	Retrospectively assembled cohort	✓	✓	✓	NI	✓	✓	Moderate (due to unvalidated algorithmic LC Dx) ICD10	Risk of at least one post-acute sequelae at 6mo HR 0.85 (0.82-0.88); Breakthrough COVID19 burden per 1000 persons at 6-months (95% CI) 252.41 (240.76, 264.52) - COVID-19 burden per 1000 persons at 6months (95% CI) 283.01 (270.21, 296.27) = Excess burden per 1000 persons at 6months (95% CI) -30.60 (-42.25, -18.49)
Antonelli 2022	Prospective case-control study	✓	✓	✓	✗	✓	✗	Serious (due to unclear definition of and self-reported outcomes)	long-duration (≥28 days) symptoms following 1 dose OR 1.03 [0.85-1.24] p=0.78; two vaccine doses for all participants (OR 0.51, 95% CI 0.32-0.82; p=0.0060; The most common symptom reported was Fatigue 92 (64.8%), followed by Cough 46 (32.4%). Only three participants reported cognitive dysfunction or brain fog.
Ayoubkhani 2022 (a)	Retrospectively assembled cohort	✓	✓	✗	✗	✓	✗	Low prospectively collected self-report	The aOR were 0.59 (0.50 to 0.69) for Long Covid of any severity and 0.59 (0.48 to 0.73) for activity-limiting symptoms in those infected after double vaccination compared with those who were infected when unvaccinated
Azzolini 2022	Retrospective cohort	✗	✗	✗	✓	NI	✓	Critical (due to retrospectively collected self-reported outcome with high recall bias)	With a reference group of unvaccinated females in wave 1 with no allergies or comorbidities (Table 2), male sex (odds ratio [OR], 0.65; 95% CI, 0.44-0.98, P = .04), 2 vaccine doses (OR, 0.25; 95% CI, 0.07-0.87, P = .03), and 3 vaccine doses (OR, 0.16; 95% CI, 0.03-0.84, P = .03) were associated with a lower probability of long COVID.
Ioannou 2022	Retrospectively assembled cohort	✓	✓	✗	✓	✓	✗	Low (Outcome adjusted for healthcare interactions 2-years)	Persons who had received both doses of mRNA vaccine at the time of SARS-CoV-2 infection less likely to have long-COVID care (aOR, 0.78; 95% CI, 0.68-0.90) than unvaccinated persons. However, persons who had received only a single dose of mRNA vaccination at the time of SARS-CoV-2 infection (5910 individuals) were not less likely to

								prior to COVID infection)	have long-COVID care (AOR, 1.03; 95% CI, 0.95-1.10) than unvaccinated persons (58 693 individuals). Compared with persons infected during the first wave of the pandemic (ie, before June 1, 2020), those infected between June and October 2020 (aOR, 1.52; 95% CI, 1.40-1.65) or between November 2020 and April 2021 (AOR, 1.65; 95% CI, 1.52-1.78) were more likely to have documented long-COVID care from 3 to 8 months after infection.
Mohr 2022	Prospective cohort	✓	✗	✗	✗	✓	✗	Moderate (due to overlap of baseline and follow up survey timeline for some participants; self-reported outcomes)	Vaccinated participants had lower prevalence of COVID-like symptoms at the 6-week survey compared to those who were not vaccinated (60.6% vs. 79.1%). RR was 0.77 (95% CI, 0.67–0.88) before adjustment and 0.70 (CI, 0.58–0.84) after adjustment for covariates. Other classifications of symptoms were also less likely after vaccination—for neurologic symptoms the adjusted risk ratio (aRR) was 0.71 (95% CI 0.55–0.93) with a 17.9 percentage point reduction (95% CI 5.1–30.7); for any 6-week symptoms the aRR was 0.76 (95% CI 0.65–0.90), with 20.1 percentage point reduction (95% CI 8.0–32.1; The median time from symptom onset to return to work was 13 days (IQR 11–16 days). 151 Vaccinated participants returned to work a median of 2.0 days (95% CI 1.0–3.0) sooner than the unvaccinated and were less likely to return to work more than 10 days after illness onset (78.9% vs. 87.5%; RR 0.90; 95% CI 0.82–0.99). Adjusting for covariates, vaccinated participants returned to work sooner than unvaccinated participants (aHR, 1.37; 95% CI 1.04–1.79;
Pell 2022	Prospective cohort	✓	✓	✗	✗	✓	✗	Moderate (due to self-reported medical history and unclearly defined LC outcomes) ICD10+EHR	Compared to unvaccinated people, people vaccinated prior to symptomatic infection were less likely to report persistent change in smell (HR 0.58, 0.44-0.75), change in taste (HR 0.60, 95% CI 0.46-0.78), problems hearing (HR 0.62, 95% CI 0.45-0.85), poor appetite (HR 0.73, 95% CI 0.53-0.99), balance problems (HR 0.75, 95% CI 0.56-0.99), confusion/difficulty concentrating (HR 0.76, CI 0.61-0.94), and anxiety /depression (HR 0.78, CI 0.65-0.94) at their latest follow up after adjustment for potential confounders. 21,525 people with ongoing symptoms following symptomatic infection, the most common were tiredness, headache and muscle aches/weakness (Table 2). After changes in smell and taste, the largest effect sizes were observed for cardiovascular symptoms (breathlessness, chest pain and palpitations) and confusion

Tannous 2022	Retrospectively assembled cohort	✓	✓	✗	✓	✗	✗	Serious (due to high detection bias) EHR	In the fully adjusted models, both vaccinated (breakthrough) COVID-19 cases (vs. unvaccinated) and anti-SARS-CoV-2 mAb treated patients (vs. untreated) had a lower likelihood for developing PASC, aOR (CI): 0.58 (0.52 - 0.66), and 0.77 (0.69 0.86), respectively. Additionally, females (vs. males) were more likely to experience PASC [aOR (CI): 1.52 (1.44 - 1.61)], as were middle-aged (40 to 65 years) COVID-19 survivors compared to older individuals (≥ 65 years) [aOR (CI): 1.25 (1.17 - 1.34)]. Shortness of breath was the most common symptom, observed among 2,578 (43.5%) PASC patients. This was followed by mood/anxiety disorders, 1,001 (16.9%), and sleep disorders, 957 (16.1%).
Taquet 2021	Retrospectively assembled cohort	✓	✓	✓	✓	✓	✗	Low ICD10	For any Long Covid feature within 6 months: 1 dose HR 1.01 (0.96-1.05) p=0.83; 2 dose HR 1.00 (0.95-1.06), p=0.98. myalgia (HR 0.78, 95% CI 0.67-0.91), fatigue (HR 0.89, 95% CI 0.81-0.97), and pain (HR 0.90, 95% CI 0.810.99), with potentially additional protection after a second dose of the vaccine against abnormal breathing (HR 0.89, 95% CI 0.81-0.98) and cognitive symptoms (HR 0.87, 95% CI 0.76-0.99)
van der Maaden 2022	Prospective cohort	✓	✓	✗	✓	✓	✗	Low Self-report	Prevalence of at least one of the significantly elevated symptoms in cases was respectively 51.7%, 56.6% and 50.0% in fully vaccinated, partially vaccinated and unvaccinated cases (figure S4). The prevalence in cases of fatigue (31.1%), loss of smell (12.0%), dyspnoea (16.4%), difficulty concentrating (15.0%), and difficulties in busy environment (13.1%) showed the largest absolute difference between cases and both control groups.
Zisis 2022	Retrospectively assembled cohort	✓	✓	✓	✗	✓	✗	Serious (due to high detection bias) ICD10	RR for developing new fatigue is 0.48 at 90 days post COVID, 0.65 at 28 days. At 28 days following COVID-19 diagnosis, the incidence of hypertension was 13.52 per 1000, diabetes was 5.98 per 1000, thyroid disease was 3.80 per 1000, heart disease was 15.41 per 1000, and mental disorders was 14.77 per 1000 in the vaccine cohort. At 90 days following COVID-19 diagnosis, the relative risk of hypertension was 0.33 (95% confidence interval [CI], .26-.42), diabetes was 0.28 (95% CI, .20-.38), heart disease was 0.35 (95% CI, .29-.44), and death was 0.21 (95% CI, .16-.27). Differences in both 28- and 90-day risk between the vaccine and no-vaccine cohorts were observed for each outcome, and there was enough evidence (P,.05) to suggest that these differences were attributed to the vaccine.

COVID vaccination after infection or after Long COVID diagnosis									
Ayoubkhani 2022 (b)	Interrupted time-series.	✓	✓	✓	✓	✓	✓	Low Self-report	Long Covid symptoms of any severity were reported by 6,729 participants (23.7%) at least once during follow-up. long covid of any severity with 1st dose after COVID aOR 0.87 (0.81-0.93); long covid of any severity with 2nd dose after COVID aOR 0.91 (0.86-0.97).
Simon 2021	Retrospectively assembled cohort	✓	✓	✗	✓	✓	✗	Low ICD10	OR of having any Sx of u had 1st dose of vax before COVID Dx 0.22 (0.196-0.245, p<0.005) compared to unvax 12wks after Dx; OR for having >1 Sx 0.113 (0.90-0.143 p<0.005) (STAGE 2: 17,796 (7.4%), were vaccinated within the first twelve weeks after COVID19 diagnosis. unvaccinated patients who received their first COVID-19 vaccination within four weeks of SARS-CoV-2 infection were 5 times less likely (OR 0.2 (0.163-0.220) to report multiple long-COVID symptoms, and those who received their first dose 4-8 weeks after diagnosis were 3 times less likely (OR 0.32 (0.289-0.348), 8-12wks after OR 0.46 (0.426-0.493) to report multiple long-COVID symptoms compared to those who remained unvaccinated.
Tran 2021	Prospective cohort	✓	✓	✓	✓	✓	✗	Low self-report	At 120 days after baseline, the mean (SD) long COVID ST score was 13.0 (9.4) in the vaccination group and 14.8 (9.8) in the control group (mean difference: -1.8, 95% CI -2.5 to 1.0). By that point, 16.6% patients in the vaccination group (n=57) reported a remission of all symptoms from long COVID, compared with 7.5% (n=27) in the control group (HR: 1.97, 95% CI 1.23 to 3.15, E-value 3.35). The impact of long COVID on patients' lives was significantly lower in the vaccination group than in the control group. The mean (SD) long COVID IT score was 24.3 (16.7) in the vaccination group and 27.6 (16.7) in the control group (mean difference: -3.3, 95% CI -6.2 to -0.5). The proportion of patients reporting an unacceptable symptom state (IT score over the PASS was 38.9% in the vaccination group and 46.4% in the control group (risk difference 7.5%, 95% CI -14.4 to -0.5, E-value: 1.67) The effect of vaccination on the severity and impact of long COVID was similar in the subgroup of patients with laboratory confirmed COVID-19. The mean difference in long COVID ST scores was -1.8, 95% CI -3.1 to -0.5, and the mean difference in long COVID IT scores -3.8, 95% CI -8.0 to 0.5.

Wisnivesky 2022	Prospective cohort	✓	✓	✓	✓	✓	✗	Low self-report	Adjusted (t3) and unadjusted (t2) analysis showed no significant differences in a in anosmia, respiratory symptoms, depression, anxiety, PTSD, or quality of life (p >0.05 for all comparisons) between vaccinated and unvaccinated cohorts.
Wynberg 2022	Prospective cohort	✓	✓	✗	✓	✓	✗	Serious (due to additional questionnaire for vaccinated people) self-report	Among 36 matched pairs with PASC, the mean number of symptoms reported each month during 3 months of follow-up were comparable between vaccinated and unvaccinated groups. Odds of full recovery from PASC also did not differ between matched pairs (OR 1.57 [95%CI 0.46–5.84]) within 3 months after the matched time-point.