Systematic review of the prevalence of Long Covid

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Key points: In a systematic review of 130 publications, prevalence estimates of Long Covid (>12 weeks) after SARSCoV2 infection differed according to how persistent symptoms/pathology were identified and measured, and ranged between 0% - 93% (pooled estimate 42.1%, 95% prediction interval: 6.8% to 87.9%).

Key words: Long Covid, Systematic Review, Prevalence, SARSCoV2

Summary (250words)

Background:

Long Covid occurs in those infected with SARSCoV2 whose symptoms persist or develop beyond the acute phase. We conducted a systematic review to determine the prevalence of persistent symptoms, functional disability or pathological changes in adults or children at least 12 weeks post-infection.

Methods: We searched key registers and databases from 1st January 2020 to 2nd November 2021, limited to publications in English and studies with at least 100 participants. Studies where all participants were critically ill were excluded. Long Covid was extracted as prevalence of at least one symptom or pathology, or prevalence of the most common symptom or pathology, at 12 weeks or later. Heterogeneity was quantified in absolute terms and as a proportion of total variation and explored across pre-defined subgroups (PROSPERO ID CRD42020218351).

Results: 120 studies in 130 publications were included. Length of follow-up varied between 12 weeks - 12 months. Few studies had low risk of bias. All complete and subgroup analyses except one had $I^2 \geq 90\%$, with prevalence of persistent symptoms range of 0% - 93% (pooled estimate 42.1%, 95% prediction interval : 6.8% to 87.9%). Studies using routine healthcare records tended to report lower prevalence of persistent symptoms/pathology than self-report. However, studies systematically investigating pathology in all participants at follow up tended to report the highest estimates of all three. Studies of hospitalised cases had generally higher estimates than community-based studies.

Conclusions: The way in which Long Covid is defined and measured affects prevalence estimation. Given the widespread nature of SARSCoV2 infection globally, the burden of chronic illness is likely to be substantial even using the most conservative estimates.

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Introduction

Long Covid is the state of not fully recovering for many weeks, months or years after contracting SARSCoV2 infection. The World Health Organization (WHO) defines Post COVID-19 Condition (Long Covid) as the condition occurring in individuals with a history of probable or confirmed SARSCoV2 infection 3 months after the onset with symptoms that last at least 2 months, cannot be explained by an alternative diagnosis and generally impacts everyday functioning(1). These symptoms may be the same as the acute illness or new symptoms developing weeks or months after the acute phase. Clinical guidelines(2, 3) in the UK and the US consider Long Covid as symptoms ongoing for four weeks or more.

Long Covid can occur across the spectrum of severity of initial infection(4). A wide range of symptoms have been reported with exhaustion, breathlessness, muscle aches, cognitive dysfunction, headache, palpitations, dizziness and chest tightness or heaviness amongst the most common(5, 6). Patients are still struggling to access adequate recognition, support, medical assessment and treatment(7, 8).

Studies assessing the prevalence of Long Covid have produced wide-ranging results due to varying settings, case definitions, population denominators and methods of ascertainment. For the purposes of this review, we define Long Covid as persistent (constant, fluctuating or relapsing) symptoms and/or functional disability and/or the development of new pathology following SARSCoV2 infection for equal or more than 12 weeks from onset of symptoms or from time of diagnosis, in people where the infection is self-described, clinically diagnosed, and/or diagnosed through a laboratory test.

We aimed to systematically collate, appraise and synthesise studies that describe the prevalence of Long Covid and to characterise its typology including patient demographics, symptoms/function disability and pathology.

Methods

Search strategy and selection criteria

Included study designs were cohort, cross-sectional and case control studies with an estimate of the denominator where participants were followed-up/assessed at a minimum of 12 weeks post-infection. Studies were restricted to those published in English between 1st January 2020 and 2nd November 2021, including peer-reviewed articles, online reports, letters, and preprints. Only studies with a sample size of 100 or more participants (at the time of follow-up assessment if longitudinal study) were included (50 or more per subgroup).

Studies of adults and children with a confirmed or probable SARSCoV2 infection in any age group (as defined by each study) were included. The control group in studies that included one is individuals with a confirmed or probable case of SARSCoV2 infection (as defined by the study) who have recovered (duration as defined by study as long as under 12 weeks from symptom onset or confirmation of infection) and have no new pathology attributed to SARSCoV2 infection. Studies that compared population-based prevalence as the control arm were excluded from the control analysis.

Community-based, hospital-based, and mixed studies were all included, apart from studies that only reported outcomes for critically ill patients admitted to intensive care, because this review did not aim to estimate delayed recovery following ICU admission (post-ICU syndrome). Patients who were not hospitalised within two weeks of symptom onset but were subsequently hospitalised were counted as non-hospitalised for the purpose of this review.

A systematic search was conducted using MEDLINE (Ovid), Embase (Ovid), the Cochrane Covid-19 Study register (www.covid-19.cochrane.org; includes Cochrane Central Register of Controlled Trials (CENTRAL), WHO International Clinical Trials Registry Platform (ICTRP), medRxiv, Cochrane CENTRAL, MEDLINE (PubMed), ClinicalTrials.gov, and the WHO Global research on coronavirus disease (COVID-19) database(9). The initial search was run on 13 November 2020 and updated on 2 November 2021,

both by VL. An example of the search strategy applied to Medline is provided in the Supplementary material; it was adapted for other databases as needed.

The screening management software Covidence was used to screen for eligibility. All articles were screened independently by two reviewers at each stage (title, abstract, and full text) with any discrepancies resolved by NAA. This review is reported in line with PRISMA guidelines(10). The protocol was published on the international prospective register of international reviews, PROSPERO (CRD42020218351): https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=218351.

Data analysis

Data for each study was extracted independently by two of four reviewers (MW, DCG, CC, NZ). Any discrepancies were resolved by consensus between the two reviewers for each study or by a third reviewer (NAA). Where multiple publications were identified as originating from the same study, all data was extracted but each data point was only used once in the analysis. In addition to excluding duplicate reports, or duplicate results from the same study, a number of general decisions were made to cope with multiple publications from the same study, either focusing on different lengths of follow-up, different timepoints, or different subgroups. These were guided by principles of (1) avoiding double counting individuals, (2) using the most appropriate outcome, for example, general Long Covid definition, in the broadest group such as the widest population, largest sample, most recent update, (3) unless stratifying by length of follow-up, we took the earliest and/or most complete follow-up as the main result.

The primary outcome is Long Covid, defined as non-recovery from COVID-19, according to symptoms, functional ability or pathology. SARSCoV2 infection can be confirmed, probable or suspected with prolonged symptoms (including but not limited to those explicitly defined as 'new onset'), functional disability or pathology for equal to or more than 12 weeks from onset of symptoms or positive test date (as defined by the study). Secondary outcomes included the demographics of people with Long Covid in relation to each study's denominator, prevalence of

specific persistent or relapsing symptoms, prevalence of functional disability, and the characterisation of post-COVID-19 pathology.

A Long Covid-specific risk of bias tool was developed, based on the Newcastle-Ottawa scale, but tailored to the relevant sources of bias. The domains used are reported in Supplementary Table 3. Risk of bias was particularly assessed in relation to the denominator, how the symptoms were assessed (active or passive elicitation of the symptoms) and hospital stay. Subgroup analysis by risk of bias was performed. In studies where follow-up was measured post-hospital admission or discharge, symptom onset was estimated to have been 7 or 14 days prior to discharge respectively and estimated as 21 days if follow-up was measured from a post-infection negative test.

The prevalence was extracted as cumulative incidence. In extracting the prevalence of persistent symptoms, we used either prevalence of at least one symptom or pathology, or the prevalence of the most common symptom/pathology, depending on the data reported by the study. Data for each symptom was extracted separately in studies that reported on the prevalence of individual symptoms but did not provide an overall estimate of prevalence of Long Covid. We used the symptom with the highest estimate as our best estimate of overall prevalence, though it is likely to be an underestimate of actual prevalence. In studies with controls, the prevalence of the same symptom was used for comparison. Where length of follow-up varied between study participants, we report a measure of average (e.g. mean or median) length of follow-up, or the midpoint of the reported range.

All analysis was conducted in Stata version 17(11). The distribution, prevalence estimates, numerators, denominators, and assessment time points in different populations was qualitatively summarised. We used random-effects meta-analysis on the logit of the proportions to ensure estimates and confidence limits did not go below 0% or over 100%, transforming back to the original scale for presentation.

The heterogeneity was quantified both in absolute terms (range of individual study estimates) and as a proportion of total variation (I^2), and explored across pre-defined subgroups described below. In a variation to our protocol, we present pooled estimates alongside 95% prediction intervals to evaluate and incorporate uncertainty in the analysis, as recently recommended for prevalence studies, where true between-study heterogeneity is expected(12, 13) . Heterogeneity was explored by stratifying on pre-defined subgroups: outcome type (pathology, symptom, functional status), geographical region (China, Europe, North America, Mixed and other), source of sample (community, healthcare workers, outpatients, hospital inpatients), length of follow-up, study design, confirmed diagnosis, and other risk of bias domains. We also stratified by severity score based on the WHO Clinical Progression Scale [supplemental methods].

Potential small study effects such as publication bias were investigated using contour-enhanced funnel plots and Egger's test of funnel plot asymmetry.

Role of funding source

None

Results

Literature search

The searches found 11,518 studies in total. After deduplication and title and abstract screening, 457 full text studies were assessed for eligibility. Hand-searching sourced an additional 9 studies and in total 130 publications were included, 120 of which were discrete studies (Figure 1). 24 studies were conducted in China (including Hong Kong), 66 in Europe, 14 in North America and 16 in various other countries(14-143). Reasons for exclusion are listed in Supplementary Table 1.

Table 1 summarises the included studies' key characteristics and primary outcome for the first follow-up. Study design was reported as described by each study or designated based on study description if not explicitly stated. Most studies were in adults and included patients who were

hospitalised in the acute phase (24 studies with <10% of the sample hospitalised in the acute phase). However, hospitalisation did not always correspond with disease severity, probably due to local diagnostic, treatment, and containment policies. Most studies used PCR testing to identify COVID-19 cases at baseline. However most did not perform COVID-19 diagnostic tests at follow-up and therefore did not consider the impact of reinfection on their results. Out of the included studies, 21 were community-based studies, 17 outpatient settings, 3 social media and 8 healthcare worker-based studies.

Prevalence estimates

The prevalence of Long Covid for studies with more than 12 weeks from infection ranged between 0% to 93% (pooled estimate (PE) 42.1%, 95% prediction interval (PI): 6.8% to 87.9%) (Figure 2). 73 included studies had a follow up of 12 weeks to 5 months, 49 had a follow-up of 6-11 months and 12 had a follow-up of 12 months or more. The range of prevalence in studies with follow-up of 12 months or more was 17% to 81% . Recognising most are not within-study comparisons, longer follow-up times showed higher pooled estimates (Supplementary Figure 1). For all complete and subgroup analyses except one, I^2 was >75%. All subgroup analysis results including pooled estimates and prediction intervals can be found in Supplementary Table 4.

The prevalence range in analyses where less than 10% of the participants were hospitalised was 0% to 67% (n=24). In studies where all participants were hospitalised for acute COVID-19 (n=65), the prevalence range was 5% to 93% (Supplementary Figure 2). 31 analyses had 10% or more of their sample admitted to intensive care unit (ICU) during their acute COVID-19 illness (Supplementary Figure 3). Studies including more hospitalised participants or more patients in ICU tended to report higher prevalence estimates (Supplementary Table 4). Likewise using the WHO CPS, studies including those with ambulatory mild disease (n=38) generally reported lower prevalence estimates than those with hospitalised severe disease who needed oxygen by NIV or high flow (n=27) (Supplementary Figure 4).

The prevalence of not returning to full health/fitness after at least 12 weeks from infection ranged between 8% to 70% (pooled estimate 34.5%, 95% PI: 4.3% to 85.9%, n=10) (Supplementary Figure 5). The prevalence of lower quality of life was 31% (n=2) (Supplementary Figure 6). With regards to individual symptoms, common symptoms reported included fatigue followed by breathing problems, sleep problems, tingling or itching, and joint/muscle aches and pains. With regards to pathology, lung pathology was the most common followed by heart or neurological pathology (Supplementary Figures 7-40).

There were very few studies with a low risk of bias (Supplementary Table 2). Few studies used a sample that was representative of all COVID-19 cases in the population. Approximately half of the studies indicated that symptoms had not been present prior to infection, while the rest did not report ascertaining this. When stratifying by risk of bias, generally lower prevalence estimates were seen in studies with COVID-19 diagnoses confirmed for all participants, studies scored as having a representative sample, studies with an internal or external non-COVID-19 comparator, studies that assessed all participants in the same way, and studies based on community participants (Supplementary Figure 41-42).

Comorbidities, ethnicity and other demographic data were not reported in all studies. Higher prevalence of Long Covid was observed in studies where populations had higher proportions of older people, males, people of non-white ethnicity, diabetes, hypertension, cardiovascular disease, and related comorbidities (Supplementary Figure 43).

Prevalence also varied by study design. In cohort studies the range was 0% to 93% (pooled estimate 41.3%, 95% PI: 6.0% to 88.6%) and in cross sectional studies, the prevalence of Long Covid ranged between 10% and 82% (pooled estimate 45.9%, 95% PI: 11.2% to 85.1%) (Supplementary Figure 50). Prevalence estimates derived from assessing Long Covid as self-reported symptoms and function (n=93) on the whole tended to report higher prevalence than those that used clinical coding in healthcare records (n=7). However, studies that had dedicated pathology follow-up of COVID-19

patients (for example pulmonary function tests or scans with pathology discovered at follow-up) tended to report the highest prevalence (n=20) (Figure 3). Studies that defined Long Covid as at least one of multiple symptom or pathology domains tended to report a slightly higher prevalence than those that assessed a single symptom/pathology domain (Supplementary Figure 44).

Comparison to controls

Twenty-four of the 130 publications included comparison to at least one group of controls (Supplementary Figure 45). The majority of studies used test-negative controls (antigen and antibody, with some matching), but others used untested controls. In community-based studies with controls, the relative risk ranged between 1.0 to 51.4 (pooled relative risk 2.7, 95% PI: 0.2 to 39.4) and the absolute risk difference ranged between -1% to 35% (pooled risk difference 10.1%, 95% PI: -12.7% to 32.8%) (Supplementary Figures 46-47). In community-based samples with controls and assessed as having a low risk of bias (n=4), the pooled relative risk of experiencing symptoms/ill health after COVID-19 was 1.33 compared to controls (95% PI: 1.30. 1.36, I^2=28.1%) (Figure 4) and the absolute risk difference between cases and controls ranged between 1% to 9% (Supplementary Figure 48).

There was no evidence of small-study effects such as publication bias (Supplementary Figure 49).

Discussion

This systematic review which included 120 studies assessing Long Covid symptoms, functional status, or pathology published up to November 2021 demonstrates substantial between-study heterogeneity and wide variation in prevalence estimates. This is due to differences in study designs (cross sectional or longitudinal), sources of study samples (community, outpatient clinic, occupational, hospitalised) and number of assessed symptoms and method of assessment (self-reported individual or collective symptoms, healthcare records, clinical investigations at follow up). The only pooled estimate with low between-study heterogeneity was a 33% (95% PI: 30% to 36%)

excess risk of experiencing prolonged symptoms in COVID-19 cases compared to controls in community-based studies with low risk of bias. Although studies that included controls showed, on the whole, lower net prevalence of Long Covid than studies that did not, the evidence from most of these studies is that COVID-19 is associated with a substantially higher risk of being ill 12 weeks after infection than those not infected.

The UK's Office for National Statistics (ONS) produces population-level Long Covid prevalence estimates where the denominator is the whole population in the specific reported population group, for example, by age, sex, or occupation(144). These fall out of our inclusion criteria. The ONS also produced prevalence estimates based on following up those with confirmed SARSCoV2 infection and we used the most recent estimate within the review's search period(83). This study used multiple approaches including assessing individual symptoms compared to controls and asking participants if they believe they have Long Covid. The latter approach, in the absence of a standardised method of assessment, may realistically be the best way to assess the presence of Long Covid as most people will take the combination of their symptoms, duration, fluctuation, effect on functional ability and change from pre-COVID19 health to shape their responses.

The lack of consensus on the precise definition of Long Covid plays an important part in the wide differences in prevalence assessments, however we found that specifically the way the question is asked and the source of retrieved clinical information at follow-up are likely to play a crucial role. The ONS study is an example of how different methods of assessment at time of follow-up can produce substantially different Long Covid estimates(83). This was illustrated by our analysis where studies that asked about multiple symptoms/domains tended to report higher prevalence estimates than single domain studies. Our analysis indicated higher prevalence estimates with longer follow-up time, though we recognise these were mostly not within-study comparisons. However, in four of ten longitudinal studies, prevalence was higher at the time of the second follow-up. These results could be explained by several factors e.g. by the episodic nature of Long Covid, whereby in the early

stages people may feel they have got over their illness, but with passing time and phases of relapse and remittance, people may be more cautious about reporting they have recovered. People may also be developing new symptoms over time, or perhaps there is more study drop-out by people who feel they have recovered. Overall however, the results indicate that, over time, prevalence does not substantially reduce.

Studies that used questionnaires/surveys to ask participants about their symptoms, health status or quality of life tend to report higher prevalence estimates than those that recorded symptoms from healthcare records' clinical coding. This is manifested in the prevalence from Al-Aly et al(15) studies being on the lower side in our analysis as we only included those with symptoms rather than recorded post-COVID-19 pathology, and such symptoms are expected to be severe enough to prompt seeking medical help and being recorded in medical notes. Studies that had dedicated pathology follow-up and discovery of COVID-19 patients tended to report the highest prevalence. This is possibly because, in addition to pathology that leads to recognisable signs and symptoms, specific medical investigations as part of the research protocol can pick up latent pathology that may not be accompanied by clinical manifestations.

Studies such as Al-Aly et al investigating medical diagnoses in the period following COVID-19, report cardiovascular, neurological, and other system-specific clinical sequelae providing a substantial excess burden in those who survived the acute phase of COVID-19(13). However, there is no agreement yet whether these outcomes are classed as Long Covid. They are generally not recorded by symptom studies and the WHO does not yet specifically include such outcomes within its clinical case definition of Post-COVID-19 Condition (also known as Long Covid) (1). A specific pathology diagnosed after COVID-19 could have been triggered by the infection, but identification as such will depend on the extent of clinical investigations identifying and labelling specific pathology as opposed to differences in the disease manifestation themselves.

Other sources of heterogeneity between studies include study design as some were cross-sectional with assessment taking place at one point in time, whereas others were longitudinal where assessment of COVID-19 status was conducted prior to the development of Long Covid. This assessment itself varied in terms of using PCR or antigen testing or self-reporting of history of acute infection.

Ideally, excess absolute risk in comparison to controls is a good measure to estimate the burden of Long Covid. This is likely dependent on the approach to control selection, whether based on self-report of absence of infection history or lab results that are not accurate enough to ascertain the state of previous infection (antigen or antibody), and timing of assessment given the predominant episodic nature of Long Covid.

Few studies had a low risk of bias, which suggests there is a gap in the evidence base for strong studies of Long Covid prevalence. In terms of causal inference, many studies were liable to potential collider bias, which presented as selection bias caused by restricting analyses to people who were hospitalised, self-selected for PCR or lateral flow tests based on symptoms, or simply volunteered their study participation(145). Similarly, our exploration of potential sources of heterogeneity may be prone to table 2 fallacy in the original studies, where these subgroups do not derive from the focal research question, so should be interpreted descriptively rather than causally(146).

The strengths of our review include comprehensive electronic searching for relevant studies and comprehensive assessment of risk of bias, data extraction and checking with each of these processes being done independently by two authors. We also adapted the Newcastle-Ottawa scale (Supplementary Table 3) for this prevalence systematic review which can be used by other researchers for risk assessment and/or to build high quality study designs. The quality assessment criteria and process were discussed within the study team which includes two authors with lived experience of Long Covid.

Our review was limited by the substantial between study heterogeneity. We used the most common reported symptom estimate for studies and did not combine multiple individual symptoms into one overall estimate of prevalence of Long Covid. The symptom with the highest prevalence differed from study to study, so may not be entirely comparable. We did not include more recent studies that assessed the prevalence of Long Covid following infection with different variants of SARSCoV2 and/or in double or triple vaccinated populations. Recent estimates point to a prevalence of 4-5% of reporting Long Covid at 12 to 16 weeks after first confirmed SARSCoV2 infection depending on variant, with no evidence of difference between variants among those who are triple vaccinated when infected(147). In those double vaccinated, the prevalence of persistent symptoms was around 10% compared to 15% of unvaccinated controls(148).

We extracted estimates of "new-onset" Long Covid/symptoms where possible. Where the proportion is of a symptom like fatigue for example, we picked the one quoted as new-onset fatigue if available, or we downgraded quality because it was not possible to ascertain that the symptom is 'new' following infection. Because Long Covid is a novel condition, prevalence of the condition is considered equivalent to cumulative incidence. When comparing with controls, we estimated cumulative incidence from reported absolute risk, when appropriate. When reporting risk ratio, we included incidence rate ratio and hazard ratios, but did not consider the odds ratio an adequate approximation because of the high potential prevalence in some populations.

We know that significant numbers of people experience ill health following SARSCoV2 infection. Long Covid impacts on society, particularly in places with continuing waves of infection. Through reviewing how different research approaches attempted to quantify the population burden of Long Covid, our findings provide insight into how to get more accurate estimates of prevalence and severity. With quantification of prevalence, we can understand the investment needed for prevention, diagnosis, and treatment as well as the policy decisions needed to resource healthcare and social care services and to mitigate the wider social and economic impact of Long Covid.

Contributors

NAA, DCG, RT, AA, VL, MW conceptualised and designed the study. MW drafted the protocol and search strategy with input from all co-authors. VL conducted the search. All authors contributed to screening the articles. MW, DCG, NZ, RT, CC extracted and quality-assessed the data. NAA, MW, DCG, NZ, CC contributed to the process of checking and verifying the extracted data. DCG planned and conducted the statistical analyses and produced the forest plots. MW, DCG, NZ, NAA interpreted the data and drafted the manuscript. All authors reviewed the final manuscript. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Potential conflicts of interest

The authors declare no competing interests.

Data sharing

All data used in this review is available in the published included studies. Data extractions and analytic code is available from the authors on reasonable request.

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of the UK's Office for National Statistics outputs on the prevalence of Long Covid. AA has lived experience of Long Covid, is a co-founder of the Patient-Led Research Collaborative and has contributed in an advisory capacity to NIH, CDC and WHO. The views and opinions expressed in this review are those of the authors and do not necessarily reflect those of the NIHR, the Department of Health and Social Care or the UK government's official policies.

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Figure legends

Figure 1: Study selection

Figure 2: Forest plot of prevalence of Long Covid in the included studies, with 95% prediction intervals

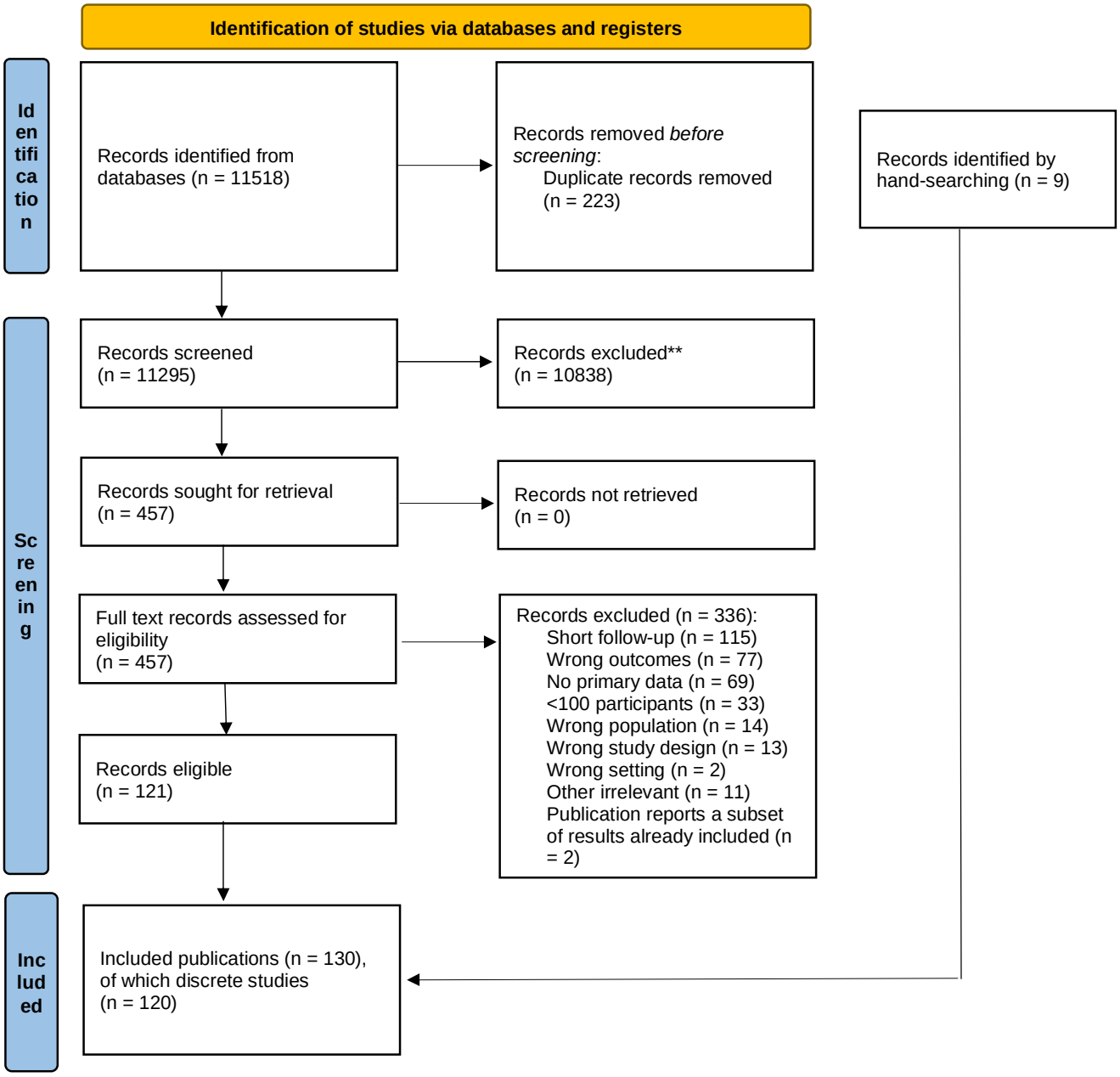
Figure 3: Forest plot of prevalence of Long Covid in the included studies by method of outcome assessment, with 95% prediction intervals

Figure 4: Forest plot of risk of Long Covid in included studies with community-based samples and controls assessed as having low risk of bias, with 95% prediction intervals

Supplementary material

Supplementary appendix

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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Table 1 – Study characteristics and findings of first follow-up

Papers coded variously with the following symbols are different publications from the same study data: **Ω, Ø, ◊, ¥, †, ∞, π**

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
..	Abdelrahman, M et al(1)	Egypt	Prospective cohort	172	-	Hospitalised patients and non-hospitalised	41.8/17.6	65.7	'Tested positive'	12.8% hospitalised (including 4% ICU)	240-300 (range) following 'improvement of acute COVID-19'	61.0%
..	Al-Aly, Z et al(2)	USA	Cohort with controls	60255	4526737 without COVID-19 and not hospitalised	Non-hospitalised	61 (4872)	12.1	'Positive test'	-	126[b]	2.9%
a.	Al-Aly, Z et al (2)	USA	Cohort with controls	11800	11868 hospitalised with seasonal influenza	Hospitalised patients	70 (61-76)	5.8	PCR confirmed	26.3% ICU	150[b]	9.2%
..	Aminian, A et al (3)	USA	Retrospective	2839	-	Hospitalised patients	52.7/20.1	52.3	PCR confirmed	ICU excluded	243[b]	44.2%
..	Arnold, D et al(4)	UK	Prospective cohort	110	-	Hospitalised patients	60 (46-73)	44.0	PCR confirmed or clinico-radiological	Mixed	90[b]	73.6%
..	Augustin, M et al(5)	Germany	Longitudinal prospective cohort	442	-	Non-hospitalised patients	43 (31-54)	52.3	PCR confirmed	97.5% mild	131[b]	27.8%
..	Ayoubkhani, D et al(6)	UK	Observational retrospective matched cohort (with controls)	47780	47780 matched for age, sex	Hospitalised patients	64.5/19.2	45.1	Laboratory confirmed or clinical diagnosis	9.9% ICU	140[e]	21.5
..	Baricich, A et al(7)	Italy	Cross-sectional	204	-	Hospitalised patients	57.9/12.8	40.0	'Confirmed diagnosis'	13% ICU	124.7[e]	32.4%

[1] Different denominators specific to each outcome have been used in cases where data are incomplete or where individual symptoms have different denominators.

[2] a – mean no. of days post-symptom onset or positive test; b - median no. of days post-symptom onset or positive test; c – mean no. of days post-hospital admission; d - median no. of days post-hospital admission; e – mean no. of days post-hospital discharge; f – median no. of days post-hospital discharge; g – mean no. of days post-negative test following infection; h - median no. of days post-negative test following infection

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
8.	Becker, J et al(8)	USA	Cross-sectional	740	-	Hospitalised patients, outpatients and ER attendees	49 (38-59)	63.0	Tested positive or antibody positive	-	228[a]	24.1%
9.	Bellan, M et al(9)	Italy	Prospective cohort	238	-	Hospitalised patients	61 (50-71)	40.3	PCR confirmed bronchial swab, serological testing, or suggestive CT	27.7% did not require oxygen 11.8% ICU	91-121[e]	53.8%
10.	Blanco, J et al(10)	Spain	Prospective	100	-	Hospitalised patients	54.9/10.3	36.0	PCR confirmed	47% severe	104[b]	52.0%
11.	Bliddal, S et al(11)	Denmark	Cohort	129	-	Non-hospitalised patients	44.8 (13.6)	70.0	PCR confirmed	Non-hospitalised	90[a]	40.3%
12.	Blomberg, B et al(12)	Norway	Prospective cohort with controls	312	60 seronegative household contacts	Hospitalised patients and non-hospitalised	46 (30-58)	51.0	'Tested positive'	2% asymptomatic,78% symptomatic in community, 21% hospitalised	152-213 (range) after illness	60.6%
13.	Boscolo-Rizzo, P et al(13)	Italy	Prospective	304	-	Community	47 (n/a)	60.9	PCR confirmed	Mild-to-moderate (home-isolated)	365[a]	53.0%
14.	Carrillo-Garcia, P et al(14)	Spain	Longitudinal observational	165	-	Hospitalised older adult patients	88.5/6.7	69.1	PCR confirmed and suspected cases (clinical, imaging and laboratory results)	-	3m post-hospital discharge	66.2%
15.	Caruso, D et al(15)	Italy	Prospective	118	-	Hospitalised patients with interstitial pneumonia	65/12	53.0	PCR confirmed	Moderate to severe	6m post-hospital admission	77.1%
16.	Caspersen, I et	Norway	Matched cohort	774	72953	Community	25+	58.0	PCR	-	334-365 (range)	16.5%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
	al(16)					(MoBa: population-based pregnancy cohort study)			confirmed		after infection	
.7.	Castro, V et al(17)	USA	Retrospective cohort	5571	30193 hospitalised COVID-19 negative patients	Hospitalised patients	63 (50-76)	47.0	PCR confirmed	13% ICU	91-150 days post-hospital admission	10.9%
.8.	Chai, C et al(18)	China	Multi-centre ambidirectional cohort	546	-***	Hospitalised cancer and non-cancer patients	65 (59-70)	51.0	PCR confirmed	24% severe	370[d]	28.6%
.9.	Cirulli, E et al(19)	USA	Prospective longitudinal	357	-	Community	-	-	PCR confirmed	-	90[a]	14.8%
0.	Clavario, P et al(20)	Italy	Prospective cohort	200	-	Hospitalised patients	58.8 (51.6-66.0)	43.0	PCR confirmed	89% required at least oxygen support	107[f]	80.0%
1.	Cristillo, V et al(21)	Italy	Cohort*	101	-	Hospitalised patients	63.6/12.9	27.7	'Hospitalised for COVID-19'	hospitalized for mild to moderate COVID	6m post-hospital discharge	49.5%
2.	Diaz-Fuentes, G et al(22)	USA	Retrospective cohort	111	-	Hospitalised patients and non-hospitalised	60/13.9	53.1	Positive nasal swab	Mixed	12 weeks post-infection	79.3%
3.	Domenech-Montoliu, S et al(23)	Spain	Prospective cohort	483	-	Community	37.2/17.1	62.1	Laboratory confirmed	11.2% asymptomatic	7m post-infection	53.4%
4.	Erol, N et al(24)	Turkey	Cohort	121	95 randomly selected from non-COVID patients attending the ward	Hospitalised and non-hospitalised children	9.2 (10.9-17.9)	46.2	'Tested positive'	22.3% hospitalised	5.6m post-infection	37.2%
5.	Evans R, et al	UK	Prospective		-	Hospitalised	58.0/12.6	39.0	PCR	Mixed	365[f]	

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
	(PHOSP-COVID study) (25) **(¥)**		longitudinal cohort	804		patients			confirmed or clinician diagnosed			48.8%
26.	Evans, R et al (PHOSP-COVID study)(26) **(¥)**	UK	Prospective longitudinal cohort	1077	-	Hospitalised patients	57.9/13	35.7	Confirmed or clinician-diagnosed	Mixed	176[f]	92.6%
27.	Fernandez-de-Las-Penas, C et al(27) **(∞)**	Spain	Multi-centre observational	1142	-	Hospitalised patients	61/17	47.5	PCR confirmed	7% ICU	210[e]	81.4%
28.	Fernandez-de-Las-Penas, C et al(28) **(∞)**	Spain	Multicentre observational	1142	-	Hospitalised patients	61/17	47.4	PCR confirmed	7% ICU	210[e]	49.6%
29.	Fernandez-de-Las-Penas, C et al(29) **(∞)**	Spain	Multi-centre cohort	1950	-	Hospitalised patients	61/16	46.9	PCR confirmed	6.6% ICU	340[e]	81.2%
30.	Frija-Masson, J et al(30)	France	Retrospective	137	-	Not stated	59 (50-68)	49.0	PCR confirmed	90.5% required respiratory support	3m post-symptom onset	75.2%
31.	Froidure, A et al(31)	Belgium	Single-centre cohort	107	-	Hospitalised patients	60 (53-68)	41.0	PCR confirmed	Severe and critical	103[b]	68.2%
32.	Fu, L et al(32)	China	Cross-sectional	199	-	Hospitalised patients	18+	53.3	Not stated	2.5% ICU	6m post-hospital discharge	10.1%
33.	Gaber, T et al(33)	UK	Cross-sectional	138	-	98% non-hospitalised health care workers	-	92.0	83% PCR confirmed 17% no laboratory confirmation	2% hospitalised	4m post-infection	44.2%
34.	Garcia-Abellan, J et al(34)	Spain	Prospective longitudinal	116	-	Hospitalised patients	64 (54-76)	39.7	PCR confirmed	14% ICU	180[a]	24.1%
35.	Garratt, A et al(35) **(⍰)**	Norway	Cross-sectional survey of a geographical cohort	447	Norwegian general population norms	Community	49.5/15.3	56.0	PCR confirmed	Non-hospitalised	117.5[b]	35.3%
36.	Gonzalez-Hermosillo, J et al(36)	Mexico	Prospective longitudinal	130	-	Hospitalised patients	51/14	34.6	PCR confirmed	Moderate to severe	3m post-hospital discharge	91.5%
37.	Han, X et al(37)	China	Prospective longitudinal	114	-	Hospitalised patients	54/12	30.0	PCR confirmed	Severe	175[a]	62.3%
38.	Havervall, S et	Sweden	Cohort with	323	1072	Health care	43 (33-52)	83.0	Seropositive	mild/mode	122[a]	21.4%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
	al(38)		controls		seronegative	workers				rate (severe excluded)		
9.	Huang, C et al(39) **(Ω)**	China	Ambidirectional cohort	1655	-	Hospitalised patients	57 (47-65)	48.0	Laboratory confirmed	68% required oxygen therapy 4% ICU	186[b]	76.4%
0.	Huang, L et al(40) **(Ω)**	China	Ambidirectional cohort with controls	1227	3383 community dwelling without SARS-CoV-2 infection, 1164 matched pairs	Hospitalised patients	59 (49-67)	47.0	Laboratory confirmed	4% ICU	185[b]	68.0%
1.	Jacobson, K et al(41)	USA	Cohort*	118	-	Hospitalised patients and non-hospitalised	43.3/14.4	46.6	PCR confirmed	18.6% hospitalised 9.3% ICU	119.3[b]	66.9%
2.	Kashif, A et al(42)	Pakistan	Cohort*	242	-	Hospitalised patients and non-hospitalised	18-65	30.6	PCR confirmed	Mild	3m post-hospital discharge or visit	41.7%
3.	Kim, Y et al(43)	S Korea	Cohort*	900	-	Hospitalised patients and non-hospitalised	31 (24-47)	69.7	PCR confirmed	12% moderate or severe	195[b]	65.7%
4.	Lemhofer, C et al(44)	Germany	Cross-sectional	365	-	Community	49.8/16.9	59.2	'Positively tested'	Mild and moderate	93.7% - more than 3months post-infection	61.9%
5.	Li, X et al(45)	China	Cohort	289	-	Hospitalised patients	43.6/17.4	48.8	PCR confirmed	19.4% severe/critical	90-150 (range) post- symptom onset	59.9%
6.	Liao, T et al(46)	China	Cohort*	303	-	Hospitalised healthcare workers	39 (33-48)	80.5	'Infected with COVID-19'	62.7% critical/severe	395[f]	37.3%
7.	Liao, X et al(47)	China	Longitudinal cohort	142	-	Hospitalised patients	47.5 (36-57)	48.8	PCR confirmed	21.1% severe	90[f]	85.9%
8.	Liu, Y-H et al(48)	China	Cross-sectional	1301	466 uninfected	Hospitalised patients,	68 (66-74)	53.3	'Diagnosis of COVID-19'	1.8% ICU	6m post-hospital	28.7%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
					spouses who lived together	elderly					discharge	
49.	Liyanage-Don, A et al(49)	USA	Cohort*	153	-	Hospitalised patients	54.5/16.7	39.9	'Hospitalised for COVID-19'	5.9% ICU	111[b]	64.7%
50.	Logue, J et al(50)	USA	Longitudinal prospective cohort (cross sectional for controls*)	177	21, 'healthy controls recruited via email and flyer advertisements'	Hospitalised and outpatients	48 / 15.2	57.1	laboratory-confirmed	6.2% asymptomatic, 84.7% mild illness, 9.0% moderate or severe disease	169[b]	30.0%
51.	Lucidi, T et al(51)	Italy	Observational retrospective	110	-	Not stated	41.4/12.3	63.6	'COVID-19 positive patients'	-	6.1 +/- 1.1 months post-infection	36.4%
52.	Lui, D et al(52)	China (HK)	Prospective	204	-	Hospitalised patients	55 (44-63)	53.4	PCR confirmed	3.9% severe	89[d]	20.1%
53.	Maestre-Muniz, M et al(53)	Spain	Cross-sectional	543	-	Hospitalised patients and ER attendees	65.1/17.5	49.3	Laboratory confirmed	Mixed	12m post-hospital discharge	56.9%
54.	Martinez, A et al(54)	Switzerland	Retrospective cohort	260	-	Healthcare workers	Mean range 30-39	75.4	'Positive test'	1.2% hospitalised	168[b]	26.5%
55.	Matteudi, T et al(55)	France	Prospective cohort	137	-	Hospitalised patients and outpatients, paediatric	9.3 (n/a)	-	PCR confirmed	27% asymptomatic	180[a]	16.8%
56.	Mazza, M et al(56)	Italy	Prospective cohort	226	-	Hospitalised patients and ER attendees	58.5/12.8	34.1	PCR confirmed	78% hospitalised	90.1[e]	35.8%
57.	Mechi, A et al(57)	Iraq	Single-centre cross-sectional	112	-	Hospitalised patients and non-hospitalised	50.6/13.4	34.0	Laboratory confirmed	46.4% hospitalised	9m after acute infection	82.1%
58.	Mei, Q et al(58) (†)	China	Cohort*	4328	1500, random sample of general population	Hospitalised patients	59 (47-68)	54.1	Met relevant clinical criteria	Not defined	144[f]	14.2%
59.	Mei, Q et al(59)	China	Prospective	3677	-	Hospitalised	59 (47-68)	55.5	PCR	33.7%	144[f]	26.5%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
	(†)		cohort			patients			confirmed	severe, 2.6% critical		
50.	Menges, D et al(60)	Switzerland	Population-based prospective cohort	431	-	Community	47 (33-58)	49.7	PCR confirmed	10.7% asymptomatic, 38.1% severe/very severe	220[b]	24.6%
51.	Milanese, M et al(61)	Italy	Prospective cohort	135	-	Hospitalised patients	59/11	33.0	Not stated	Moderate and severe	182[e]	47.4%
52.	Millet, C et al(62)	USA	Prospective cohort	173	-	Hospitalised patients and outpatients	51.5/n/a	50.6	PCR confirmed	-	12m post-diagnosis	48.0%
53.	Mohiuddin Chowdhury, A et al(63)	Bangladesh	Prospective multi-centre cross-sectional	313	-	Hospitalised patients and outpatients	37.7/13.7	19.8	PCR confirmed	Not critically ill (ICU/HDU)	140[g]	21.4%
54.	Munblit, D et al(64)	Russia	Longitudinal cohort	2649	-	Hospitalised patients	56 (46-66)	51.1	PCR confirmed and clinically diagnosed	2.6% severe	218[f]	57.9%
55.	Nabahati, M et al(65)	Iran	Prospective cross-sectional	173	-	Hospitalised patients	53.6/13.7	67.1	PCR confirmed	54% severe	90[e]	52.0%
56.	Nehme, M, et al(66)	Switzerland	Prospective cohort	410	-	Outpatients	42.7/12.9	67.1	PCR confirmed	Mild and moderate	7-9m post-diagnosis	39.0%
57.	Nguyen, N et al(67)	France	Cohort*	125	-	Hospitalised	36 (27-48))	55.0	PCR confirmed	Non-severe	210[a]	24.0%
58.	Nunez-Fernandez, M et al(68)	Spain	Prospective cohort	200	-	Hospitalised patients	62 (n/a)	40.5	PCR confirmed	15.5% ICU	84[e]	29.0%
59.	O'Keefe, J et al(69)	USA	Cross-sectional	198	-	Outpatients	45/14	74.2	PCR confirmed	29.7% moderate, 1.1% severe	119[b]	39.9%
70.	Office for National Statistics(70)	UK	Prospective cohort w	21374	-	Community	2+	52.3	PCR confirmed	-	12 weeks post-infection	11.7%
71.	Ong, S et al(71)	Singapore	Prospective longitudinal multi-centre cohort	175	-	Hospitalised patients	44 (33-56)	24.6	PCR confirmed	30.1% severe	90[e]	7.4%
72.	Orru, G et al(72)	Italy	retrospective	152	-	Community via social	-	-	Self-report	-	At least 3m post-infection	74.3%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
						media						
73.	Osmanov, I et al(73)	Russia	Prospective cohort	518	-	Hospitalised children	10.4 (3.0-15.2)	52.1	PCR confirmed	2.7% severe (NIV/IV or PICU)	256[f]	24.3%
74.	Peghin M, et al(74)	Italy	Bidirectional prospective cohort	599	-	Hospitalised patients and outpatients	53/15.8	53.4	NAAT for confirmed cases; laboratory, imaging or serology for suspected cases	Mixed	191[b]	40.2%
75.	Peluso, M et al(75)	USA	Cohort	143	-	Hospitalised patients and non-hospitalised	48 (37-57)	44.0	RNA-confirmed	Mixed	4m post-test or first symptoms	62.2%
76.	Petersen, M et al(76)	Faroe Islands	Longitudinal	180	-	96% non-hospitalised patients	39.9/19.4	54.4	PCR confirmed	4.4% asymptomatic	125[a]	52.8%
77.	Qin, W et al(77)	China	Prospective cohort	647	-	Hospitalised patients	58/15	56.0	PCR confirmed	38% severe	3m post-hospital discharge	13.4%
78.	Qu, G et al(78)	China	Multicentre follow-up	540	-	Hospitalised patients	47.5 (37-57)	50.0	PCR confirmed	9.4% severe	3m post-hospital discharge	32.6%
79.	Radtke, T et al(79)	Switzerland	Longitudinal cohort	109	1246 seronegative	Community, children and adolescents	6-16	53.0	Antibody positive	No hospitalisation	84[a]	3.7%
80.	Rass, V et al(80)	Austria	Prospective observational cohort	135	-	Hospitalised and outpatients	56 (48-68)	39.0	PCR confirmed	23% severe (ICU), 53% moderate (hospitalised)	90[a]	60.7%
81.	Riestra-Ayora, J et al(81)	Spain	Prospective case–control	195	125 healthcare workers with negative PCR	Hospitalised and non-hospitalised healthcare workers	41.6/n/a	80.0	PCR confirmed	4.4% hospitalised	6m post-positive test	26.7%
82.	Righi, E et al(82)	Italy	Prospective cohort	421	-	Hospitalised patients and	56 (45-66)	45.1	PCR confirmed	52% hospitalise	84[a]	19.7%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
						outpatients				d, 20% ICU		
83.	Roessler, M et al(83) *Split cohort (Adults)*	Germany	Matched cohort	145184	-	Community	-	60.2	'Laboratory confirmed'	5.8% hospitalised, 2.1% intensive care or ventilation	>90[a]	9.2%
83a.	Roessler, M et al(83) *Split cohort (Children)*	Germany	Matched cohort	11950	-	Community, children	-	48.1	Laboratory confirmed	1% hospitalised, 0.4% ICU	>90[a]	6.1%
84.	Romero-Duarte, A et al(84)	Spain	Retrospective longitudinal observational follow-up	797	-	Hospitalised patients	63/14.4	46.3	PCR confirmed	10.8% ICU	6m post-hospital discharge	63.9%
85.	Sathyamurthy, P et al(85)	India	Single-centre prospective cohort	279	-	Hospitalised older adult patients	71.0/5.6	36.2	PCR confirmed	41.6% severe to critical	90[e]	23.7%
86.	Seeβle, J et al(86)	Germany	Prospective cohort	146	-	Hospitalised and outpatients	57 (50-63)	57.0	PCR confirmed	15.6% mild, 55.2% moderate, 25.0% severe, 4.2% critical	140-154 (range) following symptom onset	73.3%
87.	Shang, Y et al(87)	China	Cohort	796	-	Hospitalised patients	62 (51-69)	49.2	PCR confirmed	90.8% severe, 9.2% critical	6m post-hospital discharge	55.4%
88.	Sibila, O et al(88)	Spain	Prospective cohort	172	-	Hospitalised patients	56.1/19.8	43.0	Not stated	moderate and severe 43% ICU	101.5[e]	57.0%
89.	Sigfrid, L et al(89)	UK	Prospective cohort	327	-	Hospitalised patients	59.7 (51.7-67.7)	41.3	PCR confirmed or 'clinically diagnosed highly suspected'	20.8% no O2, 36.1% supplemental O2, 15.0% non-invasive O2, 28.1% mechanical ventilation	222[b]	93.3%
90.	Simani, L et al(90)	Iran	Cohort*	120	-	Hospitalised	54.6/16.9	33.3	Spiral chest	7.5% ICU	183[e]	10.0%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
						patients			CT scan or PCR confirmed			
91.	Skala, M et al(91)	Czech Republic	Prospective cohort	102	-	Hospitalised patients and outpatients	46.7/ n/a	53.9	PCR confirmed	14.7% hospitalised	3m after testing positive	54.9%
92.	Skjorten, I et al(92)	Norway	Multi-centre prospective cohort	126	-	Hospitalised patients	56.2/12.7	38.5	'Discharge diagnosis of COVID-19'	20% ICU	104[f]	46.8%
93.	Sonnweber, T et al(93)	Austria	Prospective observational	145	-	Hospitalised and outpatients	57/14	43.0	PCR confirmed	22% ICU	103[a]	54.9%
94.	Soraas, A et al(94) **(π)**	Norway	Cohort	651	5712 SARS-CoV-2– negative + 3342 randomly selected untested	Community	48.6/13.6	57	PCR confirmed	Non-hospitalised, mild	258[a]	51.9%
95.	Soraas, A et al(95) **(π)**	Norway	Prospective cohort	672	6006 SARS-COV2-negative patients	Community	48.5/13.5	56.8	PCR confirmed	Non-hospitalised	126[a]	56.2%
96.	Stavem, K et al(96) (□)	Norway	Cross-sectional	451	-	Community survey	49.7/15.2	56.0	PCR confirmed	-	117[b]	41.0%
97.	Stavem, K et al(97) (□)	Norway	Cross-sectional mixed-mode	458	-	Community	49.5/15.3	56.0	PCR confirmed	-	117.5[b]	46.0%
98.	Stephenson, T et al(98)	UK	Matched cohort	3065	3739 who tested negative	Community, adolescents	11-17	63.5	PCR confirmed	35.4% symptomatic	104[b]	66.5%
99.	Sudre, C et al(99)	UK, USA and Sweden	Prospective observational cohort	4182	4,182, matched PCR negative***	Community	46.0/15.8	57.0	PCR confirmed	13.9% visited hospital	84[a]	2.6%
100.	Sykes, D et al(100)	UK	Cohort*	127	-	Hospitalised patients	59.6/14	34.3	PCR confirmed	87% required oxygen and/or respiratory support, 20% ICU	113[f]	59.1%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
.01.	Taboada, M et al(101)	Spain	Cross-sectional observational	183	-	Hospitalised patients	6.9/14.1	40.5	PCR confirmed	18.2% ICU	6 months post-hospitalisation	47.5%
.02.	Taquet, M et al(102) (◊)	Primarily USA	Retrospective cohort with matching	236,379	105,579 diagnosed with flu, 236,038 with any other RTI including flu	healthcare organisations including hospitals, primary care, and specialist providers	46/19.7	55.6	"confirmed diagnosis"	Mixed	180[a]	12.8%
.03.	Taquet,. M et al(103) (◊)	USA	Retrospective cohort	273618	106,578 matched cohort with influenza and without a diagnosis of COVID-19 or positive test	Hospitalised patients and non-hospitalised	46.3/19.8	55.6	'Confirmed diagnosis', ICD-10 code	Mixed	90[a]	36.5%
.04.	Tarsitani, L et al(104)	Italy	Cohort follow-up	115	-	Hospitalised patients	57 (48-66)	46.0	'Confirmed COVID-19'	23% ICU	3m post-hospital discharge	29.6%
.05.	Tawfik, H et al(105)	Egypt	Retrospective cohort	120	-	Hospitalised and non-hospitalised healthcare workers	33.7/7.29	58.0	PCR confirmed	28.3% moderate, 10.0% severe	At least 3m post-positive test	33.3%
.06.	Taylor, R et al(106)	UK	Cohort*	545	-	Hospitalised patients	58.6/15.3	38.2	'Presumed and confirmed'	-	16weeks post-hospital discharge	47.9%
.07.	Tempany, M et al(107)	Republic of Ireland	Cross-sectional*	217	-	Healthcare workers	20-69	80.0	PCR confirmed or antibody positive	-	At least 12 weeks post- +ve test	53.5%
.08.	The Writing Committee for the COMEBAC Study Group(108)	France	Prospective uncontrolled cohort	478	-	Hospitalised patients	60.9/16.1	42.1	PCR confirmed or by CT scan	29.7% ICU, remainder hospitalised	113[f]	51.0%
.09.	Tholin, B et al(109) (□)	Norway	Multicentre prospective cohort	683	-	Hospitalised patients and non-hospitalised	52.9/15.5	51.0	PCR confirmed, or discharge diagnosis of 'confirmed or	Mixed	3m after discharge (hospitalised), 4m post-symptom onset	1.8%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
									unconfirmed COVID-19'		(non-hospitalised)	
.10.	Tleyjeh, I et al(110)	Saudi Arabia	Prospective cohort	222	-	Hospitalised patients	52.5/14.0	23.0	PCR confirmed	Mixed 30.2% ICU	122[f]	56.3%
.11.	Todt, B et al(111)	Brazil	Single-centre cohort	239	-	Hospitalised patients	53.6/14.9	40.2	PCR confirmed	69.7% severe	3m post-hospital discharge	40.2%
.12.	Tohamy, D et al(112)	Egypt	Retrospective comparative study with controls	100	100 randomly recruited from hospital registration system without COVID-19	Hospitalised and outpatients	55.5/6.2	43.0	PCR confirmed	25% moderate, 45% severe	3m post-hospital discharge	5.0%
.13.	Townsend, L et al(113)	Republic of Ireland	Cross-sectional*	128	-	Hospitalised and non-hospitalised	49.5/15	53.9	PCR confirmed	55.5% hospitalised	72[f]	57.8%
.14.	Trunfio, M et al(114)	Italy	Cross-sectional	168	-	Hospitalised patients and outpatients	56 (43-69)	42.0	PCR confirmed	63.7% hospitalised	194[b]	24.4%
.15.	Ursini, F et al(115)	Italy	Cross-sectional	616	-	Community via social media	45/12	77.4	Positive nasopharyngeal swab	10.7% hospitalised, 1.6% ICU	6 ± 3m post-positive test	43.8%
.16.	Venturelli, S et al(116)	Italy	Cohort*	767	-	Emergency Department and hospitalised patients	63/13.6	32.9	PCR confirmed	88.4% admitted 8.6% ICU	105[b]	51.4%
.17.	Walle-Hansen, M et al(117)	Norway	Cohort	106	-	Hospitalised older adult patients	74.3/n/a	43.0	PCR confirmed	26% severe	186[f]	53.8%
.18.	Weng, J et al(118)	China	Retrospective	117	-	Hospitalised patients	-	44.4	PCR confirmed	28.2% severely ill	89.5[e]	44.4%
.19.	Whitaker, M et al(119)	UK	Random community-based survey (REACT-2)	76,155	-	Community	-18+	57.3	Self-reported	0.8% admitted to hospital	84[a]	37.7%
.20.	Xiong, L et al(120)	China	Ambidirectional cohort	162	-	Hospitalised healthcare workers	36 (31-43)	77.0	'Infected with COVID-19'	100% severe, 5% ICU	153[f]	70.4%

	Author	Country	Study design (as described by study, * if not stated)	Denominator[1]	Controls N, type	Setting	Age (years) Mean/SD Median (IQR)	% female	COVID-19 diagnostic method	Severity	Follow-up time[2] Days	Finding: % with at least one symptom or pathology remaining at follow-up
.21.	Xiong, Q et al(121)	China	Longitudinal with controls	538	184, volunteers	Hospitalised patients	52 (41-62)	54.5	"confirmed"	5% critical, 33.5% severe	97[f]	49.6%
.22.	Yan, B et al(122)	China	Prospective observational	125	-	Mobile cabin hospital, adult males	35 (30-49)	0.0	'Diagnosed with COVID-19'	asymptomatic / mild symptoms	84[e]	0.0%
.23.	Yan, X et al(123)	China	Cohort	119	-	Hospitalised patients	53.0/12.2	59.0	PCR confirmed	24% severe	365[e]	39.5%
.24.	Yin, X et al(124)	China	Retrospective analysis	337	-	Hospitalised patients	53.5/14.8	49.5	PCR confirmed	12.8% severe, 3.6% ICU	203[a]	55.8%
.25.	Zayet, S et al(125)	France	Retrospective cohort	354	-	Hospitalised patients and outpatients	49.6/18.7	63.0	PCR confirmed	34.2% hospitalised, 5% ICU	289[a]	35.9%
.26.	Zhan, Y et al(126)	China	Prospective cohort	121	-	Hospitalised patients	49 (40-57)	58.7	PCR confirmed	15.7% severe	348[b]	29.8%
.27.	Zhang, D et al(127)	China	Retrospective comparative	122	-	Hospitalised patients	51 (31.8-61.0)	50.3	PCR confirmed	mild cases excluded, only patients with pulmonary sequelae at discharge included	92[f]	54.9%
.28.	Zhang, J et al(128)	China	Cohort*	245	-	Hospitalised patients	43 (33-54)	43.8	Nucleic acid testing	9.3% severe/critical	90[e]	72.7%
.29.	Zhang, X et al(129)	China	Retrospective multi-centre cohort	2433	-	Hospitalised patients	60 (49-68)	50.5	Laboratory confirmed	27.9% severe	364[f]	45.0%
.30.	Zhou, M et al(130)	China	Prospective cohort with controls	164	42 healthy controls – negative nucleic acid and antibody tests	Hospitalised patients	-	56.9	PCR and antibody test	54.6% severe	129[b] (severe cases) 125[b] (mild)	69.5%

***Relevant outcome data not available for controls

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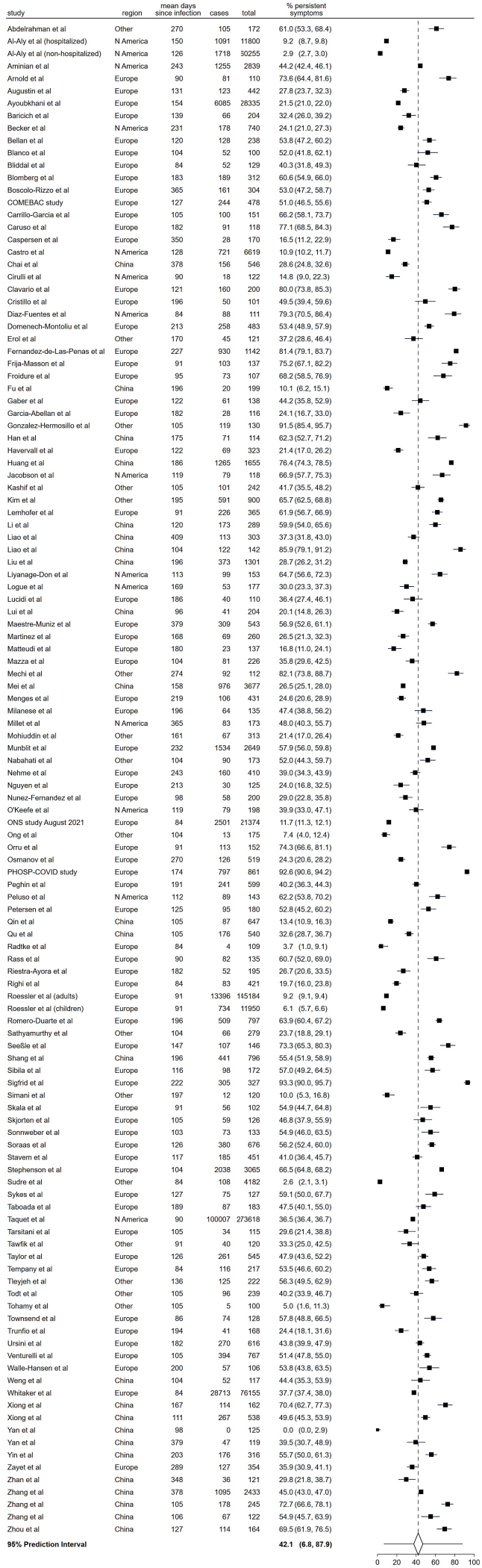
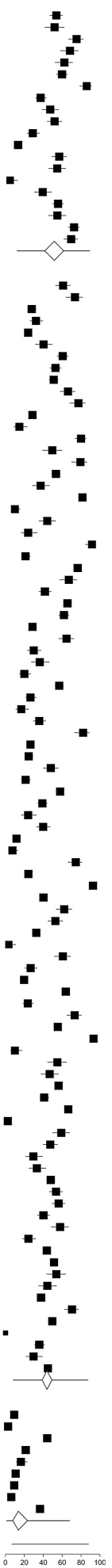

study
region
mean days since infection
cases
total
% persistent symptoms
Abdelrahman et al Other 270 105 172 61.0 (53.3, 68.4)
Al-Aly et al (hospitalized) N America 150 1091 11800 9.2 (8.7, 9.8)
Al-Aly et al (non-hospitalized) N America 126 1718 30255 2.9 (2.7, 3.0)
Aminian et al N America 243 1255 2839 44.2 (42.4, 46.1)
Arnold et al Europe 90 81 110 73.6 (64.4, 81.6)
Augustin et al Europe 131 123 442 27.8 (23.7, 32.3)
Ayoubkhani et al Europe 154 6085 28335 21.5 (21.0, 22.0)
Baricich et al Europe 139 66 204 32.4 (26.0, 39.2)
Becker et al N America 231 178 740 24.1 (21.0, 27.3)
Bellan et al Europe 120 128 238 53.8 (47.2, 60.2)
Blanco et al Europe 104 52 100 52.0 (41.8, 62.1)
Blíddal et al Europe 84 52 129 40.3 (31.8, 49.3)
Blomberg et al Europe 183 189 312 60.6 (54.9, 66.0)
Boscolo-Rizzo et al Europe 365 161 304 53.0 (47.2, 58.7)
COMEBAC study Europe 127 244 478 51.0 (46.5, 55.6)
Carrillo-Garcia et al Europe 105 100 151 66.2 (58.1, 73.7)
Caruso et al Europe 182 91 118 77.1 (68.5, 84.3)
Caspersen et al Europe 350 28 170 16.5 (11.2, 22.9)
Castro et al N America 128 721 6619 10.9 (10.2, 11.7)
Chai et al China 378 156 546 28.6 (24.8, 32.6)
Cirulli et al N America 90 18 122 14.8 (9.0, 22.3)
Clavario et al Europe 121 160 200 80.0 (73.8, 85.3)
Cristillo et al Europe 196 50 101 49.5 (39.4, 59.6)
Diaz-Fuentes et al N America 84 88 111 79.3 (70.5, 86.4)
Domenech-Montoliu et al Europe 213 258 483 53.4 (48.9, 57.9)
Erol et al Other 170 45 121 37.2 (28.6, 46.4)
Fernandez-de-Las-Penas et al Europe 227 930 1142 81.4 (79.1, 83.7)
Frija-Masson et al Europe 91 103 137 75.2 (67.1, 82.2)
Froidure et al Europe 95 73 107 68.2 (58.5, 76.9)
Fu et al China 196 20 199 10.1 (6.2, 15.1)
Gaber et al Europe 122 61 138 44.2 (35.8, 52.9)
Garcia-Abellan et al Europe 182 28 116 24.1 (16.7, 33.0)
Gonzalez-Hermosillo et al Other 105 119 130 91.5 (85.4, 95.7)
Han et al China 175 71 114 62.3 (52.7, 71.2)
Havervall et al Europe 122 69 323 21.4 (17.0, 26.2)
Huang et al China 186 1265 1655 76.4 (74.3, 78.5)
Jacobson et al N America 119 79 118 66.9 (57.7, 75.3)
Kashif et al Other 105 101 242 41.7 (35.5, 48.2)
Kim et al Other 195 591 900 65.7 (62.5, 68.8)
Lemhofer et al Europe 91 226 365 61.9 (56.7, 66.9)
Li et al China 120 173 289 59.9 (54.0, 65.6)
Liao et al China 409 113 303 37.3 (31.8, 43.0)
Liao et al China 104 122 142 85.9 (79.1, 91.2)
Liu et al China 196 373 1301 28.7 (26.2, 31.2)
Liyanage-Don et al N America 113 99 153 64.7 (56.6, 72.3)
Logue et al N America 169 53 177 30.0 (23.3, 37.3)
Lucidi et al Europe 186 40 110 36.4 (27.4, 46.1)
Lui et al China 96 41 204 20.1 (14.8, 26.3)
Maestre-Muniz et al Europe 379 309 543 56.9 (52.6, 61.1)
Martínez et al Europe 168 69 260 26.5 (21.3, 32.3)
Matteudi et al Europe 180 23 137 16.8 (11.0, 24.1)
Mazza et al Europe 104 81 226 35.8 (29.6, 42.5)
Mechi et al Other 274 92 112 82.1 (73.8, 88.7)
Mei et al China 158 976 3677 26.5 (25.1, 28.0)
Menges et al Europe 219 106 431 24.6 (20.6, 28.9)
Milanese et al Europe 196 64 135 47.4 (38.8, 56.2)
Millet et al N America 365 83 173 48.0 (40.3, 55.7)
Mohiuddin et al Other 161 67 313 21.4 (17.0, 26.4)
Munblit et al Europe 232 1534 2649 57.9 (56.0, 59.8)
Nabahati et al Other 104 90 173 52.0 (44.3, 59.7)
Nehme et al Europe 243 160 410 39.0 (34.3, 43.9)
Nguyen et al Europe 213 30 125 24.0 (16.8, 32.5)
Nunez-Fernandez et al Europe 98 58 200 29.0 (22.8, 35.8)
O'Keefe et al N America 119 79 198 39.9 (33.0, 47.1)
ONS study August 2021 Europe 84 2501 21374 11.7 (11.3, 12.1)
Ong et al Other 104 13 175 7.4 (4.0, 12.4)
Orru et al Europe 91 113 152 74.3 (66.6, 81.1)
Osmanov et al Europe 270 126 519 24.3 (20.6, 28.2)
PHOSP-COVID study Europe 174 797 861 92.6 (90.6, 94.2)
Peghin et al Europe 191 241 599 40.2 (36.3, 44.3)
Peluso et al N America 112 89 143 62.2 (53.8, 70.2)
Petersen et al Europe 125 95 180 52.8 (45.2, 60.2)
Qin et al China 105 87 647 13.4 (10.9, 16.3)
Qu et al China 105 176 540 32.6 (28.7, 36.7)
Radtke et al Europe 84 4 109 3.7 (1.0, 9.1)
Rass et al Europe 90 82 135 60.7 (52.0, 69.0)
Riestra-Ayora et al Europe 182 52 195 26.7 (20.6, 33.5)
Righi et al Europe 84 83 421 19.7 (16.0, 23.8)
Roessler et al (adults) Europe 91 13396 145184 9.2 (9.1, 9.4)
Roessler et al (children) Europe 91 734 11950 6.1 (5.7, 6.6)
Romero-Duarte et al Europe 196 509 797 63.9 (60.4, 67.2)
Sathyamurthy et al Other 104 66 279 23.7 (18.8, 29.1)
Seeßle et al Europe 147 107 146 73.3 (65.3, 80.3)
Shang et al China 196 441 796 55.4 (51.9, 58.9)
Sibila et al Europe 116 98 172 57.0 (49.2, 64.5)
Sigfrid et al Europe 222 305 327 93.3 (90.0, 95.7)
Simani et al Other 197 12 120 10.0 (5.3, 16.8)
Skala et al Europe 91 56 102 54.9 (44.7, 64.8)
Skjorten et al Europe 105 59 126 46.8 (37.9, 55.9)
Sonnweber et al Europe 103 73 133 54.9 (46.0, 63.5)
Soraas et al Europe 126 380 676 56.2 (52.4, 60.0)
Stavem et al Europe 117 185 451 41.0 (36.4, 45.7)
Stephenson et al Europe 104 2038 3065 66.5 (64.8, 68.2)
Sudre et al Other 84 108 4182 2.6 (2.1, 3.1)
Sykes et al Europe 127 75 127 59.1 (50.0, 67.7)
Taboada et al Europe 189 87 183 47.5 (40.1, 55.0)
Taquet et al N America 90 100007 273618 36.5 (36.4, 36.7)
Tarsitani et al Europe 105 34 115 29.6 (21.4, 38.8)
Tawfik et al Other 91 40 120 33.3 (25.0, 42.5)
Taylor et al Europe 126 261 545 47.9 (43.6, 52.2)
Tempany et al Europe 84 116 217 53.5 (46.6, 60.2)
Tleyjeh et al Other 136 125 222 56.3 (49.5, 62.9)
Todt et al Other 105 96 239 40.2 (33.9, 46.7)
Tohamy et al Other 105 5 100 5.0 (1.6, 11.3)
Townsend et al Europe 86 74 128 57.8 (48.8, 66.5)
Trunfio et al Europe 194 41 168 24.4 (18.1, 31.6)
Ursini et al Europe 182 270 616 43.8 (39.9, 47.9)
Venturelli et al Europe 105 394 767 51.4 (47.8, 55.0)
Walle-Hansen et al Europe 200 57 106 53.8 (43.8, 63.5)
Weng et al China 104 52 117 44.4 (35.3, 53.9)
Whitaker et al Europe 84 28713 76155 37.7 (37.4, 38.0)
Xiong et al China 167 114 162 70.4 (62.7, 77.3)
Xiong et al China 111 267 538 49.6 (45.3, 53.9)
Yan et al China 98 0 125 0.0 (0.0, 2.9)
Yan et al China 379 47 119 39.5 (30.7, 48.9)
Yin et al China 203 176 316 55.7 (50.0, 61.3)
Zayet et al Europe 289 127 354 35.9 (30.9, 41.1)
Zhan et al China 348 36 121 29.8 (21.8, 38.7)
Zhang et al China 378 1095 2433 45.0 (43.0, 47.0)
Zhang et al China 105 178 245 72.7 (66.6, 78.1)
Zhang et al China 106 67 122 54.9 (45.7, 63.9)
Zhou et al China 127 114 164 69.5 (61.9, 76.5)
95% Prediction Interval 42.1 (6.8, 87.9)
0
20
40
60
80
100

study	Dominant source of participants	Breadth of coverage	Mean days since infection	Cases	Total	% persistent symptoms	
pathology discovered at follow-up							
Bellan et al	hospitalised	multiple domains	120	128	238	53.8	(47.2, 60.2)
Blanco et al	hospitalised	single domain	104	52	100	52.0	(41.8, 62.1)
Frija-Masson et al	hospitalised	single domain	91	103	137	75.2	(67.1, 82.2)
Froidure et al	hospitalised	single domain	95	73	107	68.2	(58.5, 76.9)
Han et al	hospitalised	single domain	175	71	114	62.3	(52.7, 71.2)
Li et al	.	single domain	120	173	289	59.9	(54.0, 65.6)
Liao et al	hospitalised	single domain	104	122	142	85.9	(79.1, 91.2)
Liao et al	healthcare workers	single domain	409	113	303	37.3	(31.8, 43.0)
Milanese et al	hospitalised	multiple domains	196	64	135	47.4	(38.8, 56.2)
Nabahati et al	hospitalised	single domain	104	90	173	52.0	(44.3, 59.7)
Nunez-Fernandez et al	hospitalised	single domain	98	58	200	29.0	(22.8, 35.8)
Qin et al	hospitalised	single domain	105	87	647	13.4	(10.9, 16.3)
Sibila et al	hospitalised	single domain	116	98	172	57.0	(49.2, 64.5)
Sonnweber et al	community	single domain	103	73	133	54.9	(46.0, 63.5)
Tohamy et al	outpatients	single domain	105	5	100	5.0	(1.6, 11.3)
Yan et al	hospitalised	single domain	379	47	119	39.5	(30.7, 48.9)
Yin et al	hospitalised	single domain	203	176	316	55.7	(50.0, 61.3)
Zhang et al	hospitalised	single domain	106	67	122	54.9	(45.7, 63.9)
Zhang et al	hospitalised	single domain	105	178	245	72.7	(66.6, 78.1)
Zhou et al	hospitalised	single domain	127	114	164	69.5	(61.9, 76.5)
						51.7	**(12.3, 89.1)**
symptoms & function discovered at follow-up							
Abdelrahman et al	outpatients	multiple domains	270	105	172	61.0	(53.3, 68.4)
Arnold et al	hospitalised	multiple domains	90	81	110	73.6	(64.4, 81.6)
Augustin et al	community	multiple domains	131	123	442	27.8	(23.7, 32.3)
Baricich et al	hospitalised	single domain	139	66	204	32.4	(26.0, 39.2)
Becker et al	outpatients	single domain	231	178	740	24.1	(21.0, 27.3)
Bliddal et al	community	multiple domains	84	52	129	40.3	(31.8, 49.3)
Blomberg et al	outpatients	multiple domains	183	189	312	60.6	(54.9, 66.0)
Boscolo-Rizzo et al	community	multiple domains	365	161	304	53.0	(47.2, 58.7)
COMEBAC study	hospitalised	multiple domains	127	244	478	51.0	(46.5, 55.6)
Carrillo-Garcia et al	hospitalised	multiple domains	105	100	151	66.2	(58.1, 73.7)
Caruso et al	hospitalised	multiple domains	182	91	118	77.1	(68.5, 84.3)
Chai et al	hospitalised	multiple domains	378	156	546	28.6	(24.8, 32.6)
Cirulli et al	community	multiple domains	90	18	122	14.8	(9.0, 22.3)
Clavario et al	hospitalised	single domain	121	160	200	80.0	(73.8, 85.3)
Cristillo et al	hospitalised	single domain	196	50	101	49.5	(39.4, 59.6)
Diaz-Fuentes et al	hospitalised	multiple domains	84	88	111	79.3	(70.5, 86.4)
Domenech-Montoliu et al	community	multiple domains	213	258	483	53.4	(48.9, 57.9)
Erol et al	hospitalised	multiple domains	170	45	121	37.2	(28.6, 46.4)
Fernandez-de-Las-Penas et al	hospitalised	single domain	227	930	1142	81.4	(79.1, 83.7)
Fu et al	hospitalised	single domain	196	20	199	10.1	(6.2, 15.1)
Gaber et al	healthcare workers	multiple domains	122	61	138	44.2	(35.8, 52.9)
Garcia-Abellan et al	hospitalised	multiple domains	182	28	116	24.1	(16.7, 33.0)
Gonzalez-Hermosillo et al	hospitalised	multiple domains	105	119	130	91.5	(85.4, 95.7)
Havervall et al	healthcare workers	multiple domains	122	69	323	21.4	(17.0, 26.2)
Huang et al	hospitalised	multiple domains	186	1265	1655	76.4	(74.3, 78.5)
Jacobson et al	outpatients	multiple domains	119	79	118	66.9	(57.7, 75.3)
Kashif et al	.	single domain	105	101	242	41.7	(35.5, 48.2)
Kim et al	outpatients	multiple domains	195	591	900	65.7	(62.5, 68.8)
Lemhofer et al	community	multiple domains	91	226	365	61.9	(56.7, 66.9)
Liu et al	hospitalised	single domain	196	373	1301	28.7	(26.2, 31.2)
Liyanage-Don et al	hospitalised	multiple domains	113	99	153	64.7	(56.6, 72.3)
Logue et al	outpatients	multiple domains	169	53	177	30.0	(23.3, 37.3)
Lucidi et al	.	single domain	186	40	110	36.4	(27.4, 46.1)
Lui et al	hospitalised	multiple domains	96	41	204	20.1	(14.8, 26.3)
Maestre-Muniz et al	hospitalised	multiple domains	379	309	543	56.9	(52.6, 61.1)
Martinez et al	healthcare workers	multiple domains	168	69	260	26.5	(21.3, 32.3)
Matteudi et al	outpatients	multiple domains	180	23	137	16.8	(11.0, 24.1)
Mazza et al	hospitalised	single domain	104	81	226	35.8	(29.6, 42.5)
Mechi et al	outpatients	multiple domains	274	92	112	82.1	(73.8, 88.7)
Mei et al	hospitalised	multiple domains	158	976	3677	26.5	(25.1, 28.0)
Menges et al	community	multiple domains	219	106	431	24.6	(20.6, 28.9)
Millet et al	hospitalised	multiple domains	365	83	173	48.0	(40.3, 55.7)
Mohiuddin et al	outpatients	multiple domains	161	67	313	21.4	(17.0, 26.4)
Munblit et al	hospitalised	multiple domains	232	1534	2649	57.9	(56.0, 59.8)
Nehme et al	.	multiple domains	243	160	410	39.0	(34.3, 43.9)
Nguyen et al	hospitalised	single domain	213	30	125	24.0	(16.8, 32.5)
O'Keefe et al	outpatients	multiple domains	119	79	198	39.9	(33.0, 47.1)
ONS study August 2021	community	multiple domains	84	2501	21374	11.7	(11.3, 12.1)
Ong et al	hospitalised	multiple domains	104	13	175	7.4	(4.0, 12.4)
Orru et al	social media	single domain	91	113	152	74.3	(66.6, 81.1)
Osmanov et al	hospitalised	multiple domains	270	126	519	24.3	(20.6, 28.2)
PHOSP-COVID study	hospitalised	multiple domains	174	797	861	92.6	(90.6, 94.2)
Peghin et al	outpatients	multiple domains	191	241	599	40.2	(36.3, 44.3)
Peluso et al	social media	single domain	112	89	143	62.2	(53.8, 70.2)
Petersen et al	community	multiple domains	125	95	180	52.8	(45.2, 60.2)
Qu et al	hospitalised	single domain	105	176	540	32.6	(28.7, 36.7)
Radtke et al	community	multiple domains	84	4	109	3.7	(1.0, 9.1)
Rass et al	hospitalised	single domain	90	82	135	60.7	(52.0, 69.0)
Riestra-Ayora et al	healthcare workers	single domain	182	52	195	26.7	(20.6, 33.5)
Righi et al	hospitalised	multiple domains	84	83	421	19.7	(16.0, 23.8)
Romero-Duarte et al	hospitalised	multiple domains	196	509	797	63.9	(60.4, 67.2)
Sathyamurthy et al	hospitalised	multiple domains	104	66	279	23.7	(18.8, 29.1)
Seeßle et al	outpatients	multiple domains	147	107	146	73.3	(65.3, 80.3)
Shang et al	hospitalised	multiple domains	196	441	796	55.4	(51.9, 58.9)
Sigfrid et al	hospitalised	multiple domains	222	305	327	93.3	(90.0, 95.7)
Simani et al	hospitalised	single domain	197	12	120	10.0	(5.3, 16.8)
Skala et al	outpatients	multiple domains	91	56	102	54.9	(44.7, 64.8)
Skjorten et al	hospitalised	single domain	105	59	126	46.8	(37.9, 55.9)
Soraas et al	community	multiple domains	126	380	676	56.2	(52.4, 60.0)
Stavem et al	community	multiple domains	117	185	451	41.0	(36.4, 45.7)
Stephenson et al	community	multiple domains	104	2038	3065	66.5	(64.8, 68.2)
Sudre et al	community	multiple domains	84	108	4182	2.6	(2.1, 3.1)
Sykes et al	hospitalised	single domain	127	75	127	59.1	(50.0, 67.7)
Taboada et al	hospitalised	multiple domains	189	87	183	47.5	(40.1, 55.0)
Tarsitani et al	hospitalised	single domain	105	34	115	29.6	(21.4, 38.8)
Tawfik et al	healthcare workers	single domain	91	40	120	33.3	(25.0, 42.5)
Taylor et al	hospitalised	single domain	126	261	545	47.9	(43.6, 52.2)
Tempany et al	healthcare workers	multiple domains	84	116	217	53.5	(46.6, 60.2)
Tleyjeh et al	hospitalised	multiple domains	136	125	222	56.3	(49.5, 62.9)
Todt et al	hospitalised	single domain	105	96	239	40.2	(33.9, 46.7)
Townsend et al	outpatients	multiple domains	86	74	128	57.8	(48.8, 66.5)
Trunfio et al	hospitalised	multiple domains	194	41	168	24.4	(18.1, 31.6)
Ursini et al	social media	single domain	182	270	616	43.8	(39.9, 47.9)
Venturelli et al	outpatients	multiple domains	105	394	767	51.4	(47.8, 55.0)
Walle-Hansen et al	hospitalised	single domain	200	57	106	53.8	(43.8, 63.5)
Weng et al	hospitalised	single domain	104	52	117	44.4	(35.3, 53.9)
Whitaker et al	community	multiple domains	84	28713	76155	37.7	(37.4, 38.0)
Xiong et al	healthcare workers	single domain	167	114	162	70.4	(62.7, 77.3)
Xiong et al	hospitalised	single domain	111	267	538	49.6	(45.3, 53.9)
Yan et al	hospitalised	multiple domains	98	0	125	0.0	(0.0, 2.9)
Zayet et al	hospitalised	multiple domains	289	127	354	35.9	(30.9, 41.1)
Zhan et al	hospitalised	multiple domains	348	36	121	29.8	(21.8, 38.7)
Zhang et al	hospitalised	multiple domains	378	1095	2433	45.0	(43.0, 47.0)
						43.9	**(8.2, 87.2)**
outcomes from health record linkage							
Al-Aly et al (hospitalized)	hospitalised	single domain	150	1091	11800	9.2	(8.7, 9.8)
Al-Aly et al (non-hospitalized)	community	single domain	126	1718	60255	2.9	(2.7, 3.0)
Aminian et al	outpatients	multiple domains	243	1255	2839	44.2	(42.4, 46.1)
Ayoubkhani et al	hospitalised	single domain	154	6085	28335	21.5	(21.0, 22.0)
Caspersen et al	community	single domain	350	28	170	16.5	(11.2, 22.9)
Castro et al	hospitalised	single domain	128	721	6619	10.9	(10.2, 11.7)
Roessler et al (adults)	community	multiple domains	91	13396	145184	9.2	(9.1, 9.4)
Roessler et al (children)	community	multiple domains	91	734	11950	6.1	(5.7, 6.6)
Taquet et al	community	multiple domains	90	100007	273618	36.5	(36.4, 36.7)
						13.6	**(1.2, 68.0)**



study	region	type of control	mean days since infection	relative risk (95% CI)
ONS study August 2021	Europe	negative test result	84	1.47 (1.30, 1.66)
Radtke et al	Europe	negative test result	84	1.63 (0.58, 4.57)
Roessler et al (adults)	Europe	no positive test result	91	1.33 (1.32, 1.35)
Roessler et al (children)	Europe	no positive test result	91	1.30 (1.25, 1.35)
95% Prediction Interval				1.33 (1.30, 1.36)