COVID-19: updates on follow-up & long-term effects

21st June 2021

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**guidance/new publications**

**Title:** **EVALUATING AND CARING FOR PATIENTS WITH POST-COVID CONDITIONS: INTERIM GUIDANCE**

Source: CDC, 15th June 2021

The term “Post-COVID Conditions” is an umbrella term for the wide range of physical and mental health consequences experienced by some patients that are present four or more weeks after SARS-CoV-2 infection, including by patients who had initial mild or asymptomatic acute infection. Based on current information, many post-COVID conditions can be managed by primary care providers, with the incorporation of patient-centered approaches to optimize the quality of life and function in affected patients. Objective laboratory or imaging findings should not be used as the only measure or assessment of a patient’s well-being; lack of laboratory or imaging abnormalities does not invalidate the existence, severity, or importance of a patient’s symptoms or conditions.

Healthcare professionals and patients are encouraged to set achievable goals through shared decision-making and to approach treatment by focusing on specific symptoms (e.g., headache) or conditions (e.g., dysautonomia); a comprehensive management plan focusing on improving physical, mental, and social wellbeing may be helpful for some patients. Understanding of post-COVID conditions remains incomplete and guidance for healthcare professionals will likely change over time as the evidence evolves.
<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-index.html>

**Title:** **SAFE REHABILITATION APPROACHES FOR PEOPLE LIVING WITH LONG COVID: PHYSICAL ACTIVITY AND EXERCISE**

Source: World Physiotherapy (UK), 16th June 2021

The briefing paper presents considerations for safe rehabilitation specific to physical activity, including exercise or sport, for people living with Long COVID.  The statements presented in the briefing paper may be used by physiotherapists, and other healthcare professionals, assessing and treating people living with Long COVID, to consider how post-exertional symptom exacerbation, cardiac impairment, exertional oxygen desaturation, and autonomic nervous system dysfunction impact on safe prescription of rehabilitation, including physical activity.
<https://world.physio/news/world-physiotherapy-briefing-paper-focuses-safe-rehabilitation-people-living-long-covid>

**national data & policy**

**Title:** **PREVALENCE OF ONGOING SYMPTOMS FOLLOWING CORONAVIRUS (COVID-19) INFECTION IN THE UK: 4 JUNE 2021**

**Source:** ONS, 4th June 2021

At 2 May 2021, an estimated 1.0 million people living in private households in the UK (1.6%) were experiencing self-reported long COVID (symptoms persisting for more than four weeks after the first suspected coronavirus (COVID-19) infection that were not explained by something else). The estimates presented in this analysis relate to self-reported long COVID, as experienced by study participants who responded to a representative survey, rather than clinically diagnosed ongoing symptomatic COVID-19 or post-COVID-19 syndrome in the full population.

Of people with self-reported long COVID, 869,000 first had (or suspected they had) COVID-19 at least 12 weeks previously, and 376,000 first had (or suspected they had) COVID-19 at least one year previously. Self-reported long COVID symptoms were adversely affecting the day-to-day activities of 650,000 people, with 192,000 of these individuals reporting that their ability to undertake their day-to-day activities had been limited a lot. Fatigue was the most common symptom reported as part of individuals' experience of long COVID (547,000 people), followed by shortness of breath (405,000), muscle ache (313,000), and difficulty concentrating (285,000).

As a proportion of the UK population, prevalence of self-reported long COVID was greatest in people aged 35 to 69 years, females, those living in the most deprived areas, those working in health or social care, and those with another activity-limiting health condition or disability; prevalence was lowest in people of Asian ethnic background. The raised prevalence of self-reported long COVID among health and social care workers compared with those in other sectors was largely explained by other (non-employment) socio-demographic characteristics and the risk of initial infection.
<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/prevalenceofongoingsymptomsfollowingcoronaviruscovid19infectionintheuk/4june2021>

**Title:** **NHS SETS UP SPECIALIST YOUNG PEOPLE’S SERVICES IN £100 MILLION LONG COVID CARE EXPANSION**

Source: NHS England, 15th June 2021

The NHS is setting up specialist long COVID services for children and young people as part of a £100 million expansion of care for those suffering from the condition. The 15 new paediatric hubs will draw together experts on common symptoms such as respiratory problems and fatigue who can directly treat youngsters, advise family doctors or others caring for them or refer them into other specialist services and clinics. Some £30 million will also go to GPs to improve diagnosis and care for those with long COVID while the new investment will also boost online services. The boost to dedicated services for young people is part of a package of investment in a range of measures to help young people and adults with long COVID, including a major focus on specialist treatment and rehab services.
<https://www.england.nhs.uk/2021/06/nhs-sets-up-specialist-young-peoples-services-in-100-million-long-covid-care-expansion>

**research papers**

 **GENERAL LONG-TERM EFFECTS:**

**Title:** **CHARACTERISTICS AND PREDICTORS OF ACUTE AND CHRONIC POST-COVID SYNDROME: A SYSTEMATIC REVIEW AND META-ANALYSIS**

Source: eClinicalMedicine [publ. by The Lancet] | 22 May 2021

A significant proportion of individuals experience lingering and debilitating symptoms following acute COVID-19 infection. The National Institute for Health and Care Excellence (NICE) have coined the persistent cluster of symptoms as post-COVID syndrome. This has been further sub-categorised into acute post-COVID syndrome for symptoms persisting three weeks beyond initial infection and chronic post-COVID syndrome for symptoms persisting beyond twelve weeks. The aim of this review was to detail the prevalence of clinical features and identify potential predictors for acute and chronic post-COVID syndrome…. A systematic literature search, with no language restrictions, was performed to identify studies detailing characteristics and outcomes related to survivorship of post-COVID syndrome. The last search was performed on 6 March 2021 and all pre-dating published articles included. A total of 43 studies met the eligibility criteria; of which, 38 allowed for meta-analysis. Fatigue and dyspnoea were the most prevalent symptoms in acute post-COVID (0·37 and 0·35) and fatigue and sleep disturbance in chronic post-COVID syndrome (0·48 and 0·44), respectively. The available evidence is generally of poor quality, with considerable risk of bias, and are of observational design.

In conclusion, this review highlights that flaws in data capture and interpretation, noted in the uncertainty within our meta-analysis, affect the applicability of current knowledge. Policy makers and researchers must focus on understanding the impact of this condition on individuals and society with appropriate funding initiatives and global collaborative research. [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00179-6/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370%2821%2900179-6/fulltext)

**Title:** **POST-COVID ASSESSMENT IN A SPECIALIST CLINICAL SERVICE: A 12-MONTH, SINGLE-CENTRE ANALYSIS OF SYMPTOMS AND HEALTHCARE NEEDS IN 1325 INDIVIDUALS**

**Source:** MedRxiv, 1 June 2021

[**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**](https://www.medrxiv.org/content/what-unrefereed-preprint)

Background Complications following SARS-CoV-2 infection require simultaneous characterisation and management to plan policy and health system responses. We describe the 12-month experience of the first UK dedicated Post-COVID clinical service to include both hospitalised and non-hospitalised patients.

Methods In a single-centre, observational analysis, we report outcomes for 1325 individuals assessed in the University College London Hospitals NHS Foundation Trust Post-COVID service between April 2020 and April 2021. Demography, symptoms, comorbidities, investigations, treatments, functional recovery, specialist referral and rehabilitation were compared by referral route (“post hospitalisation”, PH; “non-hospitalised”, NH; and “post emergency department”, PED). Symptoms associated with poor recovery or inability to return to work full-time were assessed using multivariable logistic regression.

Findings 1325 individuals were assessed (PH 547 [41.3%], PED 212 [16%], NH 566 [42.7%]. Compared with PH and PED groups, NH were younger (median 44.6 [35.6-52.8] vs 58.3 [47.0-67.7] and 48.5 [39.4-55.7] years), more likely to be female (68.2%, 43.0% and 59.9%), less likely to be from an ethnic minority (30.9%, 52.7% and 41.0%) and seen later after symptom onset (median [IQR]:194 [118-298], 69 [51-111] and 76 [55-128] days) (all p<0.0001). NH patients had similar rates of onward specialist referral as PH and PED groups (18.7%, 16.1% and 18.9%, p=0.452), and were more likely to require support for breathlessness (23.7%, 5.5% and 15.1%, p<0.001) and fatigue (17.8%, 4.8%, 8.0%, p<0.001). Hospitalised patients had higher rates of pulmonary emboli, persistent lung interstitial abnormalities, and other organ impairment. 716 (54.0%) individuals reported <75% of optimal health (median [IQR] 70% [55%-85%]). Overall, less than half of employed individuals felt able to return to work full-time at first assessment.

Interpretation Symptoms following SARS-CoV-2 infection were significant in both post- and non-hospitalised patients, with significant ongoing healthcare needs and utilisation. Trials of interventions and patient-centred pathways for diagnostic and treatment approaches are urgently required.
<https://www.medrxiv.org/content/10.1101/2021.05.25.21257730v1>

**Title:** **SEQUELAE, PERSISTENT SYMPTOMATOLOGY AND OUTCOMES AFTER COVID-19 HOSPITALIZATION: THE ANCOHVID MULTICENTRE 6-MONTH FOLLOW-UP STUDY**

Source:BMC Medicine; May 2021; vol. 19 (no. 1); p. 129

**Abstract:** BACKGROUND Long-term effects of COVID-19, also called Long COVID, affect more than 10% of patients. The most severe cases (i.e. those requiring hospitalization) present a higher frequency of sequelae, but detailed information on these effects is still lacking. The objective of this study is to identify and quantify the frequency and outcomes associated with the presence of sequelae or persistent symptomatology (SPS) during the 6 months after discharge for COVID-19.METHODS Retrospective observational 6-month follow-up study conducted in four hospitals of Spain. A cohort of all 969 patients who were hospitalized with PCR-confirmed SARS-CoV-2 from March 1 to April 15, 2020, was included. We collected all the SPS during the 6 months after discharge reported by patients during follow-up from primary care records. Cluster analyses were performed to validate the measures. The main outcome measures were return to the Emergency Services, hospital readmission and post-discharge death. Surviving patients' outcomes were collected through clinical histories and primary care reports. Multiple logistic regression models were applied. RESULTS The 797 (82.2%) patients who survived constituted the sample followed, while the rest died from COVID-19. The mean age was 63.0 years, 53.7% of them were men and 509 (63.9%) reported some sequelae during the first 6 months after discharge. These sequelae were very diverse, but the most frequent were respiratory (42.0%), systemic (36.1%), neurological (20.8%), mental health (12.2%) and infectious (7.9%) SPS, with some differences by sex. Women presented higher frequencies of headache and mental health SPS, among others. A total of 160 (20.1%) patients returned to the Emergency Services, 35 (4.4%) required hospital readmission and 8 (1.0%) died during follow-up. The main factors independently associated with the return to Emergency Services were persistent fever, dermatological SPS, arrythmia or palpitations, thoracic pain and pneumonia. CONCLUSIONSCOVID-19 cases requiring hospitalization during the first wave of the pandemic developed a significant range of mid- to long-term SPS. A detailed list of symptoms and outcomes is provided in this multicentre study. Identification of possible factors associated with these SPS could be useful to optimize preventive follow-up strategies in primary care for the coming months of the pandemic.
<https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-021-02003-7>

**Title:** **Developing services for long COVID: lessons from a study of wounded healers**

**Source:** Clinical Medicine (RCGP) 2021, Vol 21, No 1: 59–65

Persistent symptoms lasting longer than 3 weeks are thought to affect 10–2 0% of patients following SARS-CoV-2 infection. No formal guidelines exist in the UK for treating patients with long COVID and services are sporadic and variable, although additional funding is promised for their development. In this study, narrative interviews and focus groups are used to explore the lived experience of 43 healthcare professionals with long COVID. These individuals see the healthcare system from both professional and patient perspectives, thus represent an important wealth of expertise to inform service design. We present a set of co-designed quality standards, highlighting equity and ease of access, minimal patient care burden, clinical responsibility, a multidisciplinary and evidence-based approach, and patient involvement; and we apply these to propose a potential care pathway model that could be adapted and translated to improve care of patients long COVID.
<https://www.rcpjournals.org/content/clinmedicine/21/1/59>

**Title:** **COVID-19 PATHOPHYSIOLOGY: LOOKING BEYOND ACUTE DISEASE**

**Source:** The Lancet Respiratory Medicine, June 2021

…Little more than a year on, a picture of a new disease entity is coming into focus—with a distinct range of clinical and pathophysiological features—as described by Marcin Osuchowski and colleagues in the first of a Series of four papers in The Lancet Respiratory Medicine.

The Series highlights the wealth of data pertaining to the pathophysiology of acute disease that has emerged over the past year, but emphasises that many uncertainties about the mechanisms of acute disease—and potential targets for intervention—remain. Identifying subgroups of patients who are likely to benefit from particular treatment approaches—e.g. on the basis of markers of inflammation or immunosuppression—and establishing the optimum timing of treatment are among the many challenges that need to be addressed. A full understanding of risk and protective factors that explain why some individuals are prone to severe disease remains elusive and is a priority for research.
[https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(21)00242-3/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600%2821%2900242-3/fulltext)

**Title:** **POST-COVID-19 SYMPTOMS 6 MONTHS AFTER ACUTE INFECTION AMONG HOSPITALIZED AND NON-HOSPITALIZED PATIENTS**

Source:Clinical Microbiology and Infection: the official publication of the European Society of Clinical Microbiology and Infectious Diseases; Jun 2021
 **Abstract:** OBJECTIVES To assess the prevalence of and factors associated with Post-Coronavirus Disease 2019 (COVID-19) syndrome six months after the onset. METHODS A bidirectional prospective study. Interviews investigated symptoms potentially associated with COVID-19 six months after the disease onset of all consecutive adult in- and out-patients with COVID-19 attending Udine Hospital (Italy) from March to May 2020. IgG antibodies against Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) were also evaluated six months after the onset of symptoms, at the time of the interview. RESULTS A total of 599 individuals were included (320 female, 53.4%; mean age 53 years, SD 15.8) and interviewed 187 days (22 SD) after the onset. The prevalence of post-COVID-19 syndrome was 40.2% (241/599). The presence of IgG antibodies was significantly associated with the occurrence of post-COVID-19 syndrome (OR 2.56, 95% CI 1.48-4.38, p = 0.001) and median SARS-CoV-2 IgG titres were significantly higher in long-haulers than in patients without symptoms (42.1, IQR 17.1-78.4 vs. 29.1, IQR 12.1-54.2 kAU/L, p = 0.004). Female gender (OR 1.55, 95% CI 1.05-2.27), a proportional increase in the number of symptoms at the onset of COVID-19 (OR 1.81, 95% CI 1.59-2.05) and ICU admission OR 3.10, 95% CI 1.18-8.11) were all independent risk factors for post-COVID-19 syndrome. The same predictors also emerged in a subgroup of 231 patients with the serological follow-up available at the time of the interview alongside the proportional increase in anti-SARS-CoV-2 IgG (OR 1.01, 95% CI 1.00-1.02, p = 0.04).CONCLUSIONS Prospective follow-up could be offered to specific subgroups of COVID-10 patients, to identify typical symptoms and persistently high anti-SARS-CoV-2 IgG titers as a means of early detection of post-COVID-19 long-term sequelae.
[https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(21)00281-0/fulltext](https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X%2821%2900281-0/fulltext)

**Title:** **LONG-COVID FOLLOWING MILD SARS COV-2 INFECTION: CHARACTERISTIC T CELL ALTERATIONS AND RESPONSE TO ANTIHISTAMINES**

**Source:** MedRxiv Preprint Server, 7th June 2021

[**This article is a preprint and has not been peer-reviewed. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**](https://www.medrxiv.org/content/what-unrefereed-preprint)

Background Long-COVID is characterised by the emergence of multiple debilitating symptoms following SARS CoV2 infection. Its aetiology is unclear, and it often follows a mild acute illness. Anecdotal reports of gradual clinical responses to histamine receptor antagonists (HRA) suggest a histamine-dependent mechanism distinct from anaphylaxis. Histamine is a paracrine regulator of T-cells: although T-cell perturbations are reported in acute COVID-19, the T-cell landscape in recovered patients and its relationship to long-COVID remains under-explored. Objective To survey T-cell populations in patients recovered from mild COVID-19, comparing those with long-COVID and asymptomatic individuals, and to analyse these data in light of symptoms and response to HRA. Conclusion HRA reduce long-COVID symptoms. T-cell perturbations persist for up to 400 days following mild acute COVID-19 irrespective of long-COVID symptoms.
<https://www.medrxiv.org/content/10.1101/2021.06.06.21258272v1>

**Title:** **IMMUNOLOGICAL DYSFUNCTION PERSISTS FOR 8 MONTHS FOLLOWING INITIAL MILD-MODERATE SARS-COV-2 INFECTION**

**Source:** MedRxiv, 3rd June 2021

[**This article is a preprint and has not been peer-reviewed. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**](https://www.medrxiv.org/content/what-unrefereed-preprint)

A proportion of patients surviving acute COVID-19 infection develop post-COVID syndrome (long COVID) encompassing physical and neuropsychiatric symptoms lasting longer than 12 weeks. Here we studied a prospective cohort of individuals with long COVID (the ADAPT study) compared to age/gender matched subjects without long COVID, healthy donors and individuals infected with other non-SARS CoV2 human coronaviruses (the ADAPT-C study). We found an elevated diffuse serum inflammatory cytokine profile in symptomatic long COVID subjects that was maintained at 8 months post-infection and was not observed in asymptomatic COVID-19 survivors. This inflammatory profile consisted of 15 cytokines that positively correlated; revealing an apparent diffuse, potentially coordinated, low level up regulation of a spectrum of immune and inflammatory mediators. In addition, we found an absence of subsets of un-activated naїve T and B cells in peripheral blood of long COVID subjects, that did not reconstitute over time. In contrast, individual serum cytokines from the interferon I and III classes, T cell activation markers and plasma ACE2, while elevated in the serum of people previously infected with SARS-CoV-2 were not further elevated in subjects with long COVID symptoms. This work defines immunological parameters associated with long COVID and suggests future opportunities to prevention and treatment.
<https://www.medrxiv.org/content/10.1101/2021.06.01.21257759v1>

**Title:** **CLINICAL CODING OF LONG COVID IN ENGLISH PRIMARY CARE: A FEDERATED ANALYSIS OF 58 MILLION PATIENT RECORDS IN SITU USING OPENSAFELY**

**Source:** MedRxiv, 13th May 2021

[**This article is a preprint and has not been peer-reviewed. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**](https://www.medrxiv.org/content/what-unrefereed-preprint)

Background Long COVID is a term to describe new or persistent symptoms at least four weeks after onset of acute COVID-19. Clinical codes to describe this phenomenon were released in November 2020 in the UK, but it is not known how these codes have been used in practice.

Methods Working on behalf of NHS England, we used OpenSAFELY data encompassing 96% of the English population. We measured the proportion of people with a recorded code for long COVID, overall and by demographic factors, electronic health record software system, and week. We also measured variation in recording amongst practices.

Results Long COVID was recorded for 23,273 people. Coding was unevenly distributed amongst practices, with 26.7% of practices having not used the codes at all. Regional variation was high, ranging between 20.3 per 100,000 people for East of England (95% confidence interval 19.3-21.4) and 55.6 in London (95% CI 54.1-57.1). The rate was higher amongst women (52.1, 95% CI 51.3-52.9) compared to men (28.1, 95% CI 27.5-28.7), and higher amongst practices using EMIS software (53.7, 95% CI 52.9-54.4) compared to TPP software (20.9, 95% CI 20.3-21.4).

Conclusions Long COVID coding in primary care is low compared with early reports of long COVID prevalence. This may reflect under-coding, sub-optimal communication of clinical terms, under-diagnosis, a true low prevalence of long COVID diagnosed by clinicians, or a combination of factors. We recommend increased awareness of diagnostic codes, to facilitate research and planning of services; and surveys of clinicians’ experiences, to complement ongoing patient surveys.
<https://www.medrxiv.org/content/10.1101/2021.05.06.21256755v2>

**Title:** **UNPACKING POST-COVID SYMPTOMS [EDITORIAL]**

Source: BMJ, 19th May 2021

Common, burdensome, and highly variable. Our understanding of long covid (also known as post-covid syndrome) has progressed considerably since the first follow-up of people discharged from hospital in 2020 after SARS-CoV-2 infection. People who were not admitted to hospital with their covid-19 infection but who have enduring symptoms have driven the wider recognition of long covid symptoms, including organ impairment. Much evidence comes from small, observational studies or surveys using different case definitions and sampling frames, resulting in a wide range of prevalence estimates. Larger surveys found that enduring symptoms were more often reported among people who had had covid-19 than among controls who had not, including reporting of cognitive deficits. However, reliance on self-reporting in many studies has been criticised by some commentators.
<https://www.bmj.com/content/373/bmj.n1173>

**Title:** **SEQUELAE IN ADULTS AT 12 MONTHS AFTER MILD-TO-MODERATE CORONAVIRUS DISEASE 2019 (COVID-19)**

Source:International Forum of Allergy & Rhinology; Jun 2021

An increasing number of studies have been focused on long COVID, but they have mainly been concentrated on previously hospitalized severe COVID-19 patients reporting symptoms up to 6-months after illness. The main aim of this study was to evaluate the prevalence of COVID-related symptoms 12-months after the onset of mild-to-moderate disease. … We conducted a prospective study on mild-to-moderate symptomatic patients consecutively assessed between March 1 and March 31, 2020, who tested positive for SARS-CoV-2 RNA by polymerase chain reaction (PCR) on nasopharyngeal and throat swabs performed according to World Health Organization recommendation. … Twelve months after the onset of illness, 53.0% of patients with mild-to-moderate disease endorsed at least one persistent symptom. A previous investigation in a large cohort of previously hospitalized patients reported at least one symptom in 76% of cases 6 months after acute infection, whereas in another study, including outpatients with mild disease, ∼30% reported persistent symptoms at 6 months. Thus, taking into account that our series included only outpatients with mild-to-moderate disease representing the overwhelming majority of COVID-19 patients, the burden of long haulers on the healthcare systems will be pressing and urged researchers to identify strategies for prevention and treatment and to plan education and rehabilitation services in order to face with the considerable health and economic concerns. In agreement with other evidence, the most commonly reported symptom was fatigue followed by chemosensory dysfunction. … Experiencing more symptoms at baseline was the most significant factor associated with long COVID. Moreover, the prevalence of long haulers was higher in females, patients in their middle age, and those with BMI ≥ 25. Thus, models to identify patients at risk for long COVID may be developed.
<https://onlinelibrary.wiley.com/doi/full/10.1002/alr.22832>

**Title:** **EXTRAPULMONARY FEATURES OF POST-COVID-19 PATIENTS: MUSCLE FUNCTION, PHYSICAL ACTIVITY, MOOD, AND SLEEP QUALITY**

Source:Irish Journal of Medical Science; Jun 2021

**Abstract:** BACKGROUND Coronavirus disease 2019 (COVID-19) represents a wide range of clinical manifestations, even if mild disease severity. It has been known that pulmonary function is affected by COVID-19 during infection and mid-to-long term. However, there is inadequate evidence about extrapulmonary features in post-COVID-19 patients. AIMS This study aimed to investigate extrapulmonary features in post-COVID-19 patients who recovered from mild and moderate disease severity in the mid-term. METHODS This cross-sectional study was carried out after at least 12 weeks from the COVID-19 diagnosis. Disease severity was defined using criteria for clinical severity of confirmed COVID-19 pneumonia. The peripheral muscle strength was measured using the dynamometer. Physical performance was assessed with five times sit-to-stand and 4-m gait speed. Physical activity level (PAL), mood, and sleep quality were assessed with the International Physical Activity Questionnaire, Hospital Anxiety, and Depression Scale, and Pittsburgh Sleep Quality Index, respectively. RESULTS A total of 48 participants with post-COVID-19 (39.2 ± 7.9 years, 54.2% women) were included in the study. Handgrip and quadriceps weakness was observed in 39.6% and 35.4% of the participants, respectively. PAL was low in 39.6%, moderate in 33.3%, and high in 27.1% of the participants. Anxiety, depression, and poor sleep quality were observed in 33.3%, 29.2%, and 50% of the participants, respectively. CONCLUSIONS Extrapulmonary features are adversely affected in a substantial proportion of post-COVID-19 patients who recovered from mild and moderate disease severity in the mid-term. Comprehensive assessment and appropriate intervention strategies should also be considered for non-severe post-COVID-19 patients.
<https://link.springer.com/content/pdf/10.1007/s11845-021-02667-3.pdf>

**Title:** **LONG COVID, OR POST-COVID SYNDROME, AND THE GLOBAL IMPACT ON HEALTH CARE**

Source:Medical Science Monitor 2021; vol. 27; p. e933446

**Abstract:** During 2020, increasing numbers of case reports, case series, and small observational studies reported long-term complications of coronavirus disease 2019 (COVID-19) in patients who had recovered from acute infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Long COVID has a prevalence of between 10-30% in patients with a recent history of SARS-CoV-2 infection. Pulmonary, hematologic, cardiovascular, neuropsychiatric, renal, endocrine, gastrointestinal and hepatobiliary, and dermatologic involvement, and chronic multisystem inflammatory syndrome in children (MIS-C) highlights the requirement for a multidisciplinary approach to the management of patients with long COVID. This Editorial aims to present the current status of long COVID, or post-COVID syndrome, and its global impact on health and the provision of health care.
<https://link.springer.com/content/pdf/10.1007/s11845-021-02667-3.pdf>

**Title:** **CHARACTERISING THE LONG-TERM CLINICAL OUTCOMES OF 1190 HOSPITALISED PATIENTS WITH COVID-19 IN NEW YORK CITY: A RETROSPECTIVE CASE SERIES**

Source:BMJ Open; Jun 2021; vol. 11 (no. 6)

Abstract OBJECTIVE To characterise the long-term outcomes of patients with COVID-19 admitted to a large New York City medical centre at 3 and 6 months after hospitalisation and describe their healthcare usage, symptoms, morbidity and mortality. DESIGN Retrospective cohort through manual chart review of the electronic medical record. SETTING New York-Presbyterian/Columbia University Irving Medical Center, a quaternary care academic medical centre in New York City. PARTICIPANTS The first 1190 consecutive patients with symptoms of COVID-19 who presented to the hospital for care between 1 March and 8 April 2020 and tested positive for SARS-CoV-2 on reverse transcriptase PCR assay. MAIN OUTCOME MEASURES Type and frequency of followup encounters, self-reported symptoms, morbidity and mortality at 3 and 6 months after presentation, respectively; patient disposition information prior to admission, at discharge, and at 3 and 6 months after hospital presentation. RESULTS Of the 1190 reviewed patients, 929 survived their initial hospitalisation and 261 died. Among survivors, 570 had follow-up encounters (488 at 3 months and 364 at 6 months). An additional 33 patients died in the follow-up period. In the first 3 months after admission, most encounters were telehealth visits (59%). Cardiopulmonary symptoms (35.7% and 28%), especially dyspnoea (22.1% and 15.9%), were the most common reported symptoms at 3-month and 6-month encounters, respectively. Additionally, a large number of patients reported generalised (26.4%) or neuropsychiatric (24.2%) symptoms 6 months after hospitalisation. Patients with severe COVID-19 were more likely to have reduced mobility, reduced independence or a new dialysis requirement in the 6 months after hospitalisation. CONCLUSIONS Patients hospitalised with SARS-CoV-2 infection reported persistent symptoms up to 6 months after diagnosis. These results highlight the long-term morbidity of COVID-19 and its burden on patients and healthcare resources.
<https://bmjopen.bmj.com/content/11/6/e049488>

**Title:** **LONG-TERM CONSEQUENCES IN CRITICALLY ILL COVID-19 PATIENTS: A PROSPECTIVE COHORT STUDY**

Source:Acta Anaesthesiologica Scandinavica; Jun 2021

**Abstract:** BACKGROUNDCOVID-19 can cause severe disease with need of treatment in the intensive care unit (ICU) for several weeks. Increased knowledge is needed about the long-term consequences. METHODS This is a single-center prospective follow-up study of COVID-19 patients admitted to the ICU for respiratory organ support between March and July 2020. Patients with invasive ventilation were compared with those with high-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) regarding functional outcome and health-related qualify of life. The mean follow-up time was 5 months after ICU discharge and included clinical history, three well-validated questionnaires about health-related quality of life and psychological health, pulmonary function test, 6-minute walk test (6MWT) and work ability. Data were analyzed with multivariable general linear and logistic regression models with 95% confidence intervals. RESULTS Among 248 ICU patients, 200 patients survived. Of these, 113 patients came for follow-up. Seventy patients (62%) had received invasive ventilation. Most patients reported impaired health-related quality of life. Approximately one third suffered from posttraumatic stress, anxiety and depression. Twenty-six percent had reduced total lung capacity, 34% had reduced 6MWT and 50% worked fulltime. The outcomes were similar regardless of ventilatory support, but invasive ventilation was associated with more bodily pain (MSD -19, 95% CI: -32 to -5) and <80% total lung capacity (OR 4.1, 95% CI: 1.3-16.5).CONCLUSION Among survivors of Covid-19 who required respiratory organ support, outcomes 5 months after discharge from ICU were largely similar among those requiring invasive compared to non-invasive ventilation.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/aas.13939>

**Title:** **THIRTY-DAY POST-DISCHARGE OUTCOMES FOLLOWING COVID-19 INFECTION**

Source:Journal of General Internal Medicine; Jun 2021

**Abstract:** BACKGROUND The clinical course of COVID-19 includes multiple disease phases. Data describing post-hospital discharge outcomes may provide insight into disease course. Studies describing post-hospitalization outcomes of adults following COVID-19 infection are limited to electronic medical record review, which may underestimate the incidence of outcomes. OBJECTIVE To determine 30-day post-hospitalization outcomes following COVID-19 infection. DESIGN Retrospective cohort study SETTING: Quaternary referral hospital and community hospital in New York City.PARTICIPANTSCOVID-19 infected patients discharged alive from the emergency department (ED) or hospital between March 3 and May 15, 2020.MEASUREMENTOutcomes included return to an ED, re-hospitalization, and mortality within 30 days of hospital discharge. RESULTS Thirty-day follow-up data were successfully collected on 94.6% of eligible patients. Among 1344 patients, 16.5% returned to an ED, 9.8% were re-hospitalized, and 2.4% died. Among patients who returned to the ED, 50.0% (108/216) went to a different hospital from the hospital of the index presentation, and 61.1% (132/216) of those who returned were re-hospitalized. In Cox models adjusted for variables selected using the lasso method, age (HR 1.01 per year [95% CI 1.00-1.02]), diabetes (1.54 [1.06-2.23]), and the need for inpatient dialysis (3.78 [2.23-6.43]) during the index presentation were independently associated with a higher re-hospitalization rate. Older age (HR 1.08 [1.05-1.11]) and Asian race (2.89 [1.27-6.61]) were significantly associated with mortality. CONCLUSIONS Among patients discharged alive following their index presentation for COVID-19, risk for returning to a hospital within 30 days of discharge was substantial. These patients merit close post-discharge follow-up to optimize outcomes.
<https://link.springer.com/content/pdf/10.1007/s11606-021-06924-0.pdf>

**Title:** **PHYSICAL AND PSYCHOLOGICAL SEQUELAE AT THREE MONTHS AFTER ACUTE ILLNESS IN COVID-19 SURVIVORS**

Source:Panminerva Medica; Jun 2021

Abstract BACKGROUND Coronavirus disease 2019 (COVID-19) may leave behind an altered health status early after recovery. We evaluated the clinical status of COVID-19 survivors at three months after hospital discharge. METHODS In this prospective observational cohort study, hospitalized patients aged ≥18 years, evaluated at one (M1) and three (M3) months post-discharge were enrolled. 251 patients (71.3% males, median [IQR] age 61.8 [53.5-70.7] years) were included. Median (IQR) time from discharge to M3 was 89 (79.5-101) days. Primary outcome was residual respiratory dysfunction (RRD), defined by tachypnea, moderate to very severe dyspnea, or peripheral oxygen saturation ≤95% on room air at M3.RESULTSRRD was found in 30.4% of patients, with no significant difference compared with M1. Chronic obstructive pulmonary disease and length of stay were independent predictors of RRD at multivariable logistic regression (odds ratio, OR, [95% confidence interval, CI] 4.13 [1.17-16.88], p 0.033; OR [95% CI] 1.02 [1.00-1.04], p 0.047, respectively). Obesity and C-reactive protein levels upon admission were additional predictors at regression tree analysis. Impaired quality of life (QoL) was reported by 53.2% of patients. Anxiety and insomnia were each present in 25.5% of patients, and PTSD in 22.4%. No difference was found between M1 and M3 in QoL, anxiety or PTSD. Insomnia decreased at M3. Current major psychiatric disorder as well as anxiety, insomnia and PSTD at M1 independently predicted PTSD at M3.CONCLUSIONSClinical damage may persist at three months after discharge in COVID-19 survivors. Post-recovery follow-up is an essential component of patient management.
<https://pubmed.ncbi.nlm.nih.gov/34060280/>

**Title:** **HIGH-DIMENSIONAL CHARACTERIZATION OF POST-ACUTE SEQUELAE OF COVID-19**

Source:Nature; Jun 2021; vol. 594 (no. 7862); p. 259-264

The acute clinical manifestations of COVID-19 have been well characterized but the post-acute sequelae of this disease have not been comprehensively described. Here we use the national healthcare databases of the US Department of Veterans Affairs to systematically and comprehensively identify 6-month incident sequelae including diagnoses, medication use and laboratory abnormalities-in patients with COVID-19 who survived for at least 30 days after diagnosis. We show that beyond the first 30 days of illness, people with COVID-19 exhibit a higher risk of death and use of health resources. Our high-dimensional approach identifies incident sequelae in the respiratory system, as well as several other sequelae that include nervous system and neurocognitive disorders, mental health disorders, metabolic disorders, cardiovascular disorders, gastrointestinal disorders, malaise, fatigue, musculoskeletal pain and anaemia. We show increased incident use of several therapeutic agents-including pain medications (opioids and non-opioids) as well as antidepressant, anxiolytic, antihypertensive and oral hypoglycaemic agents-as well as evidence of laboratory abnormalities in several organ systems. Our analysis of an array of prespecified outcomes reveals a risk gradient that increases according to the severity of the acute COVID-19 infection (that is, whether patients were not hospitalized, hospitalized or admitted to intensive care). Our findings show that a substantial burden of health loss that spans pulmonary and several extrapulmonary organ systems is experienced by patients who survive after the acute phase of COVID-19. These results will help to inform health system planning and the development of multidisciplinary care strategies to reduce chronic health loss among individuals with COVID-19.
<https://www.nature.com/articles/s41586-021-03553-9>

**Title:** **POST-COVID SYMPTOMS REPORTED AT ASYNCHRONOUS VIRTUAL REVIEW AND STRATIFIED FOLLOW-UP AFTER COVID-19 PNEUMONIA**

Source:Clinical Medicine; Jun 2021

**Abstract:** BACKGROUND The COVID-19 pandemic has strained healthcare systems and how best to address post-COVID health needs is uncertain. Here we describe the post-COVID symptoms of 675 patients followed up using a virtual review pathway, stratified by severity of acute COVID infection.METHODSCOVID-19 survivors completed an online/telephone questionnaire of symptoms after 12+ weeks and a chest radiograph. Dependent on findings at virtual review, patients were provided information leaflets, attended for investigations and/or were reviewed face-to-face. Outcomes were compared between patients following high-risk and low-risk admissions for COVID pneumonia, and community referrals. RESULTS Patients reviewed after hospitalisation for COVID pneumonia had a median of two ongoing physical health symptoms post-COVID. The most common was fatigue (50.3% of high-risk patients). Symptom burden did not vary significantly by severity of hospitalised COVID pneumonia but was highest in community referrals. Symptoms suggestive of depression, anxiety and post-traumatic stress disorder were common (depression occurred in 24.9% of high-risk patients). Asynchronous virtual review facilitated triage of patients at highest need of face-to-face review. CONCLUSION Many patients continue to have a significant burden of post-COVID symptoms irrespective of severity of initial pneumonia. How best to assess and manage long COVID will be of major importance over the next few years.
<https://www.rcpjournals.org/content/clinmedicine/early/2021/06/02/clinmed.2021-0037.full.pdf>

**Title:** **FACIAL SCARS DUE TO PRONE POSITION PRESSURE ULCERS: UNDERESTIMATED SEQUELAE IN COVID-19 SURVIVORS?**

Source:Aesthetic Surgery Journal; Jun 2021

In our multidisciplinary outpatient clinic dedicated to scar treatment we recently observed an increasing number of COVID-19 survivors presenting with facial scars following long-term prone position ventilation during ICU admittance. We aim to raise awareness for the potentially underestimated sequelae – such as stigmatizing facial scarring – of COVID-19 survivors. To illustrate this, we included two cases.
<https://academic.oup.com/asj/advance-article/doi/10.1093/asj/sjab251/6297191>

**Title:** **SYMPTOMS AFTER COVID-19 VACCINATION IN PATIENTS WITH PERSISTENT SYMPTOMS AFTER ACUTE INFECTION: A CASE SERIES [LETTERS]**

Source: Annals of Internal Medicine, 25th May 21

Background: Some patients develop prolonged symptoms after acute SARS-CoV-2 infection ([1](https://www.acpjournals.org/doi/10.7326/M21-1976#r1-M211976)). Because the immunologic basis for this is unknown, uncertainty exists about whether vaccination against SARS-CoV-2 might worsen the associated symptoms ([2](https://www.acpjournals.org/doi/10.7326/M21-1976#r2-M211976)). Anecdotal reports have suggested both a potential benefit and worsening of symptoms after vaccination, with the uncertainty leading to vaccine hesitancy among some affected persons. Objective: To describe quality of life and symptoms after SARS-CoV-2 vaccination in a series of patients with persistent symptoms 8 months after hospitalization with COVID-19. …  This report presents a series of patients with robust measures of quality of life and symptoms both before and after vaccination. Limitations include the small sample size and the inability to blind participants to their vaccination status. Also, because the U.K. national policy prioritized vaccination for older age groups and adopted a delayed second-dose approach, it was not possible to suitably match vaccinated and unvaccinated persons, and we can only provide data for participants after their first vaccine dose. However, these observations may provide reassurance to the increasing number of persons experiencing long-term symptoms after acute SARS-CoV-2 infection that receipt of a messenger RNA or adenoviral vector vaccine is not associated with a decrease in quality of life or worsening of symptoms. Further work that includes appropriate unvaccinated controls is needed to confirm the trajectory of persistent symptoms after COVID-19 vaccination.
<https://www.acpjournals.org/doi/10.7326/M21-1976>

**Title:** **COVID-19: EVALUATION AND CARE OF PATIENTS WITH PERSISTENT SYMPTOMS FOLLOWING ACUTE SARS-COV-2 INFECTION**

Source:Annals of Internal Medicine, 11th June 2021

The fifth [Annals of Internal Medicine] program, held on 9 June 2021, focused on the evaluation and management of persons who continue to have symptoms despite recovering from acute COVID-19.

Dr. Newman summarized highlights of the NIH's December 2020 workshop on post–COVID-19 recovery and the NIH's more recent efforts on this topic. She highlighted the important contributions of “citizen scientists” in identifying and helping to study the brewing public health problem of persistently poor health after acute COVID-19. She estimated that even if this condition occurred in only 10% of infected persons, it could afflict more than 17 million people globally. Dr. Brooks discussed how the CDC is developing interim clinical guidance on the diagnosis, evaluation, and management of persistent symptoms after acute COVID-19. He noted that the guidance has had to rely on limited evidence to date and is certain to evolve as new data emerge. He also emphasized the importance of clinical experience in guiding patient care while we await more definitive evidence. Dr. Hope, director of one of the first post–COVID-19 clinics in New York City and now the director of a post–COVID-19 program in Oregon, shared his insights from this type of clinical experience. He discussed the broad spectrum of symptoms that people are experiencing and the need for careful epidemiologic studies of the condition and its risk factors. Because of the breadth and variability of clinical presentation, Dr. Hope emphasized the need for a team-based, multidisciplinary approach to care. He believes that post–COVID-19 programs must work in collaboration with—not in place of—patients' primary care physicians.
<https://www.acpjournals.org/doi/10.7326/M21-2342>

**Title:** **INCOMPLETE SYSTEMIC RECOVERY AND METABOLIC PHENOREVERSION IN POST-ACUTE-PHASE NONHOSPITALIZED COVID-19 PATIENTS: IMPLICATIONS FOR ASSESSMENT OF POST-ACUTE COVID-19 SYNDROME**

Source:Journal of Proteome Research; Jun 2021; vol. 20 (no. 6); p. 3315-3329

We present a multivariate metabotyping approach to assess the functional recovery of nonhospitalized COVID-19 patients and the possible biochemical sequelae of "Post-Acute COVID-19 Syndrome", colloquially known as long-COVID. Blood samples were taken from patients ca. 3 months after acute COVID-19 infection with further assessment of symptoms at 6 months. Some 57% of the patients had one or more persistent symptoms including respiratory-related symptoms like cough, dyspnea, and rhinorrhea or other nonrespiratory symptoms including chronic fatigue, anosmia, myalgia, or joint pain. Plasma samples were quantitatively analyzed for lipoproteins, glycoproteins, amino acids, biogenic amines, and tryptophan pathway intermediates using Nuclear Magnetic Resonance (NMR) spectroscopy and mass spectrometry. Metabolic data for the followup patients (n = 27) were compared with controls (n = 41) and hospitalized severe acute respiratory syndrome SARS-CoV-2 positive patients (n = 18, with multiple time-points). Univariate and multivariate statistics revealed variable patterns of functional recovery with many patients exhibiting residual COVID-19 biomarker signatures. Several parameters were persistently perturbed, e.g., elevated taurine (p = 3.6 × 10-3 versus controls) and reduced glutamine/glutamate ratio (p = 6.95 × 10-8 versus controls), indicative of possible liver and muscle damage and a high energy demand linked to more generalized tissue repair or immune function. Some parameters showed near-complete normalization, e.g., the plasma apolipoprotein B100/A1 ratio was similar to that of healthy controls but significantly lower (p = 4.2 × 10-3) than post-acute COVID-19 patients, reflecting partial reversion of the metabolic phenotype (phenoreversion) toward the healthy metabolic state. Plasma neopterin was normalized in all follow-up patients, indicative of a reduction in the adaptive immune activity that has been previously detected in active SARS-CoV-2 infection. Other systemic inflammatory biomarkers such as GlycA and the kynurenine/tryptophan ratio remained elevated in some, but not all, patients. Correlation analysis, principal component analysis (PCA), and orthogonal-partial least-squares discriminant analysis (O-PLS-DA) showed that the follow-up patients were, as a group, metabolically distinct from controls and partially comapped with the acute-phase patients. Significant systematic metabolic differences between asymptomatic and symptomatic follow-up patients were also observed for multiple metabolites. The overall metabolic variance of the symptomatic patients was significantly greater than that of nonsymptomatic patients for multiple parameters (χ2 p = 0.014). Thus, asymptomatic follow-up patients including those with post-acute COVID-19 Syndrome displayed a spectrum of multiple persistent biochemical pathophysiology, suggesting that the metabolic phenotyping approach may be deployed for multisystem functional assessment of individual post-acute COVID-19 patients.
<https://pubmed.ncbi.nlm.nih.gov/34009992/>

**Title:** **HEALTH-RELATED QUALITY OF LIFE OF COVID-19 PATIENTS AFTER DISCHARGE: A MULTICENTER FOLLOW-UP STUDY**

Source:Journal of Clinical Nursing; Jun 2021; vol. 30 (no. 11-12); p. 1742-1750

**Abstract:** AIMS AND OBJECTIVES To determine the health-related quality of life (HRQoL) of COVID-19 patients after discharge and its predicting factors. BACKGROUND COVID-19 has caused a worldwide pandemic and led a huge impact on the health of human and daily life. It has been demonstrated that physical and psychological conditions of hospitalised COVID-19 patients are impaired, but the studies focus on physical and psychological conditions of COVID-19 patients after discharge from hospital are rare. DESIGN A multicentre follow-up study. METHODS This was a multicentre follow-up study of COVID-19 patients who had discharged from six designated hospitals. Physical symptoms and HRQoL were surveyed at first follow-up (the third month after discharge). The latest multiple laboratory findings were collected through medical examination records. This study was performed and reported in accordance with STROBE checklist. RESULTS Three hundred eleven patients (57.6%) were reported with one or more physical symptoms. The scores of HRQoL of COVID-19 patients at third month after discharge, except for the dimension of general health, were significantly lower than Chinese population norm (p < .001). Results of logistic regression showed that female (odds ratio (OR): 1.79, 95% confidence interval (CI): 1.04-3.06), older age (≥60 years) (OR: 2.44, 95% CI: 1.33-4.47) and the physical symptom after discharge (OR: 40.15, 95% CI: 9.68-166.49) were risk factors for poor physical component summary; the physical symptom after discharge (OR: 6.68, 95% CI: 4.21-10.59) was a risk factor for poor mental component summary. CONCLUSIONS Health-related quality of life of discharged COVID-19 patients did not come back to normal at third month after discharge and affected by age, sex and the physical symptom after discharge. RELEVANCE TO CLINICAL PRACTICE Healthcare workers should pay more attention to the physical and psychological rehabilitation of discharged COVID-19 patients. Long-term follow-up on COVID-19 patients after discharge is needed to determine the long-term impact of COVID-19.
<https://pubmed.ncbi.nlm.nih.gov/33656210/>

**Title:** **HEALTH STATUS IN SURVIVORS OLDER THAN 70 YEARS AFTER HOSPITALIZATION WITH COVID-19: OBSERVATIONAL FOLLOW-UP STUDY AT 3 MONTHS**

Source:European Geriatric Medicine; May 2021

**Abstract:** PURPOSE To analyze factors associated with mortality at 3 months and readmissions, functional and cognitive decline, anorexia and affective disorders in patients aged > 70 years surviving after hospital admission for SARS-CoV-2.METHODSPatients aged > 70 years, discharged after hospitalization with COVID-19.OUTCOME VARIABLES mortality, readmissions, functional and cognitive impairment, anorexia and mood disorder.RESULTS165 cases at 3 months after hospital discharge, 8.5% died and 20% required at least one hospital readmission. The presence of severe dependence at discharge (BI < 40) was associated at 3 months with a higher risk of mortality (OR 5.08; 95% CI 1.53-16.91) and readmissions (OR 4.53; 95% CI 1.96-10.49). The post-hospitalization functional deterioration was associated with persistence of deterioration at 3 months (OR 24.57; 95% CI 9.24-65.39), cognitive deterioration (OR 2.32; 95% CI 1.03-5.25) and affective (OR 4.40; 95% CI 1.84-10.55) CONCLUSIONS: Loss function in older people after hospitalization by COVID-19 may contribute to identify patients with a higher risk of sequelae in the short term that require closer follow-up.
<https://link.springer.com/content/pdf/10.1007/s41999-021-00516-1.pdf>

**Title:** **PERSISTENT POOR HEALTH AFTER COVID-19 IS NOT ASSOCIATED WITH RESPIRATORY COMPLICATIONS OR INITIAL DISEASE SEVERITY**

Source:Annals of the American Thoracic Society; Jun 2021; vol. 18 (no. 6); p. 997-1003

**Abstract:** Rationale: Much is known about the acute infective process of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative virus of the coronavirus disease (COVID-19) pandemic. The marked inflammatory response and coagulopathic state in acute SARS-CoV-2 infection may promote pulmonary fibrosis. However, little is known about the incidence and seriousness of post-COVID-19 pulmonary pathology. Objectives: To describe the respiratory recovery and self-reported health after infection at the time of outpatient attendance. Methods: Infection severity was graded into three groups: 1) not requiring admission, 2) requiring hospital admission, and 3) requiring intensive care unit care. Participants underwent chest radiography and a 6-minute walk test (6MWT). Fatigue and subjective return to health were assessed, and concentrations of CRP (C-reactive protein), IL-6 (interleukin-6), sCD25 (soluble CD25), and D-dimer were measured. The associations between initial illness and abnormal chest X-ray findings, 6MWT distance, and perception of maximal exertion were investigated. Results: A total of 487 patients were offered an outpatient appointment, of whom 153 (31%) attended for assessment at a median of 75 days after diagnosis. A total of 74 (48%) had required hospital admission during acute infection. Persistently abnormal chest X-ray findings were seen in 4%. The median 6MWT distance covered was 460 m. A reduced distance covered was associated with frailty and length of inpatient stay. A total of 95 (62%) patients believed that they had not returned to full health, whereas 47% met the case definition for fatigue. Ongoing ill health and fatigue were associated with an increased perception of exertion. None of the measures of persistent respiratory disease were associated with initial disease severity. Conclusions: This study highlights the rates of objective respiratory disease and subjective respiratory symptoms after COVID-19 and the complex multifactorial nature of post-COVID-19 ill health.
<https://www.atsjournals.org/doi/pdf/10.1513/AnnalsATS.202009-1175OC>

**Title:** **QUALITY OF LIFE OF COVID-19 CRITICALLY ILL SURVIVORS AFTER ICU DISCHARGE: 90 DAYS FOLLOW-UP**

Source:Quality of Life Research: an international journal of quality of life aspects of treatment, care and rehabilitation; May 2021

The aim of the present study was to describe the health-related quality of life (HRQoL) at 90 days after ICU discharge in a cohort of COVID-19 patients undergoing invasive mechanical ventilation and to compare it with an age and sex-matched sample from the general Italian and Finnish populations. Moreover, the possible associations between clinical, demographic, social factors, and HRQoL were investigated.

Methods: COVID-19 ARDS survivors from 16 participating ICUs were followed up until 90 days after ICU discharge and the HRQoL was evaluated with the 15D instrument. A parallel cohort of age and sex-matched Italian population from the same geographic areas was interviewed and a third group of matched Finnish population was extracted from the Finnish 2011 National Health survey. A linear regression analysis. … COVID-19-related ARDS survivors at 90 days after ICU discharge present a significant reduction both on physical and psychological dimensions of HRQoL measured with the 15D instrument.
<https://pubmed.ncbi.nlm.nih.gov/33977415/>

**RESPIRATORY MEDICINE**

**Title:** **EVOLUTION OF LUNG FUNCTION AND CHEST CT 6 MONTHS AFTER COVID-19 PNEUMONIA: REAL-LIFE DATA FROM A BELGIAN UNIVERSITY HOSPITAL**

**Source**: Respiratory Medicine; Jun 2021; vol. 182; p. 106421

**Abstract:** INTRODUCTION Most post COVID-19 follow-up studies are limited to a follow-up of 3 months. Whether a favorable evolution in lung function and/or radiological abnormalities is to be expected beyond 3 months is uncertain. MATERIALS AND METHODS We conducted a real-life follow-up study assessing the evolution in lung function, chest CT and ventilation distribution between 10 weeks and 6 months after diagnosis of COVID-19 pneumonia. RESULTS Seventy-nine patients were assessed at 6 months of whom 63 had chest CT at both follow-up visits and 46 had multiple breath washout testing to obtain lung clearance index (LCI). The study group was divided into a restrictive (n = 39) and a non-restrictive subgroup (n = 40) based on TLC z-score. Restriction was associated with a history of intubation, neuromuscular blockade use and critical illness polyneuropathy. Restriction significantly improved over time, but was not resolved by 6 months (median TLC z-score of -2.2 [IQR: -2.7; -1.5] at 6 months versus -2.7 [IQR: -3.1; -2.1] at 10 weeks). LCI did not evolve between both follow-up visits. Symptoms and chest CT score improved irrespective of restriction. CONCLUSION We observed a disconnect between the improvement of COVID-19 related symptoms, chest CT lesions, and corresponding lung function. While CT imaging is almost normalized at 6 months, a further reduction of pulmonary restriction may be hoped for beyond 6 months in those patients showing restriction at their first follow-up visit.
[https://www.resmedjournal.com/article/S0954-6111(21)00127-X/pdf](https://www.resmedjournal.com/article/S0954-6111%2821%2900127-X/pdf)

**Title:** **PULMONARY LONG-TERM CONSEQUENCES OF COVID-19 INFECTIONS AFTER HOSPITAL DISCHARGE**

**Source**: Clinical microbiology and infection: the official publication of the European Society of Clinical Microbiology and Infectious Diseases; Jun 2021; vol. 27 (no. 6); p. 892-896

**Abstract:** OBJECTIVES Coronavirus disease 2019 (COVID-19) survivors are reporting residual abnormalities after discharge from hospital. Limited information is available about this stage of recovery or the lingering effects of the virus on pulmonary function and inflammation. This study aimed to describe lung function in patients recovering from COVID-19 hospitalization and to identify biomarkers in serum and induced sputum samples from these patients. METHODS Patients admitted to Spanish hospitals with laboratory-confirmed COVID-19 infection by a real-time PCR (RT-PCR) assay for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were recruited for this study. Each hospital screened their lists of discharged patients at least 45 days after symptom onset. SARS-CoV-2-infected patients were divided into mild/moderate and severe disease groups according to the severity of their symptoms during hospitalization. Patients' epidemiological and medical histories, comorbidities, chronic treatments, and laboratory parameters were evaluated. Pulmonary function tests, the standardized 6-minute walk test (6MWT) and chest computed tomography (CT) were also performed. The levels of proteases, their inhibitors, and shed receptors were measured in serum and induced sputum samples. RESULTS A total of 100 patients with respiratory function tests were included in this study. The median number of days after the onset of symptoms was 104 (IQR 89.25, 126.75). COVID-19 was severe in 47% of patients (47/100). CT was normal in 48% of patients (48/100). Lung function was normal forced expiratory volume in one second (FEV1) ≥80%, forced vital capacity (FVC) ≥80%, FEV1/FVC ≥0.7, and diffusing capacity for carbon monoxide (DLCO) ≥80% in 92% (92/100), 94% (94/100), 100% (100/100) and 48% (48/100) of patients, respectively. Multivariate analysis showed that a DLCO <80% (OR 5.92; 95%CI 2.28-15.37; p < 0.0001) and a lower serum lactate dehydrogenase level (OR 0.98; 95%CI 0.97-0.99) were associated with the severe disease group of SARS-CoV-2 cases during hospital stay. CONCLUSIONS A diffusion deficit (DLCO <80%) was still present after hospital discharge and was associated with the most severe SARS-CoV-2 cases.

[https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(21)00101-4/fulltext](https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X%2821%2900101-4/fulltext)

**Title:** **RESPIRATORY FOLLOW-UP AFTER HOSPITALIZATION FOR COVID-19: WHO AND WHEN?**

**Source**: European Journal of Clinical Investigation; May 2021; p. e13603

**Abstract:** Despite more than 148 million infected people, coronavirus disease 2019 (COVID-19) respiratory intermediate and long-term survivors' outcome remains largely unknown. Lungs are the main COVID-19 target organ, and 5-10% patients progress to critical disease including acute respiratory distress syndrome (ARDS) [1]. Pulmonary function tests (PFT) performed at discharge from hospital showed that >80% of severe COVID-19 patients had lung function impairment [2].
<https://onlinelibrary.wiley.com/doi/full/10.1111/eci.13603>

**Title:** **PREVALENCE OF POST-COVID-19 COUGH ONE YEAR AFTER SARS-COV-2 INFECTION: A MULTICENTER STUDY**

**Source**: Lung; May 2021

 **Abstract:** This multicenter study presents prevalence data and associated risk factors of post-COVID-19 cough one year after hospital discharge in COVID-19 survivors. Individuals recovered from COVID-19 at three public hospitals in Madrid (Spain) were scheduled for a telephonic interview. They were systematically asked about the presence of respiratory symptoms, e.g., fatigue, dyspnea, chest pain, and cough after hospital discharge. Clinical and hospitalization data were collected from hospital records. Overall, 1,950 patients (47% women, mean age:61, SD:16 years) were assessed at 11.2 months (SD 0.5) after hospital discharge. Just 367 (18.8%) were completely free of any respiratory post-COVID -19 symptom. The prevalence of long-term cough, chest pain, dyspnea, and fatigue was 2.5%, 6.5%, 23.3%, and 61.2%, respectively. Clinical and hospitalization factors were not associated with long-term post-COVID-19 cough. In conclusion, the prevalence of post-COVID-19 cough one year after SARS-CoV-2 infection was 2.5% in subjects who had survived hospitalization for COVID-19. No clear risk factor associated to long-term post-COVID-19 cough was identified.
<https://link.springer.com/content/pdf/10.1007/s00408-021-00450-w.pdf>

**CARDIOLOGY**

**Title:** **LONG COVID-19: A PRIMER FOR CARDIOVASCULAR HEALTH PROFESSIONALS ON BEHALF OF THE CCS RAPID RESPONSE TEAM**

**Source**: The Canadian Journal of Cardiology; Jun 2021

Abstract It is now widely recognized that COVID-19 illness can be associated with significant intermediate and potentially longer-term physical limitations. The term "Long COVID-19" is used to define any patient with persistent symptoms after acute COVID-19 (i.e. after 4 weeks). It is postulated that cardiac injury may be linked to symptoms that persist following resolution of acute infection, as part of this syndrome. The Canadian Cardiovascular Society Rapid Response Team has generated this document to provide guidance to health care providers on the optimal management of patients with suspected cardiac complications of Long COVID-19.
<https://pubmed.ncbi.nlm.nih.gov/34090980/>

**Title:** **COVID-19 RELATED CARDIAC COMPLICATIONS - FROM CLINICAL EVIDENCES TO BASIC MECHANISMS. OPINION PAPER OF THE ESC WORKING GROUP ON CELLULAR BIOLOGY OF THE HEART**

**Source**: Cardiovascular Research; Jun 2021

**Abstract:** The pandemic of Coronavirus disease (COVID)-19 is a global threat, causing high mortality, especially in the elderly. The main symptoms and the primary cause of death are related to interstitial pneumonia. Viral entry also into myocardial cells mainly via the angiotensin converting enzyme type 2 (ACE2) receptor and excessive production of pro-inflammatory cytokines, however, also make the heart susceptible to injury. In addition to the immediate damage caused by the acute inflammatory response, the heart may also suffer from long-term consequences of COVID-19, potentially causing a post-pandemic increase in cardiac complications. Although the main cause of cardiac damage in COVID-19 remains coagulopathy with micro- (and to a lesser extent macro-) vascular occlusion, open questions remain about other possible modalities of cardiac dysfunction, such as direct infection of myocardial cells, effects of cytokines storm, and mechanisms related to enhanced coagulopathy. In this opinion paper, we focus on these lesser appreciated possibilities and propose experimental approaches that could provide a more comprehensive understanding of the cellular and molecular bases of cardiac injury in COVID-19 patients. We first discuss approaches to characterize cardiac damage caused by possible direct viral infection of cardiac cells, followed by formulating hypotheses on how to reproduce and investigate the hyperinflammatory and pro-thrombotic conditions observed in the heart of COVID-19 patients using experimental in vitro systems. Finally, we elaborate on strategies to discover novel pathology biomarkers using omics platforms.
<https://academic.oup.com/cardiovascres/advance-article/doi/10.1093/cvr/cvab201/6297395>

**Title:** **DEMOGRAPHIC, MULTI-MORBIDITY AND GENETIC IMPACT ON MYOCARDIAL INVOLVEMENT AND ITS RECOVERY FROM COVID-19: PROTOCOL DESIGN OF COVID-HEART-A UK, MULTICENTRE, OBSERVATIONAL STUDY**

**Source**: Journal of Cardiovascular Magnetic Resonance: official journal of the Society for Cardiovascular Magnetic Resonance; Jun 2021; vol. 23 (no. 1); p. 77

Abstract. Background. Although coronavirus disease 2019 (COVID-19) is primarily a respiratory illness, myocardial injury is increasingly reported and associated with adverse outcomes. However, the pathophysiology, extent of myocardial injury and clinical significance remains unclear. Methods: COVID-HEART is a UK, multicentre, prospective, observational, longitudinal cohort study of patients with confirmed COVID-19 and elevated troponin (sex-specific > 99th centile). Baseline assessment will be whilst recovering in-hospital or recently discharged, and include cardiovascular magnetic resonance (CMR) imaging, quality of life (QoL) assessments, electrocardiogram (ECG), serum biomarkers and genetics. Assessment at 6-months includes repeat CMR, QoL assessments and 6-min walk test (6MWT). The CMR protocol includes cine imaging, T1/T2 mapping, aortic distensibility, late gadolinium enhancement (LGE), and adenosine stress myocardial perfusion imaging in selected patients. The main objectives of the study are to: (1) characterise the extent and nature of myocardial involvement in COVID-19 patients with an elevated troponin, (2) assess how cardiac involvement and clinical outcome associate with recognised risk factors for mortality (age, sex, ethnicity and comorbidities) and genetic factors, (3) evaluate if differences in myocardial recovery at 6 months are dependent on demographics, genetics and comorbidities, (4) understand the impact of recovery status at 6 months on patient-reported QoL and functional capacity.

Discussion COVID-HEART will provide detailed characterisation of cardiac involvement, and its repair and recovery in relation to comorbidity, genetics, patient-reported QoL measures and functional capacity.
<https://jcmr-online.biomedcentral.com/articles/10.1186/s12968-021-00752-1>

**Title:** **HIGH POST-DISCHARGE MORTALITY IN HOSPITALIZED COVID-19 PATIENTS WITH CARDIOVASCULAR COMORBIDITIES**

**Source**: Polish Archives of Internal Medicine; Jun 2021

Hospitalized COVID-19 patients with comorbid CVD have a poor prognosis with in-hospital mortality rates being as high as 36% in comparison to those without the history of CVD.[3-5] Notwithstanding, the information on the outcomes of the disease in these patients following hospital discharge is scarce. In this study, we report on the short-term outcomes following hospital discharge in patients with COVID-19 and CVD comorbidities.
<https://www.mp.pl/paim/en/node/16026/pdf>

**Title:** **CARDIAC PERFORMANCE IN PATIENTS HOSPITALIZED WITH COVID-19: A 6 MONTH FOLLOW-UP STUDY**

**Source**: ESC Heart Failure; Jun 2021; vol. 8 (no. 3); p. 2232-2239

**Abstract:** AIMS Myocardial injury is frequently observed in patients hospitalized with coronavirus disease 2019 (COVID-19) pneumonia. Different cardiac abnormalities have been reported during the acute COVID-19 phase, ranging from infra-clinic elevations of myocardial necrosis biomarkers to acute cardiac dysfunction and myocarditis. There is limited information on late cardiac sequelae in patients who have recovered from acute COVID-19 illness. We aimed to document the presence and quantify the extent of myocardial functional alterations in patients hospitalized 6 months earlier for COVID-19 infection. METHODS AND RESULTS We conducted a prospective echocardiographic evaluation of 48 patients (mean age 58 ± 13 years, 69% male) hospitalized 6 ± 1 month earlier for a laboratory-confirmed and symptomatic COVID-19. Thirty-two (66.6%) had pre-existing cardiovascular risks factors (systemic hypertension, diabetes, or dyslipidaemia), and three patients (6.2%) had a known prior myocardial infarction. Sixteen patients (33.3%) experienced myocardial injury during the index COVID-19 hospitalization as identified by a rise in cardiac troponin levels. Six months later, 60.4% of patients still reported clinical symptoms including exercise dyspnoea for 56%. Echocardiographic measurements under resting conditions were not different between patients with versus without myocardial injury during the acute COVID-19 phase. In contrast, low-level exercise (25W for 3 min) induced a significant increase in the average E/e' ratio (10.1 ± 4.3 vs. 7.3 ± 11.5, P = 0.01) and the systolic pulmonary artery pressure (33.4 ± 7.8 vs. 25.6 ± 5.3 mmHg, P = 0.02) in patients with myocardial injury during the acute COVID-19 phase. Sensitivity analyses showed that these alterations of left ventricular diastolic markers were observed regardless of whether of cardiovascular risk factors or established cardiac diseases indicating SARS-CoV-2 infection as a primary cause. CONCLUSIONS Six months after the acute COVID-19 phase, significant cardiac diastolic abnormalities are observed in patients who experienced myocardial injury but not in patients without cardiac involvement.
<https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/ehf2.13315>

**NEUROLOGY & MENTAL HEALTH**

**Title:** **NEUROLOGY AND NEUROPSYCHIATRY OF COVID-19: A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE EARLY LITERATURE REVEALS FREQUENT CNS MANIFESTATIONS AND KEY EMERGING NARRATIVES**

Source: Journal of Neurology, Neurosurgery & Psychiatry, 3 June 2021

There is accumulating evidence of the neurological and neuropsychiatric features of infection with SARS-CoV-2. In this systematic review and meta-analysis, we aimed to describe the characteristics of the early literature and estimate point prevalences for neurological and neuropsychiatric manifestations. We searched MEDLINE, Embase, PsycINFO and CINAHL up to 18 July 2020 for randomised controlled trials, cohort studies, case-control studies, cross-sectional studies and case series. Studies reporting prevalences of neurological or neuropsychiatric symptoms were synthesised into meta-analyses to estimate pooled prevalence …

Neurological and neuropsychiatric symptoms of COVID-19 in the pandemic’s early phase are varied and common. The neurological and psychiatric academic communities should develop systems to facilitate high-quality methodologies, including more rapid examination of the longitudinal course of neuropsychiatric complications of newly emerging diseases and their relationship to neuroimaging and inflammatory biomarkers.
<https://jnnp.bmj.com/content/early/2021/06/03/jnnp-2021-326405>

**Title:** **PERSISTENT VISUAL DYSFUNCTION FOLLOWING PRES DUE TO COVID-19: CASE SERIES AND LITERATURE REVIEW**

Source: European Journal of Neurology; Jun 2021

**Abstract:** BACKGROUND The full spectrum of neurological sequelae in COVID-19 is beginning to emerge. SARS-CoV-2 has the potential to cause both direct and indirect brain vascular endothelial damage through infection and inflammation that may result in long-term neurological signs and symptoms. We sought to illuminate persistent neuro-ophthalmological deficits that may be seen following posterior reversible encephalopathy syndrome (PRES) due to COVID-19.METHODSWe identified three individuals with posterior reversible encephalopathy syndrome (PRES) due to COVID-19 in our hospital system. One patient was identified on presentation to our neuro-ophthalmology clinic. The other patients were identified through internal records search. These cases were compared to published reports of PRES in COVID-19 identified through systematic literature search of PubMed/LitCOVID. RESULTS All three patients were hospitalized with severe COVID-19 and developed altered mental status with new onset seizures that led to the recognition of PRES through diagnostic imaging. During recovery, two patients had persistent visual dysfunction including visual field deficits. One patient also experienced hallucinatory palinopsia and visual hallucinations. Literature search identified 32 other cases of PRES in the context of COVID-19. Visual disturbances were described in 14 cases (40%), with only 7 cases (50%) reporting full recovering by the time of publication. CONCLUSIONS As we learn about enduring neurological complications of COVID-19, it is possible that complications may be under-recognized and under-reported. Understanding the range of complications can help in post-care evaluation and management changes in the critical care setting to potentially intervene before persistent deficits occur due to COVID-19.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/ene.14965>

**Title:** **A 5-MINUTE COGNITIVE ASSESSMENT FOR SAFE REMOTE USE IN PATIENTS WITH COVID-19: CLINICAL CASE SERIES**

Source: JMIR Formative Research; Jun 2021; vol. 5 (no. 6); p. e26417

**Abstract:** BACKGROUND Early clinical experience during the COVID-19 pandemic has begun to elucidate that the disease can cause brain function changes that may result in compromised cognition both acutely and during variable recovery periods. Reports on cognitive assessment of patients with COVID-19 are often limited to orientation alone. Further assessment may seem to create an inappropriate burden for patients with acute COVID-19, which is characterized by fatigue and confusion, and may also compromise examiner safety. OBJECTIVE The aims of this study were to assess cognition in patients with COVID-19 as comprehensively as possible in a brief format, while observing safety precautions, and to establish a clear face value of the external validity of the assessment. METHODS We adapted a brief cognitive assessment, previously applied to liver transplant candidates and medical/surgical inpatients, for remote use in patients hospitalized for COVID-19 treatment. Collecting quality assurance data from telephone-administered assessments, this report presents a series of 6 COVID-19 case vignettes to illustrate the use of this 5-minute assessment in the diagnosis and treatment of brain effects. Primary medical teams referred the cases for neuropsychiatric consultation. RESULTS The age of the patients varied over four decades, and none of them were able to engage meaningfully with their surroundings on admission. On follow-up examination 6 to 10 days later, 4 of the 6 patients had recovered working memory, and only 1 had recovered calculation ability. Of the 6 patients, 2 were capable of complex judgment responses, while none of the cases completed frontal executive function testing in the normal range. CONCLUSIONS Cognitive assessment in patients with COVID-19 using this remote examination reveals patterns of cognitive recovery that vary among cases and are far more complex than loss of orientation. In this series, testing of specific temporal, parietal, and frontal lobe functions suggests that calculation ability, judgment, and especially frontal executive functions may characterize the effects of COVID-19 on the brain. Used widely and serially, this examination method can potentially inform our understanding of the effects of COVID-19 on the brain and of healing from the virus.
<https://formative.jmir.org/2021/6/e26417>

**Title:** **POST-COVID 19 NEUROLOGICAL SYNDROME: IMPLICATIONS FOR SEQUELAE'S TREATMENT**

Source: Journal of Clinical Neuroscience: official Journal of the Neurosurgical Society of Australasia; Jun 2021; vol. 88; p. 219-225

**Abstract:** Study design Literature review. OBJECTIVES Describe the implications of post-COVID syndrome due to neurological sequelae including treatment and the differences that may exist between this group of patients and those who present these events not associated with COVID-19.METHODSA non-systematic review of the literature was carried out in PubMed and Science Direct databases, using the keywords "Post-acute COVID-19 syndrome"; "Neurological complications"; "Neurologic Manifestations" "COVID-19″ and "Rehabilitation", as well as synonyms, which were combined with the operators "AND" and "OR".RESULTS The COVID-19 viral caustive agent, SARS-CoV-2, has a high affinity for human angiotensin-converting enzyme 2 receptor on type II pneumocytes. This receptor is also expressed in neurons and glial cells. Based on the foregoing and other not so clear mechanisms, it is stated that SARS-CoV-2 has tropism for the nervous system, being evident through the neurological manifestations observed in patients with mild, moderate and severe phenotype of the disease such as anosmia, ageusia, headache, cerebrovascular accidents, Guillain-Barré syndrome, seizures, and encephalopathy. This can generate severe sequelae and even fatal outcomes in those affected. CONCLUSIONS Neurological complications caused by COVID-19 are frequent and represent a risk that compromises the functional capacity and the life of patients. The suspicion of these conditions, the strict control of metabolic alterations and cardiovascular risk factors, the effective and safe treatment of these entities, are a current challenge throughout the pandemic. The rehabilitation process in these patients is a challenge. This is due to the limitations generated by multi-organ damage, as well as risk of brain death.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8031003/>

**Title:** **NEUROLOGICAL COMPLICATIONS IN PEDIATRIC PATIENTS WITH SARS-COV-2 INFECTION: A SYSTEMATIC REVIEW OF THE LITERATURE**

Source: Italian Journal of Pediatrics; Jun 2021; vol. 47 (no. 1); p. 123

**Abstract:** OBJECTIVES To describe clinical characteristics, laboratory tests, radiological data and outcome of pediatric cases with SARS-CoV-2 infection complicated by neurological involvement. STUDY DESIGNA computerized search was conducted using PubMed. An article was considered eligible if it reported data on pediatric patient(s) with neurological involvement related to SARS-CoV-2 infection. We also described a case of an acute disseminated encephalomyelitis (ADEM) in a 5-year-old girl with SARS-CoV-2 infection: this case was also included in the systematic review. RESULTS Forty-four articles reporting 59 cases of neurological manifestations in pediatric patients were included in our review. Most (32/59) cases occurred in the course of a multisystem inflammatory syndrome in children (MIS-C). Neurological disorders secondary to cerebrovascular involvement were reported in 10 cases: 4 children with an ischemic stroke, 3 with intracerebral hemorrhage, 1 with a cerebral sinus venous thrombosis, 1 with a subarachnoid hemorrhage, 1 with multiple diffuse microhemorrhages. Reversible splenial lesions were recognized in 9 cases, benign intracranial hypertension in 4 patients, meningoencephalitis in 4 cases, autoimmune encephalitis in 1 girl, cranial nerves impairment in 2 patients and transverse myelitis in 1 case. Five cases had Guillain-Barré syndrome (GBS) and two, including ours, had ADEM. Radiological investigations were performed in almost all cases (45/60): the most recurrent radiological finding was a signal change in the splenium of the corpus callosum. The presence of SARS-CoV-2 viral nucleic acid in the cerebrospinal fluid was proved only in 2 cases. The outcome was favorable in almost all, except in 5 cases. CONCLUSIONS Our research highlights the large range of neurological manifestations and their presumed pathogenic pathways associated with SARS-CoV-2 infection in children. Nervous system involvement could be isolated, developing during COVID-19 or after its recovery, or arise in the context of a MIS-C. The most reported neurological manifestations are cerebrovascular accidents, reversible splenial lesions, GBS, benign intracranial hypertension, meningoencephalitis; ADEM is also a possible complication, as we observed in our patient. Further studies are required to investigate all the neurological complications of SARS-CoV-2 infection and their underlying pathogenic mechanism.

<https://ijponline.biomedcentral.com/track/pdf/10.1186/s13052-021-01066-9.pdf>

**Title:** **UNDERSTANDING THE PSYCHIATRIC SYMPTOMS OF COVID-19: A META-ANALYSIS OF STUDIES ASSESSING PSYCHIATRIC SYMPTOMS IN CHINESE PATIENTS WITH AND SURVIVORS OF COVID-19 AND SARS BY USING THE SYMPTOM CHECKLIST-90-REVISED**

Source: Translational psychiatry; May 2021; vol. 11 (no. 1); p. 290

**Abstract:** Understanding the psychiatric symptoms of COVID-19 could facilitate the clinical management of COVID-19 patients. However, the profile of psychiatric symptoms among COVID-19 patients has been understudied. We performed a meta-analysis of studies assessing psychiatric symptoms of COVID-19 and SARS patients and survivors by using the Symptom Checklist-90-Revised (SCL-90-R), an instrument covering a wide spectrum of psychiatric symptoms. Studies reporting SCL-90-R subscale scores among patients with and survivors of COVID-19 and SARS were retrieved from major English and Chinese literature databases. Patients' pooled SCL-90-R subscale scores were compared to the Chinese normative SCL-90-R data, and Cohen's d values were calculated to indicate the severity of psychiatric symptoms. The Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data was used to assess the quality of the included studies. The search yielded 25 Chinese studies with 1675 acute COVID-19 and 964 acute SARS patients, 30 COVID-19 and 552 SARS survivors during very early recovery (up to 1 month since discharge), 291 SARS survivors during early recovery (1-6 months after discharge), and 48 SARS survivors during late recovery (12 months after discharge). None of the included studies were rated as good quality. The ten SCL-90-R-defined psychiatric symptoms, which were of medium-to-severe severity (d = 0.68-3.01), were all exhibited in acute COVID-19 patients, and the severity of these symptoms decreased to mild-to-medium during very early recovery (d = 0.17-0.73). SARS patients presented eight psychiatric symptoms with mild-to-severe severity during the acute stage (d =0.43-1.88), and thereafter, the severity of symptoms decreased over the follow-up period. However, somatization (d = 0.30) and anxiety (d = 0.28) remained at mild levels during late recovery. A wide variety of severe psychiatric symptoms have been reported by acute COVID-19 patients, and these symptoms, despite decreasing in severity, persist in very early recovery. The changing trajectory observed with SARS suggests that psychiatric symptoms of COVID-19 may persist for a long time after discharge, and therefore, periodic monitoring of psychiatric symptoms, psychosocial support, and psychiatric treatment (when necessary) may be necessary for COVID-19 patients from the acute to convalescent stages.

<https://www.nature.com/articles/s41398-021-01416-5.pdf>

**Title:** **POST-TRAUMATIC STRESS DISORDER AMONG COVID-19 SURVIVORS AT 3-MONTH FOLLOW-UP AFTER HOSPITAL DISCHARGE**

Source: Journal of General Internal Medicine; Jun 2021; vol. 36 (no. 6); p. 1702-1707

Abstract BACKGROUND Post-traumatic stress disorder (PTSD) is a severe but treatable mental disorder that develops after a life-threatening traumatic event. Coronavirus disease 19 (COVID-19) hospitalisation is a potentially traumatic experience, especially in severe cases. Furthermore, the unprecedented context of the severe acute respiratory syndrome coronavirus 2 pandemic, with daily media bombardment about COVID-19 mortality, may have amplified life-threatening perception also in patients with moderate infection. The aim of this study was to assess the prevalence and risk factors of PTSD at 3-month follow-up in patients hospitalised for COVID-19 infection. DESIGN In this cohort follow-up study conducted in a large Italian academic COVID-19 hospital, 115 recruited survivors were contacted by telephone 3 months after discharge to home care. The Posttraumatic Stress Disorder Checklist for DSM-5 was administered. Multivariate logistic regression models were used to analyse risk factors for the development of PTSD.KEY RESULTSA total of 10.4% of the sample received a PCL-5-based diagnosis of PTSD. Other 8.6% of the sample received a diagnosis of subthreshold PTSD, which leads to significant levels of distress and impairment. Multivariate regression analysis indicated that previous psychiatric diagnosis (odds ratio (OR) = 6.3, 95% confidence interval (CI): 3.7-78.6, p < 0.001) and obesity (OR = 3.51, 95% CI: 1.4-857.9, p = 0.03) were risk factors for developing PTSD. Chronic pulmonary diseases approached significance as a risk factor (OR = 6.03, 95% CI: 1.0-37.1, p = 0.053). Male sex was a protective factor (OR=0.04, 95% CI: 0.0-0.041, p = 0.007).CONCLUSIONSPTSD and subthreshold PTSD rates in patients hospitalised for COVID-19 are worrying. Female sex and pre-existing mental disorders are established risk factors for PTSD, while the prospective association with obesity needs further investigation. Clinicians treating COVID-19 should consider screening for PTSD at follow-up assessments in patients discharged from the hospital.
<https://pubmed.ncbi.nlm.nih.gov/33782888/>

**UROLOGY**

**Title:** **LONG-TERM EFFECTS OF COVID-19 ON KIDNEY FUNCTION**

Source: The Lancet (London, England); May 2021; vol. 397 (no. 10287); p. 1807

Chaolin Huang and colleagues have highlighted the putative renal consequences of COVID-19 at 6 months from discharge. A decreased estimated glomerular filtration rate (eGFR) was defined as less than 90 mL/min per 1·73 m2 and was observed in 35% of participants during follow-up. The term decreased eGFR is ambiguous. According to the mean age of the cohort, chronic kidney disease should be defined as an eGFR of less than 60 mL/min per 1·73 m2. The usual prevalence of eGFR less than 90 mL/min per 1·73 m2 in the Chinese general population of similar ages to those in Huang and colleagues' cohort ranges between 35% and 50%. In other words, the prevalence of eGFR of less than 90 mL/min per 1·73 m2 in COVID-19 survivors might not differ from the general population….
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00881-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2821%2900881-3/fulltext)

**ENT**

**Title:** **RECOVERY FROM COVID-19-RELATED OLFACTORY DISORDERS AND QUALITY OF LIFE: INSIGHTS FROM AN OBSERVATIONAL ONLINE STUDY**

**Source:** Chemical Senses; Jun 2021

**Abstract:** Although olfactory disorders (OD) are among the most significant symptoms of COVID-19, recovery time from COVID-19 related OD as well as their consequences on the quality of life remain poorly documented. We investigated the characteristics and behavioral consequences of COVID-19 related OD using a large-scale study involving 3111 French respondents (78% women) to an online questionnaire over a period of 9 months covering different epidemic waves (from April 8th 2020 to January 13th 2021). In the patients who subjectively recovered from COVID-19 related OD (N = 609), recovery occurred on average after 16 days and most of the time within one month ("normal" recovery range); 49 subjectively recovered in 1 to 2.5 months, and several cases took up to 6.5 months. Among the patients with ongoing OD (N = 2502), 974 were outside the "normal" recovery range (persistent OD) and reported OD for 1 to 10 months. Developing a persistent OD was more likely with increasing age and in women, and was more often associated with parosmia and phantosmia. The deleterious impact of COVID-19 related OD on the quality of life was significantly aggravated by OD duration, and was more pronounced in women. Because persistent OD is not infrequent after COVID-19, has deleterious consequences on the quality of life, and receives few solutions from the health practitioners, it would be beneficial to implement screening and treatment programs to minimize the long-term behavioral consequences of COVID-19 related OD.
<https://academic.oup.com/chemse/advance-article/doi/10.1093/chemse/bjab028/6294641>

**Title:** **AUDITORY PERFORMANCE IN RECOVERED SARS-COV-2 PATIENTS**

**Source:** Otology & Neurotology: official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology; Jun 2021; vol. 42 (no. 5); p. 666-670

**Abstract:** OBJECTIVE While COVID-19 symptoms impact rhinology (anosmia) and laryngology (airways), two major disciplines of the otolaryngology armamentarium, the virus has seemed to spare the auditory system. A recent study, however, reported changes in otoacoustic emission (OAE) signals measured in SARS-COV-2 positive patients. We sought to assess the effect of COVID-19 infection on auditory performance in a cohort of recovered SARS-COV-2 patients and controls. To avoid a potential bias of previous audiological dysfunction not related to SARS-COV-2 infection, the study encompasses patients with normal auditory history. We hypothesized that if SARS-COV-2 infection predisposes to hearing loss, we would observe subtle and early audiometric deficits in our cohort in the form of subclinical auditory changes…

RESULTS We have found no significant differences between recovered asymptomatic SARS-COV-2 patients and controls in any of transitory evoked otoacoustic emission (TEOAE), distortion product otoacoustic emissions (DPOAE), or ABR responses. CONCLUSIONS There is no cochlear dysfunction represented by ABR, TEOAE, and DPOAE responses in recovered COVID-19 asymptomatic patients. Retrocochlear function was also preserved as evident by the ABR responses. A long-term evaluation of a larger cohort of SARS-COV-2 patients will help to identify a possible contribution of SARS-COV-2 infection to recently published anecdotal auditory symptoms associated with COVID-19.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8115428/>

**Title:** **TESTING OLFACTORY DYSFUNCTION IN ACUTE AND RECOVERED COVID-19 PATIENTS: A SINGLE CENTER STUDY IN ITALY**

**Source:** Neurological Sciences: official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology; Jun 2021; vol. 42 (no. 6); p. 2183-2189

**Abstract:** BACKGROUND Olfactory dysfunction in coronavirus disease 2019 (COVID-19) is common during acute illness and appears to last longer than other symptoms. The aim of this study was to objectively investigate olfactory dysfunction in two cohorts of patients at two different stages: during acute illness and after a median recovery of 4 months. METHODS Twenty-five acutely ill patients and 26 recovered subjects were investigated. Acute patients had a molecular diagnosis of COVID-19; recovered subjects had a positive antibody assay and a negative molecular test. A 33-item psychophysical olfactory identification test tailored for the Italian population was performed. RESULTS Median time from symptoms onset to olfactory test was 33 days in acute patients and 122 days in recovered subjects. The former scored a significantly higher number of errors at psychophysical testing (median [IQR]: 8 [13] vs 3 [2], p < 0.001) and were more frequently hyposmic (64% vs 19%, p = 0.002). Recovered subjects reported a variable time to subjective olfactory recovery, from days up to 4 months. Participants included in the study reported no significant nasal symptoms at olfactory testing. Among recovered subject who reported olfactory loss during acute COVID-19, four (27%) were still hyposmic. Demographic and clinical characteristics did not show significant associations with olfactory dysfunction. CONCLUSION Moderate-to-severe hospitalized patients showed a high level and frequency of olfactory dysfunction compared to recovered subjects. In the latter group, subjects who reported persisting olfactory dysfunction showed abnormal scores on psychophysical testing, indicating that, at least in some subjects, persistent hyposmia may represent a long-term sequela of COVID-19.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8115428/>

**Title:** **COVID-19-RELATED ANOSMIA IS ASSOCIATED WITH VIRAL PERSISTENCE AND INFLAMMATION IN HUMAN OLFACTORY EPITHELIUM AND BRAIN INFECTION IN HAMSTERS**

Source: Science Translational Medicine; Jun 2021; vol. 13 (no. 596)

Abstract Whereas recent investigations have revealed viral, inflammatory, and vascular factors involved in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) lung pathogenesis, the pathophysiology of neurological disorders in coronavirus disease 2019 (COVID-19) remains poorly understood. Olfactory and taste dysfunction are common in COVID-19, especially in mildly symptomatic patients. Here, we conducted a virologic, molecular, and cellular study of the olfactory neuroepithelium of seven patients with COVID-19 presenting with acute loss of smell. We report evidence that the olfactory neuroepithelium is a major site of SARS-CoV2 infection with multiple cell types, including olfactory sensory neurons, support cells, and immune cells, becoming infected. SARS-CoV-2 replication in the olfactory neuroepithelium was associated with local inflammation. Furthermore, we showed that SARS-CoV-2 induced acute anosmia and ageusia in golden Syrian hamsters, lasting as long as the virus remained in the olfactory epithelium and the olfactory bulb. Last, olfactory mucosa sampling from patients showing long-term persistence of COVID-19-associated anosmia revealed the presence of virus transcripts and of SARS-CoV-2-infected cells, together with protracted inflammation. SARS-CoV-2 persistence and associated inflammation in the olfactory neuroepithelium may account for prolonged or relapsing symptoms of COVID-19, such as loss of smell, which should be considered for optimal medical management of this disease.

<https://pubmed.ncbi.nlm.nih.gov/33941622/>

**ENDOCRINOLOGY**

**Title:** **INSIGHTS FROM A PROSPECTIVE FOLLOW-UP OF THYROID FUNCTION AND AUTOIMMUNITY AMONG COVID-19 SURVIVORS**

**Source:** Reviews Endocrinology and metabolism (Seoul, Korea); Jun 2021

**Abstract:** Background The occurrence of Graves' disease and Hashimoto thyroiditis after coronavirus disease 2019 (COVID-19) raised concerns that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may trigger thyroid autoimmunity. We aimed to address the current uncertainties regarding incident thyroid dysfunction and autoimmunity among COVID-19 survivors. Methods We included consecutive adult COVID-19 patients without known thyroid disorders, who were admitted to Queen Mary Hospital from July 21 to September 21, 2020 and had serum levels of thyroid-stimulating hormone, free thyroxine, free triiodothyronine (fT3), and anti-thyroid antibodies measured both on admission and at 3 months. Results In total, 122 patients were included. Among 20 patients with abnormal thyroid function tests (TFTs) on admission (mostly low fT3), 15 recovered. Among 102 patients with initial normal TFTs, two had new-onset abnormalities that could represent different phases of thyroiditis. Among 104 patients whose anti-thyroid antibody titers were reassessed, we observed increases in anti-thyroid peroxidase (TPO) (P<0.001) and anti-thyroglobulin (P12 U, and four became anti-TPO-positive. Worse baseline clinical severity (P=0.018), elevated C-reactive protein during hospitalization (P=0.033), and higher baseline anti-TPO titer (P=0.005) were associated with a significant increase in anti-TPO titer. Conclusion Most patients with thyroid dysfunction on admission recovered during convalescence. Abnormal TFTs suggestive of thyroiditis occurred during convalescence, but infrequently. Importantly, our novel observation of an increase in anti-thyroid antibody titers post-COVID-19 warrants further follow-up for incident thyroid dysfunction among COVID-19 survivors.

<http://europepmc.org/article/MED/34107601?singleResult=true>

**Title:** **ACUTE AND LONG-TERM DISRUPTION OF GLYCOMETABOLIC CONTROL AFTER SARS-COV-2 INFECTION**

**Source:** Nature Metabolism; May 2021

**Abstract:** Patients with coronavirus disease 2019 (COVID-19) are reported to have a greater prevalence of hyperglycaemia. Cytokine release as a consequence of severe acute respiratory syndrome coronavirus 2 infection may precipitate the onset of metabolic alterations by affecting glucose homeostasis. Here we describe abnormalities in glycometabolic control, insulin resistance and beta cell function in patients with COVID-19 without any pre-existing history or diagnosis of diabetes, and document glycaemic abnormalities in recovered patients 2 months after onset of disease. In a cohort of 551 patients hospitalized for COVID-19 in Italy, we found that 46% of patients were hyperglycaemic, whereas 27% were normoglycaemic. Using clinical assays and continuous glucose monitoring in a subset of patients, we detected altered glycometabolic control, with insulin resistance and an abnormal cytokine profile, even in normoglycaemic patients. Glycaemic abnormalities can be detected for at least 2 months in patients who recovered from COVID-19. Our data demonstrate that COVID-19 is associated with aberrant glycometabolic control, which can persist even after recovery, suggesting that further investigation of metabolic abnormalities in the context of long COVID is warranted.
<https://www.nature.com/articles/s42255-021-00407-6>

**PAEDIATRICS**

**Title:** **LONG COVID IN CHILDREN: PARTNERSHIPS BETWEEN FAMILIES AND PAEDIATRICIANS ARE A PRIORITY FOR BETTER CARE**

**Source:** Journal of Paediatrics & Child Health, 1 June 2021

… We understand that, on a superficial glimpse, these symptoms may be confused as psychological constraints. However, with a thorough examination, a careful collection of the medical history and with specific evaluations, we are easily seeing that the lives of these children suddenly changed after COVID-19 diagnosis, and seldomly psychological issues were present before it. We must understand Long COVID and recognise its impact also in the paediatric age. It is our duty to investigate, to seek the pathophysiological basis of Long COVID, because only in this way will we be able to give answers to these families. Ultimately, children will benefit from this journey of partnership between families and paediatricians.
<https://onlinelibrary.wiley.com/doi/10.1111/jpc.15600>

**Title:** **LONG-TERM CLINICAL AND SEROLOGICAL FOLLOW-UP OF PAEDIATRIC PATIENTS INFECTED BY SARS-COV-2**

**Source:** Source Le Infezioni in Medicina; Jun 2021; vol. 29 (no. 2); p. 216-223 Publication Date Jun 2021 Publication

Abstract Studies concerning Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection in paediatrics are limited to children mainly selected from hospitals, where patients with complications and co-morbidities are managed. We aimed to describe the course of the Coronavirus Disease 2019 (COVID-19) in a population of children enrolled by place of residence, from diagnosis to recovery, with a long-term clinical and serological follow-up.

<https://pubmed.ncbi.nlm.nih.gov/34061786/>

**Title:** **6-MONTH MULTIDISCIPLINARY FOLLOW-UP AND OUTCOMES OF PATIENTS WITH PAEDIATRIC INFLAMMATORY MULTISYSTEM SYNDROME (PIMS-TS) AT A UK TERTIARY PAEDIATRIC HOSPITAL: A RETROSPECTIVE COHORT STUDY**

**Source:** The Lancet Child & Adolescent Health, 24th May 2021

Paediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS) is a new, rare, post-infectious complication of SARS-CoV-2 infection in children. We aimed to describe the 6-month outcomes of PIMS-TS. Methods. This retrospective cohort study comprised children (aged <18 years) who fulfilled the UK Royal College of Paediatrics and Child Health (RCPCH) diagnostic criteria for PIMS-TS and were admitted to Great Ormond Street Hospital (London, UK) between April 4 and Sept 1, 2020. Patients were followed up by a multidisciplinary team of specialists at 6 weeks and 6 months after admission. Biochemical and functional outcomes were analysed. Findings. 46 children were included in this study. The median age at presentation was 10·2 years (IQR 8·8–13·3), 30 (65%) patients were male and 16 (35%) were female, 37 (80%) were from minority ethnic groups, and eight (17%) had pre-existing comorbidities. All patients had elevated markers of systemic inflammation at baseline. None of the patients died. By 6 months, systemic inflammation was resolved in all but one patient. 38 (90%) of 42 patients who had positive SARS-CoV-2 IgG antibodies within 6 weeks of admission remained seropositive at 6 months. Echocardiograms were normal in 44 (96%) of 46 patients by 6 months, and gastrointestinal symptoms that were reported in 45 (98%) of 46 patients at onset were present in six (13%) of 46 patients at 6 months. Renal, haematological, and otolaryngological findings largely resolved by 6 months. Although minor abnormalities were identified on neurological examination in 24 (52%) of 46 patients at 6 weeks and in 18 (39%) of 46 at 6 months, we found minimal functional impairment at 6 months (median Expanded Disability Status Scale score 0 [IQR 0–1]). Median manual muscle test-8 scores improved from 53 (IQR 43–64) during hospital admission to 80 (IQR 68–80) at 6 months, but 18 (45%) of 40 patients showed 6-min walk test results below the third centile for their age or sex at 6 months. PedsQL responses revealed severe emotional difficulties at 6 months (seven [18%] of 38 by parental report and eight [22%] of 38 by self report). 45 (98%) of 46 patients were back in full-time education (virtually or face to face) by 6 months.

Interpretation. Despite initial severe illness, few organ-specific sequelae were observed at 6 months. Ongoing concerns requiring physical re-conditioning and mental health support remained, and physiotherapy assessments revealed persisting poor exercise tolerance. Longer-term follow-up will help define the extended natural history of PIMS-TS.
[https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(21)00138-3/fulltext](https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642%2821%2900138-3/fulltext)

**REHABILITATION**

**Title:** **REHABILITATION TO ENABLE RECOVERY FROM COVID-19: A RAPID SYSTEMATIC REVIEW**

**Source**: Physiotherapy; Jun 2021; vol. 111; p. 4-22

Abstract OBJECTIVES To establish the evidence for rehabilitation interventions tested in populations of patients admitted to ICU and critical care with severe respiratory illness, and consider whether the evidence is generalizable to patients with COVID-19.METHODSThe authors undertook a rapid systematic review. Medline (via OvidSP), CINAHL Complete (via EBSCOhost), Cochrane Library, Cochrane Database of Systematic Reviews and CENTRAL (via Wiley), Epistemonikos (via Epistemonikos.org), PEDro (via pedro.org.au) and OTseeker (via otseeker.com) searched to 7 May 2020. The authors included systematic reviews, RCTs and qualitative studies involving adults with respiratory illness requiring intensive care who received rehabilitation to enhance or restore resulting physical impairments or function. Data were extracted by one author and checked by a second. TIDier was used to guide intervention descriptions. Study quality was assessed using Critical Skills Appraisal Programme (CASP) tools. RESULTS Six thousand nine hundred and three titles and abstracts were screened; 24 systematic reviews, 11 RCTs and eight qualitative studies were included. Progressive exercise programmes, early mobilisation and multicomponent interventions delivered in ICU can improve functional independence. Nutritional supplementation in addition to rehabilitation in post-ICU hospital settings may improve performance of activities of daily living. The evidence for rehabilitation after discharge from hospital following an ICU admission is inconclusive. Those receiving rehabilitation valued it, engendering hope and confidence. CONCLUSIONS Exercise, early mobilisation and multicomponent programmes may improve recovery following ICU admission for severe respiratory illness that could be generalizable to those with COVID-19. Rehabilitation interventions can bring hope and confidence to individuals but there is a need for an individualised approach and the use of behaviour change strategies. Further research is needed in post-ICU settings and with those who have COVID-19.
[https://www.physiotherapyjournal.com/article/S0031-9406(21)00017-1/fulltext](https://www.physiotherapyjournal.com/article/S0031-9406%2821%2900017-1/fulltext)

**Title:** **HAND GRIP STRENGTH BEFORE AND AFTER SARS-COV-2 INFECTION IN COMMUNITY-DWELLING OLDER ADULTS**

**Source**: Journal of the American Geriatrics Society; Jun 2021

**Abstract:** OBJECTIVE To assess the association between SARS-CoV-2 infection and decreased hand grip strength (HGS).DESIGN Longitudinal population-based study. SETTING Community-dwelling older adults (aged ≥60 years) living in a rural Ecuadorian village struck by the SARS-CoV-2 pandemic. PARTICIPANTS Of 282 enrolled individuals, 254 (90%) finished the study... CONCLUSIONS This study shows an independent deleterious impact of SARS-CoV-2 on HGS that is more marked among individuals with infections that occurred more than eight months after infection. Results suggest the possibility of chronic damage to skeletal muscles by SARS-CoV-2.
<https://agsjournals.onlinelibrary.wiley.com/doi/full/10.1111/jgs.17335>

**Title:** **SEVERE LOSS OF MECHANICAL EFFICIENCY IN COVID-19 PATIENTS**

**Source**: Journal of Cachexia, Sarcopenia and Muscle; Jun 2021

**Abstract:** BACKGROUND There is limited information about the impact of coronavirus disease (COVID-19) on the muscular dysfunction, despite the generalized weakness and fatigue that patients report after overcoming the acute phase of the infection. This study aimed to detect impaired muscle efficiency by evaluating delta efficiency (DE) in patients with COVID-19 compared with subjects with chronic obstructive pulmonary disease (COPD), ischaemic heart disease (IHD), and control group (CG).METHODSA total of 60 participants were assigned to four experimental groups: COVID-19, COPD, IHD, and CG (n = 15 each group). Incremental exercise tests in a cycle ergometer were performed to obtain peak oxygen uptake (VO2 peak). DE was obtained from the end of the first workload to the power output where the respiratory exchange ratio was 1.RESULTSA lower DE was detected in patients with COVID-19 and COPD compared with those in CG (P ≤ 0.033). However, no significant differences were observed among the experimental groups with diseases (P > 0.05). Lower VO2 peak, peak ventilation, peak power output, and total exercise time were observed in the groups with diseases than in the CG (P < 0.05). A higher VO2 , ventilation, and power output were detected in the CG compared with those in the groups with diseases at the first and second ventilatory threshold (P < 0.05). A higher power output was detected in the IHD group compared with those in the COVID-19 and COPD groups (P < 0.05) at the first and second ventilatory thresholds and when the respiratory exchange ratio was 1. A significant correlation (P < 0.001) was found between the VO2 peak and DE and between the peak power output and DE (P < 0.001).CONCLUSIONS Patients with COVID-19 showed marked mechanical inefficiency similar to that observed in COPD and IHD patients. Patients with COVID-19 and COPD showed a significant decrease in power output compared to IHD during pedalling despite having similar response in VO2 at each intensity. Resistance training should be considered during the early phase of rehabilitation.

<http://europepmc.org/article/MED/34102017?singleResult=true>

**Title:** **REHABILITATION POST-COVID-19: CROSS-SECTIONAL OBSERVATIONS USING THE STANFORD HALL REMOTE ASSESSMENT TOOL**

**Source**: BMJ Military Health; May 2021

**Abstract:** INTRODUCTION The multisystem COVID-19 can cause prolonged symptoms requiring rehabilitation. This study describes the creation of a remote COVID-19 rehabilitation assessment tool to allow timely triage, assessment and management. It hypotheses those with post-COVID-19 syndrome, potentially without laboratory confirmation and irrespective of initial disease severity, will have significant rehabilitation needs. METHODS Cross-sectional study of consecutive patients referred by general practitioners (April-November 2020). Primary outcomes were presence/absence of anticipated sequelae. Binary logistic regression was used to test association between acute presentation and post-COVID-19 symptomatology.RESULTS155 patients (n=127 men, n=28 women, median age 39 years, median 13 weeks post-illness) were assessed using the tool. Acute symptoms were most commonly shortness of breath (SOB) (74.2%), fever (73.5%), fatigue (70.3%) and cough (64.5%); and post-acutely, SOB (76.7%), fatigue (70.3%), cough (57.4%) and anxiety/mood disturbance (39.4%). Individuals with a confirmed diagnosis of COVID-19 were 69% and 63% less likely to have anxiety/mood disturbance and pain, respectively, at 3 months. CONCLUSIONS Rehabilitation assessment should be offered to all patients suffering post-COVID-19 symptoms, not only those with laboratory confirmation and considered independently from acute illness severity. This tool offers a structure for a remote assessment. Post-COVID-19 programmes should include SOB, fatigue and mood disturbance management.
<https://militaryhealth.bmj.com/content/jramc/early/2021/05/25/bmjmilitary-2021-001856.full.pdf>

**Title:** **OUTCOMES OF A COVID-19 RECOVERY PROGRAM FOR PATIENTS HOSPITALIZED WITH SARS-COV-2 INFECTION IN NEW YORK CITY: A PROSPECTIVE COHORT STUDY**

**Source**: PM & R: the journal of Injury, Function, and Rehabilitation; Jun 2021; vol. 13 (no. 6); p. 609-617

Abstract BACKGROUND In the spring of 2020, New York City was an epicenter of coronavirus disease 2019 (COVID-19). The post-hospitalization needs of COVID-19 patients were not understood and no outpatient rehabilitation programs had been described. OBJECTIVE To evaluate whether a virtual rehabilitation program would lead to improvements in strength and cardiopulmonary endurance when compared with no intervention in patients discharged home with persistent COVID-19 symptoms. DESIGN Prospective cohort study. SETTING Academic medical center. PATIENTS Between April and July 2020, 106 patients discharged home with persistent COVID-19 symptoms were treated. Forty-four patients performed virtual physical therapy (VPT); 25 patients performed home physical therapy (HPT); 17 patients performed independent exercise program (IE); and 20 patients did not perform therapy. INTERVENTIONS All patients were assessed by physiatry. VPT sessions were delivered via secure Health Insurance Portability and Accountability Act compliant telehealth platform 1-2 times/week. Patients were asked to follow up 2 weeks after initial evaluation. MAIN OUTCOME MEASURES Primary study outcome measures were the change in lower body strength, measured by the 30-second sit-to-stand test; and the change in cardiopulmonary endurance, measured by the 2-minute step test. RESULTS At the time of follow-up, 65% of patients in the VPT group and 88% of patients in the HPT group met the clinically meaningful difference for improvement in sit-to-stand scores, compared with 50% and 17% of those in the IE group and no-exercise group (P = .056). The clinically meaningful difference for improvement in the step test was met by 74% of patients in the VPT group and 50% of patients in the HPT, IE, and no-exercise groups (P = .12).CONCLUSIONS Virtual outpatient rehabilitation for patients recovering from COVID-19 improved lower limb strength and cardiopulmonary endurance, and an HPT program improved lower limb strength. Virtual rehabilitation seems to be an efficacious method of treatment delivery for recovering COVID-19 patients.
<https://pubmed.ncbi.nlm.nih.gov/33599057/>

**news & local SERVICE DEVelopments**

**Title:** **THE FOUR MOST URGENT QUESTIONS ABOUT LONG COVID**

**Source**: Nature, 7th June 2021

Scientists are starting to get insights into the lingering disorder that affects some people infected with SARS-CoV-2 — but many mysteries remain unsolved.

<https://www.nature.com/articles/d41586-021-01511-z>

**Title: LONG COVID HAS LASTED OVER A YEAR FOR 376,000 PEOPLE IN THE UK**

**Source**: New Scientist, 4th June 2021

An estimated 1 million people in private households in the UK say they had [long covid](https://www.newscientist.com/article/mg24833064-100-long-covid-why-are-some-people-sick-months-after-catching-the-virus/) in the four weeks to 2 May, according to the latest survey from the Office for National Statistics (ONS). Of these people, an estimated 869,000 first had covid-19 – or suspected they had covid-19 – at least 12 weeks earlier, while 376,000 first had the virus or suspected they had it at least a year ago. Long covid was estimated to be adversely affecting the day-to-day activities of 650,000 people, with 192,000 reporting that their ability to undertake such activities was limited a lot.
Read more: <https://www.newscientist.com/article/2279878-long-covid-has-lasted-over-a-year-for-376000-people-in-the-uk/#ixzz6xx2aFOew>

**Title:** **GPS TO BE ABLE TO REFER CHILDREN AND YOUNG PEOPLE TO SPECIALIST LONG COVID CLINICS**

**Source**: Pulse, 15th June 2021

GPs will soon be able to refer children and young people to new long Covid clinics as the specialist services are expanded. In December, new [NICE guidance recommended that GPs should consider referring long Covid patients to specialist clinics as soon as four weeks after acute infection](https://www.pulsetoday.co.uk/news/clinical-areas/respiratory/gps-should-consider-long-covid-referral-after-just-four-weeks-says-final-nice-guideline/), after ruling out other diagnoses. NHS England announced at the time that [69 long Covid clinics were in place around the country](https://www.pulsetoday.co.uk/news/clinical-areas/respiratory/gps-should-consider-long-covid-referral-after-just-four-weeks-says-final-nice-guideline/), with more sites expected to open in January. It today announced it will set up 15 paediatric long Covid clinics, as part of a £100m investment in expanding care for the condition.
<https://www.pulsetoday.co.uk/news/clinical-areas/paediatrics/gps-to-be-able-to-refer-children-and-young-people-to-specialist-long-covid-clinics/?utm_source=newsletter&utm_medium=email&utm_campaign=pulse%20daily>

**Title:** **LONG COVID 'POSTCODE LOTTERY' IN YORKSHIRE AS PROMISED CLINIC IN ROTHERHAM FAILS TO MATERIALISE**

**Source**: Yorkshire Post, 2nd June 2021

A Yorkshire MP has criticised a "postcode lottery" for sufferers of 'long Covid' in the region after it emerged that promised clinics set up by local NHS trusts to treat the condition had not yet been set up.

Rotherham’s hospital trust has not established a clinic for patients suffering with the long- term symptoms of coronavirus despite NHS England claiming it was in operation by December. Though the NHS England website lists the Rotherham NHS Foundation Trust as hosting one of 11 operational long Covid clinics in Yorkshire, the trust told the All-Party Parliamentary Group for Coronavirus it “does not run a long Covid clinic”. The NHS said a clinic had been set up by the York and Scarborough Teaching Hospital NHS Foundation Trust in December.

But the trust said while it had been remotely assessing post-Covid patients since the end of March, "a monthly face-to-face assessment clinic where patients will be seen by a Respiratory Consultant and a Respiratory Physiotherapist" would not open until later this month…

<https://www.yorkshirepost.co.uk/health/coronavirus/long-covid-postcode-lottery-in-yorkshire-as-promised-clinic-in-rotherham-fails-to-materialise-3257725>

**Title:** **SOME LONG COVID SUFFERERS IN ENGLAND WAITING MONTHS FOR TREATMENT**

**Source**: The Guardian, 30th May 2021

MPs call on Matt Hancock to explain ‘postcode lottery’ despite assertion that clinic network is operational.

<https://www.theguardian.com/world/2021/may/30/some-long-covid-sufferers-in-england-waiting-months-for-treatment>

**Title:** **COUNT THE COST OF DISABILITY CAUSED BY COVID-19**

**Source**: Nature, 26th May 2021

Focusing only on cases and deaths hides the pandemic’s lasting health burden on people, societies and economies. The COVID-19 pandemic is well into its second year, but countries are only beginning to grapple with the lasting health crisis. In March, a UK consortium reported that 1 in 5 people who were hospitalized with the disease had a new disability after discharge. A large US study found similar effects for both hospitalized and non-hospitalized people. Among adults who were not hospitalized, 1 in 10 have ongoing symptoms 12 weeks after a positive test3. Treatment services for the long-term consequences of COVID-19 are already having to be absorbed into health and care systems urgently. Tackling this requires a much clearer picture of the burden of the disease than currently exists…

Here we offer a very rough first estimate, based on simple assumptions, that as much as 30% of the COVID-19 health burden could be due to COVID-induced disability, not death. Much more needs to be done to improve such estimates so they can be acted on effectively. To design the right policies now, and invest well to deal with COVID-19 (and other pandemics) in the future, we need to use metrics that encapsulate all the consequences of a disease.
<https://www.nature.com/articles/d41586-021-01392-2>

**TITLE:** **COVID RECOVERY SERVICE MORECAMBE BAY**

**Source**: Twitter, June 2021

‘Our service has been running for over a year now, we have received >600 referrals & delivered >2000 consultations to patients recovering from Critical care or Long-COVID Thank you to all those who created, implemented, supported and continued this fab service’ (see comments)
<https://twitter.com/COVIDrehabUHMBT/status/1396882286881263622>
<https://twitter.com/COVIDrehabUHMBT>

‘

We

[TRFT Library & Knowledge Service](https://www.trftlibraryknowledge.com/) aim to bring together the latest guidelines, research and news on Covid-19 through our [Covid-19 portal](https://www.trftlibraryknowledge.com/coronavirus.html). For daily updates on Covid-19 visit our '[Latest Health](https://trfthealthweeklydigest.wordpress.com/)' newsfeed, or use the hashtag [#covid19rftlks](https://twitter.com/hashtag/covid19rftlks?src=hashtag_click) to see our latest tweets on Covid-19 research, guidelines and news.

We also produce a range of subject-specific news feeds to ensure our clinical and professional teams stay up to date with developments in their work areas. Please visit our [website](http://www.trftlibraryknowledge.com/) for more information

<https://www.trftlibraryknowledge.com/health-newsfeeds.html>