

## COVID PATIENT RECOVERY ALLIANCE

The COVID Patient Recovery Alliance is a multi-sector collaboration with the mission to support the energy and innovation of government and private-sector leaders as they care for individuals with long-COVID. The Alliance is developing national solutions that link diverse data sources, improve clinical care pathways, and ensure sustainable federal financial support for the care of these patients. The Alliance is particularly interested in those patients who served their communities and nation when called to duty; whose COVID-19-related costs are extraordinary and burdensome; or who are underserved by existing programs, including racial and ethnic minorities and communities experiencing health disparities.

For more information, please visit our website at [COVID19PatientRecovery.org](https://COVID19PatientRecovery.org).

### PURPOSE OF RESEARCH TRACKER

The research, news, and knowledge of long-COVID is quickly evolving. To stay up-to-date and informed on long-COVID, the Patient Recovery Alliance is performing routine intel scans from a variety of sources – from peer-reviewed publications to various news websites – and on variety of long-COVID-related topics, including health care coverage, workers’ compensation, impacted populations, symptoms, and prevalence. The outputs of these intel scans are compiled in this document, which will be periodically updated.

# COVID-19 Patient Recovery Alliance Research Tracker

Date	Article	Publication	Key Takeaways
<b>July 2022</b>			
7/7/2022	<a href="#">Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK</a>	Office for National Statistics	An estimated 2.0 million people living in private households in the UK (3.0% of the population) were experiencing self-reported long-COVID as of June 4, 2022. Of people with self-reported long COVID, 21% first had (or suspected they had) COVID-19 less than 12 weeks previously, 74% at least 12 weeks previously, 41% at least one year previously and 21% at least two years previously. Long COVID symptoms adversely affected the day-to-day activities of 1.4 million people (72% of those with self-reported long COVID), with 21% reporting that their ability to undertake their day-to-day activities had been "limited a lot". Fatigue continued to be the most common symptom reported as part of individuals' experience of long COVID (56% of those with self-reported long COVID), followed by shortness of breath (31%), loss of smell (22%), and muscle ache (21%). As a proportion of the UK population, the prevalence of self-reported long COVID was greatest in people aged 35 to 69 years, females, people living in more underserved areas, those working in social care, health care, or teaching and education, and those with another activity-limiting health condition or disability.
7/6/2022	<a href="#">Long Covid estimates are startlingly high. Here's how to understand them</a>	STAT	"Whatever long-COVID's toll turns out to be, it will be too many people. However you gather or analyze the data, the proportion of people whose troublesome, sometimes disabling symptoms linger after their acute COVID-19 infections clear is sizable and worrying. It's the cruelty of large numbers: Even if the actual prevalence of long-COVID is much smaller than recent estimates, a small percentage of a large number is a large number." "1 in 5 may be an underestimate." "Even if it's in single digits at the end of the day, once a formal case definition and a true prevalence study can be accomplished, it's still a lot of people. But it's very hard to pinpoint a solid number." "Priya Duggal, and epidemiologist at John Hopkins School of Public Health, said that even with caveats, she finds the data pretty consistent for a range of 20% to 30% of people experiencing long-COVID symptoms "It's still a substantial number of people. To me, that's the take-home point," she said. "The second point is that it's real." Long-COVID has the potential to widen existing gaps in health, Linda Sprague Martinez of the Boston University School of Social Work said, "We don't want to wait. Getting ahead of it will be really important for us."
7/1/2022	<a href="#">Association Between BNT162b2 Vaccination and Long COVID After Infections Not Requiring Hospitalization in Health Care Workers</a>	JAMA	N=2260; 739 COVID positive (89 asymptomatic); Study conducted from March 2020 to April 2022 with workers from 9 Italian health care facilities. 229 (31%) participants who tested positive for COVID had long-COVID. The prevalence of long COVID varied across the pandemic waves, from 48.1% in wave 1 to 35.9% in wave 2 to 16.5% in wave 3. (Wave 1: wild-type; Wave 2: Alpha; Wave 3: Delta and Omicron). The number of vaccine doses was associated with lower long COVID prevalence: 41.8% in unvaccinated patients, 30.0% with 1 dose, 17.4% with 2 doses, and 16.0% with 3 doses. Older age, higher body mass index, allergies, and obstructive lung disease were associated with long-COVID.
7/8/2022	<a href="#">The Economy Could Have a Long Case of Long Covid - WSJ</a>	Wall Street Journal	"Beyond healthcare costs, people with long-COVID might in some cases be unable to work and require additional support or they might choose to retire early." "To the extent that long-COVID sufferers are unable to return to work, or to work as many hours, that will represent a loss for the economy...absent those workers, the economy might not be able to grow as quickly as it otherwise might, leaving the country worse off." "Researchers still know too little about long-COVID to quantify what sort of burden it might place on the country, but the available evidence suggests the costs could be significant enough to take very seriously."

# COVID-19 Patient Recovery Alliance Research Tracker

Date	Article	Publication	Key Takeaways
6/17/2022	<a href="#">Outcomes of SARS-CoV-2 Reinfection</a>	Nature Portfolio (preprint)	Results show that beyond the acute phase, reinfection with SARS-CoV-2 contributes substantial additional risks of all-cause mortality, hospitalization, and post-acute sequelae in the pulmonary and broad array of pulmonary organ systems. Compared to those with first infection, those with reinfection exhibited increased risk and excess burden of all-cause mortality, hospitalization, and at least one sequela in the acute phase and the post-acute phase of the reinfection. The risks and excess burdens of all-cause mortality, hospitalization, and at least on sequela during the post-acute phase gradually attenuated over time but remained evident even six months after reinfection.
7/12/2022	<a href="#">Long covid patients travel abroad for expensive and experimental “blood washing”</a>	BMJ	Thousands of long-COVID patients in the UK are traveling to private clinics in Cyprus, Germany and Switzerland for apheresis—a blood filtering treatment normally used for patients with lipid disorders that have not responded to drugs—and anti-clotting therapy. Existing research has suggested that "microclots" present in the plasma of people with long COVID could be responsible for long-COVID symptoms; more research is needed to understand how microclots form and whether they are causing long-COVID symptoms. “They [microclots] may be a biomarker for disease, but how do we know they are causal?” said Robert Ariens, professor of vascular biology at the University of Leeds School of Medicine. He believes the clinics offering apheresis and anticoagulation therapy are prematurely providing treatment that is based on a hypothesis that needs more scientific research. “If we don’t know the mechanisms by which the microclots form and whether or not they are causative of disease, it seems premature to design a treatment to take the microclots away, as both apheresis and triple anticoagulation are not without risks, the obvious one being bleeding,” he continued.
7/11/2022	<a href="#">Long Covid May Be Long Tail of Risk for Insurers - WSJ</a>	Wall Street Journal	“We are at an inflection point, and exactly where risk goes isn’t yet clear,” says Stuart Silverman, principal and consulting actuary at Milliman, which works with insurance companies. A study of thousands of claims by the Workers’ Compensation Insurance Rating Bureau of California found that about 11% of claims for mild Covid infections also involved workers receiving medical treatments for long-COVID symptoms in the four months following acute care. That jumped to about 36% and 40%, respectively, for severe and critical cases. “The potential long-term cost impacts of long-COVID on healthcare systems and disability insurance programs are also increasingly concerning.”
7/11/2022	<a href="#">Long Covid Is an Elusive Target for Big Pharma - WSJ</a>	Wall Street Journal	Researchers have been calling on Pfizer to undertake a Paxlovid clinical trial for long-COVID patients; yet a spokeswoman says the company is still “considering what a study may entail.” Dr. Deeks says he has talked to several companies about testing treatments, but he says representatives at these companies typically tell him that “no one knows how to define it, so no one wants to invest \$1 billion in a Phase III program.”
7/12/2022	<a href="#">Multi-omics provide evidence for an anti-inflammatory immune signature and metabolic alterations in patients with Long COVID Syndrome; an exploratory study   medRxiv</a>	medRxiv	This study presents a distinct multi-omics signature demonstrating a prevalence of anti-inflammatory effector molecules combined with molecular patterns of characteristically altered metabolism detectable in plasma of LCS patients, offering a unique chance for diagnosis with selected molecular biomarkers and providing novel hypotheses about the pathophysiology of the disease, thus potentially aiding the development of urgently required treatment options. It can be envisioned that a combination of presently described proteins (e.g. low SERPINA5), docosanoids (e.g. high DHA) and small metabolites (e.g. high hypaphorine) in patients with characteristic anamnesis and symptoms could help to identify and better define LCS. In this regard, large scale studies to assess the potential sensitivity and specificity of such scores, including the consideration of different SARS-CoV-2 strains, are clearly warranted.

# COVID-19 Patient Recovery Alliance Research Tracker

Date	Article	Publication	Key Takeaways
7/14/2022	<a href="#">High-pressure oxygen shows promise in long COVID; earlier Omicron infection may protect against subvariants</a>	Reuters	Patients with long-COVID may see some improvement after breathing pure oxygen in a high-air-pressure environment, according to data from a small Israeli trial. N=73 patients with post-COVID symptoms lasting at least three months to receive hyperbaric oxygen therapy (HBOT) or a placebo. Participants in the HBOT group had 40 sessions breathing pure oxygen in a chamber in which the air pressure was two-to-three times higher than normal, allowing the lungs to receive more oxygen than they normally would. Shortly after the last treatment, the HBOT group showed "significant improvement" compared to the sham group in thinking skills, energy, sleep, psychiatric symptoms, and pain. Symptom improvement was associated with magnetic resonance imaging evidence of structural and functional brain healing and improved delivery of oxygen-carrying blood to the brain.
7/11/2022	<a href="#">"I feel like my body is broken": exploring the experiences of people living with long COVID   SpringerLink</a>	Quality of Life Research	N=169 survey respondents; a majority of respondents managed symptoms of long-COVID for longer than 10 months. Four overlapping and interconnected themes were identified: (1) Long COVID symptoms are numerous and wearing, (2) The effects of long COVID are pervasive, (3) Physical activity is difficult and, in some cases, not possible, and (4) Asking for help when few are listening, and little is working.
6/26/2022	<a href="#">Persistent circulating SARS-CoV-2 spike is associated with post-acute COVID-19 sequelae   medRxiv</a>	medRxiv	N=63. In 37 patients diagnosed with long-COVID, researchers reported detecting a fragment of SARS-CoV-2 in blood samples from long COVID sufferers up to a year after their original infection. The samples were taken two or more times over the course of a year since the patients' original COVID infection and compared with plasma from a control group of 26 people who had fully recovered from the disease. The intact spike protein found in patients' blood could indicate that infected cells missed by the immune system are to blame for long COVID.
7/8/2022	<a href="#">JCI Insight - Anti-nucleocapsid antibody levels and pulmonary comorbid conditions are linked to post-COVID-19 syndrome</a>	JCI Insight	In 90% of the study participants, antibodies to SARS-CoV-2 persisted for up to nine months after diagnosis. However, antiviral treatment, including remdesivir, had no effect on TTSR. The study identified additional features predictive of long-COVID. First, they found an association between pre-existing lung diseases, including asthma and chronic obstructive pulmonary disease (COPD), with a longer TTSR and TTSR. Second, there was a trend towards longer TTSR and TTSR in a subset of participants with prolonged antigen positivity after two months. A novel revelation of the study was that higher anti-N IgG levels at initial COVID-19 diagnosis were associated with faster symptom resolution. Previous studies have shown that SARS-CoV-2 N protein is far more conserved than its other structural proteins, including spike (S) protein, and elicits broad-based cellular immune responses. Together, this data makes the N protein an invaluable target in vaccine development against SARS-CoV-2.
7/20/2022	<a href="#">Generalizable Long COVID Subtypes: Findings from the NIH N3C and RECOVER Programs (medrxiv.org)</a>	medRxiv	N=2,464: N=1,233 for clustering; N=1,231 for assessing generalizability. The researchers presented a novel algorithm for semantic clustering that identifies patient similarity by transforming EHR data to phenotypic profiles using the Human Phenotype Ontology (HPO). They reviewed long-COVID subtypes that show a statistically significant degree of generalizability of clusters across different medical centers. There was a significant association of cluster membership with a range of pre-existing conditions and with measures of severity during acute COVID-19. (Clusters 1 and 6 were associated with severe manifestations and displayed increased mortality.) The identified clusters were generalizable across different hospital systems and that the increased mortality rate was consistently observed in two of the clusters. Semantic phenotypic clustering could provide a basis for assigning patients to stratified subgroups for natural history or therapy studies.

# COVID-19 Patient Recovery Alliance Research Tracker

Date	Article	Publication	Key Takeaways
7/22/2022	<a href="#">Post-COVID-19 Conditions Among Children 90 Days After SARS-CoV-2 Infection   Pediatrics   JAMA Network Open   JAMA Network</a>	JAMA	<p>N=1884 SARS-CoV-2 positive children; median age=3 years. Prospective cohort study, conducted in 36 emergency departments (EDs) in 8 countries between March 7, 2020, and January 20, 2021. 5.8% of patients, including 9.8% of hospitalized children and 4.6% of discharged children, reported post-COVID conditions (PCCs) at 90 day follow-up. Characteristics associated with PCCs included being hospitalized 48 hours or more, having 4 or more symptoms reported at the index ED visit, and being 14 years of age or older.</p>
7/25/2022	<a href="#">Symptoms and risk factors for long COVID in non-hospitalized adults</a>	Nature Medicine	<p>EHR records of 486,149 non-hospitalized individuals with a record of SARS-CoV-2 infection; N=1,944,580 controls with no record of either suspected or confirmed COVID-19 who were propensity score matched with cases. 4.5% of the patients infected with SARS-CoV-2 and 4.7% of the patients with no recorded evidence of SARS-CoV-2 infection had received at least a single dose of a COVID-19 vaccine before the index date. Study period: January 31, 2020 to April 15, 2021. The most common comorbidities were depression (22.1%), anxiety (20.3%), asthma (20.1%), eczema (19.5%) and hay fever (18.1%). At 12 weeks after the index date, a history of SARS-CoV-2 infection was significantly associated with a total of 62 symptoms, after adjustment for age, sex, ethnic group, socioeconomic status, smoking, BMI and baseline symptoms (Supplementary Table 3a).</p>
7/27/2022	<a href="#">Prognosis and persistence of smell and taste dysfunction in patients with covid-19: meta-analysis with parametric cure modelling of recovery curves</a>	BMJ	<p>Systematic review and meta-analysis of 18 studies; N=3699. Based on parametric cure modelling, persistent self-reported smell and taste dysfunction could develop in an estimated 5.6% and 4.4% of COVID-19 patients, respectively. Sensitivity analyses suggest these could be underestimates. Women, individuals with greater initial severity of dysfunction, and individuals with nasal congestion were less likely to recover their sense of smell. Women were also less likely to recover their sense of taste. “With more than 550 million people worldwide confirmed as having COVID-19 as of July 2022, of whom about 50% report smell or taste dysfunction, just 5.6% and 4.4% of patients with persistent smell and taste dysfunction translates to more than 15 million and 12 million patients with long term smell and taste dysfunctions, respectively.”</p>