

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.

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.

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August 2020			
31-Aug-20	Our teen was diagnosed with covid-19. Months later, the worries (and headaches) remain.	<i>The Washington Post</i>	Headaches, dizziness. New York-Presbyterian/Columbia University is doing a month-long study on those who have had covid-19.
28-Aug-20	Scientists are reporting several cases of Covid-19 reinfection—but the implications are complicated	<i>STAT News</i>	Milder cases may generate low or no antibodies making reinfection possible. Researchers don't know how long immunity will last, exactly what mechanisms provide protection against Covid-19, nor what levels of antibodies or T cells are required to signal that someone is protected through a blood test. "The most important question for reinfection, with the most serious implications for controlling the pandemic, is whether reinfected people can transmit the virus to others," Columbia University virologist Angela Rasmussen wrote in Slate this week. "Whether it's six months after the first infection or nine months or a year or longer, at some point, protection for most people who recover from Covid-19 is expected to wane. And without the arrival of a vaccine and broad uptake of it, that could change the dynamics of local outbreaks."
28-Aug-20	Researchers find first US case of COVID-19 reinfection	<i>The Hill</i>	In a paper submitted to the Lancet, researchers stated that a 25-year-old man in Nevada was re-infected in late May, after recovering from a mild case the month before. Researchers sequenced the RNA from both virus samples and found they were two different strains. This time he was hospitalized and required oxygen.
26-Aug-20	A dilemma for 'long-haulers': Many can't prove they ever had Covid-19	<i>STAT</i>	Many patients lack a positive COVID-19 test and report difficulty finding doctors who take the complaints seriously. In May, a patient-led research team associated with Body Politic released a survey of 640 people experiencing lingering symptoms. Only 235 has a positive test, almost half had not been tested, and 28% tested negative. The CDC estimates that 30 to 60 million Americans have likely been infected with COVID-19, compared to the 5.7 million who tested positive.
25-Aug-20	Two European cases of coronavirus re-infection reported	<i>The Hill</i>	Patients from Belgium and the Netherlands were confirmed to have been re-infected. The Belgian woman, in her late 50s, first contracted COVID-19 in March and then again in June. The woman from the Netherlands was elderly and had a compromised immune system.
25-Aug-20	First documented coronavirus reinfection reported in Hong Kong	<i>The New York Times</i> (also covered in <i>The Japan Times</i> , see	Researchers in Hong Kong reported the first new case of reinfection in a 33-year-old man more than 4 months after his first bout of COVID-19. He had NO symptoms the second time, indicating his initial viral exposure aided in combatting his reinfection.

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		hyperlink in this section)	His infection was caused by a different version of the virus.
25-Aug-20	<u>For Many Pandemic Victims, Lingering Effects Stress Insurance Coverage</u>	<i>The Wall Street Journal</i>	<p>Extended symptoms results in longer care and higher medical bills, and often patients are still unable to work putting a strain on financial security</p> <p>“Treatment for post-Covid 19 symptoms can include repeat computerized and magnetic resonance scans, home health care, treatment for strokes and blood clots, rehabilitation and dialysis.”</p> <p>“Eighty-seven percent of patients who had recovered from Covid-19 reported persistence of at least one symptom 60 days later, particularly fatigue and shortness of breath, according to a July 9 study by Gemelli University Hospital in Rome.”</p> <p>“Long-term Covid patients are filing for disability or applying for Medicaid, some health advocates say, but 12 states haven’t expanded the program and many of those states have high case counts. Florida and Texas together have more than one million cases and didn’t expand the federal-state program for low-income and disabled people.”</p>
21-Aug-20	<u>A Federal Testing Fund Gets America Back to Work</u>	<i>Morning Consult</i>	<p>“While there’s widespread agreement that more testing is needed, there is currently no mechanism in place to guarantee federal coverage for return to work purposes... American worker’s should know that COVID-19 testing will be readily accessible and available as part of employers’ efforts to safely return to the office. This, however, can only be accomplished by establishing a robust public testing fund to support the level of testing that will be needed.”</p>
20-Aug-20	<u>As Covid-19 Symptoms Linger, Demand for Specialized Clinics Surges</u>	<i>The Wall Street Journal</i>	<p>Many patients are having trouble finding the resources they need to recover and navigate their lingering symptoms.</p> <p>Around the country, medical centers have begun setting up clinics focused on evaluating and treating Covid-19 patients reporting symptoms that last weeks or months after their initial illness or diagnosis. But the clinics are relatively new and hospitals are still adding resources, so wait lists can stretch months at the ones that exist so far.</p> <p>Mount Sinai’s Center for Post-Covid Care first opened its doors in May. It focuses on assessing patients with longer-term symptoms and connecting them with the appropriate specialists and care. The center saw exponential growth in demand in June, according to Zijian Chen, the center’s medical director. Doctors there have seen around 300 patients so far, and the wait list is now 2½ months long, he said.</p> <p>Northwestern Memorial Hospital in Chicago in May opened a clinic focused on evaluating and treating patients with Covid-19-related neurological issues. The hospital’s Neuro Covid-19 Clinic is now booked up months in advance, said Igor Koralnik, chief of the division of neuro-infectious disease and global neurology at Northwestern Medicine, who also oversees the clinic.</p>

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19-Aug-20	Long-Haulers Are Redefining COVID-19	<i>The Atlantic</i>	<p>Chronic fatigue syndrome, bulging veins, racing heartbeat, excessive bruising, short-term memory loss, brain fog, sensitivity to light and sound, gynecological problems.</p> <p>Dr. David Putrino at Mount Sinai: Most long-haulers he has treated are women. The average age is 44. Most were formerly fit and healthy. They look very different from the typical portrait of a COVID-19 patient—an elderly person with preexisting health problems. He believes many patients have symptoms that resemble dysautonomia, an umbrella term for disorders that disturb the autonomic nervous system.</p> <p>Many long-haulers begin feeling better in month 4 or 5, but recovery is variable and not guaranteed.</p> <p>“Several studies have found that most COVID-19 patients produce antibodies that recognize the new coronavirus, and that these molecules endure for months. Their presence should confirm whether a long-hauler was indeed infected. But there’s a catch: Most existing antibody studies focused on either hospitalized patients or those with mild symptoms and swift recoveries. By contrast, Putrino told me that in his survey of 1,400 long-haulers, two-thirds of those who have had antibody tests got negative results, even though their symptoms were consistent with COVID-19.”</p> <p>An Italian study found 87% of hospitalized patients still had symptoms after two months. A British study found similar results. A German study (noted above with the MRI) included patients who recovered at home and found that 78% had heart abnormalities after two or three months. A team from the CDC found a third of 270 non-hospitalized patients had not returned to their normal state of health after two weeks.</p> <p>Nisreen Alwan, a public health professor at the University of Southampton, believes experts should agree on a definition of recovery that goes beyond testing negative and accounts for a patient’s quality of life.</p>
17-Aug-20	Seven months later, what we know about Covid-19 — and the pressing questions that remain	<i>Stat News</i>	<p>Heart, brain, and nervous system.</p> <p>Individuals may test positive for a long time after they recover. This may be a product of the PCR test, which looks for fragments of SARS-CoV-2, but can’t tell if the sections of genetic code are part of actual viruses that can infect someone else, or fragments that are no threat.</p> <p>Heart: hyperinflammation of an immune response triggered by the virus can weaken heart muscles. Some people also have chest pain or feel like their hearts are racing.</p> <p>Brain: Loss of smell may persist, headaches and dizziness are common, mood disorders (anxiety, depression, and PTSD) have occurred, and brain fog leaves people searching for words or unable to do simple math.</p> <p>Peripheral nervous system: Some patients have experienced autoimmune disorders (myasthenia gravis and Guillain-Barre syndrome (which can interfere with nerve signals leading to abnormal sensations, weakness, and sometimes, paralysis)). Doctors are also worried about demyelination, where the protective coating on nerve cells is attached by the immune system causing weakness, numbness, and tingling.</p>

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14-Aug-20	CDC backtracks guidance on three-month window of immunity	<i>The Hill</i> Tal Axelrod	The CDC stated individuals are not immune to reinfection after recovering from COVID-19. “On August 3, 2020, CDC updated its isolation guidance based on the latest science about COVID-19 showing that people can continue to test positive for up to three months after diagnosis and not be infectious to others. Contrary to media reporting today, this science does not imply a person is immune to reinfection with SARS-CoV-2, the virus that causes COVID-19, in the three months following infection,’ the CDC said in a press release.”
13-Aug-20	The road to recovery after serious COVID-19 is long. Some may never be the same.	<i>Herald Media Inquirer/The Philadelphia Inquirer</i>	Muscle weakness, cognitive impairment, chest pain, SOB. Long before COVID-19, doctors knew that patients who needed intensive care were at high risk for long-term physical, cognitive and mental health problems, a condition that was named post-intensive care syndrome (PICS) in 2012. Survivors of acute respiratory distress syndrome (ARDS), a severe form of lung infection that is often the reason people with diseases like COVID-19 need a ventilator, were especially likely to struggle.
12-Aug-20	Long after the fire of a Covid-19 infection, mental and neurological effects can still smolder	<i>Stat News</i>	Neurological symptoms, including brain fog, numbed limbs, fatigue, headache, dizziness, loss of smell/taste, fumbling for words, depression, anxiety, and PTSD. As many as 1 in 3 patients recovering from Covid-19 could experience neurological or psychological after-effects of their infections, experts told STAT. Muscle weakness and nerve damage sometimes mean patients can’t walk. Patients may also suffer lasting damage to their heart, kidneys, and liver from the inflammation and blood clotting the disease causes. The virus appears to cause its damage to the brain and nervous system not through direct infection but from the indirect effects of inflammation. Pieces of the virus, not actual viruses multiplying, can trigger an inflammatory response in the brain.
11-Aug-20	This 21-year-old thought he had overcome a mild case of COVID-19. Then he went into organ failure.	<i>CNN</i>	Organ failure (and lingering effects). The patient suffered heart failure, acute respiratory failure, and severe sepsis. He remains on blood pressure medication and has his heart monitored, both likely to last for a year.
12-Aug-20	China reports reinfection in patient who was sick months ago	CIDRAP (Center for infectious Disease and Research Policy) Lisa Schnirring	China’s state media reported that a 68 years old woman from Jingzhou in Hubei province was recently hospitalized and diagnosed with COVID-19, about 6 months after she was diagnosed with COVID-19
10-Aug-20	Heart condition linked with COVID-19 fuels Power 5 concern about season’s viability	ESPN	Myocarditis. COVID-19 has been linked with myocarditis with a higher frequency than other viruses, based on limited studies and anecdotal evidence since the start of the pandemic. Left undiagnosed, myocarditis can cause heart damage and sudden cardiac arrest.

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10-Aug-20	This Doctor Understands Her Long-Term Covid Patients—She’s Been One Herself	<i>Wall Street Journal</i>	<p>Fatigue, chest pain, cognitive issues, phantosmia (smelling something not present), loss of smell/taste.</p> <p>Potential clinical expert resource for Alliance (Dr. Colleen Kivlahan).</p> <p>Patients feel emotional or frustrated because clinicians may not believe they are still experiencing symptoms while otherwise COVID-19-free or healthy.</p>
9-Aug-20	55% of coronavirus patients still have neurological problems three months later: study	<i>MarketWatch</i>	<p>Neurological problems, including brain fog, headaches, extreme fatigue, mood changes, insomnia, and loss of taste and/or smell.</p> <p>Evidence suggests COVID-19 can cause brain damage in adults and children.</p> <p>Younger patients are suffering from blood clots and strokes.</p> <p>A study of 60 COVID-19 patients published in <i>Lancet</i> found that 55% of patients were still displaying neurological symptoms during follow-up visits three months later. When doctors compared brain scans of these 60 COVID patients with those of a control group who had not been infected, they found that the brains of the COVID patients showed structural changes that correlated with memory loss and smell loss.</p> <p>Similarly, a case study published in <i>JAMA Neurology</i> in June highlighted four U.K. children with multisystem inflammatory syndrome, a severe and potentially fatal condition that appears to be linked to COVID-19. These children developed neurological manifestations such as headaches, muscle weakness, confusion and disorientation. While two of the kids recovered, the other two continued to show symptoms, including muscle weakness so severe that they needed a wheelchair.</p> <p>Noted some of these long-term symptoms are akin to myalgic encephalomyelitis.</p>
8-Aug-20	Health experts worry coronavirus could cause lasting heart complications for athletes	<i>Washington Post</i>	<p>Cardiac complications.</p> <p>Research raises the possibility that athletes who recover from covid-19 may face dire or lasting heart complications.</p> <p>Dean Winslow, an infectious-disease doctor at Stanford University, said research has shown as many as 20 percent of people who recover from covid-19 show cardiac abnormalities.</p>
7-Aug-20	Chronic fatigue symptom a possible long-term effect of COVID-19, experts say	<i>CNN</i>	<p>Chronic fatigue syndrome.</p> <p>Fauci: “It’s extraordinary how many people have a postviral syndrome that’s very strikingly similar to myalgic encephalomyelitis/chronic fatigue syndrome.”</p> <p>Chronic fatigue syndrome is a neuroimmune condition with symptoms including brain fog, severe fatigue, pain, immune aberrations, and post-exertional malaise.</p> <p>Of the 292 people the CDC surveyed on post-COVID recoveries, 35% reported fatigue.</p> <p>Rep. Jamie Raskin, D-MD is co-sponsoring bill, HR 7057, the “Understanding COVID-19 Subsets and ME/CFS Act” which calls for \$15 million annually through 2021 for data collection, collaborative research centers and a medical research program to be executed by the NIH and US Dept. of Veterans Affairs.</p>

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4-Aug-20	We Thought It Was Just a Respiratory Virus	<i>University of California San Francisco Magazine</i>	Respiratory symptoms, loss of sense of smell and taste, nausea or diarrhea, arrhythmias or even heart attacks, damaged kidneys or livers, headaches, blood clots, rashes, swelling, or strokes. Dr. Michael Peluso is conducting the Long-Term Impact of Infection with Novel Coronavirus (LIINC) study. It is enrolling individuals who were infected with SARS-CoV-2 and will follow them for two years. LIINC will investigate the chronic effects of infection on the immune system, lungs, heart, brain, blood, and other parts of the body
3-Aug-20	Cerebral Micro-Structural Changes in COVID-19 Patients – An MRI-based 3-month Follow-up Study	<i>The Lancet</i>	Memory loss. Neurological damage consistent with memory loss was found to be statistically significant in COVID-19 patients.
3-Aug-20	COVID-19, neutrophil extracellular traps and vascular complications in obstetric practice	<i>PubMed</i>	Vascular and obstetric complications. Due to the leading role of vascular complications from COVID-19, several groups of patients are at extra risk, including pregnant women, patients with a burdened obstetric history, with hereditary thrombophilia and antiphospholipid syndrome, and patients after in vitro fertilization (IVF).

July 2020

31-Jul-20	From 'brain fog' to heart damage, COVID-19's lingering problems alarm scientists	<i>Science Magazine</i>	The article describes different studies and patient experiences including fatigue, a racing heartbeat, shortness of breath, achy joints, foggy thinking, a persistent loss of sense of smell, and damage to the heart, lungs, kidneys, and brain. Additionally, patients may experience insomnia, skin rash, joint pain, heart arrhythmia, and hypertension.
29-Jul-20	COVID-19 Long-Hauler Symptoms Report	<i>Survivor Corps White Papers and Reports</i>	The study recorded 98 long-hauler symptoms. The top ten included fatigue, muscle or body aches, shortness of breath, difficulty concentrating, inability to exercise or be active, headache, insomnia, anxiety, and memory problems. Long Haulers' COVID-19 symptoms are far more numerous than what is currently listed on the CDC's website. While the impact of COVID-19 on the lungs and vascular system have received some media and medical attention, the results of this survey suggest that brain, whole body, eye, and skin symptoms are also frequent-occurring health problems for people recovering from COVID-19. Survivor Corp group members frequently report reaching out to primary care doctors for help managing such lesser-known and painful symptoms, but find that some physicians are unable or unwilling to help patients manage these due to lack of research. A reported 26.5% of symptoms experienced by Long Haulers are described as painful by the group members.
28-Jul-20	Even mild coronavirus cases can cause lasting cardiovascular damage, study shows	<i>The Week</i>	Cardiovascular damage. A study published in <i>JAMA Cardiology</i> details the results of cardiac MRI exams of 100 recovered coronavirus patients.

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			<p>Twenty-eight of them required oxygen supplementation while fighting the virus, while just two were on ventilators. But 78 of them still had cardiovascular abnormalities after recovery, with 60 of them showing “ongoing myocardial inflammation.”</p>
27-Jul-20	<p>Suffering From Covid for Months—and Battling Murky Test Results Too</p>	<p><i>Wall Street Journal</i></p>	<p>Individuals are experiencing lingering symptoms but negative antibody tests.</p> <p>Dr. David Putrino estimates there are tens of thousands of long-haul patients, but that they are not receiving proper care because of incorrect testing.</p> <p>Doctors say a certain percentage of all Covid-19 patients don’t produce measurable levels of the specific antibodies tested. Some experts suggest that patients with negative antibody test results may clear the virus using other parts of the immune system that aren’t detected on current tests.</p> <p>Other possibilities are that the immune system fails to completely eradicate the virus and is perpetually stimulated from low levels of the virus leading to “immune exhaustion” and an inability to produce the right type of protective antibodies. A third possibility is that the body’s antibody response may go awry.</p> <p>Another issue is that many long-haul patients were younger and were previously healthy and had Covid cases which were initially mild or moderate. Many didn’t get tested early on because they didn’t qualify for the diagnostic PCR tests, which are designed to detect live virus at the time when you have an active infection. If you wait too long after infection, the test is unlikely to detect the virus.</p> <p>Mount Sinai’s Center for Post-Covid Care has set up a way for people who test negative to still get referrals to doctors, so they can qualify for care and receive reimbursement.</p> <p>The Neuro Covid-19 Clinic at Northwestern Memorial Hospital, which launched in May, has also had many patients who didn’t test positive for Covid-19 but have lingering neurological symptoms.</p>
27-Jul-20	<p>Long-lasting COVID symptoms from lungs to limbs linger in coronavirus ‘long haulers’</p>	<p><i>USA Today</i></p>	<p>Fatigue/inability to exercise, respiratory issues, neurological issues including: difficulty concentrating/memory/difficulty sleeping/irritability or sadness, vision impairment, heart rate fluctuation.</p> <p>Doctors have no clear answer for how long lingering symptoms might last.</p> <p>Some patients have issues with getting doctors to believe they are still experiencing symptoms.</p> <p>Patients with preexisting cardiac diseases, diabetes, or coronary artery disease are almost always at higher risk.</p>
27-Jul-20	<p>Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered From Coronavirus Disease 2019 (COVID-19)</p>	<p><i>JAMA</i></p>	<p>Myocardial inflammation.</p> <p>Through the study of 100 patients recently recovered from COVID-19 identified from a COVID-19 test center, cardiac magnetic resonance imaging revealed cardiac involvement in 78 patients (78%) and ongoing myocardial inflammation in 60 patients (60%), which was independent of preexisting conditions, severity and overall course of the acute illness, and the time from the original diagnosis.</p>
24-Jul-20	<p>CDC: One-third of COVID-19 patients who aren’t</p>	<p><i>NBC News</i></p>	<p>Fatigue/insomnia, memory loss, cough/SOB, low fever, rapid heartbeat.</p> <p>Even patients that do not require hospitalization are seeing severe symptoms for more than 3 weeks.</p>

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	hospitalized have long-term illness		
22-Jul-20	Coronavirus Linked To Life-Threatening Blood Clots In Leg Arteries	<i>Study Finds</i>	<p>New research now suggests the virus is also creating life-threatening blood clots in the legs. This has had a large effect on seniors.</p> <p>The study in the journal <i>Radiology</i>: All patients with COVID-19 had at least one thrombus, and only 69% of control had thrombi. Ninety-four percent of patients with COVID-19 had proximal thrombi compared with 47% of control patients.</p>
14-Jul-20	Covid-19, ACE2, and the kidney	<i>PubMed</i>	<p>Kidney complications: The kidney is a common target of coronavirus (SARS-CoV2) disease and we are still trying to understand the long-term effects.</p>
12-Jul-20	Guillain-Barré Syndrome Associated with SARS-CoV-2 Infection in a Pediatric Patient	<i>PubMed</i>	<p>A 15-year-old patient tested positive for COVID-19 but was also diagnosed with Guillain-Barré syndrome.</p> <p>This condition in which the immune system attacks the nerves and could be triggered by a bacterial or viral infection. While this condition has been seen in adults, this is the first pediatric case.</p>
12-Jul-20	COVID-19-Related Collapsing Glomerulopathy in a Kidney Transplant Recipient	<i>PubMed</i>	<p>Acute kidney injury, nephrotic-range proteinuria (the loss of 3 grams or more per day of protein into the urine).</p> <p>COVID-19 may promote a collapsing glomerulopathy in kidney allografts with a low-risk APOL1 genotype, in the absence of detectable SARS-CoV2 RNA in the kidney, and that podocyte injury may precede SARS-CoV2 RNAemia.</p>
12-Jul-20	What we know about the long term consequences of getting COVID-19	<i>The Salt Lake Tribune</i>	<p>Loss of smell, blood clots (leading to kidney failure, limb amputation, and strokes).</p> <p>Various studies have estimated the percentage of coronavirus patients that temporarily lose sense of smell to be anywhere from 30% to 98%.</p> <p>Up to 75 percent of people who become critically ill and stay at an ICU develop post intensive care syndrome. It includes neurological, physical, and psychological symptoms.</p> <p>The immune response to COVID-19 creates inflammation which can lead to blood clots. This in turn, can have a variety of effects from kidney failure, limb amputation, and strokes.</p>
11-Jul-20	Recurrent pneumonia in a patient with new coronavirus infection after discharge from hospital for insufficient antibody production: a case report	<i>PubMed</i> Xiaoxi Zhou, Jianfeng Zhou, Jianping Zhao	<p>After a case study, it was concluded that a COVID-19 relapse may occur in some discharged patients with low titers of anti-SARS-CoV-2 antibodies.</p> <p>These patients should be maintained in isolation for longer time even after discharge. A more sensitive method to detect SARS-CoV-2 needs to be established and serological testing for specific antibodies may be used as a reference to determine the duration of isolation.</p>
10-Jul-20	Update: COVID-19 Among Workers in Meat and Poultry Processing Facilities — United States, April–May 2020	<i>CDC Morbidity and Mortality Weekly Report</i>	<p>Among 23 states reporting COVID-19 outbreaks in meat and poultry processing facilities, 16,233 cases in 239 facilities occurred, including 86 (0.5%) COVID-19-related deaths. Among cases with race/ethnicity reported, 87% occurred among racial or ethnic minorities. Commonly implemented interventions included worker screening, source control measures (universal face coverings),</p>

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			engineering controls (physical barriers), and infection prevention measures (additional hand hygiene stations).
10-Jul-20	NBA doctors concerned about long-term heart issues for players who test positive for COVID-19	<i>CBS Sports</i>	Cardiac damage. Between 7 and 33 percent of people will have some cardiac injury after getting COVID-19 and this can be exacerbated by resuming physical activity while still infected.
10-Jul-20	Mild' cases of coronavirus may have serious long-term and recurring effects	<i>The Hill</i>	Blood clots and strokes, rashes. There have been reports of people in their 30s and 40s developing blood clots and having strokes because of a minor infection. Some infected children have developed rashes.
9-Jul-20	COVID-19 infection can cause chemotherapy resistance development in patients with breast cancer and tamoxifen may cause susceptibility to COVID-19 infection	<i>PubMed</i>	Chemotherapy resistance. COVID-19 increases aminopeptidase which may cause patients with breast cancer patients receiving chemotherapy to develop resistance to chemotherapy.
6-Jul-20	Some kids suffer mysterious brain damage from coronavirus, study finds	<i>NY Post</i>	COVID pediatric inflammatory syndrome is an immune response to the virus that may lead children to develop lesions on their brains.
1-Jul-20	What we (don't) know about Covid-19's long-term health effects	<i>Quartz</i>	Complications to the throat, digestive tract, kidneys, and heart, increased fatigue and neurological weariness, potential blood clots (leading to strokes or kidney problems). Even people who do not require hospitalization may experience symptoms for up to 12 weeks.
June 2020			
28-Jun-20	"It's frightening": Doctors say half of "cured" COVID patients still suffer	<i>The Times of Israel</i>	Fatigue, anxiety/psychological issues, freak pains, burning sensation. An ongoing study shows more than half of the patients testing negative after contracting COVID-19 were still experiencing symptoms. Doctors are seeing no correlation between the severity of the case during hospitalization and those experiencing long-term symptoms.
24-Jun-20	Mounting clues suggest the coronavirus might trigger diabetes	<i>Nature</i>	Diabetes. Preliminary studies have shown that COVID can damage the pancreas by disrupting the function of or killing key cells involved in diabetes. While the connection is not absolute, further research is looking to see if COVID-19 can lead to type 1 diabetes in predisposed individuals.

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20-Jun-20	<u>Black Medicare Patients With COVID-19 Nearly 4 Times As Likely To End Up In Hospital</u>	NPR	<p>The majority of Medicare beneficiaries are over 65, though the program also covers some younger individuals with disabilities or end-stage renal disease.</p> <p>CMS Administrator Verma notes that COVID-19 has disproportionately affected people who are dually eligible for both Medicaid and Medicare, which includes both low-income older adults and some people with disabilities. This group was more likely to be hospitalized than other Medicare beneficiaries.</p> <p>Evidence also suggest black individuals on Medicare are 4 times more likely to be hospitalized as white individuals.</p>
12-Jun-20	<u>The emerging long-term complications of Covid-19, explained</u>	Vox	<p>Blood clots, cardiovascular damage, neurological damage, psychological distress, lung scarring.</p> <p>Higher rates of blood clots leading to other serious complications including stroke, pulmonary embolisms, and renal failure (cites in Vox article). These complications can affect functional status and often hinder people’s ability to return to work (e.g. only about half of young adults returned to work after suffering a stroke).</p> <p>Cardiovascular damage, including increased inflammation and other cardiac events (e.g. 20% of hospitalized patients had evidence of cardiac injury).</p> <p>Neurological manifestations (headaches, loss of certain senses) and potential long-term complications per American Heart Association president-elect and studies on SARS/MERS.</p> <p>Other effects such as mental health and psychological distress.</p> <p>England NHS Discharge Service requirements from March/April state that 45% of hospitalized patients can go home on discharge but will need either short-term or long-term care and 5% of patients will require rehabilitation support or nursing home care.</p> <p>Lung scarring/long-term damage.</p> <p>Study published in Radiology found that 94% of discharged patient had evidence of residual disease, including ground-glass opacities on CT scans.</p> <p>A different study of patients in China found that even asymptomatic patients had these ground-glass opacities.</p> <p>Other studies have discovered that SARS/MERS patients may have long-term lung damage. Notably, these coronaviruses typically affect one lung, while COVID-19 can affect both, increasing chances of long-term lung damage.</p>
11-Jun-20	<u>These people have been sick with coronavirus for more than 60 days.</u>	<i>The Washington Post</i>	<p>Cyclical and long-lasting symptoms, fatigue, trembling/buzzing.</p> <p>Some individuals remain sick for weeks/months. Doctors are unsure whether those symptoms suggest the virus is still alive in the body and creating continued symptoms, or whether it has come and gone, leaving a lingering immune or inflammatory response that makes people continue to feel sick.</p>

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1-Jun-20	Pulmonary Rehabilitation for Patients with coronavirus disease 2019 (COVID-19)	<i>Science Direct</i>	<p>Goal to return patients to society.</p> <p>Short term: Balance, respiratory, strength training and aerobic exercise.</p> <p>Long term: Functional and quality of life improvements.</p> <p>These pulmonary rehab guidelines were created by rehab specialists in China for use in recovering COVID patients. The guidelines include an overview of aerobic exercises, strength training, balance training, respiratory training, and traditional Chinese medicine practices that could be implemented in a rehab program.</p> <p>The guidelines prioritize alleviation of symptoms such as shortness of breath in the short-term. In the long term, the guidelines focus on functional and QOL improvements and assisting patients in returning to society.</p> <p>Additional exercises, safety techniques, and therapies are described for rehab of COVID patients with underlying chronic pulmonary diseases.</p>
May 2020			
15-May-20	Pulmonary fibrosis secondary to COVID-19: a call to arms?	<i>The Lancet</i>	<p>Long-term pulmonary fibrosis is a possibility in COVID patients, including those who recover.</p>
12-May-20	Virus Survivors Could Suffer Severe Health Effects for Years	<i>Bloomberg</i>	<p>Weakened immune system, high cholesterol.</p> <p>Small-scale studies conducted in Hong Kong and Wuhan, China show that survivors grapple with poorer functioning in their lungs, heart and liver as a result of COVID-19.</p> <p>According to another study on SARS, survivors suffered lung infections, higher cholesterol levels and were falling sick more frequently than others for as long as 12 years after the epidemic.</p>
April 2020			
21-Apr-20	What We Know About the Long-Term Effects of COVID-19	<i>Healthline</i>	<p>Organ damage, mental health.</p> <p>Lung dysfunction from COVID-19 can negatively affect other organs including heart, kidneys, and brain.</p> <p>Post-intensive care patients often suffer mental health sequelae (PTSD, anxiety, depression).</p>
8-Apr-20	For survivors of severe COVID-19, beating the virus is just the beginning	<i>Science Magazine</i>	<p>Muscle atrophy, delirium, heart disease.</p> <p>COVID-19 survivors are 4 times more likely to get heart disease.</p> <p>Extended time on a ventilator leads to muscle atrophy.</p> <p>Additionally, ventilator may cause long-term cognitive impairments such as memory deficits and delirium.</p>
March 2020			
17-Mar-20	Chest CT Findings in Cases from the Cruise Ship	RSNA/NCBI article	<p>Lung issues in asymptomatic patients.</p>

COVID-19 Patient Recovery Alliance Research Tracker

Date	Article	Publication	Key Takeaways
	<u>"Diamond Princess" with Coronavirus Disease 2019 (COVID-19)</u>		Of 104 cases, 76 (73%) were asymptomatic, 41 (54%) of which had lung opacities on CT scans. The CT severity score was higher in symptomatic cases than asymptomatic cases, particularly in the lower lobes.