

## 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>September 2020</b>			
28-Sep-20	<a href="#"><u>'It's Not in My Head': They Survived the Coronavirus, but They Never Got Well</u></a>	<i>NY Times</i>	<p>Difficulty breathing, dizziness, chest pain, internal shaking, facial numbness hair loss, disbelief from medical providers.</p> <p>“By some estimates, as many as one in three Covid-19 patients will develop symptoms that linger. The symptoms can span a wide range — piercing chest pain, deep exhaustion, a racing heart. Those affected include young and otherwise healthy people. One theory is that an overzealous immune system plays a role.”</p> <p>Some are unable to work. Many may need long-term medical care. Many have issues getting people to believe them. One long-hauler’s disability application was denied because no one believed her lingering symptoms were COVID-related.</p>
23-Sep-20	<a href="#"><u>Losing Your Hair Can Be Another Consequence of the Pandemic</u></a>	<i>SFGATE</i>	<p>Hair loss.</p> <p>Many COVID survivors reported shedding their hair several months after contracting the virus.</p> <p>Affects people who both had the virus and those that never became sick. Hair loss is “not from the virus itself but from the physiological stress of fighting it off. Many people who never contracted the virus are also losing hair because of emotional stress from job loss, financial strain, deaths of family members or other devastating developments stemming from the pandemic.”</p> <p>“Dr. Emma Guttman-Yassky, the incoming chair of the dermatology department at Mount Sinai’s Icahn School of Medicine, said she has treated many front-line medical workers for hair loss, including her hospital’s employees.”</p> <p>The condition should be temporary but could last for months.</p> <p>There are two types of hair loss the pandemic seems to be triggering: “One condition, called telogen effluvium, people shed much more than the typical 50 to 100 hairs per day, usually beginning several months after a stressful experience...The other hair loss condition that is increasing now is alopecia areata, in which the immune system attacks hair follicles.”</p> <p>“Not all of the patients had COVID-19...but the ones who did tended to progress very quickly from one or two bald patches to ‘losing hair all over the body...’ including eyebrows and eyelashes.” This could be because “the storm of inflammation that some COVID patients experience elevates immune molecules linked to conditions like alopecia.”</p> <p>“Experts recommend good nutrition, vitamins like biotin and stress-reduction techniques like yoga, scalp massage or mindfulness meditation.”</p>
23-Sep-20	<a href="#"><u>Senate HELP Committee Hearing: COVID-19: An Update on the Federal Response</u></a>		<p>Fatigue, myalgia, fever, neurological issues/cognitive abnormalities.</p> <p>Opening statement remarks: “In addition, there have been a number of important clinical observations that we will be pursuing in the future. I bring to your attention the fact that a number of individuals who virologically have recovered from infection, in fact have persistence measured in weeks to months of symptomatology that does not appear to be due to persistence of the virus. They’re referred to as long haulers. They have fatigue, myalgia, fever, and involvement of the neurological system, as well as cognitive abnormalities, such as the inability to concentrate.”</p>

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			<p>“In addition, we found, to our dismay, that a number of individuals who have completely recovered and apparently are asymptomatic, when they have sensitive imaging technologies, such as magnetic resonance imaging, or MRI, have found to have a disturbing number of individuals who have inflammation of the heart.” He later noted that persons could either recover, or develop scarring which could lead to cardiomyopathies.</p> <p>“These are the kinds of things that tell us we must be humble and that we do not completely understand the nature of this illness.”</p>
19-Sep-20	<p><a href="#">‘Long-haul’ covid-19 complications are real. I faced similar problems after surviving Ebola.</a></p>	<p><i>The Washington Post</i></p>	<p>Long-term symptoms are similar to other illnesses, such as SARS, MERS, and Ebola, myocarditis/Pericarditis, respiratory, kidney, and neurological problems, mental health effects.</p> <p>Guillaine-Barre syndrome: “It’s no surprise that many who survived an initial bout of covid 19—even if that illness was mild—continue to experience often-debilitating symptoms weeks and months after they first got sick. We’ve seen this with many other viral illnesses, including covid-19’s close coronavirus cousins, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS).”</p> <p>Many studies of these illness have show diminished exercise capacity, impaired lung function, enduring fatigue, inability to return to work and ongoing mental health challenges were incredibly common, in addition to the cardiac, respiratory and neurologic symptoms.</p> <p>The article also includes links to several studies on the long-term effects experienced by COVID-19 patients.</p> <p>The author suggests recognition, access to resources and rehabilitation, and additional research to address long-haul symptoms.</p>
17-Sep-20	<p><a href="#">Health-care workers make up 1 in 7 covid-19 cases recorded globally, WHO says</a></p>	<p><i>The Washington Post</i></p>	<p>“Health-care workers account for 1 in 7 coronavirus cases recorded by the World Health Organization, the U.N. agency said this week.”</p> <p>“Globally, around 14 percent of covid-19 cases reported to WHO are among health workers, and in some countries it’s as much as 35 percent,” WHO director general Tedros Adhanom Ghebreyesus said at a news conference in Geneva.”</p> <p>“The figures are disproportionate: Data collected by the WHO suggests that health workers represent less than 3 percent of the population in the majority of countries and less than 2 percent in almost all low- and middle-income countries.”</p> <p>“In April, the U.S. Centers for Disease Control and Prevention found that health-care workers accounted for 11 percent to 16 percent of covid-19 cases during the first surge of infections in the United States.”</p>

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16-Sep-20	<a href="#">Long-Term Effects of COVID-19</a>	CDC	<p>Cardiac conditions.</p> <p>One of the health effects that CDC is closely watching and working to understand relates to COVID-19 and the heart. Heart conditions associated with COVID-19 include inflammation and damage to the heart muscle itself, known as myocarditis, or inflammation of the covering of the heart, known as pericarditis.</p> <p>Heart damage like this might also explain some frequently reported long-term symptoms like shortness of breath, chest pain, and heart palpitations.</p> <p>There may be more cases of mild effects of COVID-19 on the heart that can be diagnosed with special imaging tests, including in younger people with mild or minimal symptoms; however, the long-term significance of these mild effects on the heart are unknown. CDC will continue to assess and provide updates as new data emerge.</p>
16-Sep-20	<a href="#">Lilly's Covid-19 antibody helps some patients rid their systems of virus sooner in early analysis</a>	STAT News	<p>Eli Lilly is developing monoclonal antibodies which is a manufactured version of the antibodies that the body uses as part of its response to a virus. According to recent data, these may “have helped sick patients rid their systems of the virus that causes Covid-19 sooner and may have prevented them from landing in the hospital.”</p> <p>Other drugs which have shown a benefit in randomized controlled trials against Covid-19: remdesivir, the steroid dexamethasone, and baricitinib.</p>
15-Sep-20	<a href="#">A College Runner Is Still Struggling With Symptoms Months After COVID-19 Diagnosis</a>	Runner's World	<p>A long-hauler, previously a distance runner, experienced extreme shortness of breath. At one point, she went to the hospital and was diagnosed with costochondritis (inflammation of the cartilage in the rib cage), pericarditis (inflammation of the membrane surrounding the heart), and pleurisy (inflammation of the tissue surrounding the lungs).</p>
14-Sep-20	<a href="#">Anti-inflammatory drug may shorten COVID-19 recovery time</a>	AP News	<p>Eli Lilly announced the results Monday from a 1,000-person study sponsored by the U.S. National Institute of Allergy and Infectious Diseases. “The study tested baricitinib, a pill that Indianapolis-based Lilly already sells as Olumiant to treat rheumatoid arthritis, the less common form of arthritis that occurs when a mistaken or overreacting immune system attacks joints, causing inflammation. An overactive immune system also can lead to serious problems in coronavirus patients.”</p> <p>“All study participants received remdesivir, a Gilead Sciences drug previously shown to reduce the time to recovery, defined as being well enough to leave the hospital, by four days on average. Those who also were given baricitinib recovered one day sooner than those given remdesivir alone, Lilly said.”</p>
14-Sep-20	<a href="#">Teachers union would support teacher vaccination requirement</a>	Axios	<p>American Federation of Teachers would support requiring in-school teachers to take a COVID-19 vaccine, once one has been approved and is readily available.</p> <p>AFT represents 1.7 million members in over 3,000 local affiliates.</p>

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14-Sep-20	<a href="#"><u>Use Vaccine Distribution Sites to Prevent Additional Deaths of Despair</u></a>	<i>Morning Consult</i>	<p>The authors propose Point of Dispensing sites to provide both vaccination services and mental health services to the masses to address the growing mental health crisis resulting from the pandemic.</p> <p>Studies have projected that more lives could be lost to suicide and/or the misuse of drugs and alcohol due in part to the isolation, economic hardship, fear, uncertainty and changes in patterns to daily life this year has brought us.</p> <p>Both will require additional dedicated funding and coordinated training efforts to achieve maximum benefit.</p>
14-Sep-21	<a href="#"><u>The lasting misery of coronavirus long-haulers</u></a>	<i>Nature</i>	<p>People with more severe infections might experience long-term damage in their lungs, heart, immune system, brain and elsewhere.</p> <p>Evidence from previous coronavirus outbreaks, especially the severe acute respiratory syndrome (SARS) epidemic, suggests that these effects can last for years.</p>
14-Sep-20	<a href="#"><u>Who Pays for Covid-19 Medical Care? That Depends on How (or if) You Are Insured</u></a>	<i>The Wall Street Journal</i>	<p>Across America, bills for Covid-19 treatment are coming due, and some patients are paying large out-of-pocket fees despite a federal safety net set up to help them avoid such financial surprises.</p> <p>But as many bills arrive, some patients, such as Medicare beneficiaries who don't carry supplemental insurance, are falling through the cracks. And the uninsured are required to seek financial assistance and sometimes fill out labyrinthine paperwork to cover their bills, a tall task for many patients still suffering from the illness's long-term effects.</p> <p>In other instances, hospitals mistakenly bill insured patients directly, or there are disagreements over whether certain treatments are the direct result of a Covid-19 diagnosis, as opposed to an unrelated problem. Some patients have been billed for follow-up visits and other care that they were told aren't covered by government funds.</p> <p>Four key groups experience the financial ramifications of infection in different ways: Clutch Funding-The Uninsured, Vulnerable-Some Medicare Beneficiaries (without supplemental insurance), Covered-Low-Income Medicaid Holders, Mostly Covered-Private Insurance Holders.</p>
13-Sep-20	<a href="#"><u>Redefining Covid-19: Months after infection, patients report breathing difficulty, excessive fatigue</u></a>	<i>CNN</i>	<p>Fatigue, breathlessness, rapid heart rate, Dysautonomia (a condition marked by a miscommunication between the autonomic nervous system and the rest of the body).</p> <p>About ¾ of those hospitalized with COVID-19 could become- long-haulers, according to a recently uploaded paper.</p> <p>The British Medical Journal released new guidance for health providers in August on how to treat long-haul Covid-19 patients, estimating that up to 10% of all people who have tested positive could develop a prolonged illness. The guidance includes specific blood tests to perform, possibly referring patients to pulmonary rehabilitation and having them use pulse oximetry at home to measure oxygen saturation in the blood.</p> <p>"One of the key issues in caring for each long-haul Covid-19 patient is to figure out how many of their symptoms can be chalked up to the heart and lungs and how much of the illness is actually the result of a deeper form of neurological dysfunction the coronavirus has unspooled, according to Noah Greenspan, a New York-based physical therapist and founder of the Pulmonary Wellness</p>

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			<p>Foundation.” Before engaging in physical or respiratory therapy, he asks that all his patients get a full workup from their doctor to rule out a cardiac condition, stroke or pulmonary embolism before starting physical therapy.</p>
11-Sep-20	<p><a href="#"><u>Seeking the causes of post-Covid symptoms, researchers dust off data on college students with mononucleosis</u></a></p>	STAT	<p>Myalgic encephalomyelitis/chronic fatigue syndrome.</p> <p>“From 2014 to 2018, DePaul University psychologist Leonard Jason and colleagues collected personal information and blood samples from more than 4,500 healthy college students. They followed the group as some students contracted mononucleosis and a small proportion of those subsequently developed chronic fatigue syndrome—the debilitating disease also called myalgic encephalomyelitis, or ME/CFS, that is frequently triggered by an acute viral illness... Some of these post-Covid symptoms, including profound exhaustion after exertion and deficits in memory and concentration, resembled those experienced by ME/CFS.”</p> <p>Researchers realized the data “created a unique opportunity to investigate risk factors for developing acute and prolonged illness after infection with the novel coronavirus.” “This kind of prospective research design, in which people are enrolled before falling ill, allows researchers to make robust comparisons between those who return to health and those who never recover.”</p> <p>Note: Eric Rubenstein, an epidemiology professor at Boston University, is consulting with Body Politic on a proposed survey related to the disability needs of long-Covid patients.</p>
11-Sep-20	<p><a href="#"><u>What Happens When Children’s Covid-19 Symptoms Won’t Go Away</u></a></p>	Smithsonian Magazine	<p>Exhaustion, blurry vision, metal taste in mouth, headaches, intermittent low-grade fevers, sore throat, coughing, enlarged lymph nodes, painful limbs, insomnia, mysterious splotchy skin that comes and goes.</p> <p>The long-haulers support groups are also hearing from patients whose children are not getting better.</p> <p>Parents may be unable to return to work for extended periods of time if dealing with a persistently ill child.</p> <p>“In extremely rare cases, children have experienced Kawasaki disease—an illness that causes inflammation in the blood vessel —or multisystem inflammatory syndrome in children (MIS-C), a serious condition that, according to the Centers for Disease Control and Prevention (CDC), has been associated with pediatric Covid-19.”</p> <p>“And according to data compiled by the AAP from this summer, cases, hospitalizations, and deaths from coronavirus are increasing at a faster rate in children than in the general public.”</p> <p>LongCovidSOS, a UK based campaign for recognition of long-haulers, has two children which have been sick since mid-March.</p>

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			<p>Like adults, parents are experiencing dismissal from pediatricians.</p> <p>Chronic conditions are associated with many pathogens including lime disease, Zika, Ebola, measles, and polio.</p>
10-Sep-20	<a href="#">9/11 responders who die of COVID-19 may still be eligible for victim compensation fund</a>	NY Post	<p>A new directive that allows for the families of people who have 9/11-related illnesses—but die of COVID-19—to still reap the benefits of the federal Sept. 11 victim compensation fund.</p>
10-Sep-20	<a href="#">Another possible COVID complication: ‘Punctured lung’</a>	CIDRAP (Center for infectious Disease and Research Policy)	<p>Punctured lung.</p> <p>“As many as 1 in 100 hospitalized COVID-19 patients may experience a pneumothorax, or punctured lung, according to a multicenter observational case series published yesterday in the European Respiratory Journal.”</p> <p>A case report yesterday out of China highlights the importance of being on guard for spontaneous pneumothorax, or sudden collapsed lung, especially in COVID-19 patients who have prolonged severe lung damage.</p> <p>“COVID-19 may cause cysts in the lungs that could lead to lung punctures. They advised doctors to consider the possibility of punctured lungs in COVID-19 patients, even in those who don’t fit the profile for it, as many study patients were diagnosed with this condition only by chance.”</p>
10-Sep-20	<a href="#">As students return, the deaths of at least six teachers from covid-19 renew pandemic fears</a>	Washington Post	<p>Educators in Missouri, Mississippi, South Carolina, Iowa, and Oklahoma have died as the fall semester started in their districts.</p> <p>It isn’t clear whether any of the teachers were infected at school, and many quarantined to avoid exposing students and other staff members.</p>
9-Sep-20	<a href="#">How the Coronavirus Attacks the Brain</a>	NY Times	<p>Cognitive decline.</p> <p>A new study offers the first clear evidence that, in some people, the coronavirus invades brain cells, hijacking them to make copies of itself. The virus also seems to suck up all of the oxygen nearby, starving neighboring cells to death. The researchers didn’t find any evidence of an immune response to remedy this problem.</p> <p>Alysson Muotri, a neuroscientist at the University of California, San Diego stated, “Days after infection, and we already see a dramatic reduction in the amount of synapses...We don’t know yet if that is reversible or not.”</p> <p>In the new study, Akiko Iwasaki, an immunologist at Yale University and her colleagues documented brain infection in three ways: in brain tissue from a person who died of Covid-19, in a mouse model and in organoids—clusters of brain cells in a lab dish meant to mimic the brain’s three-dimensional structure.</p>

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			<p>Dr. Iwasaki’s team then looked at two sets of mice—one with the ACE2 receptor expressed only in the brain, and the other with the receptor only in the lungs. When researchers introduced the virus into these mice, the brain-infected mice rapidly lost weight and died within six days. The lung-infected mice did neither. The results still suggest that virus infection in the brain may be more lethal than respiratory infection, Dr. Iwasaki said.”</p> <p>40 to 60 percent of hospitalized Covid-19 patients experience neurological and psychiatric symptoms, said Dr. Robert Stevens, a neurologist at Johns Hopkins University. But the symptoms may not all stem from the virus’s invasion of brain cells. They may be the result of pervasive inflammation throughout the body.</p> <p>Some cognitive symptoms, like brain fog and delirium, might be harder to pick up in patients who are sedated and on ventilators. Doctors should plan to dial down sedatives once a day, if possible, in order to assess Covid-19 patients, Dr. Stevens said.</p>
8-Sep-20	<a href="#">Study: Acute kidney injury common in adults hospitalized with COVID-19</a>	CIDRAP (Center for infectious Disease and Research Policy)	<p>“A new study published in the Journal of the American Society of Nephrology shows that 46% of hospitalized adults with severe COVID-19 suffer from acute kidney injury (AKI), and AKI was associated with a 50% mortality rate.”</p> <p>“Of those who survived AKI and COVID-19, only 30% recovered with complete kidney function by the time of discharge. Risk factors associated with developing AKI include older age, being a man, and having chronic kidney disease, hypertension, congestive heart failure, or diabetes.”</p>
8-Sep-20	<a href="#">Italy’s Bergamo is calling back coronavirus survivors. About half say they haven’t fully recovered.</a>	<i>Washington Post</i>	<p>Lung scarring, SOB, inflammation and clotting problems, leg pain/tingling in the extremities, hair loss, depression, severe fatigue.</p> <p>The Pope John XIII hospital in Bergamo, Italy is calling back the survivors, drawing their blood, examining their hearts, scanning their lungs, and asking them about their lives.</p> <p>Those who survived the peak of the outbreak in March and April are now negative. The virus is officially gone from their systems...” But we are asking: Are you feeling cured? Almost half the patients say no,” said Serena Venturelli, an infectious-disease specialist at the hospital.”</p> <p>“Bergamo doctors say the disease clearly has full-body ramifications but leaves wildly differing marks from one patient to the next, and in some cases few marks at all. Among the first 750 patients screened, some 30 percent still have lung scarring and breathing trouble. The virus has left another 30 percent with problems linked to inflammation and clotting, such as heart abnormalities and artery blockages. A few are at risk of organ failure.”</p> <p>Patients also report: leg pain, tingling in the extremities, hair loss, depression, severe fatigue. There is no clear answer when these symptoms will reside.</p> <p>Trauma from hospitalization and lingering symptoms or complications also an issue.</p>
7-Sep-20	<a href="#">For Long-Haulers, Covid-19 Takes a Toll on Mind as Well as Body</a>	<i>New York Times</i>	<p>Mental health decline.</p> <p>Months of illness have contributed to anxiety and depression, exacerbated by the difficulties of accessing medical services and disruptions to their work, social and exercise routines.</p> <p>“Natalie Lambert, a health researcher at Indiana University School of Medicine, recently surveyed more than 1,500 long-haul patients through the Survivor</p>

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			<p>Corps Facebook page and found a number of common psychological symptoms. She found that anxiety was the eighth most common long-haul symptom, cited by more than 700 respondents. Difficulty concentrating was also high on the list, and more than 400 reported feeling ‘sadness.’”</p> <p>“Dr. Teodor Postolache, a psychiatrist at the University of Maryland School of Medicine, estimates that between one-third and one-half of Covid-19 patients experienced some form of mental health problem including anxiety, depression, fatigue or abnormal sleeping.”</p> <p>“Immunologists speculate that long-haulers’ symptoms might persist because they harbor fragments of viral genes that are not infectious but that trigger violent immune reactions.”</p> <p>“Many long-haulers said their mental health suffered when they faced skepticism about their symptoms from friends, family and even medical providers. Female long-haulers pointed to numerous studies showing that medical providers were more likely to underestimate women’s pain levels and misdiagnose their conditions.”</p> <p>“Being unable to work and feeling unproductive can also hinder mental health, according to the National Alliance on Mental Illness.”</p> <p>“For long-haul Covid-19 patients, one helpful mental health resource is validation from friends, family and colleagues.”</p>
6-Sep-20	<a href="#">During pandemic, growth of U.S. adults with mental health issues jumps to 53 percent</a>	Washington Post	<p>Mental health decline.</p> <p>“A growing number of U.S. adults are struggling with mental health issues linked to worry and stress over the novel coronavirus, increasing from 32 percent in March to 53 percent in July, according to a new report from the Kaiser Family Foundation.”</p> <p>“[A] similar assessment from the Centers for Disease Control and Prevention found that, by late June, 13 percent of adults had started or increased alcohol consumption or drug use to help cope with pandemic-related woes, and 11 percent had seriously considered suicide in the past month—a number that reached 25 percent among those ages 18 to 24.”</p> <p>“Social isolation, loneliness, job loss and economic worries as well as fear of contracting the virus are among factors cited as contributing to people’s mental health problems.”</p> <p>More common among women than men.</p>
6-Sep-20	<a href="#">During pandemic, growth of U.S. adults with mental health issues jumps to 53 percent</a>	Washington Post	<p>Mental health decline.</p> <p>“A growing number of U.S. adults are struggling with mental health issues linked to worry and stress over the novel coronavirus, increasing from 32 percent in March to 53 percent in July, according to a new report from the Kaiser Family Foundation.”</p> <p>“[A] similar assessment from the Centers for Disease Control and Prevention found that, by late June, 13 percent of adults had started or increased alcohol consumption or drug use to help cope with pandemic-related woes, and 11 percent had seriously considered suicide in the past month—a number that reached 25 percent among those ages 18 to 24.”</p>

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			<p>“Social isolation, loneliness, job loss and economic worries as well as fear of contracting the virus are among factors cited as contributing to people’s mental health problems.”</p> <p>More common among women than men.</p>
2-Sep-20	<p><a href="#"><u>Covid-19 has killed more police officers this year than all other causes combined, data shows</u></a></p>	<p><i>Washington Post</i></p>	<p>According to data compiled by the Officer Down Memorial Page and the National Law Enforcement Officers Memorial Fund, more cops have died from covid this year than have been killed on patrol.</p> <p>As of Sept. 2, on-the-job coronavirus infections were responsible for a least 100 officer deaths, more than gun violence, car accidents and all other causes combined.</p> <p>“Both organizations only count covid deaths “if it is determined that the officer died as a result of exposure to the virus while performing official duties.”</p> <p>By the end of this pandemic, it is very likely that COVID will surpass 9/11 as the single largest incident cause of death for law enforcement officers,” Chris Cosgriff, executive director of ODMP, stated in an email.</p> <p>This year, Trump signed the Safeguarding America’s First Responders Act of 2020, which guarantees law enforcement officers and their survivors federal benefits if the officer is killed or disabled by COVID. For legal purposes, the legislation presumes that covid cases among officers were contracted in the line of duty.</p>
1-Sep-20	<p><a href="#"><u>A Supercomputer Analyzed Covid-19 — and an Interesting New Theory Has Emerged</u></a></p>	<p><i>Elemental</i></p>	<p>A supercomputer analyzed COVID-19 and from this study the bradykinin hypothesis emerged. Covid-19 infection generally begins when the virus enters the body through ACE2 receptors in the nose. The virus then proceeds through the body, entering cells in other places where ACE2 is also present: the intestines, kidneys, and heart. This likely accounts for at least some of the disease’s cardiac and GI symptoms. It then hijacks the body’s own systems, tricking it into upregulating ACE2 receptors in places where they’re usually expressed at low or medium levels, including the lungs.</p> <p>The virus tweaks the renin–angiotensin system (RAS), which causes the body’s mechanisms for regulating bradykinin to go haywire. Bradykinin receptors are resensitized, and the body also stops effectively breaking down bradykinin. (ACE normally degrades bradykinin, but when the virus downregulates it, it can’t do this as effectively.)</p> <p>The end result, the researchers say, is to release a bradykinin storm—a massive, runaway buildup of bradykinin in the body. According to the bradykinin hypothesis, it’s this storm that is ultimately responsible for many of Covid-19’s deadly effects.</p> <p>This accounts for effects in the lungs, heart, neurological, and many of the symptoms like cough, loss of smell and taste, and COVID toes.</p>

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