

Post-COVID Recovery and Prognosis in Severe Cases (Adults)

Overview of Long COVID and Severe Cases

Long COVID Definition: *Long COVID* (also called *post-COVID-19 condition*, PCC) refers to persistent or new health issues occurring at least 2–3 months after a SARS-CoV-2 infection, lasting for weeks or months beyond the acute phase ¹ ². Common symptoms include fatigue, breathlessness, muscle/joint pain, “brain fog” (cognitive difficulty), sleep disturbances, and more ³. Over 200 symptoms have been reported, ranging from mild to debilitating ³. By definition, these symptoms cannot be explained by alternative diagnoses once acute infection has resolved.

Prevalence: Most COVID-19 patients recover fully, but a subset develop long COVID. Global estimates (from early pandemic data) indicate roughly **6%** of all COVID-19 cases result in long COVID ⁴. More recent data suggest the risk of long COVID may be *lower with newer variants and widespread vaccination*, but it remains a significant public health concern ⁵. In the U.S., for example, about **6.4%** of adults report currently having long COVID in 2023 ⁶. Among those with long COVID, roughly 1 in 5 ($\approx 20\%$) report that it significantly limits daily activities ⁷.

Severe Cases vs Mild: Long COVID can occur even after mild initial illness – in fact, *the majority of long COVID patients were never hospitalized for acute COVID-19* ⁸. However, **severe acute COVID-19 (e.g. requiring hospitalization or ICU care)** carries a higher individual risk of long-term health problems ⁹. Severe cases may also have organ damage from the acute phase (lung injury, neurological damage, etc.), which can manifest as long-term sequelae. This report focuses on recovery trajectories and prognosis, especially for those who had severe COVID-19, while noting important factors (age, sex, etc.) influencing outcomes.

Recovery Trajectories and Timeline

General Recovery Pattern: Long COVID symptoms tend to improve gradually over time for many (though not all) patients. Global data suggest that symptoms **often improve within 4–9 months** after onset of long COVID ¹⁰. By about **1 year** post-infection, a significant portion of sufferers recover or substantially improve – but not everyone. **Approximately 15%** of people with long COVID were still experiencing symptoms at 12 months in global estimates ¹¹. Some individuals continue to have symptoms or disability well beyond one year.

6 Months as a Milestone: Six months post-infection is often seen as an important juncture. Many patients who will recover do so by 6 months, while those still significantly ill at 6+ months are more likely to have prolonged courses. For example, a large Swiss cohort study found that by **6 months** after infection, **23%** of participants had not yet returned to normal health; this decreased to **19%** at 12 months and **17%** at 24 months ¹². In the same study, **29%** reported ongoing COVID-related symptoms at 6 months, dropping to

20% at 12 months ¹³. This indicates gradual improvement between 6 and 12 months, and continuing into the second year, but a persistent minority with long-term symptoms (on the order of 1 in 6 patients at 2 years) ¹⁴ ¹². In other words, if someone still has significant long COVID at 6 months, there is still a decent chance of improvement over the next year – but a subset will remain symptomatic even at 2 years.

Longer-Term (1–2+ Years): Several cohort studies now track patients out to 2 years and beyond:

- A **Swiss 2-year study** of unvaccinated adults reported that **17–18%** of people continued to have long COVID symptoms at 2 years post-infection ¹⁴. Most of these had gradual improvement; only a small fraction reported worsening after the first year.
- In a **U.K. study** (ZOA Long COVID Project), researchers identified different recovery trajectories: the majority improved slowly over time, about ~5% experienced **rapid improvement** within 2 years, and ~4% actually deteriorated during the 2nd year ¹⁵. This highlights that while most long-haulers trend toward recovery, a minority can plateau or even worsen over time.
- **Symptom Persistence:** A notable finding is that once someone has had long COVID for a couple of months, it often tends to persist. One large study found **85%** of patients who still had symptoms at 2 months continued to report symptoms **1 year** after their illness onset ¹⁶. In other words, early persistence of symptoms (beyond the acute phase) strongly predicts longer-term persistence. Some long-haulers do recover in the second year, but others have extremely enduring symptoms.
- **“Peak” Disability:** Research indicates many long COVID sufferers experience their worst symptoms and poorest quality of life around **6–12 months** post-infection, with gradual improvement thereafter ¹⁷. By two years, overall symptom burden is usually lower than at one year, but not zero. **Relapses** or new late-onset issues can also occur. For instance, a Wuhan hospital cohort noted that by 2 years post-illness, ~7.8% of patients had developed **new or worsened symptoms** since the 1-year mark ¹⁸, even as the overall trend was improvement.

Summary: *Statistically*, about three-quarters of long COVID patients recover or substantially improve within the first year, and more by the second year ¹². However, around 10–20% may have persistent symptoms beyond a year ¹¹, and a small core might have lifelong chronic issues. If a patient is not better by 6 months, their recovery may require a longer timeline (many more months or years), and some symptoms could become chronic. On an individual level, prognosis is variable – but as time goes on, the *proportion* of patients still suffering tends to slowly decline.

Prognosis in Severe Acute COVID Cases

Patients who experienced severe or critical acute COVID-19 (e.g. required ICU admission, ventilation, or had multi-organ involvement) have a **more complex recovery trajectory**. Many face not only long COVID symptoms but also sequelae of organ damage and the after-effects of prolonged hospitalization (such as post-ICU syndrome).

1-year Outcomes: Studies of hospitalized COVID survivors show that a large majority still have abnormal findings or symptoms months later. For example, in one neurology-focused study of severe (ICU-level) COVID patients, **87%** still had some degree of functional, cognitive, or quality-of-life impairment **at 12**

months post-hospitalization ¹⁹ . Half of those patients had objectively measurable cognitive deficits a year later ¹⁹ . Similarly, in a Wuhan cohort one year after severe COVID, over half of survivors reported at least one persistent symptom ²⁰ . Common issues include physical weakness, fatigue, breathlessness, mental health struggles (anxiety/depression), and cognitive difficulties. Many hospitalized COVID patients also have lingering *radiological or physiological abnormalities* (e.g. lung function deficits, abnormal exercise capacity) at 6–12 months.

2-year Outcomes: By two years, there is often notable improvement, but a significant fraction of severe-case survivors still aren't fully back to baseline:

- A **Chinese 2-year follow-up** of ~1,200 hospital patients (mixed severity) found the proportion with ≥ 1 residual symptom declined from **68% at 6 months to 55% at 2 years** ²⁰ . So even after 2 years, more than half reported at least one ongoing symptom. Fatigue and muscle weakness were the most commonly reported persistent symptoms, though their prevalence did decline over time.
- A related **Chinese cohort (Wuhan)** of 1,864 hospitalized survivors reported **19.8%** still had COVID-related symptoms at the 2-year mark ¹⁸ . Importantly, this included **12.0%** with *persisting* symptoms from the first year and **7.8%** with *new-onset or worsened* symptoms between year 1 and 2 ¹⁸ . This shows that while many symptoms resolve, some patients develop late complications or relapses even a year out. Notably, **dyspnea (shortness of breath)** showed *little improvement* from 1 to 2 years in that study (affecting ~2% of patients at both time points) ²¹ , suggesting chronic lung impairment in a subset.
- **Organ-specific issues:** Severe COVID can leave lasting organ damage. For instance, patients who were **critically ill** (typically requiring ICU) have high rates of long-term lung abnormalities. A study in *Lancet Respiratory Medicine* observed that formerly critical patients had significantly **greater impairments in lung function** (restrictive ventilatory defects and reduced gas diffusion capacity) compared to control subjects even **2 years** after illness ²² . In other words, some who survived severe pneumonia or ARDS from COVID continue to have measurably reduced pulmonary capacity long after recovery. Cardiac issues (myocarditis scarring, arrhythmias), renal impairment, and neuropsychiatric effects (like post-ICU delirium turning into cognitive impairment or PTSD) are also documented in some survivors of severe cases.
- **Quality of Life & Daily Function:** Many severe-case survivors take a long time to regain their pre-illness functional status, if they do at all. Two years after severe COVID, a portion of patients still have not returned to work or normal activity levels ²³ ²⁴ . In the Wuhan 2-year study, about 6% of survivors still had significantly impaired lung-related quality of life (CAT score ≥ 10) at 2 years ²⁵ – and this was **2.8 times more likely** in those who had required ICU care during acute illness ²⁶ . Neurologic sequelae such as memory/concentration problems can also hinder return to normalcy. That said, the overall *trend* in severe cases is improvement: symptom burden and disability generally lessen between 1 and 2 years post-illness ²⁷ .

If Not Improved by 6–12 Months (Severe Cases): For survivors of critical illness, still having significant problems at 6 months is very common and does not rule out further recovery. Many ICU survivors improve in the second year, though often not to 100%. By 12 months, **roughly half** of severe patients may still have notable issues ²⁰ ; by 24 months this might drop to ~20–50% depending on the measure ¹⁸ ²⁰ . Some deficits (especially organ damage or severe fatigue) can be long-lasting. A subset of severe-case long COVID

patients meet diagnostic criteria for **ME/CFS** (myalgic encephalomyelitis/chronic fatigue syndrome) or autonomic dysfunction (e.g. POTS) – conditions which are often lifelong ¹⁶ . In those individuals, complete recovery might remain elusive without targeted therapies.

On a hopeful note, even among very ill patients, **incremental improvements** are often seen up to two years or more. Rehabilitation, pulmonary rehab, physical therapy, and cognitive rehab can aid recovery of function. Nonetheless, severe cases have a *higher likelihood of enduring disability*. Prognostically, needing ICU support is a red flag: one study found former ICU patients had **~2.7-fold higher odds** of still having persistent symptoms at 2 years compared to non-ICU patients ²⁶ .

Factors Influencing Long COVID Outcomes

Demographics (Age & Sex): Epidemiological studies consistently find **women are at higher risk** of developing long COVID than men. For example, CDC surveys in 2022 found ~8.5% of women had long COVID versus ~5.2% of men ²⁸ (a roughly 1.6-fold higher odds for females). Middle-aged women (around 40–55) appear to be the most affected group in some analyses ²⁹ , possibly related to hormonal or immune factors. Men can and do get long COVID as well, especially after severe illness, but overall prevalence is lower in males.

Age is a nuanced risk factor. **Older adults** (50s, 60s and above) have higher risk of severe acute COVID, which in turn raises long COVID risk (and older age itself was noted as a risk factor in many studies) ³⁰ . Indeed, long COVID prevalence tends to be higher in older versus younger adults. However, some population surveys paradoxically show slightly *lower* long COVID reporting in the very elderly (possibly because many older individuals attribute symptoms to other conditions or did not survive acute COVID). In general, **young adults (<30)** have the lowest long COVID rates ³¹ , while **middle-aged and early-senior adults** have the highest. Children and teens can develop long COVID as well, but this is far less common than in adults (and the user scope here is adults only).

Initial Disease Severity: Perhaps the strongest predictor of long-term outcome is the severity of the initial infection. As discussed, those who had **severe or critical COVID-19** are at *increased risk* for long COVID and tend to have more numerous and severe long-term symptoms ³⁰ ²⁶ . They are also more likely to have lasting organ injury (fibrotic lungs, kidney injury, etc.). Conversely, those with very mild initial illness are less likely to have long COVID, and if they do, it may be shorter-lived – though *long COVID can still occur after mild cases*. Mild outpatients often experience fatigue or neurological symptoms post-COVID, but fewer organ-specific complications compared to ICU survivors.

Pre-existing Health and Lifestyle: Certain underlying conditions increase the likelihood of prolonged recovery. Some identified risk factors include: **obesity**, diabetes, and other chronic health issues ³⁰ ³² ; a history of asthma or lung disease; and **smoking** status ³⁰ . Weakened immune function or autoimmune tendencies might also predispose one to long COVID (some patients have autoantibodies or reactivation of Epstein-Barr virus, for instance) ³² . Socioeconomic factors like lower income or inability to rest adequately during acute illness have been associated with higher long COVID risk ³³ . Notably, about one-third of long COVID patients have *no* prior comorbidity ³⁴ , so it can affect otherwise healthy people too.

Repeat Infections & Vaccination: Each SARS-CoV-2 infection carries a risk for long COVID, so **reinfections** can potentially *reset the clock* or exacerbate issues. Some individuals who recovered from long COVID then relapsed after a new COVID infection. **Vaccination** offers partial protection: being fully vaccinated (2 doses)

reduces the risk of developing long COVID by roughly 15–50%, according to various studies ³⁵ ³⁶ . Vaccinated people who do get long COVID also tend (on average) to report less severe symptoms than unvaccinated long-haulers. However, vaccination is not a guaranteed shield – breakthrough infections can still lead to long COVID, just at lower rates.

Genetic and Biological Factors: Ongoing research is examining if certain genetic traits or immune response patterns influence who gets long COVID and who recovers. Some findings suggest people with certain immune system markers (e.g. specific autoantibodies or T-cell profiles) have higher risk ³² . These factors are still being studied and are not yet used in clinical practice, but they hint that biological differences may partially drive prognosis.

Gender and Hormones: As noted, females are more prone to long COVID. There is speculation that hormone differences (estrogen, etc.) or immune system differences may underlie this. A JAMA study reported the female predominance was most pronounced in women **age 40–55**, coinciding with perimenopause ²⁹ . Some researchers are exploring if hormone therapy or other interventions could impact long COVID in women, but no clear answers yet.

Racial/Ethnic and Socioeconomic Disparities: Some data (e.g. from the U.S. NIH RECOVER program) indicate higher long COVID prevalence in certain minority groups and those with lower socioeconomic status ³³ . This may be due to disparities in healthcare access, higher exposure risk, or pre-existing health differences. These factors can indirectly affect prognosis – for example, someone without access to good post-COVID rehab or who must return to strenuous work quickly might have a harder recovery.

In summary, **positive prognostic factors** (associated with better recovery) include: younger age, male sex, healthy weight, no prior chronic illnesses, mild initial COVID, and being vaccinated. **Negative prognostic factors** (slower or incomplete recovery) include: female sex, middle-age or older, multiple co-morbid conditions, severe initial illness (especially ICU admission) ²⁶ , and perhaps certain immunologic predispositions. Recognizing these factors can help identify high-risk patients who may need closer follow-up or aggressive intervention.

Symptom Clusters and Subtypes of Long COVID

Long COVID is *heterogeneous*: patients present with different clusters of symptoms. Understanding these subtypes is important, as they might have distinct prognoses. Recent research (including the NIH **RECOVER** initiative) has identified several **symptom clusters** or subtypes of long COVID in adults:

- **Subtype 1: Predominantly Loss of Smell/Taste.** Some patients mainly experience sensory issues (anosmia, ageusia) as the lingering symptom ³⁷ . This cluster might have a relatively better prognosis, as smell/taste often gradually return within months for many (though not all).
- **Subtype 2: Respiratory Symptoms.** Characterized by chronic cough, chest tightness, shortness of breath ³⁷ . This aligns with those who have lung damage or persistent respiratory inflammation. Prognosis depends on severity; mild respiratory symptoms often improve, but severe lung impairment (fibrosis) can cause long-term issues. Many respiratory symptoms improved significantly between 6 and 24 months in studies ³⁸ .

- **Subtype 3: Cognitive and Neurological (“Brain Fog”).** Dominated by cognitive complaints, memory/concentration problems, sometimes headaches ³⁷. Neurological symptoms tend to **persist longer** on average; some reports note they can even worsen in the first year ³⁸. Patients with this cluster often improve slowly, and a fraction may be left with chronic cognitive impairment.
- **Subtype 4: Cardiac/Autonomic.** Key features include palpitations, dizziness, tachycardia (often POTS – postural orthostatic tachycardia syndrome), and exercise intolerance ³⁷. This cluster often overlaps with dysautonomia. Prognosis is variable: some patients see improvement with time or therapy (e.g. graded compression, beta-blockers), but others have persistent issues. Exercise intolerance (post-exertional malaise) is a hallmark that can *flare if patients over-exert*, so careful pacing is needed ³⁹.
- **Subtype 5: Multisystem (Severe Multi-symptom).** This group experiences a broad range of symptoms across systems – e.g. *post-exertional malaise* plus dizziness, gastrointestinal problems, fatigue, pain, etc. ³⁷. Essentially a combination of many of the above issues. Studies find this multisystem subtype tends to have the **worst quality of life** and functional impairment ⁴⁰. These patients often meet criteria for ME/CFS. Prognosis for this cluster is the guarded; many have very slow improvement and are at risk of long-term disability without significant interventions.

Different clusters also show some demographic patterns. For instance, one analysis found the “*brain fog*” subtype had a slightly higher proportion of male patients, whereas the palpitations and multisystem subtypes skewed more female ⁴¹. The multisystem severe subtype also had more patients who were unvaccinated and infected prior to Omicron ⁴², suggesting it might be somewhat less common with newer variants or vaccination (though still occurs). These patterns might guide personalized treatments in the future.

Symptom Trajectory Differences: It’s also observed that certain symptom types resolve faster than others. *Respiratory and gastrointestinal symptoms* (e.g. cough, shortness of breath, diarrhea) often improve or disappear within the first year ³⁸. In contrast, *neurocognitive symptoms* (memory issues, concentration problems, sensory disorders) tend to linger longer and can even intensify for some months before plateauing ³⁸. Musculoskeletal pain and fatigue can persist as well, though a majority do report at least partial improvement over time. Interestingly, some symptoms appear later in the long COVID course (for example, **parosmia** – distorted smell – often begins ~3 months post-infection and then gradually improves) ⁴³. Recognizing these patterns can help set patient expectations. For example, a patient with primarily GI or smell issues might expect quicker recovery, whereas someone with neurological symptoms should be prepared for a potentially longer haul.

Long COVID Prognosis: Putting It All Together

Overall Outlook: Statistically, most adults with long COVID **do improve** eventually, even in severe cases – but the time frame is highly variable. By one year post-infection, roughly 70–80% of long COVID patients have recovered or made significant progress ¹². By two years, that number rises further (e.g. 80–90% recovered or markedly improved) ¹². However, a substantial minority (perhaps 10–20% of long COVID patients, equating to 1–2% of all COVID infections) suffer chronic symptoms that can last for years or potentially a lifetime ¹¹. These often include fatigue, cognitive dysfunction, and autonomic disturbances reminiscent of ME/CFS – conditions that historically have low full-recovery rates ¹⁶.

Prognosis by Severity: For *mild-to-moderate initial COVID cases* who develop long COVID, the prognosis is relatively favorable: many will see steady improvement over months, and only a small fraction will have disabling symptoms beyond 1–2 years. *Severe acute cases* have a tougher road: almost all have some impairment in the months after hospitalization, and while many get better with time (especially in the first 2 years), a larger fraction are left with long-term health deficits or reduced functional status compared to their pre-COVID lives ²⁰ ²² .

Key Prognostic Indicators: If a patient is an older female who was hospitalized and still has multiple symptoms at 6 months, **the likelihood of a protracted course is high** – she might expect symptoms even at 18–24 months, though hopefully with gradual improvement. In contrast, a younger male patient with mild initial illness who has one lingering issue (say, loss of smell) at 3 months has a good chance of full recovery by 6–12 months. That said, **there are many exceptions**, and researchers emphasize that each patient’s trajectory can be unique ⁴⁴ . Some seemingly low-risk individuals end up with long-term illness, and some high-risk patients recover surprisingly well.

Additional Complications: It’s important to note that long COVID isn’t just about ongoing original symptoms – it also confers risk for developing new health problems. Large studies have shown COVID survivors (especially those who were severe cases) have elevated rates of conditions like **heart disease, stroke, blood clots, diabetes, kidney disease, and mental health disorders** in the year following COVID ⁴⁵ . These can influence prognosis by introducing new challenges on top of classic long COVID symptoms. For instance, a severe-case survivor might be dealing with long COVID *and* new-onset diabetes or PTSD, complicating recovery.

Ongoing Research and Hope: As of 2025, long-term data (3–4 years post-infection) are just emerging. Early evidence suggests that people infected in later waves (Delta, Omicron) or who were vaccinated have somewhat better outcomes on average than those infected in 2020 ⁵ . Treatment research is underway (e.g. trials of antivirals, anti-inflammatory drugs, rehabilitation strategies), which we hope will improve long-term prognosis. For now, supportive care and symptom management are the mainstays. Encouragingly, *the trajectory for many is upward*: even if full recovery is slow, partial improvements (such as being able to return to work part-time, or manage light exercise) are common over time.

Conclusion: In summary, **the prognosis for long COVID varies widely**. Factors like acute disease severity, demographics, and symptom profiles all interplay to influence outcomes. Statistically, a person’s odds of recovery decrease the longer they have had long COVID symptoms (e.g. still ill at 6 or 12 months), but even then, improvement can occur in the second year or beyond ¹² ¹⁸ . Severe cases have higher risks of enduring organ damage or chronic illness, yet many still see gradual healing over time ²⁷ . Continued monitoring of cohorts and new research will refine these prognostic estimates. For now, patients and providers should adopt a long-term management approach for persistent cases, focusing on rehabilitation and symptomatic relief, with cautious optimism that incremental recovery is possible even for those with prolonged severe long COVID.

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