Long COVID: Rapid Evidence Review

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Postacute sequelae of COVID-19, also known as long COVID, affects approximately 10% to 30% of the hundreds of millions of people who have had acute COVID-19. The Centers for Disease Control and Prevention defines long COVID as the presence of new, returning, or ongoing symptoms associated with acute COVID-19 that persist beyond 28 days. The diagnosis of long COVID can be based on a previous clinical diagnosis of COVID-19 and does not require a prior positive polymerase chain reaction or antigen test result to confirm infection. Patients with long COVID report a broad range of symptoms, including abdominal pain, anosmia, chest pain, cognitive impairment (brain fog), dizziness, dyspnea, fatigue, headache, insomnia, mood changes, palpitations, paresthesias, and postexertional malaise. The presentation is variable, and symptoms can fluctuate or persist and relapse and remit. The diagnostic approach is to differentiate long COVID from acute sequelae of COVID-19, previous comorbidities, unmasking of preexisting health conditions, reinfections, new acute concerns, and complications of prolonged illness, hospitalization, or isolation. Many presenting symptoms of long COVID are commonly seen in a primary care practice, and management can be improved by using established treatment paradigms and supportive care. Although several medications have been suggested for the treatment of fatigue related to long COVID, the evidence for their use is currently lacking. Holistic treatment strategies for long COVID include discussion of pacing and energy conservation; individualized, symptom-guided, phased return to activity programs; maintaining adequate hydration and a healthy diet; and treatment of underlying medical conditions. (Am Fam Physician. 2022;online. Copyright © 2022 American Academy of Family Physicians.)

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This article summarizes the best available evidence for the diagnosis and management of postacute sequelae of COVID-19 (PASC), also called long COVID, in adults. Proposed etiologies for long COVID include residual damage from acute infection, ongoing viral activity within an intrahost viral reservoir, complications from a hyperinflammatory state, immune dysfunction, and unmasking of preexisting health conditions.1,2

Epidemiology

• Data show that long COVID affects approximately 10% to 30% of the hundreds of millions of people who have had acute COVID-19.3,4 The Centers for Disease Control and Prevention reports that 19% of adults who had COVID-19 in the past are still experiencing symptoms.5
• Reliable data on long COVID in children are lacking.1,6
• Illness from COVID-19 has immediate and long-term consequences that can be conceptualized in three phases. Patients do not routinely develop all three.7
  ◦ Phase 1. An acute illness with varying degrees of severity caused by viral replication and initial immune response lasts days to weeks. Asymptomatic patients can also progress to later phases of the illness.7
  ◦ Phase 2. A rare hyperinflammatory illness known as multisystem inflammatory syndrome may occur two to five weeks after onset of the infection.8-10 Multisystem inflammatory syndrome can affect children and adults and is caused by a dysregulated immune response.
LONG COVID

with signs and symptoms similar to Kawasaki disease.\(^7\),\(^8\)

\(\circ\) Phase 3. Long COVID may develop and can last for months.\(^1\),\(^4\)

- A 2022 study identified type 2 diabetes mellitus, SARS-CoV-2 viremia, Epstein-Barr virus viremia, and specific autoantibodies as risk factors for long COVID.\(^1\) Additional risk factors suggested by other studies include age older than 50 years, female sex, more severe acute infection, more than five symptoms in the first week of acute infection, immunosuppressive conditions, underlying health conditions (e.g., hypertension, obesity, psychiatric condition), and partial or no vaccination.\(^1\),\(^2\),\(^3\),\(^4\),\(^5\),\(^6\),\(^7\),\(^8\),\(^9\),\(^10\),\(^11\),\(^12\),\(^13\),\(^14\),\(^15\)

- In a large community-based sample, the risk of long COVID in fully vaccinated individuals with breakthrough COVID-19 is less than in partially or unvaccinated individuals.\(^1\),\(^4\),\(^16\)

- Patients with long COVID report decreased quality of life on standardized testing.\(^17\)

**Diagnosis**

- The Centers for Disease Control and Prevention defines long COVID as the presence of new, returning, or ongoing symptoms associated with acute COVID-19 that persist beyond 28 days,\(^1\) whereas the World Health Organization defines long COVID as symptoms that last for at least two months.\(^1\)

- The diagnosis of long COVID can be based on a prior clinical diagnosis of COVID-19 with ongoing symptoms. A prior positive polymerase chain reaction or antigen test result to confirm
SARS-CoV-2 infection is not required. People with COVID-19 may have been asymptomatic or may not have had access to testing, and 10% to 20% do not produce detectable antibodies. The differential diagnosis includes acute sequelae of COVID-19, previous comorbidities, unmasking of preexisting health conditions, reinfection, new acute concerns, and complications of prolonged illness, hospitalization, or isolation.

Review of the patient’s medical history should assess for conditions that could impact severity of COVID-19, including asthma, chronic fatigue, chronic kidney disease, diabetes, heart conditions, pulmonary disease, and mood disorders, and trauma.

Physicians should advise patients that long COVID is not fully understood and be sensitive to patient concerns that symptoms could be misattributed to psychiatric causes.

**SIGNS AND SYMPTOMS**

- Patients with long COVID report a broad range of symptoms, most of which are common presentations in primary care.

**TABLE 1**

<table>
<thead>
<tr>
<th>Prevalence of Common Signs and Symptoms of Long COVID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiac</strong></td>
</tr>
<tr>
<td>Chest pain (5% to 16%)</td>
</tr>
<tr>
<td>Palpitations (5% to 14%)</td>
</tr>
<tr>
<td>Hypertension (1%)</td>
</tr>
<tr>
<td><strong>Dermatologic</strong></td>
</tr>
<tr>
<td>Alopecia (7% to 25%)</td>
</tr>
<tr>
<td>Flushing (5%)</td>
</tr>
<tr>
<td>Rash, such as urticaria or livedo reticularis (3%)</td>
</tr>
<tr>
<td><strong>Ear, nose, and throat</strong></td>
</tr>
<tr>
<td>Ageusia/parageusia (4% to 23%)</td>
</tr>
<tr>
<td>Anosmia/parosmia (6% to 21%)</td>
</tr>
<tr>
<td>Voice changes (8%)</td>
</tr>
<tr>
<td>Nasal congestion (5%)</td>
</tr>
<tr>
<td>Throat pain (2% to 5%)</td>
</tr>
<tr>
<td><strong>Gastrointestinal</strong></td>
</tr>
<tr>
<td>Appetite changes (6% to 17%)</td>
</tr>
<tr>
<td>Nausea/vomiting (6% to 8%)</td>
</tr>
<tr>
<td>Diarrhea (4% to 8%)</td>
</tr>
<tr>
<td>Abdominal pain (2% to 6%)</td>
</tr>
<tr>
<td><strong>Neurologic</strong></td>
</tr>
<tr>
<td>Difficulty concentrating (18% to 27%)</td>
</tr>
<tr>
<td>Insomnia/sleep disorders (11% to 27%)</td>
</tr>
<tr>
<td>Cognitive impairments (17% to 26%)</td>
</tr>
<tr>
<td>Memory deficits (16% to 19%)</td>
</tr>
<tr>
<td>Headaches (5% to 12%)</td>
</tr>
<tr>
<td>Dizziness (3% to 4%)</td>
</tr>
<tr>
<td>Paresthesias, including focal, diffuse, and changing locations (9%)</td>
</tr>
<tr>
<td>Vision changes (5%)</td>
</tr>
<tr>
<td><strong>Psychiatric</strong></td>
</tr>
<tr>
<td>Anxiety (13% to 30%)</td>
</tr>
<tr>
<td>Depression (8% to 23%)</td>
</tr>
<tr>
<td>Posttraumatic stress disorder (1% to 13%)</td>
</tr>
<tr>
<td>Dyspnea (18% to 30%)</td>
</tr>
<tr>
<td>Cough, new or progressive (5% to 15%)</td>
</tr>
<tr>
<td><strong>Systemic</strong></td>
</tr>
<tr>
<td>Fatigue (28% to 58%)</td>
</tr>
<tr>
<td>Night sweats (17% to 24%)</td>
</tr>
<tr>
<td>Weight loss (12% to 21%)</td>
</tr>
<tr>
<td>Mobility decline (14% to 20%)</td>
</tr>
<tr>
<td>Decreased exercise tolerance (15%)</td>
</tr>
<tr>
<td>Fever (0.3% to 11%)</td>
</tr>
<tr>
<td><strong>Rheumatologic</strong></td>
</tr>
<tr>
<td>Arthralgia (9% to 14%)</td>
</tr>
<tr>
<td>Myalgia (8% to 13%)</td>
</tr>
</tbody>
</table>

**Note:** Percentages represent median prevalence in systematic reviews. Information from references 17 and 25-27.
disproportionate to the effort exerted. It is characterized by improvement followed by severe exhaustion and worsening of symptoms requiring several days or weeks of recovery.\textsuperscript{1,20,28} Similar to other relapsing symptoms, postexertional malaise can be triggered by routine physical activities (e.g., bathing), cognitive activities, and emotional stress.\textsuperscript{1,20,23,28} The onset of symptoms is often delayed (12 to 72 hours after activity) with unpredictable severity.\textsuperscript{1,28} Postexertional malaise is distinct from fatigue, which is a feeling of weariness, tiredness, or lack of energy.\textsuperscript{20}

• The fatigue experienced in long COVID is often multifactorial and may appear similar to myalgic encephalomyelitis (chronic fatigue syndrome).\textsuperscript{20} Myalgic encephalomyelitis is a complex, severe, multisystem syndrome characterized by postexertional malaise that often follows a viral illness.\textsuperscript{20,28,29} Although patients with long COVID can meet criteria for myalgic encephalomyelitis, more data are needed to better understand if fatigue related to long COVID represents a distinct process or is a manifestation of myalgic encephalomyelitis.\textsuperscript{20}

• Autonomic dysfunction (dysautonomia) such as postural orthostatic tachycardia syndrome (POTS) commonly occurs in long COVID and may include abdominal pain, bloating, blurry or tunnel vision, constipation or loose stools, dizziness, fatigue, labile blood pressures, light-headedness, orthostatic intolerance, palpitations, peripheral vasoconstriction, nausea, night sweats, tachycardia, and temperature intolerance.\textsuperscript{2,30,31} See Table 2 for diagnostic criteria of POTS.\textsuperscript{32}

### Diagnostic Testing

- A basic laboratory panel, including complete blood count, comprehensive metabolic panel, C-reactive protein, erythrocyte sedimentation rate, ferritin, thyroid stimulating hormone, vitamin D, and vitamin B\textsubscript{12}, should be obtained to identify treatable conditions.\textsuperscript{1}

- Further diagnostic testing is guided by specific history and physical examination findings, persistence and severity of symptoms, the possibility of other post-COVID complications, and a shared understanding of the risks and benefits.\textsuperscript{1,3,22,24,33}

- Targeted evaluation and management for symptom complexes associated with long COVID are summarized in Table 3.\textsuperscript{1,3,20,24,31,34-42}

• Although laboratory and diagnostic test results are commonly normal in patients with long COVID, clinicians should not disregard the impact of symptoms on a patient’s daily functioning, quality of life, and ability to return to school or work.\textsuperscript{1,17}

• Clinical assessment tools and survey instruments for long COVID are listed in eTable A. These tools can be considered to evaluate a patient’s functional ability and monitor symptoms in various domains. Figure 1 is an algorithm for determining a patient’s self-reported functional status.\textsuperscript{43}

### Treatment

- Treatment recommendations for long COVID are based on expert opinion and consensus guidelines in the absence of clinical trials.\textsuperscript{1,20,22,24,38,44} The goal of treatment is to optimize function and improve quality of life.\textsuperscript{1}

- A comprehensive plan of care requires a whole-patient perspective representative of the patient’s presenting symptoms, underlying conditions, psychological well-being, personal and social situations, and treatment goals.\textsuperscript{1,3}

- An individualized, symptom-guided, phased return to activity program is recommended for patients with fatigue or postexertional malaise (Table 4).\textsuperscript{20} This is different from graded exercise therapy, which is controversial in the management of myalgic encephalomyelitis. Before initiating a program, patients should be assessed for fatigue patterns throughout the day and advised to avoid

### TABLE 2

**Diagnostic Criteria for Postural Orthostatic Tachycardia Syndrome**

<table>
<thead>
<tr>
<th>Heart rate increase of 30 beats per minute or more, or more than 120 beats per minute within the first 10 minutes of standing, in the absence of orthostatic hypotension; in children and adolescents, the standard is a heart rate increase of 40 beats per minute or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms of orthostatic intolerance</td>
</tr>
</tbody>
</table>

**Note:** Postural orthostatic tachycardia syndrome is commonly diagnosed by a tilt table test; however, it can also be diagnosed with heart rate and blood pressure measurements taken in the supine position and then in the standing position at two-, five-, and 10-minute intervals.

*Information from reference 32.*
activities that trigger postexertional malaise. The appropriate range of activities used in the program is highly dependent on the patient. Guidelines also recommend assessing a patient’s response to initiating and escalating activities.20
- Patients with cognitive impairment as a result of long COVID should be referred to a specialist with expertise in formal cognitive assessment and remediation (e.g., neuropsychologist, speech-language pathologist, occupational therapist).38
- Clinicians should address polypharmacy and, if possible, discontinue medications that may impact cognition.38
- Patients with ongoing cough and dyspnea may benefit from breathing exercises that focus on optimal body position and posture (see patient handout at the end of this article), pulmonary rehabilitation for pulmonary disease, and a phased return to activity program.15,22,39
- The recommended treatment for dysautonomia (e.g., POTS) includes dietary and behavior

### TABLE 3

<table>
<thead>
<tr>
<th>Symptom complex</th>
<th>Differential diagnosis</th>
<th>Initial evaluation*</th>
<th>Treatment†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anosmia/parosmia24</td>
<td>Allergies, postnasal drip</td>
<td>Consider allergy testing</td>
<td>Smell training (see patient education handout at the end of this article) Consider intranasal steroids</td>
</tr>
<tr>
<td>Autonomic dysfunction/dysautonomia24,31,34,37</td>
<td>POTS, deconditioning, dehydration, mast cell activation syndrome, inappropriate sinus tachycardia, Sjögren syndrome, systemic lupus erythematosus, paraneoplastic syndrome, arrhythmia due to cardiac or pulmonary disease, thyrotoxicosis, celiac disease</td>
<td>CBC, complete metabolic panel, thyroid stimulating hormone Orthostatic vital signs (Table 2), ECG, autonomic reflex testing Consider vitamin B₁₂, celiac panel, ambulatory heart rate monitoring, echocardiography</td>
<td>Fluid and salt repletion, compression garments Sleeping in the head-up position Isometric exercises Small, more frequent meals Physical reconditioning program (when stable) Avoidance of triggers Medications: propranolol, fludrocortisone, pyridostigmine, midodrine</td>
</tr>
<tr>
<td>Brain fog (e.g., difficulty concentrating, memory deficits, cognitive impairment)38</td>
<td>Stroke, progressive neurologic illness (e.g., multiple sclerosis, dementia, sleep disorder, encephalopathy, mood disorders, fatigue, traumatic brain injury, endocrine and autoimmune disorders</td>
<td>Montreal Cognitive Assessment CBC, vitamin B₁₂, vitamin D, thiamine, folate, homocysteine, magnesium, complete metabolic panel, liver function tests, thyroid function tests Consider neuropsychological testing (CT or magnetic resonance imaging of the head)</td>
<td>Referral to specialist with expertise in formal cognitive assessment and remediation Paced return to activity Polypharmacy reduction Discontinuation of medications that may impact cognition, if possible Sleep hygiene</td>
</tr>
</tbody>
</table>

**Note:** For a broader listing of symptoms and guidance, refer to reference 24. For links to functional capacity tests and survey instruments for long COVID, see eTable A at the end of this article.

CBC = complete blood count; CT = computed tomography; ECG = electrocardiography; POTS = postural orthostatic tachycardia syndrome; STOP-BANG = snoring, tiredness, observed apnea, blood pressure, body mass index, age, neck circumference, and gender.

*—These are testing options to consider if symptoms are concerning or persistent and do not represent a listing of required studies, which should be directed by the history, examination, and other objective findings.

†—Consider specialty referrals if patients do not respond to initial treatment, for complex or severe presentations, or for new abnormalities on imaging or procedural studies. Underlying conditions should be treated when indicated.
modifications such as ensuring fluid and salt repletion; wearing compression garments; performing isometric exercises; eating small, more frequent meals; implementing physical reconditioning programs in nonupright positions (when stable); and avoiding exacerbating factors (e.g., alcohol use, warm environments).30,31,35  
  
• For symptoms of dysautonomia that persist despite conservative measures, first-line pharmacologic agents include propranolol, fludrocortisone, pyridostigmine, and midodrine.31,34  
  
Patients with POTS are highly sensitive to the effects of medical management, and the lowest dose should be used first.45  
  
• Recommended initial treatments for symptoms suggestive of mast cell activation syndrome (anxiety, conjunctivitis, hypotension, palpitations, rashes, rhinitis, sore throat, urticaria, and
wheezing) include H₁ and H₂ histamine antagonists, cromolyn, and leukotriene inhibitors.⁴⁰,⁴²

- Many presenting symptoms and conditions associated with long COVID are commonly seen in primary care practice and can be managed using established treatment paradigms and supportive care.¹,²,²⁴ Examples include renal disease, chronic pain, hyperglycemia, insomnia, mood disorders, paresthesias, pulmonary infections, small fiber neuropathy, and thromboembolism.
- Several medications commonly used to treat fatigue in other conditions (e.g., myalgic encephalomyelitis, multiple sclerosis, cancer) have been suggested for the treatment of fatigue related to COVID-19, including modafinil (Provigil), methylphenidate (Ritalin), and amantadine.²⁰,²⁴ However, evidence for this use is insufficient.²⁰
- Follow-up visits are patient-specific but can be considered every two to three months.¹
- Although an in-person visit may have advantages for physiologic evaluation and other assessments, telemedicine approaches with phone calls or virtual visits can be helpful for follow-up and lessen the burden on patients.²⁰,⁴⁴

**FIGURE 1**

Patient self-report methods for the Post-COVID-19 Functional Status (PCFS) scale. (A) Flowchart. (B) Patient questionnaire. Instructions for use: (1) to assess recovery after SARS-CoV-2 infection, this PCFS scale covers the entire range of functional limitations, including changes in lifestyle, sports, and social activities; (2) assignment of a PCFS scale grade concerns the average situation of the past week (exception: when assessed at discharge, it concerns the situation of the day of discharge); (3) symptoms include (but are not limited to) dyspnea, pain, depression, muscle weakness, memory loss, depression, and anxiety; (4) in case two grades seem to be appropriate, always choose the highest grade with the most limitations; (5) measuring functional status before the infection is optional; (6) alternatively to this flowchart and patient questionnaire, an extensive structured interview is available. The full manual for patients and physicians or study personnel is available from https://osf.io/qgpdv/ (free of charge).

LIFESTYLE AND BEHAVIOR INTERVENTIONS
- Energy conservation strategies such as the four P’s framework (planning, pacing, prioritizing, positioning) and the stop, rest, pace strategy, and avoiding relapsing triggers may help patients mitigate fatigue.3,15,20,24,28,38
- Patients should be supported in maintaining adequate hydration and a healthy diet.1,3,20
- Information on peer support resources should be provided (see patient handout at the end of this article).1

REFERRAL, CONSULTATION, AND HOSPITALIZATION
- Structured coordination of care and connection to social services can benefit vulnerable populations with long COVID.20
- Primary care clinicians can manage most patients with long COVID, but almost every state has specialized clinics that can be used for more complex cases. Physicians can find post-COVID care centers in their state at https://www.survivorcorps.com/pccc.
- Specialty referral should be considered if initial treatment is unsuccessful, for complex or severe presentations, or for new concerning findings on imaging or other studies.3,24,39

Prognosis
- Most patients can expect gradual improvement in functional status with a relapsing and remitting course, aided by careful pacing, prioritization, and goal setting.3,24
- Although many individuals may experience resolution of some or all symptoms over time, the ultimate long-term prognosis of long COVID is unclear.24,46
- Clinicians should set expectations for patients, advising that there are varying outcomes and rates of recovery.1
- One study found a progressive decline in the average number of symptoms after seven months; however, 65.2% of patients still had symptoms after six months. Those with continued postexertional malaise experienced a higher number of average symptoms.23
- Most individuals with long-term breathing difficulties do not develop permanent or chronic lung injury.15
- Most people will gradually recover from cognitive impairment after a severe illness.15
- Long COVID is now a recognized disability under the Americans With Disabilities Act, sections 504 and 1557.47

Data Sources: A search of PubMed was completed using the key terms long COVID and post-acute symptoms of COVID-19. The search included government and professional organization websites such as the Centers for Disease Control and Prevention. The Essential Evidence Plus library was also searched. A reference library was curated by the Oregon Health and Science University School of Medicine COVID-19 Inquiry Group and through professional collaborative networks. Search dates: August 2021 through August 2022.

The authors thank the Oregon Health and Science University Long COVID-19 Clinical Guidelines Team and the Oregon Health and Science University School of Medicine COVID-19 Inquiry Group.

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**TABLE 4**

**General Attributes of an Individualized, Symptom-Guided, Phased Return to Activity Program for Patients With Fatigue**

The goal is to restore previous levels of activity and improve quality of life.

- If the program is advanced too quickly, it can worsen symptoms and trigger postexertional malaise.
- Patients are directed to perform activities at submaximal levels.
- Activities are adjusted in response to symptoms that develop during and after activity.
- Patients are educated on how to recognize perceived exertion and use other metrics such as heart rate or validated exertion scales.
- Activity recommendations depend on level of symptom severity and progress according to symptom tolerance.
- Until goals are achieved, patients should not initiate high-intensity aerobic exercises or heavy weight training.
- An example of program progression could be bedside mobilization, range of motion exercises, tolerated household activities, stretching of extremities, limited community activities, submaximal exercise, and eventual higher-intensity activities.
- Consider referral to a physiatrist or physical therapist who is knowledgeable in caring for patients with long COVID and can monitor the course of the program.

Information from reference 20.
LONG COVID

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References


## eTABLE A

### Functional Capacity Tests and Survey Instruments for Long COVID

#### Functional capacity tests

1-minute sit-to-stand test

2-minute step test
https://geriatrictoolkit.missouri.edu/cv/2min-step-rikli-jones.doc

10-meter walk test
https://geriatrictoolkit.missouri.edu/gaitspeed/10mWalkTest.pdf

6-minute walk test
https://www.mdcalc.com/6-minute-walk-distance

#### Survey instruments

**Modified Medical Research Council dyspnea scale**
https://www.mdcalc.com/mmrc-modified-medical-research-council-dyspnea-scale

**Montreal Cognitive Assessment**

**Patient Health Questionnaire-9**

**Generalized Anxiety Disorder-7**
https://www.mdcalc.com/gad-7-general-anxiety-disorder-7

**Fatigue Severity Scale**
https://www.sralab.org/sites/default/files/2017-06/sleep-Fatigue-Severity-Scale.pdf

**Insomnia Severity Index**
https://www.ons.org/sites/default/files/InsomniaSeverityIndex_ISI.pdf

**STOP-BANG score for obstructive sleep apnea**
https://www.mdcalc.com/stop-bang-score-obstructive-sleep-apnea

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**Note:** Tests should be selected based on the patient’s tolerance.

Information from:

Long COVID: What You Should Know

What is long COVID?
A wide range of new, returning, or ongoing health problems may happen four or more weeks after getting COVID-19. These health problems are sometimes called long COVID.

What are symptoms of long COVID?
You may have one or more of the following symptoms:
- Trouble breathing or shortness of breath
- Tiredness or low energy
- Symptoms that get worse after physical or mental activities
- Trouble thinking or concentrating (sometimes called brain fog)
- Cough
- Chest pain or chest discomfort
- Fast-beating or pounding heart
- Joint or muscle pain
- A tingling, pins-and-needles feeling
- Diarrhea
- Sleep problems
- Dizziness when standing (light-headedness)
- Rash
- Mood changes
- Change in smell or taste

What should I do if I have long COVID?
Ask for support from family and friends. Your symptoms might come and go, and they could take months to get better. Be sure to let your family and friends know you may need a lot of help for a while.

Many people find that joining a support group is helpful. The following are support groups for people who have long-term effects of COVID-19:
- Body Politic: https://www.wearebodypolitic.com/covid-19
- Survivor Corps: https://www.survivorcorps.com
- Long COVID Alliance: https://longcovidalliance.org
- Long COVID Kids: https://www.longcovidkids.org

How is long COVID treated?

LUNGS PROBLEMS
Breathing exercises can help if you have lung problems. Do one or more of the following exercises five to 10 times a day and whenever you feel short of breath:
- Belly breathing: Lie flat on your back. Place one hand on your stomach and the other on your chest. Expand (push out) your stomach, but not your chest, while breathing in for four counts. Breathe out for four counts (you will feel your stomach go back down).
- Pursed-lip breathing: Sit down and relax. Breathe in through your nose for two counts. Form a tight

This handout is provided to you by your family doctor and the American Academy of Family Physicians.

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circle with your lips, and blow out slowly for four counts.

• Boxed breathing: Breathe in for four counts, hold your breath for four counts, breathe out for four counts, and hold your breath again for four counts.

Learn more
Pulmonary Wellness Foundation: https://www.pulmonarywellness.org/covid-bootcamp
Stasis smartphone app: https://www.stasis.life (free version available)

TROUBLE THINKING (BRAIN FOG)
Trouble thinking is a common symptom after COVID-19. Be patient and slowly return to school or work while your brain recovers. Take as many breaks as you need. You’ll need to balance rest with mental activity.

Learn more
National Health Service England: https://www.yourcovidrecovery.nhs.uk/i-think-i-have-long-covid/effects-on-your-mind/memory-and-focus

LOW ENERGY OR TIREDNESS
Getting better after any illness, especially after COVID-19, can make you more tired than normal. Thinking tasks can be just as tiring as physical tasks. The most important thing is to listen to your body. Use an easier pace, and plan ahead for rest time. Make sure you rest before you get tired.

Try the four P’s:
• Plan your activities for the day and week ahead of time as much as possible. Set up your work area so you don’t have to use extra energy trying to complete something. Plan rest times throughout the activity.
• Pace yourself. Break larger tasks into smaller, easier steps. Try to rest for five to 10 minutes each hour.
• Prioritize the most challenging activities of the day so that they are done when you have the most energy.
• Position and posture are important. Sit down to work when you can. Practice deep breathing exercises while you work to help you stay relaxed and get more air into your lungs.

Learn more
Royal College of Occupational Therapists: https://www.rcot.co.uk/conerving-energy

DYSAUTONOMIA
Dysautonomia (dis-saa-tuh-NO-mee-uh) is when your nervous system (brain, spinal cord, and nerves) has trouble working properly. This can make your heart race, cause dizziness, or make you tired.

Lifestyle changes like eating more salt, staying hydrated, and eating smaller meals more times a day can help. Sometimes medicine is needed.

Learn more

CHANGES IN SMELL OR TASTE
Ongoing changes in smell or taste often happens after COVID-19. Smell retraining exercises can help you get your smell back.
Long COVID: What You Should Know (continued)

Learn more
AbScent: https://abscent.org/nosewell
Fifth Sense: https://www.fifthsense.org.uk

HEADACHE
Keep a diary to track what causes your headaches, how often you get them, and how painful they are. This can help you avoid things that trigger your headaches. Do not take over-the-counter pain medicine like acetaminophen (brand names: Tylenol, Excedrin) or ibuprofen (brand names: Advil, Motrin) for more than 10 to 15 days per month.

Learn more
National Health Service England: https://www.yourcovidrecovery.nhs.uk/i-think-i-have-long-covid/effects-on-your-body/headache-2/

BODY AND MIND
Eating well, managing stress, moving your body, and getting enough sleep are the most important things you can do to help with long-term COVID-19 symptoms.

Exercise can help your body and mind feel better. Talk with your doctor about the right level of activity before getting started. The wrong kind or amount of activity can make your symptoms worse.

Sleep helps with physical, emotional, and brain health. Sleep can be more difficult if you have long COVID, but you can take steps to help you sleep better. For example, follow a bedtime routine, and make sure you have a comfortable and quite place for sleeping.

MENTAL HEALTH
Many people recovering from COVID-19 have anxiety, depression, and panic attacks. If you are worried about your mental health, talk to your doctor. Therapy, medications, and other solutions can be helpful.

Learn more

Where can I get more information about long COVID?
Centers for Disease Control and Prevention: Caring for People with Post-COVID Conditions

National Health Service England: Your COVID Recovery
https://www.yourcovidrecovery.nhs.uk

RECOVER: Researching COVID to Enhance Recovery
https://recovercovid.org/long-covid

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