Evaluating and Supporting Patients Presenting with Cognitive Symptoms Following COVID

Clinician Outreach and Communication Activity (COCA) Call

Thursday, May 5, 2022

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Objectives

At the conclusion of today's session, the participant will be able to accomplish the following:

1. Describe cognitive symptoms associated with post-COVID conditions (PCC).

2. Determine which clinical assessments and tests are needed for an individual patient with cognitive symptoms.

3. Apply health equity considerations to clinical care, activity management, and reconditioning long COVID patients.

To Ask a Question

- Using the Zoom Webinar System
  - Click on the “Q&A” button
  - Type your question in the “Q&A” box
  - Submit your question

- If you are a patient, please refer your question to your healthcare provider.

- If you are a member of the media, please direct your questions to CDC Media Relations at 404-639-3286 or email media@cdc.gov

Today's Presenters

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Understanding Post-COVID Conditions

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CDR, US Public Health Service
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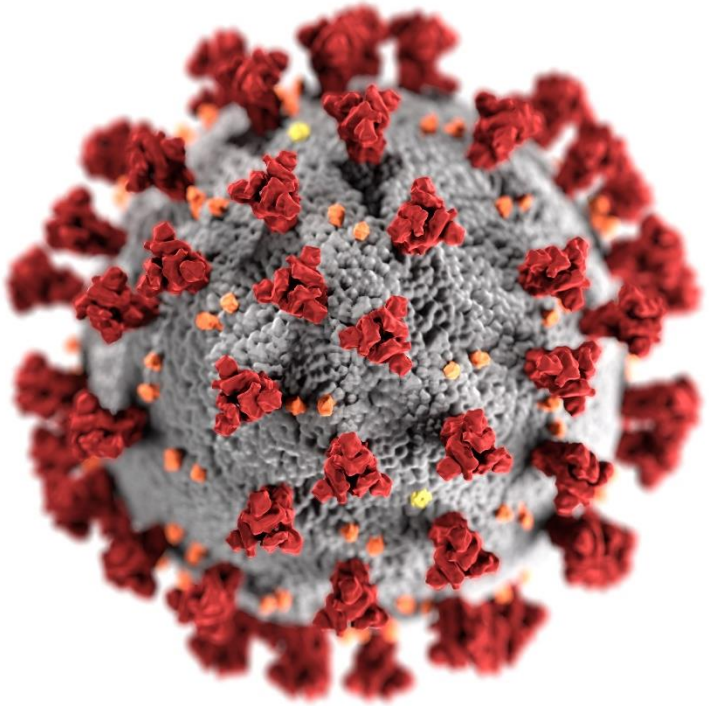


cdc.gov/coronavirus

There are many terms used to refer to these conditions

- **Long COVID**
  - Commonly used
- **Post-COVID Condition(s)**
  - CDC and WHO
- **Post-Acute Sequelae of SARS-CoV-2 (PASC)**
  - NIH terminology

A general framework for long COVID or post-COVID conditions

- Umbrella term for the wide range of physical and mental health consequences, present for **four weeks and beyond after SARS-CoV-2 infection**, *including for patients who had initial mild or asymptomatic acute infection.*

Framework for Variety of Conditions Following SARS-CoV-2 Infection

General Consequences of Illness and Hospitalization	Post-Acute Consequences of SARS-CoV-2 Infection
▪ Post ICU-syndrome ▪ Other complications of illness and treatment	▪ System-specific pathology (e.g., lung fibrosis, stroke) ▪ Clinically significant symptoms with unclear pathology (e.g., ME/CFS*-like, dysautonomia)

Conditions frequently overlap
Patients may experience any combination

*ME/CFS: Myalgic Encephalomyelitis/Chronic Fatigue Syndrome

Challenges in understanding post-COVID conditions

- Includes a wide range of physical and mental health consequences experienced by some patients
  - Spectrum of physical, social, and psychological consequences
  - Conditions are heterogenous and attributable to different underlying pathophysiologic processes
- Studies to date include different patient populations
- Assessments of occurrence of symptoms and conditions are done at varying time points following acute infection, often only once
- Many studies do not include control groups
- Severity and impact of symptoms on quality of life or daily activities not consistently reported

There is a wide range in the prevalence of post-COVID conditions

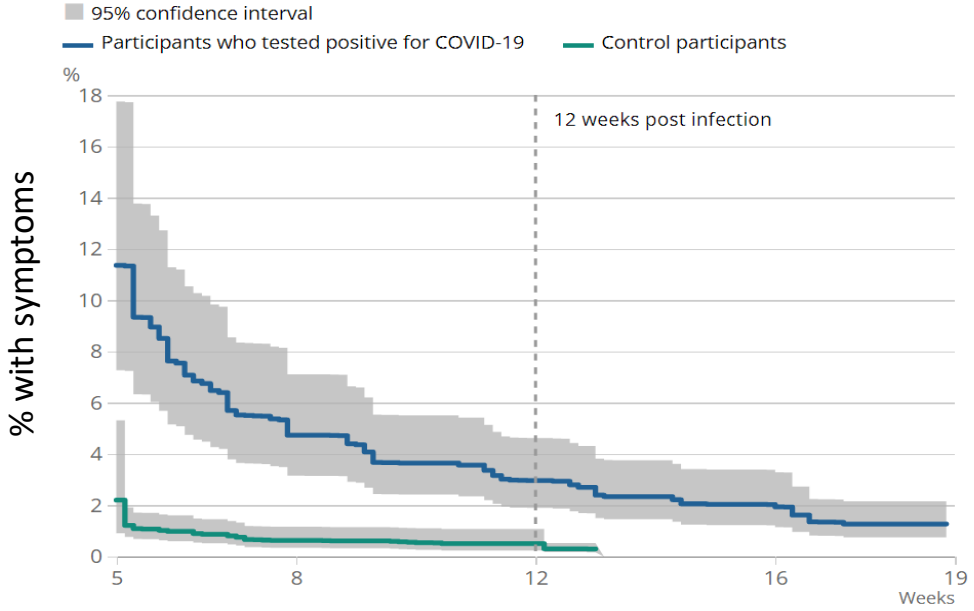
- Self- reported symptoms range from 13.3% at ≥ 1 month to 2.5% at ≥ 3 months
- Based on electronic health data
  - Of non-hospitalized adults with COVID-19, 7.7% experienced one or more of 10 identified late-onset conditions 1 to 4 months post infection[2]
  - Frequency of at least one symptom at 6 months differs by severity of acute COVID:[3]
    - Overall: 73.4/1,000 patients
    - Non-hospitalized: 44.5/1,000 patients
    - Hospitalized: 217.1/1,000 patients
      - ICU: 360.5/1,000 patients

1. Sudre CH et al Nature Medicine 27, 626-631 (2021)
2. Chevinsky JR et al. Clinical Infectious Diseases 73 (S1) 2021
3. Xie Y et al. Nature Communications 12, 6571 (2021)

Duration of post-COVID conditions can vary

- Most patients recover in 4 weeks and the proportion reporting symptoms decreases between 4-12 weeks
- Improvement slows around 12 weeks after infection
- Women and men follow same pattern, but more women report symptoms

UK Coronavirus Infection Survey: Report of symptoms lasting 4 or more weeks- April 2020 – August 2021

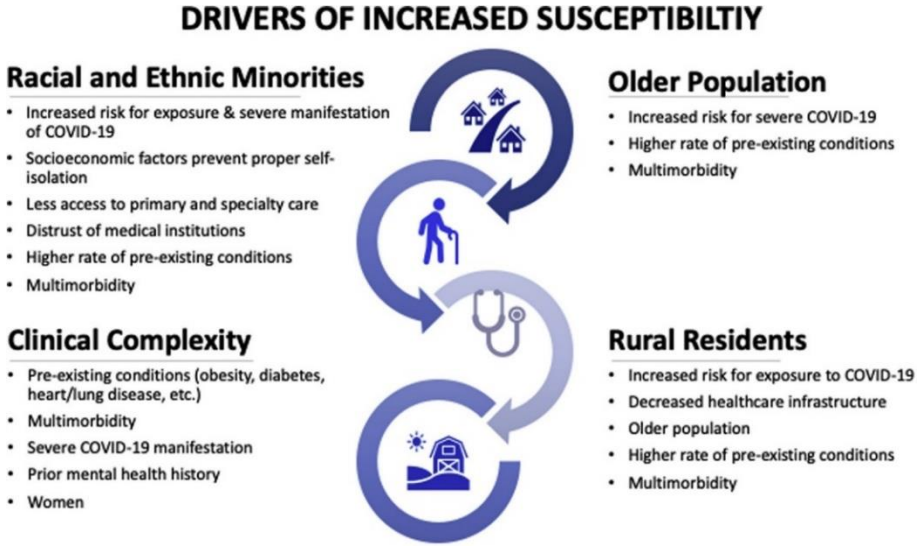


Source: Office for National Statistics - Coronavirus Infection Survey

Technical article, figure 2. Office for National Statistics (ons.gov.uk)

Factors associated with an increased occurrence of post-COVID conditions

- Severity of initial infection
- Female sex
- Pre-existing conditions
- Older age
  - Increased occurrence among older adults compared to younger adults
  - Increased occurrence among adults compared to children
- Infection without evidence of vaccination
  - Lower occurrence among adults with infection after vaccination



Jiang et al. JACC Basic Transl Sci (2021) 6:796

HEALTH DISPARITIES FOR COVID-19 LIKELY TO PERSIST WITH LONG COVID

[1]Thompson et al. medRxiv doi: 10.1101/2021.06.24.21259277
[2]Koudi et al. medRxiv doi: 10.1101/2022.01.05.22268800

Post-COVID conditions may occur after vaccine breakthrough

- Study of infections after vaccination among healthcare workers in Israel found vaccine breakthrough cases were generally mild or asymptomatic, but **19% (7/36) had persistent symptoms at >6 weeks** in the setting of alpha variant[1]

- UK Case–Control Study (n=906, 1:1 match): individuals with infections after vaccination are **less likely to report** prolonged symptoms (**≥ 28 days**) compared to persons who are unvaccinated (**OR 0.51, 95% CI 0.32, 0.82**)[2]

- **Vaccines prevent post-COVID conditions by decreasing transmission**, and lower the occurrence of post-COVID conditions in persons with infection after vaccination (who tend to have milder infections) than infections in persons who are unvaccinated
  - Whether this association changes with the emergence of new variants is unknown

1. Bergwerk NEJM 2021
2. Antonelli Lancet ID 2021

Long COVID and associated disability

- Long COVID under Americans with Disabilities Act (ADA)
  - Is a physical or mental impairment
  - Can substantially limit one or more major life activities
  - Not always a disability (must meet impairment criteria)
- Extent and duration of disability associated with persistent symptoms is unknown
  - Study of hospitalized COVID-19 patients in China found that **12% did not return to their original work by 12 months** (excluded 62% who were retired or not employed before COVID-19)[1]

Given size of pandemic, even 1% disability at one year will have impact

[1]Huang et al. Lancet (2021) 398:747

Self-Knowledge Check

- What factors are associated with an increased occurrence of post-COVID conditions?

  A. Female sex

  B. Younger age

  C. Severity of initial infection

  D. A and C

  E. All of the above

Self-Knowledge Check Answer

- The correct answer is
  - **D.** A and C (Female sex and severity of initial infection)
- **Female sex** and **severity of initial infection** along with **older age**, **pre-existing conditions**, and **infection without prior vaccination** are associated with increased occurrence of post-COVID conditions

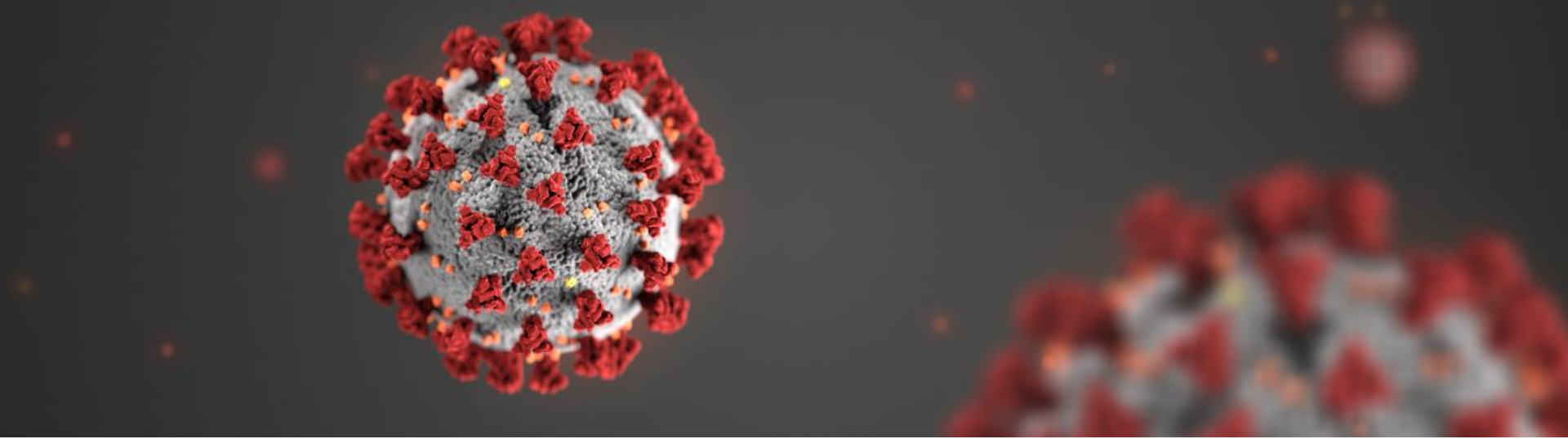
Important take home messages

1. **Post-COVID conditions are heterogeneous**
   - Standard surveillance methods may not capture all disease
   - Epidemiologic studies must characterize different phenotypes, risk factors, and biomarkers
2. **Post-COVID conditions will remain a public health concern into the future**
   - Follow-up times will be measured in years, not weeks or months
3. **Management of post-COVID conditions will require consistent engagement with patients and continued collaboration**

Focus on cognitive symptoms

- Often described as "**brain fog**" by patients
  - Includes difficulty thinking clearly and concentrating, forgetfulness, and memory loss
- Frequently reported in post-COVID studies of both **hospitalized** and **non-hospitalized** COVID-19 patients
  - 18% moderately to severely ill (including hospitalized) reported cognitive symptoms, 9% mildly ill[1]
  - 25% report cognitive symptoms at 1 year follow-up[2]
  - Cognitive deficits in 18% after 1 year (more among hospitalized)[2]
- Evidence for cognitive deficits on objective testing compared with controls[3]

1. Caspersen et al. European Journal of Epidemiology 2022
2. Rass et al. European Journal of Neurology 2022
3. Hampshire et al. eClinical Medicine 2021



For more information:

COVID-19 Response, Epi Task Force, Post COVID Conditions Team eocevent513@cdc.gov

TTY: 1-888-232-6348 www.cdc.gov

OBJECTIVES

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- Understand the most prevalent cognitive symptoms of Post-COVID Conditions (PCC)
- Describe the interplay between physical, cognitive, and psychological symptoms of PCC
- Characterize data from one year of clinical practice in a post-COVID neuropsychology clinic

POSSIBLE IMPACTS OF COVID-19 ON THE BRAIN

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Direct impacts

- Direct viral invasion
- Cerebrovascular accident
- Hypoxia
- Inflammation
- Alterations/reductions in neurotransmission

Indirect impacts

- Organ/metabolic dysfunction
- Hypotension
- Glucose dysregulation
- Nutritional deficiency

(Hewitt et al., 2021)

BUT…

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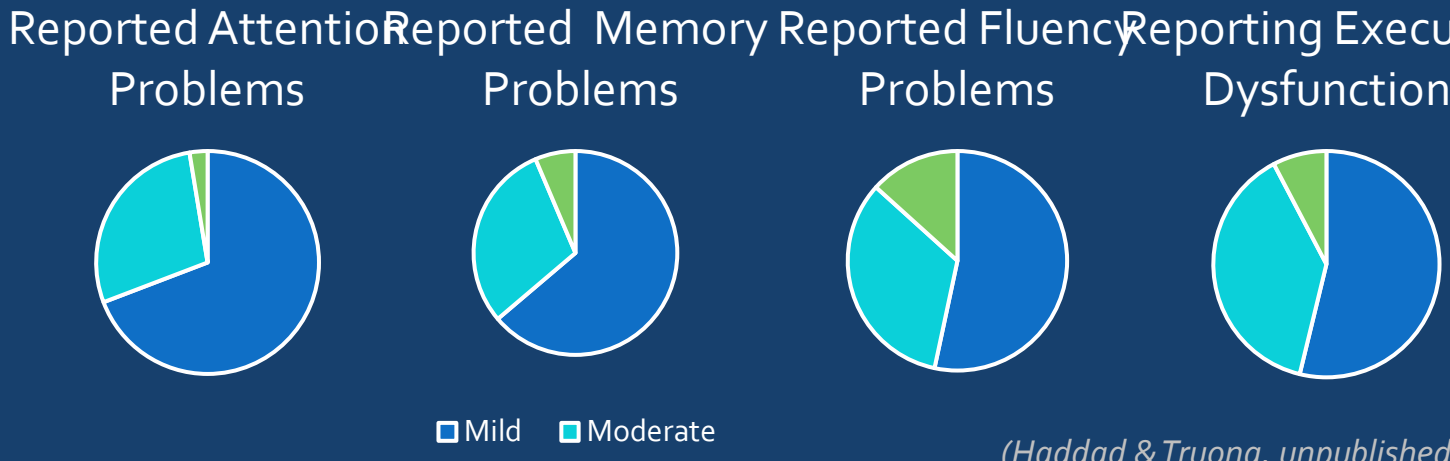
- The prevalence of self-reported brain fog in patients with PCC does not correlate with hospitalization, treatment, or acute severity of COVID-19 illness (as measured by ventilation status)



(Haddad & Truong, unpublished data from Emory University COVID Clinics)

AMONG PCC PATIENTS WHO SELF-REPORT BRAIN FOG…

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- The most common impairments reported are in:
  - Memory: 92.2%
  - Attention: 76.5%
  - Fluency: 29.4%
  - Executive Function: 25%

(Haddad & Truong, unpublished data from Emory University COVID Clinics)

ATTENTION

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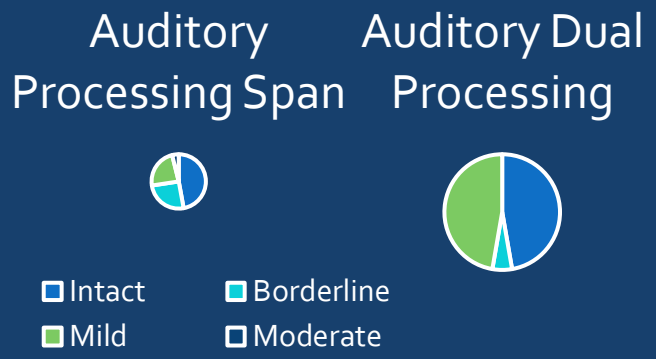
- Many patients have difficulty with sustained attention, particularly when there is also a speed component
- Working memory (ability to hold information in one's mind and manipulate or work with it) is also very frequently impacted
- Remember, attention is important for EVERYTHING ELSE!
- Patients will often endorse "memory problems" when in fact what they are describing are attention problems
  - Losing track of tasks
  - Losing train of thought
  - Missing steps in a routine

(Haddad & Truong, unpublished data from Emory University COVID Clinics)



COGNITIVE FLUENCY

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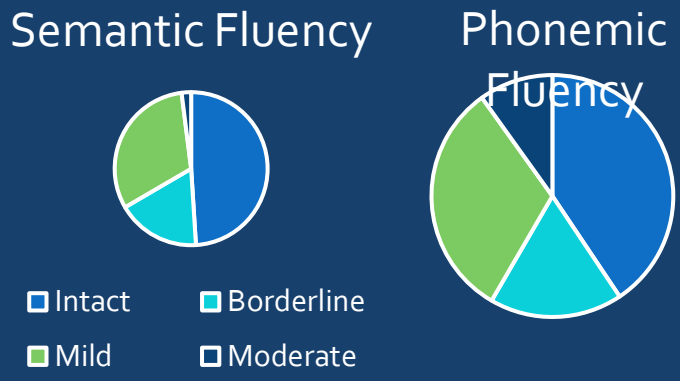
- The ability to efficiently generate and articulate novel thoughts
- Many patients with PCC have diminished speed/efficiency of thinking
- Functionally, presents as feeling slow or confused
  - Taking much longer to complete familiar tasks
  - Struggling to find the right words (this is different from aphasia in that the patient **IS** able to get the words when given enough time)



(Haddad & Truong, unpublished data from Emory University COVID Clinics)

LEARNING AND MEMORY

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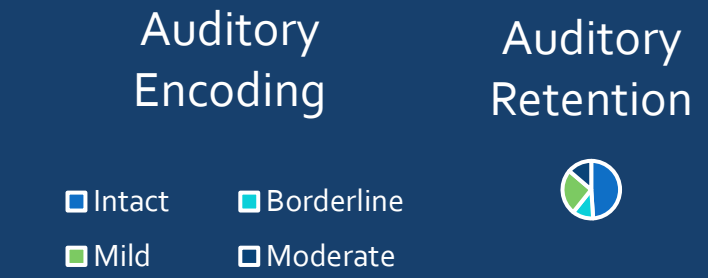
- Remember: Attention is the first part of learning/memory
  - Patients with impaired attention will **VERY LIKELY** also have impaired encoding of new information
- Poor encoding leads to transferring too little information into long-term memory
- But this is different from forgetting information that one **DID** encode
- Important to differentiate between encoding problems vs. retention problems since management strategies are different



(Haddad & Truong, unpublished data from Emory University COVID Clinics)

MOST PCC PATIENTS WITH BRAIN FOG HAVE ENCODING PROBLEMS

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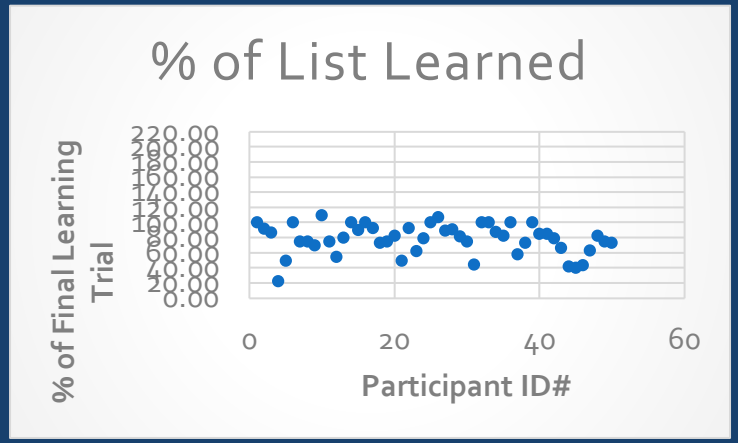

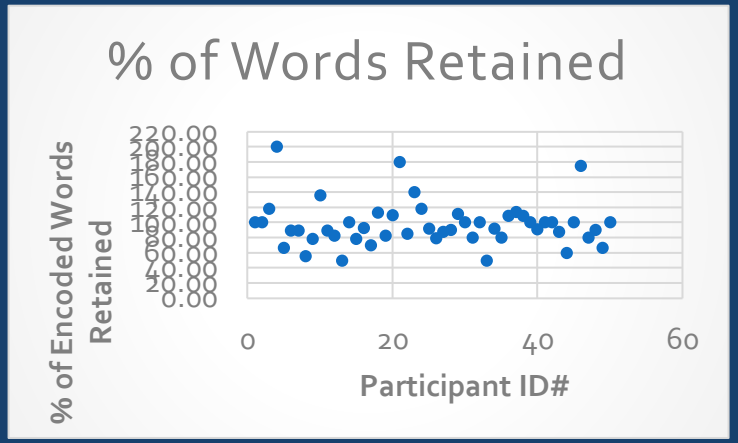

(Haddad & Truong, unpublished data from Emory University COVID Clinics)

EXECUTIVE FUNCTIONING

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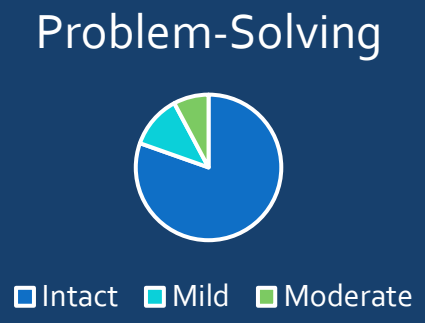
- For most patients with attention problems, a further consequence is difficulty with planning and organization
- If one can't pay attention to all relevant details, it's difficult to adequately plan, prioritize, etc.
- In a smaller proportion of patients, there is also difficulty with strategy generation and problem-solving
- Patients will usually describe this as difficulty with making decisions, or others may identify it as errors in judgment
  - For example, a supervisor at work may point out mistakes in judgment



(Haddad & Truong, unpublished data from Emory University COVID Clinics)

ADJUSTMENT-RELATED MOOD SYMPTOMS ARE VERY PREVALENT IN PATIENTS SEEKING CARE FOR PCC

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- When asked about mood disturbance specifically around symptoms/current condition
  - 82.4% reported anxiety
  - 68.6% reported depression
- Important to note, this is new-onset emotional distress
- Emotional reaction to a stressor can be perfectly appropriate and still have a significant impact on functioning

(Haddad & Truong, unpublished data from Emory University COVID Clinics)

PSYCHOLOGICAL SYMPTOMS & COGNITION

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- Mood disorders are also associated with deficits in attention, fluency, learning/memory, and executive function
- Although psychological symptoms do NOT account for all post-COVID cognitive symptoms, they can certainly worsen functioning
- Vicious cycle of catastrophic thoughts is very common
  - Cognitive slip -> "my brain is broken, I'm such an idiot, I'll never be the same again" -> distraction caused by catastrophic thoughts -> further cognitive slip -> further catastrophic thoughts -> and so on
  - In this cycle, it's also very easy to discount good performance

NEUROPSYCHOLOGICAL DATA AREN'T EVERYTHING!

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- Neuropsych assessment usually occurs under "ideal" circumstances
- Formal evaluation is intended to capture maximal cognitive ability (although it doesn't always succeed at that)
- Of course, most daily activities don't occur under these ideal conditions
- Consider how daily function might differ from a formal evaluation, and make recommendations accordingly

SELF-KNOWLEDGE CHECK

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The post-COVID symptom commonly referred to as "brain fog" may be comprised of

a. Post-viral fatigue

b. Objective cognitive deficits

c. Mood disturbance

d. All of the above

SELF-KNOWLEDGE CHECK

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The correct answer is: D. All of the above.

The reason for this is because our ability to perform our daily activities is impacted by a complex combination of physical, emotional, and cognitive factors, all of which may be affected in post-COVID conditions.

American Academy of Physical Medicine and Rehabilitation (AAPM&R)

Multi-Disciplinary Collaborative Consensus Guidance Statement on the Assessment and Treatment of Cognitive Symptoms in Patients with Post-Acute Sequelae of SARS-CoV-2 infection (PASC)

May 5, 2022

Faculty

Jeffrey S. Fine, MD, FAAPMR

Talya K. Fleming, MD, FAAPMR

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AAPM&R Consensus Guidance Statements

PM&R WILEY

Clinical Guidance | Free Access

Multidisciplinary collaborative consensus guidance statement on the assessment and treatment of fatigue in postacute sequelae of SARS-CoV-2 infection (PASC) patients

Correction(s) for this article

Joseph E. Herrera DO, William N. Niehaus MD, Jonathan Whiteson MD, Alba Azola MD, John M. Baratta MD, MBA, Talya K. Fleming MD, Soo Yeon Kim MD, Huma Naqvi MD, Sarah Sampsel MPH, Julie K. Silver MD, Monica Verduzco-Gutierrez MD, Jason Maley MD, Eric Herman MD, Benjamin Abramoff MD, MS ... See fewer authors

First published: 04 August 2021 | https://doi.org/10.1002/pmrj.12684 | Citations: 5

PM&R WILEY

Clinical Guidance | Free Access

Multi-disciplinary collaborative consensus guidance statement on the assessment and treatment of breathing discomfort and respiratory sequelae in patients with post-acute sequelae of SARS-CoV-2 infection (PASC)

Jason H. Maley MD, George A. Alba MD, John T. Barry PT, DPT, Matthew N. Bartels MD, MPH, Talya K. Fleming MD, Christina V. Oleson MD, Leslie Rydberg MD, Sarah Sampsel MPH, Julie K. Silver MD, Sabrina Sipes PT, DPT, Monica Verduzco-Gutierrez MD, Jamie Wood PhD, Joseph D. Zibrak MD, Jonathan Whiteson MD ... See fewer authors

PM&R WILEY

Clinical Guidance | Free Access

Multi-disciplinary collaborative consensus guidance statement on the assessment and treatment of cognitive symptoms in patients with post-acute sequelae of SARS-CoV-2 infection (PASC)

Jeffrey S. Fine MD, FAAPMR, Anne Felicia Ambrose MD, MS, Nyaz Didehbani PhD, Talya K. Fleming MD, Lissette Glashan MS, CCC-SLP, CBIS, Michele Longo MD, MPH, Alexandra Merlino MS, CCC-SLP, Rowena Ng PhD, Gerald J. Nora MD, PhD, Summer Rolin PsyD, Julie K. Silver MD, Carmen M. Terzic MD, PhD, Monica Verduzco-Gutierrez MD, Sarah Sampsel MPH ... See fewer authors

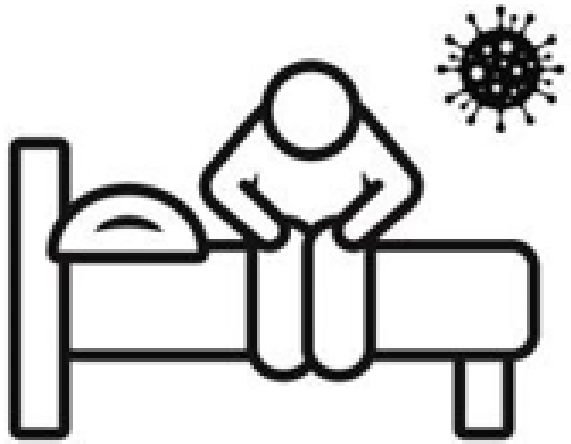
First published: 13 December 2021 | https://doi.org/10.1002/pmrj.12745

aapm&r

Disclaimer

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).

Millions of Americans have survived COVID-19



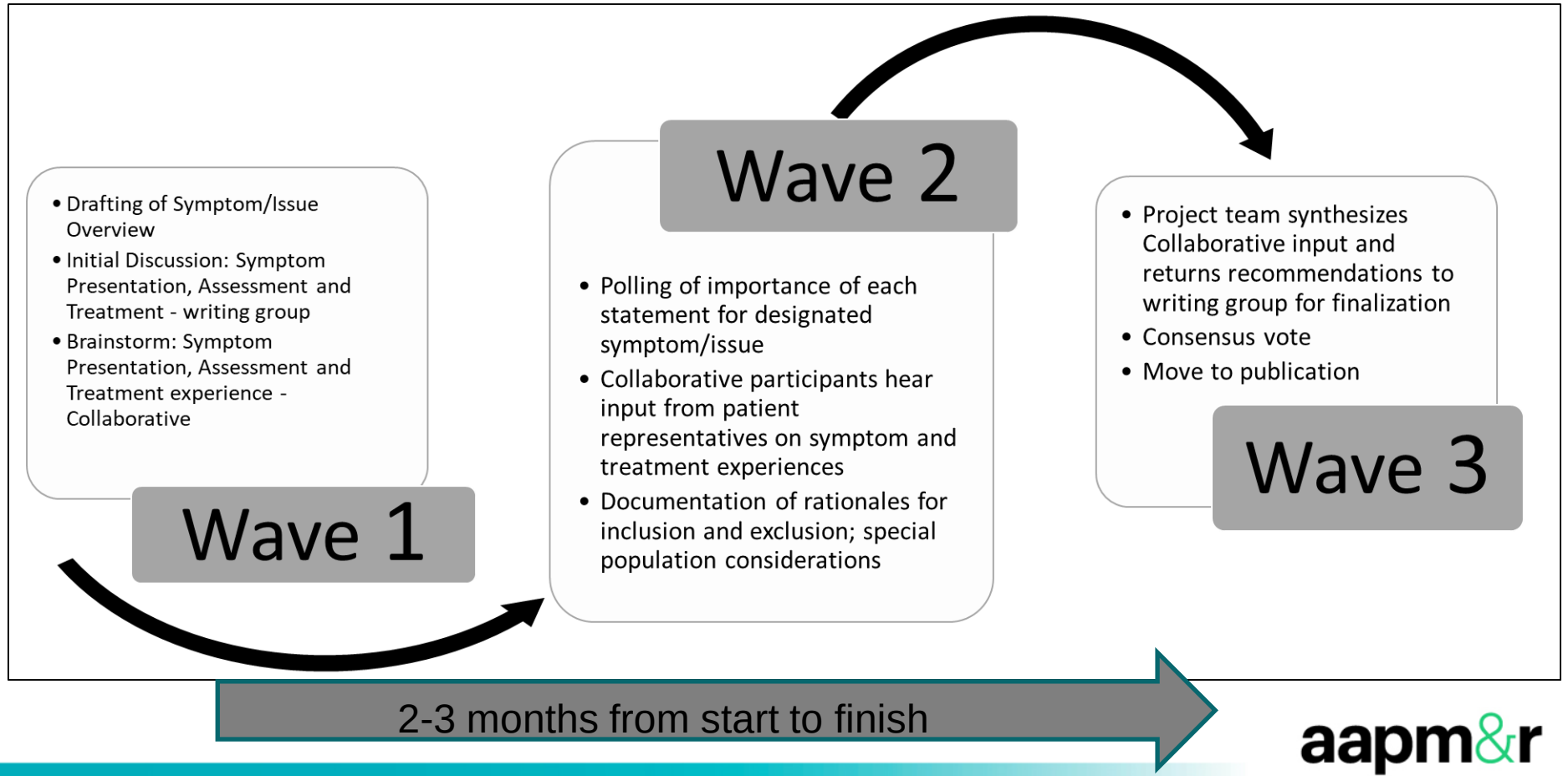
Months later, many still struggle to get out of bed.

Learning Objectives

- Apply the Post-Acute Sequelae of SARS CoV-2 infection (PASC) Consensus Guidance Statement methods into everyday practice
- Identify and diagnose cognitive symptoms in individuals with PASC
- Utilize the assessment of the PASC Consensus Guidance Statement
- Differentiate and apply appropriate PASC-related cognitive symptom treatments
- Identify health equity considerations and examples in PASC-related conditions
- Summarize the future directions in assessing and treating PASC-related cognitive symptoms

NOTE: These Consensus Guidance Statements are intended to reflect current best practices in patient assessment, testing, and treatments. They should not preclude clinical judgment and must be applied in the context of the specific patient, with adjustments for patient preferences, comorbidities, and other factors.

AAPM&R PASC Consensus Statement
Modified Delphi Methodology



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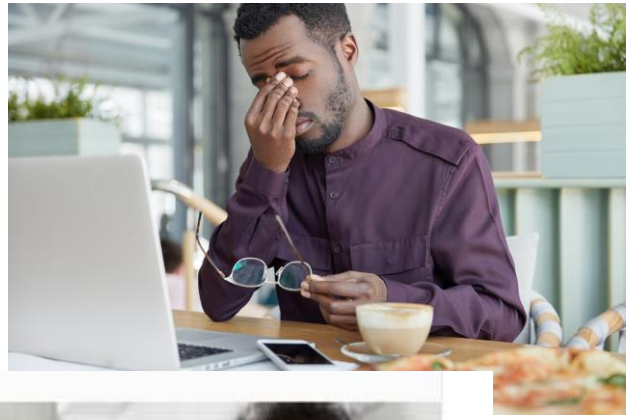
Cognitive Symptoms

- Cognitive symptoms are among the most common persistent symptoms following COVID-19 in both individuals that have been hospitalized and those that have not.

- Primary cognitive symptoms include deficits in reasoning, problem solving, spatial planning, working memory, difficulty with word retrieval, poor attention.

- Individuals are seeking care from their clinicians for cognitive symptoms following COVID-19.



PASC Cognitive Symptom Assessment Recommendations

Patients should be screened for signs of cognitive symptoms using validated tools and instruments.

Patients should be evaluated for conditions that may exacerbate cognitive symptoms and warrant further testing and potential subspecialty referral

Patients should have a thorough neurological examination to identify focal neurological deficits.

The initial lab workup should include complete blood count, vitamin B12, thiamine, folate, homocysteine, 1,25-dihydroxy vitamin D, magnesium, liver function tests, comprehensive metabolic panel, thyroid function tests

Clinicians should conduct a full patient history with review of preexisting conditions and comprehensive medication and supplement review for those that may contribute to cognitive symptoms.

Clinicians should assess impact of cognitive symptoms using standardized patient-reported assessments.

Patients should be screened for signs of cognitive symptoms using validated tools and instruments.

- Montreal Cognitive Assessment (MoCA)
- Mini-Mental State Examination (MMSE)
- Saint Louis University Mental Status Examination
- Mini-Cog
- Short Test of Mental Status

Other symptoms and signs	Referral Options
Neurologic	Neurology, Brain Injury Medicine Physiatry
Endocrine	Endocrinology
Autoimmune	Rheumatology, Infectious Disease
Mood Disorders	Psychiatry, Psychology, Neuropsychology
Sleep Disorders	Pulmonology – Sleep Medicine

Individuals experiencing PASC may present with a broad constellation of cognitive and neurobehavioral symptoms that can be assessed with validated instruments and targeted therapeutic interventions. Symptoms may include:

- Reduced attention
- Diminished processing speed
- Slowed motor function
- Word finding language deficits
- Sleep disorders

PASC Cognitive Treatment Recommendations-1

For patients who screen positive for cognitive symptoms, refer to a specialist with expertise in formal cognitive assessment and remediation.

Treat, in collaboration with appropriate specialists, underlying medical conditions that may be contributing to cognitive symptoms.

Complete, in collaboration with patient primary care provider, medication polypharmacy reduction, weaning or deprescribing medications if medically feasible with emphasis on medications that may impact cognition.

PASC Cognitive Treatment Recommendations-2

Reinforce sleep hygiene techniques including nonpharmacologic approaches as first line of sleep remediation.

Similar to patients experiencing “physical” fatigue, patients should be advised to begin an individualized and structured, titrated return to activity program.

Interventions for sleep to improve cognitive symptoms

- Establish the opportunity for 7-8 hours of sleep duration per night
- Behavioral (non-pharmacologic) and pharmacological interventions
- Behavioral sleep hygiene strategies
- Treating potential sleep apnea
- Nutritional supplements
- Referral to sleep specialists

Should conservative interventions produce incomplete effect, then pharmacological interventions may be indicated.

Medication polypharmacy considerations: Potentially inappropriate medication use in adults 65 or older

- Anticholinergics
- Selected Antidepressants (e.g., amitriptyline, nortriptyline, paroxetine)
- Antipsychotics - conventional and atypical (e.g., risperidone, quetiapine, olanzapine, ziprasidone)
- Benzodiazepines (e.g., alprazolam, diazepam, lorazepam, temazepam)
- Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics (e.g., eszopiclone, zaleplon, zolpidem)
- Skeletal muscle relaxants (e.g., varisoprodol, cyclobenzaprine)

The American Geriatrics Society Beers criteria (updated 2019)

Behavioral health and resilience

Patients with PASC should be encouraged to maintain social engagement and lean on support systems during this challenging period, which may include patient advocacy groups.

Health Equity Considerations and Examples

- Racial/Ethnic Minority Groups
- Biological Sex
- Gender
- Age
- Environmental Exposure
- Disability
- Religion
- Immigration

Example 1: Health Equity Considerations
PASC: Cognitive Symptoms

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Category	Comment	What is Known	Clinical Considerations
Racial/Ethnic Minority Groups *Example:* *People who identify as Black (including African-American), American-Indian/Alaska Native, Pacific Islander, Asian-American, and Mixed Race, and/or Latino/Hispanic (ethnicity)*	Racial/ethnic minority groups may have multiple factors that affect their overall cognitive scores.	Social determinants of health, societal factors and structural racism have disproportionate effects on underinvested communities.	Stereotype threat is common, particularly among non-White students, and interferes with learning. Clinicians administering cognitive testing that may elicit stereotype threat should be aware of factors that may affect test scores and clinical recommendations.

Example 2: Health Equity Considerations PASC: Cognitive Symptoms

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Category	Comment	What is Known	Clinical Considerations
Age *Example: Older individuals*	Healthy older individuals, as well as those with mild cognitive symptoms and dementia, have among the highest rates of COVID-19 infection. Older people may actually have or be perceived as having cognitive symptoms.	Cognitive symptoms in healthy older individuals, as well as those with mild cognitive impairment or dementia, may be due to direct or indirect effects of the virus. In addition to PASC-related cognitive symptoms, older individuals are at higher risk for preexisting cognitive conditions such as Alzheimer's disease, stroke, and Parkinson's disease. Delirium is also more common in older people. Polypharmacy and inappropriate dosing may also affect cognition. Age-related disability--such as impaired vision or hearing--may affect cognitive testing.	Cognitive testing should be conducted by clinicians experienced in working with older individuals. A review of all medications (including over the counter drugs and supplements) is critical in this population. Vision and hearing should be checked for correctable impairments and interventions should be prescribed. Screening for depression and sleep disorders is appropriate. Alcohol and other substance use should not be overlooked in this population as it may contribute to cognitive symptoms.

Example 3: Health Equity Considerations and Examples PASC: Cognitive Symptoms

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Examples of Diversity, Equity, and Inclusion (DEI) Content Integrated into the Cognitive Symptoms Guidance Statement

One report noted that healthy older individuals as well as those with mild cognitive symptoms and dementia have been among the most affected with acute COVID-19 infections, and both direct and indirect cognitive-related issues have been described.

Worsening conditions, particularly cancer, time-dependent diseases, and degenerative conditions were also noted to be a concern in older individuals who may not have received the routine care they needed during the pandemic.

Medications such as benzodiazepines or antihistamines with anticholinergic effects should be prescribed judiciously and usually for short periods of time as they may affect cognition, particularly in older patients.

Future Directions in Assessing and Treating PASC Related Cognitive Symptoms

Recognize the emerging knowledge and recognition of cognitive symptoms as a significant long-term effect of COVID-19.

The AAPM&R Multi-Disciplinary PASC Collaborative recognizes patients with PASC typically present with a cluster of symptoms that cross multiple body systems and our focus in this statement only touches the surface of the emerging evidence.

Future Directions in Assessing and Treating PASC Related Cognitive Symptoms

The duration and recovery trajectories of the PASC-related impairments have yet to be characterized, and some post-COVID patients will experience long-term disabilities.

Beyond cognitive symptoms, case studies provide evidence that patients with COVID-19 can develop a range of neurological complications including those arising from stroke, headache, encephalopathies, and neuropathies.

Tables from this manuscript can be downloaded from the AAPM&R website: **aapmr.org/longcovid**
and from the CDC website: **cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-resources-future**

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TABLE 1: PASC cognitive symptom assessment recommendations

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#	Statement
1	Patients should be screened for signs of cognitive symptoms using validated tools and instruments. (See Table 2 for commonly used tools/instruments).
2	Patients should be evaluated for conditions that may exacerbate cognitive symptoms and warrant further testing and potential subspecialty referral (see Table 3). Particular areas include: • Sleep impairment • Mood, including anxiety, depression, and posttraumatic stress disorder • Fatigue • Endocrine abnormalities • Autoimmune disorders Note: Patients often report dissatisfacti secondary to persistent medical conditi
3	Patients should have a thorough neuro
3a	For those patients identified with new c considered.
4	The following basic lab workup should b 3 months prior to visit including comple thyroid function tests (thyroid stimulatir Other laboratory tests may be consider
5	Clinicians should conduct a full patient Of note, patients with PASC often prese
5a	Clinicians should validate patient histor close contact as available.
6	Clinicians should assess impact of cogr avocational (ie, hobbies), and quality of

TABLE 2: Cognitive symptom screening tools

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Assessment tool	Areas of assessment	Administration time	Pros	Limitations
Montreal Cognitive Assessment (MoCA)[a]	Visuospatial/Executive, Naming, Memory, Attention, Verbal Fluency, Abstraction, Delayed Recall and Orientation	10 minutes in healthy adults	• Available in 55 languages • Versions for illiterate/low education and blind individuals (can be used in virtual setting) • Designed for brief assessment of cognitive impairment across medical/neurological populations • Better than MMSE in detecting mild cognitive impairment (MCI)b and dementia	• Requires training and certification to use • Fees required for training, certification and access to assessment tool
Mini-Mental State Examination (MMSE)[b]	Orientation, Recognition, Attention, Calculation, Recall and Language			
Saint Louis University Mental Status Examination (SLUMS)[c]	Orientation, Attention, Calculation, Verbal Fluency, Memory, Clock Drawing and Recognition			
Mini-Cog[d]	Memory, Planning			

TABLE 5: PASC cognitive symptom treatment recommendation

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#	Statement
1	For patients who screen positive for cognitive symptoms, refer to a specialist (ie, speech-language pathologist, occupational therapist, neuropsychologist) with expertise in formal cognitive assessment and remediation. (See Table 3 for specialist referral options; and Table 4 for examples of Assessment Tools and Intervention Options by Cognitive Domain.)
2	Treat, in collaboration with appropriate specialists, underlying medical conditions, such as pain, insomnia/sleep disorders (including poor sleep hygiene), and mood disorders that may be contributing to cognitive symptoms.
3	Complete, in collaboration with patient primary care provider, medication polypharmacy reduction, weaning or deprescribing medications if medically feasible with emphasis on medications that may impact cognition
4	Reinforce sleep hygiene techniques including nonpharmacologic approaches as first line of sleep remediation.
5	Similar to patients experiencing "physical" fatigue, patients should be advised to begin an individualized and structured, titrated return to activity program.
5a	For patients who achieve a return to their normal, daily activities, regular exercise (at least 2–3 times/week of aerobic exercise) may be effective in improving cognition and also contribute to improved sleep patterns.
5b	Frequent assessment of the impact of return to normal, daily activities (including school, work, driving, operating heavy machinery, etc.) is recommended to ensure that symptoms do not flare and exercise is tolerated.

Abbreviation: PASC, postacute sequelae of SARS-CoV-2 infection.

Self-Knowledge Check

Common cognitive symptoms in patients with PASC may include subjective or objective deficits in:

A. reasoning and problem solving
B. attention and working memory
C. spatial planning and word retrieval
D. A and B only
E. All of the above

Self-Knowledge Check

The correct answer is: E. all the above

PASC patients may experience a subjective ‘brain fog’, that has been characterized as a ‘dysexecutive’ syndrome. Primary cognitive symptoms in PASC patients include deficits in reasoning, problem solving, spatial planning, working memory, difficulty with word retrieval, and poor attention.

Impaired attention, including diminished sustained attention, as a primary impairment may have detrimental impacts on performance in other cognitive domains.

Self-Knowledge Check

Cognitive screening assessments include all the following except:

A. Montreal Cognitive Assessment (MoCA)
B. Mini-Mental State Examination (MMSE)
C. Saint Louis University Mental Status Examination (SLUMS)
D. Wechsler Adult Intelligence Scale (WAIS)

Self-Knowledge Check

The correct answer is: D.

Commonly used cognitive screening instruments include the Mini Mental Status Examination, Montreal Cognitive Assessment, Saint Louis University Mental Status Exam, Mini-Cog, and the Short Test of Mental Status. Each take 10 minutes or less to administer.

The Wechsler Adult Intelligence Scale is used for assessment of intelligence and cognitive abilities, but is not a screening examination. It is composed of 10 core subtests and five supplemental subtests, and takes 60-90 minutes to administer.

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