Long COVID – Clinical Deep Dive

Diane Sanders-Cepeda, DO CMD
FMDA President, Journal Club Chair
Let’s start with a case
78 y/o woman admitted to SNF for Post-acute care

Patient has been in facility for 2 weeks, and is not progressing with therapy

Family informed of potential next steps – remain at facility as LTC resident or discharge home with in-home care.

Patient’s daughter wants her mother transferred to an Acute Inpatient rehabilitation (AIR) facility because the SNF “is not treating her mother” and she is upset that this level of care was denied
78 y/o woman not progressing with therapy.

Patient’s history includes – COVID diagnosis 5 months ago, patient with muscle weakness, multiple falls in the last 2 months.

Pmhx: Osteoarthritis & HTN

At Baseline – Per daughter she was very active. Activities included gardening, walking around the neighborhood, visiting with friends, watching her grandkids.
Patient has complained of fatigue for the past 3 months, and has exertional dyspnea when attempting to complete certain activities.

At the last hospitalization she was treated for UTI despite negative Urine Cultures.

Upon review of her chart it was noted that Post-COVID condition was documented by physical and occupational therapist.
Defining Post-Acute Sequelae of COVID aka Long COVID

- Long COVID
- Long haulers COVID
- Post Acute Sequelae of COVID
- Post COVID Conditions
Post Acute Sequelae of COVID (PASC) WHO Definition

- History of probable or confirmed COVID-19 infection
- Symptoms 3 months from the onset of COVID
- Symptoms that cannot be explained by an alternative diagnosis
- Lasting for at least 2 months
Prevalence & Recognition

Are we seeing this in our care settings?
# Post-Acute Sequelae of SARS-CoV-2 Infections (PASC) Estimates and Insights

American Academy of Physical Medicine and Rehabilitation

Data as of 5/10/2022

## Summary

**COVID-19 Surviving Cases (Total)**

<table>
<thead>
<tr>
<th>State</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>2,758,383</td>
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<tr>
<td>Texas</td>
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**PASC Cases (Estimated)**

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## By State

**Model Assumptions and Sources**

1. Model assumes 30% of COVID-19 surviving cases in the U.S. result in PASC.
2. COVID-19 surviving cases are confirmed cases less deaths.

Powered by Association Analytics
# Post-Acute Sequelae of SARS-CoV-2 Infections (PASC) Estimates and Insights

American Academy of Physical Medicine and Rehabilitation

**SUMMARY**

<table>
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<tr>
<th>FILTERS</th>
<th>BY STATE</th>
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<tbody>
<tr>
<td>(reset to default)</td>
<td>COVID-19 SURVIVING CASES (TOTAL)</td>
</tr>
<tr>
<td>Select Est. PASC %</td>
<td>5,925,232</td>
</tr>
<tr>
<td>30%</td>
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</tbody>
</table>

**ESTIMATED PASC CASES PER STATE**

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<th>PASC Cases (Estimated)</th>
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**CUMULATIVE AND DAILY CASES**

- COVID-19 Surviving Cases
- PASC Cases (Estimated)

1. MC-19 St.:
2. COVID-19 surviving cases are confirmed cases less deaths.


U.S. Census data uses 2019 1-year estimates.

*View Dashboard Assumptions, Methodology, and Sources*
PASC Symptoms

**Neurologic**
- Olfactory deficits
- Gustatory deficits
- Headache
- Cognitive impairment
- Hearing loss/earache/tinnitus
- Retinopathy (possible)

**Psychiatric/mental health**
- Insomnia
- Post traumatic stress disorder
- Depression
- Anxiety
- Obsessive compulsive syndromes
- Secondary emotional stresses (financial, social isolation, etc.)

**Cardiac/cardiovascular**
- Dyspnea
- Tachycardia/palpitations
- Myocarditis
- Cerebrovascular disease
- Postural tachycardia syndrome (POTS)

**Pulmonary**
- Dyspnea
- Cough
- Pulmonary fibrosis
- Impaired pulmonary function
- Pulmonary hypertension

**Gastrointestinal**
- Loss of appetite
- Acid reflux
- Diarrhea & vomiting
- Abdominal distension & pain
- Possible change in gut microbiome

**Other complications**
- Chronic fatigue
- Kidney injury/chronic kidney disease
- Hyperglycemia/diabetes
- Pediatric inflammatory multisystemic syndrome
- Skin rash
- Hair loss
Long-Term Effects of COVID-19

Shreeya Joshee, BS; Nikhil Vatti, MD; and Christopher Chang, MD, PhD, MBA
Is this LONG COVID?

Case Reviews
94 y/o Female LTC resident

PMHX – frailty, Dementia

Multiple Hospitalizations since COVID diagnosis in August 2021

Persistent cough, Worsening dysphagia now with PEG tube placement, progressively worse muscle weakness; treated twice for pneumonia in the past 6 months

Persistent abnormalities on bloodwork – leukocytosis, anemia, elevated BUN & Cr
63 y/o Female LTC resident

Pmhx of HIV, Frailty

Admitted several times to the hospital since COVID diagnosis – over 6 months ago

Now with significant functional decline, worsening renal function, refusal to eat, apathy, and anemia

ACP discussions ongoing, currently family does not want to consider hospice care
78 y/o male patient
Outpatient Care

Patient with COVID infection 6 months ago; refused vaccination, treated with Monoclonal antibodies in first 72 hours

Pmhx: s/p Renal transplant, h/o spinal stenosis

Prior to COVID at baseline – walked 1 to 2 miles daily

Currently – has exertional dyspnea with exercise intolerance, muscle weakness, and low back pain

Now – receiving in-home physical therapy with incremental improvement
62 y/o Female LTC Resident

Pmhx of Diabetes, CVA, CKD 3, Morbid Obesity, HTN, Heart Failure, COPD, RA

Initially, was treated on COVID unit in facility until Acute Respiratory Failure

Upon discharge back to the facility she continued to have SOB, worsening renal function, and muscle weakness

Hospitalized Multiple times in the months following her initial COVID diagnosis
81 y/o Female LTC Resident

Pmhx COPD, CHF, AFIB, HTN, s/p Stroke, Diabetes, PAD

At baseline – mild cognitive impairments, normal PO intake

Diagnosed with COVID – 19 with mild symptoms – mild SOB, no fever, no chest pain

1 month later – significant mental and functional decline, worsening renal function and poor oral intake
71 y/o Male
Homebound Patient

Pmhx: COPD, Chronic respiratory failure on Home O2, Morbid Obesity, Heart Failure, OSA, B/L LE Lymphedema with wounds

Fully vaccinated through home vaccine program, not boosted

Never diagnosed with COVID, had several rapid test that were negative during Omicron wave – despite his family testing positive

3 months later – Muscle weakness, sacral wound development, Bilateral LE wounds worsening, severe diarrhea requiring hospitalization for dehydration.
What about Treatment??
## Summary of COVID-19 Preventative Agents & Therapeutics

<table>
<thead>
<tr>
<th>No Illness</th>
<th>Exposed</th>
<th>Mild to Moderate Symptoms</th>
<th>Hospital Admission</th>
<th>ICU Admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline health status, no infection</td>
<td>Per CDC Close Contact Criteria</td>
<td>Not hospitalized, with limitations</td>
<td>Hosp. no act. medical problems</td>
<td>Hospitalized, high flow oxygen/non-invasive ventilation</td>
</tr>
</tbody>
</table>

### COVID-19 VACCINES
- **Monoclonal Antibodies for PrEP**
  - Evusheld (tixagevimab + cilgavimab, AZ)

### Oral Antivirals
- Paxlovid (nirmatrelvir + ritonavir, Pfizer)
- Lagevrio (molnupiravir, Merck)

### Monoclonal Antibodies for Treatment
- Bebtelovimab (Lilly)

Veklury® (remdesivir, Gilead)

Please see [NIH Current Inpatient Therapies](https://www.covid19treatmentguidelines.nih.gov/therapies/)

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Impact of Monoclonal Antibody Treatment on Post-Acute COVID-19 Syndrome (MAbPACs)
Do vaccines protect from long COVID?

Priya Venkatesan

Published: January 20, 2022  DOI: https://doi.org/10.1016/S2213-2600(22)00020-0
Reduced Incidence of Long-COVID Symptoms Related to Administration of COVID-19 Vaccines Both Before COVID-19 Diagnosis and Up to 12 Weeks After

Michael A. Simon, Ryan D. Luginbuhl, Richard Parker
What about Vitamins?
RCT: Effect of High-Dose Zinc and Ascorbic Acid Supplementation on Symptom Length Among Ambulatory Patients With SARS-CoV-2 Infection

**POPULATION**
82 Men, 132 Women

Adult patients with SARS-CoV-2 infection confirmed with a PCR-based assay as outpatients

**Mean (SD) age, 45.2 (14.6) y**

**SETTINGS/LOCATIONS**
Hospitals in a single health system with sites in Ohio and Florida

**INTERVENTION**
214 Patients randomized and analyzed

50 Standard of care
Standard outpatient prescription for viral illness

48 Ascorbic acid
8000 mg Ascorbic acid

58 Zinc gluconate
50 mg Zinc

58 Zinc and ascorbic acid
50 mg Zinc and 8000 mg of ascorbic acid

**PRIMARY OUTCOME**
The primary end point was the number of days required to reach a 50% reduction of symptoms, such as severity of fever, cough, shortness of breath, and fatigue

**FINDINGS**
The study was stopped for a low conditional power for benefit with no significant difference among the 4 groups for the primary end point, a 50% reduction in symptoms

<table>
<thead>
<tr>
<th>Avenue</th>
<th>Time to 50% symptom reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care:</td>
<td>Mean (SD), 6.7 (4.4) d</td>
</tr>
<tr>
<td>Ascorbic acid:</td>
<td>Mean (SD), 5.5 (3.7) d</td>
</tr>
<tr>
<td>Zinc gluconate:</td>
<td>Mean (SD), 5.9 (4.9) d</td>
</tr>
<tr>
<td>Zinc and ascorbic acid:</td>
<td>Mean (SD), 5.5 (3.4) d</td>
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Exploring the link between Vitamin D and clinical outcomes in COVID-19

Vitamin D binds to these cells and immunomodulates gene expression enhancing innate immunity and modulating adaptive immunity.

**Question:** Does Vitamin D help decrease the severity of clinical outcomes in COVID-19?

**Conclusion:** No significant association found between Vitamin D levels and clinical outcomes in COVID-19.

Managing Post Acute Sequelae of COVID

• Multidisciplinary Team approach
• Individualized care plans
• Ongoing Support
Phase-Adapted Rehabilitation for Acute Coronavirus Disease-19 Patients and Patient With Long-term Sequelae of Coronavirus Disease-19

Christoph Gutenbrunner, MD, PhD, FRCP, Boya Nugraha, MS, PhD, and Lidia Teixido Martin, MD
Rehabilitation interventions according to needs assessment and individual rehabilitation plan: aerobic exercise, respiration treatment, sensory training (incl. taste and smell), muscle balancing and training of muscle force, manual techniques for joints and soft tissue coordination exercise, physical stimuli, coping strategies, vocational rehabilitation and return-to-work programs.
Defining Post-COVID Symptoms (Post-Acute COVID, Long COVID, Persistent Post-COVID): An Integrative Classification

César Fernández-de-las-Peñas 1,*, Domingo Palacios-Ceña 1,*, Víctor Gómez-Mayordomo 2,*, María L. Cuadrado 2,3 and Lidiane L. Florencio 1
INTEGRATIVE POST-COVID SYMPTOMS MODEL
Hospitalized patients with COVID-19
COVID-19 diagnosis

Arrange for multidisciplinary follow-up
Inpatients: ambulatory oximetry, physical therapy, occupational therapy, care coordination, home healthcare
Outpatients: primary care follow-up, referral to local COVID-19 hotline

4 weeks after diagnosis or hospital discharge
Virtual screening *

No persistent symptoms
Resume routine outpatient care

Persistent symptoms
In-person visit with primary care physician or post-COVID-19 clinic: chest x-ray, spirometry, diffusing capacity for carbon monoxide, psychiatric screening. * neurocognitive screening.
If pulmonary embolism diagnosed with COVID-19: echocardiogram, electrocardiogram, ventilation-perfusion scan
For all patients, also consider echocardiogram, electrocardiogram

Abnormal chest x-ray, spirometry, diffusion capacity, ventilation-perfusion scan
Computed tomography/ computed tomographic pulmonary arteriography
Pulmonary referral

Abnormal echocardiogram and electrocardiogram
Cardiology referral

Abnormal neurocognitive screening
Neuropsychiatric referral

Normal tests
Consider alternative diagnoses for symptoms
Refer to post-COVID-19 clinic, if available
Optimize comorbid conditions
Supportive symptomatic care

* Screening tools to consider: Post-COVID-19 Functional Status Scale, COVID-19 Yorkshire Rehabilitation Screen, University of Pennsylvania Post-COVID Screening Measures.
* Available psychiatric screening tools: General Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9; for depression screening), PTSD Checklist for DSM-5 (PCL-5), Impact of Event Scale-6 (IES-R; for PTSD screening), Hospital Anxiety and Depression Score (HADS).
* Available neurocognitive screening tools: Montreal Cognitive Assessment (MoCA), Mini-Mental State Examination (MMSE), Cognitive Assessment Tool Rapid Version (CAT-rapid).

Figure 1. Care pathway for patients with the post-acute sequelae of SARS-CoV-2 infection.
Coding Post
COVID Syndrome
WHO added new code to ICD-10

Proposal to add to ICD-10 CM made at the March 2021 Meeting

Implementation date – October 1, 2021
POST COVID Syndrome Symptoms

• Fatigue
• Difficulty thinking or concentrating
  • *sometimes referred to as “brain fog”*
• Difficulty breathing
  • *with and without abnormal imaging and pulmonary function testing*
• Cough
• Painful joints or muscles
• Chest pain

• Depression or anxiety
• Headache
• Fever
• Palpitations
• Loss of smell or taste
• Dizziness on standing
• *Rashes*
• *Hair Loss*
• *Lesions on Toes “COVID TOES”*

Code presenting symptom first, then code Post COVID condition
Example: Coding Post COVID Condition

**CODE The Presenting Condition first**

- Patient with Fatigue 2 months after COVID infection
- You will code R53.8 first

Then add Post COVID Condition code

- Then, You will code U09.9
Example: Coding Post COVID Condition

Add
U09 Post COVID-19 condition

Add
U09.9 Post COVID-19 condition, unspecified

Note: This code enables establishment of a link with COVID-19.
This code is not to be used in cases that are still presenting with active COVID-19.
However, an exception is made in cases of re-infection with COVID-19, occurring with a condition related to prior COVID-19.
Post-acute sequelae of COVID-19

Code first the specific condition related to COVID-19 if known, such as:
chronic respiratory failure (J96.1-)
loss of smell (R43.8)
loss of taste (R43.8)
multisystem inflammatory syndrome (M35.81)
pulmonary embolism (I26.-)
pulmonary fibrosis (J84.10)

Practical Takeaways – PALTC CALL TO ACTION
Post-acute sequelae of SARS-CoV-2 infection in nursing homes: Do not forget the most vulnerable

Himali Weerahandi MD, MPH1,2  Mana Rao MD3,4  Kenneth S. Boockvar MD, MS5,6
What should we be doing now?

- Know your resident’s baseline
- Document and capture coding appropriately
- High suspicion for Post COVID conditions
- Write it up - *Future case reports and studies are needed for PALTC*
Open Discussion
This meeting has been recorded and will be available at www.fmda.org/journalclub.php