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**Webinar Series**  
**COVID-19: CALTCM Rounds**

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February 22, 2021

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Janice Hoffman-Simen, Pharm.D., EdD, APh, BCGP, FASCP  
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Michael Wasserman, MD, CMD



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**Webinar Moderator**

**Heather D'Adamo, MD**  
Staff Attending Physician  
Community Living Center  
VA Greater Los Angeles  
Assistant Professor, UCLA Geriatrics; Director  
of SNF and LTC Curriculum of the VA UCLA  
Geriatrics Fellowship

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**Webinar Faculty**  
**Jay Luxenberg, MD**  
Chief Medical Officer, On Lok  
CALTCM, Wave Editor-in-Chief



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**Webinar Faculty**  
**Christian Sandrock, MD, MPH, FCCP**  
UC Davis  
Director of Critical Care  
Professor of Medicine  
Vice Chair for Quality and Safety  
Emerging Infectious Diseases  
Outbreak Management



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8

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**Webinar Faculty**  
**Michael Wasserman, MD, CMD**  
Geriatrician  
Immediate Past-President and  
Chair, Public Policy Committee  
CALTCM



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**Post-COVID Syndrome:  
What To Watch Out for in LTC**



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**Post Acute-CoVID  
Syndrome**

A Short Update

Christian Sandrock MD, MPH  
UC Davis School of Medicine

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**Outline**

- Naming an entity
- How do you define the post COVID period?
- How common is this?
- Risk factors for a Post-CoVID syndrome
- What are the symptoms associated with a post acute-CoVID syndrome?
- Why do they get these symptoms?
- Treatment
- What to expect with workers after CoVID

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### Two Cases:

- A 76 year old man with obesity, DM, HTN admitted to ICU with hypoxemic respiratory failure associated with his CoVID. Remained on mechanical ventilation for 50 days, hospitalized for 75. Now, 180 days after infection, has weakness, fatigue, depression, lethargy, SOB, decreased appetite, and extreme forgetfulness
- A 31 year old woman with no PMH develops acute CoVID. Now, 100 days from first symptoms, she has intermittent low grade fevers, DOE at 1 block, tachycardia, weakness, hair loss, fatigue, difficulty concentrating, and depression

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### What's in a name?

- Long haul CoVID
- Continued CoVID
- Post CoVID
- Post-CoVID syndrome
- Post-acute CoVID syndrome

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### What's in a name?

- Long haul CoVID- Layperson term, not descriptive
- Continued CoVID- Symptoms continue but not infectious
- Post CoVID- Nebulous as all infected without symptoms are Post-
- Post-CoVID syndrome- Works well but implies that you went through a period or resolution and this is not related to disease
- Post-acute CoVID syndrome- Might best describe the process occurring here as it gets both ICU and non-ICU issues

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### Definition

- "Post acute"- 3 weeks from symptoms onset
- "Chronic"- 12 weeks from symptom onset
- Generally, no consensus but we try for about 60 days
- Need a positive test? What to do before April 1, 2020
- Symptoms:
  - Cardiovascular: myocardial inflammation, ventricular dysfunction
  - Respiratory: pulmonary function abnormalities
  - Renal: acute kidney injury
  - Dermatologic: rash, alopecia
  - Neurological: olfactory and gustatory dysfunction, sleep dysregulation, altered cognition, memory impairment
  - Psychiatric: depression, anxiety, changes in mood

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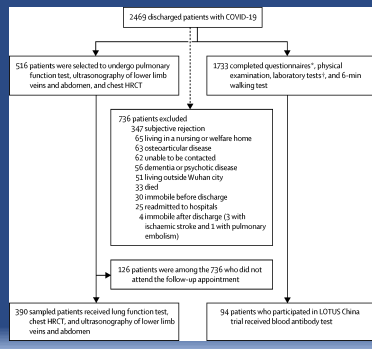
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### How common is this?



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### How common is this?

- Key issues:
  - Hospital DC only
  - Most severe will get additional testing (scale 5-6)
- 76% reported symptoms at 180 days
  - Fatigue (63%)
  - Sleep disturbance (26%)
  - Hair loss (22%)
  - Loss of smell/taste (11%)
- 58.6% seropositivity (92% acute phase)
- More severe disease associated with
  - Worsened diffusing capacity
  - Anxiety and depression
  - Fatigue

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### 60 Day Follow Up Cohort

- 293 patients hospitalized
- 30 and 60 day follow up by phone
- Most with mild-moderate disease (34 severe)
- 66% with symptoms
  - Anosmia
  - DOE
  - Asthenia
- Risk: Younger age
- Many healthcare workers

22

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### Some Mild Patients Have Been Studied

**COVID19-ALC**

**Pneumonia**  
 182 Severe inpatients  
 41 Non-Severe Hospital or home

**Mild cases**  
 54 Outpatients

**277** recovered from symptomatic SARS-CoV-2 infection

**Post-Acute COVID Syndrome 50.9%**  
 (95%CI 45.0-56.7)  
 Severe inpatients 58.2% (95%CI 51.0-65.2)

**Persistent symptoms & signs**

Fatigue	34.6%
Dyspnea	34.4%
Anosmia-dysgeusia	21.4%
Cough	21.3%
Headache	17.8%
Mesic complaints	15.2%

**Imaging study abnormalities 18.9%**

**Standard spirometry abnormalities 9.3%**

\* persistence of at least one clinically relevant symptom, or abnormalities in spirometry or chest radiology.

23

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### Commonality

- 2/3 will have some symptoms after hospitalized disease
- Most likely weakness, fatigue, DOE
- Some young people involved
- How do you separate out ICU stay from COVID?
- Limitations: What about mild disease with minimal symptoms (the non-admit)?

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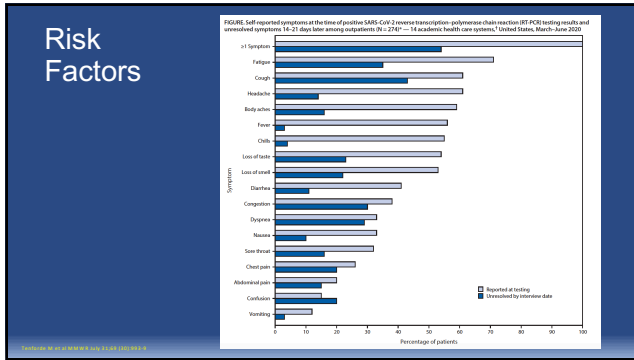
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### Risk Factors

TABLE 1. Characteristics of symptomatic outpatients with SARS-CoV-2 real-time reverse transcription-polymerase chain reaction (RT-PCR)-positive test results (N = 270) who reported returning to usual state of health or not returning to usual state of health at an interview conducted 14–21 days after testing — 14 academic health care systems, United States, March–June 2020

Characteristic	Total	Returned to usual health, no. (n=%)		P-value <sup>a</sup>
		Yes (n = 173)	No (n = 97)	
Sex				0.14
Women	140	83 (61)	57 (39)	
Men	130	90 (69)	40 (31)	
Age group (yr)				0.010
18–24	69	43 (64)	26 (36)	
25–49	96	65 (68)	31 (32)	
≥50	89	47 (53)	42 (47)	
Race/Ethnicity				0.29
White, non-Hispanic	94	58 (62)	36 (38)	
Black, non-Hispanic	46	26 (57)	20 (43)	
Other, non-Hispanic	32	24 (75)	8 (25)	
Hispanic	98	67 (68)	31 (32)	
Insurance (14 missing)				0.49
No	46	31 (67)	15 (33)	
Yes	230	132 (58)	98 (42)	
No. of medical conditions (7 missing)				0.003
0	123	87 (71)	36 (29)	
1	57	41 (72)	16 (28)	
2	39	23 (59)	16 (41)	
≥3	51	29 (57)	22 (43)	
Individual medical conditions (7 missing) <sup>b</sup>				
Hypertension	64	33 (52)	31 (48)	0.018
Obesity (BMI ≥30 kg/m <sup>2</sup> )	53	23 (43)	24 (45)	0.002
Respiratory condition	68	36 (53)	32 (47)	0.002
Asthma	36	23 (64)	13 (36)	0.09
Diabetes	28	16 (57)	12 (43)	0.44
Immunosuppressive condition	15	6 (40)	9 (60)	0.047
Autoimmune condition	13	7 (54)	6 (46)	0.44
Blood disorder	8	4 (50)	4 (50)	0.47
Chronic kidney disease	7	3 (43)	4 (57)	0.26
Chronic obstructive pulmonary disease	6	4 (67)	2 (33)	1.00
Liver disease	4	1 (25)	3 (75)	1.00
Neurologic condition	4	1 (25)	3 (75)	1.00
Coronary artery disease	4	3 (75)	1 (25)	1.00
Congestive heart failure	2	2 (100)	0 (0)	0.54

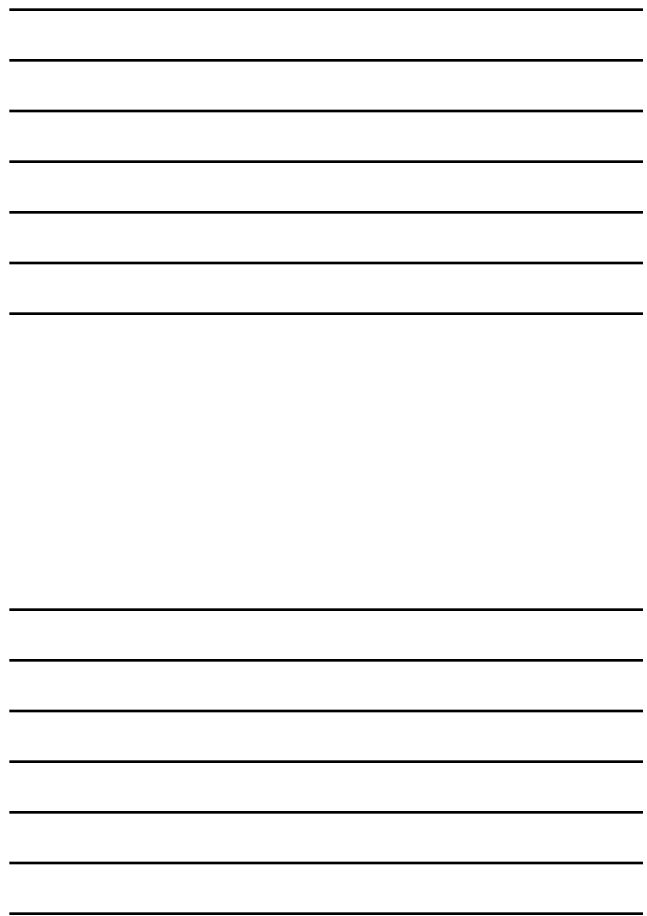
26

### Risk Factors

TABLE 2. Characteristics associated with not returning to usual health among symptomatic outpatients with SARS-CoV-2 real-time reverse transcription-polymerase chain reaction (RT-PCR)-positive test results (N = 270)<sup>a</sup> reported at an interview conducted 14–21 days after testing — 14 academic health care systems, United States, March–June 2020

Characteristic	Odds of not returning to "usual health" <sup>b</sup> at 14–21 days after testing — 14 academic health care systems	
	Unadjusted odds ratio (95% CI) <sup>b</sup>	Adjusted odds ratio (95% CI) <sup>c</sup>
Age group (yr)		
18–24	Reference	Reference
25–49	1.40 (0.72–2.67)	1.38 (0.71–2.69)
≥50	2.64 (1.39–5.00)	2.29 (1.14–4.58)
Sex		
Women	Reference	Reference
Men	0.68 (0.41–1.13)	0.80 (0.46–1.38)
Race/Ethnicity		
White, non-Hispanic	Reference	Reference
Black, non-Hispanic	1.23 (0.60–2.53)	1.13 (0.53–2.45)
Other, non-Hispanic	0.53 (0.21–1.31)	0.60 (0.24–1.61)
Hispanic	0.74 (0.40–1.34)	0.83 (0.44–1.58)
No. of medical conditions		
0	Reference	Reference
1	0.84 (0.47–1.49)	0.74 (0.35–1.52)
2	2.09 (1.00–4.38)	1.50 (0.68–3.32)
≥3	3.19 (1.56–6.50)	2.29 (1.07–4.92)
Individual medical conditions <sup>a</sup>		
Hypertension	1.08 (1.12–1.02)	1.28 (0.67–2.11)
Obesity (BMI ≥30 kg/m <sup>2</sup> )	2.65 (1.42–4.95)	2.31 (1.21–4.42)
Respiratory condition	2.47 (1.29–4.74)	2.23 (1.17–4.26)
Asthma	7.90 (2.68–23.86)	7.02 (3.47–14.26)
Diabetes	1.38 (0.68–2.80)	1.09 (0.54–2.19)
Immunosuppressive condition	2.84 (0.38–2.30)	2.33 (0.77–7.06)
Autoimmune condition	1.51 (0.51–4.70)	1.05 (0.32–3.40)
Blood disorder	1.82 (0.45–7.45)	1.43 (0.33–6.26)
Chronic kidney disease	2.82 (0.63–12.60)	2.36 (0.48–11.71)
Chronic obstructive pulmonary disease	1.34 (0.29–6.12)	0.76 (0.14–4.48)
Liver disease	0.58 (0.16–2.09)	0.72 (0.12–4.23)
Neurologic condition	1.79 (0.35–9.01)	1.23 (0.23–6.42)
Coronary artery disease	0.58 (0.06–5.70)	0.48 (0.05–4.62)
Congestive heart failure	—	—

27



### Risk Factors

- We still don't know based on data
- Anecdotal:
  - More clotting and inflammation- Big risk
  - ICU stay is risk for some symptoms
    - Fatigue, depression, DOE
  - Mild disease for others
    - Anosmia, Chest pain
  - Anosmia may be a clue to psychiatric

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28

### Symptoms of Post Acute CoVID Syndrome

- Cardiovascular: myocardial inflammation, ventricular dysfunction
- Respiratory: pulmonary function abnormalities
- Renal: acute kidney injury
- Dermatologic: rash, alopecia
- Neurological: olfactory and gustatory dysfunction, sleep dysregulation, altered cognition, memory impairment
- Psychiatric: depression, anxiety, changes in mood

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29

### 2 Patients Diverge in Pandemic

- Severe CoVID- This may mirror any other severe diseases with long ICU stay
  - Prolonged ICU/hospital stay with profound deconditioning
  - DOE and respiratory limitation
  - Neurologic and psychiatric
  - Some features below may be retained
- Mild/Moderate
  - Not admitted but clear symptoms with acute CoVID
  - Never really recovered
  - Acute infection resolved but symptoms persist. Why?

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### A Few Potential Processes of Post Acute CoVID Syndrome

- Prolonged ICU stay and complications there-of
- Microvascular disease with clot and patchy tissue hypoxemia
- Autoimmune process from excess inflammation
- Direct infection of the virus

31

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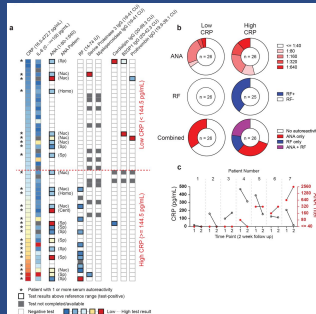
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### Autoimmune Response with Acute Inflammation



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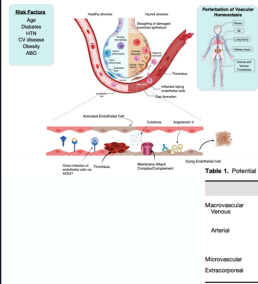
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### CORRESPONDENCE



### COVID-19-associated Acute Respiratory Distress Syndrome Clarified: A Vascular Endotype?

Niam S. Mangatburt, M.D.\*  
 John P. Riley, M.D., M.S.C.E.  
 Douglas B. Cline, M.D.  
 Nadia M. Mayer, M.D., M.S. (M.S.T.F.)  
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 Andrew E. Vaughan, B.S., Ph.D.  
 University of Pennsylvania School of Veterinary Medicine  
 Philadelphia, Pennsylvania

*Am J Respir Crit Care Med*. 2020;202(10):1403-1410.  
 doi:10.1164/rccm.202007-2511RE

Table 1. Potential Vascular Complications in Critically Ill Patients with COVID-19

Complication	Organ Affected
Microvascular	
Deep vein thrombosis	Extremities, pelvis
Pulmonary embolism	Lung
In situ pulmonary thromboses*	Lung
Stroke	Brain
Myocardial infarction	Heart
Mesenteric ischemia	Stomach
Limb ischemia	Extremities
Microvascular	Lung, heart, intestines, kidneys, and skin
Extracorporeal	
ECMO oxygenator clotting	N/A
Renal replacement filter clotting	N/A

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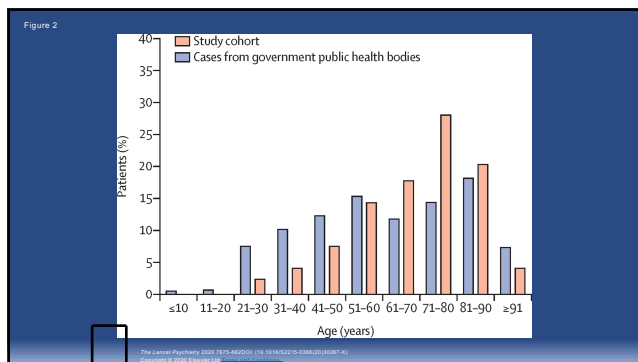
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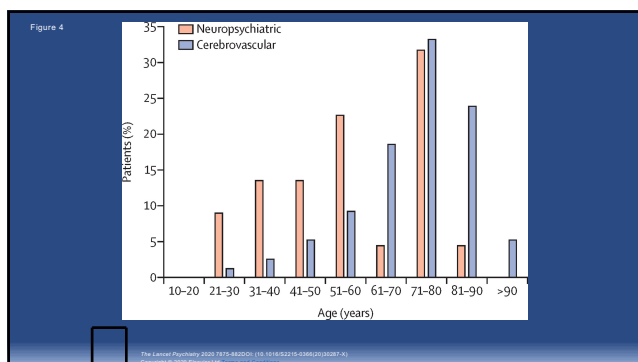
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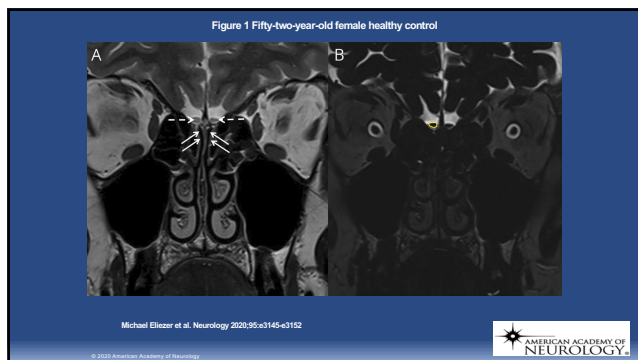
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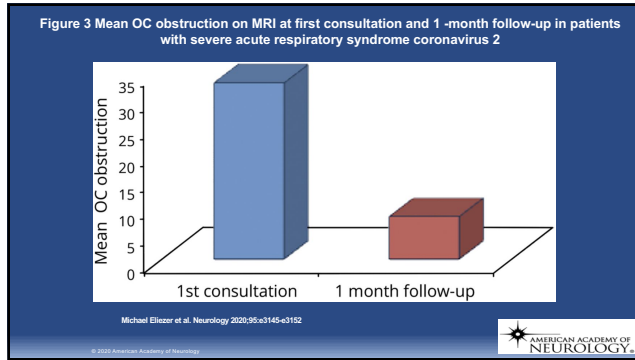
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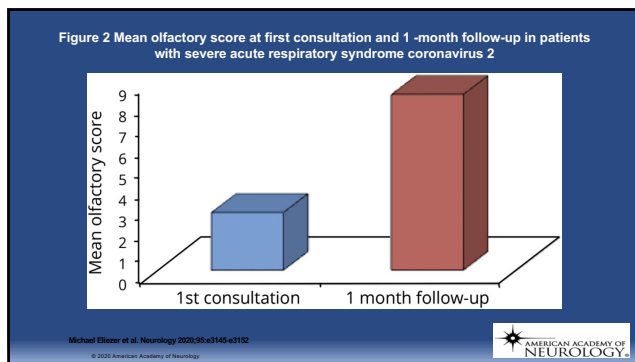
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**So where does this leave us?**

- Prolonged ICU stay and complications there-of
  - Can explain many symptoms at 6 and 12 months post DC: Depression, fatigue, lethargy, DOE
- Microvascular disease with clot and patchy tissue hypoxemia
  - Explains many of the abnormalities with tests
    - DLCO, MR imaging, neuropsych testing, CRP and D-dimer
  - This is driving much of what we see in CP, SOB, tachycardia, hypoxemia, brain fog, fatigue, inability to exercise
- Autoimmune process from excess inflammation
  - May explain the encephalopathy-driven effects: Depression, fatigue, sleep disorders, ME/CFS overlap symptoms
- Direct infection of the virus
  - Olfactory and psychiatric issues

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### Treatment

- ??????
- Time of course and patience
- Some value in anti-coagulation but no studies
- Anti-inflammatory agents
- Immune modulators

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### Managing These Patients / Employees

- This is a real process and symptoms may be organically explained
- As opposed to other post viral syndromes, we should NOT PUSH them physically
- Testing to rule out other processes
- Consider anticoagulation
- SLOW rehab
- Many might need long times off to recover

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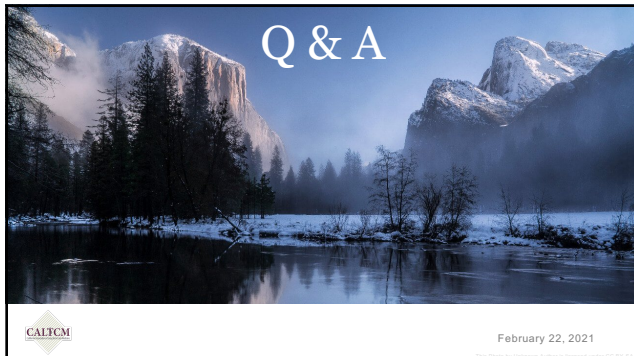
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