Primary Care Grand Rounds

Post COVID-19 Care in BC

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March 25, 2021

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BC AHSN British Columbia Academic Health Science Network
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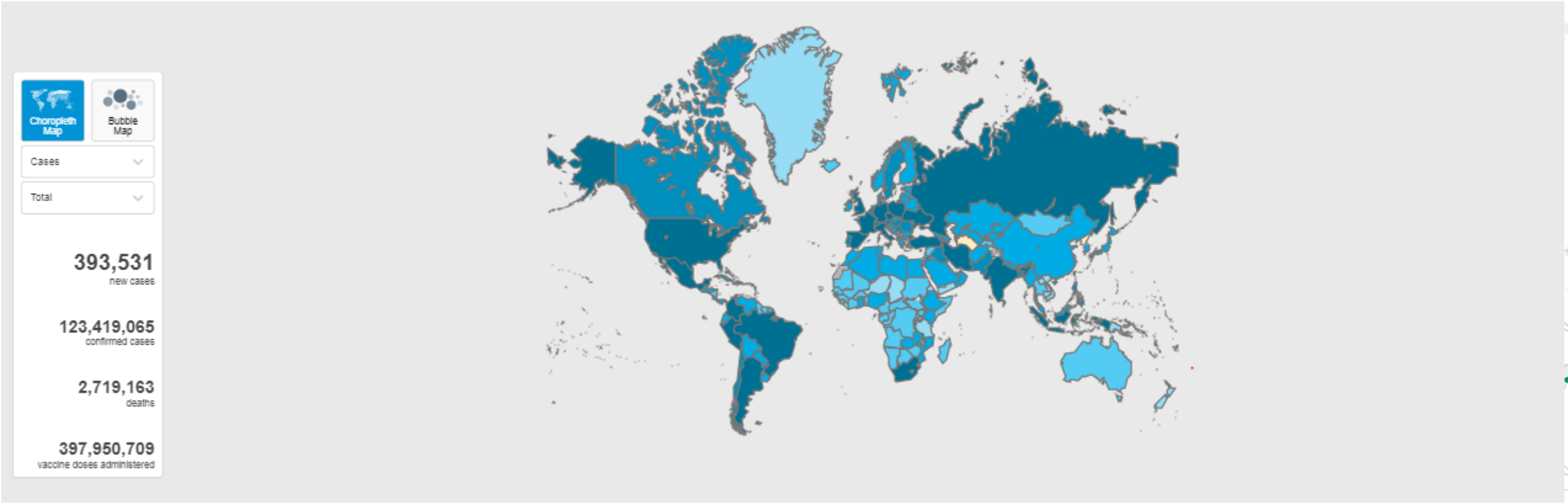
WHO Coronavirus (COVID-19) Dashboard

Overview | Data Table | Explore



Globally, as of **3:52pm CET, 23 March 2021**, there have been **123,419,065 confirmed cases** of COVID-19, including **2,719,163 deaths**, reported to WHO. As of **20 March 2021**, a total of **397,950,709 vaccine doses** have been administered.

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COVID-19 Situational Awareness Dashboard

Fullscreen ?

Updated March 23, 2021, 7 pm EDT

Cases Today	Total Cases	Deaths Today	Total Deaths
3,607	942,320	19	22,735

Recovered Today	Total Recovered	Daily Tests performed	Total tests performed
3,116	883,275	73,918	26,778,301

Count of total cases of COVID-19, by health region, as of March 23, 2021

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Source: https://health-infobase.canada.ca/covid-19/dashboard/?stat=num&measure=total&map=hr&f=true#a2

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Health through wellness

fraserhealth

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the northern way of caring

Providence HEALTH CARE

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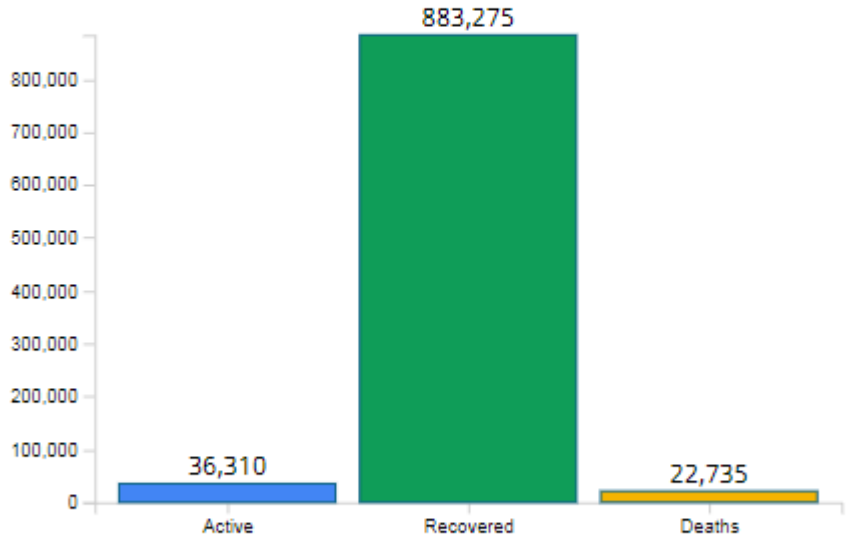
Number of cases in Canada



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British Columbia COVID-19 Dashboard

Total Cases
92,571

Laboratory Diagnosed	Epi-Linked
91,766	805

Currently Hospitalized
314
Total to Date: 4,993

Currently in Critical Care
83

Confirmed Deaths
1,438

Recovered
86,307

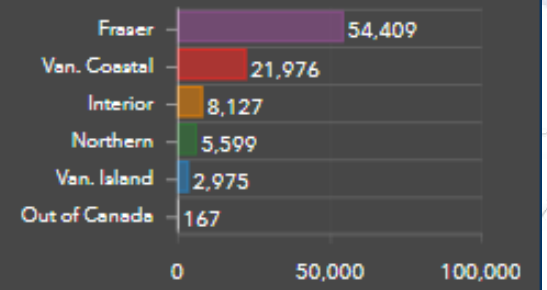
Total Vaccine Doses Administered in B.C.
557,508
Total Doses Distributed: 736,460

Last Update
23/3/2021, 4:30 PM

Today's New Cases
646

Active Cases
5,409

Total Cases Reported by Health Authority



Cases | New | Active | List

Total Tests	New Tests
2,122,446	6,006
B.C. Testing Rate	**Canadian Testing Rate**
408,849	702,650
People per 1,000,000	People per 1,000,000

Filter Dashboard Values by Health Authority: All | Interior | Fraser | Vancouver Coastal | Vancouver Island | Northern

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British Columbia COVID-19 Dashboard

Total Cases
2,975

Laboratory Diagnosed	Epi-Linked
2,944	31

Currently Hospitalized
13
Total to Date: 160

Currently in Critical Care
3

Confirmed Deaths
28

Recovered
2,669

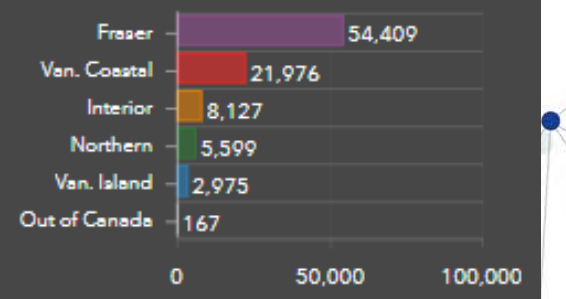
Total Vaccine Doses Administered in B.C.
557,508
Total Doses Distributed: 736,460

Last Update
23/3/2021, 4:30 PM

Today's New Cases
19

Active Cases
273

Total Cases Reported by Health Authority



Cases | New | Active | List

Total Tests	New Tests
226,273	674
B.C. Testing Rate	**Canadian Testing Rate**
408,849	702,650
People per 1,000,000	People per 1,000,000

Filter Dashboard Values by Health Authority: All | Interior | Fraser | Vancouver Coastal | Vancouver Island | Northern

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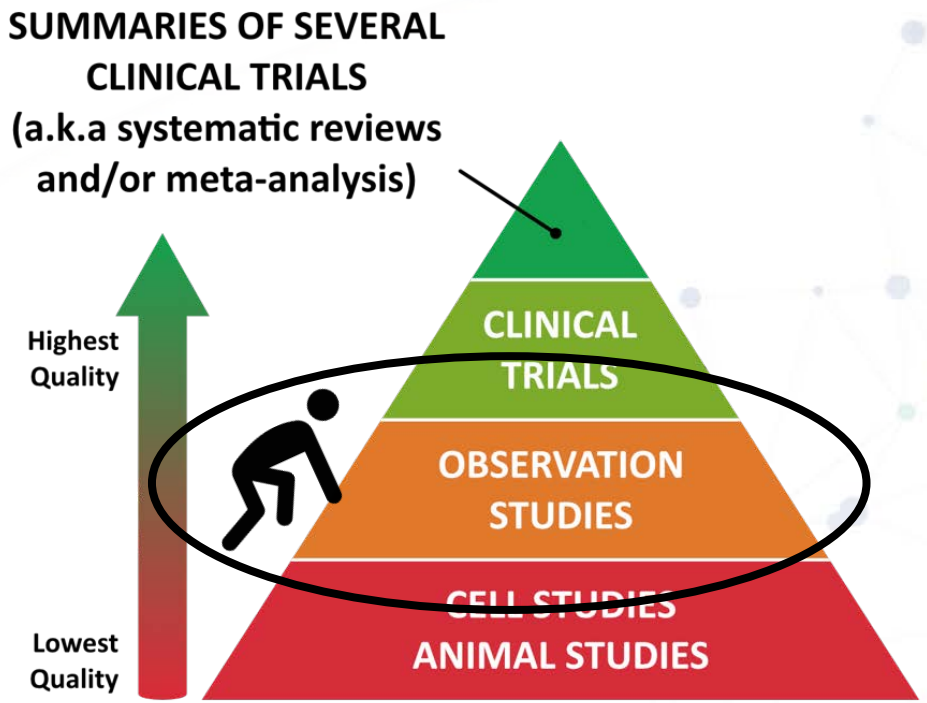
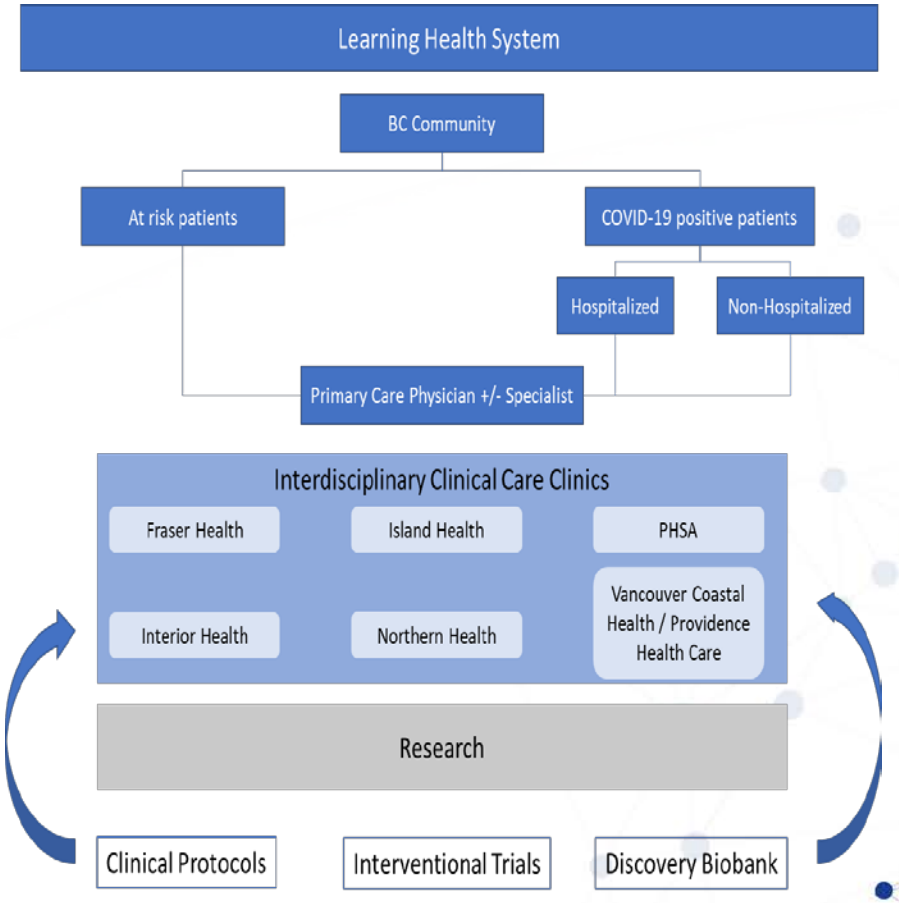
Disclaimer!


SUMMARIES OF SEVERAL CLINICAL TRIALS (a.k.a systematic reviews and/or meta-analysis)
Highest Quality
Lowest Quality
CLINICAL TRIALS
OBSERVATION STUDIES
ANIMAL STUDIES

POST-COVID RECOVERY CLINIC (PCRC)

The PCRC :

- Is a ‘One-stop shop’ for patients post-COVID
- Integrates clinical care and services with research collectively embedded within a learning health system
- Connects British Columbians who have had COVID-19 with specialists, family practitioners, and public health services



The PCRC provides:

- Standardized intake assessment
- Integration of medical, psychological, and social supports
- Rapid access to specialist expertise as needed
- Access to ‘virtual care’ where required
- Centralized data collection to enable rapid changes for best care and access to rigorous research

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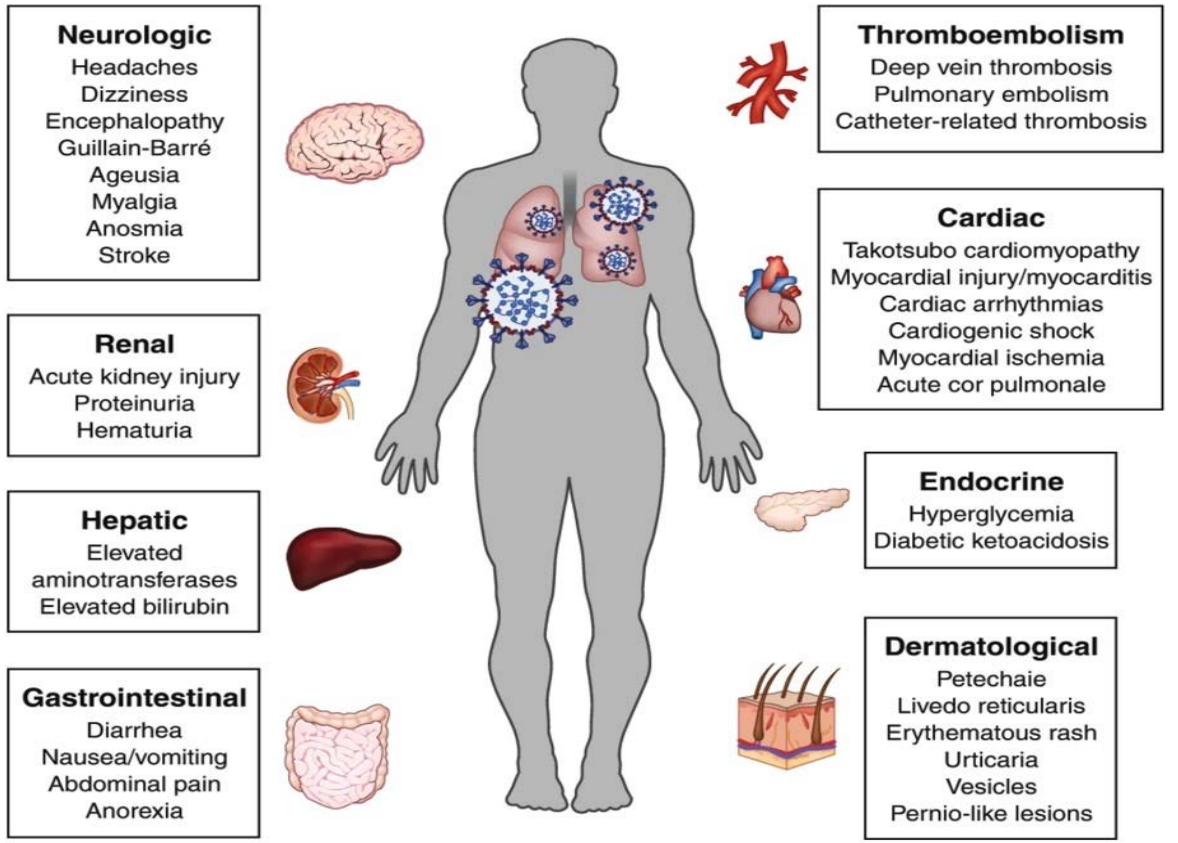
Where to Begin

- 1) Reference Class forecasting-
  - Initial approach
- 2) Anecdotal evidence
  - Our own experience
- 3) Established evidence so far
  - Emerging quickly in hospital cohort less in out patient setting

Reference Class Forecasting

- SARS/MERS complications
- Acute Covid complications
- Similar phenotypes
  - Post-ICU Syndrome
  - Post-Concussion Syndrome
  - Myalgic Encephalitis

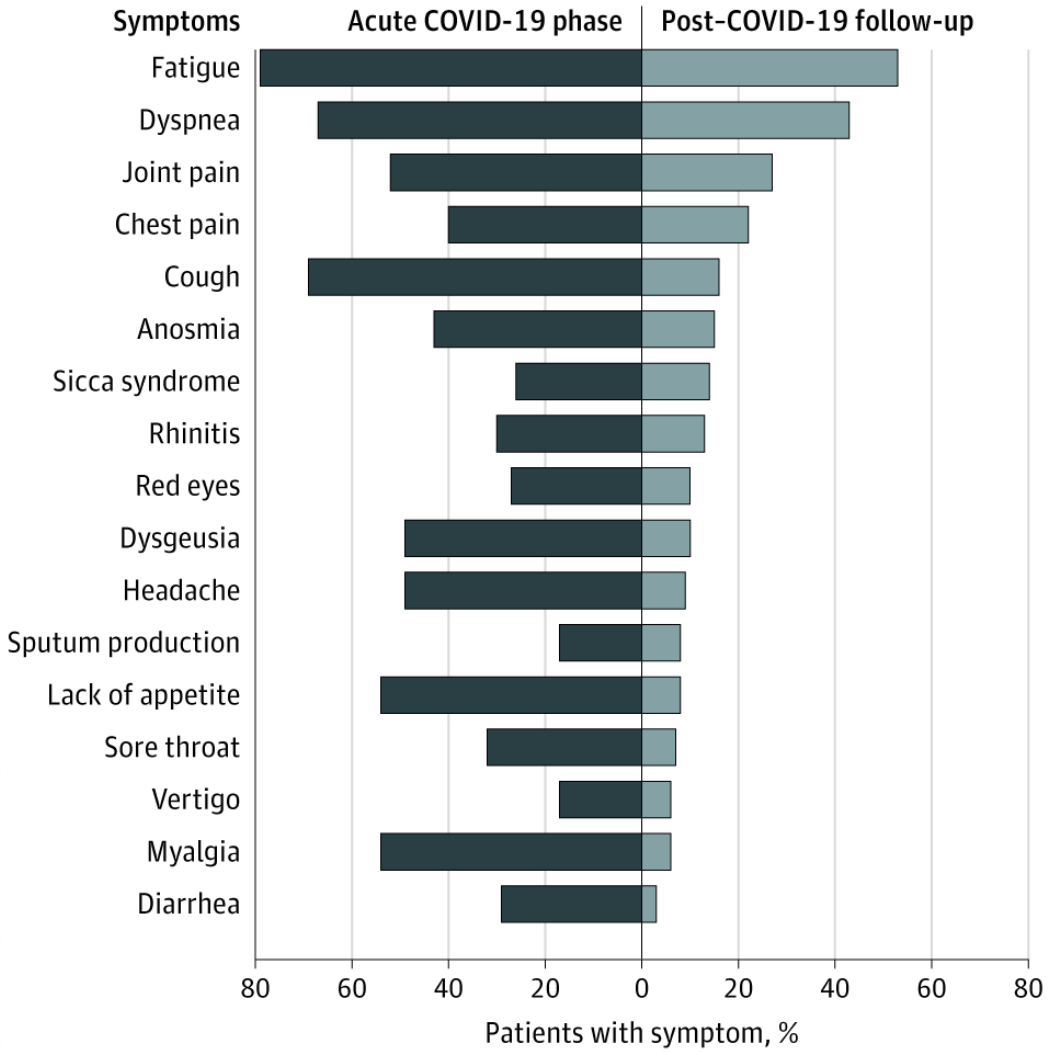


Gupta et al. 2020

Post-Covid-19 Symptoms

- See Appendix 1: comprehensive symptom lists

See Appendix 1: comprehensive symptom lists



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Carfì A, Bernabei R, Landi F, for the Gemelli Against COVID-19 Post-Acute Care Study Group. Persistent Symptoms in Patients After Acute COVID-19. *JAMA.* 2020;324(6):603–605. doi:10.1001/jama.2020.12603

Post-acute COVID-19 syndrome: PACS

- The NIH has renamed anything post COVID infection as : PACS
- A review of multiple inpatient based studies with long term follow up as outpatients after hospitalization
- Nature Medicine : March 22 , 2021

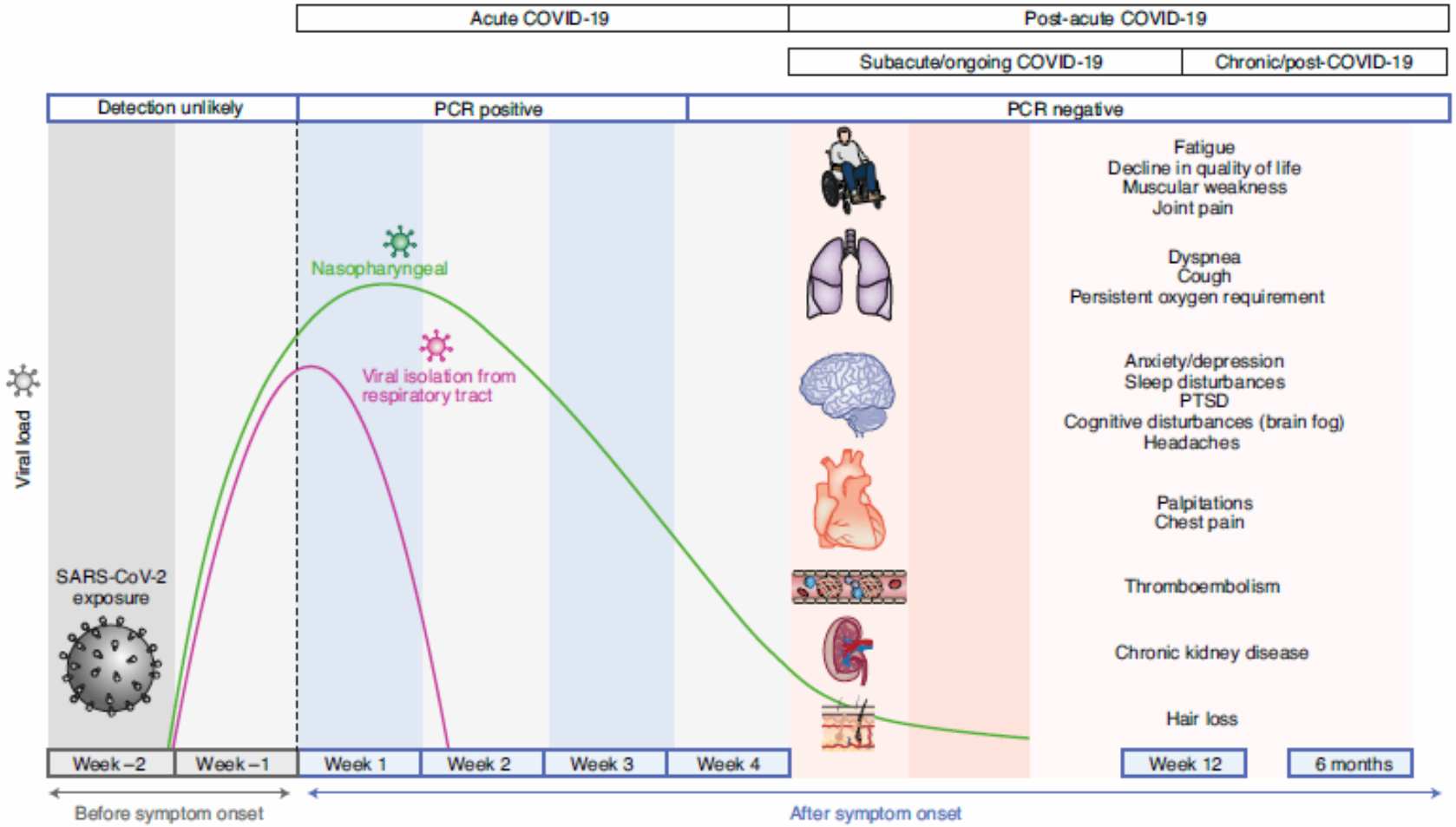


Fig. 1 | Timeline of post-acute COVID-19. Acute COVID-19 usually lasts until 4 weeks from the onset of symptoms, beyond which replication-competent SARS-CoV-2 has not been isolated. Post-acute COVID-19 is defined as persistent symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms. The common symptoms observed in post-acute COVID-19 are summarized.

Nomenclature of Post Covid /Long haulers

Incredibly confusing – different definitions

- **Acute COVID-19 phase**: The end of the acute phase is 4 weeks

- **Post-Acute COVID-19**: persistent symptoms and/or delayed, or long-term complications of SARS-CoV-2 infection beyond 4 weeks from the onset of symptoms

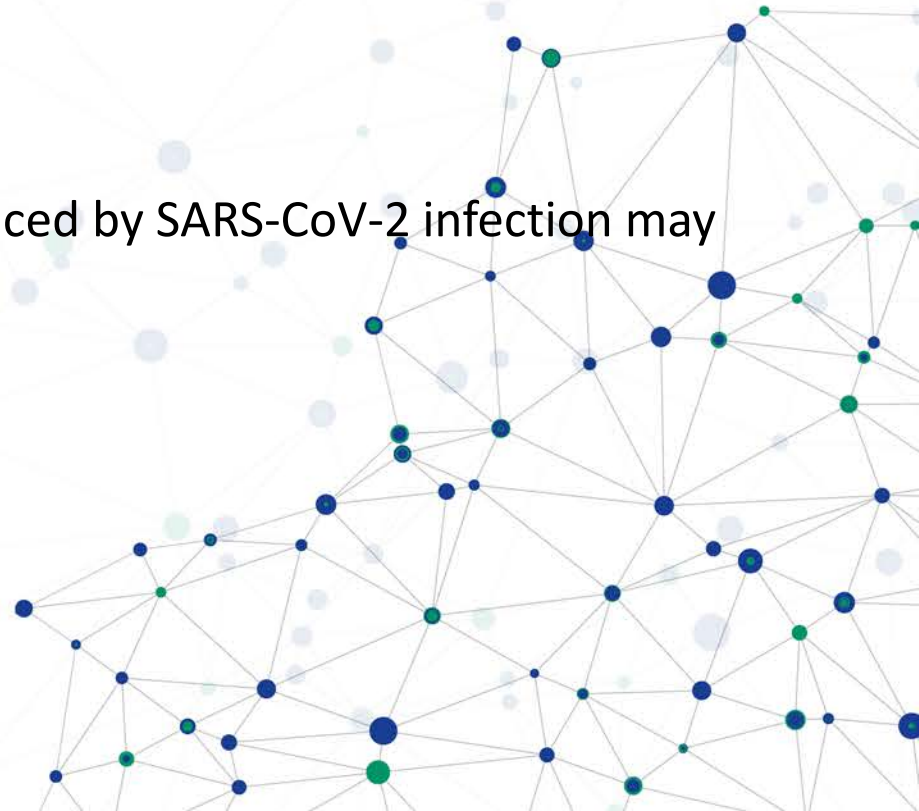
There are 2 categories:

(1) subacute or ongoing symptomatic COVID-19, which includes symptoms and abnormalities present from 4–12 weeks beyond acute COVID-19

(2) chronic or post-COVID-19 syndrome, which includes symptoms and abnormalities persisting or present beyond 12 weeks of the onset of acute COVID-19 and not attributable to alternative diagnoses.

Why do post covid symptoms occur ?

- Cellular damage with initial infection eg pulmonary fibrosis
- a robust innate immune response
- inflammatory cytokine production, and a pro-coagulant state induced by SARS-CoV-2 infection may contribute to the symptoms seen post covid syndrome



Pulmonary complications

- **Dyspnea**
  decreased exercise capacity and hypoxia are commonly persistent symptoms and signs

- Reduced diffusion capacity, restrictive pulmonary physiology, and ground-glass opacities and fibrotic changes on imaging have been noted at follow-up of COVID-19 survivors

- Assessment of progression or recovery of pulmonary disease and function may include PFTs, high-resolution computed tomography of the chest

Hematologic

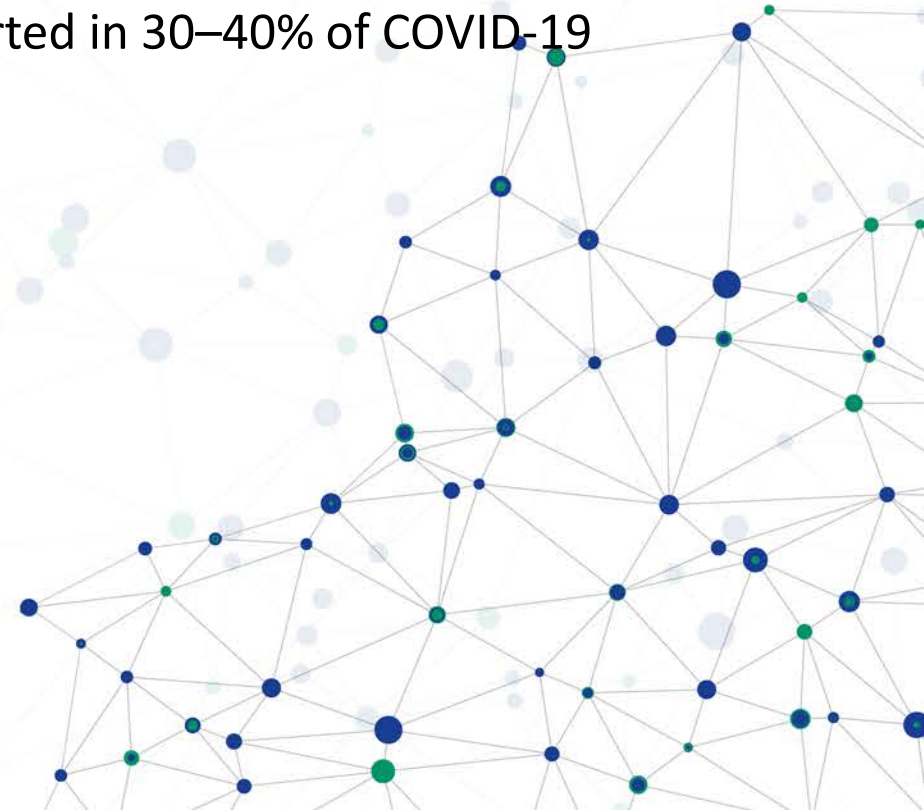
- Thromboembolic events have been noted to be <5% in post-acute COVID-19 in retrospective studies
- The duration of the hyperinflammatory state induced by infection with SARS-CoV-2 is unknown
- Currently we do not anticoagulated post discharge , at risk of clot – be aware
- Call the RACE line for thrombosis or Post Covid Care

Cardiovascular

- Persistent symptoms may include palpitations, dyspnea and chest pain
- Long-term sequelae may include increased cardio metabolic demand, myocardial fibrosis or scarring (detectable via cardiac MRI), arrhythmias, tachycardia and autonomic dysfunction
- Patients with cardiovascular complications during acute infection – warrant cardiology /GIM follow up

Neuro/Psychiatric

- Persistent abnormalities may include fatigue, myalgia, headache,dysautonomia and cognitive impairment (brain fog)
- Anxiety, depression, sleep disturbances and PTSD have been reported in 30–40% of COVID-19 survivors, similar to survivors of other pathogenic coronaviruses



Renal

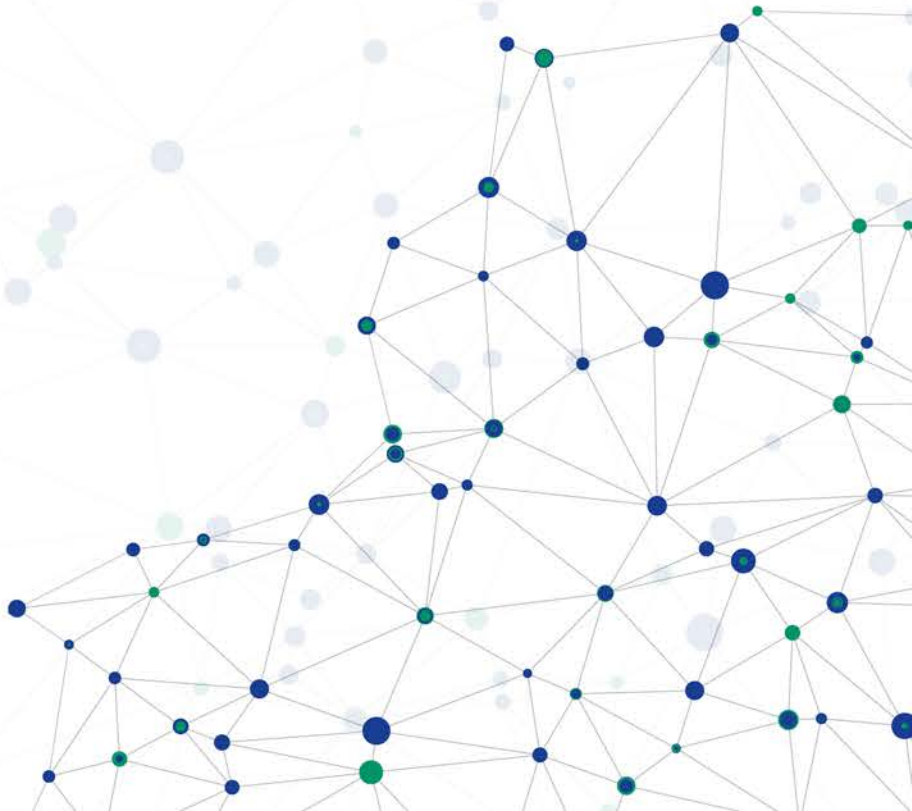
- Resolution of AKI during acute COVID-19 occurs in the majority of patients; however, reduced eGFR has been reported at 6 months follow-up
- COVID-19 survivors with persistent impaired renal function may benefit from early and close follow-up of AKI

Endocrine

- Endocrine sequelae may include new or worsening control of existing diabetes mellitus, subacute thyroiditis and bone demineralization
- Patients with newly diagnosed diabetes in the absence of traditional risk factors for type 2 diabetes, suspected hypothalamic–pituitary–adrenal axis suppression or hyperthyroidism should undergo the appropriate laboratory testing

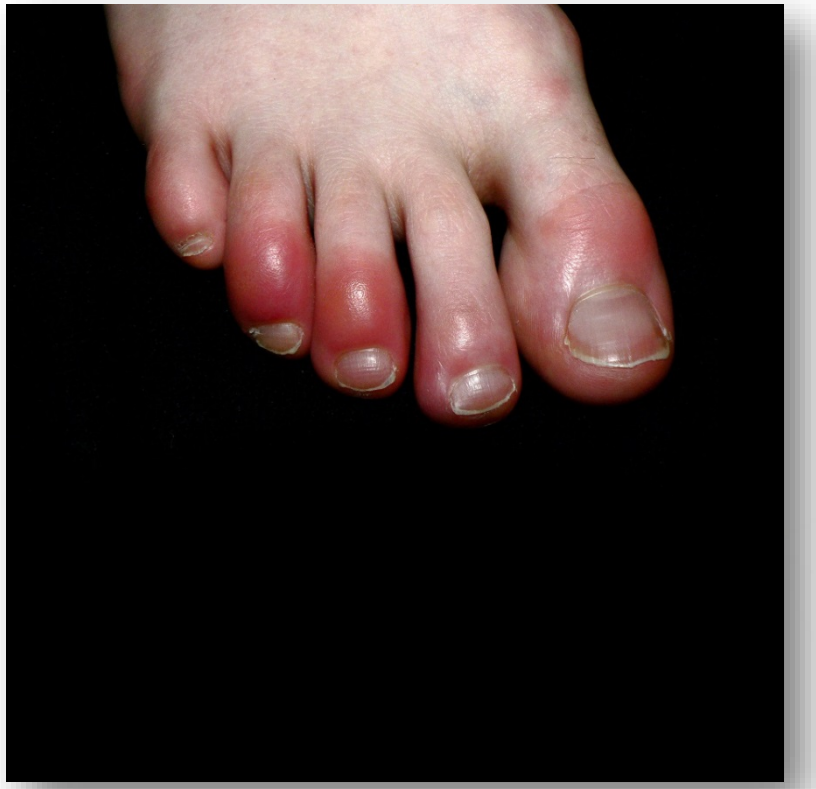
Gastrointestinal

- COVID-19 has the potential to alter the gut microbiome, including enrichment of opportunistic organisms and depletion of beneficial commensals



Dermatologic

COVID TOES



Dermatologic problems

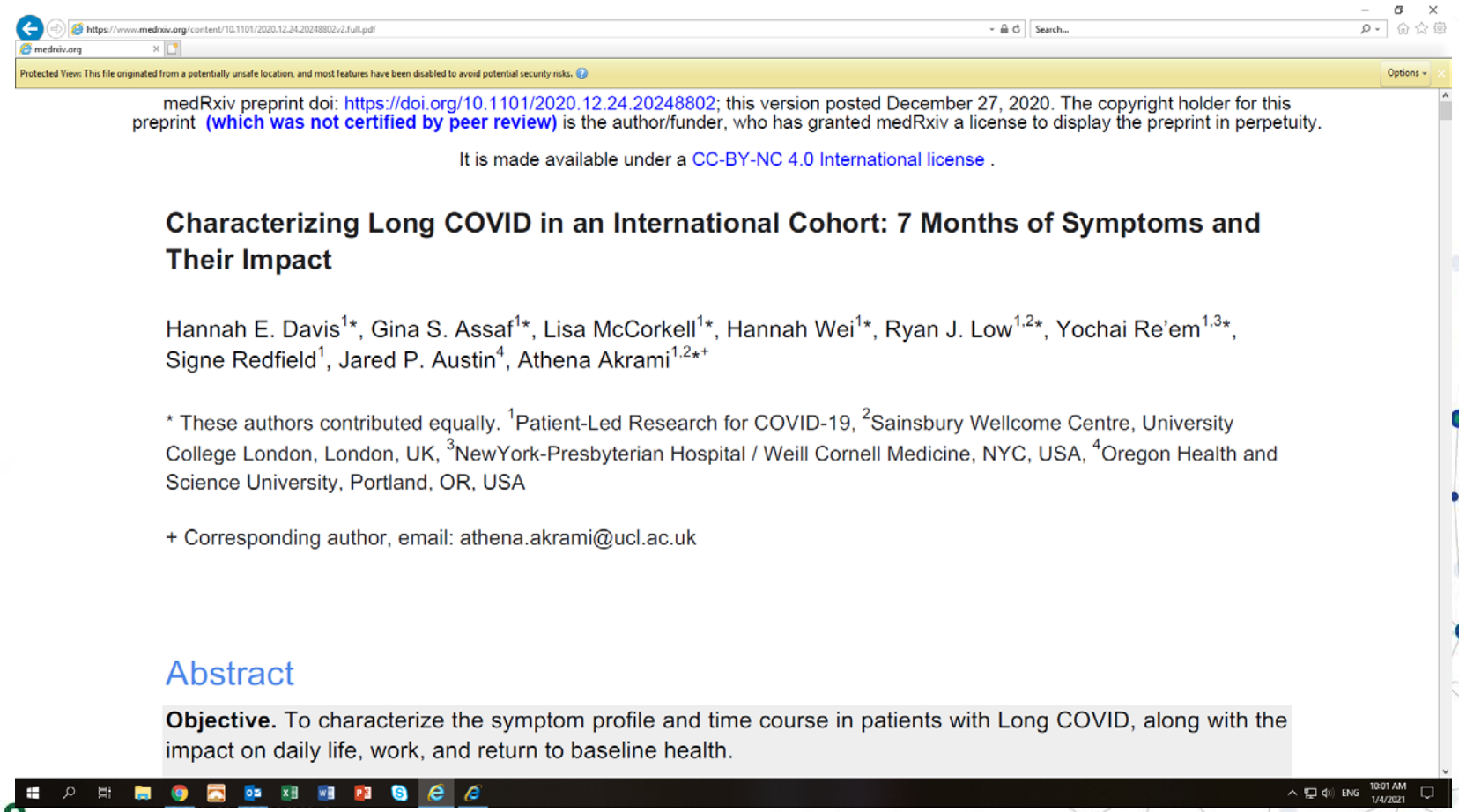
- Hair loss is the predominant symptom and has been reported in approximately 20% of COVID-19 survivors
- There are many more dermatologic symptoms eg COVID toes

Covid symptoms in the Non Hospitalized

- A small cohort study
- 30 % with mild disease had symptoms at 6 months
- Fatigue 14 %
- 29% had worse quality of life
- 13 % change in sense of smell
- 2.5 % brain fog
- Many other symptoms

Research Letter | Infectious Diseases - Sequelae in Adults at 6 Months After COVID-19 Infection JAMA Jan 16, 2021

Body Politic – COVID



https://www.medrxiv.org/content/10.1101/2020.12.24.20248802v2.full.pdf

medrxiv.org

Protected View: This file originated from a potentially unsafe location, and most features have been disabled to avoid potential security risks.

Options

Characterizing Long COVID in an International Cohort: 7 Months of Symptoms and Their Impact

Hannah E. Davis[1]*, Gina S. Assaf[1]*, Lisa McCorkell[1]*, Hannah Wei[1]*, Ryan J. Low[1,2]*, Yochai Re'em[1,3]*, Signe Redfield[1], Jared P. Austin[4], Athena Akrami[1,2]*+

* These authors contributed equally. [1]Patient-Led Research for COVID-19, [2]Sainsbury Wellcome Centre, University College London, London, UK, [3]NewYork-Presbyterian Hospital / Weill Cornell Medicine, NYC, USA, [4]Oregon Health and Science University, Portland, OR, USA

+ Corresponding author, email: athena.akrami@ucl.ac.uk

Abstract

Objective. To characterize the symptom profile and time course in patients with Long COVID, along with the impact on daily life, work, and return to baseline health.

ENG 10:01 AM 1/4/2021

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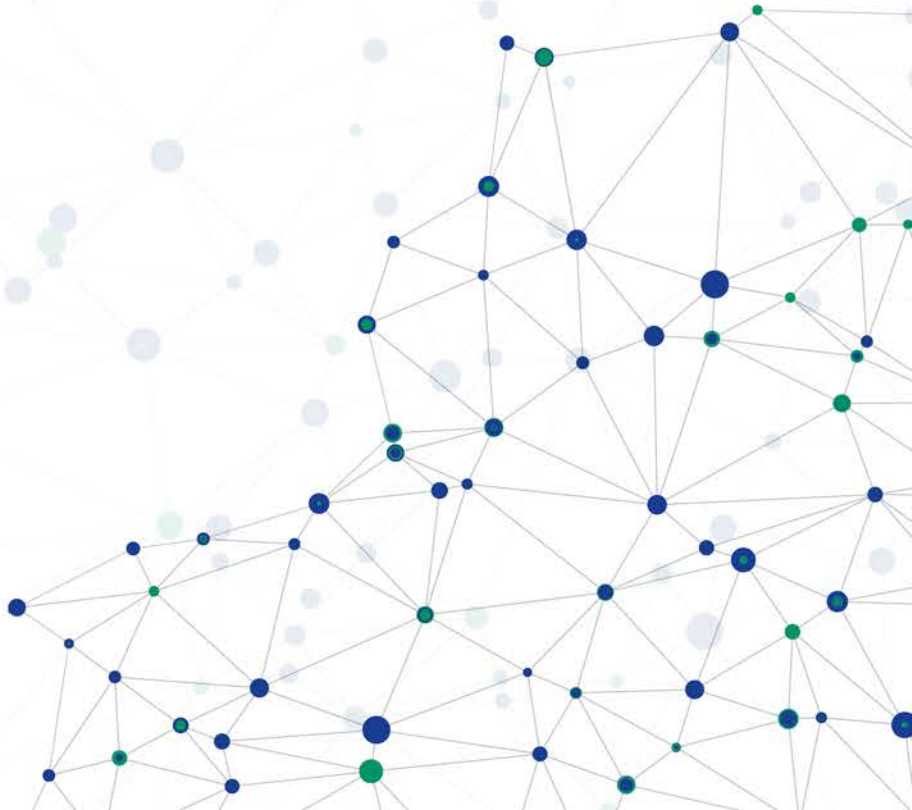
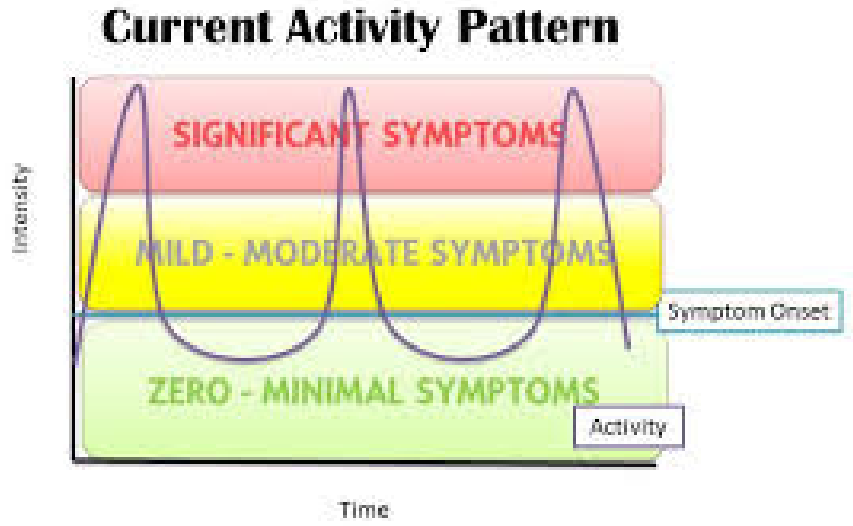
Common symptoms post COVID

- > 70 % fatigue
- >70% Post exertional Malaise
- >70% cognitive dysfunction
- 30 % POTS
- Ability to work impaired



Anecdotal Evidence: The Illness Script

- Patients develop variable yet personally distinct symptom milieu's that wax and wane together.
  - New ones can develop over time.
- Symptoms Exacerbated by Stress
  - Physical (exercise)
  - cognitive (return to work, problem solving)
  - emotional/social (social interactions, anxiety/depression)
- **Symptom flares can be temporally dissociated ~24-72 hours post-stress.**
- Anecdotally, the threshold at which stress induces a flare improves over time if patients able to pace themselves and avoid relapses. Relapses can reduce the threshold at which relapses can occur



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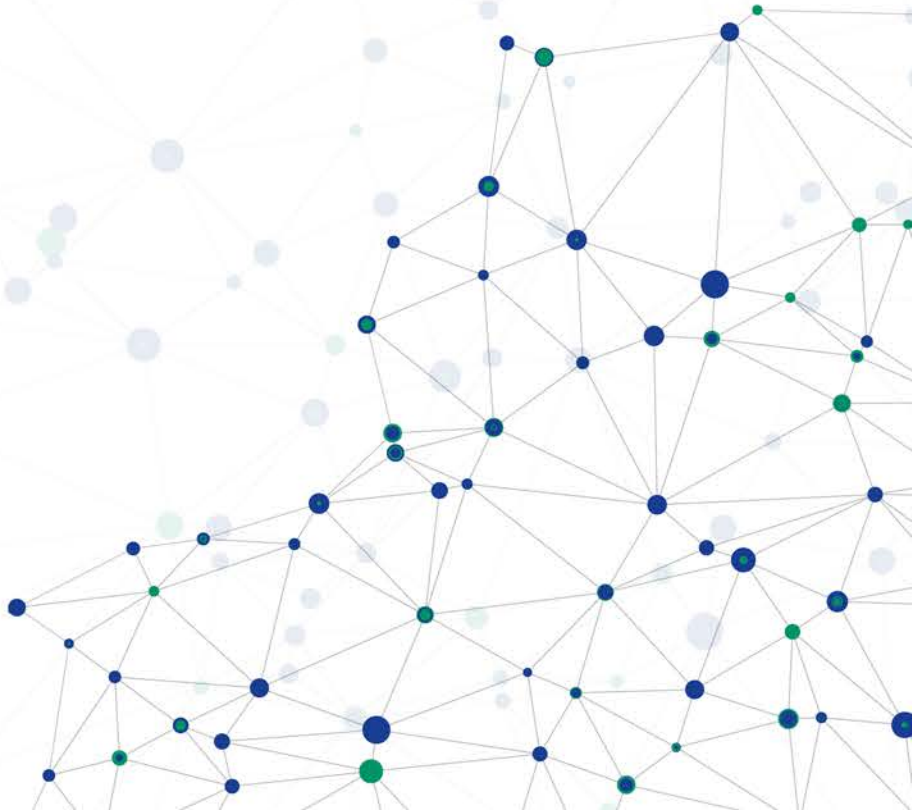
Ontario Neurotrauma Foundation. Guideline for Concussion/Mild Traumatic Brain Injury and Persistent Symptoms. 3rd edition. Accessed 17 Nov 2020. https://braininjuryguidelines.org/concussion/fileadmin/patient-version/05-Managing-Persistent-Symptoms.pdf

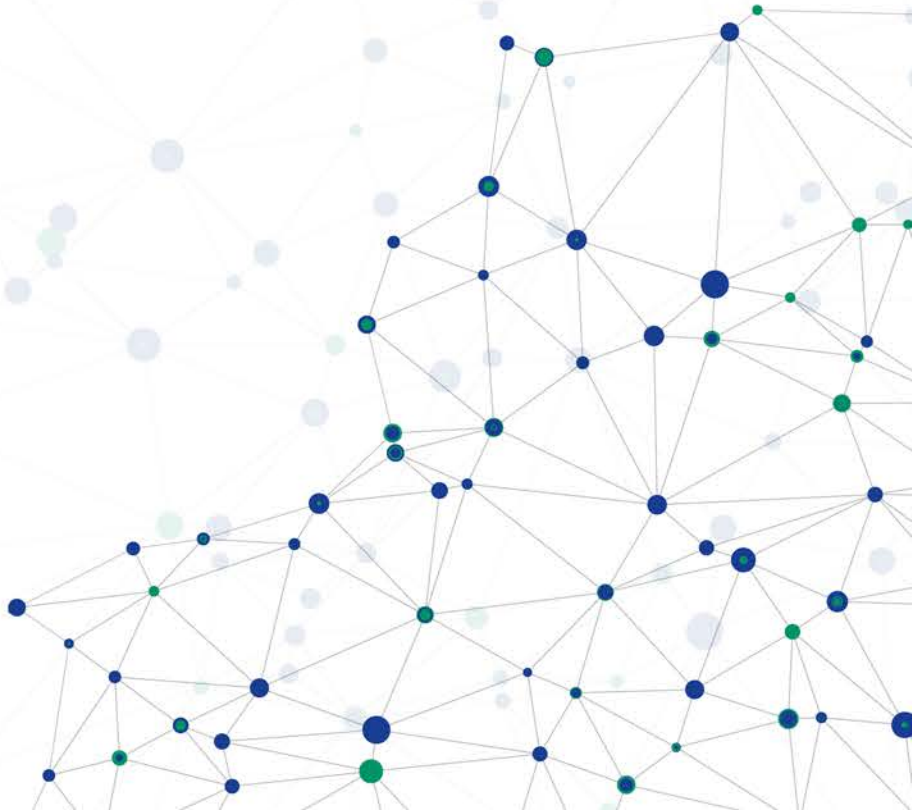
Most common symptoms of ‘Long COVID’ (not inclusive)

- Respiratory: Breathlessness, Cough
- Chest: Tightness, pain, palpitations, orthostasis POTS
- General: Fatigue, pain
- Neurology: Sleep disturbances, brain fog, tinnitus, dizziness
- GI: Abdo pain, nausea, diarrhea
- MSK: joint and muscle pain
- Psychiatric: anxiety, depression, PTSD
- ENT: Tinnitus, anosmia, dysgeusia, pharynigits
- Dermatologic: Rashes



Local Anecdotes

- Fatigue +++
- Post-exertional Malaise
- POTS
- “Unremarkable” diagnostics in most outpatients
- Hospital readmissions ~10%
  - Hypertension, age, COPD, liver disease as major RF



How do we support this population?

- **Listening and empathy**
  - Many are expected to have gradual recovery and improvement of symptoms, but many will have longstanding symptoms

- **Reassurance**
  - Recovery time differs for different people. If recover within 28 days, unlikely to develop new symptoms
  - Likelihood of developing longterm symptoms does not depend on initial severity of illness
  - Avoid using terms of “mild illness”

- **Information on pacing, prioritization and goal setting**

Fatigue

- ***Recognize and reassure that fatigue is real***
- Sleep Hygiene
- Relaxation techniques: yoga, mindful meditation, shower, bath
- Plan, Prioritize and goal setting
  - Plan each days activities in advance and build regular routine
  - Prioritize: decide when you can do the most important tasks
  - Delegate: think of where they can save energy (online groceries, cooking ahead of time). Increasing enjoyable activities
- Keeping an activity diary may help in positive reinforcement

Respiratory Symptoms

- Cough
  - Practicing normal, diaphragmatic breathing
  - Sip drinks regularly
  - Lozenges
- Breathlessness
  - Pacing and planning
  - Breaking down larger activities into several smaller ones
  - Frequent rests
  - Continue with activity

Brian Fog is Common

Proper sleep

Nutrition

Decrease stress

Memory exercises

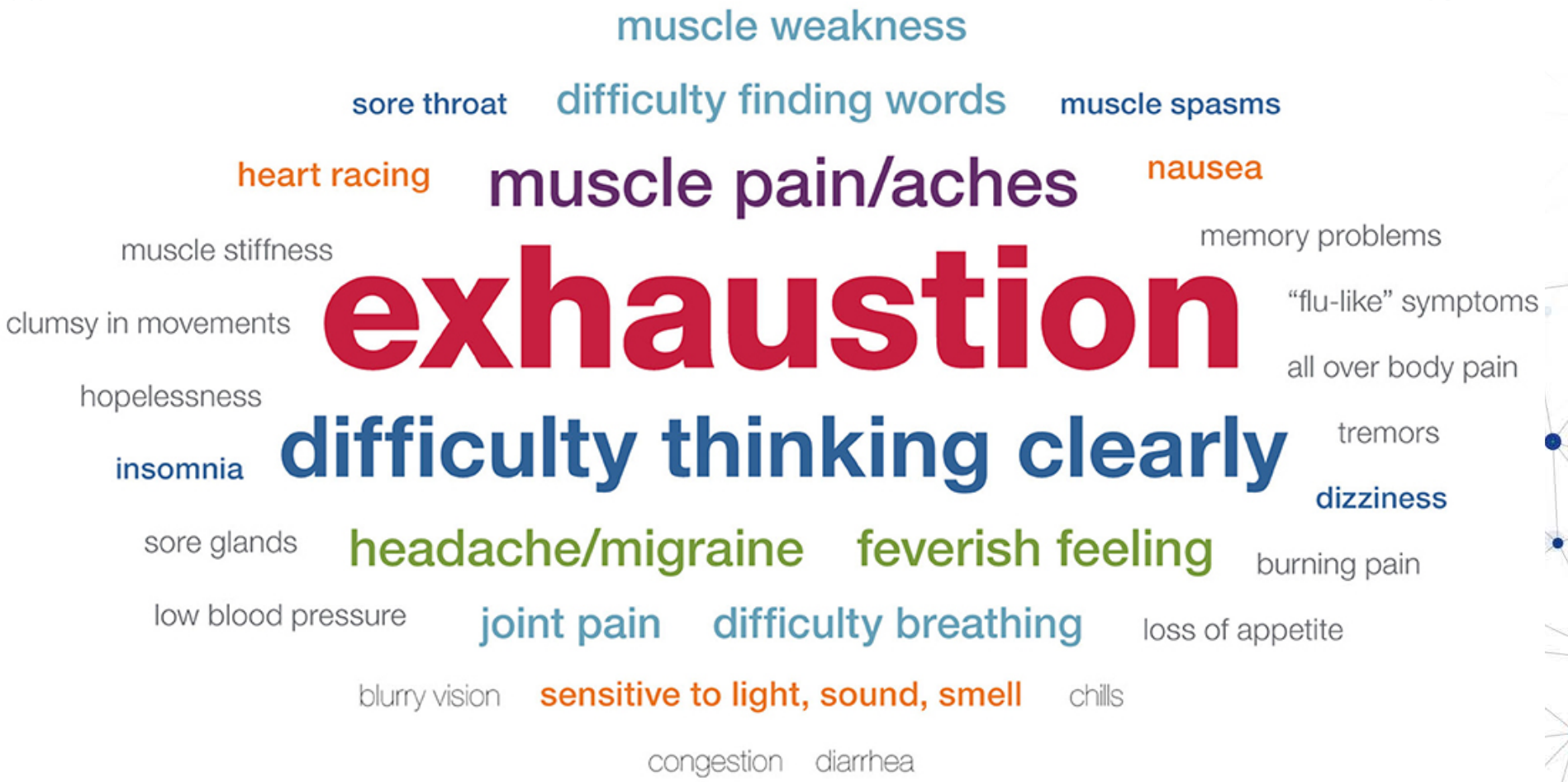
Coping strategies

Pacing for Fatigue –borrowed from ME/CFS

PACING

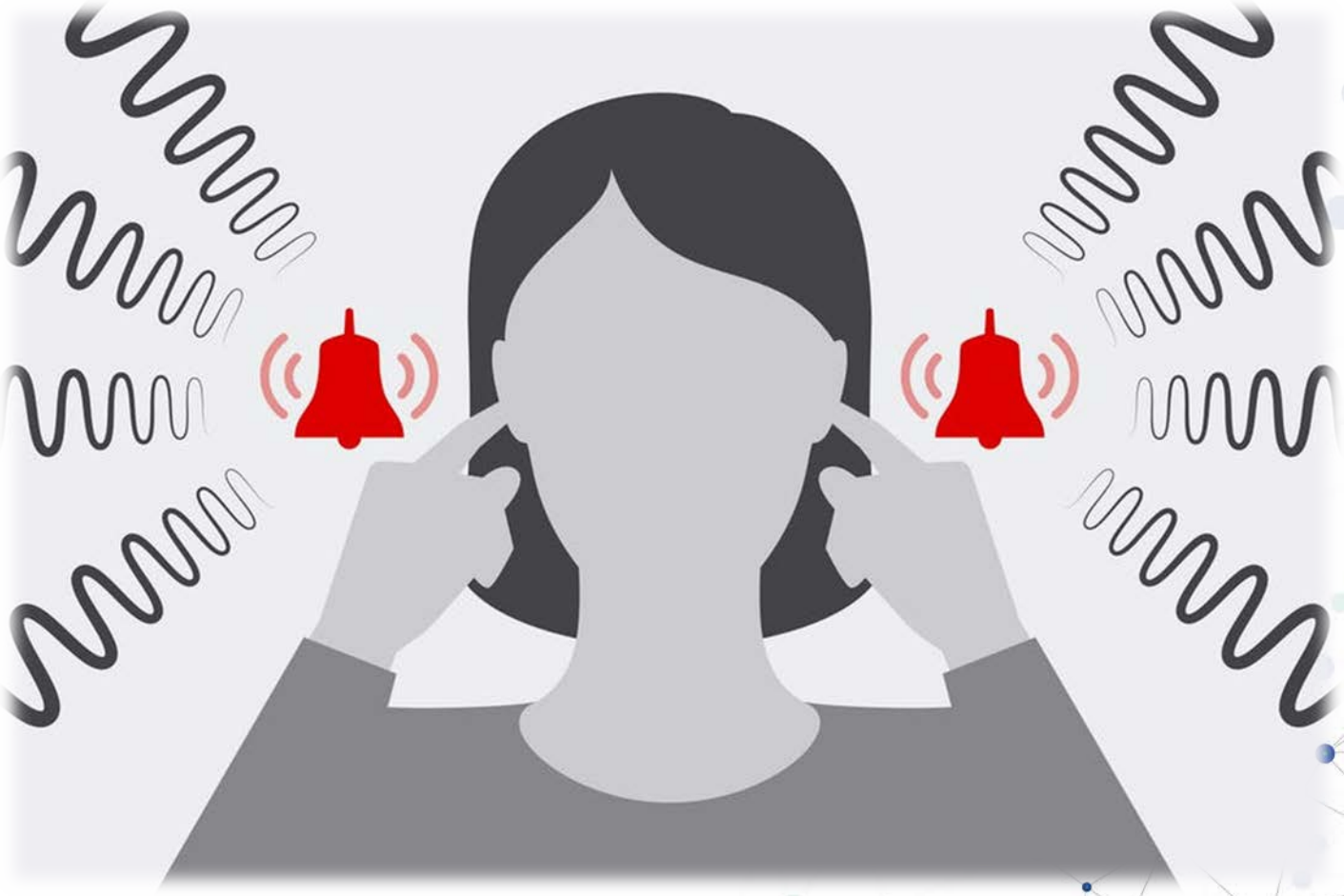
- an activity management strategy
- to help ME/CFS patients limit relapses and crashes
- while remaining as active as possible

Post Exertional Malaise



Headaches

Tinnitus



Mental Health in Post-COVID-19 Recovery

- Anxiety, depression, other – not an exhaustive list of resources:
  1. Anxiety Canada - COVID19: www.anxietycanada.com/covid-19/
  2. Here to Help - COVID19: www.heretohelp.bc.ca/infosheet/covid-19-and-anxiety Foundry (for youth aged 12 - 24):
  3. www.foundrybc.ca/covid19/
  4. Calm - Videos for meditation & relaxation: www.youtube.com/c/calm
  5. Mobile Apps Free for iOS & Android devices - Be sure to select/enable notifications/reminders if available!
  6. Mindshift CBT (Anxiety focus) COVID Coach Woebot (Chatbot) Wysa (Chatbot & optional paid chat therapist) Breathr Mindfulness Coach Insomnia Coach

Lessons (being) learned

- Need for a multidisciplinary approach to care for this population
- Significant financial stress and impact on work
- POTS, fatigue, and post exertional malaise very common
  - Screen everyone with tachycardia, dizziness, and/or fatigue for POTS
- Many at 6 months may meet diagnostic criteria for ME/CFS, but subset of people with fatigue will not
  - Etiology needs to be investigated further

Lessons (being) learned

- For those returning to work, ensure adequate time to recover.
  - Disability if needed
  - Accommodations' if needed

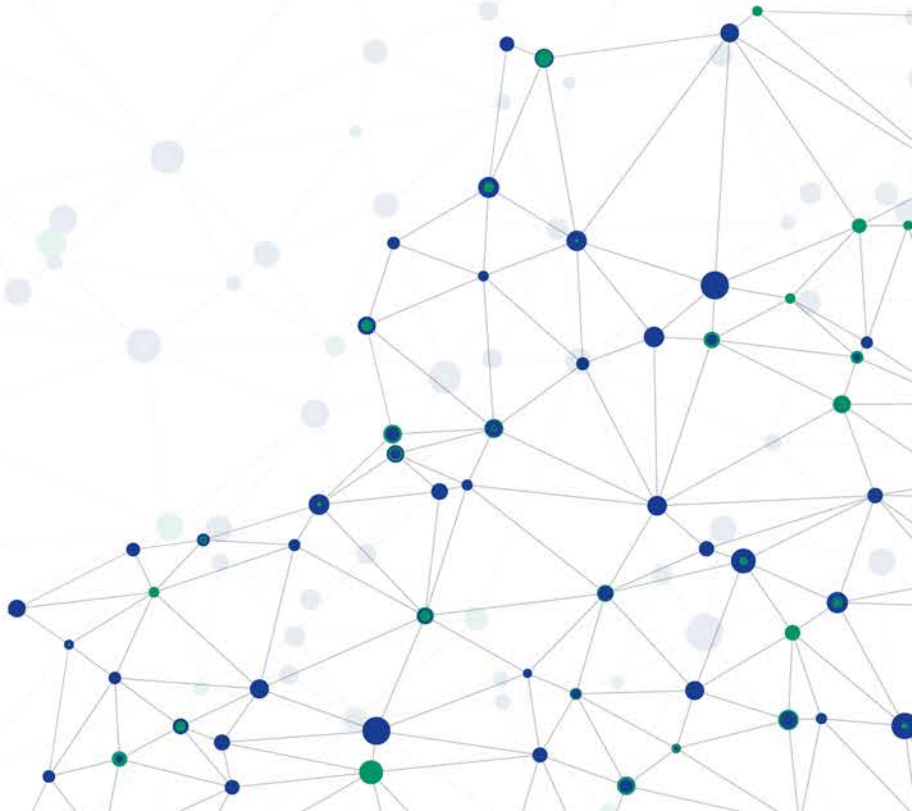
- Overall, we are now getting a much clearer picture of the morbidity of the disease

How to get Help ?

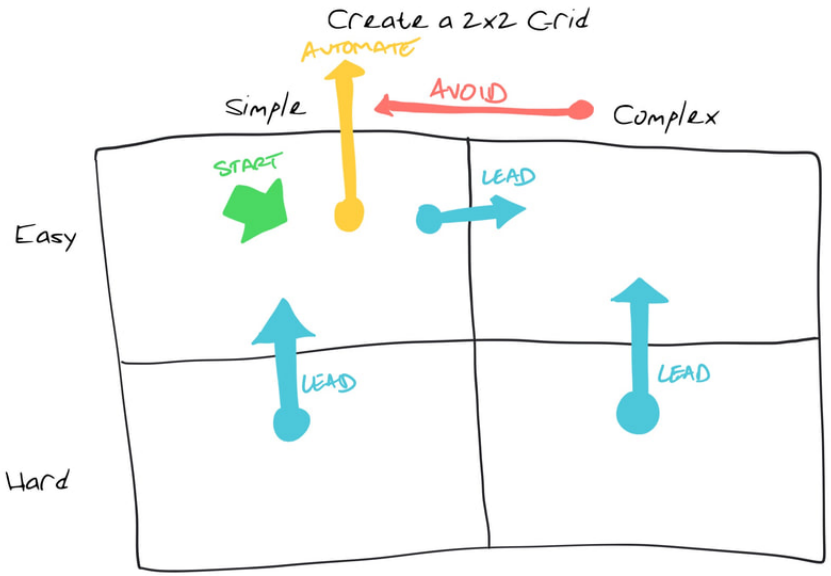
- Race Line – Post Covid
- E case
- Virtual health soon

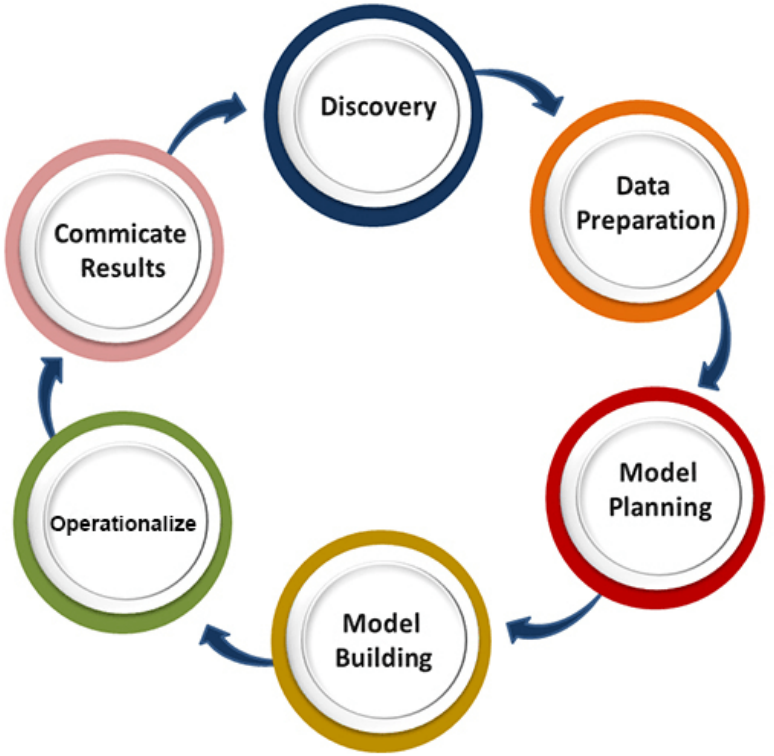
Helpful Resources

- http://www.phsa.ca/our-services/programs-services/post-covid-19-recovery-clinics
- https://www.yourcovidrecovery.nhs.uk



A learning Health System Approach





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A learning Health System Approach

- Information
  - History
  - Physical Exam
  - Investigations
  - Outcomes

→

- Standardized Questionnaires
- Vital Signs
- Standardized investigations
- Select outcomes

Standardized Questionnaires

Questionnaire	3 mo	6 mo	12 mo	18 mo
Table 1.1 Demographics: living arrangement status and employment	X			
COVID-19 History	X	X	X	X
Medical Status	X	X	X	X
Cough (Cough VAS)	X	X	X	X
Shortness of Breath (UCSD SOB)	X	X	X	X
Quality of Life/Health Today Scale/Frailty Index (EuroQol-SD, PHQ9, PSQI, Frailty Index)	X	X	X	X
Neurology Screen	X	X	X	X
Psychiatry Screen - 19 questions (below):	X	X	X	X
Generalized Anxiety Disorder-2 (GAD-2)	X	X	X	X
Patient Health Questionnaire-2 (PHQ-2)	X	X	X	X
CAGE Adapted to Include Drugs (CAGE-AID)	X	X	X	X
Obsessive-Compulsive Symptoms (Adapted from DSM)	X	X	X	X
Mania (Adapted from DSM)	X	X	X	X
Psychosis (Adapted from DSM)	X	X	X	X
Primary Care PTSD Screen for DSM-5 (PC-PTSD-5)	X	X	X	X
Fatigue Severity Scale	X	X	X	X

Standardized Labwork and Diagnostics

Test	3 mo	6mo	12 mo	18 mo	Indication/Rationale
Laboratory Tests					
BNP	X	only if abnormal	X	only if abnormal	Measure of volume overload
CBC w/diff	X	only if abnormal	X	only if abnormal	Measure changes in blood cells after COVID infection
Albumin	X	only if abnormal	X	only if abnormal	Nutritional and inflammatory marker
Electrolytes	X	only if abnormal	X	only if abnormal	Kidney function/acid/base
C-reactive protein	X	only if abnormal	X	only if abnormal	Inflammation
Creatinine	X	only if abnormal	X	only if abnormal	Kidney function/AKI/CKD
Ferritin	X	only if abnormal	X	only if abnormal	Iron status/inflammation
Liver function tests	X	only if abnormal	only if abnormal	only if abnormal	CHF/congestion or liver injury
LDH	X	only if abnormal	only if abnormal	only if abnormal	Cell breakdown/known to be high in acute COVID infection
Troponin	X	only if abnormal	only if abnormal	only if abnormal	Prognostic significance
D-Dimer, Fibrinogen	X	only if abnormal	X	only if abnormal	Elevated in acute illness
Lupus anticoagulant	only if VTE	only if abnormal	only if abnormal	only if abnormal	high incidence of thrombosis in COVID (literature); could lead to antiphospholipid syndrome
Anti-beta 2 glycoprotein1 IgG and IgM	only if VTE	only if abnormal	only if abnormal	only if abnormal	high incidence of thrombosis in COVID (literature); could lead to antiphospholipid syndrome
Anticardiolipin IgG and IgM					This is a measure of potential clotting disorder, shown to be abnormal in acute COVID
Urine ACR	X	only if abnormal	X	only if abnormal	Measure of acute and chronic kidney damage
Urine Analysis (dipstick)	X	only if abnormal	X	only if abnormal	Abnormal urine sediment
Urine Microscopy	X	only if abnormal	X	only if abnormal	Helps with decisions to biopsy or not
Diagnostics					
Pulmonary Function Tests	*		*		*As per individual patient assessment
Physical function: 6-minute walk test (6MWT), sit-to-stand	*		*		*As per individual patient assessment
Echocardiography	*		*		*As per individual patient assessment
CT chest	*		*		*As per individual patient assessment

Current Referral Criteria

Date of symptom onset: (dd/mmm/yyyy) _____

Date of first positive COVID-19 test: (dd/mmm/yyyy) _____

Patient admitted to hospital: ☐ No ☐ Yes Date of hospital discharge: (dd/mmm/yyyy) _____

ICU admission: ☐ No ☐ Yes Date admitted to ICU: (dd/mmm/yyyy) _____

REASON FOR REFERRAL (this will be used for Triage purposes)

Category A	Category B	Category C
☐ Hospitalization for COVID-19 ☐ 2 or more ER presentations following diagnosis of COVID-19 ☐ New evidence of end organ impairment without identifiable cause: (check all that apply) ☐ cardio ☐ neuro ☐ resp ☐ renal ☐ musculoskeletal	☐ NYHA dyspnea scale 3 or higher (new finding) ☐ Inability to return to work or school post diagnosis of COVID-19 for 12 or more weeks ☐ Functional deterioration post diagnosis of COVID-19 (dependence on ADLs or iADLs) for 12 or more weeks	☐ Unexplained, persistent symptoms for more than 12 weeks post symptom-onset, thought to be related to COVID-19

Learning Objectives

Referral Criteria, Referring Clinician Checklist and Clinic Contact Information on reverse.

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Post COVID-19

Interdisciplinary Clinical Care Network

Recovery | Care | Research | Education