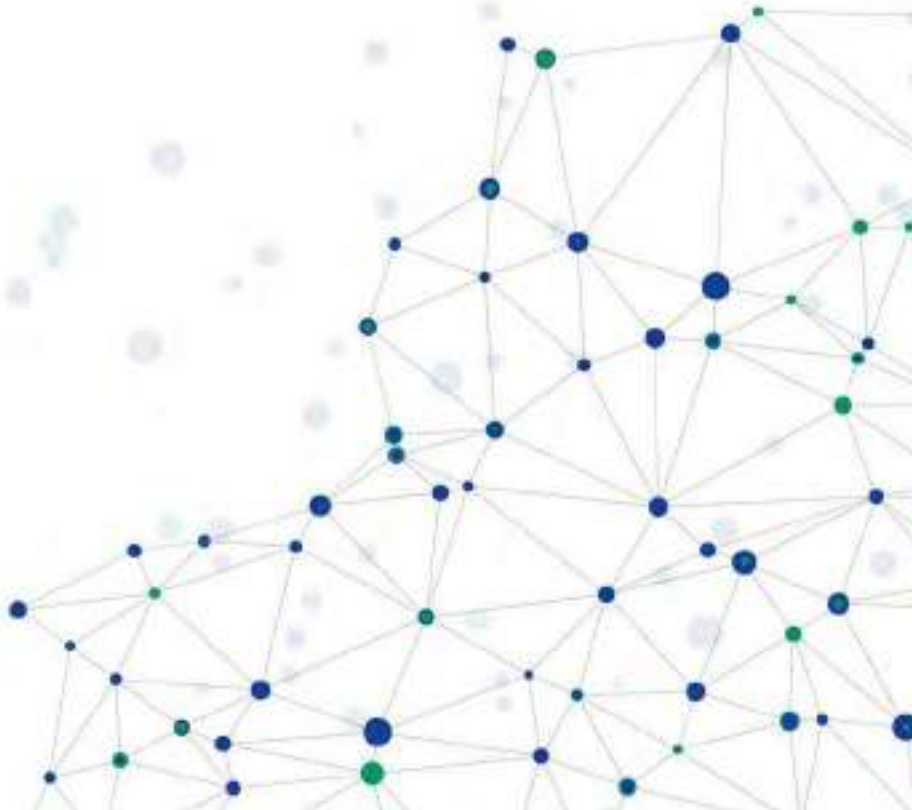
The Journey to Recovery - Post-COVID-19 Care in BC

28 Jan 2021



Post COVID-19
Interdisciplinary Clinical Care Network
Recovery | Care | Research | Education

Disclosures

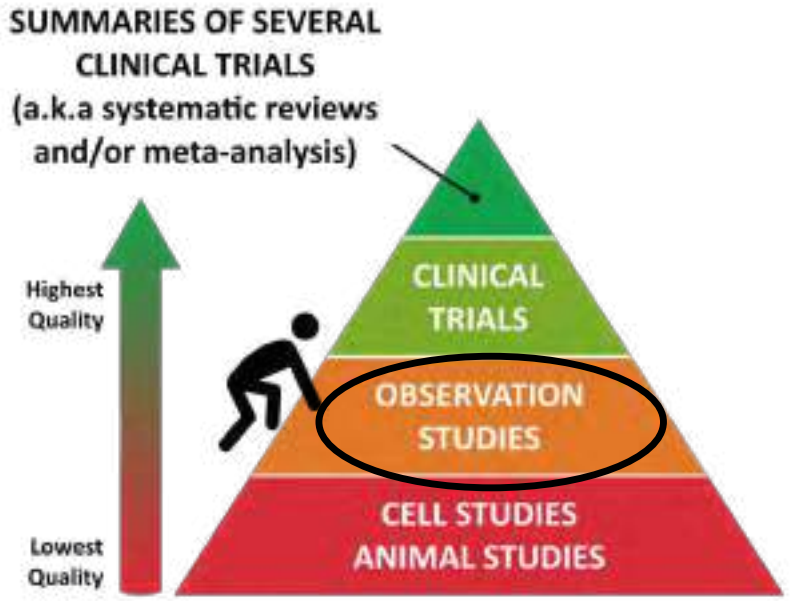
- Jesse Greiner
- Zach schwartz
- Evan Kwong
- Grant Millar
- Chris Ryerson
- Peter Birks

Acknowledgements

- Post-COVID ICCN Team
- AHSN
- Shared Care

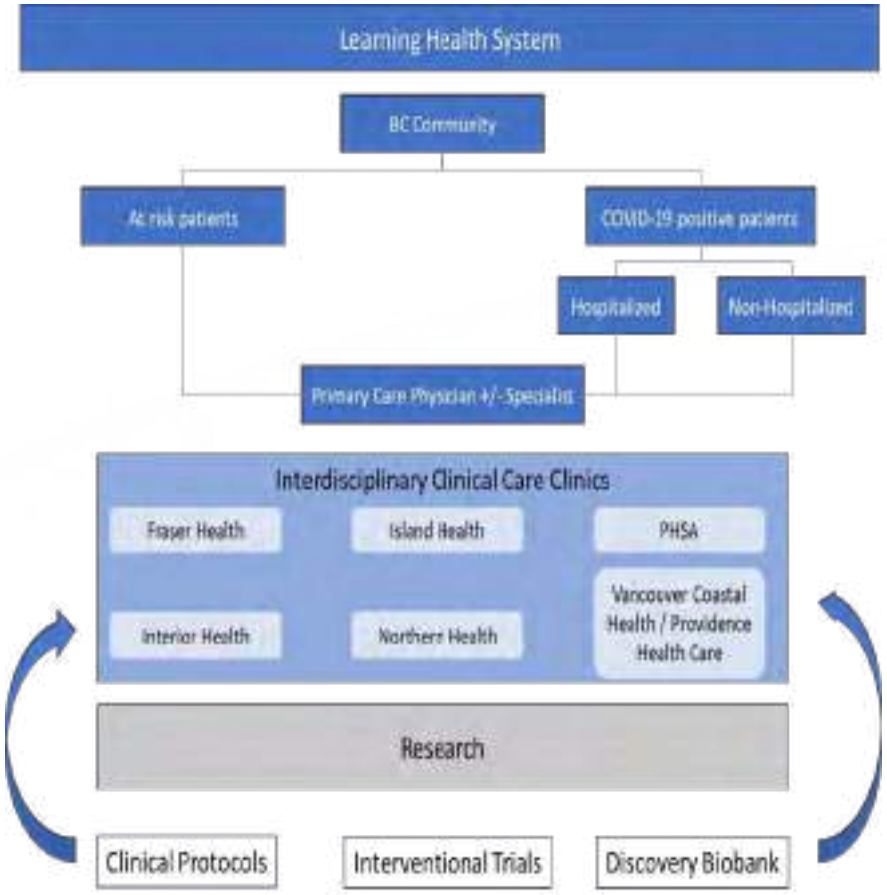
Learning Objectives

1. Access existing resources for COVID-19 recovery care in BC;
2. Apply best practices and existing evidence to guide care for chronic post-COVID-19 symptoms; and
3. Assess the psychiatric, respiratory and rehabilitative needs of patients recovering from COVID-19



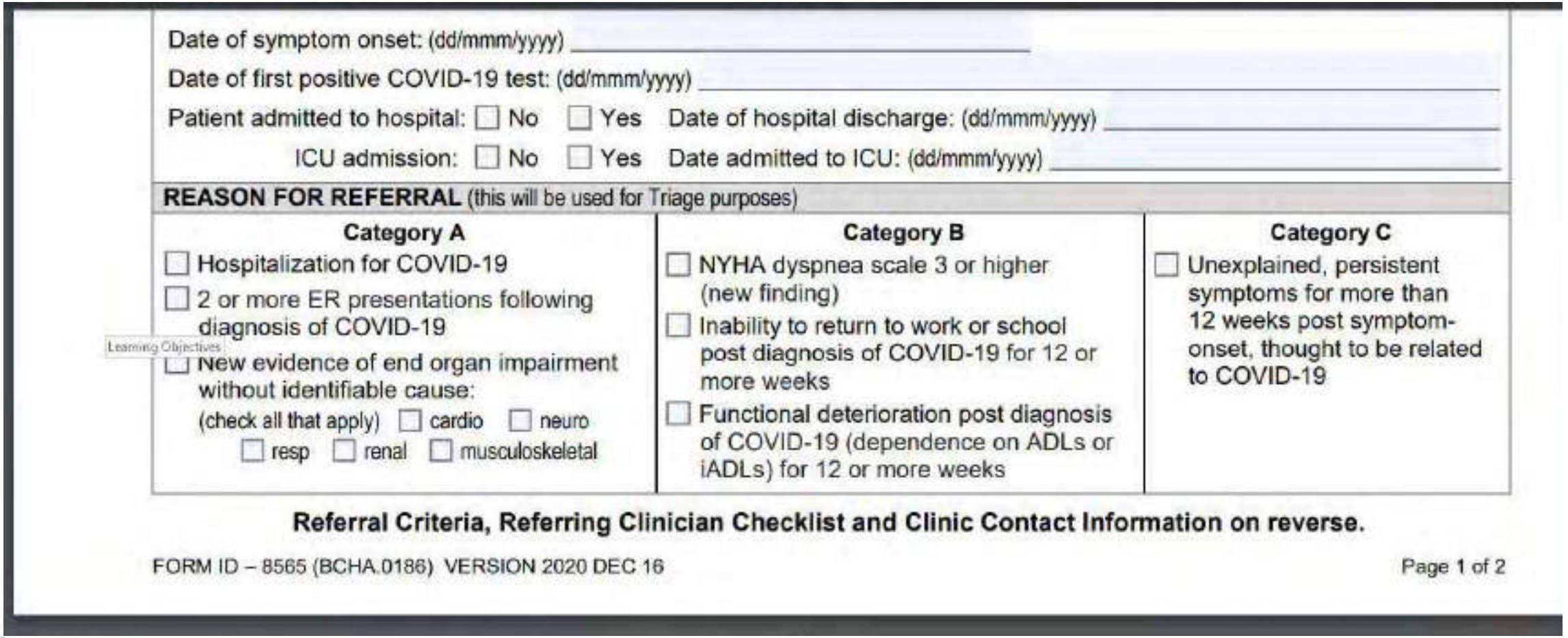
POST-COVID RECOVERY CLINIC (PCRC)

- 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



- 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

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

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

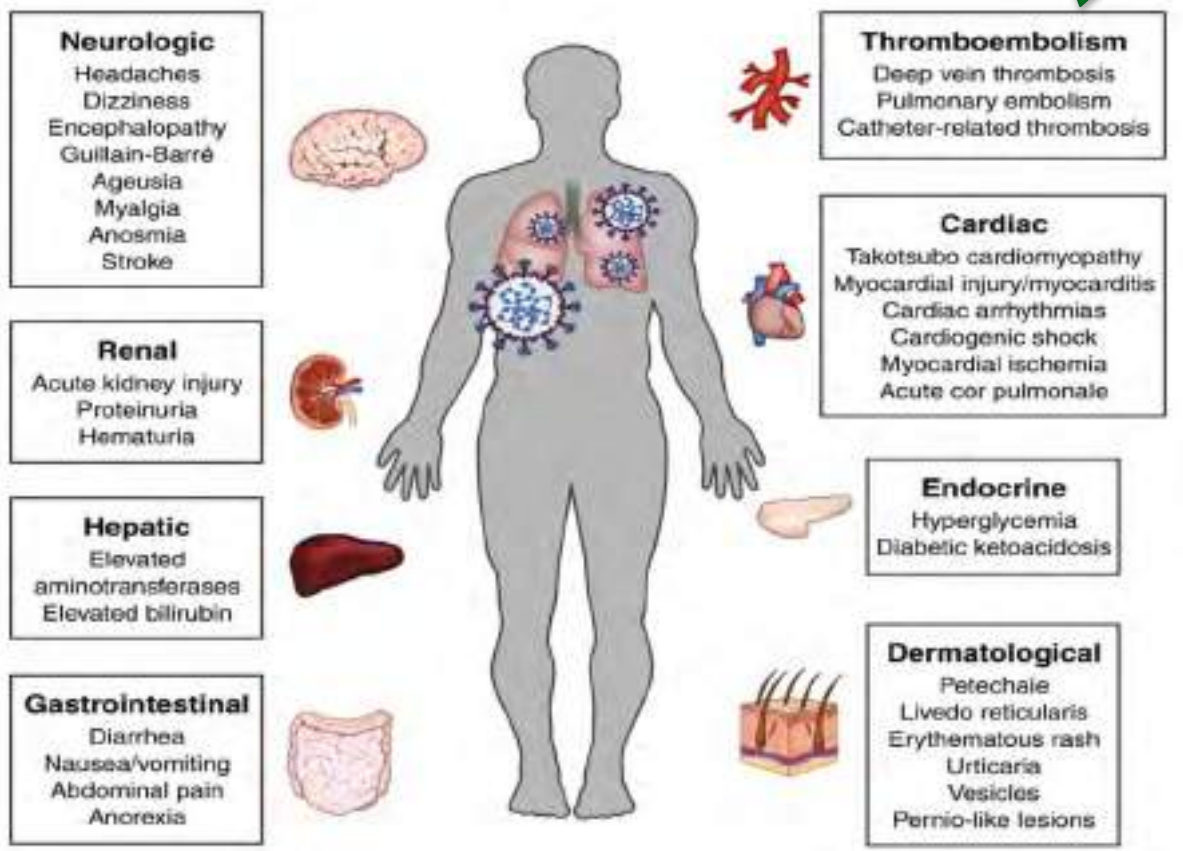
FORM ID – 8565 (BCHA.0186) VERSION 2020 DEC 16

Page 1 of 2

Reference Class Forecasting

See Appendix 1 for acute complications

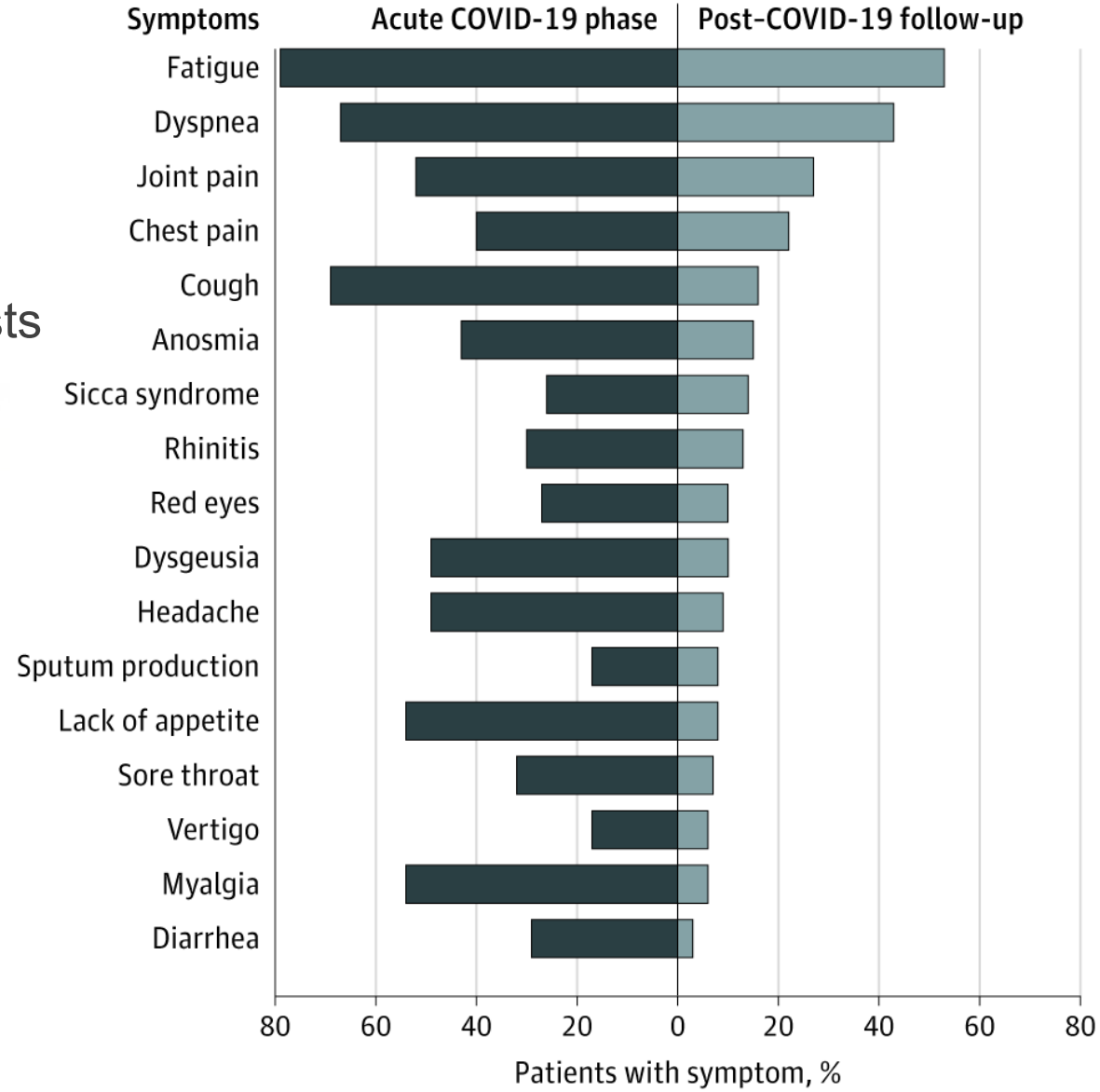
- SARS/MERS complications
- Acute Covid complications
- Similar phenotypes
  - Post-ICU Syndrome
  - Post-Concussion Syndrome
  - Myalgic Encephalitis



Gupta et al. 2020

There Are Lots of symptoms!

- See Appendix 2: comprehensive symptom lists



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

Prevalence of Long-Covid

- 2.3% total patients symptomatic at 12 weeks

Sudre et al. 2020. Attributes and predictors of Long-COVID: analysis of COVID cases and their symptoms collected by the Covid Symptoms Study App . medRxiv. Preprint. doi: https://doi.org/10.1101/2020.10.19.20214494

- 10% total Patients symptomatic at 12 weeks

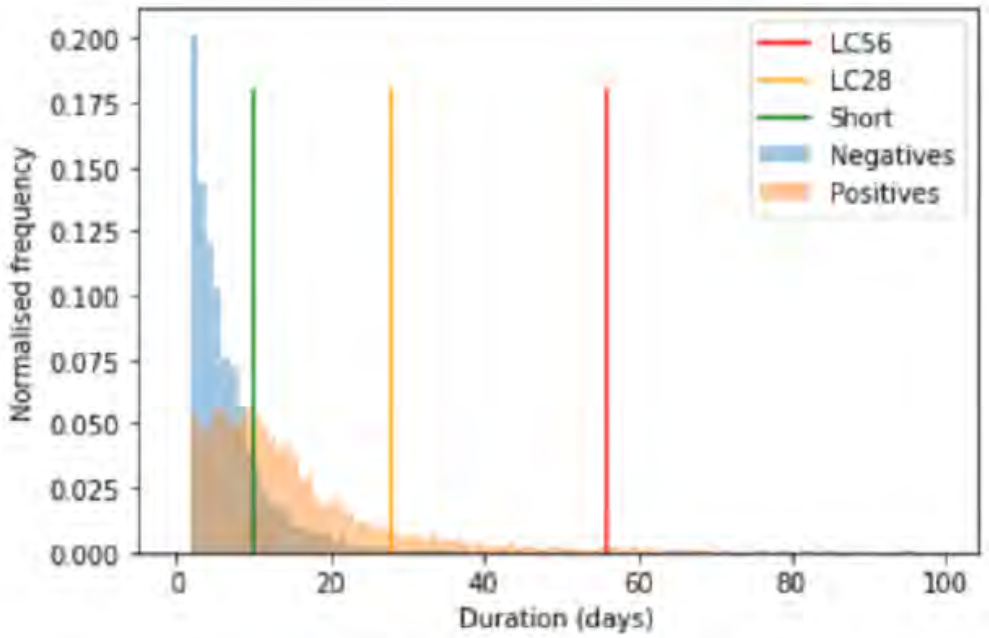
UK Office of National Statistics COVID Infection Survey.
https://www.ons.gov.uk/news/statementsandletters/theprevalenceoflongcovidsymptomsandcovid19complications

- 76% of hospitalized patients symptomatic at 6 months.

6-6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. Chaolin Huang, MD, Lixue Huang, MD, Yeming Wang, MD, Xia Li, MD, Lili Ren, PhD, Xiaoying Gu, PhD. The Lancet. VOLUME 397, ISSUE 10270, P220-232, JANUARY 16, 2021

COVID Symptom Study

- 13% patients symptomatic at 4 weeks
- 4.5% patients symptomatic at 8 weeks
- 2.3% patients symptomatic at 12 weeks



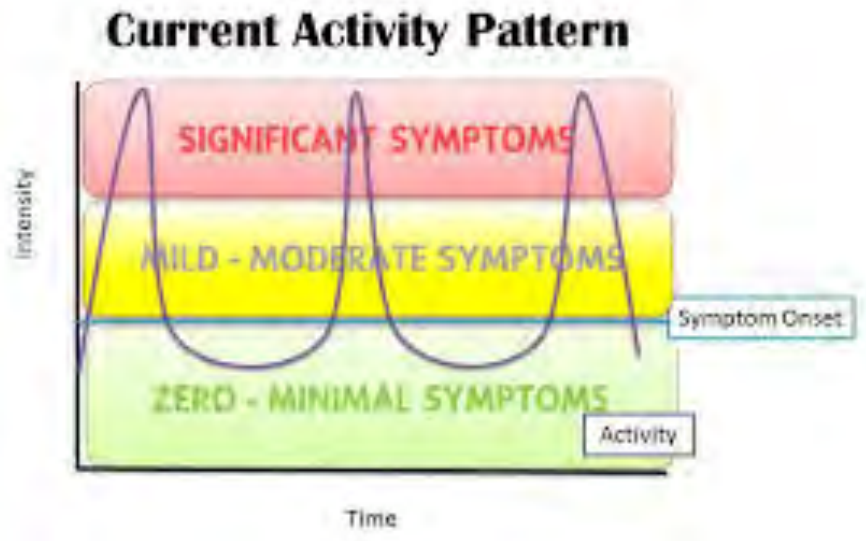
Risk Factors for Long-COVID

- Age
- Obesity
- Females
- Asthma

Sudre et al. 2020. Attributes and predictors of Long-COVID: analysis of COVID cases and their symptoms collected by the Covid Symptoms Study App
. medRxiv. Preprint. **doi:** https://doi.org/10.1101/2020.10.19.20214494

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 stress (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



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

Medical Complications

See Appendix 1 for acute complications

- 58 hospitalized patients, and 30 comorbidity matched controls received standardized MRI, Spirometry, 6 min walk test, cardio-pulmonary exercise test, QOL, Mental health assessments.
- Evaluated at 2-3 months post symptom onset:
  - 64% persistant SOB
  - 55% had persistent fatigue
  - 60% had persistent abnormalities of lung MRI
  - Reduced FEV1 11%, FVC 13%, reduced 6 min walk test
  - On CPET, reduced VO2, anaerobic threshold, VE/VCO2

Raman et al. 2020. Medium-term effects of SARS-CoV-2 infection on multiple vital organs, exercise capacity, cognition, quality of life and mental health, post-hospital discharge. medRxiv. Preprint.
doi: https://doi.org/10.1101/2020.10.15.20205054

Medical Complications

See Appendix 1 for acute complications

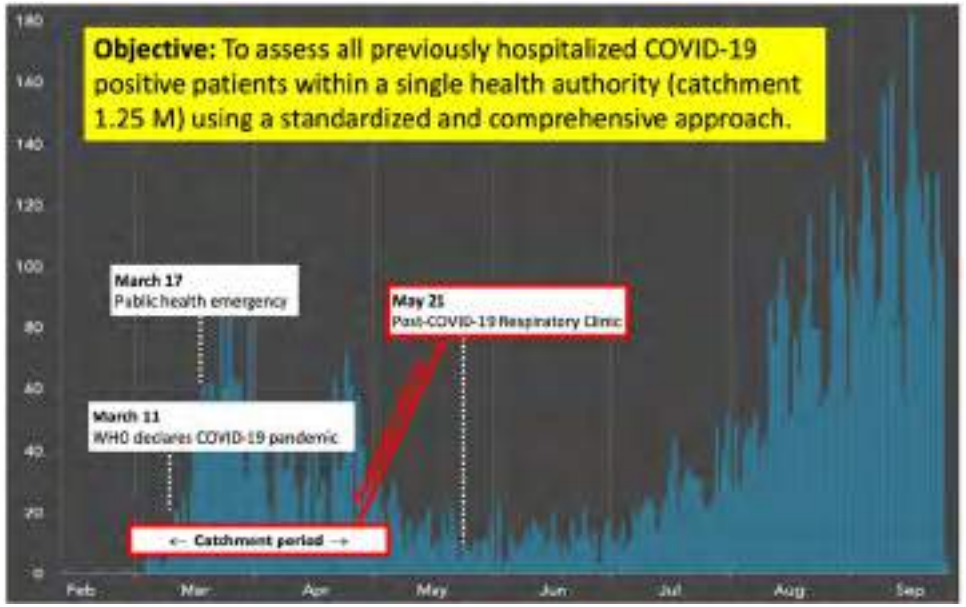
- 58 hospitalized patients, and 30 comorbidity matched controls received standardized MRI, Spirometry, 6 min walk test, cardio-pulmonary exercise test, QOL, Mental health assessments.
- Evaluated at 2-3 months post symptom onset:
  - Minor abnormalities in brain neuro-imaging,
  - Median moca scores unchanged
  - Increased myocardial fibrosis on MRI
  - 10% of patients had liver injury/fibrosis.
  - Increased Renal inflammation in 29% of patients, statistically similar Cr and eGFR's
  - Increased prevalence of PHQ9 >6 (39% vs 17%), GAD-7> 6 (35% vs 10%)

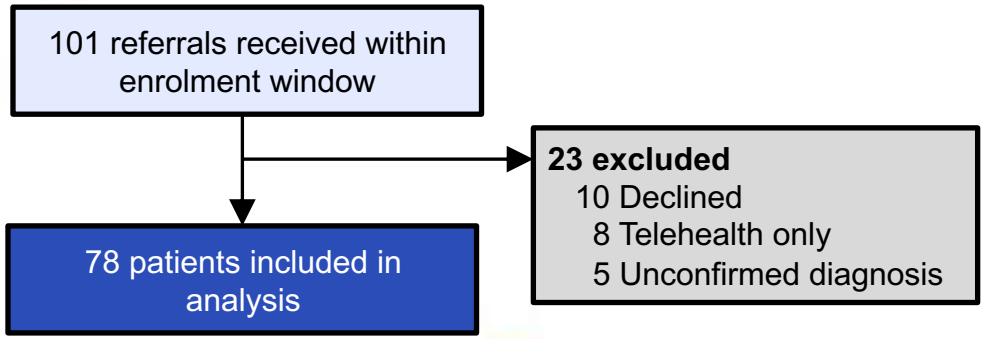
Raman et al. 2020. Medium-term effects of SARS-CoV-2 infection on multiple vital organs, exercise capacity, cognition, quality of life and mental health, post-hospital discharge. medRxiv. Preprint.
doi: https://doi.org/10.1101/2020.10.15.20205054

Covid-19 Pulmonary Complications

- Christopher J. Ryerson
  - Department of Medicine & Centre for Heart Lung Innovation
  - University of British Columbia & St. Paul's Hospital

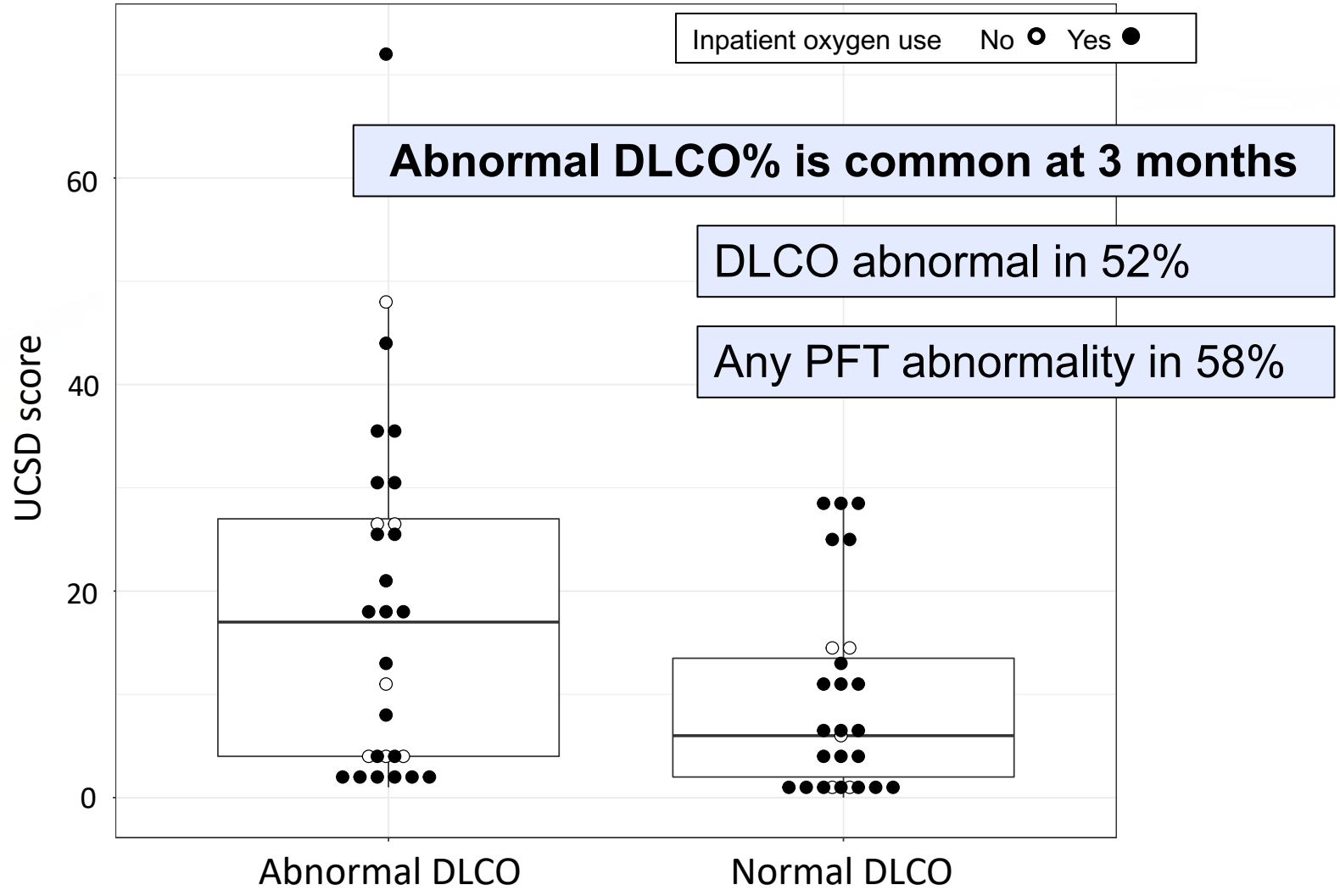
Study enrolment & population



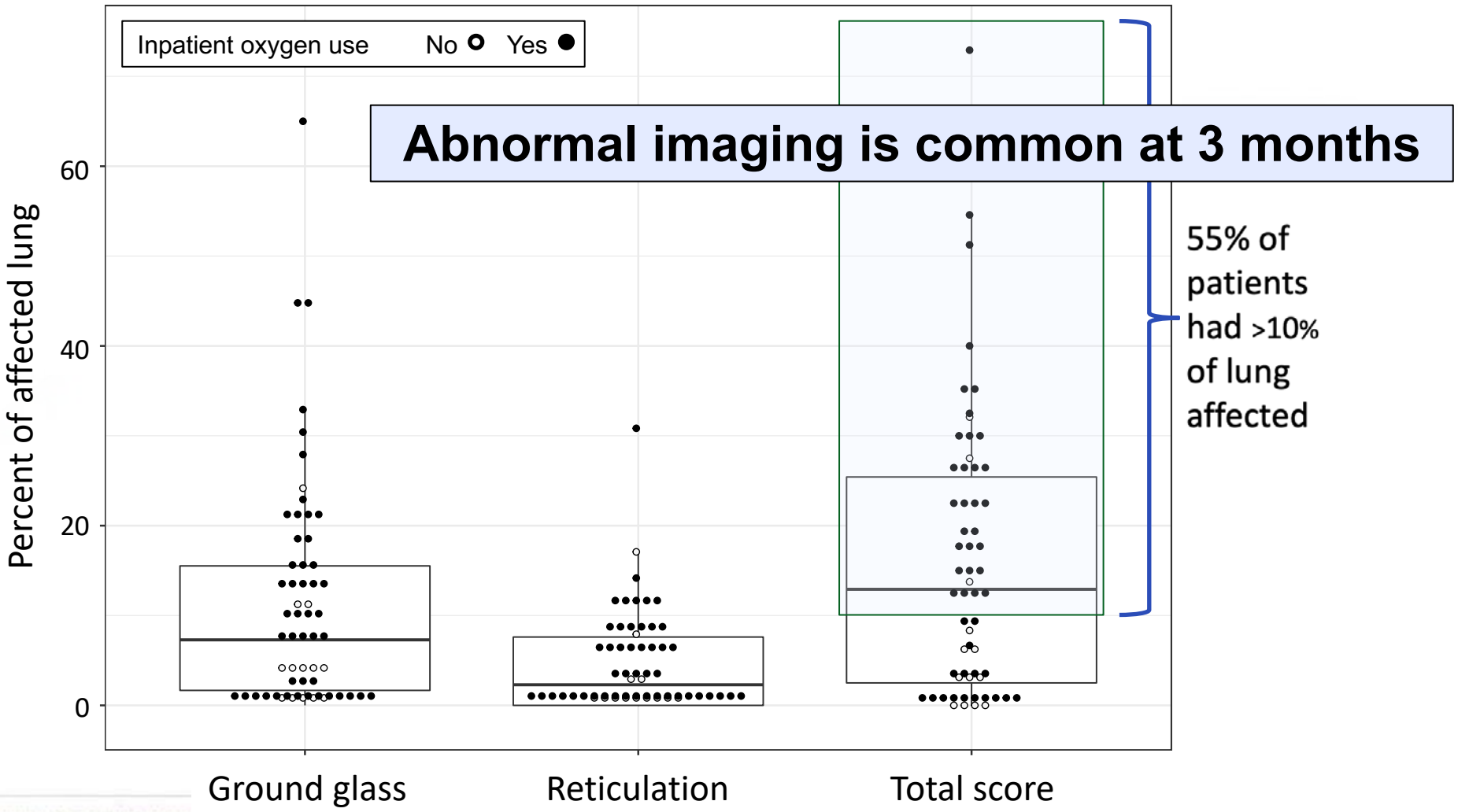


Characteristics	Values
Demographics	
Age, years	67 (54 - 74)
Male	41 (68%)
Body mass index, kg/m^2	25 (23 - 29)
Ever smoker	23 (38%)
Respiratory symptoms on admission	
Dyspnea	46 (77%)
Cough	35 (58%)
Comorbidities	
Hypertension	21 (35%)
Diabetes	13 (22%)
Chronic pulmonary disease	8 (13%)
Coronary heart disease	6 (10%)
Malignancy	6 (10%)
Chronic kidney disease	4 (7%)
Hospital course	
Hospital LOS, days	10 (6 - 16)
Patients requiring oxygen	46 (78%)
Duration of oxygen, days	9 (4 - 15)
Mechanical ventilation	12 (20%)
Duration of mech. vent., days	8 (5 - 11)

DLCO at 3 months



CT findings at 3 months



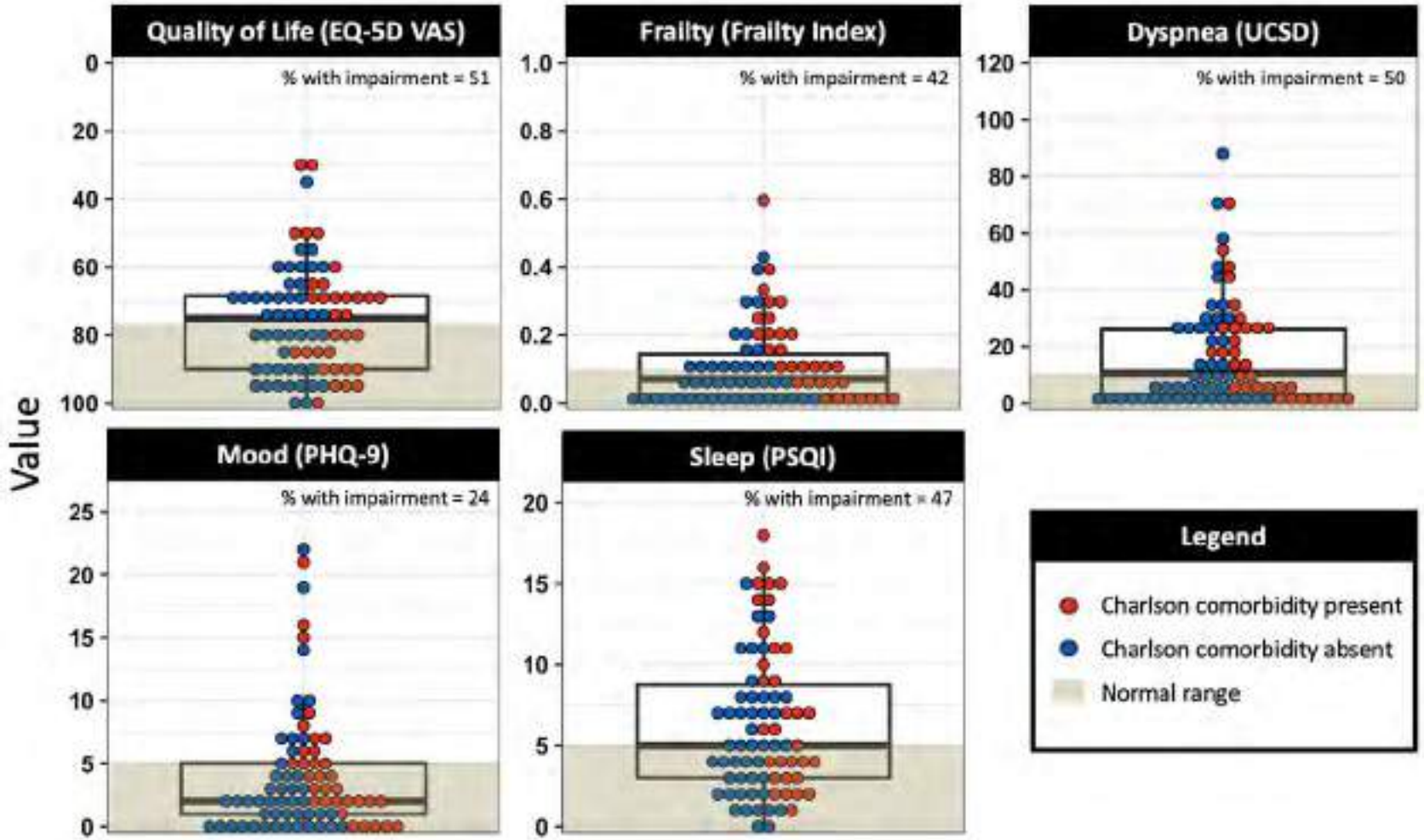
Predictors of 3-month outcomes

			Unadjusted analysis			Adjusted analysis			
Model	**Outcome (at 3 mo)**	**1º predictor**	**Coefficient**	**95%CI**	**p-value**	**Coefficient**	**95%CI**	**p-value**	**Prespecified covariates**
1	**UCSD**	Days on O_2	0·17	-0·19 to 0·52	0·35	0·19	-0·17 to 0·55	0·29	Sex, age, BMI
2	**DLCO%**	Days on O_2	-0·49	-0·83 to -0·15	0·01	-0·44	-0·77 to -0·11	0·01	Sex, age
3	**Total CT score**	Days on O_2	0·81	0·56 to 1·07	<0·001	0·77	0·52 to 1·02	<0·001	Sex, age
4	**DLCO%**	UCSD at 3 mo	-0·46	-0·73 to -0·18	0.002	-0·39	-0·65 to -0·13	0·005	Sex, age, days on O_2

Take-home messages

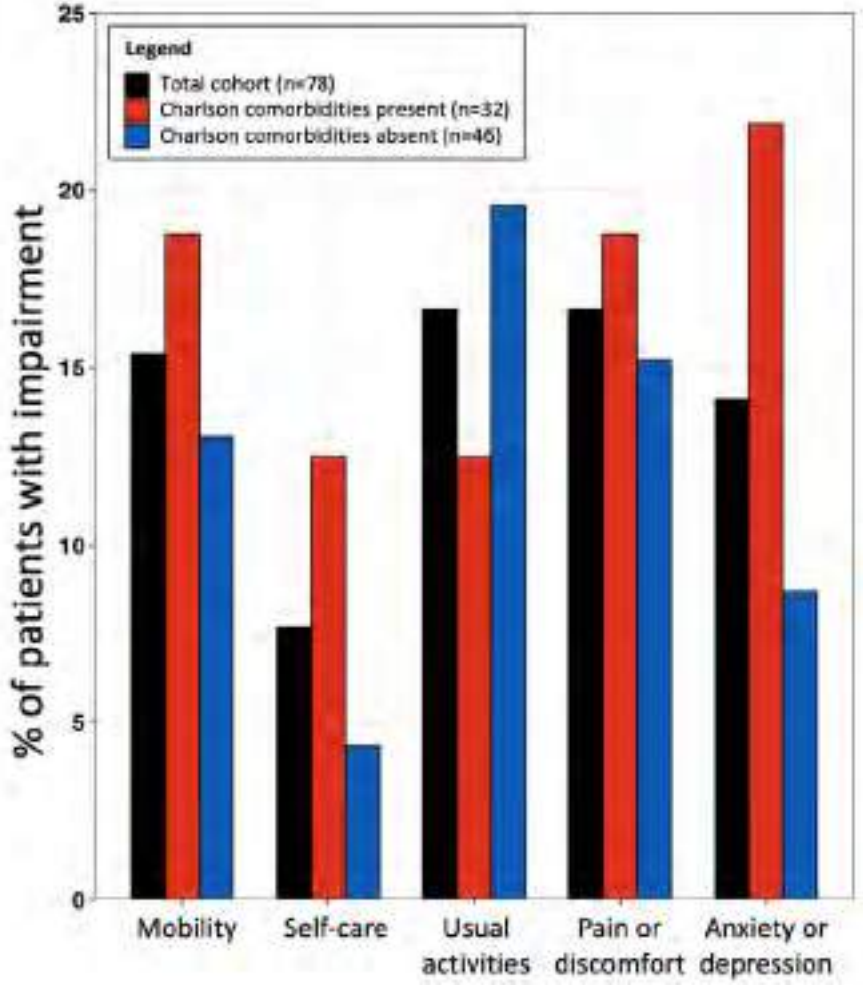
1. Ongoing dyspnea is hard to predict
2. Days on oxygen predict DLCO% and CT severity at 3 months
3. Dyspnea at 3 months correlates with DLCO% at 3 months

PROMs at 3 months



Approximately half of patients have abnormalities at 3 months

QOL domains at 3 months



Under each heading, please tick the ONE box that best describes your health TODAY

MOBILITY
- I have no problems in walking about ☐
- I have slight problems in walking about ☐
- I have moderate problems in walking about ☐
- I have severe problems in walking about ☐
- I am unable to walk about ☐

SELF-CARE
- I have no problems washing or dressing myself ☐
- I have slight problems washing or dressing myself ☐
- I have moderate problems washing or dressing myself ☐
- I have severe problems washing or dressing myself ☐
- I am unable to wash or dress myself ☐

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*
- I have no problems doing my usual activities ☐
- I have slight problems doing my usual activities ☐
- I have moderate problems doing my usual activities ☐
- I have severe problems doing my usual activities ☐
- I am unable to do my usual activities ☐

PAIN / DISCOMFORT
- I have no pain or discomfort ☐
- I have slight pain or discomfort ☐
- I have moderate pain or discomfort ☐
- I have severe pain or discomfort ☐
- I have extreme pain or discomfort ☐

ANXIETY / DEPRESSION
- I am not anxious or depressed ☐
- I am slightly anxious or depressed ☐
- I am moderately anxious or depressed ☐
- I am severely anxious or depressed ☐
- I am extremely anxious or depressed ☐

QOL impairment is poorly associated with pre-existing comorbidities

Covid-19 Physiatry Considerations

- **Evan H. Kwong, BSc(Pharm), MD, MSc, FRCPC, CSCN (EMG)**
  - Clinical Assistant Professor, University of British Columbia
  - Medical Site Lead, Holy Family Hospital Rehabilitation
  - Division Head, Physical Medicine and Rehabilitation, Providence Health Care

- 2021 Jan 28

The Last Slide (from a May 2020 presentation)

We are still learning about “Post-COVID19” impairments

Compare/contrast with the literature about viral infections, Post-ICU Syndrome, and ARDS

WHO’s International Classification of Functioning, Disability, and Health framework helps provide a holistic view

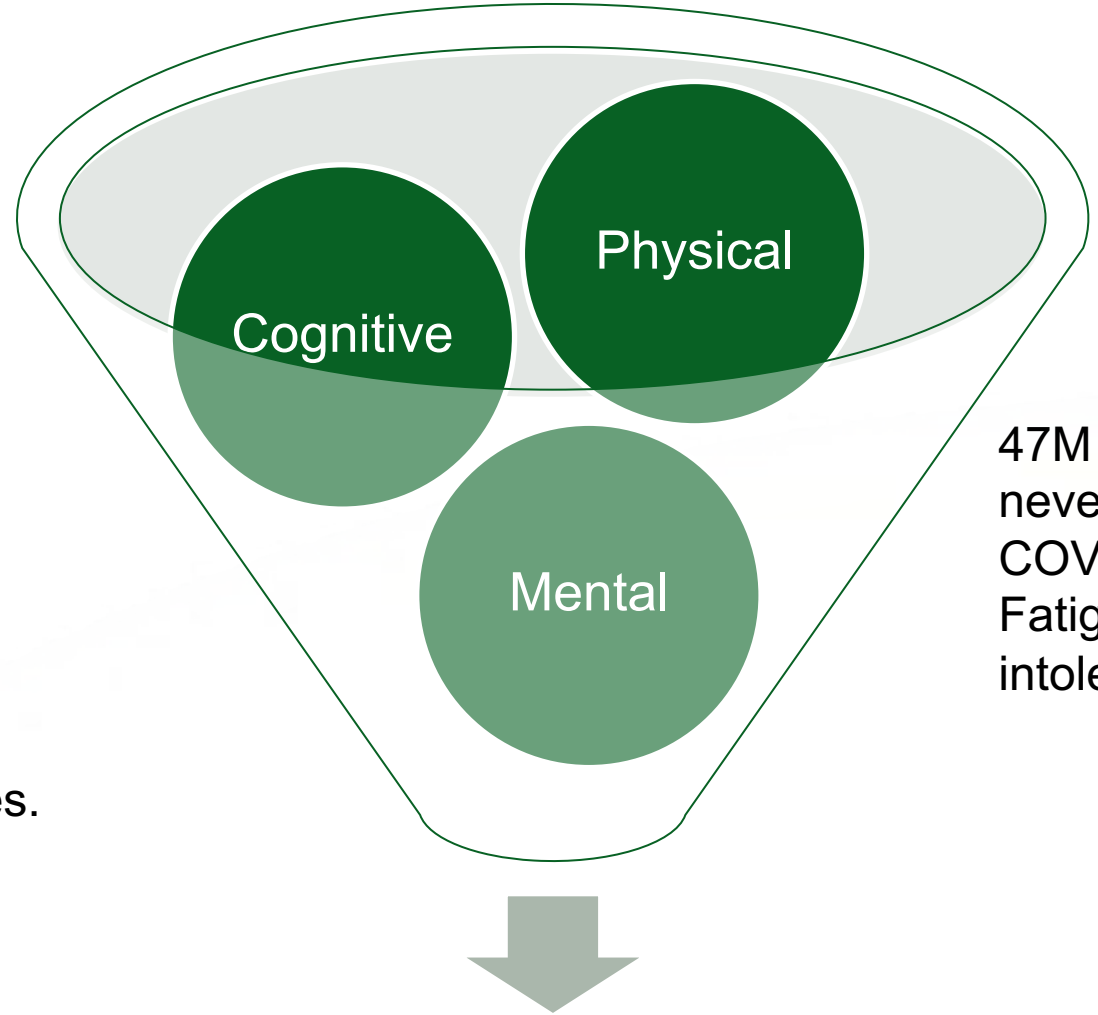
Physiatry can help diagnose and coordinate multidisciplinary rehabilitation of physical and cognitive impairments

Management of various co-morbidities and co-impairments will need primary care and other specialists

There continues to be rehabilitation needs for acute and chronic diseases not related to COVID-19

83M hospitalized including ICU for COVID-19. Physical and cognitive impairments, including femoral neuropathy.

72M hospitalized 4mo including ICU for COVID19, with 4-limb motor/sensory changes.



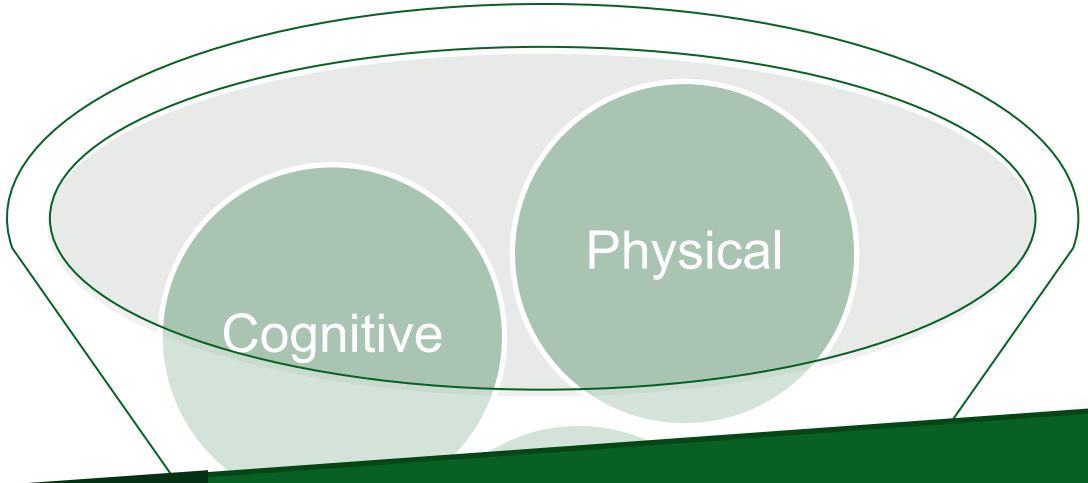
57F with viral-like illness, never hospitalized, COVID-19 negative. Fatigue and cognitive difficulties >6months.

47M with viral-like illness, never hospitalized, COVID-19 negative. Fatigue and exercise intolerance >3months.

42F with viral-like illness, never hospitalized, COVID-19 positive. Fatigue and exercise intolerance >3months.

Weak, Fatigued, Short of breath, Decreased memory, Depressed, Anxious, Insomnia

83M hospitalized including ICU for COVID-19. Physical and cognitive impairments, including femoral neuropathy.



57F with viral-like illness, never hospitalized, COVID-19 negative. Fatigue and cognitive difficulties >6months.

Post-ICU Neuromusculoskeletal Impairments

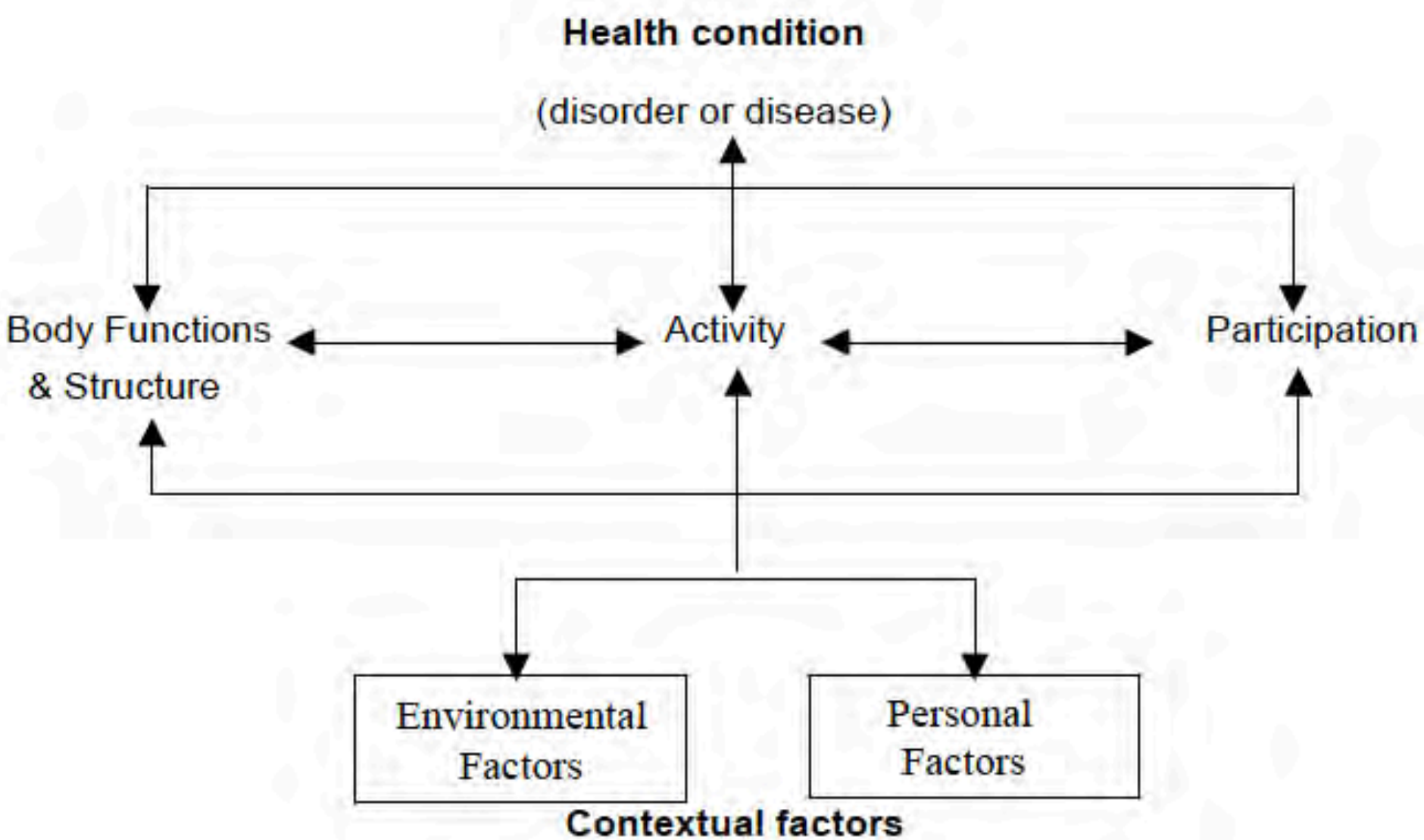
Post-infection fatigue, exercise capacity limitations, cognitive difficulties, mental health needs

ess,

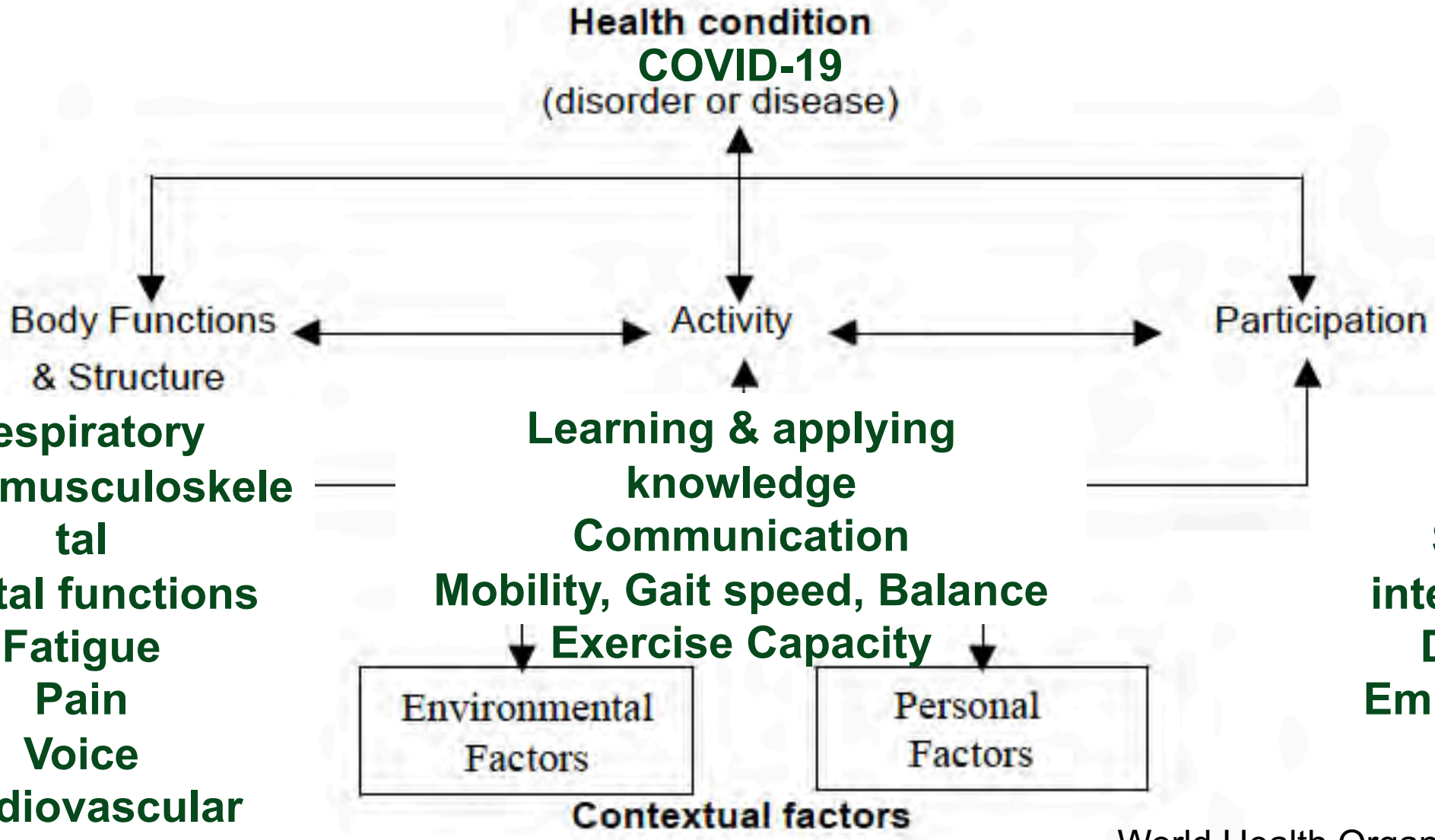
intolerance >3months.

Weak, Fatigued, Short of breath, Decreased memory, Depressed, Anxious, Insomnia

ICHOM COVID-19 Standard Set



World Health Organization (2002)



World Health Organization (2002); Smith et al. (2020); Ohtake et al. (2018)

The Last Slide… still

We are still learning about “Post-COVID19” impairments

Compare/contrast with the literature about viral infections, Post-ICU Syndrome, and ARDS

WHO’s International Classification of Functioning, Disability, and Health framework helps provide a holistic view

Physiatry can help diagnose and coordinate multidisciplinary rehabilitation of physical and cognitive impairments

Management of various co-morbidities and co-impairments will need primary care and other specialists

There continues to be rehabilitation needs for acute and chronic diseases not related to COVID-19

References

- International Consortium for Health Outcomes Measurement (2020). *COVID-19 Standard Set.* https://www.ichom.org/portfolio/covid-19/
- Ohtake, P. J., Tower, K., Hinman, R. S., Needham, D. M., & Hop, J. (2018). Physical Impairments Associated With Post–Intensive Care Syndrome: Systematic Review Based on the World Health Organization's International Classification of. *Physical Therapy*, *98*(8), 15.
- World Health Organization. (2002). *Towards a Common Language for Functioning Disability and Health*. World Health Organization. https://www.who.int/classifications/icf/icfbeginnersguide.pdf

Covid-19 Psychiatry Considerations

- **Dr. Grant Millar MD, FRCPC**

- Department of Psychiatry
- Physician Lead – Staff Support Team
- Physician Lead – Consultation Liaison Psychiatry
- Physician Program Lead – Ambulatory and Consultation Liaison
- Eating Disorders Program
- St. Paul's Hospital

Post COVID-19

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COVID and mental health

Mental Health Research Canada

- Data most recently collected December 10th – 18th, 2020
- Highest rates yet of people reporting
    - High levels of anxiety – 23%
    - High levels of depression – 15%
- Currently driven by social isolation, working from home, negative impact of economy
- Highly vulnerable include young adults, parents, frontline HCW

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Psychiatric screening questionnaire

- Screen for 7 broad domains of psychopathology
  - Anxiety – Generalized Anxiety Disorder - 2
  - Depression – Patient Health Questionnaire -2
  - Substance use – CAGE Adapted to Include Drugs
  - OCD Sx
  - Mania
  - Psychosis

  } Questions adapted from MINI Screen
  - Post Traumatic Stress Disorder - Primary Care PTSD screen for DSM-5

- All questions begin “During the last 2 weeks…”
- Any positive screen would lead to a Psychiatry referral

Results (N = 30)

Psychopath. Domain	Screen	N	(%)	Clinical diagnosis confirmed	
Anxiety	Positive	19	(63)	11 (6 Adj. d/o)	Sn – 100%, Sp – 58%, PPV – 58%, NPV – 100%
	Negative	11	(37)	0 (4 Adj. d/o)	
Depression	Positive	13	(43)	4 (5 Adj. d/o)	Sn – 50%, Sp – 59%, PPV – 31%, NPV – 77%
	Negative	17	(57)	4	
Substance use	Positive	3	(10)	2	Sn – 100%, Sp – 96%, PPV – 67%, NPV – 100%
	Negative	27	(90)	0	
OCD Sx	Positive	21	(70)	0	Sn – ?%, Sp – 30%, PPV – 0%, NPV – 100%
	Negative	9	(30)	0	
Mania	Positive	19	(63)	0	Sn – ?%, Sp – 37%, PPV – 0%, NPV – 100%
	Negative	11	(27)	0	
Psychosis	Positive	1	(3)	0	Sn – ?%, Sp – 97%, PPV – 0%, NPV – 100%
	Negative	29	(97)	0	
PTSD	Positive	11	(37)	4 (3 Adj. d/o)	Sn – 67%, Sp – 71%, PPV – 36%, NPV – 89%
	Negative	19	(63)	2 (2 Adj. d/o)	

Additional health concerns at time of initial assessment

- Shortness of breath 82%
- Fatigue 91%
- Memory / cognitive concerns 63%
- Loss of taste / smell 36% (and 45% others at intake)
- Health rating scale 35 – 80 % (Mean 64.9, Median 65)
    - How good (or bad) is your health today?

Key research findings

Anxiety
Depression
Substance use
OCD
Mania
Psychosis
PTSD

For all of the above proceed with treatment as usual
Prognosis unknown! More research required!!

Acknowledgements

Dr. Lingsa Jia, Dr. Stefanie Montgomery, Dr. Alexander Levit (UBC Psychiatry Residents)

Dr. Julia Raudzus

Dr. Lakshmi Yatham

Dr. Sophia Frangou et al (UBC Psychiatry Covid research group)

Ms. Jaclyn Robinson

Network partners

Provincial Health Services Authority
Province-wide solutions. Better health.

First Nations Health Authority
Health through wellness

fraserhealth

island health

Interior Health

northern health
the northern way of caring

Providence HEALTH CARE

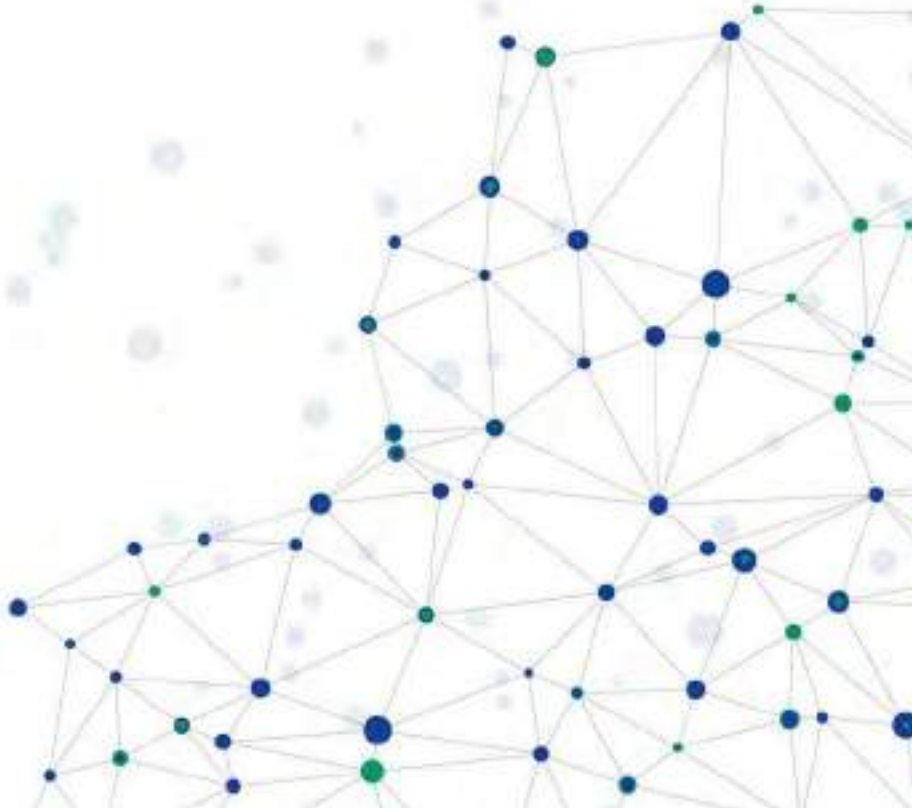
Vancouver CoastalHealth

BC AHSN
British Columbia Academic Health Science Network

SFU

UBC

Questions?



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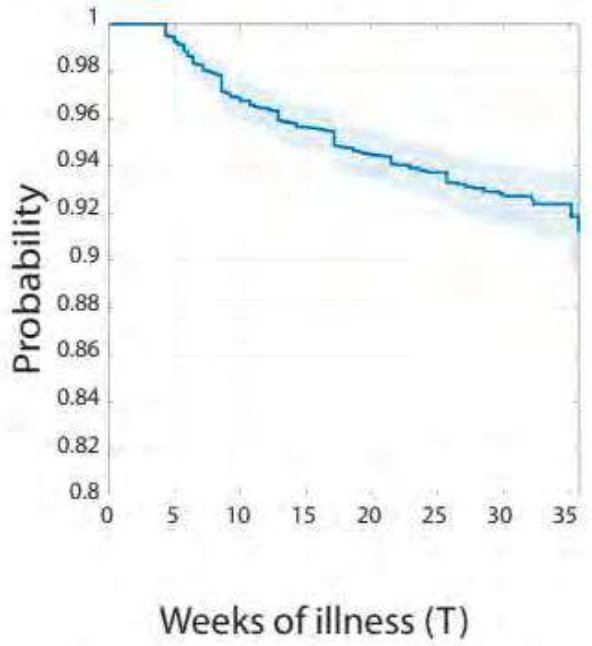
Appendix 1 - Acute Complications

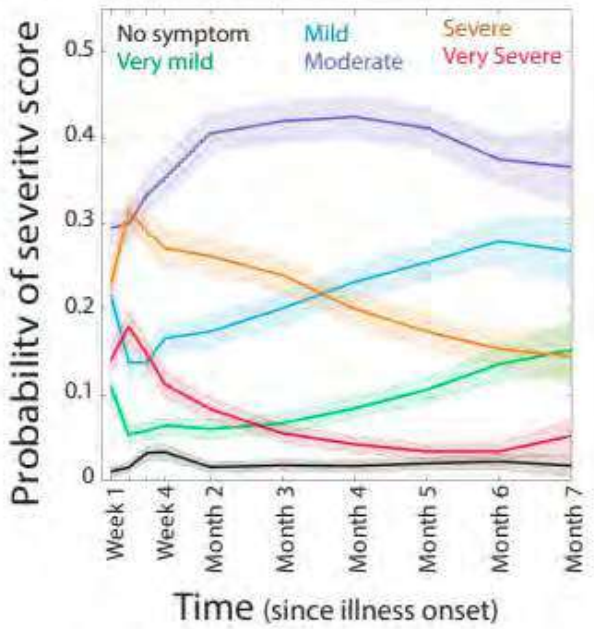
- Cardiovascular – myo/pericarditis, arrhythmia's, atrial fibrillation,
- Renal – Increased incidence of AKI, proteinuria, microscopic hematuria,
- GI – elevated liver enzymes, impaired glucose tolerance
- Respiratory – VTE/PE, airspace opascifications, pulmonary fibrosis
- Psychiatric – PTSD, Depression, Anxiety, cognitive impairment, impaired working memory, insomnia,
- Neurologic – Guillan Barre syndrome, encephalitis, demyelinating disorders, neuropathy, ischemic/hemorrhagic stroke, acute disseminating encephalomyelitis, acute polyneuropathy, critical illness polyneuropathy/myopathy, necrotizing hemorrhagic encephalitis
- Dermatologic – Pernio-like lesions, urticaria, telogen effluvium,
- Immunologic – IFN-1 defects.

Appendix 2a – COVID Symptoms

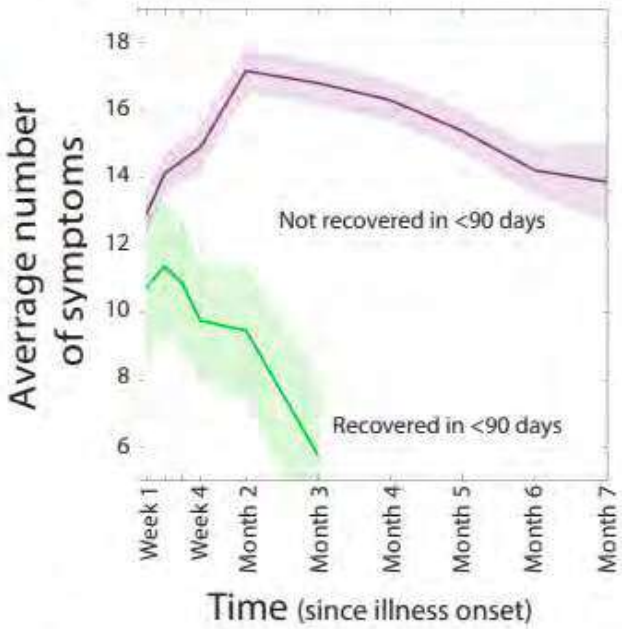
a. Probability of having symptoms after T



b. Symptom severity score over time

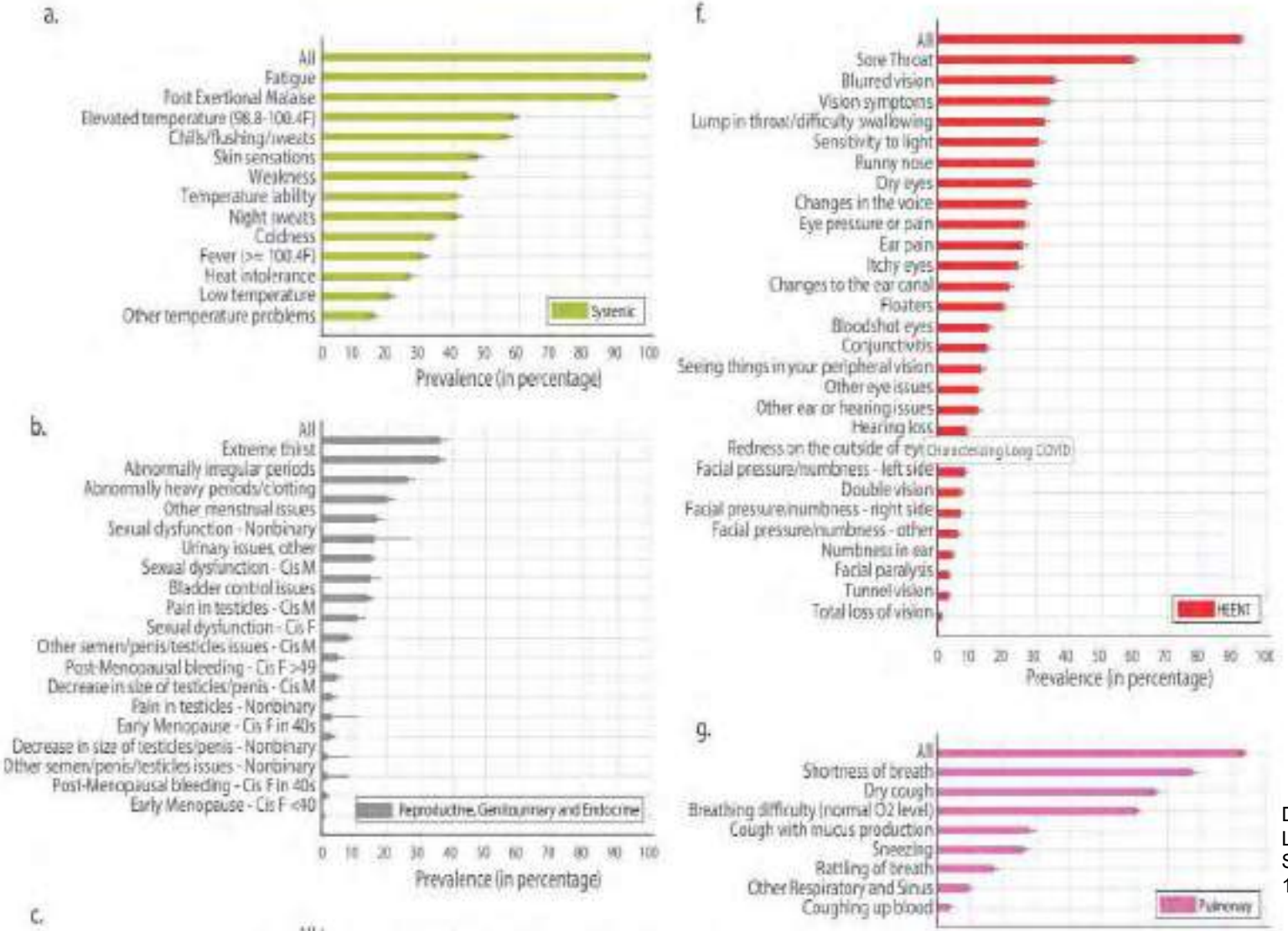


c. Average number of symptoms over time



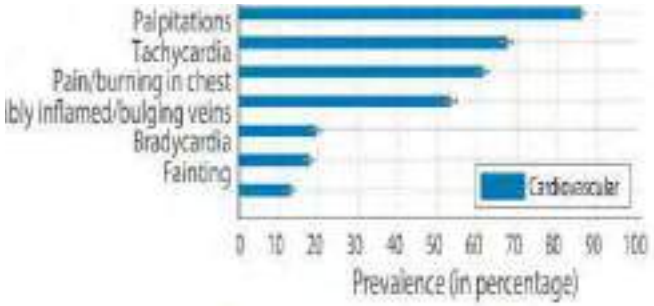
Davis HE, Assaf GS, McCorkell L, et al. Characterizing Long COVID in an International Cohort: 7 Months of Symptoms and Their Impact. medRxiv; 2020. DOI: 10.1101/2020.12.24.20248802.

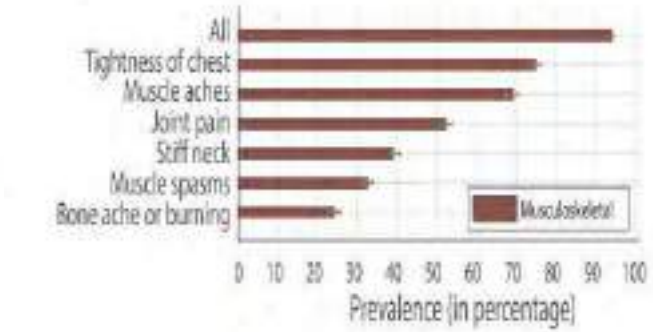
Appendix 2b – COVID Symptoms

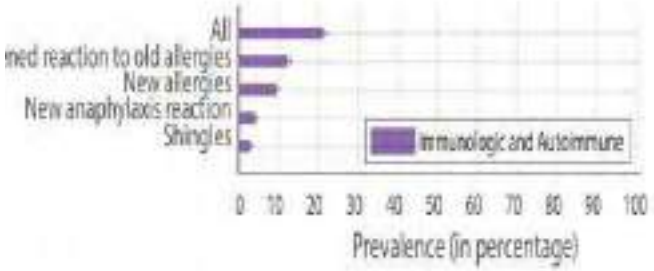


Davis HE, Assaf GS, McCorkell L, et al. Characterizing Long COVID in an International Cohort: 7 Months of Symptoms and Their Impact. medRxiv; 2020. DOI: 10.1101/2020.12.24.20248802.

Appendix 2c – COVID Symptoms







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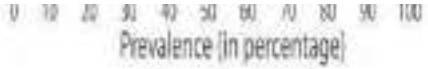

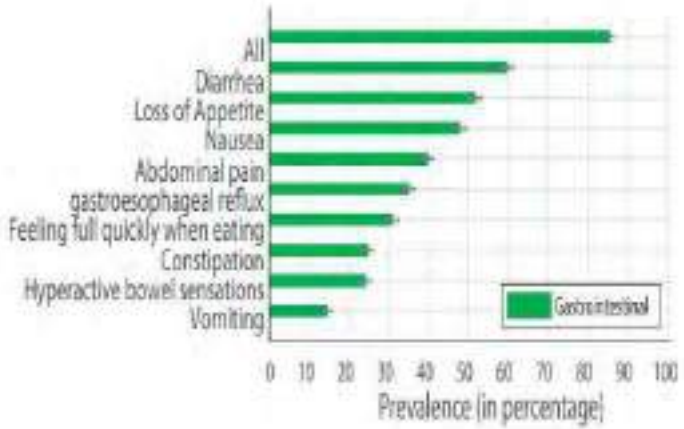

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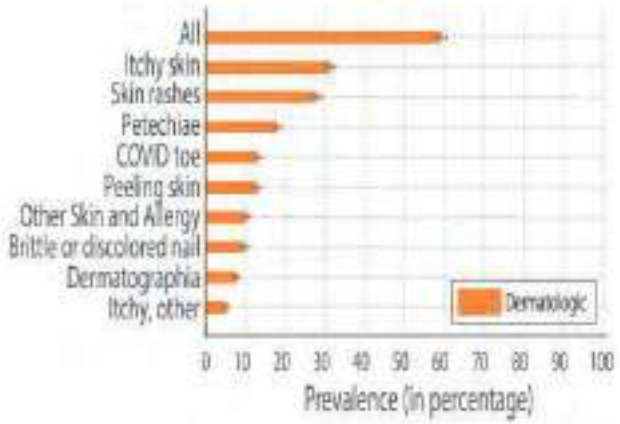

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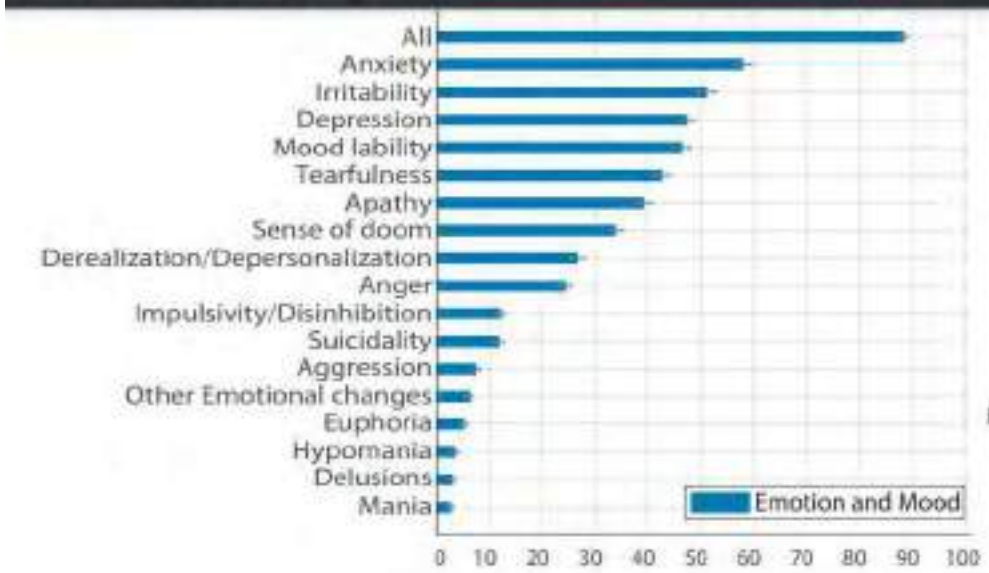
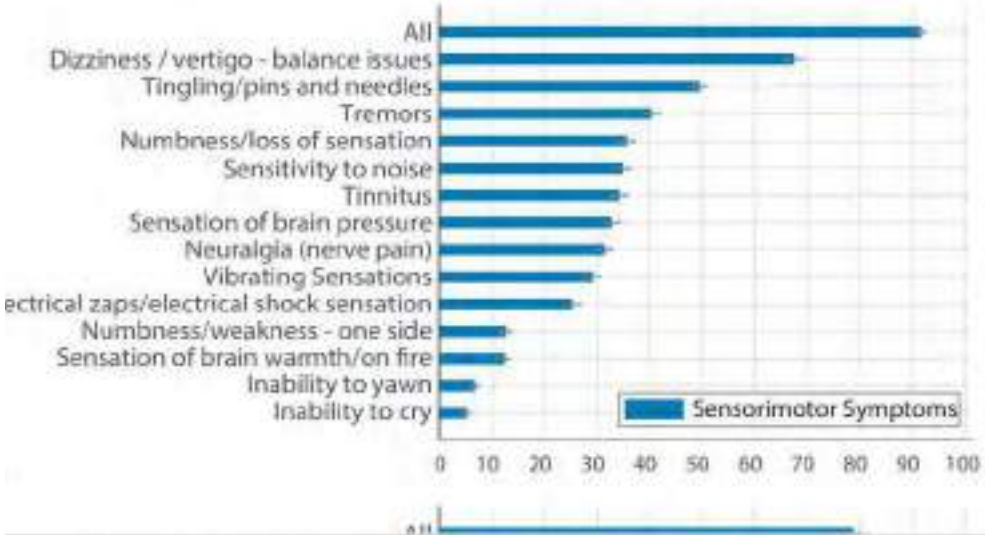
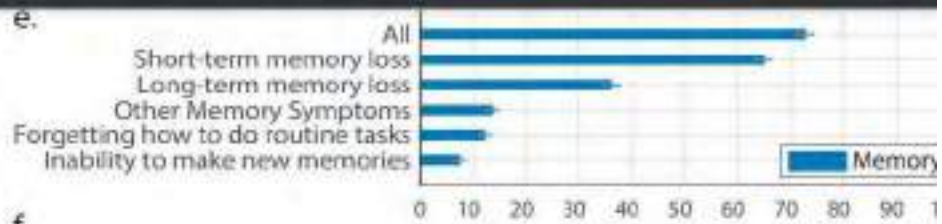
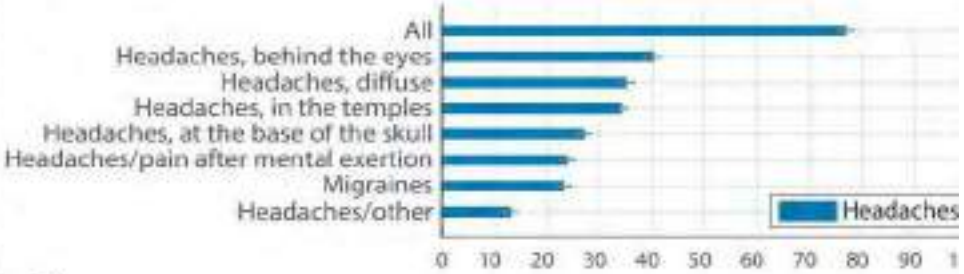
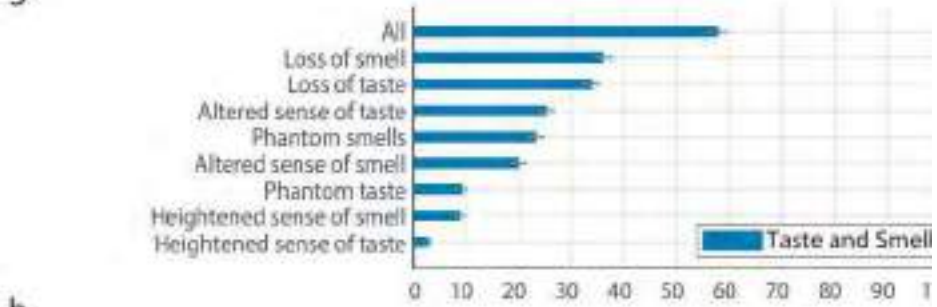
Appendix 2d – COVID Symptoms

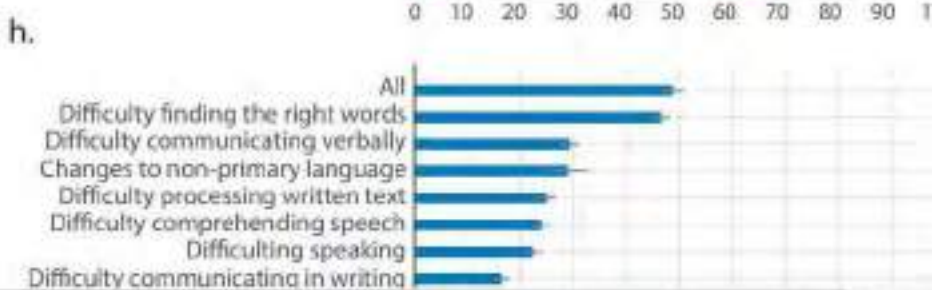












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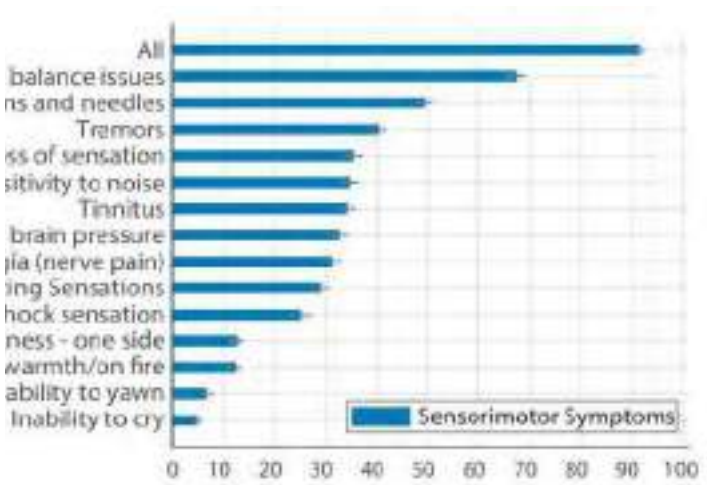
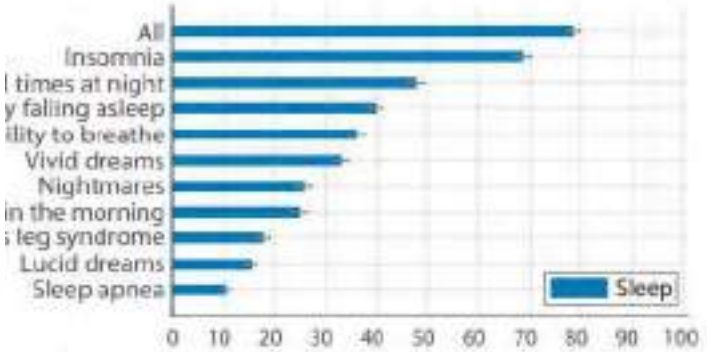
Appendix 2e – COVID Symptoms





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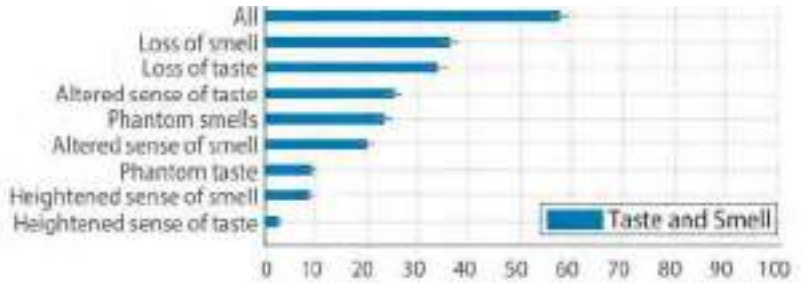

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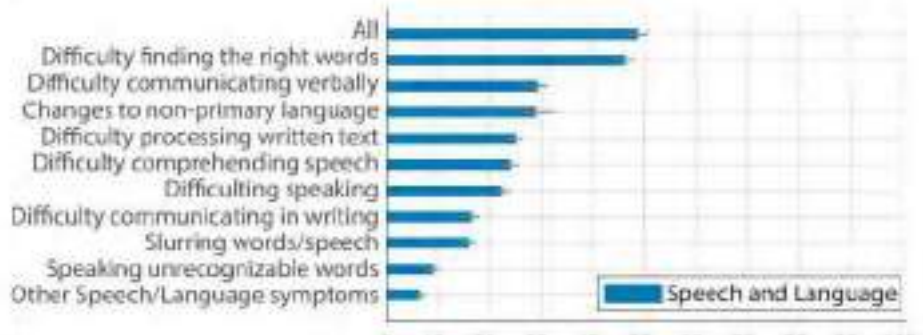

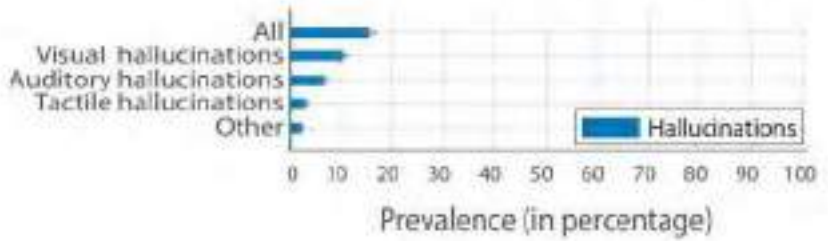

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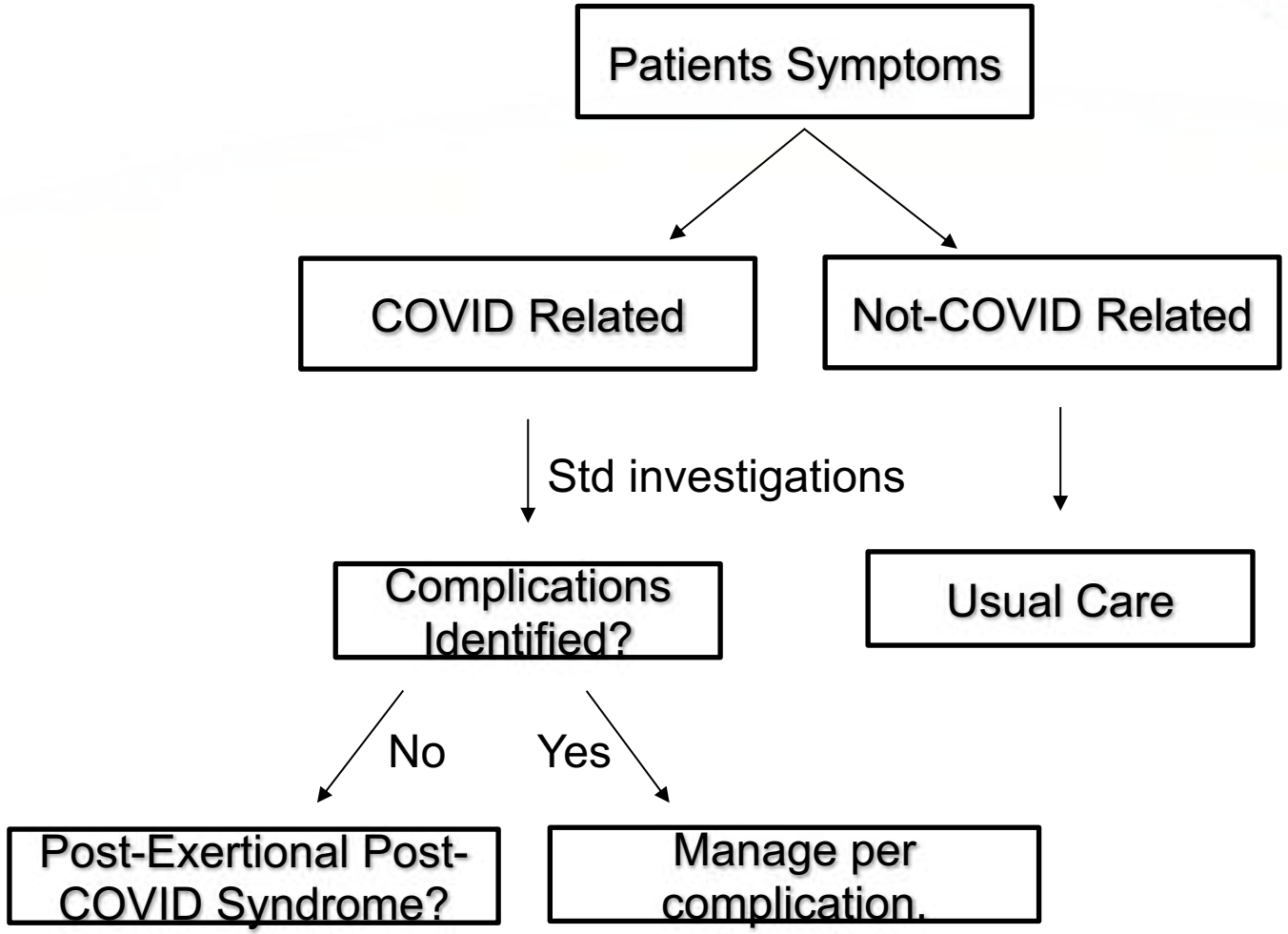
Appendix 3 – Possible Framework for Evaluation

- Patient Profiles
  - **Profile 1** – ICU admission
  - **Profile 2** – hospitalized
  - **Profile 3** –Non-Hospitalized, Persistent Symptoms > 12 weeks
  - **Profile 4** – Non-Hospitalized, Asx by 12 weeks.
  - **Profile 5** – Diagnosis unconfirmed, Persistent Symptoms

Appendix 4a - Approach to Management

- Are the Patients' Symptoms
  - COVID Related
  - Non-COVID Related

- Post-Exertional Post-COVID Syndrome is a diagnosis of EXCLUSION!!



Appendix 4b – Approach to Management

- Supportive Care
  - Education and Pattern Recognition
    - Trigger Identification
      - Physical
      - Cognitive
      - Emotional/social stress
    - Pacing guidance
    - Sleep Hygiene
    - Mindfulness Practise
  - Supportive Symptom Management
    - Pain
    - Dizziness
    - Insomnia
    - Etc

- Medical/Interventional Therapies
  - Pending Investigation

- Referrals
  - RACE line
  - Referral to Post-Covid Recovery Clinic.

Appendix 4c – Physical Activity Reintroduction guide

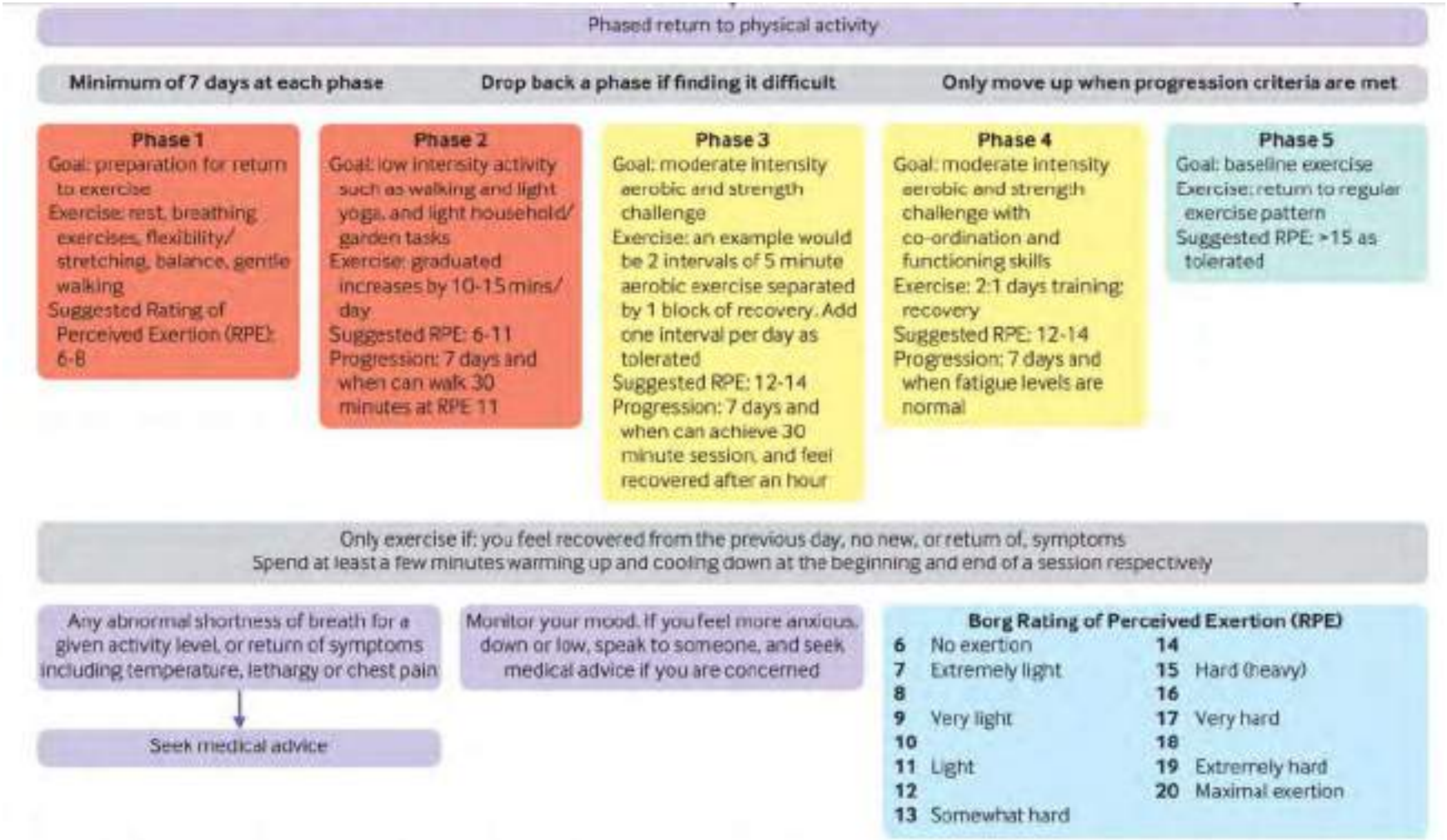


Fig 1 | Suggested return to physical activity after covid-19: risk stratification to exclude features suggestive of myocarditis or post-acute covid-19 and phased resumption o physical activity after 7 days without symptoms[28]

Appendix 5 – Standardized Questioinnaires

Post COVID-19
Interdisciplinary Clinical Care Network
Recovery | Care | Research | Education

Table 1.1

Questionnaire	3 mo	6 mo	12 mo	18 mo
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

Appendix 6 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

Case examples

During admission

57 year old male never-smoker
- Dyslipidemia
- Sore throat, headache, fevers/sweats → fatigue, exertional dyspnea → Adm x 3d
  - Nadir SpO_2 93% on 2L O_2, CRP 112
- Minimal fatigue (40 push-ups *vs*. 60)

70 year old male never-smoker
- HTN, Dyslipidemia
- Fatigue, fever, dyspnea, non-productive cough → Adm x 5 weeks
  - Intubated for 22d
- Wheelchair-bound since discharge

70 year old female never-smoker
- T2DM, dyslipidemia
- Fatigue, fever, headache → Adm x 10d
  - Nadir SpO_2 96% on 3L O_2, CRP 234
- Feels back to her baseline, but limited exercise being done thus far

Case examples

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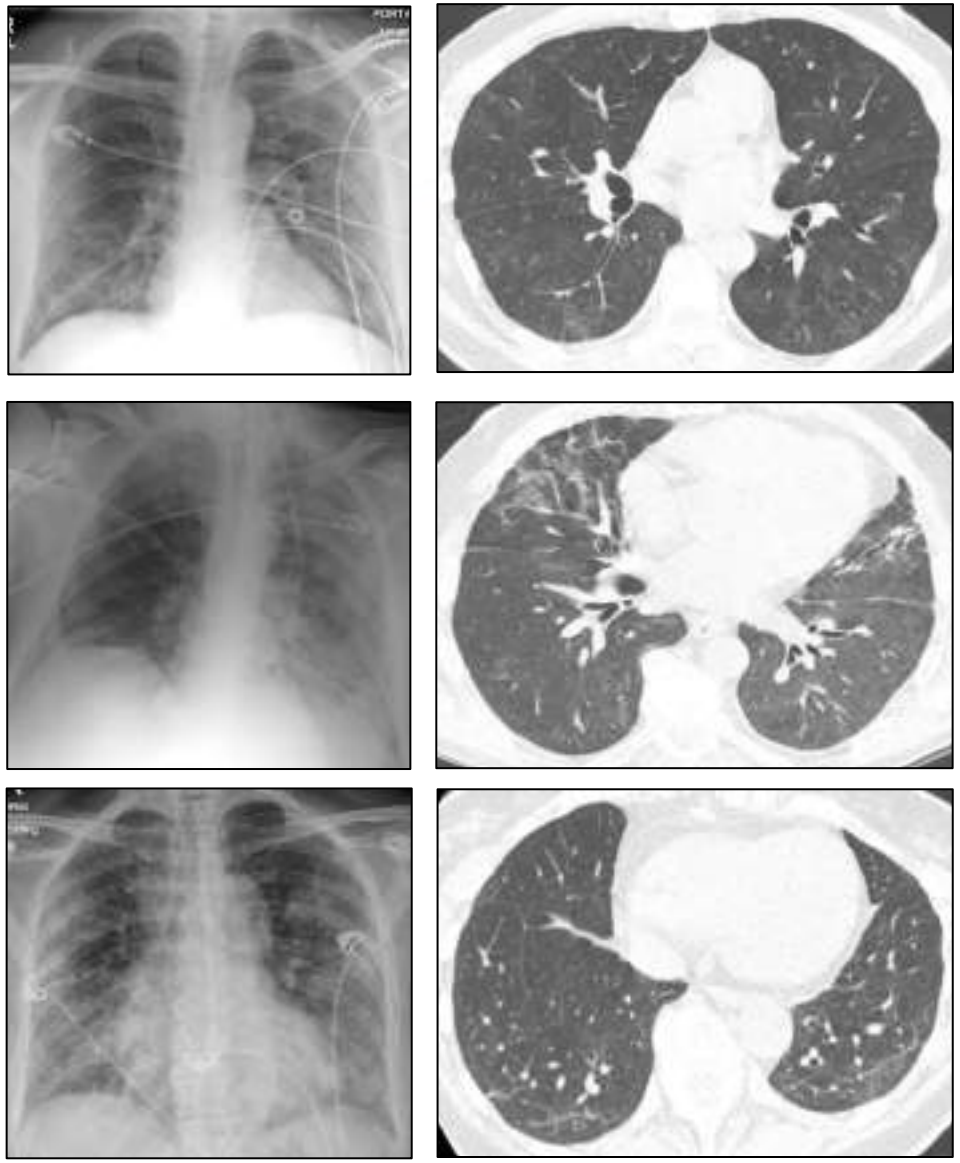
During admission | 3 months



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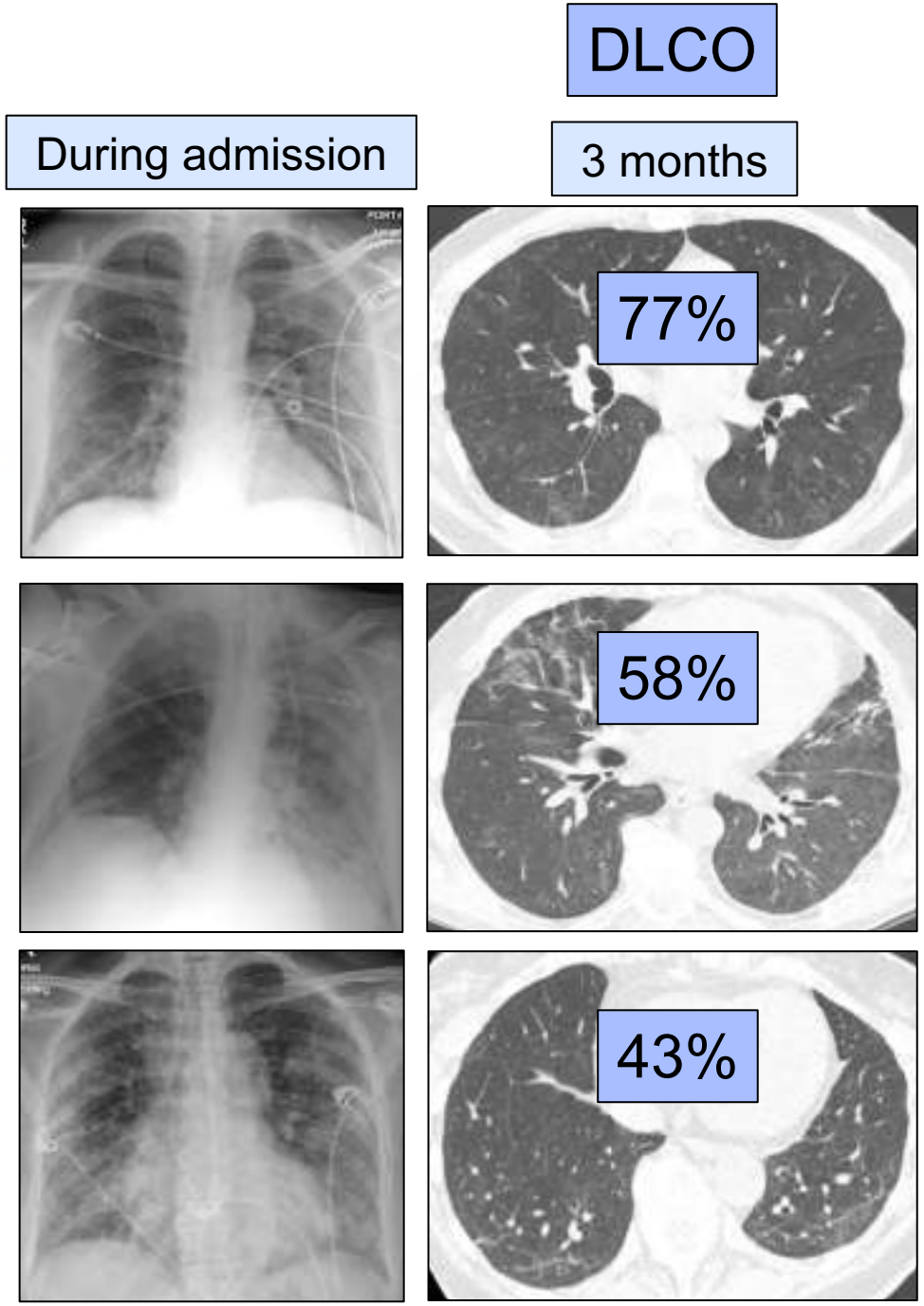

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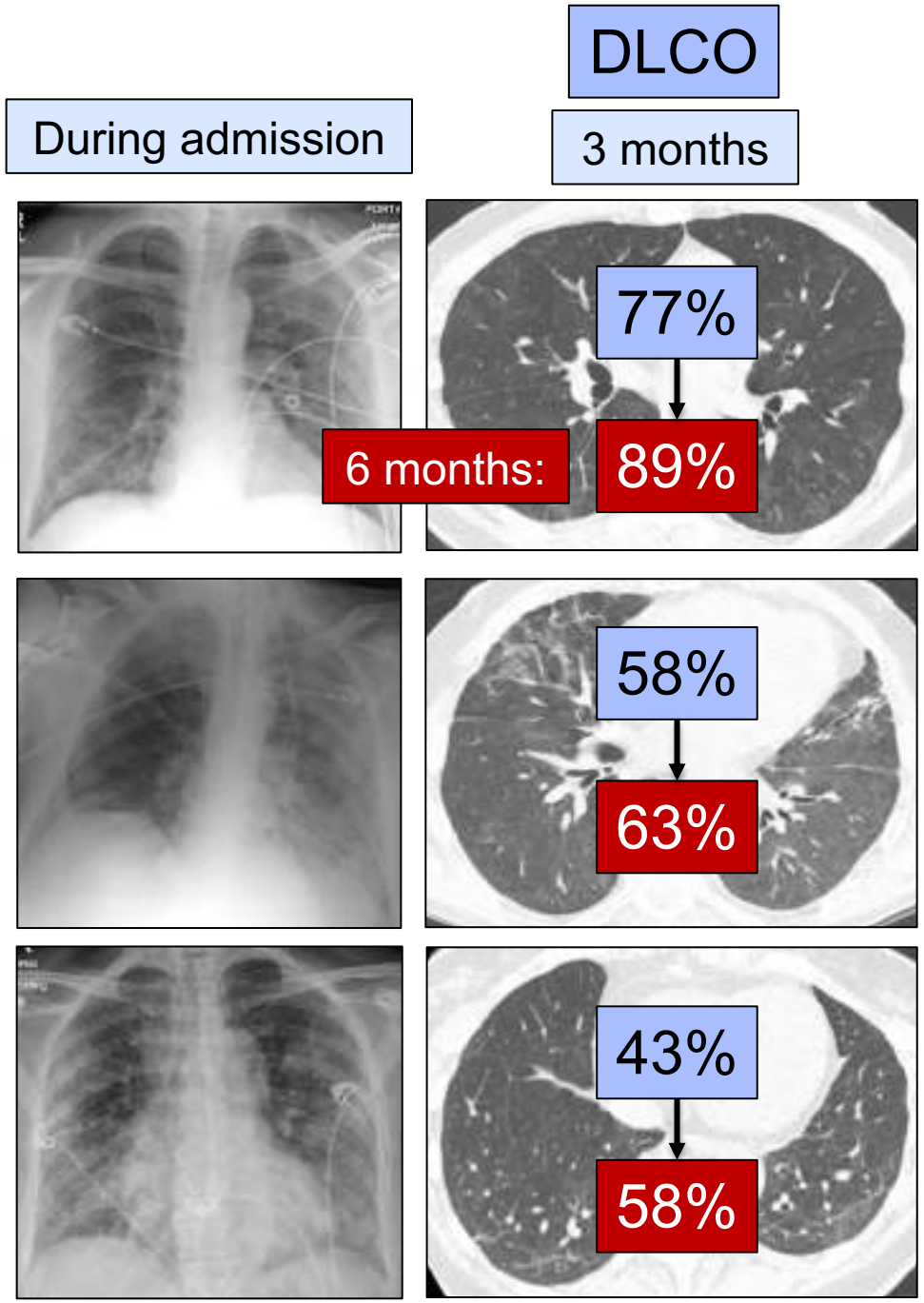

Anxiety screen (GAD-2)

How often have you been feeling nervous, anxious or on edge?

- **Not at all 0**
- **Several days 1**
- **More than half of the days 2**
- **Nearly every day 3**

How often have you not been able to stop or control your worrying?

- **Not at all 0**
- **Several days 1**
- **More than half of the days 2**
- **Nearly every day 3**

Positive screen is ≥ 3 Total

Depression screen (PHQ-2)

How often have you experienced little interest or pleasure in doing things?

- **Not at all 0**
- **Several days 1**
- **More than half of the days 2**
- **Nearly every day 3**

How often have you been feeling down, depressed or hopeless?

- **Not at all 0**
- **Several days 1**
- **More than half of the days 2**
- **Nearly every day 3**

Positive screen is ≥ 3 Total

Substance use screen (CAGE-AID)

Have you ever felt that you ought to cut down on your drinking or drug use?

Yes or No

Have people annoyed you by criticizing your drinking or drug use?

Yes or No

Have you ever felt bad or guilty about your drinking or drug use?

Yes or No

Have you ever had a drink or used drugs first thing in the morning to steady your nerves or to get rid of a hangover?

Yes or No

Positive screen is at least 1 Yes

Obsessive-compulsive screen (MINI)

Have you had frequent unwanted thoughts that seem difficult to control?

Yes No Maybe / Not Sure

Have you felt an urge that was difficult to control to repeat actions (e.g., washing, checking)?

Yes No Maybe / Not sure

Positive screen is at least 1 Yes or Maybe / Not Sure

Mania screen (MINI)

Have you noticed periods lasting at least 2 days when you felt very happy or irritable?

Yes No Maybe / Not Sure

Have your noticed periods lasting at least 2 days when you felt full of energy for most of the day?

Yes No Maybe / Not Sure

Positive screen is at least 1 Yes or Maybe / Not Sure

Psychosis screen (MINI)

Have you thought that other people are plotting against you or are trying to hurt you

Yes No Maybe / Not Sure

Have you noticed any unusual experiences – like hearing or seeing things other people couldn't or when other people are not present?

Yes No Maybe / Not Sure

Positive screen is at least 1 Yes or Maybe / Not Sure

PTSD screen (PC-PTSD-5)

The following questions refer specifically <u>to any traumatic experiences you may have ever had</u> including your hospital stay for COVID19 disease or any other traumatic event – During the last 2 weeks have you…

Had nightmares about the event(s) or thought about the event(s) when you did not want to?

Yes or No

Tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?

Yes or No

Been constantly on guard, watchful, or easily startled?

Yes or No

Felt numb or detached from people, activities, or your surroundings?

Yes or No

Felt guilty or unable to stop blaming yourself or others for the events(s) or any problems the event(s) may have caused?

Yes or No

Positive screen is at least 3 Yes

Treatment – Key Points

- Chronic symptoms following COVID19 infection may be common and often include low mood and heightened anxiety.
- A bidirectional relationship between mental and somatic symptoms may complicate recovery; a holistic approach is needed to support patients with “long-COVID”.
- The majority of long-COVID patients with mental health symptoms do not meet DSM5 criteria for a psychiatric disorder, but patients should still be supported in managing these symptoms to facilitate recovery.
- For patients that had COVID19, assess & manage new or recurrent psychiatric disorders per normal guidelines.

Treatment – Key Points

Assessment

- Screen for mood disorders, anxiety disorders, substance use disorders, and PTSD
- Screen for ideation of homicide, self-harm, or suicide.

Management

- As best as possible, address other common physical symptoms of long-covid that may contribute to mental health symptoms. Recommend pacing strategies (similar to those suggested for ME/CFS or post-concussion) as appropriate.

- If not meeting DSM5 criteria, offer reassurance and consider recommending non-pharmacological management such as meditation, exercise, referral to psychotherapy, and digital patient resources (see suggestions below).

- If meeting DSM5 criteria, manage per regular guidelines (including pharmacologic & non-pharmacologic treatments).

Treatment – Key Points

Web Resources

- Anxiety Canada - COVID19: www.anxietycanada.com/covid-19/
- Here to Help - COVID19: www.heretohelp.bc.ca/infosheet/covid-19-and-anxiety
- Foundry (for Ages 12 - 24): www.foundrybc.ca/covid19/
- Calm - Videos for meditation & relaxation: www.youtube.com/c/calm

Mobile Apps (Free for iOS & Android - Be sure to enable notifications/reminders where available!)

- Mindshift CBT (Anxiety focus)
- COVID Coach
- Woebot (Chatbot)
- Wysa (Chatbot & *optional* paid chat therapist)
- Breathr
- Mindfulness Coach
- Insomnia Coach

https://www2.gov.bc.ca/gov/content/health/managing-your-health/mental-health-substance-use/virtual-supports-covid-19

Stress management strategies

Stay Connected
- Although we are practicing social distancing, connect with friends and family online, by text and on the phone.

Maintain a Routine
- Self-isolation can be boring and difficult. Set a routine that gives your day some structure.
- If you are confined with others, plan with them what you will do with the time together and ensure you each plan for some alone time each day.
- Use your time in a way that feels meaningful to you and your family members.

Self-care
- Be gentle with yourself, and remember stress and anxiety are normal reactions these circumstances and that there are some things happening beyond your control.
- Explore self-management strategies like mindfulness, yoga, creative expression, journaling and exercise.
- Eat as well as possible, drink lots of water, get enough sleep, and make time for the activities and hobbies you enjoy.
- Try to relax and take it one day at a time.
- Stay informed but avoid spending too much time on the news, instead check in periodically and get only the updates and information you need.

- Adapted from Canadian Mental Health Association