

Post-acute sequelae of COVID-19

Respiratory and Rehabilitation Communities of Practice

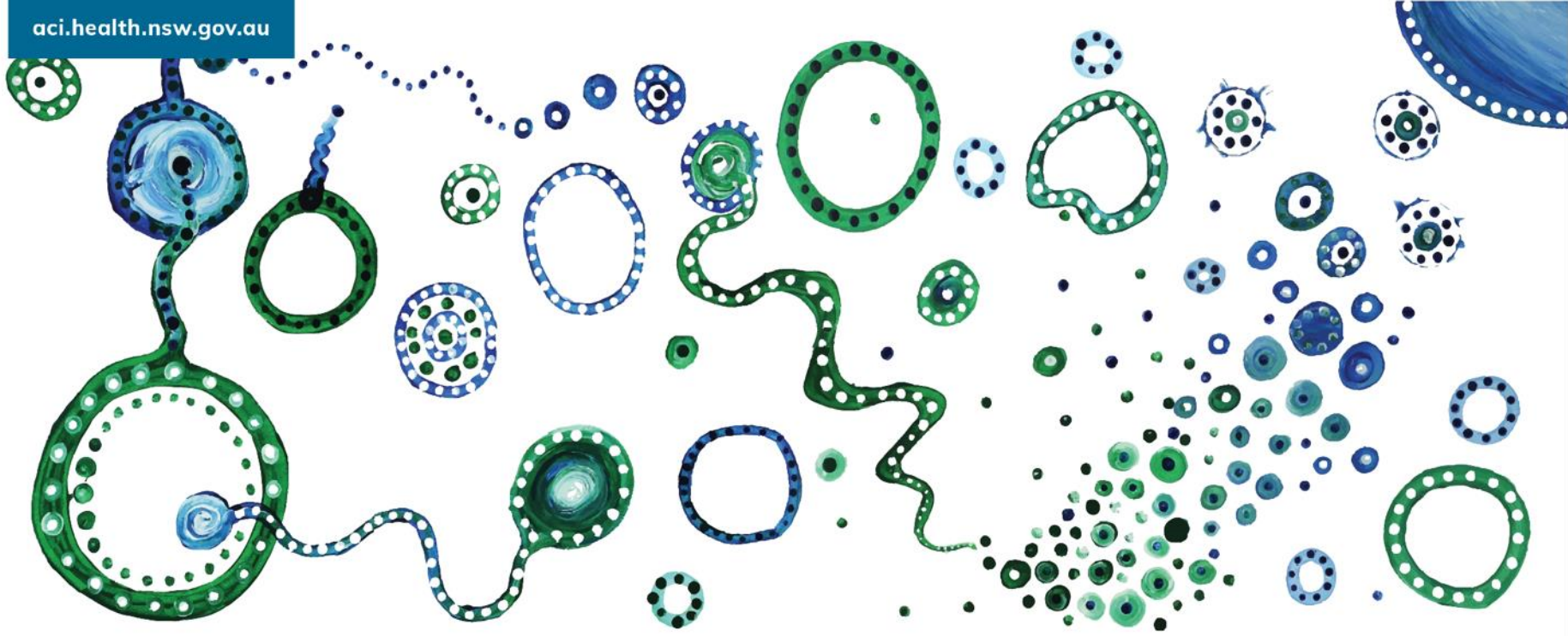
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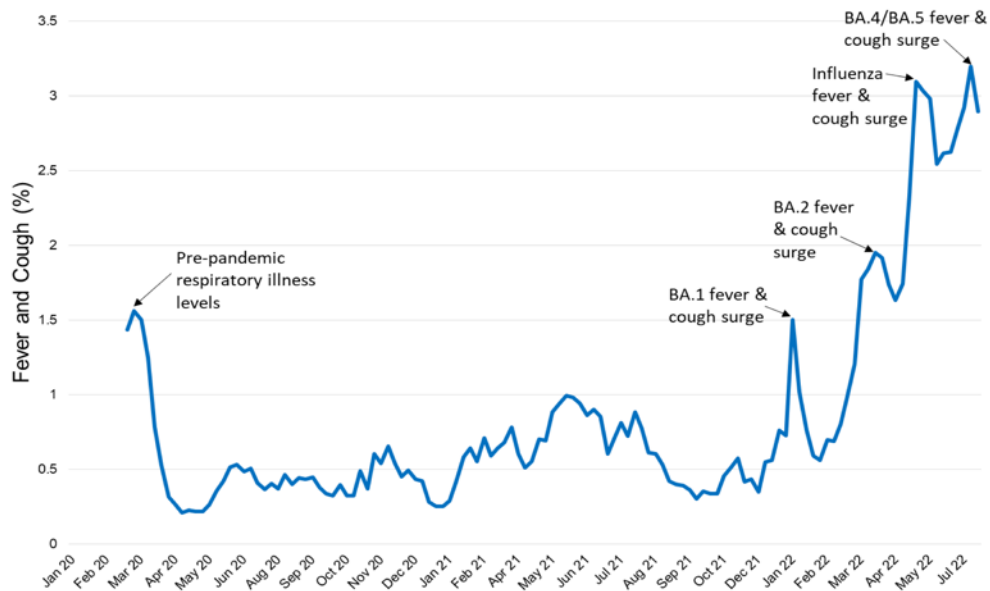


ACI acknowledges the traditional owners of the land that we work on.

We pay our respect to Elders past and present and extend that respect to other Aboriginal peoples present here today.

Acute COVID-19 in 2022

Figure 1. Percentage of Flutracking participants nationally with fever and cough, 2020 to 17 July 2022.



NSW hospitalisations with acute COVID-19 2022

Figure 1. Daily seven-day rolling average of people with COVID-19 admitted to hospital within 14 days of their diagnosis, NSW, 1 January to 03 September 2022

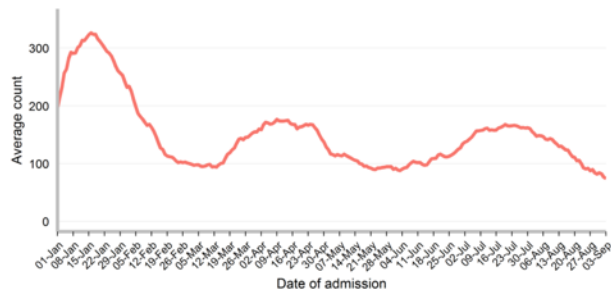
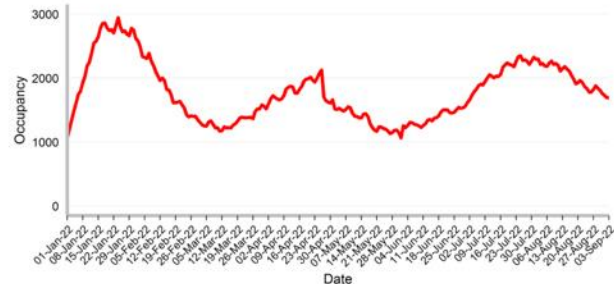


Figure 3. Number of people in hospital with COVID-19 by day, NSW, 1 January to 03 September 2022



Clinical practice guide for assessment and management of adults with post-acute sequelae of COVID-19

Guidance for NSW health clinicians, ACI Clinical practice guide



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- Publication due this week
- Document informed by clinical expertise and current evidence based including rapid evidence checks by CIU
- Intended for NSW health clinicians and primary care – patient may present with symptoms in a variety of settings
- Symptoms persisting > 3 months post-diagnosis – consistent with WHO and NICE definitions of PASC
- Lists the top 10 symptoms – how they present, assessment tools, recommendations for management and referral. Includes where immediate or urgent referral required.
- To be integrated with the existing “Post-COVID-19 conditions” HealthPathway

DRAFT THIS DOCUMENT HAS NOT BEEN APPROVED FOR PUBLISHING DRAFT
aci.health.nsw.gov.au

Clinical practice guide for assessment and management of adults with post-acute sequelae of COVID-19

Guidance for NSW health clinicians

This clinical practice guide is intended for use by clinicians in primary health networks and local health districts, as well as primary care practitioners across NSW who provide care to adults aged 16 years and older with a history of COVID-19 diagnosis, regardless of severity or COVID-19 variant of concern.

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Definition of 'post-acute sequelae of COVID-19'

Post-acute sequelae of COVID-19 (PASC), also referred to as 'post-acute COVID-19 condition', 'post COVID-19 syndrome' or colloquially as 'long COVID' is defined by the World Health Organization as:

"the condition that occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually:

- **three months** from the onset of COVID-19, AND
- with symptoms that last for at least **two months** and cannot be explained by an alternative diagnosis.

Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be onset following initial illness. Symptoms may also fluctuate or relapse over time" (emphasis added).

ACI/19/054/003 | SUPPLY/ACI/22/007 | 876 4 19023 474 6 | 1904ACI02/21/18

Clinical Case Definitions

- **Acute COVID-19** – Signs and symptoms for up to 4 weeks
- **Ongoing symptomatic COVID-19** – Signs and symptoms from 4 weeks up to 12 weeks
- **Post COVID-19 Syndrome (also known as “long COVID”, “post-COVID-19 condition” or “post-acute sequelae of COVID-19”)**

*“the condition that occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, **usually three months from the onset of COVID-19 with symptoms that last for at least two months and cannot be explained by an alternative diagnosis.** Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be onset following initial illness. Symptoms may also fluctuate or relapse over time” [emphasis added].*

What we do (and don't) know about PASC

- The evidence base on the signs, symptoms and treatment of PASC is an evolving area which will continue to grow
- Research to date is largely limited to pre-Omicron strains (Omicron first reported in November 2021)
- Pre-Omicron, the reported rate of PASC ranged from 43-63% with a higher PASC estimated amongst those hospitalized during the acute phase of illness.
- Vaccination has a protective effect – incidence and severity of PASC is reduced in vaccinated people.

Factors that increase the risk of PASC

- Hospitalisation or severity of symptoms during the acute phase of illness
- Age > 65
- Pre-existing frailty
- Comorbidities, particularly chronic lung disease and diabetes
- Obesity
- Vaccination status
- Increase of inflammatory markers during acute phase
- Female sex

Why do people get ongoing symptoms?

- The mechanisms that lead to PASC are still poorly understood and under ongoing study – may be singular or multifactorial.
- Possible causes include:
 - organ dysfunction as a consequence of the acute illness
 - a persistent hyper-inflammatory state
 - cerebrovascular disease
 - cerebral hypoxia
 - adverse effects of medications such as sedatives or neuromuscular blockade
 - physical deconditioning
 - pre-existing comorbidities and psychological sequelae.

Symptoms may fluctuate and change in nature over time.

The top 10 most frequently reported symptoms

NB – prevalence varies between studies. Listed in no particular order

1. Fatigue
2. Breathlessness
3. Cough
4. Depression and anxiety
5. PTSD
6. Cognitive impairment (“brain fog”)
7. Joint and muscle pain
8. Mobility impairment
9. Palpitations and chest pain
10. Loss of taste and/or smell

PHOSP-COVID

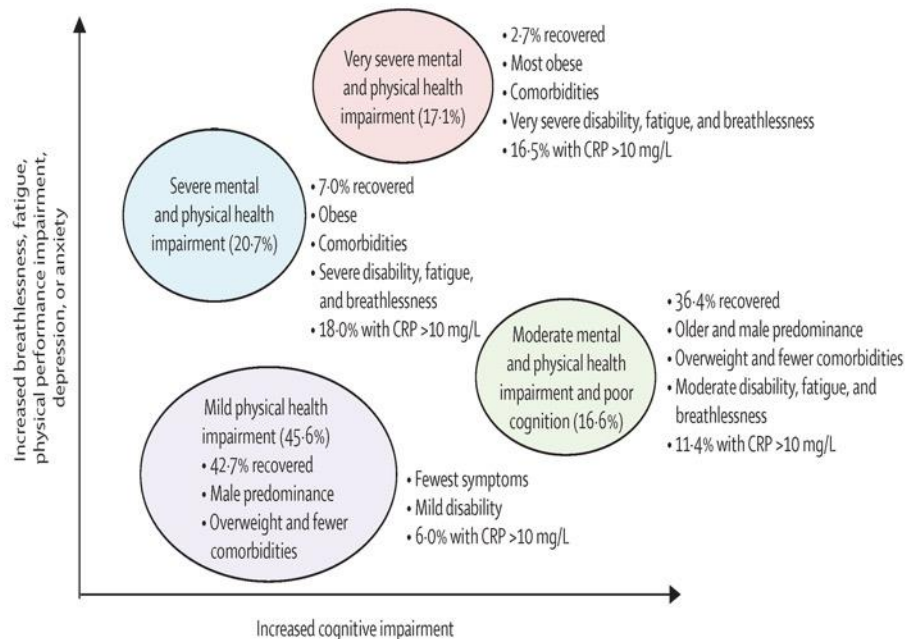
- 20 UK NHS trusts, from July 2020
- Analysis of 2320 at 5 months and 807 at 12 months
- Approx 40% of all admissions with COVID-19 (likely selection bias)

Recovered	5 months	12 months
Yes	25%	28.9%
Not sure	19.6%	22.4%
No	54.9%	48.8%

	One-year visit
Any symptoms	94.6%
Number of symptoms	9 (4-17)
Fatigue	60.1%
Aching in your muscles (pain)	54.6%
Physical slowing down	52.9%
Sleep disturbance	52.3%
Breathlessness	51.4%
Joint pain or swelling	47.6%
Slowing down in your thinking	46.7%
Pain	46.6%
Short term memory loss	44.6%
Limb weakness	41.9%

orative Group; Lancet Respir Med. 2022 Apr 22:S2213-2600(22)00127-8.

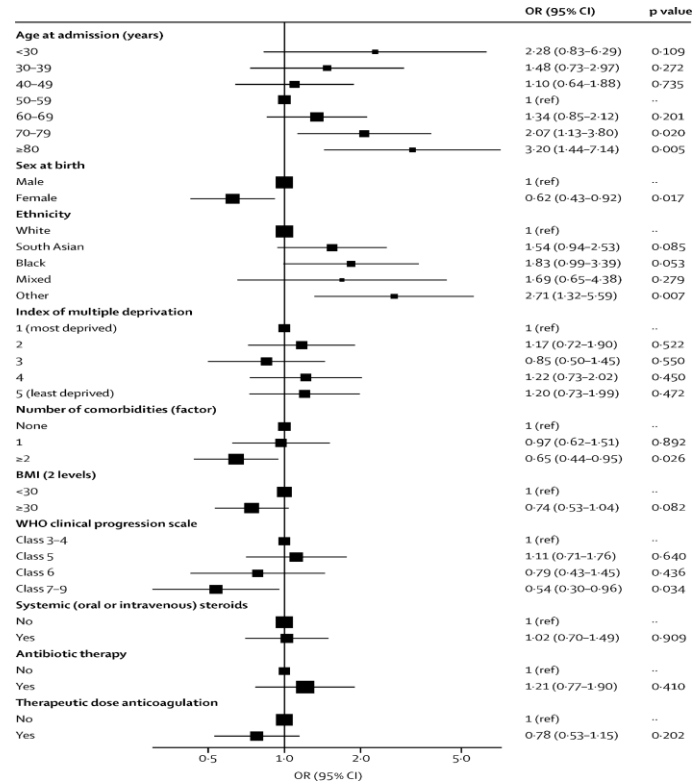
Multidimensional face of PASC



First 1000 assessed at 6 months.

The Lancet Respiratory Medicine 2021 9:1275-1287 DOI: (10.1016/S2213-2600(21)00383-0)

Factors associated with worse recovery at 6 months



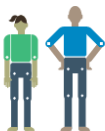
UK model integrated primary care

Tier 1	on line support for self management of long covid symptoms
Tier 2	Management in General Practice with specialist phone support
Tier 3	GP/Specialist/Allied Health/Nursing run hospitals consults with presentation to a MDT of specialists from panel of specialists
Tier 4	only one Hospital in Greater Manchester super specialised panel with capacity to admit and specialty clinics eg CFS clinic (referral only from tier 3)
Overall principle	A single individual can be managed in a number of tiers simultaneously eMR

The importance of self-management



Support for Rehabilitation Self-Management after COVID-19- Related Illness



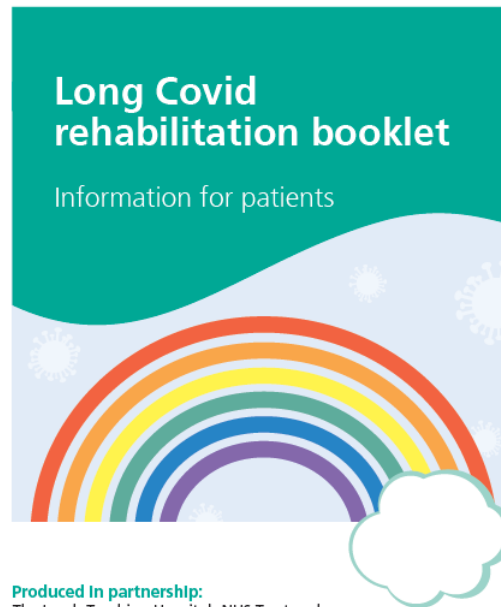
Name: _____

Discharge date: _____

Hospital where treated: _____

Healthcare professional providing leaflet: _____

Name and contact of local healthcare professional: _____



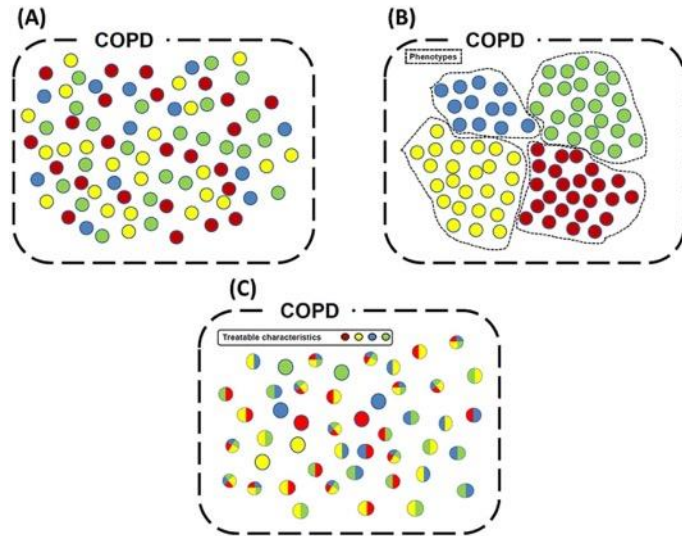
Produced in partnership:
The Leeds Teaching Hospitals NHS Trust and
Leeds Community Healthcare NHS Trust

Where to now?

1. Structure and standardization;
 - a) Models of care that are themed to clinical problems (ie breathlessness, rehabilitation, cognition/neurological, psychosocial).
 - b) Evidence based approach to assessment and management
2. Access (A hierarchical approach)
 - a. Self management
 - b. Primary care and secondary care
 - c. Distribution and access to services
 - d. Challenges of social deprivation, chronic disease and minority groups
3. A culture to learn from experience and develop the evidence base for intervention.

A complex problem with solutions

Identifying traits that are treatable



1. Assess each individual and their multiple symptoms/impairments
2. Apply sensible diagnostics and investigations
3. Identify traits that are treatable and assess severity
4. A hierarchical approach to management
 - Self management
 - Leverage & refer to services currently available
 - Those most impaired dedicated specialist services

Agusti et al <http://dx.doi.org/10.1136/thoraxjnl-2014-205507>

Assessing breathlessness post COVID-19



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The top 10 most frequently reported symptoms

NB – prevalence varies between studies. Listed in no particular order

1. Fatigue
2. **Breathlessness**
3. Cough
4. Depression and anxiety
5. PTSD
6. Cognitive impairment (“brain fog”)
7. Joint and muscle pain
8. Mobility impairment
9. **Palpitations and chest pain**
10. Loss of taste and/or smell

Breathlessness and palpitations and chest pain most likely to present to ED

Breathlessness

- Ongoing breathlessness occurs in 14.2 – 37% of people
- May be continual or on exertion
- Does not always directly correlate with measures of respiratory function but can still be debilitating
- Considerations:
 - Severity of acute illness
 - Acute complications
 - Level of respiratory support required during the acute illness e.g. use of NIV
 - Review comorbid cardiac or respiratory disease

Persistent breathlessness

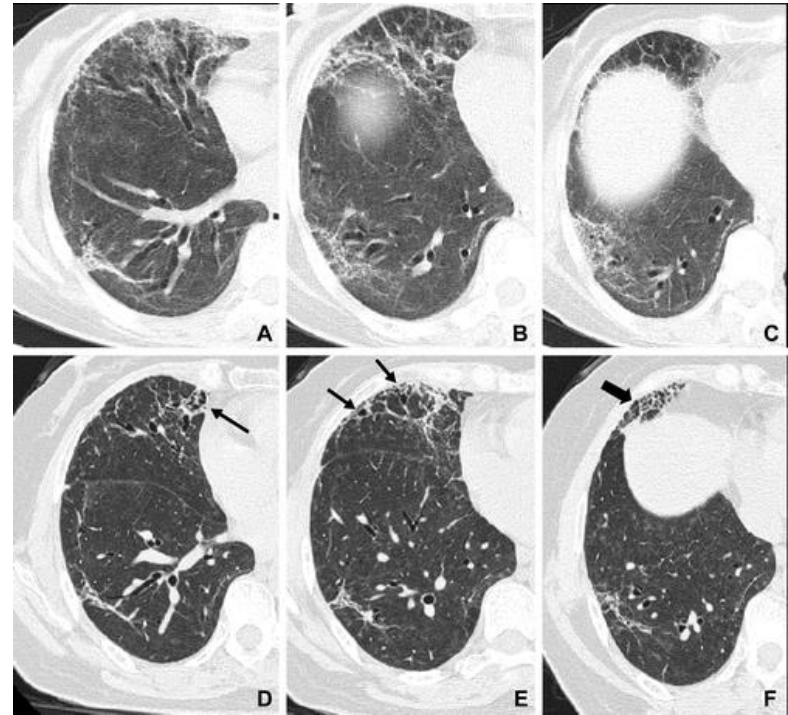
- Dyspnea 38 studies (median [IQR], 29.7%; [14.2%-37.0%]), and
- Cough 26 studies (median [IQR], 13.1% [5.3%-22.6%])
- Lung function abnormalities
 - Pulmonary diffusion abnormalities (DLCO) (4 studies; median [IQR], 30.3% [22.1%-38.5%])
 - Restrictive spirometry (3 studies; median [IQR], 10.0% [6.1%-24.1%])
 - Ground glass opacification (7 studies; median [IQR], 23.1% [19.7%-43.0%])

Goff et al JAMA 2021

HRCT changes and COVID-19

Serial CT scans 46yr woman with severe acute COVID-19. A–C, day 32 after symptom onset show multiple ground-glass opacities and interstitial thickening with mild cylindrical traction bronchiectasis

D–F, Scans obtained on day 198 show partial absorption of the abnormalities, reduced extension, traction bronchiectasis



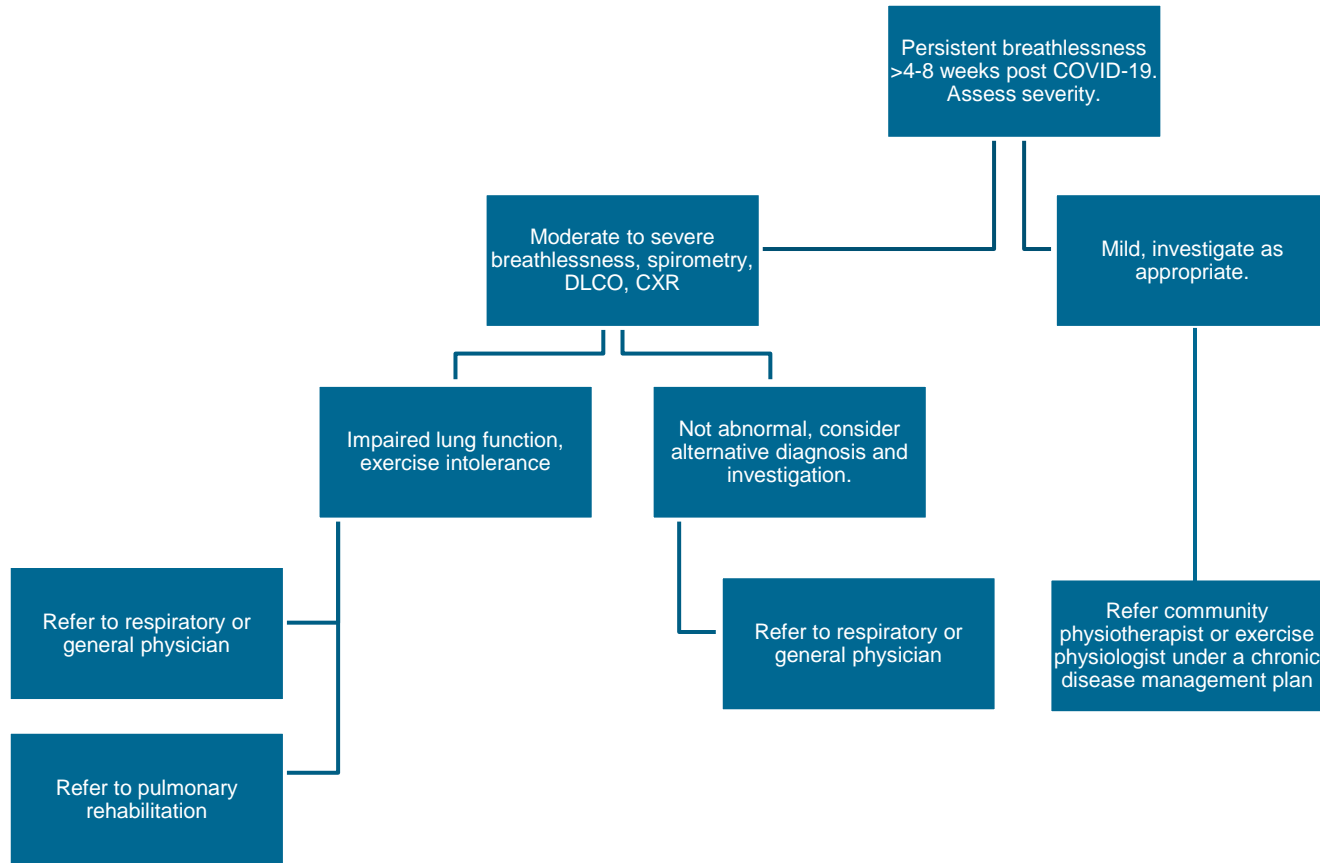
Six-month Follow-up Chest CT Findings after Severe COVID-19 Pneumonia
Xiaoyu Han, Yanqing Fan, Osamah Alwalid, Na Li, Xi Jia, Mei Yuan, Yumin Li, Yukun Cao, Jin Gu, Hanping Wu, and Heshui Shi
Radiology 2021 299:1, E177-E186

Persistent breathlessness-HRCT chest should not be needed in most and can be misleading

UKILD cohort

- N=3702, 240 days post discharge
- Assessed spirometry, DLCO and CXR risk of ILD then HRCT
- 6.9% were at high risk ILD
- 85% CT scans demonstrated ILD
- Risk of an abnormal CT
 - Severe acute pneumonitis
 - DLCO<80pp
 - Abnormal CXR

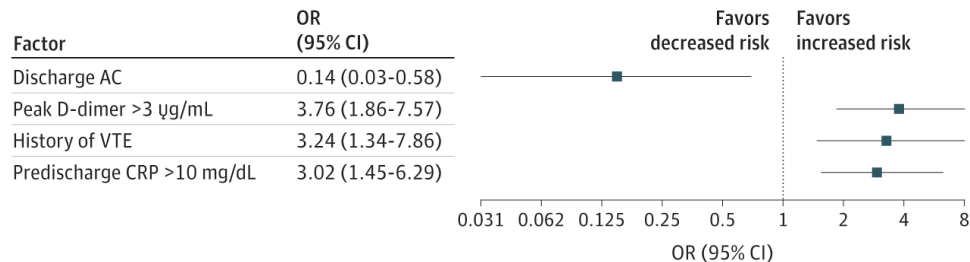
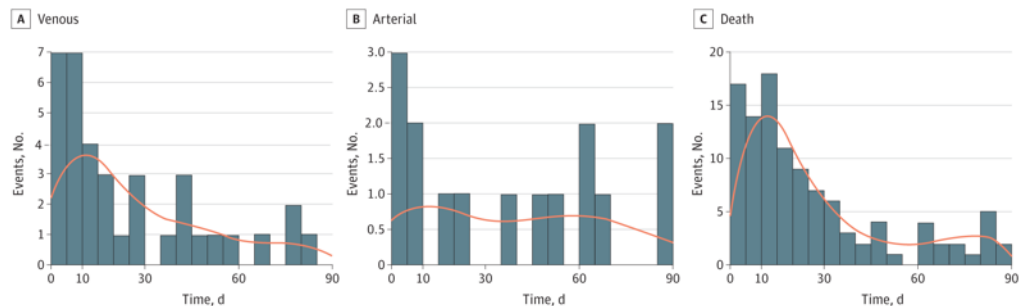
<https://www.medrxiv.org/content/10.1101/2022.03.10.22272081v1>



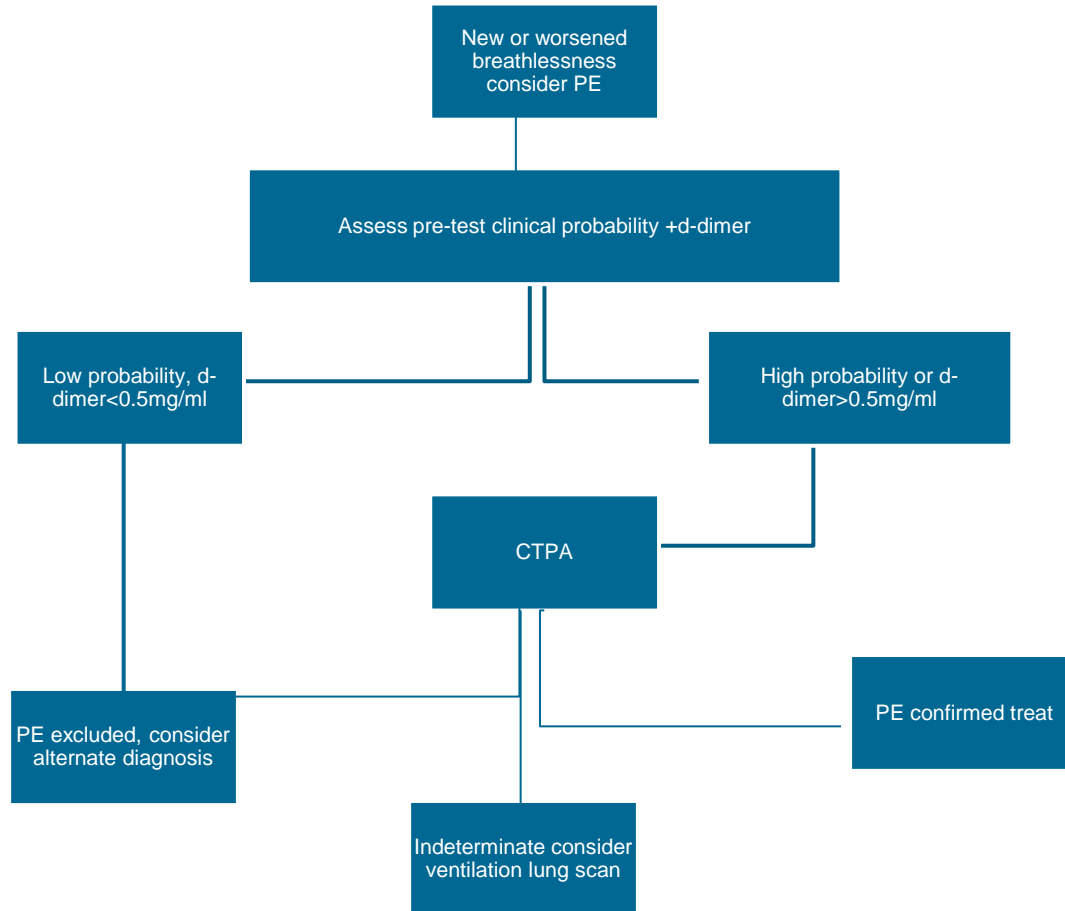
New or worsened dyspnoea, Pulmonary embolism?

Li et al JAMA Netw Open. 2021;4(11):e2135397. doi:10.1001/jamanetworkopen.2021.35397

- N=2832, post hospitalized COVID-19
- Up to 90 days post discharge
- 1.3% post-discharge venous thromboembolic events (16 PE, 18 DVT, and 2 portal vein thrombosis)
- Risk increased,
 - history of PE/DVT
 - Predischarge CRP>10 or d-dimer>3.0.
- Reduced with discharge anticoagulation



PE?



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