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Post-acute sequalae of COVID-19

Presentation to ED Community of Practice – 16 March 2022

Respiratory and Rehabilitation Communities of Practice
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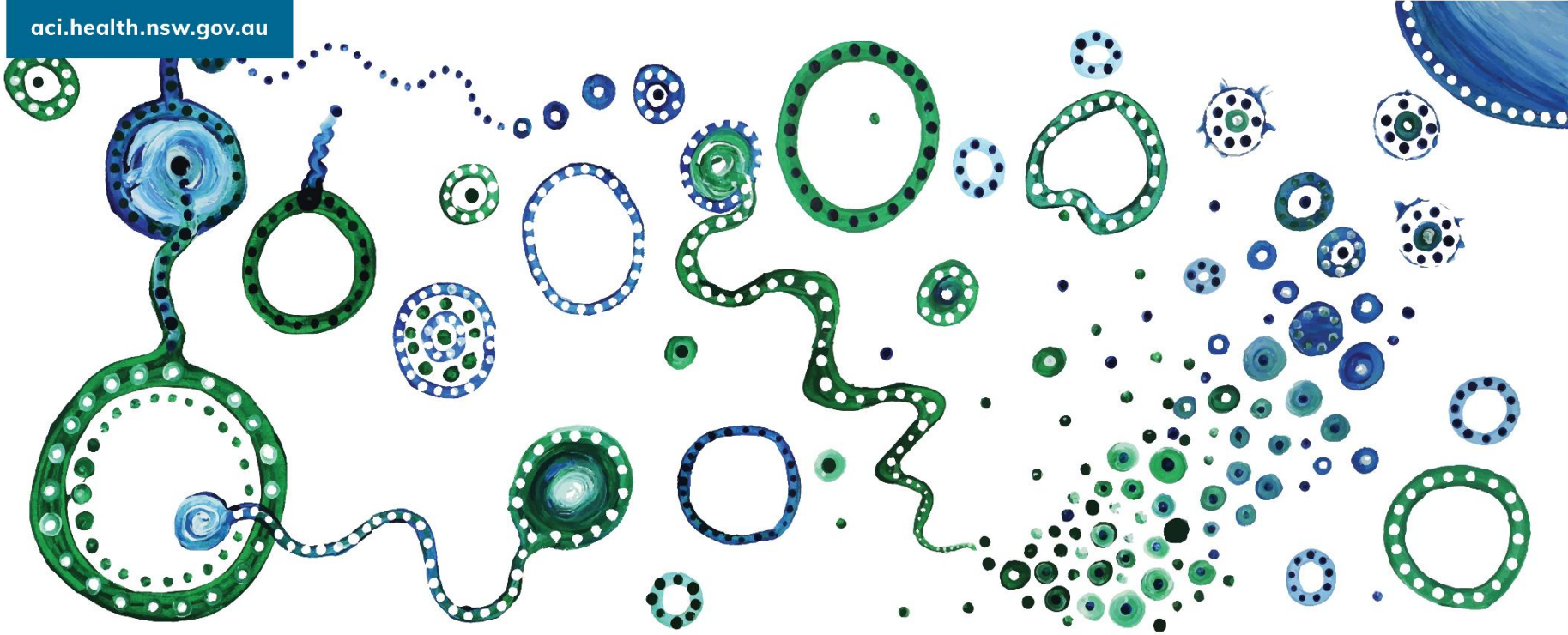


ACI acknowledges the traditional owners of the land that we work on.

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

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 asthma 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 *Clinical Practice Guide* - scope and intended audience

- 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

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

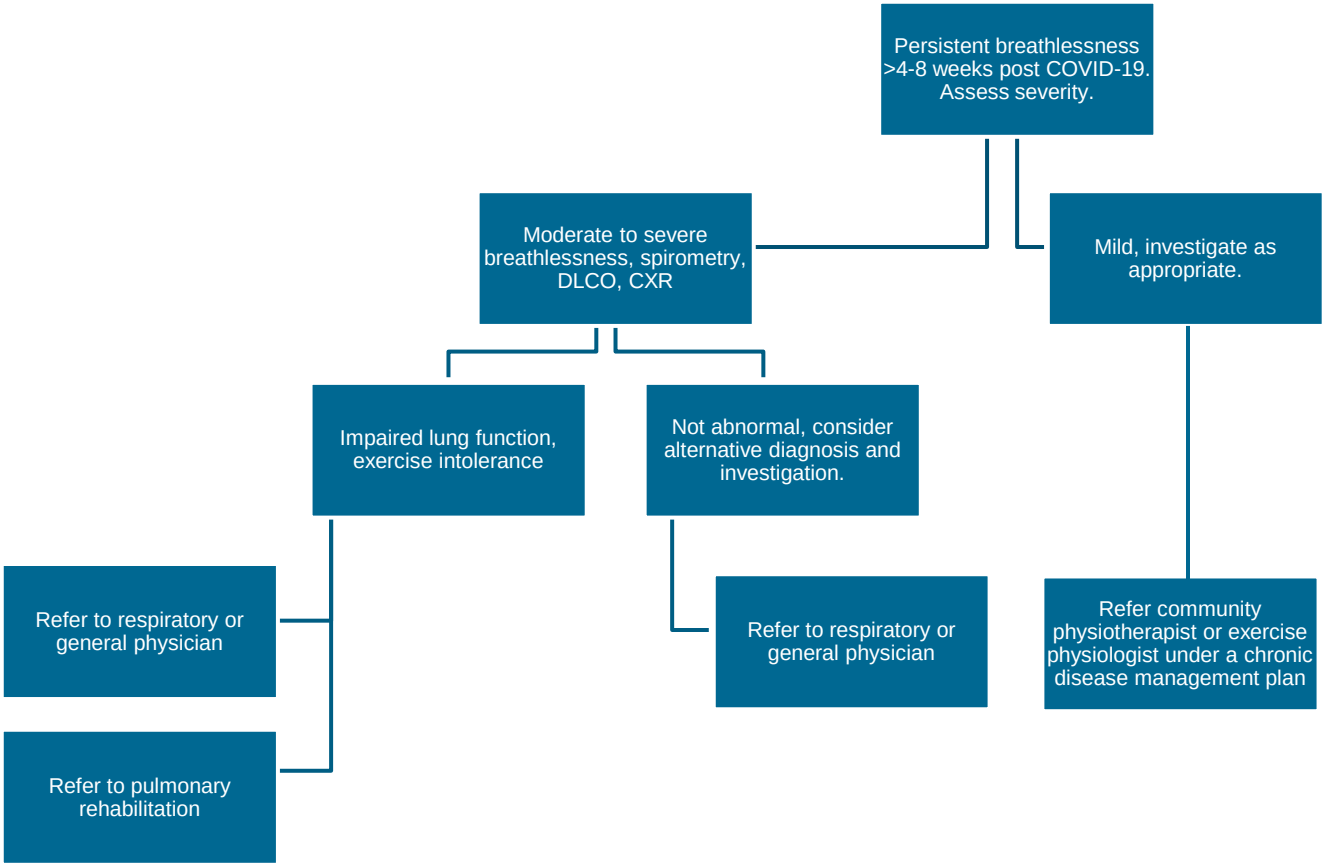
- Dyspnea 38 studies (median [IQR], 29.7%; [14.2%-37.0%]), and
- Cough 26 studies (median [IQR], 13.1% [5.3%-22.6%])
- Lung function abnormalities
  - Pulmonary diffusion abnormalities (DLCO) (4 studies; median [IQR], 30.3% [22.1%-38.5%])
  - Restrictive spirometry (3 studies; median [IQR], 10.0% [6.1%-24.1%])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

Goff et al JAMA 2021

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 abnormal CT
  - Severe acute pneumonitis
  - DLCO<80pp
  - Abnormal CXR

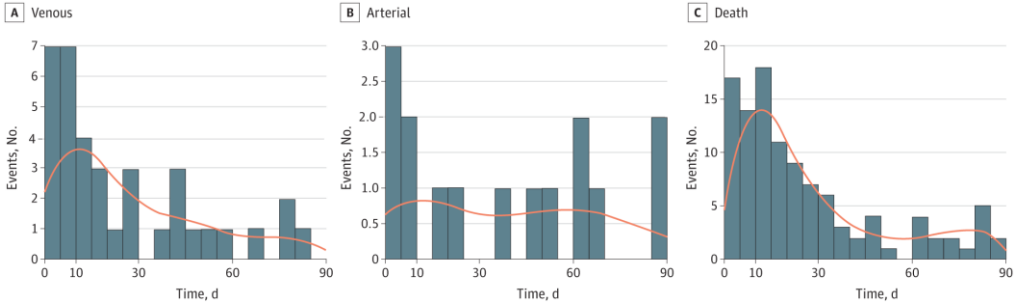
https://www.medrxiv.org/content/10.1101/2022.03.10.22272081v1


Persistent breathlessness >4-8 weeks post COVID-19. Assess severity.
Moderate to severe breathlessness, spirometry, DLCO, CXR
Mild, investigate as appropriate.
Impaired lung function, exercise intolerance
Not abnormal, consider alternative diagnosis and investigation.
Refer to respiratory or general physician
Refer to pulmonary rehabilitation
Refer to respiratory or general physician
Refer community physiotherapist or exercise physiologist under a chronic disease management plan

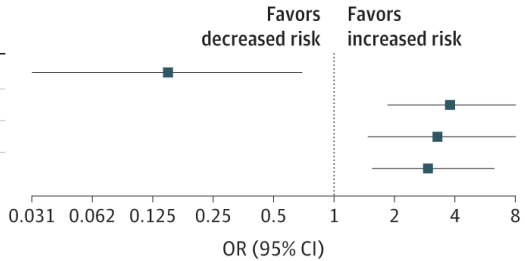
New or worsened dyspnoea, Pulmonary embolism?

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

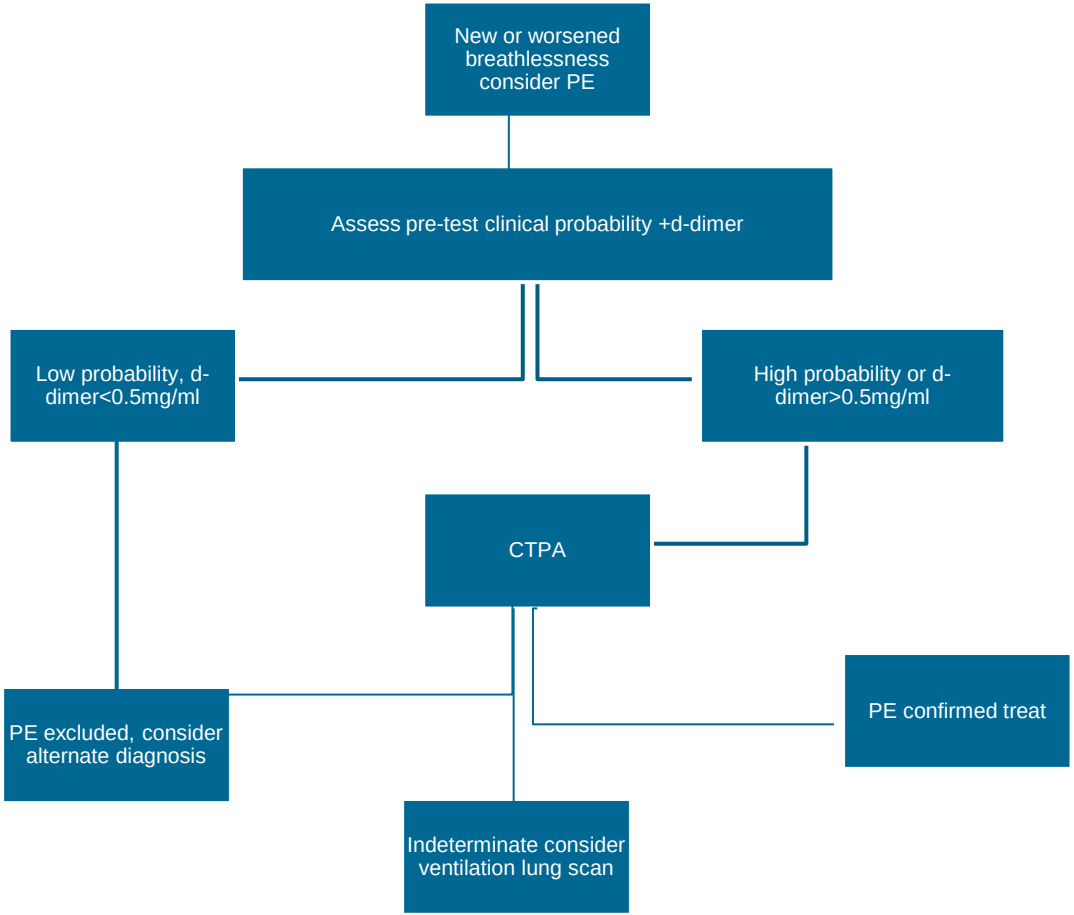
- N=2832, post hospitalized COVID-19
- Up to 90 days post discharge
- 1.3% post-discharge venous thromboembolic events (16 PE, 18 DVT, and 2 portal vein thrombosis)
- Risk increased,
  - history of PE/DVT
  - Predischarge CRP>10 or d-dimer>3.0.
- Reduced with discharge anticoagulation



Factor	OR (95% CI)
Discharge AC	0.14 (0.03-0.58)
Peak D-dimer >3 µg/mL	3.76 (1.86-7.57)
History of VTE	3.24 (1.34-7.86)
Predischarge CRP >10 mg/dL	3.02 (1.45-6.29)



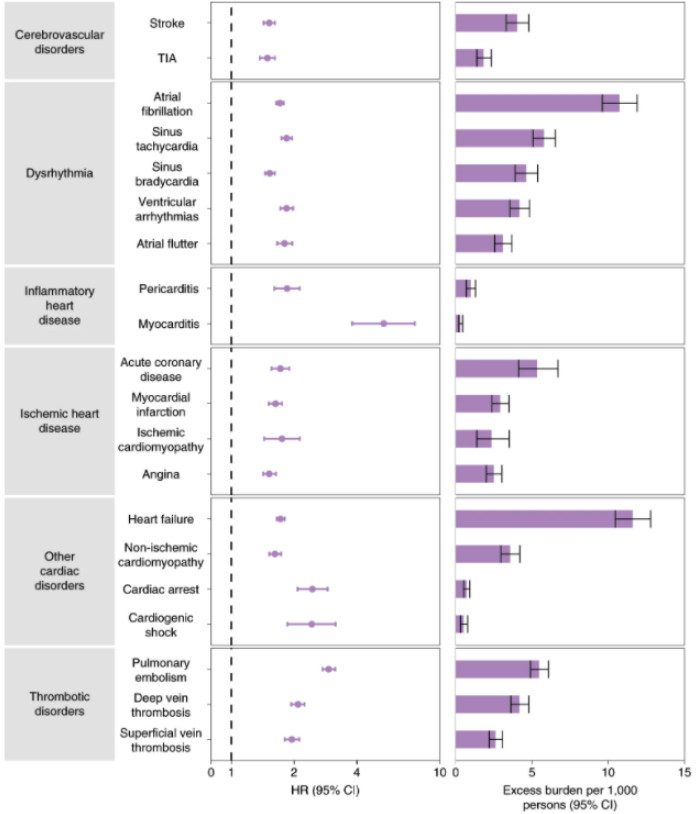
PE?

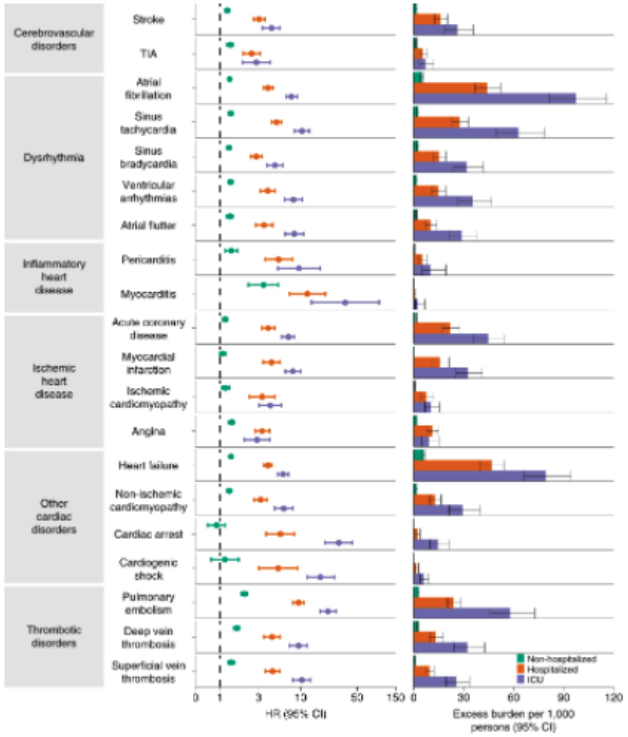

New or worsened breathlessness consider PE
Assess pre-test clinical probability +d-dimer
Low probability, d-dimer<0.5mg/ml
High probability or d-dimer>0.5mg/ml
CTPA
PE excluded, consider alternate diagnosis
PE confirmed treat
Indeterminate consider ventilation lung scan

Long term cardiovascular outcomes of COVID-19

Xi et al Nat Med 2022

- 150, 000 US veterans
- Burden at 12 months
- myocarditis (HR = 5.38 (3.80, 7.59)
- AMI (HR = 1.63 (1.51, 1.75)
- AF (HR = 1.71 (1.64, 1.79)
- CVA = 1.52 (1.43, 1.62)





Palpitations and chest pain

- CV symptoms including chest pain and palpitations are common PASC and are not usually associated with serious pathology

- **Clinical priority – differentiate MSK and other non-specific chest pain from serious conditions**

- Palpitations and symptoms such as dizziness and elevated HR occur in 20% of people post-COVID-19.

- For chest pain – the *Pathway for Acute Coronary Syndrome* (PACSA) should be followed

- For palpitations – ECG as initial assessment. Further evaluation may include ECHO, Holter monitor and dynamic evaluations of HR and BP.
- Causes of palpitations **may** include:
    - Deconditioning as a result of physical inactivity during acute illness
    - Postural Orthostatic Tachycardia Syndrome (POTS)
    - Psychological distress

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