Post-acute and subacute COVID-19 care

Evidence check question

What published advice and models of care are available regarding post-acute and subacute care for COVID-19 patients?

In brief

- Providing care for COVID-19 patients as they move from critical and acute care settings is complex and a range of models of care have been described.
- The burden post severe COVID-19 and prolonged ICU stay is considerable in patients, affecting both functional status and biological parameters, suggesting the need for close follow-up for critically ill COVID-19 survivors.¹
- Emerging evidence suggest that age, hospitalisation, a higher number of onset symptoms, history of asthma bronchiale, distinct immunoglobulin signature and an increase of certain inflammatory markers during primary infection are associated with an increased risk of developing post-acute sequalae of COVID-19.²⁻⁴ A pre-print study suggests that COVID-19 infection may cause microscopic damage to the lungs which may explain the breathlessness experienced by post-acute COVID-19 patients.⁵
- National COVID-19 Clinical Evidence Taskforce recommendations for the care of people with post-acute COVID-19 encompass assessment; managing infection; diagnosis; red flags and symptoms; as well as goals of care such as communication, access and coordination.⁶
- The UK’s NICE guideline includes assessment of new or ongoing symptoms after acute COVID-19; investigations and referral; planning care; management; follow-up and monitoring; sharing information and continuity of care; and health service organisation.⁷
- The World Health Organization provides recommendations for policy makers regarding post-acute COVID-19 including:
  - the need for multi-disciplinary, multi-specialty approaches to assessment and management
  - development of new care pathways and contextually appropriate guidelines for health professionals
  - creation of appropriate services, including rehabilitation and online support tools.⁸
- A review of models of care available for long COVID-19 found the following:
  - The rehabilitation needs of patients are varied and multi-faceted, and post COVID-19 clinics should offer multi-disciplinary assessments.
Emerging literature emphasises the importance of assessment of post-acute COVID-19 patients after discharge; and of preparedness with appropriate clinical rehabilitation pathways.

Initial multi-disciplinary assessment post-COVID-19 may play a role in reducing unnecessary chest X-rays and clinic appointments, and in helping to focus on those most likely to require follow-up.9

Post ICU and post discharge care models

- There are two main types of models focused on stepping down care: those in a ward-based environment, and those outside of hospital.
- Almost all models include the following elements: assessment following a point in time; a referral pathway; subsequent care; discharge; describe the importance of interdisciplinary management.
- There are different permutations of the models, with examples below and further detail described in Table 1.10
- Ward based models:
  - A US model encompasses three subspecialists as the core consulting team including neurology.11 As part of the model a 30-bed COVID-19 recovery unit was established to provide a multi-disciplinary, comprehensive treatment model for those recovering from COVID-19 critical illness.
- Home based models:
  - A model developed in the UK for respiratory follow-up of patients with clinic radiological confirmation of COVID-19 pneumonia after discharge. It includes assessment within 4-6 weeks post discharge and at 12 weeks post discharge. If normal, patients are discharged and if not, further assessment is undertaken with consideration of referral to specialist services.12
  - A model developed in the US post hospital discharge includes psychiatry, psychology, neurology, cardiology, infectious diseases, nephrology, dermatology, haematology, hepatology and otolaryngology.13 Referral criteria for COVID-19 positive hospital discharges is based on length in ICU, whether the patient has post-discharge rehabilitation recommendations and pre-existing lung disease.
  - A model developed in the UK includes assessment 12 weeks after care on ward, and if normal, patient is discharged. After a further two rounds of assessment, consideration is given to referral to specialist services or consideration of other diagnosis, which should be managed accordingly.12
  - A multi-disciplinary model to manage post-COVID-19 syndrome in the community developed by the NHS based on entry criteria (such as persistent symptoms and pre-existing conditions) to determine the level of care required following discharge: Level 1 (COVID-19 MDT); Level 2 (community therapy teams); Level 3 (primary care).14
  - A similar model following discharge and assessment leads to integrated care in the community, a COVID-19 survivorship clinic of multi-disciplinary post COVID-19 mental health services.15
- For the management of post-acute sequelae of COVID-19, NSW Health recommends that patients should be managed with an emphasis on holistic support while avoiding over-investigation and over-treatment.16 Models of care encompass clinical assessment; investigations; managing comorbidities; medical management; self-management; safety netting and referral; social financial and cultural support; and mental health.17

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
Omicron and post-acute sequelae COVID-19

- Multiple studies indicate that infections with Omicron variant is associated with a reduced risk of hospitalisations and severe disease (i.e., supplemental oxygen, mechanical ventilation, high/intensive care or death compared to previous variants of concern).\textsuperscript{18-25}
- While Omicron is generally associated with milder disease, there are concerns regarding the post-acute sequelae of COVID-19 and the increasing need for post-acute care.\textsuperscript{26, 27} Evidence specific to Omicron variant is lacking, however, prior research had found that even the mild COVID-19 cases can develop post-acute sequelae of COVID-19 infection (PASC).\textsuperscript{2, 28, 29}

Limitations

Evidence on the longer-term impact of COVID-19 on infected patients is rapidly emerging. Comprehensive data is not yet available on all aspects involved. Guidance on models of care for people should be interpreted in the context of individual disease staging and underlying comorbidities, as well as disease prevalence in the local context. The literature search strategy for this evidence check focused on post infection with SARS-CoV-2, but not on individual conditions.

Background

COVID-19 has resulted in a growing population of individuals with a wide range of persistent symptoms that develop during or after SARS-CoV-2 infection, continue for more than twelve weeks, and are not explained by an alternative diagnosis.\textsuperscript{30} Significant physical\textsuperscript{15}, psychological\textsuperscript{31} and cognitive impairments\textsuperscript{32} may persist despite clinical resolution of the infection.

The World Health Organisation has initiated a planned response to long-COVID, including new clinical guidelines and pathways, and the creation of post-COVID clinics and online support tools.\textsuperscript{8, 33}

Methods (Appendix 1)

PubMed and Google were searched on the 13 September 2021.

Results

Table 1. Peer reviewed literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-acute care</strong></td>
<td></td>
</tr>
<tr>
<td>Models of care for postacute COVID-19 Clinics: experiences and a practical framework for outpatient physical settings</td>
<td>- This study presents five models of care for post-acute COVID-19 clinics, including: UT Southwestern Medical Center COVID recover Program, UT Health San Antonio program, VA Greater Los Angeles Healthcare System, Hennepin Healthcare and University of Florida models.</td>
</tr>
<tr>
<td></td>
<td>- Model 1: UT Southwestern COVID Recover clinic flow chart</td>
</tr>
</tbody>
</table>
Post-acute care

Verduzco-Gutierrez, et al. 2021


- This article suggests tailored models of care for various clinical settings, utilising multidisciplinary teams with physician involvement, longer initial consultations with the patients and equitable access to post-COVID therapeutic and rehabilitative care for marginalized minority groups.

Commentary describes a dedicated multi-disciplinary post-ICU recovery unit for COVID-19 patients which addresses their unique complexities and allows them to begin rehabilitation earlier.
## Source vs. Summary

<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-acute care</strong></td>
<td></td>
</tr>
<tr>
<td>Gupta, et al.</td>
<td>May 2020</td>
</tr>
<tr>
<td>O’Brien, et al.</td>
<td>Sep 2020</td>
</tr>
</tbody>
</table>

### Gupta, et al. May 2020

An integrated multidisciplinary model of COVID-19 recovery care

- Article describes the establishment of a COVID-19 Recovery Service, a multidisciplinary service for comprehensive follow-up of patients with a hospital diagnosis of COVID-19 pneumonia.

### O’Brien, et al. Sep 2020

- Article describes the establishment of a COVID-19 Recovery Service, a multidisciplinary service for comprehensive follow-up of patients with a hospital diagnosis of COVID-19 pneumonia.
**Source**

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-acute care</strong></td>
</tr>
</tbody>
</table>
| **Respiratory follow-up of patients with COVID-19 pneumonia**<sup>12</sup>  
George, et al.  
Aug 2020 |
| • Article provides a suggested structure for the respiratory follow-up of patients with clinic radiological confirmation of COVID-19 pneumonia.  
• There are two separate algorithms integrating disease severity, likelihood of long-term respiratory complications and functional capacity on discharge. |

---

| **Post-COVID-19 follow-up clinic: depicting chronicity of a new disease**<sup>13</sup>  
Rovere-Querini, et al.  
July 2020 |
| • A multi-disciplinary COVID-19 follow-up outpatient clinic for patients after COVID-19 hospitalisation.  
• The team comprises internists, neurologists, psychiatrists, cardiologists, nutritionists and nephrologists.  
• The multi-disciplinary assessment comprises a complete physical examination, respiratory, cardiovascular assessment, nutritional assessment, neurological examination including cognitive tests, and mental health assessment. |

---

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
### Source

**A Clinic Blueprint for Post-Coronavirus Disease 2019 RECOVERY: Learning From the Past, Looking to the Future**

Lutchmansingh, et al. Mar 2021

### Summary

- Article discusses the aims, general principles, elements of design, and challenges of a successful multi-disciplinary model to address the needs of COVID-19 survivors.

![Diagram of RECOVERY: Comprehensive Post-COVID Center at Yale](image)

- **Referral Pathway**
  - Inpatients (pre-discharge)
  - Respiratory Assessment
    - Ambulatory oximetry
    - Pulse oximeter & incentive spirometry training
  - Functional Assessment
    - Physical & occupational therapy evaluation
    - Swallow evaluation
  - Care Coordination
    - Arrange home services
    - Address care barriers
  - Outpatients (ongoing care)
    - Referral by outpatient provider, occupational medicine provider, health system COVID-19 hotline, or self

- **Initial Assessment**
  - Visit 1 (telehealth)
    - Pulmonary consultation
    - Subjective ox assessment
    - Assess for extrapulmonary complications
  - Initial Diagnostics
    - Repeat imaging (HRCT)
    - PFTs, 6MWT
    - Repeat selected labs
  - Visit 2 (face-to-face)
    - Ongoing pulmonary care
    - PIOT assessment
    - Subjective ox assessment
    - Neurocognitive screening
    - Mental health screening
    - Additional subspecialty involvement

- **Subsequent Care**
  - MD status
    - Planned: 3, 6, and 12 mo or as needed per severity
    - Extrapulmonary consultation as needed
  - Rehab
    - PT/OT outpatient care
    - Pulmonary rehabilitation
  - Lung function testing
    - PFT & 6MWT at 3, 6, 12 mo
    - CRP for selected patients
  - Additional diagnostics
    - VO2 or CTA chest
    - Transesophageal Echo
    - Cardiac event monitoring
    - Functional cardiac imaging
    - Neurocognitive testing

- **Disposition**
  - 6 min walk test: COVID-19 = coronavirus disease 2019; CRP = C-reactive protein; CT = computerized tomography; CT scan = computed tomography scan; PIOT = pulmonary rehabilitation; PFT = pulmonary function test; PIOT = pulmonary rehabilitation; VO2 = 6 min walk test

- **Multi-disciplinary discussion of active cases**

- **Implementation and evaluation of a COVID-19 rapid follow-up service for patients discharged from the emergency department**

- **Framework for a remote follow-up service for patients discharged from ED with suspected COVID-19 to:**
  - Support patient self-management in the community
  - Proactively identify deteriorating patients requiring reassessment
  - Form a pathway for patients requiring specialist follow-up.

- **Rapid remote follow-up pathway:**

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-acute care</strong></td>
<td></td>
</tr>
</tbody>
</table>

**ED attender with suspected COVID-19**
- Safe for discharge from ED (all age): O₂ saturation ≥94%, and exercise desaturation < 2%, HR < 110, RR < 23
- Criteria for considering pulse oximeter (any of): CRP > 50; RR > 20; O₂ saturation 94% or 95%; exercise desaturation > 2%; typical significant COVID-19 radiological abnormalities

**EHRS report**
- Identifies all ED discharges with COVID-19-related diagnosis and/or tested for SARS-CoV-2 in the ED
- Clinic doctor triages list and schedules patients for follow-up call within 36 hours of attendance

**Telephone assessment**
- Patient calls into clinic via safety-net number provided in ED or during follow-up

- **COVID-19 confirmed or probable** (determined on swab result and/or clinical history and other results)
- **High risk of deterioration** (based on day of illness and clinical features)
  - Further follow-up call(s) scheduled
- **Low risk of deterioration**
  - Discharged from regular follow-up, but ensure has safety-net number

- **COVID-19 unlikely or uncertain** (determined on swab result, clinical history and other results)
- **Deteriorating or concerning symptoms**
  - Recall for face-to-face assessment

All patients with confirmed or probable COVID-19 with radiological changes or ongoing shortness of breath at day 28 – referred to long-term respiratory follow-up

- **Retrospective and prospective monitoring in post COVID-19 complications and an approach for vigilance in Post-recovery period**

- A narrative review article focusing on recovered COVID-19 patients, their complications, precautionary methods and post care.
<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
</table>
| Post-acute care | **A unique integrated rehabilitation pathway was developed in the NHS.**  
**The pathway was first of its kind to be set up in the UK and comprises of a three-tier service model (Level 1: specialist MDT service; Level 2: community therapy teams; and Level 3: self-management).** |

**A Multidisciplinary NHS COVID-19 Service to Manage Post-COVID-19 Syndrome in the Community**
Parkin, et al.  
April 2021
**Source**  | **Summary**
---|---
**Post-acute care**

**Management of post-acute covid-19 in primary care**

Greenhalgh et al, Aug 2020

- Inter-disciplinary management of post-acute COVID-19.

**Post-acute COVID-19 syndrome**

Nalbandian, et al. March 2021

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
## Post-acute care

### Early rehabilitation in post-acute COVID-19 patients: data from an Italian COVID-19 Rehabilitation Unit and proposal of a treatment protocol

- Study proposed a post-acute COVID-19 rehabilitation protocol.
- The early rehabilitation protocol consists of 2 sessions per day of 30 minutes each, for 2 to 3 weeks, that should be adapted to the 2 subgroups based on ventilatory support and estimated FIO2 needs at the admission: 1) patients wearing non-rebreather mask, Venturi mask or oxygen mask (FiO2 ≥40% and <60%); 2) patients without oxygen support devices or wearing nasal cannula (FiO2 ≥21% and <40%)

### Post-Acute Care Preparedness in a COVID-19 World

- Framework of post-acute care identifying four stages:
**Source**

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-acute care</strong></td>
</tr>
</tbody>
</table>

**Framework for Post-Acute Care Preparedness in a COVID-19 World: Key Strategies**

- **Stage 1: Survive the Surge**
  1. Place non-COVID patients in non-acute hospitals
  2. Assess capacity of SNFs and HHAs and other sources of care to enable hospital discharges for non-COVID patients
  3. Direct regional post-acute care providers to identify separate, specialized capacity for COVID-positive discharges

- **Stage 2: Regroup and Prepare**
  1. Protect vulnerable populations from COVID-19 infection
  2. Prepare treat-in-place protocols for non-COVID admissions
  3. Create and formalize post-acute care COVID-19 designs and create transfer protocols for various designs

- **Stage 3: Restructure to Recovery**
  1. Tap post-acute providers to participate in front lines of distribution and administration of prophylaxis, vaccinations
  2. Continue and deepen strategies to deliver non-COVID-related medical care at home and in residential care communities
  3. Prepare strategic plan for transition

- **Stage 4: Redesign to Reality**
  1. Create local hospital/post-acute/public health advisory bodies
  2. Identify opportunities to optimize post-acute care at market level for system performance moving forward
  3. Create, revise, and revisit pandemic response plan to include optimal use of all delivery system resources, supplies/equipment, and staff necessary to meet demand

---

**Surviving COVID-19 in Bergamo province: a post-acute outpatient re-evaluation**
Venturelli, et al.
Jan 2021

- Dedicated outpatient service to follow-up patients with COVID-19.
- Two-step assessment:
  - Step 1: nurse assessment, blood tests (including full blood count, liver function tests, renal function tests, D-dimer, coagulation tests, thyroid function tests and thyroid antibodies, glucose, glycated haemoglobin, lactate dehydrogenase, brain natriuretic peptide, C-reactive protein), chest-X-ray, electrocardiogram, full pulmonary function testing with diffusion, psychological evaluation, assessment of rehabilitation needs.
  - Step 2 (three days later): infectious diseases consultation and subsequent referral to primary care or to other specialists (mainly respiratory medicine, cardiology, neurology, endocrinology, physical and rehabilitation medicine, haematology) as deemed appropriate.

Brigham, et al.
Apr 2021

- Post-acute COVID-19 team (PACT) referral criteria for COVID-19+ hospital discharges:

- Key services and staff of the PACT team:

---

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
Post-acute care

- **Establishment of a COVID-19 Recovery Unit in a Veterans Affairs Post-Acute Facility**
  - Post-acute care recovery unit for clinically stable patients with COVID-19 in a long-term care facility at a Department of Veterans Affairs medical center.
  - Patients are monitored with vital signs every eight hours, blood tests performed biweekly, and infectious diseases nurse practitioner liaises with CRU team on daily basis.
  - Deteriorating patients transfer back to acute care unit (hospital).
  - Recovering patients repeat tested for COVID-19 weekly; when two consecutive tests performed 24-hours apart are negative, patient is discharged.
  - Two wings, 25 beds each – one wing initial COVID-19 recovery unit and opposite wing reserved for ‘surge’.

- **How a Barcelona Post-Acute Facility became a Referral Center for Comprehensive Management of Subacute**
  - Geriatric post-acute care (PAC) can be a key resource for responding to the COVID-19 pandemic as it offers:
    - an alternative to conventional hospitalisation, reducing burden on acute care
    - active treatment for COVID-19, rehabilitation and palliative care
    - better isolation of frail persons.
  - Overview of the older COVID-19 patient pathway in a post-acute care facility:
Source

*Summary*

**Post-acute care**

**Patients With COVID-19**

Inzatari, et al.  
Jul 2020

---

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
Table 2 Grey literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peer reviewed sources</strong></td>
<td>These recommendations provide guidance for the goals of care, assessment and management of symptoms post-acute COVID-19.</td>
</tr>
</tbody>
</table>
| Care of People with Post-Acute COVID<sup>®</sup> | **CARE OF PEOPLE WITH POST-ACUTE COVID-19**

**BACKGROUND**

People who have been infected with COVID-19 sometimes experience ongoing symptoms (e.g., shortness of breath, fatigue, joint pain, or chronic cough) or new symptoms (e.g., ongoing cough, new shortness of breath, or loss of taste or smell) that may occur weeks or months following acute COVID-19. These recommendations will help guide the goals of care, assessment and management of symptoms post-acute COVID-19. These recommendations will help guide the goals of care, assessment and management of symptoms post-acute COVID-19. |

**GOALS OF CARE**

<table>
<thead>
<tr>
<th><strong>Goal of Care</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Coordinated care</td>
</tr>
<tr>
<td>Access to care</td>
</tr>
<tr>
<td>What is not recommended</td>
</tr>
<tr>
<td>Assessment of red flags</td>
</tr>
<tr>
<td>Assessment</td>
</tr>
</tbody>
</table>

**Communication**

**Coordinated care**

**Access to care**

<table>
<thead>
<tr>
<th><strong>What is not recommended</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough or loss of taste or smell without a known cause.</td>
</tr>
</tbody>
</table>

**Assessment of red flags**

**Assessment**

**Physiotherapy management for COVID-19 in the acute hospital setting:** Recommendations to guide clinical practice<sup>44</sup>

This document outlines recommendations for physiotherapy management for COVID-19 in the acute hospital setting.

It includes recommendations for physiotherapy workforce planning and preparation; a screening tool for determining requirement of physiotherapy; recommendations for the selection of physiotherapy treatments and personal protective equipment.

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
## Source

<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
</table>
| **COVID-19: Evaluation and management of adults following acute viral illness**<sup>39</sup>                                      | This report describes in detail the evaluation and management of adults during the post-acute and chronic recovery phase from COVID-19. The definitions used agree with the CDC:  
- Acute COVID-19: up to four weeks following the onset of illness.  
- Post-COVID conditions: broad range of symptoms (physical and mental) that develop during or after COVID-19, continue for ≥2 months (i.e. three months from the onset), and are not explained by an alternative diagnosis. |
| UpToDate. August, 2021 Updated February 2022                           |                                                                                                                                                                                                          |
| **Caring for adult patients with post-COVID-19 conditions**<sup>45</sup>                                                   | This guide contains information for general practitioners (GPs) who are providing care for adult patients who have previously tested positive to COVID-19 or have a history suggestive of undiagnosed COVID-19, and have (or are at risk of) post-COVID-19 conditions. |
| The Royal Australian College of General Practitioners. October, 2020 Updated December 2021 |                                                                                                                                                                                                          |
| **COVID-19 rapid guideline: managing the long-term effects of COVID-19**<sup>7</sup>                                        | A guideline on managing the long-term effects of COVID-19 which includes recommendations on assessing people with new or ongoing symptoms after acute COVID-19; investigations and referral; planning care; management; follow-up and monitoring; sharing information and continuity of care; and health service organisation. |
| National Institute for Health and Care Excellence, December 2020 Updated November 2021                                    |                                                                                                                                                                                                          |
| **National guidance for post-COVID syndrome assessment clinics**<sup>46</sup>                                                  | The purpose of this guidance is to inform the commissioning of post-COVID-19 syndrome assessment clinics.  
This report is designed to assist local healthcare systems in establishing and maintaining post-COVID-19 assessment services for patients experiencing long-term health effects following COVID-19 infection.  
Clinics should offer physical, cognitive, psychological and psychiatric assessments with the aim of providing consistent services for people with post-COVID syndrome. These services should support those who need them, irrespective of whether they were hospitalised and regardless of whether clinically diagnosed by a SARS-CoV-2 test. |
| National Health Service, UK Government. April, 2020                   |                                                                                                                                                                                                          |
| **In the wake of the pandemic: preparing for Long COVID**<sup>8</sup>                                                      | A policy brief which raises awareness of long COVID-19 and provides recommendation for policy makers on the:  
- need for multi-disciplinary, multispecialty approaches to assessment and management |
## Source

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
</table>
| • development, in association with patients and their families, of new care pathways and contextually appropriate guidelines for health professionals.  
• creation of appropriate services, including rehabilitation and online support tools  
• action to tackle the wider consequences of long COVID-19, including attention to employment rights, sick pay policies, and access to benefit and disability benefit packages  
• involving patients both to foster self-care and self-help  
• implementing well-functioning patient registers and other surveillance systems; creating cohorts of patients; and following-up those affected to support the research which is so critical to understanding and treating long COVID. |

### Peer reviewed sources

<table>
<thead>
<tr>
<th>World Health Organization, May 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>An evidence review conducted by the National Health Library and Knowledge Service Evidence Virtual Team looking at models of care available for long COVID-19. The main points of the review are:</td>
</tr>
</tbody>
</table>
| • COVID-19 has resulted in a growing population of individuals with a range of persistent symptoms that develop during or after SARS-CoV-2 infection, continue for ≥ 12 weeks, and are not explained by an alternative diagnosis. Significant physical, psychological, and cognitive impairments may persist despite clinical resolution of the infection.  
• Post-acute COVID-19 rehabilitation will assume increasing importance as a surge of patients are discharged from hospital, placing a burden on health systems.  
• The rehabilitation needs of patients are varied and multi-faceted, and post COVID-19 clinics should offer multi-disciplinary assessments. Experience from recently established COVID-19 recovery services in Ireland and Britain suggests that significant physical, psychological and cognitive impairments may persist; and that multi-disciplinary teams should integrate respiratory, cardiology, rheumatology, radiology, psychology and immunology services into a holistic post-discharge model of follow-up.  
• Emerging literature emphasises the importance of assessment of post-acute COVID-19 patients after discharge; and of preparedness with appropriate clinical rehabilitation pathways.  
• Initial multi-disciplinary assessment post-COVID-19 may play a role in reducing unnecessary chest X-rays and clinic appointments, and in helping to focus on those most likely to require follow-up. |

<table>
<thead>
<tr>
<th>What models of care are available for patients recovering from COVID-19 with persisting symptoms? What models of care are available for long COVID, or post-acute sequelae of COVID-19?</th>
</tr>
</thead>
<tbody>
<tr>
<td>This document outlines a model of care to guide acute clinicians in planning for, and delivering, care to patients in the post-acute period. The aim is to improve patient outcomes and patient flow from the acute environment.</td>
</tr>
</tbody>
</table>
### Table 3. Omicron impact on health system

<table>
<thead>
<tr>
<th>Source</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peer reviewed sources</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Characteristics and outcomes of hospitalized patients in South Africa during the COVID-19 Omicron wave compared with previous waves | - This article from South Africa compares the characteristics and outcomes of hospitalised patients during different waves of COVID-19 outbreak, including ancestral variant outbreak, Beta variant outbreak, Delta variant outbreak and Omicron variant outbreak.  
- Compared to previous waves, patients hospitalised during the Omicron outbreak were younger and had a higher proportion of females, a lower proportion patient with comorbidities. There was also a significantly lower proportion requiring oxygen therapy and mechanical ventilation. The median length of stay at hospital was three days, compared to seven to eight days in previous waves. |
| Maslo, et al. 2021<sup>23</sup> | |
| Hospitalisation risk for Omicron cases in England | - This is a report from the MRC Centre for Global Infectious Disease Analysis, Jameel Institute, Imperial College London.  
- This report estimates that the risk of any attendance at hospital and hospitalisation lasting one day or longer with Omicron infections are 20-25% and 40-45%, respectively, less than Delta infections. |
| Ferguson, et al. 2021<sup>24</sup> | |
| Omicron: severity and VE | - This report estimates that there is an overall reduction in risk of hospitalisation for Omicron relative to Delta of 25%-65% depending on endpoint.  
- This report did not find any statistically significant difference in length of stay for either the “any hospital attendance” or “hospitalisations lasting one day or longer” between Omicron and Delta for each age group. |
| Imperial College COVID-19 Response Team. 2022<sup>25</sup> | |
| Update 72 – SARS-CoV-2 variant of concern Omicron | - An update from WHO on the Omicron variant  
- This update states that Omicron has reduced risk of hospitalisation and is associated with lower severity compared to Delta. However, large number of infections caused by a high transmissibility can translate into increased number of hospitalisations and can overwhelm the health system. |
| WHO. 2022<sup>47</sup> | |
| Early assessment of the clinical severity of the SARS-CoV-2 omicron variant in South Africa: a data linkage study | - This article from South Africa found that S gene target failure (SGTF)-infected individuals had a reduced risk of hospitalisation but a similar risk of severe disease once hospitalised compared to non-SGTF-infected individuals. Compared to individuals infected with Delta variant, SGTF-infected individuals had a reduced risk of severe disease. |
| Wolter, et al. 2021<sup>19</sup> | |
Severity of Omicron variant of concern and vaccine effectiveness against symptomatic disease: national cohort with nested test negative design study in Scotland
Sheikh, et al. 2021

This preprint study from Scotland found that Omicron is associated with a two-thirds reduction in the risk of COVID-19 hospitalisation when compared to Delta.

Comparison of outcomes from COVID infection in pediatric and adult patients before and after the emergence of Omicron
Wang, et al. 2022

This retrospective cohort study from the United States found that compared to patients who had their first infection during the Delta outbreak, patients who had their first infection during the Omicron predominant period had significantly less severe outcomes.

- Emergency department (ED) visit: 4.55% vs. 15.22% (risk ratio or RR: 0.30, 95% CI: 0.28–0.33)
- Hospitalization: 1.75% vs. 3.95% (RR: 0.44, 95% CI: 0.38–0.52)
- ICU admission: 0.26% vs. 0.78% (RR: 0.33, 95% CI: 0.23–0.48)
- Mechanical ventilation: 0.07% vs. 0.43% (RR: 0.16, 95% CI: 0.08–0.32)

Patients in the Omicron cohort had fewer comorbidities and adverse social determinants of health compared to the Delta cohort.

Reduced risk of hospitalisation associated with infection with SARS-CoV-2 Omicron relative to Delta: a Danish cohort study
Bager, et al. 2022

This observational cohort study from Denmark found a significantly lower risk of hospitalisation with Omicron infection compared to Delta (adjusted RR of hospitalisation of 0.64 (95%CI 0.56-0.75)) among both vaccinated and unvaccinated individuals.

Clinical severity of COVID-19 patients admitted to hospitals in Gauteng, South Africa during the Omicron-dominant fourth wave
Jassat, et al. 2021

This study from South Africa found that patients admitted to hospitals during Omicron wave were less likely to have severe disease (one or more of acute respiratory distress, supplemental oxygen, mechanical ventilation, high/Intensive care or death) than those admitted during the Delta wave (28.8% vs 66.9%).

Omicron severity: milder but not mild
Nealon and Cowling. 2021

In this commentary in The Lancet, the authors cautions that although Omicron is associated with milder clinical presentation and less likely to cause severe disease, the increased incidence of infections could overwhelm the health system and lead to significant social and workforce disruptions.

Early estimates of SARS-CoV-2 Omicron variant severity based on a matched cohort study, Ontario, Canada
Ulloa, et al. 2022

This matched cohort study from Canada found that infection with Omicron variant is associated with a reduced rate of hospitalisation (0.51% vs 1.6%) and death (0.03% vs 0.12%) compared to infection with Delta variant.

- The risk of hospitalisation or death was 65% among Omicron cases compared to Delta cases, while risk of ICU admission or death was 83% lower.
Appendix

PubMed search terms

Search 1:

Search 2:
post-acute[Title] AND COVID-19

Google search terms

To inform this brief, Google searches were conducted using terms related to post-COVID-19, long COVID-19, model of care, acute, post-acute, sub-acute, rehabilitation on 13 September 2021.

Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Published advice / models of care for COVID-19 patient journeys in the subacute and post-acute setting</td>
<td>• Opinion letter, case reports</td>
</tr>
<tr>
<td>• Post discharge from acute care</td>
<td></td>
</tr>
</tbody>
</table>

Original search
13 September 2021

Updates
25 January 2021

• Search re-run
• Additional search on Omicron variant and its impact on health system including subacute care
• New relevant publications added to table
• In-brief updated to reflect new evidence

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
COVID-19 Critical Intelligence Unit

References


Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
27. Slezak M. Mild Omicron COVID-19 infections causing long-term fatigue, as experts warn not to 'push through'. 2022 Jan 22.


49. Nealon J, Cowling BJ. Omicron severity: milder but not mild. The Lancet. DOI: 10.1016/S0140-6736(22)00056-3