

# COVID-19 Critical Intelligence Unit

## Evidence check

11 February 2022

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 This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.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 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.<sup>1</sup>
- 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 sequelae of COVID-19.<sup>2-4</sup> 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.<sup>5</sup>
- 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.<sup>6</sup>
- 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.<sup>7</sup>
- 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.<sup>8</sup>
- 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

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clinics should offer multi-disciplinary assessments.

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- 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.<sup>9</sup>

## 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.<sup>10</sup>
- Ward based models:
  - A US model encompasses three subspecialists as the core consulting team including neurology.<sup>11</sup> 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.<sup>12</sup>
  - A model developed in the US post hospital discharge includes psychiatry, psychology, neurology, cardiology, infectious diseases, nephrology, dermatology, haematology, hepatology and otolaryngology.<sup>13</sup> 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.<sup>12</sup>
  - 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).<sup>14</sup>
  - 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.<sup>15</sup>
- 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.<sup>16</sup> 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.<sup>17</sup>

## 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).<sup>18-25</sup>
- 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.<sup>26, 27</sup> 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).<sup>2, 28, 29</sup>

## 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.<sup>30</sup> Significant physical<sup>15</sup>, psychological<sup>31</sup> and cognitive impairments<sup>32</sup> 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.<sup>8, 33</sup>

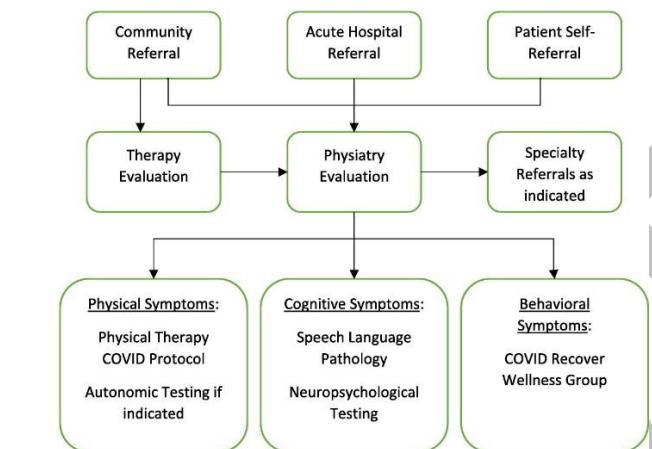
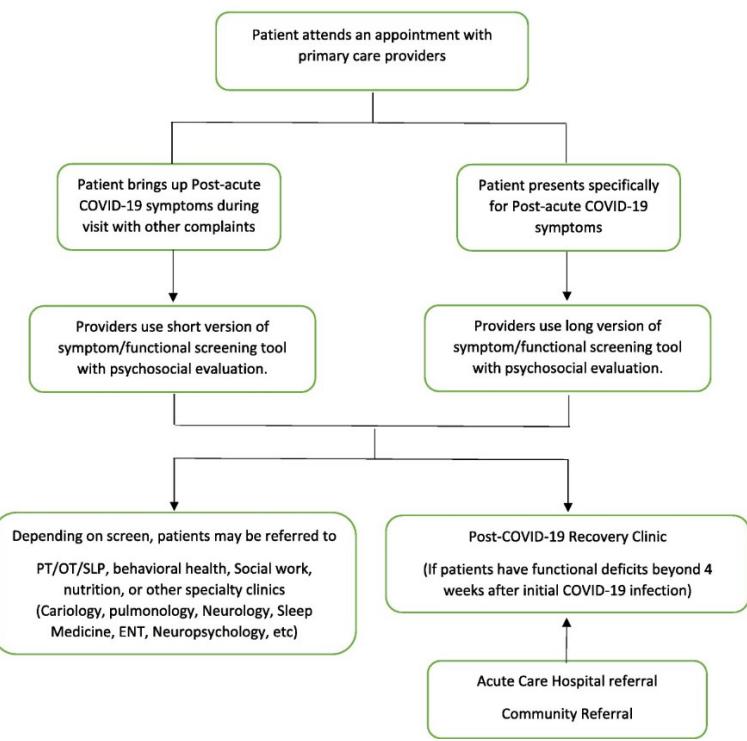
## Methods (Appendix 1)

PubMed and Google were searched on the 13 September 2021.

## Results

**Table 1. Peer reviewed literature**

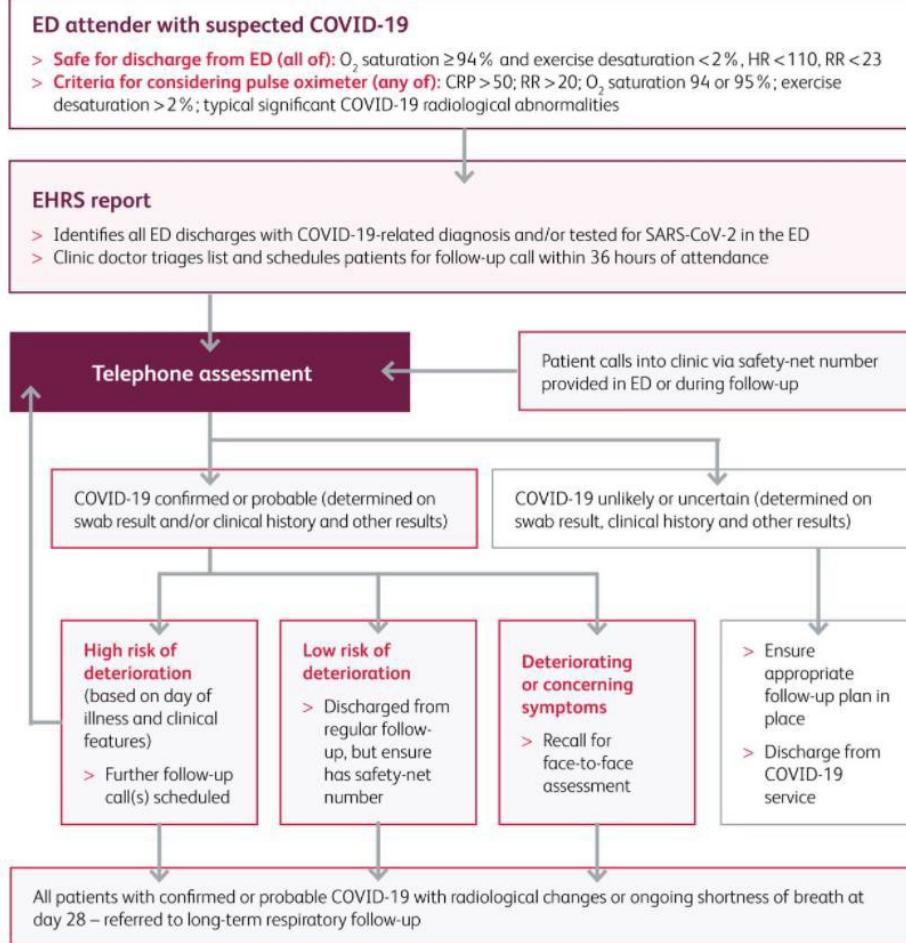
Source	Summary
<b>Post-acute care</b>	
<a href="#"><u>Models of care for postacute COVID-19 Clinics: experiences and a practical framework for outpatient physiatry settings</u></a>	<ul style="list-style-type: none"> <li>• This study presents five models of care for post-acute COVID-19 clinics, including: 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.</li> <li>• Model 1: UT Southwestern COVID Recover clinic flow chart</li> </ul>

Source	Summary
<b>Post-acute care</b> Verduzco-Gutierrez, et al. 2021 <sup>34</sup>	<p>UTSW COVID Recover Clinic Flow Chart</p>  <pre> graph TD     CR[Community Referral] --&gt; TE[Therapy Evaluation]     AH[Acute Hospital Referral] --&gt; PE[Physical Evaluation]     PSR[Patient Self-Referral] --&gt; SR[Specialty Referrals as indicated]     TE --&gt; PE     PE --&gt; SR     PE --&gt; PS[Physical Symptoms]     PE --&gt; CS[Cognitive Symptoms]     PE --&gt; BS[Behavioral Symptoms]     PS --&gt; PT[Physical Therapy COVID Protocol]     PS --&gt; AT[Autonomic Testing if indicated]     CS --&gt; SLP[Speech Language Pathology]     CS --&gt; NPT[Neuropsychological Testing]     BS --&gt; CRWG[COVID Recover Wellness Group]   </pre> <ul style="list-style-type: none"> <li>Model 4: Hennepin Healthcare Post-COVID-19 recovery care flow chart.</li> </ul> <p>Hennepin Healthcare Post-COVID-19 Recovery Care Flow Chart</p>  <pre> graph TD     A["Patient attends an appointment with primary care providers"] --&gt; B["Patient brings up Post-acute COVID-19 symptoms during visit with other complaints"]     A --&gt; C["Patient presents specifically for Post-acute COVID-19 symptoms"]     B --&gt; D["Providers use short version of symptom/functional screening tool with psychosocial evaluation."]     C --&gt; D     D --&gt; E["Depending on screen, patients may be referred to PT/OT/SLP, behavioral health, Social work, nutrition, or other specialty clinics (Cardiology, pulmonology, Neurology, Sleep Medicine, ENT, Neuropsychology, etc)"]     C --&gt; F["Providers use long version of symptom/functional screening tool with psychosocial evaluation."]     F --&gt; G["Post-COVID-19 Recovery Clinic (If patients have functional deficits beyond 4 weeks after initial COVID-19 infection)"]     G --&gt; H["Acute Care Hospital referral Community Referral"]   </pre> <ul style="list-style-type: none"> <li>This article suggests tailored models of care for various clinical settings, utilising multidisciplinary team with psychiatry involvement, longer initial consults with the patients and equitable access to post-COVID therapeutic and rehabilitative care for marginalized minority groups.</li> </ul>
<a href="#">A Paradigm for the Pandemic: A Covid-19 Recovery Unit<sup>11</sup></a>	<ul style="list-style-type: none"> <li>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.</li> </ul>

Source	Summary
<b>Post-acute care</b>	
Gupta, et al. May 2020	<p>1 Lead Hospitalist</p> <p>3 Hospitalists 2 Onsite, 1 Virtual Primary attending of record</p> <p>Advanced Practitioners 3 NP/PA</p> <p>Medicine</p> <p>Nursing</p> <p>Core Consulting Team</p> <p>Neurology      Neuropsychologist      Psychiatry</p> <p>1 Lead Physiatrist</p> <p>1 Physiatrist Resident 2 Senior Therapists</p> <p>10-12 Therapists 5-6 PT 4-5 OT 1 SLP</p>
An integrated multidisciplinary model of COVID-19 recovery care <sup>15</sup>  O'Brien, et al. Sep 2020	<ul style="list-style-type: none"> <li>Article describes the establishment of a COVID-19 Recovery Service, a multi-disciplinary service for comprehensive follow-up of patients with a hospital diagnosis of COVID-19 pneumonia.</li> </ul> <p>COVID-19 pneumonia admitted to hospital or treated in community</p> <p>Virtual Assessment Clinic: 8-12 Weeks After Discharge</p> <p>PA with physician support</p> <ul style="list-style-type: none"> <li>- CXR</li> <li>- Bloods</li> <li>- Symptom screen</li> <li>- Mental Health Screen</li> <li>- Complete Quality of Life Score</li> <li>- Organise tests for in-person clinic</li> </ul> <p>MDT &amp; call back with results</p> <p>Clinical concern after MDT and all patients managed in ICU or NIV on ward</p> <p>In-person clinic: 12 Weeks After Discharge</p> <p>Clinical assessment and review</p> <ul style="list-style-type: none"> <li>- CXR</li> <li>- PFTs – spirometry and DLCO</li> <li>- 6MWT</li> <li>- Bloods</li> <li>- Review symptom screen, Mental Health Screen and SF-36</li> <li>- +/-Echocardiogram or HRCT of Chest</li> </ul> <p>Significant functional impairment</p> <p>Respiratory specialty clinic</p> <p>Referral from other hospital in group</p> <p>Integrated Care in the Community</p> <p>General Practitioner Community Psychology Community Care Hub (physiotherapy)</p> <p>COVID Survivorship Clinic 6 and 12 Months</p> <p>Respiratory and ICU Medicine, Psychiatry and Psychology.</p> <p>Multidisciplinary Post COVID Mental Health Service</p> <p>Psychiatry Psychology Liaison and community services</p>

Source	Summary
<b>Post-acute care</b> <p><a href="#">Respiratory follow-up of patients with COVID-19 pneumonia<sup>12</sup></a> George, et al. Aug 2020</p>	<ul style="list-style-type: none"> <li>Article provides a suggested structure for the respiratory follow-up of patients with clinic radiological confirmation of COVID-19 pneumonia.</li> <li>There are two separate algorithms integrating disease severity, likelihood of long-term respiratory complications and functional capacity on discharge.</li> </ul> <p><b>Cared for in ICU<sup>1</sup> or HDU<sup>2</sup> or ward care with severe pneumonia*</b></p> <p><b>Within 4 - 6 weeks of discharge</b></p> <p>Telephone consultation or face to face review by doctor or nurse</p> <ul style="list-style-type: none"> <li>Consider new diagnosis of PE<sup>3</sup></li> <li>Liaise with local ICU<sup>1</sup> team for dedicated post-ICU follow up</li> <li>Post-COVID-19 holistic assessment*</li> </ul> <p><b>12 weeks after discharge</b></p> <p>Chest X-Ray<sup>+</sup> Face to face clinical assessment Consider full pulmonary function tests If diagnosed with PE<sup>3</sup> combine with post-PE<sup>3</sup> follow up Consider walk test with assessment of oxygen saturation Assess need for Post-COVID-19 holistic assessment* Consider sputum sampling Consider echocardiogram</p> <p>Normal → Discharge</p> <p>Abnormal Chest X-Ray<sup>+</sup> and/or physiological impairment → Evidence of ILD<sup>7</sup> or PVD<sup>4</sup></p> <p>Evidence of ILD<sup>7</sup> or PVD<sup>4</sup> → High Resolution CT scan<sup>+</sup> and CTPA<sup>5</sup> Consider echocardiogram if not already done</p> <p>Evidence of PVD<sup>4</sup> → Consider referral to specialist PH<sup>6</sup> service</p> <p>If no significant ILD<sup>7</sup> or PVD<sup>4</sup> to account for any disability consider other diagnoses, manage accordingly +/- discharge</p> <p><sup>1</sup> Intensive care unit <sup>2</sup> High dependency unit <sup>3</sup> Pulmonary embolism <sup>4</sup> Pulmonary vascular disease <sup>5</sup> CT Pulmonary angiogram <sup>6</sup> Pulmonary Hypertension <sup>7</sup> Interstitial lung disease</p> <p><b>Mild to moderate pneumonia – typically cared for on ward or in community*</b></p> <p><b>Discharge</b></p> <p>Send template letter with advice to see GP for assessment if experiencing persistent, new or progressive respiratory symptoms</p> <p><b>12 weeks after discharge - Step 1</b></p> <p>Pre-order Chest X-Ray - virtual clinic If diagnosed with PE<sup>3</sup>, combine follow up Chest X-Ray with post-PE<sup>3</sup> follow up*</p> <p>If abnormal CXR<sup>+</sup> pre-order full PFTs<sup>8</sup></p> <p>Step 2</p> <p>Clinical assessment* with PFT<sup>8</sup> review ^ If PE suspected proceed straight to CTPA<sup>5</sup> If PE not suspected, and patient clinically improving consider repeat Chest X-ray<sup>+</sup></p> <p>Any abnormality<sup>+</sup></p> <p>Evidence of ILD<sup>7</sup> or PVD<sup>4</sup> → High Resolution CT scan<sup>+</sup> and CTPA<sup>5</sup> Consider walk test Consider echocardiogram</p> <p>Evidence of PVD<sup>4</sup> → Consider referral to specialist PH<sup>6</sup> service</p> <p>If no significant ILD<sup>7</sup> or PVD<sup>4</sup> to account for any disability consider other diagnoses, manage accordingly +/- discharge</p> <p><sup>1</sup> If any suggestion of malignancy refer to cancer services <sup>2</sup> Consider Post-COVID-19 holistic assessment – see FAQ in document</p> <p><sup>3</sup> Pulmonary embolism <sup>4</sup> Pulmonary vascular disease <sup>5</sup> CT Pulmonary angiogram <sup>6</sup> Pulmonary Hypertension <sup>7</sup> Interstitial lung disease <sup>8</sup> Pulmonary function test</p>
<a href="#">Post-COVID-19 follow-up clinic: depicting chronicity of a new disease<sup>13</sup></a> Rovere-Querini, et al. July 2020	<ul style="list-style-type: none"> <li>A multi-disciplinary COVID-19 follow-up outpatient clinic for patients after COVID-19 hospitalisation.</li> <li>The team comprises internists, neurologists, psychiatrists, cardiologists, nutritionists and nephrologists.</li> <li>The multi-disciplinary assessment comprises a complete physical examination, respiratory, cardiovascular assessment, nutritional assessment, neurological examination including cognitive tests, and mental health assessment.</li> </ul>

Source	Summary								
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<a href="#">A Clinic Blueprint for Post-Coronavirus Disease 2019 RECOVERY: Learning From the Past, Looking to the Future<sup>10</sup></a>  Lutchmansingh, et al. Mar 2021	<ul style="list-style-type: none"> <li>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.</li> </ul> <div style="background-color: #e0f2ff; padding: 10px; border-radius: 10px;"> <p style="text-align: center;"><b>RECOVERY: CompREhensive Post-COVID CentER at Yale</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #f080bd; color: white; padding: 5px;">Referral Pathway</th> <th style="background-color: #ffd700; color: black; padding: 5px;">Initial Assessment</th> <th style="background-color: #90ee90; color: black; padding: 5px;">Subsequent Care</th> <th style="background-color: #a6c9e0; color: black; padding: 5px;">Disposition</th> </tr> </thead> <tbody> <tr> <td style="padding: 10px;"> <b>Inpatients (pre-discharge)</b> <ul style="list-style-type: none"> <li><b>Respiratory Assessment</b> <ul style="list-style-type: none"> <li>Ambulatory oximetry</li> <li>Pulse oximeter &amp; 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COVID-19 = coronavirus disease 2019; CPET = cardiopulmonary exercise testing; CTA = CT angiogram; Echo = echocardiogram; HRCT = high-resolution CT; OT = occupational therapy; PFT = pulmonary function test; PT = physical therapy; RECOVERY = Comprehensive Post-COVID Center at Yale; sx = symptoms; VQ = ventilation-perfusion scan.</small></p>	Referral Pathway	Initial Assessment	Subsequent Care	Disposition	<b>Inpatients (pre-discharge)</b> <ul style="list-style-type: none"> <li><b>Respiratory Assessment</b> <ul style="list-style-type: none"> <li>Ambulatory oximetry</li> <li>Pulse oximeter &amp; incentive spirometry training</li> </ul> </li> <li><b>Functional Assessment</b> <ul style="list-style-type: none"> <li>Physical &amp; occupational therapy evaluation</li> <li>Swallow evaluation</li> </ul> </li> <li><b>Care Coordination</b> <ul style="list-style-type: none"> <li>Arrange home services</li> <li>Address care barriers</li> </ul> </li> <li><b>Outpatients (ongoing sx)</b> <ul style="list-style-type: none"> <li>Referral by outpatient provider, occupational medicine provider, health system COVID-19 hotline, or self</li> </ul> </li> </ul>	<b>Visit 1 (telehealth)</b> <ul style="list-style-type: none"> <li>Pulmonary consultation</li> <li>Subjective sx assessment</li> <li>Assess for extrapulmonary complications</li> </ul> <b>Initial Diagnostics</b> <ul style="list-style-type: none"> <li>Repeat Imaging (HRCT)</li> <li>PFTs, 6MWT</li> <li>Repeat selected labs</li> </ul> <b>Visit 2 (face-to-face)</b> <ul style="list-style-type: none"> <li>Ongoing pulmonary care</li> <li>PT/OT assessment</li> <li>Subjective sx assessment</li> <li>Neurocognitive screening</li> <li>Mental health screening</li> <li>Additional subspecialty involvement</li> </ul>	<b>MD visits</b> <ul style="list-style-type: none"> <li>Planned 3, 6, and 12 mo or as needed per severity</li> <li>Extrapulmonary consultation as needed</li> </ul> <b>Rehab</b> <ul style="list-style-type: none"> <li>PT/OT outpatient care</li> <li>Pulmonary rehabilitation</li> </ul> <b>Lung function testing</b> <ul style="list-style-type: none"> <li>PFT &amp; 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<a href="#">Implementation and evaluation of a COVID-19 rapid follow-up service for patients discharged from the emergency department<sup>35</sup></a>	<ul style="list-style-type: none"> <li>Framework for a remote follow-up service for patients discharged from ED with suspected COVID-19 to: <ul style="list-style-type: none"> <li>support patient self-management in the community</li> <li>proactively identify deteriorating patients requiring reassessment</li> <li>form a pathway for patients requiring specialist follow-up.</li> </ul> </li> <li>Rapid remote follow-up pathway:</li> </ul>								

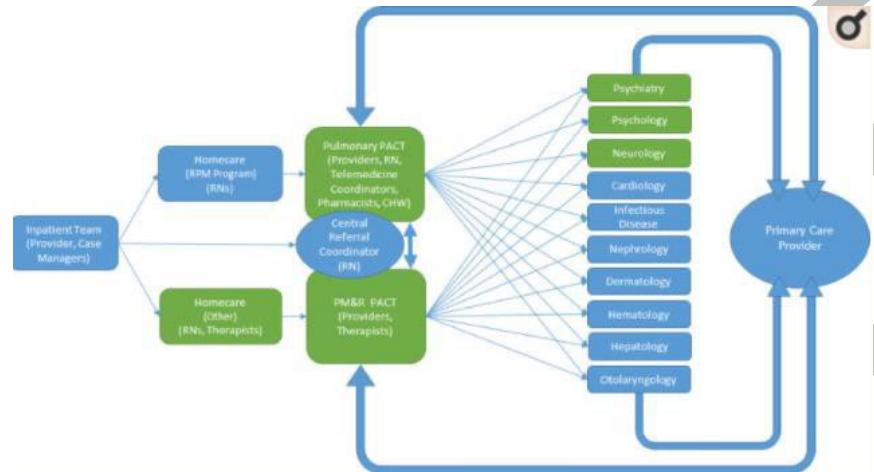
Source	Summary
<b>Post-acute care</b>	 <pre> graph TD     A[ED attender with suspected COVID-19] --&gt; B[EHRS report]     B --&gt; C[Telephone assessment]     C --&gt; D[Covid-19 confirmed or probable]     C --&gt; E[Covid-19 unlikely or uncertain]     D --&gt; F[High risk of deterioration]     D --&gt; G[Low risk of deterioration]     D --&gt; H[Deteriorating or concerning symptoms]     E --&gt; I[Ensure appropriate follow-up plan in place]     E --&gt; J[Discharge from COVID-19 service]     F --&gt; K[Further follow-up call(s) scheduled]     G --&gt; L[Discharged from regular follow-up, but ensure has safety-net number]     H --&gt; M[Recall for face-to-face assessment]     I --&gt; N[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]     J --&gt; O[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]   </pre> <p><b>ED attender with suspected COVID-19</b></p> <ul style="list-style-type: none"> <li>&gt; Safe for discharge from ED (all of): O<sub>2</sub> saturation ≥ 94 % and exercise desaturation &lt; 2%, HR &lt; 110, RR &lt; 23</li> <li>&gt; Criteria for considering pulse oximeter (any of): CRP &gt; 50; RR &gt; 20; O<sub>2</sub> saturation 94 or 95%; exercise desaturation &gt; 2%; typical significant COVID-19 radiological abnormalities</li> </ul> <p><b>EHRS report</b></p> <ul style="list-style-type: none"> <li>&gt; Identifies all ED discharges with COVID-19-related diagnosis and/or tested for SARS-CoV-2 in the ED</li> <li>&gt; Clinic doctor triages list and schedules patients for follow-up call within 36 hours of attendance</li> </ul> <p><b>Telephone assessment</b></p> <p>Patient calls into clinic via safety-net number provided in ED or during follow-up</p> <p><b>Covid-19 confirmed or probable (determined on swab result and/or clinical history and other results)</b></p> <p><b>Covid-19 unlikely or uncertain (determined on swab result, clinical history and other results)</b></p> <p><b>High risk of deterioration</b> (based on day of illness and clinical features)</p> <ul style="list-style-type: none"> <li>&gt; Further follow-up call(s) scheduled</li> </ul> <p><b>Low risk of deterioration</b></p> <ul style="list-style-type: none"> <li>&gt; Discharged from regular follow-up, but ensure has safety-net number</li> </ul> <p><b>Deteriorating or concerning symptoms</b></p> <ul style="list-style-type: none"> <li>&gt; Recall for face-to-face assessment</li> </ul> <p><b>Ensure appropriate follow-up plan in place</b></p> <ul style="list-style-type: none"> <li>&gt; Discharge from COVID-19 service</li> </ul> <p>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</p>
<a href="#">Retrospective and prospective monitoring in post COVID-19 complications and an approach for vigilance in Post-recovery period<sup>36</sup></a>  Rao, et al. Jun 2021	<ul style="list-style-type: none"> <li>• A narrative review article focusing on recovered COVID-19 patients, their complications, precautionary methods and post care.</li> </ul>

Source	Summary
<b>Post-acute care</b>	<pre> graph TD     A[Physicians Pharmacists Nurses] --&gt; C[Health Care System (Plan of action)]     B[Rehabilitation plan Dieticians Counselors] --&gt; C     C --&gt; D[Patient Health Record]     C --&gt; E[Guidelines for Therapy]     C --&gt; F[Preventive Care]     E --&gt; G[Post Recovery Healthy measures followed]     E --&gt; H[Fight against the complications in Post – recovery]     G --&gt; I["➤ Holistic approach ➤ Self Care ➤ Routine Care ➤ Specialty Care (as advised)"]     H --&gt; J["• Reducing long term damage to lungs (mainly) • Proactive interventions • Extreme care and support"]   </pre>
<p>A  <a href="#">Multidisciplinary NHS COVID-19 Service to Manage Post-COVID-19 Syndrome in the Community<sup>14</sup></a></p> <p>Parkin, et al. April 2021</p>	<ul style="list-style-type: none"> <li>• A unique integrated rehabilitation pathway was developed in the NHS.</li> <li>• 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).</li> </ul>

Source	Summary
<p><b>Post-acute care</b></p> <p><a href="#">Management of post-acute covid-19 in primary care<sup>17</sup></a></p> <p>Greenhalgh et al, Aug 2020</p>	<p>The infographic is titled "Long covid" in primary care: Assessment and initial management of patients with continuing symptoms. It features a central circular diagram showing a person with symptoms 3 or more weeks after covid-19 onset, surrounded by various clinical and social support sections.</p> <ul style="list-style-type: none"> <li><b>An uncertain picture:</b> The long term course of covid-19 is unknown. This graphic presents an approach based on evidence available at the time of publication. Caution is advised as patients may present atypically, and new treatments are likely to emerge.</li> <li><b>Clinical assessment:</b> Full history (from date of first symptom), Current symptoms (Nature and severity), Examination, for example: Temperature, Heart rate and rhythm, Blood pressure, Respiratory examination, Functional status, Pulse oximetry, Clinical testing (if indicated).</li> <li><b>Managing comorbidities:</b> Many patients have comorbidities including diabetes, hypertension, kidney disease or ischaemic heart disease. These need to be managed in conjunction with covid-19 treatment. Refer to condition specific guidance, available in the associated article by Greenhalgh and colleagues.</li> <li><b>Safety netting and referral:</b> The patient should seek medical advice if concerned, for example: Worsening breathlessness, <math>\text{PaO}_2 &lt; 96\%</math>, Unexplained chest pain, New confusion, Focal weakness. Specialist referral may be indicated, based on clinical findings, for example:       <ul style="list-style-type: none"> <li><b>Respiratory</b> if suspected pulmonary embolism, severe pneumonia</li> <li><b>Cardiology</b> if suspected myocardial infarction, pericarditis, myocarditis or new heart failure</li> <li><b>Neurology</b> if suspected neurovascular or acute neurological event</li> </ul> <b>Pulmonary rehabilitation</b> may be indicated if patient has persistent breathlessness following review.     </li> <li><b>Investigations:</b> Clinical testing is not always needed, but can help to pinpoint causes of continuing symptoms, and to exclude conditions like pulmonary embolism or myocarditis. Examples are provided below:       <ul style="list-style-type: none"> <li><b>Blood tests:</b> Full blood count, Electrolytes, Liver and renal function, Troponin, C reactive protein, Creatine kinase, D-dimer, Brain natriuretic peptides, Ferritin – to assess inflammatory and prothrombotic states</li> <li><b>Other investigations:</b> Chest x-ray, Urine tests, 12 lead electrocardiogram</li> </ul> </li> <li><b>Social, financial, and cultural support:</b> Prolonged covid-19 may limit the ability to engage in work and family activities. Patients may have experienced family bereavements as well as job losses and consequent financial stress and food poverty. See the associated article by Greenhalgh and colleagues for a list of external resources to help with these problems.</li> <li><b>Medical management:</b> Symptomatic, such as treating fever with paracetamol, Optimise control of long term conditions, Listening and empathy, Consider antibiotics for secondary infection, Treat specific complications as indicated.</li> <li><b>Self management:</b> Daily pulse oximetry, Attention to general health, Rest and relaxation, Self pacing and gradual increase in exercise if tolerated, Set achievable targets.</li> <li><b>Mental health:</b> In the consultation: Continuity of care, Avoid inappropriate medicalisation, Longer appointments for patients with complex needs if face to face if needed! In the community: Community linkworker, Patient peer support groups, Attached mental health support service, Cross-sector partnerships with social care, community services, faith groups.</li> </ul> <p>© 2020 BMJ Publishing Group Ltd. Read the full article online: <a href="https://bit.ly/BMjlong">https://bit.ly/BMjlong</a></p> <p>See more visual summaries: <a href="http://www.bmj.com/infographics">http://www.bmj.com/infographics</a></p>
<p><b>Post-acute COVID-19 syndrome<sup>37</sup></b></p> <p>Nalbandian, et al. March 2021</p>	<ul style="list-style-type: none"> <li>• Inter-disciplinary management of post-acute COVID-19.</li> </ul>

Source	Summary
<b>Post-acute care</b>	
<a href="#">Early rehabilitation in post-acute COVID-19 patients: data from an Italian COVID-19 Rehabilitation Unit and proposal of a treatment protocol<sup>38</sup></a>  Curci, et al. Jul 2020	<ul style="list-style-type: none"> <li>• Study proposed a post-acute COVID-19 rehabilitation protocol.</li> <li>• 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 FIO<sub>2</sub> needs at the admission: 1) patients wearing non-rebreather mask, Venturi mask or oxygen mask (FIO<sub>2</sub> ≥40% and &lt;60%); 2) patients without oxygen support devices or wearing nasal cannula (FIO<sub>2</sub> ≥21% and &lt;40%)</li> </ul>
<a href="#">Post-Acute Care Preparedness in a COVID-19 World<sup>39</sup></a>  Tumlinson, et al. Jun 2020	<ul style="list-style-type: none"> <li>• Framework of post-acute care identifying four stages:</li> </ul>

Source	Summary				
<b>Post-acute care</b>	<p style="text-align: center;"><b>Framework for Post-Acute Care Preparedness in a COVID-19 World: Key Strategies</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 10px; vertical-align: top;"> <b>Stage 1: Survive the Surge</b> <ol style="list-style-type: none"> <li>1. Outplace non-COVID patients in non-acute hospitals</li> <li>2. Assess capacity of SNFs and HHAs and other sources of care to enable hospital discharges for non-COVID patients</li> <li>3. Direct regional post-acute care providers to identify separate, specialized capacity for COVID-positive discharges</li> </ol> </td> <td style="width: 25%; padding: 10px; vertical-align: top;"> <b>Stage 2: Regroup and Prepare</b> <ol style="list-style-type: none"> <li>1. Protect vulnerable populations from COVID infection</li> <li>2. Prepare treat-in-place protocols for non-COVID admissions</li> <li>3. Create and formalize post-acute care COVID designations and create transfer protocols for various designations</li> </ol> </td> <td style="width: 25%; padding: 10px; vertical-align: top;"> <b>Stage 3: Restructure to Recovery</b> <ol style="list-style-type: none"> <li>1. Tap post-acute providers to participate in front lines of distribution and administration of prophylaxis, vaccinations</li> <li>2. Continue and deepen strategies to deliver non[en]COVID-related medical care at home and in residential care communities</li> <li>3. Prepare strategic plan for transition</li> </ol> </td> <td style="width: 25%; padding: 10px; vertical-align: top;"> <b>Stage 4: Redesign to Reality</b> <ol style="list-style-type: none"> <li>1. Create local hospital/ post-acute/public health advisory bodies</li> <li>2. Identify opportunities to optimize post-acute care at market level for system performance moving forward</li> <li>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</li> </ol> </td> </tr> </table>	<b>Stage 1: Survive the Surge</b> <ol style="list-style-type: none"> <li>1. Outplace non-COVID patients in non-acute hospitals</li> <li>2. Assess capacity of SNFs and HHAs and other sources of care to enable hospital discharges for non-COVID patients</li> <li>3. Direct regional post-acute care providers to identify separate, specialized capacity for COVID-positive discharges</li> </ol>	<b>Stage 2: Regroup and Prepare</b> <ol style="list-style-type: none"> <li>1. Protect vulnerable populations from COVID infection</li> <li>2. Prepare treat-in-place protocols for non-COVID admissions</li> <li>3. Create and formalize post-acute care COVID designations and create transfer protocols for various designations</li> </ol>	<b>Stage 3: Restructure to Recovery</b> <ol style="list-style-type: none"> <li>1. Tap post-acute providers to participate in front lines of distribution and administration of prophylaxis, vaccinations</li> <li>2. Continue and deepen strategies to deliver non[en]COVID-related medical care at home and in residential care communities</li> <li>3. Prepare strategic plan for transition</li> </ol>	<b>Stage 4: Redesign to Reality</b> <ol style="list-style-type: none"> <li>1. Create local hospital/ post-acute/public health advisory bodies</li> <li>2. Identify opportunities to optimize post-acute care at market level for system performance moving forward</li> <li>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</li> </ol>
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<a href="#"><u>Surviving COVID-19 in Bergamo province: a post-acute outpatient re-evaluation<sup>40</sup></u></a>  Venturelli, et al. Jan 2021	<ul style="list-style-type: none"> <li>• Dedicated outpatient service to follow-up patients with COVID-19.</li> <li>• Two-step assessment:           <ul style="list-style-type: none"> <li>◦ 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.</li> <li>◦ 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.</li> </ul> </li> </ul>				
<a href="#"><u>The Johns Hopkins Post-Acute COVID-19 Team (PACT): A Multidisciplinary, Collaborative, Ambulatory Framework Supporting COVID-19 Survivors<sup>41</sup></u></a>  Brigham, et al. Apr 2021	<ul style="list-style-type: none"> <li>• A multi-disciplinary approach grounded in a post-intensive care syndrome/post-hospital syndrome framework.</li> <li>• Post-acute COVID-19 team (PACT) referral criteria for COVID-19+ hospital discharges:</li> </ul> <pre> graph TD     A[Did patient require ICU-level care for at least 48 hours?] -- YES --&gt; B[FACIT ICU (Pulm and PM&amp;R combined) Referral + RPM (if indicated)]     A -- NO --&gt; C[Does patient have post-discharge rehab recommendations?]     C -- YES --&gt; B     C -- NO --&gt; D[PM&amp;R PACT BASE Referral + Homecare if indicated]     D -- YES --&gt; E[Does patient have pre-existing lung disease or any of the following?: (1) Significant persistent respiratory symptoms?, and/or (2) New oxygen requirement at discharge?, and/or (3) Inpatient pulmonary consult recommendations for PACT?]     E -- YES --&gt; F[Pulmonary PACT BASE Referral + RPM (if indicated)]     E -- NO --&gt; G[No additional PACT needs identified]   </pre> <ul style="list-style-type: none"> <li>• Key services and staff of the PACT team:</li> </ul>				

Source	Summary
<b>Post-acute care</b>	 <p>The diagram illustrates a complex network of healthcare providers connected to a central hub. At the center is a 'Central Referral Coordinator (RN)' node. Four arrows point from four different 'Homecare' nodes (IHPM Program RNs, Other RNs, Therapists, and Inpatient Team Provider Case Managers) to the central node. From the central node, multiple arrows point to various medical specialties: Psychiatry, Psychology, Neurology, Cardiology, Infectious Disease, Nephrology, Dermatology, Hematology, Hepatology, and Otolaryngology. A large blue arrow points from the central hub to a 'Primary Care Provider' node, which is also connected to a male patient icon.</p>
<a href="#">Establishment of a COVID-19 Recovery Unit in a Veterans Affairs Post-Acute Facility<sup>42</sup></a>  Sohn, et al. Oct 2020	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Deteriorating patients transfer back to acute care unit (hospital).</li> <li>Recovering patients repeat tested for COVID-19 weekly; when two consecutive tests performed 24-hours apart are negative, patient is discharged.</li> <li>Two wings, 25 beds each – one wing initial COVID-19 recovery unit and opposite wing reserved for ‘surge’.</li> </ul> <p><b>Veterans Affairs Greater Los Angeles COVID-19 Recovery Unit</b></p>  <p>The floor plan shows a building layout with color-coded zones: green for Clean Zone and pink for Dirty Zone. It includes a 'Soiled Utility Room', 'Clean Utility Room', 'Elevator', 'Active Wing', 'Surge Wing', 'PPE Station', 'Nurse's Station', and 'Closer Observation Rooms'. The plan illustrates how the building is divided into wings and how patient flow is managed through designated zones.</p>
<a href="#">How a Barcelona Post-Acute Facility became a Referral Center for Comprehensive Management of Subacute</a>	<ul style="list-style-type: none"> <li>Geriatric post-acute care (PAC) can be a key resource for responding to the COVID-19 pandemic as it offers: <ul style="list-style-type: none"> <li>an alternative to conventional hospitalisation, reducing burden on acute care</li> <li>active treatment for COVID-19, rehabilitation and palliative care</li> <li>better isolation of frail persons.</li> </ul> </li> <li>Overview of the older COVID-19 patient pathway in a post-acute care facility:</li> </ul>

Source	Summary
<b>Post-acute care</b>	
<u><a href="#">Patients With COVID-19<sup>43</sup></a></u> Inzatari, et al. Jul 2020	<p><b>Source (mainly 75+ years old)</b></p> <p><b>COVID-19 patients' management at the post-acute care facility</b></p> <ul style="list-style-type: none"> <li><b>Assess</b> <ul style="list-style-type: none"> <li>Mini-Comprehensive Geriatric Assessment (functional, mental, social), CFS¹</li> <li>PCR, X-Ray/blood testing, if needed</li> </ul> </li> <li><b>Revise Advanced Care Planning (ACP)</b> Mark desirable Intensity of care² in the Health Electronic Records</li> <li><b>Treat (balanced options)</b> <ul style="list-style-type: none"> <li>Active treatment</li> <li>Symptoms control</li> <li>Management of geriatric syndromes (delirium, immobility)</li> <li>Intensity of care 4-5² (CFS¹ 8-9) → Palliative care (family visits allowed)</li> </ul> </li> <li><b>Post-COVID rehabilitation</b> <ul style="list-style-type: none"> <li>After the acute phase → Early mobilization</li> <li>Previously walking independently, without advanced dementia/active delirium → Fast-track (7-10 days multi-component mainly resistance and respiratory)</li> <li>Others → Conventional geriatric rehabilitation</li> </ul> </li> <li><b>Discharge</b> <ul style="list-style-type: none"> <li>Pre-discharge information to primary care</li> <li>Specialized home care if needed</li> </ul> </li> <li>Communication, staff-caregiver (phone), patient-family/friends (phone, video)</li> <li>Psychological support</li> <li>Ethical framework</li> <li>Care of staff (PPE, training, PCR testing, psychological support)</li> </ul> <p><small><sup>1</sup>Clinical Frailty Scale (CFS), 0-9, no frailty-terminal disease (Rockwood K, et al., CMAJ 2005) <sup>2</sup>Levels of desirable Intensity of Care, 1-5, any possible option-comfort care (Sachs GA, et al, JAGS 1995)</small></p>

APRCH

**Table 2 Grey literature**

Source	Summary
<b>Peer reviewed sources</b>	
<p><a href="#">Care of People with Post-Acute COVID<sup>6</sup></a></p> <p>National COVID-19 Clinical Evidence Task Force. June, 2021</p>	<p>These recommendations provide guidance for the goals of care, assessment and management of symptoms post-acute COVID-19.</p> <p><b>CARE OF PEOPLE WITH POST-ACUTE COVID-19</b></p> <p>The document cover features the 'NATIONAL COVID-19 CLINICAL EVIDENCE TASKFORCE' logo and 'VERSION 3.0 PUBLISHED 3 JUNE 2021'. It includes a legend: EBR (Evidence-Based Recommendation), CBR (Consensus-Based Recommendation), and PP (Practice Point). The background text discusses the variety of symptoms that may arise in the weeks or months following acute COVID-19, noting that our understanding of risk of the illness and effective management approaches is still emerging. It emphasizes the importance of communication with the patient and the care team, and highlights the need for coordinated care involving a multidisciplinary team.</p> <p><b>Goals of Care</b></p> <ul style="list-style-type: none"> <li><b>COMMUNICATION</b>: Due to the broad range of effects of post-acute COVID-19, a biopsychosocial approach to care, within the local context, is important. Validate the patient's experience and offer information about the symptoms that they are experiencing, including management options. <b>PP</b> [Taskforce]</li> <li><b>COORDINATED CARE</b>: The primary health care team is well placed to coordinate person-centered care and should remain a central point in the care team along with the person's carer or significant other. Best practice would include a multidisciplinary team. This could be accessed through community health, rehabilitation programs or post COVID-19 clinics, where these are available. <b>PP</b> [Taskforce]. Use case conferences to facilitate coordinated care. <b>PP</b> [Taskforce]</li> <li><b>ACCESS TO CARE</b>: This flowchart should be applied after considering features of the individual, their preferences and the context in terms of rurality/remoteness, public health responses and proximity to rehabilitation or higher-level care. For those needing active rehabilitation involving a larger centre or specialist care could be considered. Use of virtual care, including telehealth, should be considered. <b>PP</b> [Taskforce]</li> </ul> <p><b>Assessment</b></p> <ul style="list-style-type: none"> <li><b>MANAGING RISK OF INFECTION</b>: Confirm all the criteria for release from isolation have been met for both the person and any others/associates presenting with them. Ensure appropriate personal protective equipment (PPE) is worn if: <ul style="list-style-type: none"> <li>the criteria for release from isolation have not been met;</li> <li>there has been recent close contact with a confirmed positive case of COVID-19;</li> <li>there are clinical symptoms suggestive of potential re-infection.</li> </ul> <b>PP</b> [NHV HealthPathway]</li> <li><b>WHAT IS THE PROBABILITY DIAGNOSIS?</b>: Confirm that the person had COVID-19 (by checking that they had a PCR positive test), or is likely to have had COVID-19 (by checking that they have had symptoms consistent with a SARS-CoV-2 infection and/or have had contact with a positive case or high-risk setting). Document details of the acute illness.</li> <li><b>ASSESSMENT OF RED FLAGS</b>: Exclude red flag symptoms that could indicate the need for emergency assessment for serious complication of COVID-19. Red flag symptoms include severe, new onset, or worsening breathlessness or hypoxia, unexplained chest pain, palpitations or arrhythmias, new delirium, or focal neurological signs or symptoms. <b>PP</b> [NHV HealthPathway]</li> <li><b>SYMPOMS AND SIGNS THAT HAVE BEEN DESCRIBED POST ACUTE COVID-19</b>: Investigate symptoms as per usual care. <b>CBR</b> [Taskforce]. The following symptoms and signs have been described by people post acute COVID-19 [1-7]: <ul style="list-style-type: none"> <li><b>Pulmonary symptoms</b>: Shortness of breath, Cough</li> <li><b>Neurological symptoms</b>: Fatigue, Headache, Cognitive dysfunction, Sleep disturbance, Loss of smell, Paresthesia</li> <li><b>Renal disease</b></li> <li><b>Thromboembolism</b></li> <li><b>Psychological symptoms</b>: Anxiety, Depression, Mood swings</li> <li><b>Cardiac symptoms</b>: Chest pain</li> <li><b>Musculoskeletal symptoms</b>: Non-specific pain, Myalgia</li> <li><b>Fever</b>: Low grade fevers</li> </ul> <p>In some people, symptoms may indicate ongoing or worsening acute COVID-19. If goals of care include active disease management, please see recommendations for the treatment of COVID-19 in our <a href="#">Living guidelines</a>. <b>EBR</b> [Taskforce]</p> <p><b>Reduced activity and functional level</b></p> <p><b>Reduced nutritional status and weight loss</b></p> <p><b>Post-intensive care syndrome (PICS)</b>: PICS refers to one or more of the following symptoms that people experience following the receipt of care in an ICU. Symptoms may include anxiety, depression, cognitive impairment, confusion, fatigue, weakness, dysphagia and reduced quality of life [8-10]. In some people, both adults and children, symptoms corresponding to a multisystem inflammatory syndrome (CDC 2021) have been reported. [7] This list of symptoms and signs will be updated as new evidence emerges.</p> </li> </ul>
<p><a href="#">Physiotherapy management for COVID-19 in the acute hospital setting: Recommendations to guide clinical practice<sup>44</sup></a></p> <p>Australian Physiotherapy Association. March, 2020</p>	<p>This document outlines recommendations for physiotherapy management for COVID-19 in the acute hospital setting.</p> <p>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.</p>

Source	Summary
<b>Peer reviewed sources</b>	
<a href="#">COVID-19: Evaluation and management of adults following acute viral illness<sup>30</sup></a>  UpToDate. August, 2021 Updated February 2022	<p>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:</p> <ul style="list-style-type: none"> <li>- Acute COVID-19: up to four weeks following the onset of illness.</li> <li>- 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.</li> </ul>
<a href="#">Caring for adult patients with post-COVID-19 conditions<sup>45</sup></a>  The Royal Australian College of General Practitioners. October, 2020  Updated December 2021	<p>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.</p>
<a href="#">COVID-19 rapid guideline: managing the long-term effects of COVID-19<sup>7</sup></a>  National Institute for Health and Care Excellence, December 2020  Updated November 2021	<p>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.</p>
<a href="#">National guidance for post-COVID syndrome assessment clinics<sup>46</sup></a>  National Health Service, UK Government. April, 2020	<p>The purpose of this guidance is to inform the commissioning of post-COVID-19 syndrome assessment clinics.</p> <p>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.</p>
<a href="#">In the wake of the pandemic: preparing for Long COVID<sup>8</sup></a>	<p>A policy brief which raises awareness of long COVID-19 and provides recommendation for policy makers on the:</p> <ul style="list-style-type: none"> <li>• need for multi-disciplinary, multispecialty approaches to assessment and management</li> </ul>

Source	Summary
<b>Peer reviewed sources</b>	
World Health Organization, May 2021	<ul style="list-style-type: none"> <li>• development, in association with patients and their families, of new care pathways and contextually appropriate guidelines for health professionals.</li> <li>• creation of appropriate services, including rehabilitation and online support tools</li> <li>• 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</li> <li>• involving patients both to foster self-care and self-help</li> <li>• 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.</li> </ul>
<p><a href="#"><u>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?</u></a><sup>9</sup></p> <p>National Health Library and Knowledge Service. May, 2021.</p>	<p>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:</p> <ul style="list-style-type: none"> <li>• 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 <math>\geq 12</math> weeks, and are not explained by an alternative diagnosis. Significant physical, psychological, and cognitive impairments may persist despite clinical resolution of the infection.</li> <li>• Post-acute COVID-19 rehabilitation will assume increasing importance as a surge of patients are discharged from hospital, placing a burden on health systems.</li> <li>• 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.</li> <li>• Emerging literature emphasises the importance of assessment of post-acute COVID-19 patients after discharge; and of preparedness with appropriate clinical rehabilitation pathways.</li> <li>• 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.</li> </ul>
<p><a href="#"><u>Management of adults with COVID-19 in the post-acute phase: A model of care for NSW health clinicians</u></a></p>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>

Source	Summary
<b>Peer reviewed sources</b>	
NSW Health. 2021 <sup>16</sup>	

**Table 3. Omicron impact on health system**

Source	Summary
<b>Peer reviewed sources</b>	
<a href="#">Characteristics and outcomes of hospitalized patients in South Africa during the COVID-19 Omicron wave compared with previous waves</a>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
Maslo, et al. 2021 <sup>23</sup>	
<a href="#">Hospitalisation risk for Omicron cases in England</a>	<ul style="list-style-type: none"> <li>This is a report from the MRC Centre for Global Infectious Disease Analysis, Jameel Institute, Imperial College London.</li> <li>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.</li> </ul>
Ferguson, et al. 2021 <sup>24</sup>	
<a href="#">Omicron: severity and VE</a>	<ul style="list-style-type: none"> <li>This report estimates that there is an overall reduction in risk of hospitalisation for Omicron relative to Delta of 25%-65% depending on endpoint.</li> <li>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.</li> </ul>
<a href="#">Imperial College COVID-19 Response Team. 2022<sup>25</sup></a>	
<a href="#">Update 72 – SARS-CoV-2 variant of concern Omicron</a>	<ul style="list-style-type: none"> <li>An update from WHO on the Omicron variant</li> <li>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.</li> </ul>
WHO. 2022 <sup>47</sup>	
<a href="#">Early assessment of the clinical severity of the SARS-CoV-2 omicron variant in South Africa: a data linkage study</a>	<ul style="list-style-type: none"> <li>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.</li> </ul>
Wolter, et al. 2021 <sup>19</sup>	

<a href="#">Severity of Omicron variant of concern and vaccine effectiveness against symptomatic disease: national cohort with nested test negative design study in Scotland</a>	<ul style="list-style-type: none"> <li>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.</li> </ul>
Sheikh, et al. 2021 <sup>22</sup> <a href="#">Comparison of outcomes from COVID infection in pediatric and adult patients before and after the emergence of Omicron</a>	<ul style="list-style-type: none"> <li>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. <ul style="list-style-type: none"> <li>Emergency department (ED) visit: 4.55% vs. 15.22% (risk ratio or RR: 0.30, 95% CI: 0.28–0.33)</li> <li>hospitalization: 1.75% vs. 3.95% (RR: 0.44, 95% CI: 0.38–0.52])</li> <li>ICU admission: 0.26% vs. 0.78% (RR: 0.33, 95% CI: 0.23–0.48)</li> <li>mechanical ventilation: 0.07% vs. 0.43% (RR: 0.16, 95% CI: 0.08–0.32)</li> </ul> </li> <li>Patients in the Omicron cohort had fewer comorbidities and adverse social determinants of health compared to the Delta cohort.</li> </ul>
<a href="#">Reduced risk of hospitalisation associated with infection with SARS-CoV-2 Omicron relative to Delta: a Danish cohort study</a>	<ul style="list-style-type: none"> <li>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</li> </ul>
Bager, et al. 2022 <sup>21</sup> <a href="#">Clinical severity of COVID-19 patients admitted to hospitals in Gauteng, South Africa during the Omicron-dominant fourth wave</a>	<ul style="list-style-type: none"> <li>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%).</li> </ul>
Jassat, et al. 2021 <sup>18</sup> <a href="#">Omicron severity: milder but not mild</a>	<ul style="list-style-type: none"> <li>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.</li> </ul>
<a href="#">Early estimates of SARS-CoV-2 Omicron variant severity based on a matched cohort study, Ontario, Canada</a>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
Ulloa, et al. 2022 <sup>20</sup>	

## Appendix

### PubMed search terms

Search 1:

(((((follow-up[title] OR recovery\*[title]) AND (algorithm\*[title/abstract] OR program\*[title/abstract] OR model\*[title/abstract] OR framework\*[title/abstract]))) AND (english[Filter]) AND (COVID-19[Title/Abstract] AND (acute[Title/Abstract] OR subacute[Title/Abstract] OR postacute[Title/Abstract]))) NOT (animal))

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

Inclusion	Exclusion
<ul style="list-style-type: none"><li>Published advice / models of care for COVID-19 patient journeys in the subacute and post-acute setting</li><li>Post discharge from acute care</li></ul>	<ul style="list-style-type: none"><li>Opinion letter, case reports</li></ul>

Original search 13 September 2021	Updates
25 January 2021	<ul style="list-style-type: none"><li>Search re-run</li><li>Additional search on Omicron variant and its impact on health system including subacute care</li><li>New relevant publications added to table</li><li>In-brief updated to reflect new evidence</li></ul>

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**Evidence checks are archived a year after the date of publication**