



The following information resources have been selected by the National Health Library and Knowledge Service Evidence Virtual Team in response to your question. The resources are listed in our estimated order of relevance to practicing healthcare professionals confronted with this scenario in an Irish context. In respect of the evolving global situation and rapidly changing evidence base, it is advised to use hyperlinked sources in this document to ensure that the information you are disseminating to the public or applying in clinical practice is the most current, valid and accurate. For further information on the methodology used in the compilation of this document -including a complete list of sources consulted- please see our [National Health Library and Knowledge Service Summary of Evidence Protocol](#).

YOUR QUESTION

What is the potential role of post-acute telerehabilitation for COVID-19 patients?

IN A NUTSHELL

Telerehabilitation may be employed both in the acute phase of COVID-19 patient care and also in the post-acute phase. COVID-19 patients may experience ongoing health concerns such as: respiratory; central nervous system and cognitive; deconditioning; critical-illness related myopathy and neuropathy; dysphagia; joint stiffness and pain; and psychiatric problems¹⁵.

Societal guidance on the implementation of telerehabilitation is available from the World Confederation for Physical Therapy¹, the Chartered Society of Physiotherapists (UK)³, the British Thoracic Society⁶ and the American Thoracic Society⁸. The European Respiratory Society has also developed an expert-based opinion on early and short-term rehabilitative interventions in the post-acute setting for COVID-19 survivors which is a living guideline and is continuously updated². A range of technological solutions have been put forward as facilitators of telerehabilitation including instructional videos, videoconferencing, live streaming and online guidance¹¹⁻¹⁹. An article by Verduzco-Gutierrez et al., outlines a system-based approach to performing and documenting a physical exam via telemedicine; and examples of special tests that may be performed during telemedicine physical examination¹³.

The limitations of telerehabilitation are also discussed in the literature; these limitations include: availability of equipment; technical malfunctions; potential for inadvertent personal data disclosure; limited scope for physical examination; and the reliance on patients to be able to attend, communicate and interact¹⁵.



IRISH AND INTERNATIONAL GUIDANCE

[World Confederation for Physical Therapy \(2020\) \[Website\] COVID-19 Practice Based Resources¹](#)

The World Confederation for Physical Therapy has developed a collection of COVID-19 practice-based resources. The resources feature a dedicated section on digital physical therapy and telehealth:

- WCPT and INPTRA report on [Digital Physical Therapy Practice](#) with the aim of helping physiotherapists to work appropriately and effectively online
- PEDro list of [systematic reviews published in the last 5 years that evaluate the effects of tele-physiotherapy](#)
- Telehealth toolbox guide on [how to use telehealth to care for your patients during COVID-19](#)

The WCPT also includes a link to the report of an ad-hoc international task force of the European Respiratory Society to develop [expert-based opinion on early and short-term rehabilitative interventions \[after the acute hospital setting\] in COVID-19 survivors²](#). This is a living document and includes: What do we know? ; What don't we know? ; and a preliminary expert-based conclusion and recommendations based on current knowledge.

Section 4 of this document is particularly relevant and includes:

4.10

During the first 6-8 weeks in a patient's home-environment, presumably infectious patients are recommended to perform only low-intensity physical activity or exercises [including functional strengthening; consider using ≤ 3 points for dyspnoea and/or fatigue on modified 0-10 points Borg scale] if a formal exercise assessment has not yet been completed. Use of ICT solutions for safe communication between patient and healthcare professional should be considered.

4.18

Monitoring of pre-existing comorbid conditions in COVID-19 survivors during rehabilitation is warranted to guarantee safety of the rehabilitative interventions and to optimize the health of these patients. This may require availability of a multidisciplinary team of medical specialists.



[Chartered Society of Physiotherapy \(UK\) \(2020\) \[Website\] COVID-19: guide for rapid implementation of remote consultations³](#)

Includes practical advice for physiotherapists and support workers on how to implement remote consultations rapidly and efficiently.

Remote consultations include video consultations — eg Skype, FaceTime, WhatsApp or other commercial products — telephone consultations, email and mobile messaging. Setting up remote consultation options normally requires time, planning and incremental introduction; however, in these extenuating circumstances the CSP endorses a more rapid approach to implementation to minimise risk of exposure to SARS-CoV-2 to patients, the public and HCWs.

Only in the case of management of acutely unwell COVID-19 patients in support of discharge from hospital or for emergency symptoms should a patient be physically seen. Clinicians should use their professional judgement to make decisions about the most appropriate consultation method on an individual basis.

[Irish Society of Chartered Physiotherapists \(2020\) \[Website\] Member Update: COVID-19 \(Coronavirus\)⁴](#)

The ISCP provides FAQs including links to guidelines for rehabilitating the COVID-19 patient and a section on e-health. See especially the [ISCP Policy on eHealth](#).

[Canadian Physiotherapy Association \(2020\) \[Website\] Tele-Rehabilitation⁵](#)

The CPA lists telehealth options for physiotherapists including webinars detailing how to implement remote sessions for clients.

[British Thoracic Society \(2020\) COVID-19 Information for the Respiratory Community⁶](#)

A range of resources including: a sample consent form for the use of electronic communication to provide telehealth service; a fact-sheet on cybersecurity risks; and a webinar providing an overview of the evidence for telerehabilitation for individuals living with neurological conditions.

[British Lung Foundation \(2020\) ‘Stay Active, Stay Well’⁷](#)

The ‘Stay Active, Stay Well’ programme has been designed for people living with a long-term lung condition. Exercises at 3 levels are available to the patient via video links. An exercise handbook and diary are available for the patient to download and keep account of activities.

[American Thoracic Society \(2020\) Pulmonary Rehabilitation Resources in a Complex and Rapidly Changing World⁸](#)

The ATS guideline sets out models to help patients initiate or continue rehabilitative programs in collaboration with a clinical team. A number of remotely delivered PR



models are available with some published evidence of their efficacy. Remote PR should deliver the essential components of pulmonary rehabilitation including exercise training, education and behaviour change:

1. A home-based telephone rehabilitation model using highly structured calls delivered by a health professional trained in motivational interviewing.
2. The UCSF PR program has transitioned to a Zoom video-based exercise training model. The approach targets stable patients who have been screened as clinically appropriate for such an approach: eg those without cardiovascular contraindications, fall risk or cognitive impairment. The document lists aerobic and resistive exercises suitable for clients with COPD and asthma with detailed schedules appended.

[Lee et al \(2020\) COVID-19 and the advancement of digital physical therapist practice and telehealth⁹](#)

The authors assert that advantages, limitations, current evidence, regulatory issues, academic implications and recommendations for future opportunities in digital physical therapist practice prior to COVID-19 should be considered. With a paucity of evidence available in the wake of COVID-19, it is not possible to recommend condition specific digital practice standards. Hence, guiding principles should be reviewed by the physical therapy profession until such evidence is available. Ethical principles of autonomy, social justice and the phenomenological meaning of digital practice for service users and their families were identified by the authors as needs which must be taken into account by rehabilitation providers even during the COVID-19 crisis.

[Zhao et al \(9 April 2020\) Recommendations for respiratory rehabilitation in adults with COVID-19¹⁰](#)

These Chinese clinical guidelines provide 5 recommendations to guide clinical practice and form the basis for respiratory rehabilitation of the COVID-19 patient:

1. for inpatients with COVID-19, respiratory rehabilitation would relieve the symptoms of dyspnea, anxiety and depression and eventually improve physical functions and the quality of life;
2. for severe/critical inpatients, early respiratory rehabilitation is not suggested;
3. for patients in isolation, respiratory rehabilitation guidance should be conducted through educational videos, instruction manuals, or remote consultation;
4. assessment and monitoring should be performed throughout the respiratory rehabilitation process;
5. proper grade protection should be used following the present guidelines.

The authors suggest: “For patients in the isolation ward, educational videos, self-management booklets and remote consultation are recommended during respiratory

rehabilitation to reduce the usage of protective equipment and avoid cross-infection. Integrated rehabilitation using multiple methods can be employed in patients who meet the recovery criteria and are no longer under quarantine observation based on their indications and condition.” These recommendations state that booklets and videos can be used for patient education to explain the importance, specifics and precautions of respiratory rehabilitation to increase patient compliance.

Section VI addresses respiratory rehabilitation treatment for discharged patients:

1. Mild and ordinary patients after discharge
2. Severely or critically ill patients after discharge

Exclusion criteria, exercise termination criteria and rehabilitation evaluation are outlined.

INTERNATIONAL LITERATURE

[Mukaino et al \(8 April 2020\) \[Letter\] Staying Active in Isolation: Telerehabilitation for Individuals With the SARS-CoV-2 Infection¹¹](#)

The authors describe how a telerehabilitation system was used to deliver exercise opportunities to 4 hospitalized individuals [aged 19–66, median age 53 years; two male] who were infected with SARS-CoV-2 during the outbreak on the Diamond Princess cruise ship and were subsequently isolated. The telerehabilitation equipment consisted of an android tablet computer connected to the Internet, a pulse oximeter connected to the tablet via Bluetooth—both of which were located in the participant’s room—and a desktop computer in the therapist’s room. Using videoconferencing and remote-control software [TeamViewer], a physical therapist guided each individual in a 20-minute exercise program. The participants were simply asked to wear the pulse oximeter and launch the remote control software at the scheduled time; the physical therapist then accessed the tablet from the host computer and started the exercise program which consisted of stretching, muscle strengthening and balance exercises directed by a video program with real-time instructions provided by the physical therapist. A movie file of the video exercise program was pre-installed on the tablet to allow for possible instability of the Internet connection. The exercise session was successfully completed by all participants without any issues or complications and participants expressed satisfaction with the exercise programme. This type of telerehabilitation system can be easily assembled using a combination of affordable technologies and could mitigate against decline in the functional status of isolated individuals.



[Coraci et al \(3 April 2020\) \[Letter\] Global approaches for global challenges: The possible support of rehabilitation in the management of COVID-19¹²](#)

The authors emphasise the importance of rehabilitation in the post-acute phase to counter the long-term bio- psycho- social consequences of COVID-19 and adaptation of rehabilitation programmes. The suggested holistic approach addresses how specifically the patient was affected — for example if the pulmonary damage is associated with neurological impairment, the programs usually developed for pure respiratory diseases would not be sufficient for the patient's recovery. The authors describe rehabilitation programmes that may be suitable for patients to undertake in their own home with the aid of simple self-administered exams. Further, they suggest that the programmes should be supported by telerehabilitation systems based on electronic applications with the capacity to make efficient the communication between patients, caregivers and healthcare professionals without direct contact. “Hence, rehabilitation enlarges its usual field of action, representing a model for secondary and tertiary prevention, and can be a potential aid in the control of COVID- 19 diffusion.”

[Verduzco-Gutierrez et al \(15 April 2020\) How to Conduct an Outpatient Telemedicine Rehabilitation or Prehabilitation Visit¹³](#)

The authors outline the experience of physiatrists in conducting synchronous/real-time telemedicine visits. Practical considerations around organising the visit are discussed such as ensuring that patients receive instructions prior to the visit on how to access the platform and that a test call is performed in advance. The authors recommend that the physician should start the visit by confirming the patient’s identity, obtaining verbal consent for telemedicine and providing a brief orientation to telemedicine. The authors suggest that the telemedicine visit should incorporate features that constitute current practice for an in-person visit with the physician maintaining a professional appearance and demeanour, eye contact and nonverbal cues. It is suggested that telemedicine enables the viewing of the home environment which may be beneficial to the physician and patient. The visit should be documented as per usual practice. The authors provide tables which outline a system-based approach to performing and documenting a physical exam via telemedicine; and examples of special tests that may be performed during telemedicine physical examination.

[Amatya and Khan \(March 2020\) \[Commentary\] Medical Rehabilitation in Pandemics: Towards a New Perspective¹⁴](#)

“Currently there are no guidelines as to how long a patient remains contagious following clinical recovery. The option of rehabilitation in the patient’s home may be limited by inability to manage high acuity patients with COVID-19. Therefore, care models where institutions provide ‘hospital at home’ services are more feasible. Delivery of ambulatory care services will need to use telemedicine rather than face-to-



face care model where possible. This will have significant impact on patients and families/carers, and healthcare system at large.”

[Simpson and Robinson \(10 April 2020\) Rehabilitation following critical illness in people with COVID-19 infection](#)¹⁵

This review article features a dedicated section on innovative approaches to providing rehabilitation during the COVID-19 pandemic with specific focus on virtual rehabilitation. The authors cite the advantages of virtual outpatient care: eg avoiding settings such as waiting rooms and not coming into contact with a healthcare professional who may be carrying COVID-19 asymptomatically and may have inadvertently become a super spreader. Virtual care circumvents these issues and allows personalized consultation and treatment via telephone or live Internet connections; or via pre-recorded sessions for more generic materials. In some countries, well developed, secure virtual care platforms already exist; in others, media such as Zoom, Skype, FaceTime and others may be suitable alternatives. The limitations of virtual care are also discussed: availability of equipment; technical malfunctions; potential for inadvertent personal data disclosure; limited scope for physical examination; and the reliance on patients to be able to attend, communicate and interact. The authors assert that rehabilitation providers should start to consider the scope and limitations of virtual physical examinations and make patients expressly aware of the options it presents.

[Carda et al \(18 April 2020\) \[Letter\] The role of physical and rehabilitation medicine in the COVID-19 pandemic: the clinician's view](#)¹⁶

The authors emphasize the importance of a prompt response from physical medicine and rehabilitation (PMR) specialists as being crucial to reducing COVID-19 related disability. The authors cite ongoing health concerns that COVID-19 patients may experience: respiratory; central nervous system and cognitive; deconditioning; critical-illness related myopathy and neuropathy; dysphagia; joint stiffness and pain; and psychiatric problems. In respect of virtual rehabilitation, the authors strongly advise implementing tele-consultation and tele-rehabilitation devices, minimizing exposure risk and implementing communication technologies to help patients and families reduce barriers imposed by isolation. The following criteria for admission to PMR are suggested: 1. ≥ 7 days from diagnosis of COVID-19; 2. at least 72 hours with no fever and no fever-reducing medication; 3. stable RR and SatO₂; and 4. clinical and/or radiological evidence of stability [CT-scan or lung ultrasonography]. During rehabilitation, RR and SatO₂ in COVID-19 patients should be monitored on a regular basis to quickly identify clinical degradation.

[Wainwright and Low M \(29 April 2020\) \[Letter\] Beyond acute care: Why collaborative self-management should be an essential part of rehabilitation pathways for COVID-19 patients](#)¹⁷

The authors emphasise the importance of collaborative self-management strategies and an interdisciplinary approach to COVID-19 patients in order to support longer-term rehabilitation. The authors suggest that patients will need specific advice on activity pacing and managing the fatigue associated with recovery from acute viral illness and associated complications. Supporting resources and information for patients should be made available through a number of sources including online guidance, live streaming and video consultations as technological systems allow. “In whatever guise, it is clear that the blending of disciplines across healthcare systems are warranted to align with the interdisciplinary needs of our patients”.

[Smith et al \(13 April 2020\) \[Uncorrected Manuscript\] Home and Community-Based Physical Therapist Management of Adults With Post-Intensive Care Syndrome¹⁸](#)

The authors suggest that critically unwell COVID-19 patients may develop Post-Intensive Care Syndrome and provides recommendations for rehabilitation of such patients outside of the acute and post-acute inpatient settings. The authors report the prevalence and clinical presentation of PICS and provide guidance regarding physical examination and outcomes measures, care plans and intervention strategies. When devising a plan of care it is proposed that: “The physical therapist must also consider the impact of cognitive and/or mental health impairments. To optimize the rehabilitation plan, incorporation of strategies to compensate for problems with memory, problem solving, organization, anxiety and/or depression are essential. Commonly employed strategies may include repetition of essential messages, establishing comprehension by having the person paraphrase or repeat back to the physical therapist and providing handouts that communicate instructions in a manner optimal for the person. In some situations, it may be of value to combine physical and cognitive rehabilitation as improved outcomes in both areas have been observed.”

[Li \(24 April 2020\) Rehabilitation management of patients with COVID-19. Lessons learned from the first experiences in China¹⁹](#)

The authors discuss how reasonable rehabilitation programmes need scientific research to avoid arbitrary conclusions. Rehabilitation is a discipline that aims at improving function; it is one of the anchors of the medical system of prevention, treatment and rehabilitation in China. How to bring rehabilitation into full play in the treatment of COVID- 19 and draw a successful conclusion to this unprecedented battle is discussed. Effects of rehabilitation in each stage of COVID- 19 are outlined by the authors. Rehabilitation in the recovery period is detailed with remote rehabilitation being promoted for community and home settings. Breakthroughs in ‘smart’ rehabilitation including robots and telemedicine are mentioned as having helped advanced the process of recovery.



PAPERS RELATING TO TELEHEALTH FOR CARDIAC REHABILITATION

- [Percy et al \(2020\) Post-Discharge Cardiac Care in the Era of Coronavirus 2019: How Should We Prepare?²⁰](#)
- [Yeo et al \(2020\) Have a heart during the COVID-19 crisis: Making the case for cardiac rehabilitation in the face of an ongoing pandemic²¹](#)
- [Babu et al \(2020\) COVID-19: A Time for Alternate Models in Cardiac Rehabilitation to Take Centre Stage²²](#)
- [Thomas et al \(2020\) Future-proofing cardiac rehabilitation: Transitioning services to telehealth during COVID-19²³](#)

Produced by the members of the National Health Library and Knowledge Service Evidence Team[†]. Current as at 10 May 2020. This evidence summary collates the best available evidence at the time of writing and **does not replace clinical judgement or guidance**. Emerging literature or subsequent developments in respect of COVID-19 may require amendment to the information or sources listed in the document. Although all reasonable care has been taken in the compilation of content, the National Health Library and Knowledge Service Evidence Team makes no representations or warranties expressed or implied as to the accuracy or suitability of the information or sources listed in the document. This evidence summary is the property of the National Health Library and Knowledge Service and subsequent re-use or distribution in whole or in part should include acknowledgement of the service.

The following PICO(T) was used as a basis for the evidence summary:

P Population person location condition/patient characteristic	COVID-19 PATIENTS
I Intervention length location type	POST-ACUTE TELE-REHABILITATION
C Comparison another intervention no intervention location of the intervention	
O Outcome	

The following search strategy was used:

EMTREE: telemedicine/ or telehealth/ or teleconsultation/ or telerehabilitation/
 MeSH: telemedicine; remote consultation
 Keywords: rehabilitation OR rehabilitative OR physical therapy OR physiotherapy OR physical medicine OR exercise therapy OR mobilisation OR exercise prescription) AND (digital OR virtual OR mobile OR remote OR internet OR web OR electronic OR technol* OR online OR ehealth OR telehealth OR tele-health OR Telerehab* OR tele-rehab* OR telephone OR phone OR tele-consult* OR teleconsult* OR telemed* OR telecommunication OR video-consultation OR video-consulting OR videoconference OR video OR videos OR wearable device OR virtual reality OR App OR application OR artificial intelligence OR live streaming OR webcams OR Zoom OR Facetime)

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- ³ Chartered Society of Physiotherapy (UK) <https://www.csp.org.uk/publications/covid-19-guide-rapid-implementation-remote-consultations> Accessed 19/06/2020.
- ⁴ Irish Society of Chartered Physiotherapists https://www.iscp.ie/covid-19#news_page_accordion-block-14 Accessed 08/05/2020.
- ⁵ Canadian Physiotherapy Association <https://physiotherapy.ca/tele-rehabilitation> Accessed 08/05/2020.
- ⁶ British Thoracic Association <https://brit-thoracic.org.uk/about-us/covid-19-information-for-the-respiratory-community/> Accessed 08/05/2020.
- ⁷ www.blf.org.uk <https://www.blf.org.uk/support-for-you/keep-active/exercise-video> Accessed 08/05/2020.
- ⁸⁸ Pulmonary Rehabilitation Resources in a Complex and Rapidly Changing World Prepared by Chris Garvey NP, Anne Holland PT, PhD and Judy Com, MSED, ATS Staff Accessed 08/05/2020.
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