# Evidence Search Service Results of your search request

## The long term health impacts of covid-19

**ID of request:** 22943  
**Date of request:** 23rd April, 2020  
**Date of completion:** 28th April, 2020

If you would like to request any articles or any further help, please contact:  Kaye Bagshaw at [kaye.bagshaw@nhs.net](mailto:kaye.bagshaw@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: The long term health impacts of covid-19. Kaye Bagshaw. (28th April, 2020). LONDON, UK: Newcomb Library Library and Information Service.

**Sources searched**  
CINAHL (20)  
MEDLINE (36)

**Date range used** (5 years, 10 years): All   
**Limits used** (gender, article/study type, etc.): None   
**Search terms and notes** (full search strategy for database searches below):

Broadened the search to include post intensive care syndrome

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### [B. Search History](#SearchHistory)

## A. Original Research

1. **A model for a ventilator-weaning and early rehabilitation unit to deal with post-ICU impairments with severe COVID-19.**  
   Levy Jonathan Annals of physical and rehabilitation medicine 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=09674c53034421d8d4995a064f70e683)

1. **Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms.**  
   Troyer Emily A. Brain, behavior, and immunity 2020;:No page numbers.

The coronavirus disease 19 (COVID-19) pandemic is a significant psychological stressor in addition to its tremendous impact on every facet of individuals' lives and organizations in virtually all social and economic sectors worldwide. Fear of illness and uncertainty about the future precipitate anxiety- and stress-related disorders, and several groups have rightfully called for the creation and dissemination of robust mental health screening and treatment programs for the general public and front-line healthcare workers. However, in addition to pandemic-associated psychological distress, the direct effects of the virus itself (several acute respiratory syndrome coronavirus; SARS-CoV-2), and the subsequent host immunologic response, on the human central nervous system (CNS) and related outcomes are unknown. We discuss currently available evidence of COVID-19 related neuropsychiatric sequelae while drawing parallels to past viral pandemic-related outcomes. Past pandemics have demonstrated that diverse types of neuropsychiatric symptoms, such as encephalopathy, mood changes, psychosis, neuromuscular dysfunction, or demyelinating processes, may accompany acute viral infection, or may follow infection by weeks, months, or longer in recovered patients. The potential mechanisms are also discussed, including viral and immunological underpinnings. Therefore, prospective neuropsychiatric monitoring of individuals exposed to SARS-CoV-2 at various points in the life course, as well as their neuroimmune status, are needed to fully understand the long-term impact of COVID-19, and to establish a framework for integrating psychoneuroimmunology into epidemiologic studies of pandemics.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=7a84df534a54c42860087b2474e9028b)

1. **Covid-19 and Physical and Rehabilitation Medicine.**  
   Borg Kristian Journal of Rehabilitation Medicine (Stiftelsen Rehabiliteringsinformation) 2020;52(4):1-1.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=59791f6eba6e707995a0a576bfadeeb1)

1. **Covid-19 and Post Intensive Care Syndrome: A Call for Action.**  
   Stam Henk J. Journal of rehabilitation medicine 2020;52(4):jrm00044.

Although we are currently overwhelmed by the astonishing speed of infection of the Covid-19 pandemic, and the daily onslaught of new, and ever-worsening predictions, it is vital that we begin to prepare for the aftershocks of the pandemic. Prominent among this will be the cohort of post-intensive case survivors who have been mechanically ventilated and will like experience short- and medium-term consequences. The notion that patients surviving intensive care and mechanical ventilation for several weeks can be discharged home without further medical attention is a dangerous illusion. Post Intensive Care Syndrome and other severe conditions will require not only adequate screening but early rehabilitation and other interventions. Action must be taken now to prepare for this inevitable aftershock to the healthcare system.

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1. **COVID-19 pandemic: what consequences for cardiac rehabilitation?**  
   Vigorito Carlo Monaldi archives for chest disease = Archivio Monaldi per le malattie del torace 2020;90(1):No page numbers.

The ongoing COVID-19 pandemic spreading all around the world has stressed over its capabilities and determined profound changes in the health systems in all countries and has caused hundreds of thousand deaths. Health professionals have been called to a tremendous effort to deal with this emergency, often contaminating or succumbing themselves to the disease.

1. **Covid-19, Coronavirus and Mental Health Rehabilitation at Times of Crisis.**  
   Chaturvedi Santosh K. Journal of psychosocial rehabilitation and mental health 2020;:1-2.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=cf55bec15d734fcd4d6c80cdcb815629)

1. **Department of rehabilitation medicine in Shanghai response for coronavirus disease 2019: the impact and challenges.**  
   Zhong Zongye European journal of physical and rehabilitation medicine 2020;:No page numbers.

1. **Early pulmonary rehabilitation for SARS-CoV-2 pneumonia: Experience from an intensive care unit outside of the Hubei province in China.**  
   Zhu Chengrui Heart & lung : the journal of critical care 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=601b54bdc40fd4bb4ca5b5f6622f9bf9)

1. **Editorial: Covid-19 and Physical and Rehabilitation Medicine.**  
   Borg Kristian Journal of rehabilitation medicine 2020;52(4):jrm00045.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=49dfe8348d84d1a217c4f4d11bd00e55)

1. **Effect and enlightenment of rehabilitation medicine in COVID-19 management.**  
   Li Jianan European journal of physical and rehabilitation medicine 2020;:No page numbers.

Corona virus disease 2019 (COVID-19) is a new disease characterized by lung damage and involvement in multiple tissues and organs in the whole body. Some of the patients may have long-term impairment and dysfunctions, including pulmonary fibrosis, heart, liver, kidney, nerve and immune system. Rehabilitation has certain beneficial effect in the acute stage, and especially in the recovery stage, including improving respiratory function, exercise endurance, self-care in daily living activities, as well as psychological support, etc. Rehabilitation is not offside or absent. A reasonable rehabilitation program needs scientific research to avoid arbitrary conclusions.

1. **Epidemic of COVID-19 in China and associated Psychological Problems.**  
   Ahmed Md Zahir Asian journal of psychiatry 2020;51:102092.

The world is experiencing pandemic of the COVID-19 now, a RNA virus that spread out from Wuhan, China. Two countries, China first and later Italy, have gone to full lock down due to rapid spread of this virus. Till to date, no epidemiological data on mental health problems due to outbreak of the COVID-19 and mass isolation were not available. To meet this need, the present study was undertaken to assess the mental health status of Chinese people. An online survey was conducted on a sample of 1074 Chinese people, majority of whom from Hubei province. Lack of adequate opportunities to conduct face to face interview, anxiety, depression, mental well-being and alcohol consumption behavior were assessed via self-reported measures. Results showed higher rate of anxiety, depression, hazardous and harmful alcohol use, and lower mental wellbeing than usual ratio. Results also revealed that young people aged 21-40 years are in more vulnerable position in terms of their mental health conditions and alcohol use. To address mental health crisis during this epidemic, it is high time to implement multi-faceted approach (i.e. forming multidisciplinary mental health team, providing psychiatric treatments and other mental health services, utilizing online counseling platforms, rehabilitation program, ensuring certain care for vulnerable groups, etc.).

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1. **First impact on services and their preparation. "Instant paper from the field" on rehabilitation answers to the Covid-19 emergency.**  
   Boldrini Paolo European journal of physical and rehabilitation medicine 2020;:No page numbers.

This paper reports the immediate impact of the epidemic on rehabilitation services in Italy, the first country in Europe hit by Covid-19. In a country with almost 5,000 Physical and Rehabilitation Medicine physicians, the webinar had 230 live viewers (4.5%), and more than 8,900 individual visualizations of the recorded version. The overall inadequate preparation of the rehabilitation system to face a sudden epidemic was clear, and similar to that of the acute services. The original idea of confining the Covid-19 cases to some areas of rehabilitation wards and/or hospitals, preserving others, proved not to be feasible. Continuous reorganization and adaptation were required due to the rapid changes. Overall, rehabilitation needs had to surrender to the more acute emergency, with total conversion of beds, wards and even hospitals. The quarantine needs heavily involved also outpatient services that were mostly closed. Rehabilitation professionals needed support, but also acted properly, again similarly to what happened in the acute wards. The typical needs of rehabilitation, such as human and physical contacts, but also social interactions including patient, team, family and caregivers, appeared clearly in the current unavoidable need of being suppressed. These notes could serve the preparation of other services worldwide.

1. **Global approaches for global challenges: The possible support of rehabilitation in the management of COVID-19.**  
   Coraci Daniele Journal of medical virology 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=77d78d6391f656da7ffd5e9a48b726c7)

1. **Have a heart during the COVID-19 crisis: Making the case for cardiac rehabilitation in the face of an ongoing pandemic.**  
   Yeo Tee Joo European journal of preventive cardiology 2020;:2047487320915665.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=720b75f54f66f1356cd285512c8aad3b)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=3f077f254681fb61a1e8f2528b00a33a)

1. **Home and Community-Based Physical Therapist Management of Adults With Post-Intensive Care Syndrome.**  
   Smith James M. Physical therapy 2020;:No page numbers.

More than 4 million adults survive a stay in the intensive care unit each year, with many experiencing new or worsening physical disability, mental health problems, and/or cognitive impairments, known as the post-intensive care syndrome (PICS). Given the prevalence and magnitude of physical impairments after critical illness, many survivors, including those recovering from COVID-19, could benefit from physical therapist services after hospital discharge. However, due to the relatively recent recognition and characterization of PICS, there may be limited awareness and understanding of PICS among physical therapists practicing in home healthcare and community-based settings. This lack of awareness may lead to inappropriate and/or inadequate rehabilitation service provision. While this perspective article provides information relevant to all physical therapists, it is aimed toward those providing rehabilitation services outside of the acute and post-acute inpatient settings. This article reports the prevalence and clinical presentation of PICS and provides recommendations for physical examination and outcomes measures, plan of care, and intervention strategies. The importance of providing patient and family education, coordinating community resources including referring to other healthcare team members, and community-based rehabilitation service options is emphasized. Finally, this perspective article discusses current challenges for optimizing outcomes for people with PICS and suggests future directions for research and practice.

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1. **Long-term bone and lung consequences associated with hospital-acquired severe acute respiratory syndrome: a 15-year follow-up from a prospective cohort study.**  
   Zhang Peixun Bone research 2020;8:8.

The most severe sequelae after rehabilitation from SARS are femoral head necrosis and pulmonary fibrosis. We performed a 15-year follow-up on the lung and bone conditions of SARS patients. We evaluated the recovery from lung damage and femoral head necrosis in an observational cohort study of SARS patients using pulmonary CT scans, hip joint MRI examinations, pulmonary function tests and hip joint function questionnaires. Eighty medical staff contracted SARS in 2003. Two patients died of SARS, and 78 were enrolled in this study from August 2003 to March 2018. Seventy-one patients completed the 15-year follow-up. The percentage of pulmonary lesions on CT scans diminished from 2003 (9.40 ± 7.83)% to 2004 (3.20 ± 4.78)% (P < 0.001) and remained stable thereafter until 2018 (4.60 ± 6.37)%. Between 2006 and 2018, the proportion of patients with interstitial changes who had improved pulmonary function was lower than that of patients without lesions, as demonstrated by the one-second ratio (FEV1/FVC%, t = 2.21, P = 0.04) and mid-flow of maximum expiration (FEF25%-75%, t = 2.76, P = 0.01). The volume of femoral head necrosis decreased significantly from 2003 (38.83 ± 21.01)% to 2005 (30.38 ± 20.23)% (P = 0.000 2), then declined slowly from 2005 to 2013 (28.99 ± 20.59)% and plateaued until 2018 (25.52 ± 15.51)%. Pulmonary interstitial damage and functional decline caused by SARS mostly recovered, with a greater extent of recovery within 2 years after rehabilitation. Femoral head necrosis induced by large doses of steroid pulse therapy in SARS patients was not progressive and was partially reversible.

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1. **Novel Coronavirus Pneumonia (COVID-19) Progression Course in 17 Discharged Patients: Comparison of Clinical and Thin-Section CT Features During Recovery.**  
   Han Xiaoyu Clinical infectious diseases : an official publication of the Infectious Diseases Society of America 2020;:No page numbers.

BACKGROUNDTo retrospectively analyze the evolution of clinical features and thin-section CT imaging of novel coronavirus pneumonia (COVID-19) in 17 discharged patients.METHODSSerial thin-section CT scans of 17 discharged patients with COVID-19 were obtained during recovery. Longitudinal changes of clinical parameters and CT pattern were documented in all patients during 4 weeks since admission. CT score was used to evaluate the extent of the disease.RESULTSThere was a marked improvement of fever, lymphocytes count, C-reactive protein and erythrocyte sedimentation rate within the first two weeks since admission. However, the mean CT score rapidly increased from the 1st to 3rd week, with a top score of 8.2 obtained in the 2nd week. During the 1st week, the main CT pattern was ground-glass opacities (GGO,76.5%). The frequency of GGO (52.9%) decreased in the 2nd week. Consolidation and mixed patterns (47.0%) were noted in the 2nd week. Thereafter, consolidations generally dissipated into GGO and the frequency of GGO increased in the 3rd week (76.5%) and 4th week (71.4%). Opacities were mainly located in the peripheral (76.5%), subpleural (47.1%) zones of the lungs, and presented as focal (35.3%) or multifocal (29.4%) in the 1st week and became more diffuse in the 2nd (47.1%) and 3rd week (58.8%), then showed reduced extent in 4th week (50%).CONCLUSIONSThe progression course of CT pattern was later than the clinical parameters within the first two weeks since admission; however, there was a synchronized improvement in both clinical and radiologic features in the 4th week.

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1. **Persistent viral RNA positivity during recovery period of a patient with SARS-CoV-2 infection.**  
   Yang Jian-Rong Journal of medical virology 2020;:No page numbers.

As an emerging infectious disease, the clinical course and virological course of SARS-CoV-2 infection remain to be further investigated. In this case report, we described a case of SARS-CoV-2 infection with clinical course more than two months. This patient had recovered from the pneumonia after treatment. The viral RNA of throat swabs became negative and the viral specific antibodies were produced during recovery period. However, the viral RNA reappeared and additionally persisted in throat swabs for more than 40 days. In addition, the viral RNA was detected in multiple types of specimens with extremely high titers in the saliva. In conclusion, these findings indicate that SARS-CoV-2 can cause a long clinical course. The coexistence of viral RNA and viral specific antibodies may imply an immune evasion of SARAS-CoV-2 from host's immune system. This article is protected by copyright. All rights reserved.

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1. **Post-Discharge Cardiac Care in the Era of Coronavirus 2019: How Should We Prepare?**  
   Percy Edward The Canadian journal of cardiology 2020;:No page numbers.

The novel coronavirus 2019 (COVID-19) pandemic has placed intense pressure on healthcare organizations around the world. Amongst others, there has been an increasing recognition of common and deleterious cardiovascular effects of COVID-19 based on preliminary studies. Furthermore, patients with pre-existing cardiac disease are likely to experience a more severe disease course with COVID-19. As case numbers continue to increase exponentially, a surge in the number of patients with new or comorbid cardiovascular disease will translate into more frequent, and in some cases, prolonged rehabilitation needs following acute hospitalization. This manuscript describes the current status of post-discharge cardiac care in Canada and provides suggestions with regards to steps that policymakers and healthcare organizations can take to prepare for the COVID-19 pandemic.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=aa6ff21c159cd2fb7996164c1951ff69)

1. **Post-discharge surveillance and positive virus detection in two medical staff recovered from coronavirus disease 2019 (COVID-19), China, January to February 2020.**  
   Xing Yuanyuan Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin 2020;25(10):No page numbers.

Since December 2019, 62 medical staff of Zhongnan Hospital in Wuhan, China have been hospitalised with coronavirus disease 2019. During the post-discharge surveillance after clinical recovery, swabs were positive in two asymptomatic cases (3.23%). Case 1 had presented typical clinical and radiological manifestations on admission, while manifestation in Case 2 was very mild. In conclusion, a small proportion of recovered patients may test positive after discharge, and post-discharge surveillance and isolation need to be strengthened.

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1. **Recommendations for respiratory rehabilitation in adults with COVID-19.**  
   Zhao Hong-Mei Chinese medical journal 2020;:No page numbers.

Coronavirus disease-2019 (COVID-19) is a highly infectious respiratory disease that leads to respiratory, physical, and psychological dysfunction in patients. Respiratory rehabilitation is an important intervention as well as cure for clinical patients. With increased understanding of COVID-19 and the accumulation of clinical experience, we proposed recommendations for respiratory rehabilitation in adults with COVID-19 based on the opinions of frontline clinical experts involved in the management of this epidemic and a review of the relevant literature and evidence. Our recommendations are as follows: 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. These recommendations can guide clinical practice and form the basis for respiratory rehabilitation in COVID-19 patients.

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1. **Rehabilitation and respiratory management in the acute and early post-acute phase. "Instant paper from the field" on rehabilitation answers to the Covid-19 emergency.**  
   Kiekens Carlotte European journal of physical and rehabilitation medicine 2020;:No page numbers.

Covid-19 is a respiratory infectious disease that can cause respiratory, physical and psychological long-term dysfunctions in patients. First recommendations on respiratory management were published, but they were not based on the specific needs due to Covid-19. In this paper we share the early experiences from the clinical field in Northern Italy, where the epidemic started in February. This paper summarizes the second webinar on Covid-19 (230 live attendees, 11,600 viewers of the recorded version) organized by the Italian Society of Physical and Rehabilitation Medicine about rehabilitation and in particular respiratory management in the acute (Intensive Care Unit - ICU) and immediate post-acute phases. There is the need to prepare for the post-acute phase. ICU length of stay is relatively long, with immobilisation in prone position. Some specific problems are described, including severe muscle weakness and fatigue, joint stiffness, dysphagia, (neuro)psychological problems, impaired functioning concerning mobility, activities of daily life and work. A lot is yet unknown and patients can experience long-term consequences as we know from the literature on the post-intensive care syndrome, but Covid-19 has unique features to be investigated and understood. As one colleague stated during the Covinar: this is a marathon, not a sprint….

1. **Rehabilitation following critical illness in people with COVID-19 infection.**  
   Simpson Robert American journal of physical medicine & rehabilitation 2020;:No page numbers.

The current COVID-19 pandemic will place enormous pressure on healthcare systems around the world. Large numbers of people are predicted to become critically ill with acute respiratory distress syndrome (ARDS) and will require management in intensive care units (ICUs). High levels of physical, cognitive and psychosocial impairments can be anticipated. Rehabilitation providers will serve as an important link in the continuum of care, helping move patients on from acute sites to eventual discharge to the community. Likely impairment patterns, considerations for healthcare practitioner resilience, and organization of services to meet demand are discussed. Innovative approaches to care, such as virtual rehabilitation, are likely to become common in this environment.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=992bdf47c60b0dc1c48543f533585064)

1. **REHABILITATION OF COVID-19 PATIENTS.**  
   Brugliera Luigia Journal of Rehabilitation Medicine (Stiftelsen Rehabiliteringsinformation) 2020;52(4):1-3.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=59791f6eba6e707995a0a576bfadeeb1)

1. **Systematic rapid "living" review on rehabilitation needs due to covid-19: update to march 31st 2020.**  
   Ceravolo Maria G. European journal of physical and rehabilitation medicine 2020;:No page numbers.

BACKGROUNDThe outbreak of Covid-19 epidemics has challenged the provision of health care worldwide, highlighting the main flaws of some national health systems with respect to their capacity to cope with the needs of frail subjects. People experiencing disability due to Covid-19 express specific rehabilitation needs that deserve a systematic evidence-based approach.OBJECTIVESTo provide the rehabilitation community with updates on the latest scientific literature on rehabilitation needs due to Covid-19. The first rapid "living" review will present the results of a systematic search performed up to March 31st, 2020.METHODSA systematic search on PubMed, Pedro and Google Scholar was performed using the search terms: "Covid-19", "Coronavirus", "severe acute respiratory syndrome coronavirus 2", "rehabilitation", "physical therapy modalities", "exercise", "occupational therapy", and "late complications". Papers published up to March 31st, 2020, in English, were included.RESULTSOut of the 2758 articles retrieved, 9 were included in the present review. Four of them are "calls for action", 3 provide recommendations about rehabilitation interventions in the acute phase, 2 address the needs of people quarantined at home or with restricted mobility due to the lockdown, and 1 provides a Core Outcome Set to be used in clinical trials to test the efficacy of health strategies in managing Covid-19 patients.CONCLUSIONSAll selected papers were based on previous literature and not on the current Covid-19 pandemic. Main messages included: 1) early rehabilitation should be granted to inpatients with Covid-19; 2) people with restricted mobility due to quarantine or lockdown should receive exercise programs to reduce the risk of frailty, sarcopenia, cognitive decline and depression; 3) telerehabilitation may represent the first option for people at home. Further updates are warranted in order to characterize the emerging disability in Covid-19 survivors and the adverse effects on the health of chronically disabled people.

1. **The role of physical and rehabilitation medicine in the COVID-19 pandemic: the clinician's view.**  
   Carda Stefano Annals of physical and rehabilitation medicine 2020;:No page numbers.

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1. **Approaches to Addressing Post-Intensive Care Syndrome among Intensive Care Unit Survivors. A Narrative Review.**  
   Brown Samuel M. Annals of the American Thoracic Society 2019;16(8):947-956.

Critical illness can be lethal and devastating to survivors. Improvements in acute care have increased the number of intensive care unit (ICU) survivors. These survivors confront a range of new or worsened health states that collectively are commonly denominated post-intensive care syndrome (PICS). These problems include physical, cognitive, psychological, and existential aspects, among others. Burgeoning interest in improving long-term outcomes for ICU survivors has driven an array of potential interventions to improve outcomes associated with PICS. To date, the most promising interventions appear to relate to very early physical rehabilitation. Late interventions within aftercare and recovery clinics have yielded mixed results, although experience in heart failure programs suggests the possibility that very early case management interventions may help improve intermediate-term outcomes, including mortality and hospital readmission. Predictive models have tended to underperform, complicating study design and clinical referral. The complexity of the health states associated with PICS suggests that careful and rigorous evaluation of multidisciplinary, multimodality interventions-tied to the specific conditions of interest-will be required to address these important problems.

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1. **FOLLOW-UP SERVICES FOR IMPROVING LONG-TERM OUTCOMES IN INTENSIVE CARE UNIT (ICU) SURVIVORS – A COCHRANE REVIEW SUMMARY WITH COMMENTARY.**  
   KIEKENS Carlotte Journal of Rehabilitation Medicine (Stiftelsen Rehabiliteringsinformation) 2019;51(11):879-882.

The aim of this commentary is to discuss in a rehabilitation perspective the published Cochrane Review "Follow-up services for improving long-term outcomes in intensive care unit (ICU) survivors" known collectively as post-intensive care syndrome (PICS by Schofield-Robinson et al. (1), under the direct supervision of the Cochrane Effective Practice and Organisation of Care Group. This Cochrane Corner is produced in agreement with the Journal of Rehabilitation Medicine by Cochrane Rehabilitation.

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1. **Optimizing Post-Intensive Care Unit Rehabilitation.**  
   Held Natalie Turk Toraks Dergisi / Turkish Thoracic Journal 2019;20(2):147-152.

Survivors of intensive care unit (ICU) admission face unique challenges after hospital discharge. In addition to an increased overall mortality and rates of hospital readmission, patients often experience difficulties in physical functioning, cognition, and mental health, which are collectively termed post-intensive care syndrome. To this date, there are no established strategies to address these deleterious outcomes. A number of studies have examined various unique methods to prevent and treat PICS symptoms, including early physical and occupational therapy, providing post-discharge education, or facilitating routine follow up in post-ICU clinics. These trials have yet to demonstrate any substantial or meaningful effect in post-ICU patients and collectively reinforce the need for further research to identify effective intervention for patients who survive critical illness.

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1. **Post-intensive care syndrome (PICS): Why you need to know about it...Canadian Association of Critical Care Nurses' Dynamics of Critical Care Conference 2019, September 16-18, 2019, Halifax, Nova Scotia.**  
   Chahal Jagdeep Canadian Journal of Critical Care Nursing 2019;30(2):20-20.

Purpose/goals: This presentation will introduce critical care nurses to Post-Intensive Care Syndrome (PICS) and discuss what can be done to mitigate the inadvertent physical, cognitive and psychological symptoms present after surviving critical illness. The goal of this session is to aid critical care nursing dialogue with institutional leaders on methods of optimizing intensive care unit (ICU) survivorship in respective settings. Pre-requisites: It is beneficial to have a basic understanding of critical care nursing practices for the general medical adult intensive care unit (ICU) population before attending a session on post-intensive care syndrome (PICS). Outcome 1: Discuss post-intensive care syndrome (PICS) with the interdisciplinary team involved in rehabilitation care planning Outcome 2: Identify the best strategies of post-intensive care syndrome (PICS) prevention, identification and rehabilitation during the critical care stay, during the ward-based care, and before discharge home Outcome 4: Apply coordination of an of an intensive care unit (ICU) survivorship care pathway in respective hospital settings Session description: As intensive care unit (ICU) mortality decreases, it has been reported that over half of ICU survivors inadvertently experience post-intensive care syndrome (PICS). Comprehensive and consistent strategies to prevent, recognize and treat the physical, cognitive and psychological symptoms of PICS are in development in many clinical settings nationally and internationally. There exists little research focusing on the implementation of PICS care pathways at the individual institutional level. This session will begin with a theoretical review on available PICS rehabilitation literature. The framework for this session will be the National Institute for Health and Clinical Excellence (NICE) 2009 Guideline on rehabilitation after critical illness. The NICE guidance cohorts strategies of PICS prevention, recognition, and treatment/rehabilitation into five stages. The stages of the ICU care pathway presented by the NICE guidelines and utilized in this session for discussion are during the critical care stay, before critical care discharge, during ward-based care, and before discharge to home or community care. The session will relay proposed strategies of PICS prevention, recognition, and treatment and rehabilitation through a case scenario of a critically ill patient within the four stages of an ICU care pathway. As well, data from a pilot study that utilized the NICE guidelines on a rehabilitation after critical illness audit tool and nursing roles in ICU survivorship care planning will be discussed.

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1. **Post–intensive care syndrome: A review of preventive strategies and follow-up care.**  
   Fernandes Andre American Journal of Health-System Pharmacy 2019;76(2):119-122.

The authors discuss strategies for prevention and management of post-intensive care syndrome through medication management, post-intensive care follow-up clinics, and public and professional awareness. Proper pain, agitation, sedation, and glycemic management should be priority in the intensive care unit (ICU). Hypoglycemia and hyperglycemia in critically-ill patients are linked with poor long-term cognitive function. Effective pain management has been linked with reduced ICU length of stay.

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1. **After intensive care: A realistic look at recovery.**  
   Anon. Mayo Clinic Health Letter 2018;36(4):6-6.

This article focuses on recovery following intensive care for critical illness. It discusses the physical and psychological impacts of intensive care unit (ICU) treatment, the development of post-intensive care syndrome (PICS) after an ICU stay, signs and symptoms of PICS, and ways to minimize the impact of ICU treatment.

1. **Altered Lipid Metabolism in Recovered SARS Patients Twelve Years after Infection.**  
   Wu Qi Scientific reports 2017;7(1):9110.

Severe acute respiratory syndrome-coronavirus (SARS-CoV) and SARS-like coronavirus are a potential threat to global health. However, reviews of the long-term effects of clinical treatments in SARS patients are lacking. Here a total of 25 recovered SARS patients were recruited 12 years after infection. Clinical questionnaire responses and examination findings indicated that the patients had experienced various diseases, including lung susceptibility to infections, tumors, cardiovascular disorders, and abnormal glucose metabolism. As compared to healthy controls, metabolomic analyses identified significant differences in the serum metabolomes of SARS survivors. The most significant metabolic disruptions were the comprehensive increase of phosphatidylinositol and lysophospha tidylinositol levels in recovered SARS patients, which coincided with the effect of methylprednisolone administration investigated further in the steroid treated non-SARS patients with severe pneumonia. These results suggested that high-dose pulses of methylprednisolone might cause long-term systemic damage associated with serum metabolic alterations. The present study provided information for an improved understanding of coronavirus-associated pathologies, which might permit further optimization of clinical treatments.

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1. **Follow-up chest radiographic findings in patients with MERS-CoV after recovery.**  
   Das Karuna M. The Indian journal of radiology & imaging 2017;27(3):342-349.

PURPOSETo evaluate the follow-up chest radiographic findings in patients with Middle East respiratory syndrome coronavirus (MERS-CoV) who were discharged from the hospital following improved clinical symptoms.MATERIALS AND METHODSThirty-six consecutive patients (9 men, 27 women; age range 21-73 years, mean ± SD 42.5 ± 14.5 years) with confirmed MERS-CoV underwent follow-up chest radiographs after recovery from MERS-CoV. The 36 chest radiographs were obtained at 32 to 230 days with a median follow-up of 43 days. The reviewers systemically evaluated the follow-up chest radiographs from 36 patients for lung parenchymal, airway, pleural, hilar and mediastinal abnormalities. Lung parenchyma and airways were assessed for consolidation, ground-glass opacity (GGO), nodular opacity and reticular opacity (i.e., fibrosis). Follow-up chest radiographs were also evaluated for pleural thickening, pleural effusion, pneumothorax and lymphadenopathy. Patients were categorized into two groups: group 1 (no evidence of lung fibrosis) and group 2 (chest radiographic evidence of lung fibrosis) for comparative analysis. Patient demographics, length of ventilations days, number of intensive care unit (ICU) admission days, chest radiographic score, chest radiographic deterioration pattern (Types 1-4) and peak lactate dehydrogenase level were compared between the two groups using the student t-test, Mann-Whitney U test and Fisher's exact test.RESULTSFollow-up chest radiographs were normal in 23 out of 36 (64%) patients. Among the patients with abnormal chest radiographs (13/36, 36%), the following were found: lung fibrosis in 12 (33%) patients GGO in 2 (5.5%) patients, and pleural thickening in 2 (5.5%) patients. Patients with lung fibrosis had significantly greater number of ICU admission days (19 ± 8.7 days; P value = 0.001), older age (50.6 ± 12.6 years; P value = 0.02), higher chest radiographic scores [10 (0-15.3); P value = 0.04] and higher peak lactate dehydrogenase levels (315-370 U/L; P value = 0.001) when compared to patients without lung fibrosis.CONCLUSIONLung fibrosis may develop in a substantial number of patients who have recovered from Middle East respiratory syndrome coronavirus (MERS-CoV). Significantly greater number of ICU admission days, older age, higher chest radiographic scores, chest radiographic deterioration patterns and peak lactate dehydrogenase levels were noted in the patients with lung fibrosis on follow-up chest radiographs after recovery from MERS-CoV.

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1. **After Critical Care: Challenges in the Transition to Inpatient Rehabilitation.**  
   Merbitz Nancy Hansen Rehabilitation Psychology 2016;61(2):186-200.

Purpose/Objective: The aftermath of treatment for critical illness and/or critical injury in the intensive care unit (ICU) often includes persisting cognitive and emotional morbidities as well as severe physical deconditioning (a constellation termed post-intensive care syndrome, or PICS), but most patients do not receive psychological services before they enter the inpatient rehabilitation facility (IRF). Although a burgeoning literature guides the efforts of critical care providers to reduce risk factors for PICS - for example, reducing the use of sedatives and enacting early mobilization, there is need for a corresponding awareness among IRF psychologists and other providers that the post-ICU patient often arrives in a state of significantly reduced capacity, with persisting cognitive impairments and acute psychological distress. Many are at risk for long-term complications of posttraumatic stress disorder, general anxiety and/or clinical depression, and assuredly all have experienced a profound life disruption. This paper offers a multilevel perspective on the adaptation of post-ICU patients during inpatient rehabilitation, with discussion of the psychologist's role in education and intervention. Research Method/Design: Clinical review paper. Results: NA. Conclusions: To optimize response to rehabilitation, it is important to understand the behavior of post-ICU patients within a full biopsychosocial context including debility, cognitive and emotional impairment, disruption of role identities, and environmental factors. The psychologist can provide education about predictable barriers to participation for the post-ICU patient, and guide individual, family and team interventions to ameliorate those barriers.

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1. **Implementing a Mobility Program to Minimize Post-Intensive Care Syndrome.**  
   Hopkins Ramona O. AACN Advanced Critical Care 2016;27(2):187-204.

Immobility in the intensive care unit (ICU) is associated with neuromuscular weakness, post-intensive care syndrome, functional limitations, and high costs. Early mobility-based rehabilitation in the ICU is feasible and safe. Mobility-based rehabilitation varied widely across 5 ICUs in 1 health care system, suggesting a need for continuous training and evaluation to maintain a strong mobility-based rehabilitation program. Early mobility-based rehabilitation shortens ICU and hospital stays, reduces delirium, and increases muscle strength and the ability to ambulate. Long-term effects include increased ability for self-care, faster return to independent functioning, improved physical function, and reduced hospital readmission and death. Factors that influence early mobility-based rehabilitation include having an interdisciplinary team; strong unit leadership; access to physical, occupational, and respiratory therapists; a culture focused on patient safety and quality improvement; a champion of early mobility; and a focus on measuring performance and outcomes.

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1. **Rehabilitating a Missed Opportunity: Integration of Rehabilitation Psychology Into the Care of Critically Ill Patients, Survivors, and Caregivers.**  
   Jackson James C. Rehabilitation Psychology 2016;61(2):115-119.

Objective: Rehabilitation psychologists are specifically trained to work with individuals across the spectrum of health care settings and they have only recently begun to wade into the often deep and challenging waters of the critical care environment and intensive care unit (ICU) setting. Method: In the commentary that follows, we will provide a brief historical perspective on the involvement of rehabilitation psychologists in medical settings and we will describe and interact with the various topics raised in this current special section, all of them pertaining to the intersection of psychology and critical illness. Results: These topics concern the potential role of psychologists in the ICU, the identification and treatment of conditions such as Post-Intensive Care Syndrome, the clinical nuances of cognitive impairment and psychological dysfunction after critical illness, and the legacy of critical illness on families. Conclusion: In light of the relevance of these and related topics, we argue in the commentary that the time for psychologists to become involved in the critical care arena is "now" and we discuss practical opportunities for such involvement.

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1. **Quality of life in intensive care survivors.**  
   McPeake Joanne British Journal of Nursing 2015;24(20):1016-1016.

The article discusses issues concerning the quality of life of and the residual issues facing intensive care unit (ICU) survivors in Great Britain. Topics covered include total ICU admissions in 2014, post-intensive care syndrome and the importance of developing a multifaceted holistic intervention for ICU survivors.

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1. **Exploring the scope of post-intensive care syndrome therapy and care: engagement of non-critical care providers and survivors in a second stakeholders meeting.**  
   Elliott Doug Critical Care Medicine 2014;42(12):2518-2526.

BACKGROUND: Increasing numbers of survivors of critical illness are at risk for physical, cognitive, and/or mental health impairments that may persist for months or years after hospital discharge. The post-intensive care syndrome framework encompassing these multidimensional morbidities was developed at the 2010 Society of Critical Care Medicine conference on improving long-term outcomes after critical illness for survivors and their families. OBJECTIVES: To report on engagement with non-critical care providers and survivors during the 2012 Society of Critical Care Medicine post-intensive care syndrome stakeholder conference. Task groups developed strategies and resources required for raising awareness and education, understanding and addressing barriers to clinical practice, and identifying research gaps and resources, aimed at improving patient and family outcomes. PARTICIPANTS: Representatives from 21 professional associations or health systems involved in the provision of both critical care and rehabilitation of ICU survivors in the United States and ICU survivors and family members. DESIGN: Stakeholder consensus meeting. Researchers presented summaries on morbidities for survivors and their families, whereas survivors presented their own experiences. MEETING OUTCOMES: Future steps were planned regarding 1) recognizing, preventing, and treating post-intensive care syndrome, 2) building strategies for institutional capacity to support and partner with survivors and families, and 3) understanding and addressing barriers to practice. There was recognition of the need for systematic and frequent assessment for post-intensive care syndrome across the continuum of care, including explicit 'functional reconciliation' (assessing gaps between a patient's pre-ICU and current functional ability at all intra- and interinstitutional transitions of care). Future post-intensive care syndrome research topic areas were identified across the continuum of recovery: characterization of at-risk patients (including recognizing risk factors, mechanisms of injury, and optimal screening instruments), prevention and treatment interventions, and outcomes research for patients and families. CONCLUSIONS: Raising awareness of post-intensive care syndrome for the public and both critical care and non-critical care clinicians will inform a more coordinated approach to treatment and support during recovery after critical illness. Continued conceptual development and engagement with additional stakeholders is required.

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1. **Post-intensive care syndrome: What it is and how to help prevent it.**  
   Davidson Judy E. American Nurse Today 2013;8(5):32-37.

ICU stays can cause physical and cognitive problems for years after discharge. Find out how to improve patient outcomes.

1. **What Follows Survival of Critical Illness? Physical Therapists' Management of Patients With Post- Intensive Care Syndrome.**  
   Bemis-Dougherty Anita R. Physical Therapy 2013;93(2):79-85.

Historically, the management of patients in the intensive care unit (ICU) has involved immobilization and sedation, with care focused on physiological impairments and survival. Because more ICU patients are now surviving their hospital stay, it is imperative that their ICU care be managed with the goal of long-term health, Wellness, and functioning. The evidence confirms that mobilization and exercise are feasible in the ICU and demonstrates that the benefits of early mobilization include reduced length of stay in the ICU and hospital. In 2010, the Society of Critical Care Medicine (SCCM) invited key stakeholder groups, including the American Physical Therapy Association (APTA), to identify strategies to improve long-term consequences following ICU discharge, including early mobilization in the ICU and integration of the physical therapist as a member of the ICU team. This model appears to be successful in some institutions, but there is variation among institutions. The SCCM Task Force developed major areas of focus that require multidisciplinary)' action to improve long-term outcomes after discharge from an ICU. This article describes physical therapist practice in the management of ICU survivors, the importance of long-term follow-up after ICU discharge, and how APTA is taking steps to address the major areas of focus identified by the SCCM Task Force to improve long-term outcomes after ICU discharge.

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1. **Neuromusculoskeletal disorders following SARS: a case series.**  
   Stainsby Brynne Journal of the Canadian Chiropractic Association 2011;55(1):32-39.

Objective: To detail the presentation of three health care workers diagnosed with sudden acute respiratory syndrome (SARS) who later presented to a CMCC teaching clinic with neuromusculoskeletal sequelae and underwent conservative treatments. This case series aims to inform practitioners of the potential pathogenesis of these neuromuscular complaints and describes their treatment in a chiropractic practice. Clinical Features: Three patients presented with a variety of neurological, muscular and joint findings. Conservative treatment was aimed at decreasing hypertonic muscles, increasing joint mobility, and improving ability to perform activities of daily living. Intervention and Outcome: The conservative treatment approach utilized in these cases involved spinal manipulative therapy, soft tissue therapy, modalities, and rehabilitation. Outcome measures included subjective pain ratings, disability indices, and return to work. Conclusion: Three patients previously diagnosed with SARS presented with neuromusculoskeletal complaints and subjectively experienced intermittent relief of pain and improvement in disability status after conservative treatments.

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1. **Risk factors for chronic post-traumatic stress disorder (PTSD) in SARS survivors.**  
   Mak Ivan Wing Chit General hospital psychiatry 2010;32(6):590-598.

BACKGROUNDPost-traumatic stress disorder (PTSD) is one of the most prevalent long-term psychiatric diagnoses among survivors of severe acute respiratory syndrome (SARS).OBJECTIVESThe objective of this study was to identify the predictors of chronic PTSD in SARS survivors.DESIGNPTSD at 30 months after the SARS outbreak was assessed by the Structured Clinical Interview for the DSM-IV. Survivors' demographic data, medical information and psychosocial variables were collected for risk factor analysis.RESULTSMultivariate logistic regression analysis showed that female gender as well as the presence of chronic medical illnesses diagnosed before the onset of SARS and avascular necrosis were independent predictors of PTSD at 30 months post-SARS. Associated factors included higher-chance external locus of control, higher functional disability and higher average pain intensity.CONCLUSIONThe study of PTSD at 30 months post-SARS showed that the predictive value of acute medical variables may fade out. Our findings do not support some prior hypotheses that the use of high dose corticosteroids is protective against the development of PTSD. On the contrary, the adversity both before and after the SARS outbreak may be more important in hindering recovery from PTSD. The risk factor analysis can not only improve the detection of hidden psychiatric complications but also provide insight for the possible model of care delivery for the SARS survivors. With the complex interaction of the biopsychosocial challenges of SARS, an integrated multidisciplinary clinic setting may be a superior approach in the long-term management of complicated PTSD cases.

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1. **The long-term impact of severe acute respiratory syndrome on pulmonary function, exercise capacity and health status.**  
   Ngai Jenny C. Respirology (Carlton, Vic.) 2010;15(3):543-550.

BACKGROUND AND OBJECTIVESevere acute respiratory syndrome (SARS) emerged in 2003 and its long-term sequelae remain largely unclear. This study examined the long-term outcome of pulmonary function, exercise capacity, health and work status among SARS survivors.METHODSA prospective cohort study of SARS patients at the Prince of Wales Hospital, Hong Kong was conducted, with serial assessments of lung function, 6MWD and 36 item Short Form General Health Survey at 3, 6, 12, 18 and 24 months after disease onset. The work status was also recorded.RESULTSSerial assessments were completed by 55 of the 123 (39.9%) subjects, of whom 27 were health-care workers (HCW). The mean age of the group was 44.4 (SD 13.2) years and 19 (34.5%) were males. At 24 months, 10 (18.2%), 9 (16.4%), 6 (10.9%) and 29 (52.7%) subjects had FEV(1), FVC, TLC and DL(CO) < 80% of predicted values, respectively. The mean (SD) 6MWD increased significantly from 439.0 (89.1) m at 3 months to 460.1 (102.8) m at 6 months (P 0.016) and became steady after 6 months. However, 6MWD and 36 item Short Form General Health Survey scores were lower than the normal population throughout the study. Moreover, 29.6% of HCW and 7.1% of non-HCW had not returned to work 2 years after illness onset.CONCLUSIONSThis 2-year study of a selected population of SARS survivors, showed significant impairment of DL(CO), exercise capacity and health status persisted, with a more marked adverse impact among HCW.

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1. **Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up.**  
   Lam Marco Ho-Bun Archives of internal medicine 2009;169(22):2142-2147.

BACKGROUNDShort-term follow-up studies of severe acute respiratory syndrome (SARS) survivors suggested that their physical conditions continuously improved in the first year but that their mental health did not. We investigated long-term psychiatric morbidities and chronic fatigue among SARS survivors.METHODSAll SARS survivors from the hospitals of a local region in Hong Kong were assessed by a constellation of psychometric questionnaires and a semistructured clinical interview for the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) to determine the presence of psychiatric disorders and chronic fatigue problems.RESULTSOf 369 SARS survivors, 233 (63.1%) participated in the study (mean period of time after SARS, 41.3 months). Over 40% of the respondents had active psychiatric illnesses, 40.3% reported a chronic fatigue problem, and 27.1% met the modified 1994 Centers for Disease Control and Prevention criteria for chronic fatigue syndrome. Logistic regression analysis suggested that being a health care worker at the time of SARS infection (odds ratio [OR], 3.24; 95% confidence interval [CI], 1.12- 9.39; P = .03), being unemployed at follow-up (OR, 4.71; 95% CI, 1.50-14.78; P = .008), having a perception of social stigmatization (OR, 3.03; 95% CI, 1.20-7.60; P = .02), and having applied to the SARS survivors' fund (OR, 2.92; 95% CI, 1.18-7.22; P = .02) were associated with an increased risk of psychiatric morbidities at follow-up, whereas application to the SARS survivors' fund (OR, 2.64; 95% CI, 1.07-6.51; P = .04) was associated with increased risk of chronic fatigue problems.CONCLUSIONSPsychiatric morbidities and chronic fatigue persisted and continued to be clinically significant among the survivors at the 4-year follow-up. Optimization of the treatment of mental health morbidities by a multidisciplinary approach with a view for long-term rehabilitation, especially targeting psychiatric and fatigue problems and functional and occupational rehabilitation, would be needed.

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1. **Psychological resilience and dysfunction among hospitalized survivors of the SARS epidemic in Hong Kong: a latent class approach.**  
   Bonanno George A. Health psychology : official journal of the Division of Health Psychology, American Psychological Association 2008;27(5):659-667.

OBJECTIVETo examine trajectories of psychological functioning using latent class analysis on a sample of hospitalized survivors of the 2003 severe acute respiratory syndrome (SARS) epidemic in Hong Kong.DESIGNA longitudinal study of 997 survivors, recruited from among 1,331 individuals hospitalized for SARS, were interviewed at 6, 12, and 18 months after hospitalization.MAIN OUTCOME MEASURESPsychological and physical functioning at each time point was measured using the 12-item Medical Outcome Study Short-Form Health Survey (SF-12).RESULTSFour latent classes were identified--chronic dysfunction, delayed dysfunction, recovery, and resilience. All groups had better physical health than the chronic group. Resilient and recovered individuals had greater social support and less SARS-related worry, and resilient individuals were more likely to be male. The resilient group also had greater social support than the delayed group and better physical functioning than the recovered group.CONCLUSIONThis study demonstrated that longitudinal outcome trajectories following a major health-threat event in an Asian sample bear close resemblance to prototypical trajectories observed in trauma studies using Western samples. Unique predictors of the trajectories included factors observed in previous studies, such as social support, as well as factors of particular relevance to a major disease outbreak, such as SARS-related worry.

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1. **The impact of SARS on hospital performance.**  
   Chu D. BMC Health Services Research 2008;8:228-228.

During the SARS epidemic, healthcare utilization and medical services decreased significantly. However, the long-term impact of SARS on hospital performance needs to be further discussed.~Background~Background~A municipal hospital in Taipei City was shut down for a month due to SARS and then became the designated SARS and infectious disease hospital for the city. This study collected the outpatient, inpatient and emergency service volumes for every year from April to March over four years. Average monthly service amount +/- standard deviation were used to compare patient volume for the whole hospital, as well as the outpatient numbers accessing different departments. The ARIMA model of outpatient volume in the pre-SARS year was developed.~Methods~Methods~The average monthly service volume of outpatient visits for the base year 2002 was 52317 +/- 4204 visits per month, and number for 2003 and the following two years were 55%, 82% and 84% of the base year respectively. The average emergency service volume was 4382 +/- 356 visits per month at the base year and this became 45%, 77% and 87% of the base year for the following three years respectively. Average inpatient service volume was 8520 +/- 909 inpatient days per month at the base year becoming 43%, 81% and 87% of the base year for the following three years respectively. Only the emergency service volume had recovered to the level of a non-significant difference at the second year after SARS. In addition, the departments of family medicine, metabolism and nephrology reached the 2002 patient number in 2003. The ARIMA (2,1,0) model was the most suitable for outpatient volume in pre-SARS year. The MAPE of the ARIMA (2,1,0) model for the pre-SARS year was 6.9%, and 43.2%, 10.6%, 6.2% for following 3 years.~Results~Results~This study demonstrates that if a hospital is completely shut down due to SARS or a similar disease, the impact is longer than previous reported and different departments may experience different recover periods. The findings of this study identify subspecialties that are particularly vulnerable in an infectious disease designated hospital and such hospitals need to consider which subspecialties should be included in their medical structure.~Conclusion~Conclusions

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1. **Stress and psychological distress among SARS survivors 1 year after the outbreak.**  
   Lee Antoinette M. Canadian journal of psychiatry. Revue canadienne de psychiatrie 2007;52(4):233-240.

OBJECTIVEOur study examined the stress level and psychological distress of severe acute respiratory syndrome (SARS) survivors 1 year after the outbreak.METHODDuring the SARS outbreak in 2003, we used the 10-item Perceived Stress Scale (PSS-10) to assess SARS survivors treated in 2 major hospitals (non-health care workers, n = 49; health care workers, n = 30). We invited SARS survivors from the same hospitals (non-health care workers, n = 63; health care workers, n = 33) to complete the PSS-10 again in 2004. At that time, they were also asked to complete the General Health Questionnaire (GHQ-12) and measures of depression, anxiety, and posttraumatic symptoms. PSS-10 scores were also obtained from matched community control subjects during the outbreak (n = 145) and again in 2004 (n = 112).RESULTSSARS survivors had higher stress levels during the outbreak, compared with control subjects (PSS-10 scores = 19.8 and 17.9, respectively; P < 0.01), and this persisted 1 year later (PSS-10 scores = 19.9 and 17.3, respectively; P < 0.01) without signs of decrease. In 2004, SARS survivors also showed worrying levels of depression, anxiety, and posttraumatic symptoms. An alarming proportion (64%) scored above the GHQ-12 cut-off that suggests psychiatric morbidity. During the outbreak, health care worker SARS survivors had stress levels similar to those of non-health care workers, but health care workers showed significantly higher stress levels in 2004 (PSS-10 score = 22.8, compared with PSS-10 score = 18.4; P < 0.05) and had higher depression, anxiety, posttraumatic symptoms, and GHQ-12 scores.CONCLUSIONSOne year after the outbreak, SARS survivors still had elevated stress levels and worrying levels of psychological distress. The situation of health care worker SARS survivors is particularly worrying. The long-term psychological implications of infectious diseases should not be ignored. Mental health services could play an important role in rehabilitation.

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1. **Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak.**  
   Maunder Robert G. Emerging infectious diseases 2006;12(12):1924-1932.

Healthcare workers (HCWs) found the 2003 outbreak of severe acute respiratory syndrome (SARS) to be stressful, but the long-term impact is not known. From 13 to 26 months after the SARS outbreak, 769 HCWs at 9 Toronto hospitals that treated SARS patients and 4 Hamilton hospitals that did not treat SARS patients completed a survey of several adverse outcomes. Toronto HCWs reported significantly higher levels of burnout (p = 0.019), psychological distress (p<0.001), and posttraumatic stress (p<0.001). Toronto workers were more likely to have reduced patient contact and work hours and to report behavioral consequences of stress. Variance in adverse outcomes was explained by a protective effect of the perceived adequacy of training and support and by a provocative effect of maladaptive coping style and other individual factors. The results reinforce the value of effective staff support and training in preparation for future outbreaks.

1. **The validity and reliability of the functional impairment checklist (FIC) in the evaluation of functional consequences of severe acute respiratory distress syndrome (SARS).**  
   Lam Siu Pui Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation 2006;15(2):217-231.

Severe acute respiratory distress syndrome (SARS) contributed to significant mortality and morbidity worldwide. We aimed to establish the validity, reliability and responsiveness of the functional impairment checklist (FIC) as a measurement tool for physical dysfunction in SARS survivors. One hundred and sixteeen (65 females and 51 males, mean age 45.6) patients who joined the SARS rehabilitation programme were analysed. The factor analysis yielded two latent factors. The mean FIC-symptom and FIC-disability score were 24.12 (SD +/- 20.2) and 26.11 (SD +/- 27.32), respectively. Based on the item-scale correlation coefficients, the Cronbach's alpha coefficients reflecting the internal consistency reliability of scale score were 0.75 for FIC-symptom and 0.86 for FIC-disability. Test-retest reliability in 23 patients showed no statistical significant difference in the FIC scores between tests with intraclass correlation coefficient (ICC) 0.49-0.57. The FIC scales correlated both with 6 munute walking test (6MWT) distance (-0.26 and -0.38) and handgrip strength (HGS) (-0.20 and -0.27). Moreover, the FIC scales correlated with St. George's respiratory questionnaire (SGRQ) (0.19 to 0.52) and short form 36 Hong Kong (SF-36) domains (-0.19 to -0.59). Both FIC scales correlated stronger with physical component summary (PCS) (-0.41 and -0.55) than with mental component summary (MCS) (-0.30 and -0.23). FIC reduced significantly at 6 months while the SF-36 PCS and MCS did not show any change. In conclusion, the study results indicate the FIC is reliable, valid and responsive to change in symptom and disability as a consequence of SARS, suggesting it may provide a means of assessing health related quality of life (HRQOL) outcomes in a longitudinal follow up.

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1. **A randomised controlled trial of the effectiveness of an exercise training program in patients recovering from severe acute respiratory syndrome.**  
   Lau HM Australian Journal of Physiotherapy 2005;51(4):213-219.

The aim of this study was to evaluate the effectiveness of an exercise training program on cardiorespiratory and musculoskeletal performance and health-related quality of life of patients who were recovering from severe acute respiratory syndrome (SARS). A 6-week supervised exercise training program was carried out in the physiotherapy department of a university teaching hospital. One hundred and thirty-three patients referred from a SARS Review Clinic solely for physiotherapy were included. Cardiorespiratory fitness (6-minute walk test, Chester Step Test for predicting VO[2max]), musculoskeletal performance (isometric deltoid and gluteal muscles strength, handgrip strength, 1-minute curl-up and push-up tests) and health-related quality of life (SF-36) were measured and evaluated. Patients were assigned randomly to either a control group (standardised educational session about exercise rehabilitation) or an exercise group. After 6 weeks, significantly greater improvement was shown in the exercise group in the 6-minute walk test (77.4 m vs 20.7 m, p < 0.001), VO[2max] (3.6 ml/kg/min vs 1 ml/kg/min, p = 0.04), and musculoskeletal performance (handgrip strength, curl-up and push-up tests, p < 0.05). Effects on health-related quality of life were not statistically significant. It was concluded that the exercise training program was effective in improving both the cardiorespiratory and musculoskeletal fitness in patients recovering from SARS. However, health-related quality of life was not affected by physical training.

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1. **Follow-up study on pulmonary function and lung radiographic changes in rehabilitating severe acute respiratory syndrome patients after discharge.**  
   Xie L. CHEST 2005;127(6):2119-2124.

Objectives: To follow-up on the changes in lung function and lung radiographic pictures of severe acute respiratory syndrome (SARS) patients discharged from Xiaotangshan Hospital in Beijing (by regularly receiving examination), and to analyze retrospectively the treatment strategy in these patients.Methods: Surviving SARS patients were seen at least twice within 3 months after discharge and underwent SARS-associated coronavirus (SARS-CoV) IgG antibody testing, pulmonary function testing, and chest radiography and/or high-resolution CT (HRCT) examinations at Chinese PLA General Hospital. The treatments received at Xiaotangshan Hospital were analyzed retrospectively and were correlated to later status.Results: Positive SARS-Co virus IgG antibody results were seen in 208 of 258 patients, with 21.3% (55 of 258 patients) still having a pulmonary diffusion abnormality (D(LCO) < 80% of predicted). By comparing the 155 survivors with positive SARS-CoV IgG antibody results and D(LCO) > or = 80% predicted with the 50 patients with negative SARS-CoV IgG results, we found that 53 patients with positive SARS-CoV IgG results and a lung diffusion abnormality had endured a much longer course of fever and received larger doses of glucocorticoid, as well as higher ratios of oxygen inhalation and noninvasive ventilation treatment. For these patients, 51 of 53 patients with positive SARS-CoV IgG results and a lung diffusion abnormality underwent pulmonary function testing after approximately 1 month. D(LCO) improved in 80.4% of patients (41 of 51 patients). Of the patients with a lung diffusion abnormality, 40 of 51 patients showed lung fibrotic changes in the lung image examination and 22 patients (55%) showed improvement in lung fibrotic changes 1 month later.Conclusion: These findings suggest that lung fibrotic changes caused by SARS disease occurred mostly in severely sick patients and may be self-rehabilitated. D(LCO) scores might be more sensitive than HRCT when evaluating lung fibrotic changes.

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1. **Tachycardia amongst subjects recovering from severe acute respiratory syndrome (SARS).**  
   Lau Suet-Ting International journal of cardiology 2005;100(1):167-169.

SARS is a new infection in human. Patients recovering from SARS had palpitation in the form of sinus tachycardia. This study to identify the possible causes for the tachycardia excluded active disease, thyroid dysfunction, haematological, cardiac, autonomic and significant pulmonary defect at 2 months from onset of disease. The symptomatology was attributed to physical deconditioning and anxiety state. Physical and psychological fitness should be restored with rehabilitation.

1. **The impact of severe acute respiratory syndrome on the physical profile and quality of life.**  
   Lau HM Archives of Physical Medicine & Rehabilitation 2005;86(6):1134-1140.

OBJECTIVE: To investigate the impact of severe acute respiratory syndrome (SARS) on the physical fitness and health-related quality of life (HRQOL) among SARS survivors. DESIGN: A cohort study. SETTING: An outpatient physiotherapy department in a major hospital in Hong Kong. PARTICIPANTS: SARS patients (N=171) discharged from the hospital. Their mean age was 37.36+/-12.65 years, and the average number of days of hospitalization was 21.79+/-9.93 days. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: Subjects cardiorespiratory (6-minute walk test [6MWT], Chester step test for predicting maximal oxygen uptake [VO2 max]), musculoskeletal (proximal/distal muscle strength and endurance test), and HRQOL status (Medical Outcomes Study 36-Item Short-Form Health Survey [SF-36]) were measured and compared with the normative data matched for age and sex. RESULTS: Seventy-eight (45.61%) patients continued to require prednisolone (< 0.5mg.kg -1 x d[-1]) for residual lung opacities when data were collected. The values of 6MWT distance, predicted VO2 max, proximal and distal muscle strength, and the scores from all SF-36 domains, particularly perceived role-physical, were significantly lower than the normative data ( P <.05). CONCLUSIONS: SARS survivors had deficits in cardiorespiratory and musculoskeletal performance, and their HRQOL appeared to be significantly impaired. Copyright © 2005 by the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation

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1. **Adjustment outcomes in Chinese patients following one-month recovery from severe acute respiratory syndrome in Hong Kong.**  
   Cheng Sammy K. W The Journal of nervous and mental disease 2004;192(12):868-871.

This study aimed to examine the short-term adjustment outcomes including distress, self-esteem, and quality of life among Chinese patients after 1-month recovery from severe acute respiratory syndrome (SARS) in Hong Kong and to investigate the predictive abilities of a set of selected variables on the outcomes. At 1-month recovery, 100 SARS survivors (mean age = 37; 66 women) and 184 community subjects completed self-administered questionnaires. In the General Health Questionnaire-28, 61% of the SARS survivors were identified as distressed cases under a conservative cutoff score of 6. Compared with the community sample, SARS survivors had significantly more distress and poor quality of life. Being a healthcare worker, severity of SARS symptoms, steroid dosage, and social support accounted for a portion of variances of different measures. Early psychiatric screening and intervention may be beneficial for the adjustment of SARS survivors after short-term recovery. Future research on the long-term impact of SARS is recommended.

1. **SARS: prognosis, outcome and sequelae.**  
   Chan K. S Respirology (Carlton, Vic.) 2003;8:No page numbers.

Severe acute respiratory syndrome (SARS) is associated with considerable morbidity and mortality in the acute phase. Worldwide case fatality rate is 11% (range 7 to 27%) for the most severely affected regions. Several adverse prognostic factors have been identified, including advanced age, presence of comorbidity, higher lactose dehydrogenase levels and initial neutrophil count, but the impact of viral and other host factors on outcome is unknown. Published data on sequelae of SARS are limited. Clinical follow-up of patients who recovered from SARS has demonstrated radiological, functional and psychological abnormalities of varying degrees. In the early rehabilitation phase, many complained of limitations in physical function from general weakness and/or shortness of breath. In a small series of subjects who underwent CT scan of the chest, over half showed some patchy changes consistent with pulmonary fibrosis. Lung function testing at 6-8 weeks after hospital discharge showed mild or moderate restrictive pattern consistent with muscle weakness in 6-20% of subjects. Mild decrease in carbon monoxide diffusing capacity was detected in a minority of subjects. Preliminary evidence suggests that these lung function abnormalities will improve over time. Psychobehavioural problems of anxiety and/or depression were not uncommon in the early recovery phase, and improved over time in the majority of patients. Avascular necrosis of the hip has been reported as another complication. The long-term sequelae of SARS are still largely unknown. It is important to follow up these patients to detect and appropriately manage any persistent or emerging long-term sequelae in the physical, psychological and social domains.

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| 3. | Medline | TIME/ | 12739 |
| 4. | Medline | ("long term effects").ti,ab | 29036 |
| 5. | Medline | ("longterm effects").ti,ab | 151 |
| 6. | Medline | ("after effects").ti,ab | 1858 |
| 7. | Medline | ("long term impact\*").ti,ab | 5419 |
| 8. | Medline | (rehabilitation).ti,ab | 153235 |
| 9. | Medline | (3 OR 4 OR 5 OR 6 OR 7 OR 8) | 200617 |
| 10. | Medline | (1 AND 2 AND 9) | 3 |
| 11. | Medline | (1 AND 9) | 33 |
| 12. | Medline | ("post intensive care syndrome").ti,ab | 116 |
| 13. | Medline | (1 AND 12) | 3 |
| 14. | Medline | ("Severe Acute Respiratory Syndrome" OR "Middle East Respiratory Syndrome").ti,ab | 6655 |
| 16. | Medline | ("covid-19").ti,ab | 5006 |
| 17. | Medline | (coronavirus OR "corona virus" OR SARS OR MERS).ti,ab | 21174 |
| 18. | Medline | ("2019-nCoV" OR "SARS-CoV" OR "MERS-CoV").ti,ab | 5252 |
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| 25. | CINAHL | ("2019-nCoV" OR "SARS-CoV" OR "MERS-CoV").ti,ab | 573 |
| 26. | CINAHL | ("long term effects").ti,ab | 7852 |
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| 28. | CINAHL | ("after effects").ti,ab | 285 |
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| 30. | CINAHL | (rehabilitation).ti,ab | 92903 |
| 31. | CINAHL | (22 OR 23 OR 24 OR 25) | 5343 |
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| 33. | CINAHL | (31 AND 32) | 44 |
| 34. | CINAHL | ("post intensive care syndrome").ti,ab | 119 |
| 35. | CINAHL | "AFTER CARE"/ | 15507 |
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