Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

although further investigation in a higher-risk cohort might be warranted, aiming to recruit patients closer to symptom onset and possibly dosing colchicine closer to the recommendations for familial Mediterranean fever. This trial does however add proof of principle of two important therapeutic concepts—progression of COVID-19 lung injury can be inhibited to prevent hospital admission and anti-inflammatory therapy can achieve this. The STOIC trial[9] (167 outpatients with mild COVID-19) also suggested that early anti-inflammatory therapy might be beneficial; when compared with usual care, inhaled budesonide resulted in a reduction in the need for urgent medical care.[9]

Trials of anti-viral therapies in patients that were admitted to hospital have been disappointing, with neither intravenous remdesivir nor subcutaneous interferon (IFN) b-1a improving survival.[10] However, the evidence for a defective IFN response leading to severe disease is compelling; neutralising auto-antibodies against IFN-a2 and IFN-ω are over-represented in severe COVID-19 (compared with asymptomatic infection or healthy controls)[11] and variation in the *IFNAR2* gene, associated with low expression, is associated with COVID-19 critical illness.[12] Evaluation of IFN therapy in outpatients will be valuable, including in combination with anti-inflammatory therapies.

There is observational evidence that an early window of opportunity exists in which to modify the inflammatory trajectory in COVID-19 with the aim of preventing hospital admission. Encouragingly, these findings are now supported by emerging evidence from outpatient clinical trials. As has been the case in trials with patients admitted to hospital, evaluation of multiple agents will probably be required before highly efficacious outpatient therapy is identified. COLCORONA represents the beginning of this important process.

I declare no competing interests.

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Recovery after prolonged ICU treatment in patients with COVID-19

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With millions of individuals contracting COVID-19 worldwide, an unprecedented number of intensive care unit (ICU) survivors are now in recovery.[1] There is an urgent need to understand more fully the consequences of COVID-19 critical illness to prioritise patient-centred and family-centred interventions to meet their post-ICU physical and mental health needs. However, achieving advances in understanding to provide optimum care after acute disease remains challenging, with a paucity of post-COVID-19 long-term outcome data, and little understanding of the intersection between the direct consequences of COVID-19 (currently identified under the term post-COVID-19 condition) and the complex consequences of critical illness (post-intensive care syndrome or PICS). Although lessons certainly can be learned from previous studies of acute respiratory

distress syndrome (ARDS) and SARS-CoV infection, we need to be open to the possibility that the range of persistent symptoms after COVID-19-associated critical illness is different from that reported previously.

Detailed follow-up data from survivors of both ARDS and SARS-CoV[2,3] show that a large proportion of patients have physical and cognitive impairments for weeks to years after ICU discharge, and suggest that some disability might be permanent. Persistent weakness affects over 25% of patients, with substantial functional dependency in activities of daily living, including mobility and self-care. Peripheral nerve injuries from positioning, joint contracture from immobility, and oral or laryngeal injuries from protracted endotracheal intubation during the ICU stay are common. Tracheal stenosis might be more frequent than was previously thought.

Patients and family caregivers can develop important mental health challenges, lasting months to years after critical illness.[2] These challenges might be exacerbated in an outbreak setting in which patients and families are isolated and stigmatised,[3] and racial and ethnic minorities might be disproportionately affected. Additionally, inpatient visiting restrictions during the hospital stay in the acute phase, put in place to reduce disease transmission risks, might result in a lack of personal contact and dehumanisation of health care, adding to patients' and family members' longer-term health burden. Similar trajectories to those seen previously are emerging in the early outcomes literature for COVID-19. Huang and colleagues[4] reported 6-month outcomes from Wuhan, including 1733 patients, 122 of whom had required high-flow nasal cannulae, non-invasive mechanical ventilation, or invasive mechanical ventilation. Most patients reported at least one symptom at 6-month follow-up, most commonly fatigue or muscle weakness, sleep difficulties, and anxiety or depression, and patients with more severe illness in the acute phase had an increased risk of these symptoms and pulmonary diffusion abnormalities at follow-up.[4] Morin and colleagues[5] reported on 4-month outcomes for 478 patients who survived treatment in hospital for COVID-19. Among 94 patients who had been admitted to the ICU, anxiety (23%), depression (18%), and post-traumatic stress disorder (7%) were reported, and muscular weakness was reported by 14 (27%) of 51 patients who had been intubated.[5] Ayoubkhani and colleagues[6] showed that nearly a third of individuals who were discharged from hospital after acute COVID-19 were readmitted (14 060 of 47 780 patients) and more than 10% died after discharge, with these events occurring at rates four times and eight times higher, respectively, than in a general population matched control group.[6]


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Additional challenges imposed by the pandemic that might hinder care and recovery in the post-acute phase include inadequate access to post-ICU follow-up and comprehensive rehabilitation, due to limitations in the number and quality of inpatient appointments or potential shortages of health-care professionals related to redeployment to acute care areas, burnout, or illness. These challenges might be exacerbated in low-income settings or in areas hit hardest by COVID-19, where health-care systems are overwhelmed. Such considerations might also impact studies evaluating recovery from COVID-19-related critical illness and thereby impede advances in understanding.

It is fundamental to initiate global, coordinated efforts, both to provide ongoing care for people in recovery from critical illness and to align definitions and core outcome measures for long-term follow-up to accurately inform our understanding of the long-term consequences of COVID-19-associated critical illness, so that pathways of care can be adapted and personalised.[7,8] A unifying definition of the post-COVID-19 condition is an urgent starting point and many international groups have already embarked on this. The WHO definition will emerge soon. Studies must be inclusive and explore different determinants of recovery trajectories based, for example, on gender or socioeconomic factors.[9] It is imperative that children and pregnant women, who are so often excluded and neglected in clinical research, are assessed in detail and prioritised for follow-up and inclusion as part of the case definition. International comparisons are essential to investigate the differential biological effects of the virus across a spectrum of ethnicities and within health-care systems offering varied resources and patient access. WHO is fostering this international effort.[7] The independent contribution to long-term outcomes from variably overwhelmed health systems might bias observed outcomes and must be considered in describing post-acute sequelae of COVID-19-associated critical illness. In-person assessments might be limited by isolation needs and require researchers to rely on metrics that can be

administered remotely. Virtual care infrastructures, rapidly deployed during the pandemic, could represent novel opportunities for clinical and research efforts, and ensure more appropriate inclusion of vulnerable populations; these efforts could include global, prospective registries to collate cases and health outcomes across a range of settings. Physical, psychological, and neurocognitive aspects of chronic pain might require multimodal assessment, and patient-centric smartphone app-based technology might help to enhance communication between providers and patients, and promote self-management.[10] The scientific community needs to endorse the importance of follow-up and reporting of long-term outcomes for the interventions that have now become the standard of care during the acute phase of SARS-CoV-2 infection. Clinical outcomes need to be linked to basic and translational research to understand genomics, mechanisms of organ injury, and recovery, in a continuum of research that encompasses mechanistic, observational, and randomised studies of preventive or therapeutic interventions.

In addition to patients, clinicians, and researchers, the involvement of other stakeholders (eg, social workers, economists, and politicians) will be key for a comprehensive understanding and informed support to address the needs of affected individuals and the impact of their conditions at the society level (eg, delays in return to work or need for alternative occupations in the workplace).

The unprecedented volumes of post-ICU patients as a result of the COVID-19 pandemic will require thoughtful system change and the development of a systematised continuum of care. As more data emerge and the features and course of post-COVID-19-associated critical illness become clearer, this continuum of care will need to be refined and optimised to meet the long-term needs of patients and their families.

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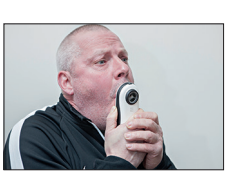
Addressing a system failure to diagnose COPD and asthma


Lewis Houghton/SPL

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To provide high-quality guideline-based care for patients with asthma or chronic obstructive pulmonary disease (COPD) we must first establish the correct diagnosis. The National Asthma and COPD Audit Programme (NACAP) has highlighted an important issue across England, Scotland, and Wales that potentially undermines care for many people with airways disease.

The clinical diagnosis of COPD requires confirmation with quality-assured spirometry after administration of a bronchodilator. For diagnosis, spirometry should show airflow obstruction defined as FEV_1/forced vital capacity ratio of less than 0·7.[1] The national audit showed that among the more than 275 000 acute COPD admissions entered between February, 2017, and March, 2021, less than half had a record of spirometry (either from current or past hospital records) available to the team treating the exacerbation of COPD. In 14% of patients where a spirometry result was available, the result was