



## EDITORIALS

# Covid-19 care before, during, and beyond the hospital

It's time to shift the research focus to studies on living with this disease

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By the third week of May 2020, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (covid-19), had infected about 4.7 million people worldwide and over 300 000 had died.<sup>1</sup> Without a vaccine or disappearance of the virus, we could be living with SARS-CoV-2 and covid-19 for the foreseeable future, possibly years.

In the initial phase of the pandemic, descriptive studies of patients in hospital have been invaluable in understanding the epidemiology, populations at risk, and outcomes for patients with severe covid-19. Peer reviewed studies and preprints have described patients admitted to hospital in China, the United States, and Korea, ranging in size from 69 to 5700 patients.<sup>2-5</sup> Other studies, notably several from Italy, describe those in intensive care.<sup>6,7</sup>

In a linked study, Docherty and colleagues (doi:10.1136/bmj.m1985) describe what appears to be the largest cohort of patients in hospital so far.<sup>8</sup> Using a standardized data collection protocol, the investigators collected information on 20 133 patients with covid-19 from 208 hospitals, representing 34% of patients admitted with this disease in England, Scotland, and Wales.

Beyond the size of the cohort, the researchers had several notable findings. This cohort is among the oldest reported (median age 73). The proportion of intensive care unit admissions (17%) was slightly lower than many other studies. The mortality (26%) at the time of reporting was higher than almost all other studies. Independent predictors of mortality included older age, male sex, obesity, and several chronic conditions. The authors reason that the high mortality in this cohort was due to older age, health system differences (for example, proportion of intensive care unit beds), and practices for advanced care planning. Indeed, guidance from the National Institute for Health and Care Excellence regarding use of critical care services emphasized early advanced care planning in addition to consideration of patient frailty, judicious use of potentially limited resources of the UK's health service, and protection of NHS staff.<sup>9</sup>

Observational studies of hospital admissions cover only part of the healthcare response to the pandemic: we need better information and studies of care before, during, and beyond the

hospital. Before admission, physicians need guidance about prevention, transmission, monitoring, home care, integration with primary care, risk factors for clinical worsening, and criteria for escalating patients to emergency or hospital care. Observational studies in community or home care settings could serve as platforms for interventional studies of prevention, treatment, or supportive strategies. Patients, families, and care givers are desperate for better, clearer information on effective home care.

Two large studies, published as preprints, link community with hospital care. The OpenSAFELY Collaborative is using electronic health record data from 17.4 million English patients in primary care in a study that has integrated exposure, incidence, and 5683 deaths in hospital.<sup>10</sup> Independent risk factors for death included black and Asian ethnicity (versus white ethnicity) and deprivation, similar to findings from the United States.<sup>11</sup> An integrated health delivery plan in California and Washington states has used data from 9.6 million enrollees in a study that reported 1277 hospital admissions and 15% mortality in hospital to examine community transmission dynamics.<sup>12</sup>

In the absence of “game changing” antiviral or immunomodulating pharmacotherapies, more controlled studies of supportive treatment strategies are needed for patients in hospital. Clinical experience and research evidence so far suggest that key components of good supportive care include oxygenation; management of symptoms, fluid balance, and chronic conditions; judicious use of antibacterial drugs; prophylactic anticoagulation; closer monitoring of frail or immunosuppressed patients; multidisciplinary management among hospital medicine, infectious diseases, pulmonary critical care, palliative care, and medical ethics teams; and advanced care planning with patients and care givers. Establishing criteria for discharge and arranging follow-up are challenging, particularly for patients who might still have symptoms or are infectious.

Beyond the hospital, long term outcomes of covid-19 are unknown. Anecdotal reports have included symptoms that last for weeks or months. Sequelae of covid-19 infection might

include worsening of chronic conditions and profound needs for rehabilitation. And we still have much to learn about transmission, immunity and its durability, and, as with other coronaviruses, the potential for reinfection.<sup>13-15</sup>

At the outset of the covid-19 pandemic, it was natural to focus first on the people with severe disease who might need potentially scarce resources in hospital and intensive care. Cohort studies of such patients important, and the work described by Docherty and colleagues is a testament to good planning and preparation before, and implementation of data collection during a pandemic. If we are going to be managing covid-19 for the next several years, however, we need to understand and optimize care before, during, and beyond the hospital.

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- 1 Johns Hopkins University. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE). 2020. <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>.
- 2 Wang Z, Yang B, Li Q, Wen L, Zhang R. Clinical features of 69 cases with coronavirus disease 2019 in Wuhan, China. *Clin Infect Dis* 2020;ciaa272. 10.1093/cid/ciaa272 32176772

- 3 Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with covid-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395:1054-62. 10.1016/S0140-6736(20)30566-3 32171076
- 4 Goyal P, Choi JJ, Pinheiro LC, et al. Clinical Characteristics of Covid-19 in New York City. *N Engl J Med* 2020. 10.1056/NEJMc2010419 32302078
- 5 Richardson S, Hirsch JS, Narasimhan M, et al. and the Northwell COVID-19 Research Consortium. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with covid-19 in the New York City area. *JAMA* 2020. 10.1001/jama.2020.6775 32320003
- 6 Onder G, Rezza G, Brusaferro S. Case-fatality rate and characteristics of patients dying in relation to covid-19 in Italy. *JAMA* 2020. 10.1001/jama.2020.4683 32203977
- 7 Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet* 2020;395:1225-8. 10.1016/S0140-6736(20)30627-9 32178769
- 8 Docherty AB, Harrison EM, Green CA, et al. Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study. *BMJ* 2020;369:m1985.
- 9 National Institute for Health and Care Excellence. COVID-19 rapid guideline: critical care in adults. 2020. <https://www.nice.org.uk/guidance/NG159>.
- 10 Williamson E, Walker AJ, Bhaskaran KJ, et al. OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. *medRxiv* [Preprint] 2020. <https://www.medrxiv.org/content/10.1101/2020.05.06.20092999v1>.
- 11 Yancy CW. Covid-19 and African Americans. *JAMA* 2020;323:1891-2. 10.1001/jama.2020.6548 32293639
- 12 Lewnard JA, Liu VX, Jackson ML, et al. Incidence, clinical outcomes, and transmission dynamics of severe coronavirus disease 2019 in California and Washington: prospective cohort study[forthcoming]. *BMJ* 2020;369:m1923.
- 13 Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (covid-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020;323:1239-42. 10.1001/jama.2020.2648 32091533
- 14 Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020;382:970-1. 10.1056/NEJMc2001468 32003551
- 15 Arons MM, Hatfield KM, Reddy SC, et al. Presymptomatic SARS-CoV-2 infections and transmission in a skilled nursing facility. *N Engl J Med* 2020. 10.1056/NEJMoa2008457 32329971

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