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Robert L. Klitzman

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## Needs to Prepare for “Post-COVID-19 Syndrome”

Robert L. Klitzman 

Columbia University

While attention has focused in many states and countries on the initial acute phase of the COVID-19 pandemic and on lowering rates of infection and deaths, evidence suggests that among many survivors, the virus is causing ongoing symptoms that need to be more fully anticipated and addressed. Governments, healthcare institutions, providers, patients, family members, the media and the public need to recognize and plan to meet these patients’ ongoing needs.

Data collection and reporting have concentrated on the numbers of individuals tested, infected, hospitalized, admitted to intensive care units (ICUs), deceased and recovered—on the quantity, but not the quality of survival. Major questions are thus arising regarding COVID-19-infected individuals who have not yet died, but have ongoing moderate to severe symptoms.

The number of such COVID-19 patients in the U.S. and abroad who will require ongoing care and rehabilitation in facilities or at home remains unknown but, evidence suggests, it may be enormous. As of October 9 2020, around 37 million people have been infected worldwide, with around 1.06 million dying, and around 26 million recovering, leaving around 28% unaccounted for (Johns Hopkins Coronavirus Resource Center 2020). In the U.S., about 7.6 million have been infected, around 213,000 have died and 3 million have recovered, leaving 42% unaccounted for. Some of those unaccounted for may simply be lost to follow up, but many are no doubt still symptomatic—alive, but not yet recovered. In the U.S., for instance, COVID-19 could eventually infect as many as 50% of the population, with 5% (8.25 million) needing ICU beds, of whom perhaps almost roughly half may die, leaving around 4 million survivors, who may have significant longer-term medical problems, requiring ongoing treatment (Palosky 2020).

The proportion of hospitalized COVID-19 patients needing ICUs or similar units has ranged across hospitals in different cities and regions. At one major

U.S. hospital system, for example, 22% of hospitalized COVID-19 patients required critical care, with 79% requiring ventilators, and 37% remaining hospitalized for a mean of 33 days (Cummings et al. 2020).

Yet concerns emerge regarding COVID-19 patients who have survived ICUs and, evidence suggests, will frequently encounter significant medical sequelae. Among U.S. COVID-19 patients on ventilators, 31% have needed renal replacement therapy (Cummings et al. 2020), and 36% have developed neurological problems, with about 6% suffering strokes or cerebral hemorrhages (Mao et al. 2020). Post-ICU Syndrome has also been well-described regarding other disorders, with up to 33% and 43% of patients, respectively, developing PTSD and depression (Jensen et al. 2015).

Most COVID-19 patients on ventilators develop conditions suggesting acute respiratory distress syndrome (ARDS). But neurocognitive deficits have been found in 73% of ARDs survivors, in general, at hospital discharge, and 47% two years later (Hopkins et al. 2005). Two years post-discharge, 23% each had moderate to severe depression and anxiety. At one year, 50% of former patients were unable to work, with many requiring care from families, who must then reduce work hours or stop employment altogether (Griffiths et al. 2013). Many COVID-19 patients with medical sequelae have prior medical conditions and psychosocial vulnerabilities, exacerbating these challenges.

Hospitals may want to transfer COVID-19 patients who survive ICUs and require ongoing care to other facilities (e.g., longer-term rehabilitation or acute care centers) that, however, have limited capacity and may be wary of accepting COVID-19 patients. The U.S. has only around 38,000 rehab beds, most of which were filled on the eve of the pandemic (Medicare Payment Advisory Commission 2015). COVID-19 patients themselves may also fear transfer to nursing homes and rehabs, given possible risks of infection

there with the virus. Many patients can potentially receive outpatient treatment and home rehab, but social distancing can hamper home health aides and agencies, family and friends from coming to help. Some COVID-19 patients fear returning home, concerned that they may still be infectious and expose families, who may lack sufficient personal protective equipment.

In the U.S., Medicare and private insurers have frequently agreed to cover physical and occupational therapy through telehealth during the pandemic, which can help; but hospitals then have to figure out how to best set up such services. How long these insurers will continue to cover such costs in the U.S. and elsewhere, especially after the acute phase of pandemic ends, is also unclear.

Better-resourced hospitals have been able to afford to transform regular wards into COVID-19 rehab or step-down units, but doing so is not sustainable long-term, since patients with serious diseases other than COVID-19 will also need hospitalization. Moreover, not all hospitals have sufficient equipment or staff to meet such COVID-19 patients' longer-term needs.

A recent study of patients in Italy hospitalized for COVID-19, 5% of whom had received invasive ventilation, found that, an average of 60 days after onset of symptoms, 87.4% still had virus-related symptoms, with 55% having three or more symptoms, especially fatigue, dyspnea and joint and chest pain (Carfi et al. 2020).

Policymakers, public health departments, healthcare institutions, providers, insurers, patients and families should prepare to meet these needs. COVID-19 requires consideration of not only short-term risks and benefits, but longer-term ones as well. Moreover, the burdens of these longer-term problems will likely fall disproportionately on vulnerable populations—the poor, the elderly, and persons of color. Governments should thus begin collecting data on the nature and extent of these longer-term problems, including specific kinds of national, state and local hospital, outpatient and home services required, and how best to meet these. Policy makers should also allocate sufficient resources to meet these growing needs for outpatient services.

In the U.S. and elsewhere, funds available thus far may be insufficient. Up to about 2 million hospitalized U.S. COVID-19 patients will have no insurance, and this number is increasing due to job losses caused by the pandemic. Undocumented immigrants are also disproportionately represented among COVID-19 patients, posing challenges for rehab centers and

insurers. Among the approximately 10 million undocumented immigrants in the U.S., around 65% are Latino, who as a group, have been more likely than Caucasians, for instance, to become infected and die of COVID-19 (Oppel et al. 2020). Hospitalization of uninsured COVID-19 patients may ultimately cost \$13.9–\$41.8 billion—up to 40% of the amount Congress established to assist healthcare institutions' responses to the pandemic (Palosky 2020).

Given the many uncertainties and unknowns regarding the virus and its clinical effects, a robust research agenda is essential, including longitudinal studies over several years to understand the specific nature of post-COVID-19 symptoms, how best to prevent, minimize, and treat these, what services and care are most effective, which patients are at highest risk—how age, prior co-morbidities, sociodemographic, and other factors influence the prevalence and outcomes—and what specific obstacles emerge.

Appropriate public health messaging is also crucial to enhance education of patients and the public-at-large to set appropriate expectations about the challenges survivors may encounter. The fact that COVID-19 survivors may suffer long-term difficulties can, however, potentially further motivate people to protect themselves.

While attention has understandably thus far focused on the initial, acute stages of the COVID-19 pandemic, we must now attend, too, to these mounting longer-term medical and psychosocial sequelae of infection—what I term “Post-COVID-19 Syndrome”—and how best to meet this growing challenge.

## DISCLOSURE STATEMENT

The author reports no conflict of interest.

## ORCID

Robert L. Klitzman  <http://orcid.org/0000-0002-6827-8063>

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