

# COVID-19 Vaccine Priority for People With Neurologic and Rare Diseases

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As vaccination programmes against coronavirus disease 2019 (COVID-19) are expanded, substantial variation in the prioritisation of different groups is apparent both between countries but also interprovincially within Canada. In this editorial, we bring attention to the need to prioritize individuals with neurologic and rare disorders for vaccination.

## Neurologic Complications From COVID-19

The pandemic illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has led to the identification of numerous common neurologic complications, which may result directly or indirectly from infection [1]. The most well-known neurologic symptom is anosmia/dysgeusia (loss of sense of smell/taste) [2] whose uniqueness to SARS-CoV-2 has been debated [3]; involvement of skeletal muscles is also very common and fortunately mild in most cases (predominantly myalgias), although myositis and rhabdomyolysis are described [4, 5]. Rarely, more significant neurologic complications arise [6]. In the central nervous system, some of the described phenotypes include encephalopathy [7], neuroimmunological syndromes [8], and myoclonus/ataxia [9]. Ischemic stroke appears to have a more severe outcome in COVID-19 patients but was not more common in a recent large series [10]. Peripheral nervous system complications mainly relate to above-mentioned complications of skeletal muscle, as well as variants of Guillain-Barré syndrome [11-13]. Mononeuritis multiplex has been described with high prevalence in a series of critically ill patients with COVID-19 [14], which is a group of patients in whom neurologic impairments may be difficult

to identify and may be misattributed to critical illness neuro/myopathy. When present, neurologic syndromes have been associated with increased mortality in COVID-19 patients [15].

SARS-CoV-2 infects cells via angiotensin-converting enzyme 2 (ACE2), a protein found abundantly among numerous cell types including neurones of the central and peripheral nervous systems, and muscle [16-18]. Therefore, neurologic complications may occur as a direct consequence of viral infection, in addition to neurologic damage resulting from hypoxia, the inflammatory cascade, and other end-organ injuries. As a result, there is concern that patients with pre-existing neurological disorders may be at greater risk of neurological complications, or more severe outcomes in general from COVID-19 [19].

## Persons With Pre-Existing Neurological Conditions and Rare Diseases, and COVID-19 Risk

Recent evidence indicates more severe outcomes may occur in patients with common pre-existing neurological disorders [20]. It is more challenging to study the impact of COVID-19 on rare diseases (a large group of individually rare, but collectively common disorders, approximately one-third of which are neurologic) [21]. The available evidence certainly demonstrates a major impact of the pandemic on patients with rare disease in numerous domains [22, 23], including mental health, physical health, and access to care among others. Shifts in healthcare resources to address pandemic needs have directly impacted the care of patients with chronic neurologic conditions [24]. For some specific rare disorders there is evidence for an increased risk of poor outcomes. For example, in trisomy 21 (Down syndrome), the mortality risk is markedly increased compared with the general population [25]. Preliminary evidence from a myasthenia gravis registry suggests severe outcomes may be frequent [26]. Expert opinions agree that many neuromuscular conditions are likely to be associated with increased risk from SARS-CoV-2 infection [27]. This is a highly rational conclusion because patients with neuromuscular disorders are at high risk from pulmonary infections in general [28], and can have compromised respiratory muscle strength at various stages of disease [29]. While there is otherwise limited evidence for specific rare disorders, there is evidence that broader groups of patients, such as those with intellectual and developmental disability, may have more severe outcomes [30].

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## Vaccine Priority for People With Neurological and Rare Diseases

Persons with neurologic disabilities may have increased risk of contracting SARS-CoV-2 (due to carers entering the home) [31], have reduced access to public health information and health services [32], and have additional challenges during hospitalization if visits from family and other supports are restricted [33]. There is also a bioethical concern that forthcoming intensive care unit (ICU) rationing guidelines [34] could deprioritize the care of those with neurological disorders hospitalized with COVID-19 [35]. The impetus to deprioritized care must be considered in light of regular lack of synchronicity between patient and practitioners' definitions and assumptions of what constitutes "quality of life" with a disability [36-39]. Bureaucratic barriers, such as a focus on recipients of chronic home care as opposed to diagnosis-based priority for phase 1 inoculation, leaves those living with and receiving care from family off priority lists in some municipalities. These decisions are often driven by studies regarding the impact of COVID-19 on persons with disabilities that may be limited due to systemic problems with how data in these populations are collected [40]. Within these communities, individuals have been advised to exercise heightened levels of precaution and vigilance [41], which may result in lower infection numbers and misleading conclusions that patients with neurologic and rare disorders are not at high risk.

There have been calls to prioritize COVID-19 vaccination in persons with intellectual and developmental disabilities [42]. We here suggest that persons with other neurological disorders and rare diseases should also be considered a priority group for vaccination. Neurologic and rare disorders are not considered one of the major risk factors for severe outcomes from SARS-CoV-2 infection; nonetheless the evidence clearly shows these patients are vulnerable to direct complications of the virus in addition to elevated risks of exposure due to home care needs and the potential for deprioritized care should they become infected during surging ICU admissions. The impact of SARS-CoV-2 variants of concern, which are more transmissible [43] and virulent [44], adds to the immediacy of this issue. For all these reasons, there is an urgent need to prioritize protecting those with neurologic and rare disorders from contracting COVID-19.

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## Conflict of Interest

None to declare.

## Author Contributions

GP and JP authored the manuscript. SJ edited the work for intellectual content and aided in literature review.

## Data Availability

The authors declare that data supporting the findings of this study are available within the article.

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