

COVID-19 and people with neuromuscular disorders:

World Muscle Society advice - Vaccines and Therapeutics

(updated 23rd April 2022)

The WMS has provided advice for people with neuromuscular disorders, and their healthcare providers since the start of the COVID-19 pandemic. This document follows on from previous advice aiming to answer questions regarding vaccines and vaccination against Coronavirus SARS-CoV2 asked by people with neuromuscular disorders. It includes a section on therapeutic drugs used in the treatment of SARS-CoV2 infection.

This is a rapidly developing field, and the WMS will keep this advice under regular review.

Background:

Control of the COVID-19 pandemic hinges on a worldwide program of vaccination designed to reduce the likelihood of infection by the SARS-CoV2 virus, and of developing severe illness if infected.

A large number of vaccines have been developed since the start of the pandemic 2 years ago. According to the New York Times Coronavirus Vaccine Tracker, 119 vaccines are currently in clinical trials on humans, and to this date 50 have reached the final stages of testing (Phase 3 trials). 31 vaccines have been approved for full or limited use in different countries. The current leading vaccines offer different modes of action:

- mRNA-based vaccines (Moderna and Pfizer/BioNTech) promoting an immune response against viral spike proteins
- Adenovirus-based vaccines (CanSino, Gamaleya, Johnson&Johnson, Oxford-AstraZeneca) raise the immune response against coronavirus via genetically modified adenoviruses containing the DNA instructions for spike proteins. Note: None of these vaccines use adeno-associated viruses (AAV) as employed in some genetic therapies.
- Protein-based vaccines (Novavax, Corbevax) based on triggered immune response against various proteins contained in the Coronavirus
- Inactivated virus-based vaccines (Sinopharm-Beijing, Sinopharm-Wuhan, Sinovac, Bharat Biotech) based on the immune response to inactivated Coronavirus

For exact information on which of these vaccines has approval in a specific country, we refer to national information. Approved vaccines have been tested in healthy study subjects without a serious underlying medical condition, some from 5 years of age, and in these have demonstrated high effectiveness in preventing SARS-CoV2 infection. Trials on younger children are underway.

Vaccination programs are currently underway in many countries, and in some countries have attained an advanced stage. Side-effects have so far been relatively rare, and in most cases minor, consisting of local pain, fever, chills and muscle aching over days. More severe side effects have been reported, including neurological effects and myocarditis, but are very rare. Importantly, having a diagnosis of a neuroimmunological condition does not contraindicate vaccination (see below).

Vaccination strategies vary according to the respective healthcare system. So far, no clear evidence has emerged that favours one vaccine over another, where vaccination programs have been analysed. According to data so far, the approved vaccines still provide strong protection against newer variants of the SARS-CoV2 virus.

The current document has been amended to include a section outlining therapeutic drugs used for the treatment of SARS-CoV2 virus infection, or, in some settings, as prophylaxis to avoid severe disease in people at high risk. For such drugs, licencing differs substantially between countries, and a detailed discussion of therapeutic drugs is beyond the scope of this document.

COVID-19 vaccination and Neuromuscular Disorders

The following questions are the ones most often raised by people with neuromuscular disease and by their carers and physicians:

1. Am I eligible to be vaccinated when one or more vaccines are approved?

Distribution of vaccines in most countries initially follows a vaccination program in which vaccination is offered first to vulnerable groups. These are in essence the elderly and those vulnerable through severe underlying health conditions, and, potentially, their carers, but definitions of vulnerable groups vary from one country to another. National health authority or health department websites may provide detailed information and guidelines on distribution processes, but may not specifically mention neuromuscular disorders. In addition, depending on the vaccines' approval, only certain age groups may be eligible. Where vaccines have been secured in sufficient supply, they may be generally available, apart from very specific medical conditions.

2. Am I in a priority group for vaccination?

The WMS position and advice document "COVID-19 and people with neuromuscular disorders", (paragraph 1), provides criteria that define a "vulnerable" group amongst people with neuromuscular disorders, who should be observing strict measures to avoid COVID-19 infection. A further "highly vulnerable" group may be identified (see WMS position and advice document), and in these people vaccination may be a priority, but national health authority guidelines and definitions vary from one country to another. We advise all people with neuromuscular disorders to stay in contact with their healthcare providers and clarify their status, and the vaccination eligibility of their carers, once a vaccination program is available in their country. Where persons with a neuromuscular disorder are not in a defined "vulnerable" group, they should follow the general vaccination guideline in their country. Note: evidence regarding the risk status of particular NMDs is beginning to emerge.

3. Can I be vaccinated once a vaccine is approved or am I at risk of developing COVID-19 or other severe side effects through the vaccination?

There is no risk of developing COVID-19 from the vaccines currently approved or in final stages of development. We are not aware of any live vaccines under development. Side effects in the study subjects have been mild and transient, and are outweighed by the benefits; this has held true in vaccination programs so far. There is no indication that neuromuscular patients should be different in this respect.

For certain vaccines, with regard to specific neuromuscular treatments, particularly in clinical trials, there may be restrictions on when vaccination can take place, and uncertainties around interaction between the vaccination and the neuromuscular treatment. Examples are medications that affect the immune system, but also gene therapy treatments. People with neuromuscular disorders on such treatments should contact their neuromuscular specialist or neuromuscular centre, who can contact the drug company providing treatment.

4. Will my neuromuscular condition affect the way the vaccine works?

The mechanisms of action of the vaccines approved so far does not suggest that neuromuscular disorders give an inherently increased risk of side-effects. Neither should neuromuscular disorders that do not involve the immune system affect the way the vaccine works. However, the studies were carried out in healthy adults and children; studies involving children under the age of 5 years are underway. None had neuromuscular conditions, as far as we are aware, and therefore, there is no evidence regarding specific effects on people with neuromuscular disorders, or effects of the neuromuscular condition on the vaccination.

5. I take medication that affects the immune system (immunosuppressant drugs). Can I be vaccinated?

Yes, in principle. There is no risk of infection through the vaccinations that have been approved or are in development so far. However, immunomodulation/immunosuppression may diminish the effectiveness of the vaccination, so recommendations have been produced by professional and government agencies advising on delays between such treatments and vaccination. For this reason, the Centers for Disease Control in the United States and a number of authorities elsewhere have authorised additional vaccine doses for people with compromised immune systems.

6. Do I still need to observe precautions once I have been vaccinated?

After vaccination, precautions (wearing a mask, social distancing) will still be necessary. This is to protect from the reduced, but remaining risk of infection.

7. Booster vaccinations

Booster vaccinations are advised to avoid the risk of diminishing protection through COVID-19 vaccination after some months. Eligibility for booster vaccination and timing of boosters depends on the precise vaccine initially used, and on national regulations. We advise people with a neuromuscular disorder to follow the national guidelines in their country.

There is no evidence that booster vaccination should be different from national guidelines for people with a neuromuscular disease, although the timing of booster vaccinations may need to be coordinated with the timing of neuromuscular treatments (i.e. neuromuscular treatments administered at defined intervals).

In some healthcare systems, additional vaccine doses have been authorised for persons with compromised immune systems, such as people take immunosuppressant medication. Thus, advice for additional vaccine doses in special groups may differ from routine “booster” vaccinations. Again, people with neuromuscular disorders should follow national guidelines in this respect.

8. What are the important unknowns at present?

Where the immune system is involved, either through the neuromuscular disease itself or through its treatment, there is uncertainty whether the vaccine will be as effective as in the studies. This does not mean that the vaccine may be no good, but it does mean that caution and measures to avoid infection such as wearing masks and social distancing are still important. People undergoing such treatments should seek advice before setting a date for vaccination; likewise, healthcare professionals planning to start such treatments (for instance, biological drugs in autoimmune neuromuscular disorders) should ideally coordinate administration with the date of COVID-19 vaccination (including boosters).

Currently, there is not enough evidence to advise whether one particular vaccine is preferable to the other. There is no evidence theoretical preferences may justify delaying vaccination using any of the currently approved vaccines. However, consensus in our group is that vaccines are safe in people with neuromuscular disorders, and that benefits clearly outweigh risks.

Whether interactions might exist between any genetic neuromuscular therapies and genetic vaccines employing viral vectors or mRNA mechanisms remains a subject of close scrutiny. So far, concerns of cross-reactions remain unsubstantiated.

There is no evidence that muscle atrophy impacts on the effectiveness of vaccines applied by intramuscular injection, although this has not been specifically investigated. Muscle cells do not play a significant role in the immune response, according to current knowledge.

The full range of side effects, including the rarer ones, will only be known in the further course of the vaccination program. So far, however, there has been no indication of any evidence to support a position rejecting vaccination for any group of the population, including people with neuromuscular disorders.

Therapeutic drugs used in the treatment of COVID-19 and Neuromuscular Disorders

A large number of therapeutic drugs have been trialled and used in the treatment of COVID19 since the beginning of the pandemic. At this point, sufficient evidence has been gathered in clinical trials to permit authorisation of a number of them not only for compassionate use in patients who are desperately ill, but also where to avoid severe illness in patients considered at risk. This may be the situation in some people with neuromuscular disorders infected by the virus despite vaccination and observing precautionary measures (see “COVID-19 and people with neuromuscular disorders: World Muscle Society position and advice” update 11-04-2021).

In this section, we will briefly introduce the drugs currently most commonly used, and also discuss the cautions applying to some drugs which have not achieved recommended status. To this date, very little evidence on side effects specific to people with neuromuscular disease has been reported.

1. Which drugs have become licensed for the treatment of COVID-19?

A range of drugs have gained approval for use in the treatment of COVID-19 in different countries. The main categories of specific agents used after exposure or infection are monoclonal antibodies (these include drugs such as Sotrovimab, Evusheld, and Bebtelovimab), and antivirals (including drugs such as Paxlovid/ PF-07321332+Ritonavir, Remdesivir, and Molnupiravir. Immunomodulation in various forms is used to mitigate immunological reactions to the SARS-CoV2 infection, which are responsible for many of the severe courses of the disease. Licensing differs substantially from one country to another and we advise to follow the advice of specialist physicians locally.

2. Is there information on which drugs are best for people with neuromuscular disease?

No. There is no current evidence giving preference for one or the other licensed treatment specific to neuromuscular disease.

3. Is there information on drugs that have been used in COVID-19 that might be dangerous for people with a neuromuscular disorder?

Yes. A number of medications have been used before sufficient evidence was available, and some of these are ineffective, generally toxic, or particularly risky in the context of neuromuscular disease. Drugs with specific neuromuscular side effects Hydroxychloroquine (which is known to cause muscle disease), and Azithromycin (which can worsen myasthenia). Drugs such as Ivermectin have significant toxicity, others, such as Lopinavir have been shown to have no effect in trials, and bleach is highly corrosive to human tissue, beside having no therapeutic effect. **Therefore, do not consider or use medications except with qualified expert medical advice.**

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Web-based resources:

<https://www.worldmusclesociety.org/news/view/150>

<https://www.who.int/news-room/news-updates>

<https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines>

<https://www.gov.uk/government/collections/covid-19-vaccination-programme>

<https://myasthenia.org/MG-Community/COVID-19-Resource-Center>

<https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html>

<https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html>

<https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines>

https://www.sarepta.com/sites/sarepta-corporate/files/2020-12/Community%20Bulletin_COVID19.pdf

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961287/Greenbook_chapter_14a_v7_12Feb2021.pdf

<https://www.rheumatology.org.uk/practice-quality/covid-19-guidance>

<https://www.spierziekten.nl/themas/corona-en-spierziekten/coronavaccinatie/> [Dutch language]

<https://www.rivm.nl/en/covid-19-vaccination/vaccines/immunocompromised-patients> [Dutch language]

<https://www.rijksoverheid.nl/onderwerpen/coronavirus-vaccinatie/aanpak-coronavaccinatie/boostervaccinatie> [Dutch language]

Online data regarding therapeutic drugs for COVID-19:

<https://www.who.int/publications/i/item/WHO-2019-nCoV-therapeutics-2022.2>

<https://www.who.int/publications/i/item/WHO-2019-nCoV-therapeutics-2022.2> [“Therapeutics and COVID-19”];

<https://www.covid19treatmentguidelines.nih.gov> <https://www.covid19treatmentguidelines.nih.gov> [“COVID-19 treatment guidelines”]

<https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/treatments-covid-19/covid-19-treatments-authorized>