# Evidence Search Service Results of your search request

## Covid-19 vaccination response in people taking immunosuppressants

**ID of request:** 29200  
**Date of request:** 21st April, 2021  
**Date of completion:** 5th May, 2021

If you would like to request any articles or any further help, please contact:  Igor Brbre at [igor.brbre@nhs.net](mailto:igor.brbre@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: Covid-19 vaccination response in people taking immunosuppressants. Igor Brbre. ( 5th May, 2021). BRIGHTON, UK: Brighton and Sussex Library and Knowledge Service.

**Sources searched**  
EMBASE (3)  
Google (4)  
Google Scholar (2)  
MEDLINE (16)  
MedRxiv (1)

**Date range used** (5 years, 10 years): no restrictions   
**Limits used** (gender, article/study type, etc.): none   
**Search terms and notes** (full search strategy for database searches below):

Relevant natural language and controlled vocabulary terms were selected and combined. Thesaurus terms were adapted for different databases. Medline and Embase were searched on OVID. Results were screened for relevance and deduplicated in EndNote. Full search strategy below.

For more information about the resources please go to: <https://www.bsuh.nhs.uk/library/>.

## Summary of Results

No evidence was found related to COVID-19 vaccines and Azathioprine.

On more general efficacy of COVID-19 vaccine in immunosuppressed patients see especially:

Geisen UM, Berner DK, Tran F, et al

**Immunogenicity and safety of anti-SARS-CoV-2 mRNA vaccines in patients with chronic inflammatory conditions and immunosuppressive therapy in a monocentric cohort**

Annals of the Rheumatic Diseases Published Online First: 24 March 2021. doi: 10.1136/annrheumdis-2021-220272

**Results** Anti-SARS-CoV-2 antibodies as well as neutralising activity could be detected in all study participants. IgG titres were significantly lower in patients as compared with controls (2053 binding antibody units (BAU)/mL ±1218 vs 2685±1102). Side effects were comparable in both groups. No severe adverse effects were observed, and no patients experienced a disease flare.

**Conclusion** We show that SARS-CoV-2 mRNA vaccines lead to development of antibodies in immunosuppressed patients without considerable side effects or induction of disease flares. Despite the small size of this cohort, we were able to demonstrate the efficiency and safety of mRNA vaccines in our cohort.

**Glucocorticoids and B Cell Depleting Agents Substantially Impair Immunogenicity of mRNA Vaccines to SARS-CoV-2**

Parakkal Deepak, Wooseob Kim, Michael A. Paley et al.

medRxiv 2021.04.05.21254656; doi: https://doi.org/10.1101/2021.04.05.21254656

“Most patients can mount an antibody response [to the vaccine] even on medication,” says study author Alfred Kim, MD, Assistant Professor of Medicine, Pathology, and Immunology at Washington University. “The response may not be as high as those who do not take immunosuppressives, but the drop is not very much, and most are still in the range of the immunocompetent [healthy] controls that we have measured. So for the vast majority of autoimmune patients, they can rest easier knowing they will mount a response.”

Researchers did find, however, that certain medications were associated with much lower responses to the vaccine.

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## A. Institutional Publications

#### British Society for Immunology

**British Society for Immunology statement on COVID-19 vaccines for patients who are immunocompromised or immunosuppressed** (2021)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=e0a2f5c32f90488562fff94edaf10afe)

All three of the COVID-19 vaccines (Pfizer/BioNTech; AstraZeneca/Oxford; Moderna) that have currently been approved for use in the UK are safe to use for people who are immunocompromised or immunosuppressed. None of these approved COVID-19 vaccines contain any active SARS-CoV-2 virus. The Pfizer/BioNTech and Moderna COVID-19 vaccines are both mRNA vaccines which contain a small piece of genetic code from the SARS-CoV-2 virus to generate an immune response. The AstraZeneca/Oxford COVID-19 vaccine is a viral vector vaccine, which uses an inactive unrelated virus (the viral vector) which cannot replicate to deliver SARS-CoV-2 genetic material to generate an immune response. While COVID-19 vaccination might provide a lower level of protection in people who are immunosuppressed or immunocompromised compared with the rest of the population, it is still very important that you get vaccinated as it will offer you a certain amount of protection against catching COVID-19. It is important that you receive two doses of the vaccine to maximise the protection that vaccination offers you.

#### Centers for Disease Control and Prevention (CDC)

**Vaccine Considerations for People with Underlying Medical Conditions** (2021)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=c58f97ff34919548e179d7c182052f94)

People who have weakened immune systems People with HIV and those with weakened immune systems due to other illnesses or medication might be at increased risk for severe COVID-19. They may receive a COVID-19 vaccine. However, they should be aware of the limited safety data: Information about the safety of COVID-19 vaccines for people who have weakened immune systems in this group is not yet available People living with HIV were included in clinical trials, though safety data specific to this group are not yet available at this time People with weakened immune systems should also be aware of the potential for reduced immune responses to the vaccine, as well as the need to continue following current guidance to protect themselves against COVID-19.

#### IDSA COVID‐19 Real Time Learning Network

**COVID‐19 Real‐Time Learning Network: Vaccines FAQ - COVID-19 vaccination by patient population** (2021)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=d921017c06c2e48f47501c1a2cb9de77)

Q: Are there any considerations regarding COVID vaccination in oncology patients, many of whom are immunocompromised either by virtue of their disease of cancer or their treatment, e.g., chemotherapy, radiation, stem cell transplant? Do we think it will it be safe and efficacious in this group? A: Persons with HIV infection or other immunocompromising conditions, or who take immunosuppressive medications or therapies, might be at increased risk for severe COVID-19. Data are not currently available to establish vaccine safety and efficacy in these groups. Persons with stable HIV infection were included in mRNA COVID-19 vaccine clinical trials, though data remain limited. Immunocompromised individuals may receive COVID-19 vaccination if they have no contraindications to vaccination. However, they should be counseled about the unknown vaccine safety profile and effectiveness in immunocompromised populations, as well as the potential for reduced immune responses and the need to continue to follow all current guidance to protect themselves against COVID-19.  Oncology patients should be counseled that the effectiveness and safety profile of these vaccines for them are limited. As these are not live virus vaccines, it is unlikely that these vaccines would pose a safety risk. It is important for there to be intact host immunity in individuals receiving the vaccine for there to be optimal protective immunity post-vaccination, especially with respect to antigen presentation, B and T cell activation and plasma B cell antibody generation. Therefore, individuals lacking functional adaptive immune cells may be unable to generate a fully protective immune response to the SARS-CoV-2 vaccine. Therefore, patients with cancer should be advised regarding the importance of maintaining all current guidance to protect themselves even after vaccination. Additionally, caregivers and household contacts should be strongly encouraged to get vaccinated when vaccine is available in an effort to protect the patient.

#### Specialist Pharmacy Service (SPS)

**Using COVID-19 vaccines in patient taking immunosuppressive medicines** (2021)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=6d825d2151eaa298d0688d1d8337c9a5)

Use in patients taking immunosuppressive medicines Public Health England’s Immunisation Against Infectious Disease (The Green book) states that immunosuppressed patients, due to disease or treatment are clinically extremely vulnerable and should be vaccinated against COVID-19. According to both the Patient Group Direction for COVID-19 mRNA vaccine BNT162b2 (Pfizer/BioNTech) and the Patient Group Direction for COVID-19 Vaccine AstraZeneca, (ChAdOx1-S [recombinant]) there are no groups of potentially immunosuppressed patients that should be excluded from receiving the vaccine based on their treatment or disease alone. It is, however, noted that some immunosuppressed patients may have a suboptimal response to the vaccine and should therefore continue to avoid exposure unless they are advised otherwise by their doctor.

## B. Original Research

1. **Between COVID-19 severity and its prevention-what should rheumatologists be aware of?**  
   Makowska Joanna Reumatologia 2021;59:1-2.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=36011b91d1b8cd13479615e6fe4acd30)

1. **Changes in humoral immune response after SARS-CoV-2 infection in liver transplant recipients compared to immunocompetent patients**  
   Caballero-Marcos Aranzazu American journal of transplantation : official journal of the American Society of Transplantation and the American Society of Transplant Surgeons 2021;:No page numbers.

The protective capacity and duration of humoral immunity after SARS-CoV-2 infection are not yet understood in solid organ transplant recipients. A prospective multicenter study was performed to evaluate the persistence of anti-nucleocapsid IgG antibodies in liver transplant recipients 6 months after coronavirus disease 2019 (COVID-19) resolution. A total of 71 liver transplant recipients were matched with 71 immunocompetent controls by a propensity score including variables with a well-known prognostic impact in COVID-19. Paired case-control serological data were also available in 62 liver transplant patients and 62 controls at month 3 after COVID-19. Liver transplant recipients showed a lower incidence of anti-nucleocapsid IgG antibodies at 3 months (77.4% vs. 100%, p < .001) and at 6 months (63.4% vs. 90.1%, p < .001). Lower levels of antibodies were also observed in liver transplant patients at 3 (p = .001) and 6 months (p < .001) after COVID-19. In transplant patients, female gender (OR = 13.49, 95% CI: 2.17-83.8), a longer interval since transplantation (OR = 1.19, 95% CI: 1.03-1.36), and therapy with renin-angiotensin-aldosterone system inhibitors (OR = 7.11, 95% CI: 1.47-34.50) were independently associated with persistence of antibodies beyond 6 months after COVID-19. Therefore, as compared with immunocompetent patients, liver transplant recipients show a lower prevalence of anti-SARS-CoV-2 antibodies and more pronounced antibody levels decline. Copyright © 2021 The American Society of Transplantation and the American Society of Transplant Surgeons.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=704c8abf9c113c4d67c7234f6b1b3e4b)

1. **COVID-19 pathophysiology and pharmacology: What do we know and how did Canadians respond? A review of Health Canada authorized clinical vaccine and drug trials**  
   Diab Antonios M. Canadian journal of physiology and pharmacology 2021;:No page numbers.

Coronavirus disease 2019 (COVID-19) has resulted in the death of over 18000 Canadians and has impacted the lives of all Canadians. Many Canadian research groups have expanded their research programs to include COVID-19. Over the past year, our knowledge of this novel disease has grown and has led to the initiation of a number of clinical vaccine and drug trials for the prevention and treatment of COVID-19. Here, we review SARS-CoV-2 (the coronavirus that causes COVID-19) and the natural history of COVID-19, including a timeline of disease progression after SARS-CoV-2 exposure. We also review the pathophysiological effects of COVID-19 on the organ systems that have been implicated in the disease, including the lungs, upper respiratory tract, immune system, central nervous system, cardiovascular system, gastrointestinal organs, the liver, and the kidneys. Then we review general therapeutics strategies that are being applied and investigated for the prevention or treatment of COVID-19, including vaccines, antivirals, immune system enhancers, pulmonary supportive agents, immunosuppressants/anti-inflammatories, and cardiovascular system regulators. Finally, we provide an overview of all current Health Canada authorized clinical drug and vaccine trials for the prevention or treatment of COVID-19.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=40c7186505a18da27fb75003de98bad0)

1. **COVID-19 vaccination and antirheumatic therapy**  
   Arnold Jack Rheumatology (Oxford, England) 2021;:No page numbers.

The COVID-19 vaccination will be the largest vaccination programme in the history of the NHS. Patients on immunosuppressive therapy will be amongst the earliest to be vaccinated. Some evidence indicates immunosuppressive therapy inhibits humoral response to the influenza, pneumococcal and hepatitis B vaccines. The degree to which this will translate to impaired COVID-19 vaccine responses is unclear. Other evidence suggests withholding methotrexate for two weeks post vaccination may improve responses. Rituximab has been shown to impair humoral responses for 6months or longer post administration. Decisions on withholding or interrupting immunosuppressive therapy around COVID-19 vaccination will need to be made prior to the availability of data on specific COVID-19 vaccine response in these patients. With this in mind, this article outlines the existing data on the effect of antirheumatic therapy on vaccine responses in patients with inflammatory arthritis and formulates a possible pragmatic management strategy for COVID-19 vaccination.Copyright © The Author(s) 2021. Published by Oxford University Press on behalf of the British Society for Rheumatology. All rights reserved. For permissions, please email: journals.permissions@oup.com.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5b2e90fce5899c0315464ff0e97690fb)

1. **COVID-19 Vaccination in Patients with Autoimmune Inflammatory Rheumatic Diseases: Clinical Guidance of the Korean College of Rheumatology**  
   Park Jin Kyun Journal of Korean medical science 2021;36:e95.

The coronavirus disease 2019 (COVID-19) pandemic has caused more than 100 million infections and 2 million deaths worldwide. In up to 20% of cases, COVID-19 infection can take a severe, life-threatening course. Therefore, preventive measures such as mask-wearing, hand hygiene, and social distancing are important. COVID-19 vaccines that use novel vaccine technology can prevent up to 95% of infections. However, the uncertainty regarding the efficacy and safety of vaccination in patients with autoimmune inflammatory rheumatic disease (AIIRD), who are immunocompromised due to underlying immune dysfunction and concomitant immunosuppressive treatment, warrants clear guidance. A task force of the Korean College of Rheumatology formulated a set of vaccination guidance based on the currently available data and expert consensus. The currently available COVID-19 vaccines are considered to be safe and effective. Every patient with AIIRD should receive one of the available COVID-19 vaccines unless contraindicated for medical reasons such as prior allergy/anaphylaxis to the COVID-19 vaccine or its components. Patients should continue immunosuppressive treatment for their underlying AIIRD, including biological and targeted synthetic disease-modifying anti-rheumatic drugs (b/tsDMARDs). Corticosteroids should be reduced to the lowest dose possible without aggravating the AIIRD. To improve the vaccine response, methotrexate can be withheld for 1-2 weeks after each vaccination, and the timing of rituximab and abatacept infusion should be adjusted if clinically acceptable. Rheumatologists should play a leading role in educating and vaccinating patients with AIIRD. Copyright © 2021 The Korean Academy of Medical Sciences.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=8b8a7218898c9fd10c845b51f7033047)

1. **Covid-19 vaccine failure in a patient with multiple sclerosis on ocrelizumab**  
   Chilimuri Sridhar Vaccines 2021;9:1-3.

Vaccines will play a key role in ending the COVID-19 pandemic. Vaccination against infections remains an important part of the management of patients with multiple sclerosis. However, there are limited data about the safety and efficacy of the currently available COVID-19 mRNA vaccines in patients with multiple sclerosis receiving concurrent immunosuppressive therapies. Patients on B cell depleting therapy such as ocrelizumab have an attenuated vaccine response. We report the first case of COVID-19 vaccine failure in a patient with relapsing-remitting multiple sclerosis on B cell depleting therapy, ocrelizumab. We offer suggestions to improve vaccine efficacy in these patients.Copyright © 2021 by the authors. Licensee MDPI, Basel, Switzerland.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=8012876d16f76fdec7ce8da5c82ed2e9)

1. **COVID-19 vaccines and kidney disease**  
   Windpessl Martin Nature Reviews Nephrology 2021;:1-3.

Patients receiving immunosuppression Patients with autoimmune kidney diseases on chronic immunosuppression were excluded from all major trials of COVID-19 vaccine candidates (Supplementary Table 1). Thus, no data are currently available regarding short-term and longer-term vaccine safety, immunogenicity and protective efficacy in these patients. Specific issues that impact vaccination decisions in certain subgroups of patients also need to be addressed. Timing of vaccination and vaccine readiness is relevant in this regard, particularly in patients receiving treatment with anti-CD20 therapy (e.g. rituximab), which is known to abrogate immune responses to vaccinations9. Decisions on whether to delay or interrupt non-urgent treatment with rituximab to find an appropriate vaccination window or to use alternative immunosuppressive therapies need to be considered in addition to weighing the potential risk of autoimmune disease relapse versus risk of infection with SARS-CoV-2 if vaccination is deferred. In patients with active autoimmune disease, treating this disease should take priority and vaccination should be delayed.

1. **Doctor-Should I get the COVID-19 vaccine? Infection and immunization in individuals with neuromuscular disorders**  
   Zivkovic Sasha A. Muscle & nerve 2021;63:294-303.

The clinical course of neuromuscular disorders (NMDs) can be affected by infections, both in immunocompetent individuals, and in those with reduced immunocompetence due to immunosuppressive/immunomodulating therapies. Infections and immunizations may also trigger NMDs. There is a potential for reduced efficacy of immunizations in patients with reduced immunocompetence. The recent vaccination program for coronavirus disease-2019 (COVID-19) raises several questions regarding the safety and efficacy of this vaccine in individuals with NMDs. In this Practice Topic article, we address the role of vaccine-preventable infections in NMDs and the safety and efficacy of immunization in individuals with NMDs, with emphasis on vaccination against COVID-19. Copyright © 2021 Wiley Periodicals LLC.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=4a1f93392b8dbe6bf071b8b38d021745)

1. **Glucocorticoids and B Cell Depleting Agents Substantially Impair Immunogenicity of mRNA Vaccines to SARS-CoV-2**  
   Deepak Parakkal medRxiv 2021;:2021.04.05.21254656.

Background Individuals with chronic inflammatory diseases (CID) are frequently treated with immunosuppressive medications that can increase their risk of severe COVID-19. While novel mRNA-based SARS-CoV-2 vaccination platforms provide robust protection in immunocompetent individuals, the immunogenicity in CID patients on immunosuppression is not well established. Therefore, determining the effectiveness of SARS-CoV-2 vaccines in the setting of immunosuppression is essential to risk-stratify CID patients with impaired protection and provide clinical guidance regarding medication management.Methods We conducted a prospective assessment of mRNA-based vaccine immunogenicity in 133 adults with CIDs and 53 immunocompetent controls. Blood from participants over 18 years of age was collected before initial immunization and 1-2 weeks after the second immunization. Serum anti-SARS-CoV-2 spike (S) IgG+ binding, neutralizing antibody titers, and circulating S-specific plasmablasts were quantified to assess the magnitude and quality of the humoral response following vaccination.Results Compared to immunocompetent controls, a three-fold reduction in anti-S IgG titers (P=0.009) and SARS-CoV-2 neutralization (p&amp;lt;0.0001) were observed in CID patients. B cell depletion and glucocorticoids exerted the strongest effect with a 36- and 10-fold reduction in humoral responses, respectively (p&amp;lt;0.0001). Janus kinase inhibitors and antimetabolites, including methotrexate, also blunted antibody titers in multivariate regression analysis (P&amp;lt;0.0001, P=0.0023, respectively). Other targeted therapies, such as TNF inhibitors, IL-12/23 inhibitors, and integrin inhibitors, had only modest impacts on antibody formation and neutralization.Conclusions CID patients treated with immunosuppressive therapies exhibit impaired SARS-CoV-2 vaccine-induced immunity, with glucocorticoids and B cell depletion therapy more severely impeding optimal responses.Competing Interest StatementP.D. participated in consulting, advisory board, or speaker&#039;s bureau for Janssen, Pfizer, Prometheus Biosciences, Boehringer Ingelheim, AbbVie, and Arena Pharmaceuticals and received funding under a sponsored research agreement unrelated to the data in the paper from Takeda Pharmaceutical, Arena Pharmaceuticals, Bristol Myers Squibb-Celgene, and Boehringer Ingelheim. M.A.C. participated in consulting, advisory board, or speaker&#039;s bureau for AbbVie, Pfizer, Bristol Myers Squibb, and Theravance, and received funding under a sponsored research agreement unrelated to the data in the paper from Incyte, Pfizer, Janssen, and the Crohn&#039;s and Colitis Foundation. G.F.W. received honoraria for consulting for Novartis and Genentech and funding under a sponsored research agreement unrelated to the data in the paper from Biogen, EMD Serono, and Roche. The S.P.J.L. laboratory received funding under a sponsored research agreement unrelated to the data in the paper from Vir Biotechnology, AbbVie, and SAb therapeutics. L.S.G. received honoraria for consulting for AbbVie, Eli Lilly, Gilead, Janssen, Novartis, Pfizer, and UCB received funding under a sponsored research agreement unrelated to the data in the paper from Pfizer and UCB. The A.H.E. laboratory received funding under a sponsored research agreement unrelated to the data in the paper from Emergent BioSolutions and Abbvie. A.H.J.K. participated in consulting, advisory board, or speaker&#039;s bureau for Alexion Pharmaceuticals, Aurinia Pharmaceuticals, Annexon Biosciences, Exagen Diagnostics, Inc., and GlaxoSmithKilne and received funding under a sponsored research agreement unrelated to the data in the paper from GlaxoSmithKline. All other authors declare no competing interests.Funding StatementThis research was supported by The Leona M. and Harry B. Helmsley Charitable Trust, Washington University Digestive Disease Research Core Center (NIDDK P30DK052574), Washington University Rheumatic Diseases Research Resource-Based Center (NIAMS P30AR073752), The Judy Miniace Research Fund for the Washington University upus Clinic, and UCSF investigators were funded by PREMIER, a NIAMS P30 Center (P30AR070155) and the Russell/Engleman Rheumatology Research Center. This study utilized samples obtained from the Washington University School of Medicine&#039;s COVID-19 biorepository, which is supported by the Barnes-Jewish Hospital Foundation, the Siteman Cancer Center grant P30CA091842 from the National Cancer Institute of the National Institutes of Health, and the Washington University Institute of Clinical and Translational Sciences grant UL1TR002345 from the National Center for Advancing Translational Sciences of the National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the view of the NIH.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:This study was approved by the Washington University School of Medicine Institutional Review Board (protocol #201105110, approved 01 June 2011; protocol #202012081, approved 21 December 2020; and protocol #202012084, approved 23 December 2020) and the UCSF Institutional Review Board (protocol #17-21898, approved 22 April 2017 and protocol #20-33078, approved 04 January 2021).All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesRelevant data are available from the corresponding author upon reasonable request.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=25c43bfa6463bd7226bc0cdb65cc1cb2)

1. **Immunogenicity and safety of anti-SARS-CoV-2 mRNA vaccines in patients with chronic inflammatory conditions and immunosuppressive therapy in a monocentric cohort**  
   Friedrichs Anette Annals of the Rheumatic Diseases 2021;:No page numbers.

Introduction: In light of the SARS-CoV-2 pandemic, protecting vulnerable groups has become a high priority. Persons at risk of severe disease, for example, those receiving immunosuppressive therapies for chronic inflammatory cdiseases (CIDs), are prioritised for vaccination. However, data concerning generation of protective antibody titres in immunosuppressed patients are scarce. Additionally, mRNA vaccines represent a new vaccine technology leading to increased insecurity especially in patients with CID. Objective(s): Here we present for the first time, data on the efficacy and safety of anti-SARS-CoV-2 mRNA vaccines in a cohort of immunosuppressed patients as compared with healthy controls. Method(s): 42 healthy controls and 26 patients with CID were included in this study (mean age 37.5 vs 50.5 years). Immunisations were performed according to national guidelines with mRNA vaccines. Antibody titres were assessed by ELISA before initial vaccination and 7 days after secondary vaccination. Disease activity and side effects were assessed prior to and 7 days after both vaccinations. Result(s): Anti-SARS-CoV-2 antibodies as well as neutralising activity could be detected in all study participants. IgG titres were significantly lower in patients as compared with controls (2053 binding antibody units (BAU)/mL +/-1218 vs 2685+/-1102). Side effects were comparable in both groups. No severe adverse effects were observed, and no patients experienced a disease flare. Conclusion(s): We show that SARS-CoV-2 mRNA vaccines lead to development of antibodies in immunosuppressed patients without considerable side effects or induction of disease flares. Despite the small size of this cohort, we were able to demonstrate the efficiency and safety of mRNA vaccines in our cohort.Copyright © Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=82ccb152614be1652091a7dad1a79e6f)

1. **Immunosuppressants, immunomodulators and COVID-19 vaccines: anticipating patient concerns**  
   Rick Jonathan Journal of Dermatological Treatment 2021;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=01aab288dba4251cca6f4415c1d1dfe4)

1. **Immunosuppression in kidney transplant recipients with COVID-19 infection - where do we stand and where are we heading?**  
   Daoud Ahmed Renal failure 2021;43:273-280.

The appropriate immunosuppressive regimen in kidney transplant recipients with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2/COVID-19) infection remains unclear. The impact of direct virus injury complicated by dysregulated hyperimmune response with overwhelming release of various cytokines in COVID-19 infected subjects contributes to the complexity of management. The largest concern of the practicing clinicians at current time is how to tailor maintenance immune-modulating therapy during active viral infection and the efficacy of the soon-to-be upcoming immunization for COVID-19. This targeted review aims to cover most of the current evidence on the effect of key maintenance immunosuppressive agents in COVID-19 infection and proposes a line of management to specific scenarios on this very rapidly evolving subject.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=513b0d72d5eb555f4df0bfa1f1d55cd8)

1. **Lack of Immune Response After mRNA Vaccination to SARS-CoV-2 in a Solid Organ Transplant Patient**  
   Rusk D. S. Journal of medical virology 2021;:No page numbers.

The recent approval and distribution of vaccines against SARS-CoV-2 has been a major development in the fight against the current COVID-19 pandemic. The first 2 vaccines approved in the United States, mRNA-1273 and BNT162b2, are both mRNA based and highly effective in immunocompetent persons, but efficacy in patients on immunosuppressants has not been established. Additionally, data suggests these patients are less likely that immunocompetent people to develop neutralizing antibodies after COVID-19 infection. Given the high risk of poor outcomes in organ transplant and immunosuppressed patients, effective vaccination is paramount in this group. We present the first reported case of a SOT patient who failed to achieve seroconversion after 2 doses of mRNA vaccine. This case has significant implications about how immunosuppressed patients should be counseled about SARS-CoV-2 vaccination and the protection provided. Physicians should remain clinically suspicious for infection with SARS-CoV-2 despite vaccination status in solid organ transplant patients. This article is protected by copyright. All rights reserved. Copyright This article is protected by copyright. All rights reserved.

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1. **Recommendations for the use of COVID-19 vaccines in patients with immune-mediated kidney diseases**  
   Kronbichler Andreas Nephrology, Dialysis, Transplantation: Official Publication of the European Dialysis and Transplant Association-European Renal Association 2021;:No page numbers.

1. **SARS-CoV-2 vaccination in IBD: more pros than cons**  
   D'Amico Ferdinando Nature Reviews Gastroenterology and Hepatology 2021;18:211-213.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=674de0e9635d30086de9c9ff2ed73fc3)

1. **The impact of SARS-CoV-2 variants on IBD management**  
   Segal Jonathan P. The lancet. Gastroenterology & hepatology 2021;6:343-344.

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1. **Winter Is Coming! Clinical, Immunologic, and Practical Considerations for Vaccinating Patients With Inflammatory Bowel Disease During the Coronavirus Disease-2019 Pandemic**  
   Melmed Gil Y. Gastroenterology 2021;160:639-644.

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1. **[SARS-CoV-2 vaccines - what the nephrologist should know]**  
   Heine Gunnar H. SARS-CoV-2-Impfungen - Was muss der Nephrologe wissen? 2021;146:466-470.

Only fifteen months after the beginning of the COVID-19 pandemic, several vaccines are already available for clinical use. While the spike protein of SARS-CoV-2 constitutes the main target of all predominant SARS-CoV-2 vaccines, they work by different mechanisms (mRNA-based vaccines vs. vector-based vaccines vs. protein-based vaccines). Though there are slight differences regarding the level of protection against mild COVID-19, all five vaccines that have been through phase 3 trials were nearly 100 % effective in preventing severe or fatal cases of COVID-19. The side effects were of short duration.Patients with chronic kidney disease (or other significant comorbidities) were largely excluded from Phase 3 trials, which makes definite recommendations concerning their vaccination difficult. The vaccine's effectiveness may be reduced in that population due to a uremic immune defect and/or immunosuppressive medication. However, these patients have an increased risk for severe or fatal COVID-19, so that they may particularly benefit from the vaccine. Copyright Thieme. All rights reserved.

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1. **[Vaccination against SARS-CoV-2 in patients with multiple sclerosis]**  
   Costa Frossard-Franca L. Vacunacion frente al SARS-CoV-2 en pacientes con esclerosis multiple. 2021;72:250-260.

INTRODUCTION: The recent availability of SARS-CoV-2 vaccines has raised concerns in certain patient groups, such as those with multiple sclerosis. However, there are currently few publications that provide information on this issue. We pooled the information available on the safety and efficacy of vaccination against SARS-CoV-2 in patients with multiple sclerosis, with and without disease-modifying therapy., DEVELOPMENT: The study consisted in a literature search focused on the types of SARS-CoV-2 vaccines, the current status of their approval, and the data available on the safety and efficacy of vaccines in patients with multiple sclerosis, including the new COVID-19 vaccines. Based on this search, the document has been designed taking into account current evidence and expert recommendations. There are no data on the safety and efficacy of SARS-CoV-2 vaccines in patients with multiple sclerosis. However, evidence does exist to suggest that messenger RNA (mRNA) vaccines against SARS-CoV-2 are as safe in these patients as in other individuals. Some therapies with immunosuppressants might reduce the effectiveness of these vaccines and require the scheduling of their administration, preferably before the start of treatment if possible., CONCLUSION: The data available make it possible to recommend mRNA vaccines against SARS-CoV-2 in patients with multiple sclerosis. In patients on fingolimod, cladribine, alemtuzumab, ocrelizumab and rituximab, vaccination prior to the initiation of medication administration would be recommendable whenever possible.

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1. **COVID-19 and immunosuppressive therapy in dermatology**  
   Schwartz Robert A. Dermatologic therapy 2020;33:e14140.

Coronavirus 2019 (COVID 19) was first detected in December 2019 in China. It has become a pandemic. With concern about therapies that may decrease immunity and enhance the severity of an individual's COVID-19 infection, leading to a possibly fatal outcome, use of immunosuppressants has become an important concern. This work focuses on management of various skin diseases individuals lacking immunity to COVID-19 but requiring a systemic immunosuppressant, keeping in view the challenge of the COVID 19 pandemic and that our knowledge of this virus and its effects on the immune system are incomplete including knowledge as to an individual's immunity after COVID-19 infection. Copyright © 2020 Wiley Periodicals LLC.

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1. **Management of Rheumatic Diseases during COVID-19: A National Veterans Affairs Survey of Rheumatologists**  
   Singh Jasvinder Arthritis and Rheumatology 2020;72:8-12.

Background/Purpose: To assess the experience, views and opinions of rheumatology providers at Veterans Affairs (VA) facilities about rheumatic disease healthcare issues during the COVID-19 pandemic. Method(s): We used the QualtricsTM survey to perform an anonymized cross-sectional survey of all VA rheumatology providers, who were members of the VA Rheumatology Consortium, a volunteer organization of VA rheumatologists. Non-responders received reminders to complete the survey from April 16 to May 18, 2020. We assessed provider experience, views and opinions about various COVID-19 issues and resilience. Result(s): Of the 153 eligible VA rheumatologists, 103 (67%) completed the survey. Potential participants were slightly older (16% vs. 11% were >=65 yrs) and more likely to be male compared to the survey responders (45% vs. 38%). Established patients. Most/majority of rheumatologists considered that the following conditions were appropriate for telephone follow-up visits: gout, osteoporosis, polymyalgia rheumatica, sTable rheumatoid arthritis, sTable spondyloarthritis, and osteoarthritis (Figure 1). One-third or more rheumatologists considered it appropriate to have a video based VA video connect (VVC) visit for local musculoskeletal conditions, tendinitis, rheumatoid arthritis with active medication (DMARD/biologic) changes and patients with sTable lupus, scleroderma or vasculitis; 53% preferred an in-person for people with lupus, scleroderma, vasculitis with immunosuppressive or glucocorticoid dose changes (Figure 1). Most/majority of the responders were somewhat or very comforTable with technology for providing healthcare to established patients during COVID-19 pandemic using: (1) telephone, 87%; (2) VA video connect (VVC), 64%; and (3) in-person visits, 54% (Figure 2). A smaller proportion were comforTable with technology providing healthcare to new clinic patients (Figure 2). High provider resilience was independently associated with significantly higher odds ratio (OR) of more comfort with technology for telephone (OR, 3.1 (95% CI, 1.1-9.7)) and VVC visits for new patients (OR, 4.7 (95% CI, 1.4-15.7)), with no difference for in-person visits (OR, 1.8 (95% CI, 0.7-5.0)). Live vaccine. Most responders would not hold hydroxychloroquine (95%) or sulfasalazine for a live COVID-19 vaccine (74%). A majority would hold methotrexate or leflunomide (66%) and glucocorticoids of 20 mg/day or higher (52%) for 2 weeks or less (Figure 3); and would hold non-TNF biologics (76%), anti TNF-biologics (85%), Janus-kinase inhibitors (78%), anti IL-17/23 biologics (82%), belimumab (77%)immunosuppressive drugs such as azathioprine (64%), for 3-8 weeks (Figure 3). Killed vaccine. A majority of responders (50% or higher) would not withhold these drugs for a killed COVID-19 vaccine; another 25% would hold them off for < 2 weeks (Figure 3). Conclusion(s): A better understanding of COVID-19 rheumatic disease healthcare issues using a health-system approach can inform improve the care of Veterans with rheumatic disease and their providers.

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1. **Racing to immunity: Journey to a COVID-19 vaccine and lessons for the future**  
   Calvo Fernandez Ester British journal of clinical pharmacology 2020;:No page numbers.

SARS-CoV-2 is the novel coronavirus behind the COVID-19 pandemic. Since its emergence, the global scientific community has mobilized to study this virus, and an overwhelming effort to identify COVID-19 treatments is currently ongoing for a variety of therapeutics and prophylactics. To better understand these efforts, we compiled a list of all COVID-19 vaccines undergoing preclinical and clinical testing using the WHO and ClinicalTrials.gov database, with details surrounding trial design and location. The most advanced vaccines are discussed in more detail, with a focus on their technology, advantages and disadvantages, as well as any available recent clinical findings. We also cover some of the primary challenges, safety concerns and public responses to COVID-19 vaccine trials, and consider what this can mean for the future. By compiling this information, we aim to facilitate a more thorough understanding of the extensive COVID-19 clinical testing vaccine landscape as it unfolds, and better highlight some of the complexities and challenges being faced by the joint effort of the scientific community in finding a prophylactic against COVID-19. Copyright © 2020 British Pharmacological Society.

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| 3. | medline | 1 or 2 | 5567 |
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| 6. | medline | 4 or 5 | 334797 |
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| 8. | medline | Azathioprine/ | 14806 |
| 9. | medline | (Azathioprine or Azothioprine or Immuran or Imuran or Imurel).ti,ab,kf. | 16106 |
| 10. | medline | 8 or 9 | 23584 |
| 11. | medline | 3 and 10 | 0 |
| 1. | embase | SARS-CoV-2 vaccine/ | 2246 |
| 2. | embase | (("covid 19" or "2019 Novel Coronavirus" or "2019-nCoV" or "Coronavirus Disease 2019" or "Coronavirus Disease-19" or "SARS Coronavirus 2" or "SARS-CoV-2" or "SARS2") adj3 (vaccin\* or immuni\* or jab\*)).ti,ab,kw. | 3821 |
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| 6. | embase | 4 or 5 | 390074 |
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