

# COVID-19 Vaccines and Immunosuppressed Patients With Cancer: Critical Considerations

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**BACKGROUND:** Patients with cancer are highly vulnerable to COVID-19 because of immunosuppression from diseases and treatments. Emerging data characterize the impact of COVID-19 vaccines related to cancer malignancies and treatments.

**OBJECTIVES:** This article provides a clinical foundation on the immune response to the COVID-19 vaccine associated with the impact of cancer and its related treatments. It reviews strategies for vaccine scheduling, Centers for Disease Control and Prevention recommendations, and nursing considerations when administering the vaccine to immunosuppressed patients.

**METHODS:** Research studies about immune responses to COVID-19 vaccines among immunosuppressed patients with hematologic and solid tumor malignancies were summarized.

**FINDINGS:** Studies about the humoral immune responses of patients with cancer to COVID-19 vaccines help guide vaccination planning for this population. Critical nursing considerations for patients with cancer receiving COVID-19 vaccination are integral to the provision of optimal clinical oncology care during the pandemic.

## KEYWORDS

COVID-19; vaccination; hematology; immunosuppression; solid tumor

## DIGITAL OBJECT IDENTIFIER

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**PATIENTS WITH CANCER ARE AT GREATER RISK** for contracting the SARS-CoV-2 virus, twice as likely to be hospitalized with a COVID-19 infection, and three times more likely to die from COVID-19 compared to the general population (Bakouny et al., 2020; Wang et al., 2021). The immunosuppression that many patients with cancer develop because of their disease and therapy is related to poor COVID-19 outcomes (Bakouny et al., 2020; Chavez-MacGregor et al., 2022). The U.S. Food and Drug Administration (FDA)-approved COVID-19 vaccines have demonstrated safety and efficacy at reducing COVID-19-related deaths in the general population. However, patients actively being treated for cancer were not included in the initial vaccine studies (Elkrief et al., 2021). Although vaccines offer a pathway to recovery from the pandemic, there are special considerations for patients with cancer, particularly those who are immunosuppressed. Because of the evolving nature of the pandemic and related vaccine recommendations, Figure 1 provides additional resources with the latest guidelines, including those for patients aged 12 or younger.

## COVID-19 Vaccines

There are currently two FDA-approved messenger RNA (mRNA) vaccines available in the United States to protect against COVID-19, Pfizer-BioNTech and Moderna. The Johnson & Johnson (Janssen) vector vaccine has FDA authorization for emergency use and is approved for use as a heterologous booster following full vaccination with either mRNA vaccine.

### mRNA Vaccines

The Pfizer-BioNTech and Moderna vaccines contain mRNA from the SARS-CoV-2 virus, created in a laboratory, which enables cells to make a piece of the spike protein that is present on the surface of the virus (Centers for Disease Control and Prevention [CDC], 2022). The mRNA is destroyed after cells make copies of the spike protein (CDC, 2022). The spike protein triggers an immune response that produces antibodies against the virus and builds T and B lymphocytes that will be able to identify and fight the SARS-CoV-2 virus (CDC, 2022).

### Vector Vaccines

Vector vaccines contain a modified version of a harmless virus. This modified virus is known as a “vector virus” that carries spike protein DNA material from SARS-CoV-2 into the cells of the vaccinated person (CDC, 2022). Once the viral vector is inside the cell, the genetic material instructs the cell to make the spike protein unique to the SARS-CoV-2 virus (CDC, 2022). The spike protein