

# Coronavirus Vaccination Adverse Reactions and the Role of the Dermatologist

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A nationwide vaccination program against coronavirus disease 2019 (COVID-19) has materialized as Emergency Use Authorizations (EUA) have been issued for the Pfizer-BioNTech and Moderna COVID-19 vaccines. These vaccines rely on novel, messenger RNA (mRNA) technology. Reported adverse effects include minimal local skin reactions. As the world fights COVID-19, dermatologists serve a critical role in supporting vaccination efforts, reassuring patients about potential adverse reactions, and strengthening continued vaccine safety monitoring.

Coronavirus disease 2019 (COVID-19) has infected more than 17 million individuals and caused over 300,000 deaths in the United States (US).<sup>1</sup> The US Food and Drug Administration (FDA) has issued Emergency Use Authorizations (EUA) for COVID-19 vaccines from Pfizer-BioNTech (December 11, 2020)<sup>2</sup> and Moderna (December 18, 2020).<sup>3</sup>

Both vaccines harness the power of nucleoside-modified messenger RNA (mRNA) technology, where intracytoplasmic mRNA translation of the viral spike protein precedes binding and neutralizing antibody production.<sup>4</sup> While the COVID-19

vaccines are not the first to utilize mRNA (previously developed for viruses, including: influenza, rabies, Zika, and cytomegalovirus),<sup>4-8</sup> these vaccines are the first to undergo widespread distribution. With expert knowledge of potential cutaneous or systemic dermatologic manifestations of vaccine administration, dermatologists may reassure patients and help the larger healthcare community track emerging adverse reactions.

Local reactions to vaccine administration have been common in recipients of mRNA vaccines. In an mRNA rabies vaccine trial, 95% of recipients reported cutaneous injection site reactions within seven days of vaccination.<sup>7</sup> While local injection site reactions such as pain, swelling, and erythema have been connected with mRNA vaccines, no systemic cutaneous adverse reactions have yet been reported (Table 1).<sup>5-8</sup> Clinical studies of the Pfizer-BioNTech COVID-19 Vaccine reported injection site pain (84.1% of recipients), swelling (10.5%), and erythema (9.5%).<sup>2</sup> Injection site pain (92%), swelling (14.7%), and erythema (10%) were also reported in clinical studies of the Moderna COVID-19 Vaccine.<sup>3</sup> Notably, local skin reactions occur more frequently following the required, second dose of

**TABLE 1.**

**Comparison of Viral mRNA Vaccine Studies and Documented Skin Reactions**

Virus	Study Type	Documented Local Skin Reaction	Documented Systemic Skin Reaction
Influenza <sup>5</sup>	Double blind, randomized, placebo controlled	Pain, erythema, ecchymosis, swelling	No documented systemic skin reactions
Rabies <sup>7</sup>	Prospective, open label, non-randomized	Pain, erythema, ecchymosis, swelling, itching	
Zika <sup>6</sup>	Observer blind, randomized, placebo controlled	Pain	
Cytomegalovirus <sup>8</sup>	Observer blind, randomized, placebo controlled	Pain	
COVID-19 (Pfizer/BioNTech) <sup>2</sup>	Observer blind, randomized, placebo controlled	Pain, erythema, swelling, lymphadenopathy	
COVID-19 (Moderna) <sup>3</sup>	Observer blind, randomized, placebo controlled	Pain, erythema, swelling	

both vaccines.<sup>2,3</sup> Studies have demonstrated fatigue, headache, myalgia, and nausea as potential adverse reactions without systemic cutaneous adverse effects, similar to the results of previous mRNA vaccines.<sup>2,3</sup>

If further adverse systemic reaction were to emerge following vaccination, dermatologists have an important duty to report observations to the Vaccine Adverse Event Reporting System (VAERS) to enhance continuous safety monitoring. As efforts to expand US COVID-19 vaccinations continue, dermatologists are ideally positioned to reassure patients experiencing common cutaneous injection site reactions and educate and encourage those who are hesitant to accept these important preventative vaccines. Greater knowledge of potential adverse effects may increase public confidence for those who may be wary of new vaccine technologies.

## DISCLOSURES

Dr. Dellavalle is a Joint Coordinating Editor for *Cochrane Skin*, a dermatology section editor for *UpToDate*, a Social Media Editor for the *Journal of the American Academy of Dermatology (JAAD)*, and a Podcast Editor for the *Journal of Investigative Dermatology (JID)*. He is a coordinating editor representative on *Cochrane Council*.

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