

Does the effectiveness of a vaccine differ for individuals with MS?

More studies are needed due to the lack of trial data. Research has shown that individuals with MS could potentially have a reduced response to the influenza vaccine, although the confidence level of these findings was low.

Should a person receive a vaccine if taking a disease-modifying therapy?

More studies are needed. We do know that with the immunosuppressive and immunomodulating (ISIM) properties of most DMTs, the risk for infections is increased and the efficiency of a vaccine may be decreased. Medical professionals need to consult the prescribing information (PI) on any DMT to determine what screenings need to be done in advance and when a vaccine may be given for maximum safety and effectiveness. Please note that if a patient is having a relapse, a vaccine should not be given until the relapse has completely resolved.

For individuals taking Betaseron® (interferon beta-1b), researchers found that these patients will probably have a normal response and not experience a reduction in seroprotection, which is the ability to prevent infection through an antibody response. With DMTs such as Copaxone® (glatiramer acetate), Gilenya® (fingolimod), and Novantrone® (mitoxantrone), the likelihood of seroprotection may be reduced.

Most ISIM therapies require a vaccine to be given several weeks prior to starting treatment, allowing time for the immune response to develop. More time is typically required for a live vaccine versus a non-live one. After discontinuing treatment, the ISIM effects can last for several months, so the PI will often recommend waiting two to six months after stopping a treatment before a vaccine may be given.

About MSAA

The Multiple Sclerosis Association of America (MSAA) was founded in 1970 and is a leading resource for the entire MS community, improving lives today through vital services and support. As a national nonprofit 501(c)3 organization, MSAA has achieved Platinum Level status with GuideStar, which is the highest level of recognition of an organization's commitment to transparency.

MSAA's free services include a toll-free Helpline, equipment and cooling distribution programs, MRI funding, award-winning publications and videos, educational programs, My MS Manager mobile phone application, online peer community, and more.



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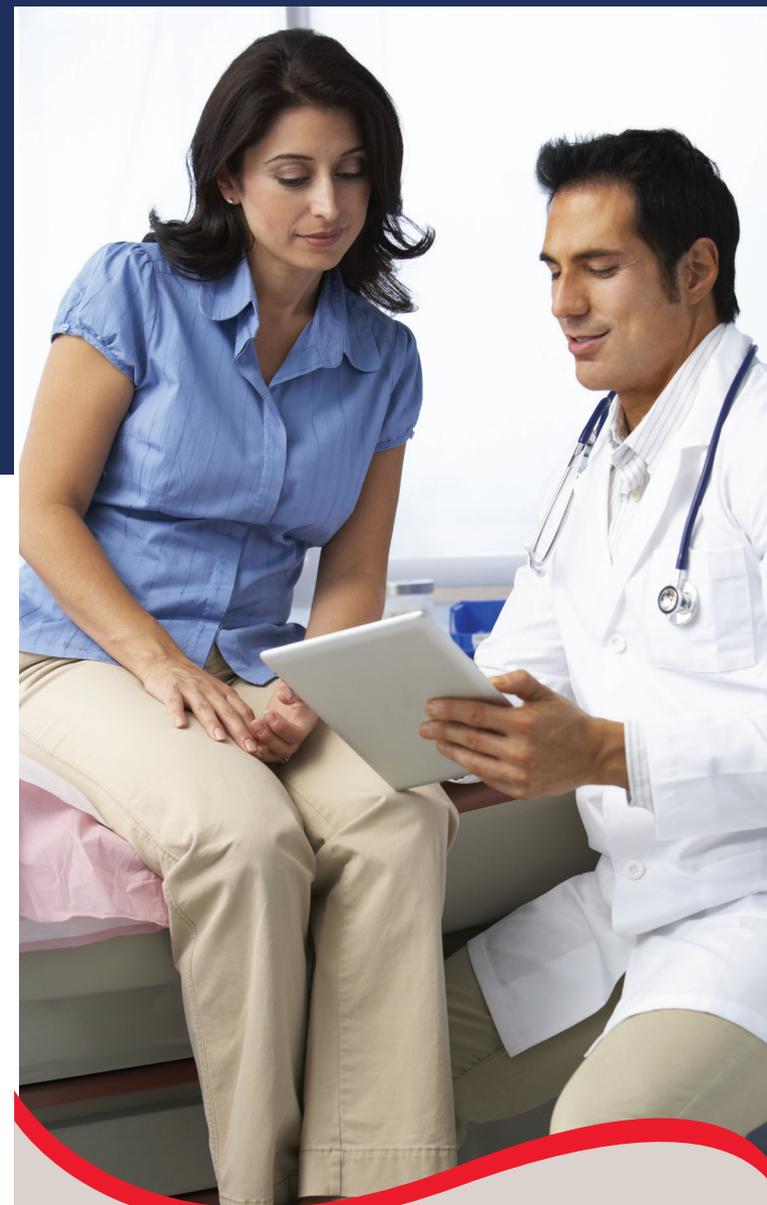
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Vaccination Safety in MS



Introduction

The details surrounding immunizations and multiple sclerosis (MS) are quite complex and not always well understood. Research in the United States as well as other countries continues to reveal more about this intricate relationship between MS, its effects on the immune system, its immunosuppressive and immunomodulating (ISIM) disease-modifying therapies (DMTs), and how vaccinations affect these immune-system functions.

In general, the rule of thumb is that non-live, inactivated vaccines are safe for people with MS, while live vaccines should be avoided – although in some instances, the benefits may outweigh the risks. Many factors are involved with MS, DMTs, and immunizations. First and foremost, members of the MS community should always consult their healthcare professional for specific recommendations.

Frequently Asked Questions

Can immunizations cause MS or increase disease activity?

Experts agree that neither live nor inactive vaccines can cause MS. Epidemiological studies and pharmaceutical data continue to find that most vaccines are safe and have not shown any connection with the onset or worsening of MS. Interestingly, some vaccines may even be associated with a possible lower likelihood of being diagnosed with MS in the future; these include vaccines for human papillomavirus, pertussis, tetanus, and smallpox.

Determining if vaccines increase disease activity in MS is challenging to study. A live vaccine could possibly increase disease activity, although more data are needed. The yellow fever vaccine, which is also a live vaccine, has been shown to increase relapses in MS, but in this case, the sample size was small. More studies are needed with live vaccines to reach a final conclusion on their safety in MS.



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Immunity and Types of Vaccines

Vaccines work by activating antigen-presenting cells (APCs) within the immune system, which ultimately activate T-cells and develop the potential for an immune response when the body is exposed to this specific antigen (toxin or foreign substance) in the future. Live vaccines are “attenuated,” in the laboratory, making them too weak to cause disease (under normal conditions), but these live pathogens are still strong enough to cause an immune response.

With killed or inactivated vaccines, the virus or bacteria are killed in the lab through chemicals or heat, rendering them unable to cause disease. They are usually combined with adjuvants, such as aluminum salt adjuvants or oil emulsions, to help induce an immune response to the antigen. The type of adjuvant used is important and some may cause problems in autoimmune diseases, so side effects need to be closely monitored.

Other types of vaccines include toxoid (a bacterial toxin or protein from that toxin that has been made harmless but still invokes an immune response), recombinant (lab-generated antigens combining different genetic material), conjugate vaccine (combines a weak antigen with a strong protein antigen for a stronger immune response), and polysaccharide vaccines (having long chains of sugar molecules on the surface of certain bacteria).

In recent years, some people have avoided vaccinations due to fears of developing neurological disease, but studies supporting this theory are often underpowered and poorly designed. “Vaccine hesitancy” not only endangers the health of the individual, but threatens the health of the community as well. For more information on types of vaccines, please visit www.vaccines.gov/basics/types.

Common Approved Immunizations* in the United States

<p style="text-align: center;">Vaccines CONSIDERED SAFE for individuals with MS:</p>	<ul style="list-style-type: none"> • Diphtheria, toxoid • Hepatitis A, inactivated vaccine • Hepatitis B, recombinant vaccine • Influenza (flu), INACTIVATED vaccine • Poliomyelitis (polio), inactivated vaccine • Rabies, inactivated vaccine • Tetanus, toxoid
<p style="text-align: center;">Vaccines CONSIDERED PROBABLY SAFE for individuals with MS:</p>	<ul style="list-style-type: none"> • Human papillomavirus (HPV), recombinant vaccine • Measles, mumps, and rubella; live attenuated vaccine • Meningococcal A, C, W, and Y (meningitides), inactivated vaccine • Meningococcal B (meningitides), recombinant vaccine • Pertussis (whooping cough), toxoid • Varicella (chicken pox), live attenuated vaccine
<p style="text-align: center;">Vaccines with INSUFFICIENT DATA for individuals with MS:</p>	<ul style="list-style-type: none"> • Haemophilus influenzae type b (Hib), conjugate vaccine • Pneumococcus (pneumonia), polysaccharide vaccine • Zoster (shingles/herpes zoster), recombinant vaccine • Zoster (shingles/herpes zoster), live attenuated vaccine (recombinant preferred)
<p style="text-align: center;">Vaccines probably having an INCREASED RISK OR NOT RECOMMENDED for individuals with MS:</p>	<ul style="list-style-type: none"> • Influenza (flu), LIVE ATTENUATED vaccine • Yellow fever, live attenuated vaccine

*Information provided is from peer-reviewed resources, published prior to the approval of a COVID-19 vaccine. MSAA does not endorse any specific vaccinations; please consult your physician for specific recommendations.

In a 2019 MSAA survey of 1,962 people with MS: 36% of the participants said that they did not feel well-informed about immunizations; 38% thought the vaccines could interfere with their treatments or worsen their MS; and 42% were concerned about adverse events. This study suggests the need for targeted education and improved communication between healthcare professionals and MS patients.

References:

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Farez MF, Correale J, Armstrong MJ, et al. Practice guideline update summary: Vaccine preventable infections and immunization in multiple sclerosis. *Neurology*. 2019; 93: 584-594.

Zrzavy T, Kollaritsch H, Rommer PS, et al. Vaccination in Multiple Sclerosis: Friend or Foe? *Frontiers in Immunology*. 2019; 10 (1883): 1-10.

AAN’s 2019 Guidelines

In 2019, the American Academy of Neurology (AAN) updated their 2002 guidelines regarding immunization and MS. To follow are some of the main points that physicians will be following to provide the best care for their patients.

- Recommend that patients with MS follow all local vaccine standards, including an annual influenza vaccination, unless specific contraindications exist.
- Vaccinate patients as needed several weeks before initiating immunosuppressive and immunomodulating (ISIM) therapy, as specified in the PI. Discuss the advantage of vaccination with patients as soon as possible after MS diagnosis, regardless of initial therapeutic plans, to prevent future delays in initiation of ISIM therapies.
- Screen for infections according to PI before ISIM therapy – and treat patients testing positive for latent infections; screen for infections before ISIM therapy in high-risk populations, even if not specifically mentioned on PI.
- Recommend against using live-attenuated vaccines in people with MS receiving ISIM therapies or who have recently discontinued these therapies. When the risk of infection is high, may recommend using live-attenuated vaccines if killed vaccines are unavailable.
- Delay vaccinating people with MS who are experiencing a relapse until clinical resolution or until the relapse is no longer active.

In summary, MS disease activity worsens during an infection. Since immunizations can reduce this risk, the long-term benefits of receiving the recommended vaccinations should be considered. Individuals should always consult their physician.