

MICRONEEDLE ARRAY (MNA)



MNAs are tiny patches of micro-needles, about the thickness of a fingernail, that can deliver vaccines and other medicines.

MNAs are minimally invasive. They may be less painful than vaccines delivered by regular sized needles. They feel like velcro on the skin.

MNAs can be easily self-administered, without professional training. Patches are typically kept on for 1-2 days.

MNA technology development began in the 1990's. Research and clinical trials are underway for insulin delivery to diabetic patients and other vaccines.



HYPODERMIC NEEDLE

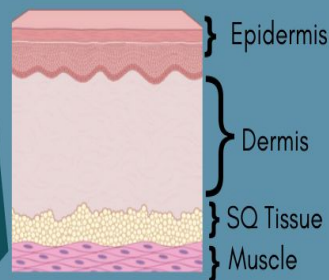


A hypodermic needle is a thin, hollow tube with a sterile pointed tip. It delivers vaccines and other medicine or extracts fluids from under the skin. Delivery of vaccine is quick and clean.

A hypodermic injection can be delivered to the:

- Epidermis
- Dermis
- Subcutaneous tissue (SQ)
- Muscle

The Layers of Skin



The invention of the hypodermic needle dates back to the 1850's. The needle is commonly used by phlebotomists to extract blood for donations or for routine blood work.



Common vaccines delivered via Hypodermic Injection:

- MMR
- DTap
- Influenza
- Meningococcal

NASAL SPRAY



Nasal spray can be used to deliver vaccines and other medicines into the nasal cavities.

So far, only live virus vaccines have been delivered via nasal spray. The live virus is weakened and cannot survive at body temperature



Live virus vaccines, like nasal sprays, are not recommended for:

- children under 2
- pregnant women
- immunosuppressed
- immunocompromised



Nasal spray has been used for influenza vaccine delivery since 2003

Nasal spray vaccines may mean more people get vaccinated:

- minimally invasive
- self-application
- for those who fear needles

MNAs may mean more people get vaccinated:

- minimally invasive
- self-application
- micro-needle technology for those who fear needles

References

- [Vaccine delivery systems](#)
- [Disease Prevention: An Opportunity to Expand Edible Plant-Based Vaccines?](#)
- [Microneedle-mediated vaccine delivery: Harnessing cutaneous immunobiology to improve efficacy](#)
- [Microneedles for drug and vaccine delivery](#)
- [Live Attenuated Influenza Vaccine \[LAIV\] \(The Nasal Spray Flu Vaccine\)](#)
- [Nasal Spray Flu Vaccine | FLUMIST® QUADRIVALENT \(Influenza Vaccine Live, Intranasal\)](#)
- [Influence of parenteral administration routes and additional factors on vaccine safety and immunogenicity: a review of recent literature](#)
- [A Coronavirus Nasal Spray Vaccine Can Be Strong But Is Hard To Make : Shots - Health News](#)
- [Live Attenuated Influenza Vaccine \[LAIV\] \(The Nasal Spray Flu Vaccine\)](#)