

# Microarray patches for vaccine delivery

## HEALTH NEED

The eradication of polio, measles, and rubella, among other infectious diseases, could be accelerated with vaccines that are easier to store, transport, and deliver in low-resource settings. Considerations of programmatic suitability—and the thermostable, easy-to-use, and sharps-free product features that can potentially enable such suitability—are critical to easing logistical challenges and expanding vaccine coverage and public health impact in routine and campaign immunization settings.

## TECHNOLOGY SOLUTION

Currently in development, microarray patches (also known as microneedle patches) consist of microscopic projections that, once applied to the body like a small, adhesive bandage, painlessly penetrate the skin's outermost layer to deliver vaccines. Some designs have solid projections coated with dried vaccine; others have dissolvable projections formulated from the vaccine itself. For both designs, contact with the skin's moisture initiates the vaccine delivery process.

Advantages of delivering vaccines by microarray patch include the potential for increased thermostability (reducing cold chain burdens and better enabling access to remote settings), ease-of-use (facilitating self-administration or delivery by lesser-trained health care workers), and safety (eliminating the risks typically associated with needle and syringe). Furthermore, the technology platform can access unique immune cells in the skin to induce a potent immune response. As a result, microarray patches could enable dose sparing, helping to increase supply. In addition, existing vaccines and new vaccines in development (such as malaria vaccines) may prove more effective when formulated for delivery by microarray patch rather than by intramuscular injection.



*Microarray patches may be a safe and painless way to effectively deliver vaccines. Photo: Georgia Institute of Technology*

## CURRENT STATUS AND RESULTS

PATH is collaborating with microarray-patch developers, vaccine manufacturers, and other global stakeholders to evaluate and advance a range of microarray patches, at all stages of product development, for the delivery of vaccines against polio, influenza, measles, and other diseases. Recent activities include:

- Defining desirable product attributes for microarray-patch delivery of measles-rubella vaccine by minimally trained health care workers.
- Evaluating the potential benefits, challenges, and financial costs associated with self-administration of influenza vaccine by microarray patch.
- Conducting human-centered design and field evaluations to assess the usability, acceptability, and programmatic fit of microarray patches for vaccine delivery.
- Identifying and facilitating product development pathways for microarray patches—including the relevant clinical, regulatory, manufacturing, and scale-up activities.
- Evaluating the cost of manufacturing and delivering vaccines by microarray patch.