

Long-acting drug delivery product innovation

Partnering to improve real-world access, adherence, and cost-effectiveness of essential medicines

Photo: PATH/Patrick McKern



PATH is optimizing and advancing injection technology with the potential to improve patient outcomes and reduce health care burden and climate impacts. Clockwise from top left: a CONRAD universal implant inserter, microarray patches, Dualject and Uniject injection devices, a blow-fill-seal (BFS) compact prefilled autodisable device (CPAD) from 3CK, an INJECTO easyject CPAD, and an autodisable (AD) syringe.

PATH is a global nonprofit with more than 1,300 staff in 70 countries, focused on health innovations for low- and middle-income countries. With nearly 50 years of experience forging multisector partnerships, our scientists, clinicians, business leaders, and engineers develop and deploy solutions for the world's most pressing health challenges.

Our multidisciplinary vaccine and pharmaceutical delivery team identifies, advances, and assesses primary packaging and delivery devices that have the potential to maximize safety and efficacy, expand equitable access, and minimize costs for immunization and essential medicines.

Partnering with industry to scale injection innovations for global health impact

Together with industry partners and donor organizations, PATH tackles health challenges with commercial solutions that are sustainable and scalable. In the last five years, our team has partnered with more than 20 private-sector companies on packaging and delivery projects with a shared aim of global impact. Our technical experts help our private-sector partners de-risk the product development process—from early exploration to commercial scale-up—to bring treatments and cures to communities that need them.

Prioritizing long-acting pharmaceuticals for urgent global health needs

PATH is establishing strategic partnerships with industry, academic institutions, and health organizations to drive the development of pharmaceutical injection technologies aimed at improving access, adherence, and delivery of essential medicines in resource-constrained settings through product innovation. Long-acting pharmaceuticals often require parenteral delivery, are viscous, have large or non-standard dose volumes, may not be compatible with standard device materials, and are expensive to manufacture. To overcome these barriers to access, PATH can partner to identify suitable packaging and delivery solutions that can reduce costs, improve access, and maximize impact. Too often, existing therapeutics and medicines do not reach the people who need them to treat critical diseases such as malaria, tuberculosis, hepatitis B and C, rabies, Ebola, and other neglected tropical diseases, as well as rising noncommunicable diseases such as cancer and diabetes.

Our proven human-centered design process in Africa and Asia

With a network of 40 offices across Africa and Asia, PATH has decades of experience working alongside local experts and communities in resource-constrained settings to ensure

innovations reflect local priorities and meet the needs of users and health systems. Engaging end users early and often in the development process—through local evaluations of usability and preferences—helps de-risk the introduction of novel products by ensuring technologies are easy to use, appropriate, and accessible.

Our technical expertise to accelerate product development

- **Technical and regulatory support:** We provide support for technology transfer, manufacturing scale-up technical assistance, and WHO prequalification readiness.
- **Pharmaceutical formulation science:** PATH scientists use our in-house biosafety level 2 laboratory to formulate, optimize, and test pharmaceutical products to improve efficacy, thermostability, and ease of use.
- **Engineering capabilities:** Our product engineers have significant expertise with prototypes, standards and test methods, container performance evaluations, formulation and device compatibility assessments, quality management systems, and life cycle assessments and carbon emission analyses of products and systems.
- **User and stakeholder evaluations:** Our researchers, including in-country experts, can explore and evaluate novel concepts, produce technology market landscapes, develop target product profiles, and conduct human factors assessments at various stages of development.
- **Commercialization readiness:** Our health economists and market experts specialize in economic modeling, including cost of goods sold (COGS), total cost of delivery, and cost-effectiveness. We support partnership landscape assessments, market research, risk assessments, and commercialization strategy.

Innovative delivery solutions solve barriers to impact

We have deep expertise assessing product needs and specifications to determine which syringe or innovative device would yield the most benefits across multiple factors such as safety, cost, and manufacturing options.

- **Autodisable (AD) syringe:** to minimize bloodborne disease transmission via needlesticks, PATH designed the first commercially available AD syringe: a single-use fixed-needle syringe that locks after administration to prevent reuse. To date, more than 7 billion SoloShot AD syringes have been produced by BD and procured by UNICEF for immunizations in more than 100 countries.
- **BD Uniject™:** PATH and BD developed a compact prefilled autodisable injection system that combines a needle, a syringe, and a single dose of vaccine or pharmaceutical for

safer, easier injections. In addition to 150 million hepatitis B birth-dose vaccinations, more than 20 million units of the self-injectable contraceptive DMPA-SC have been administered via the BD Uniject injection system in multiple countries across sub-Saharan Africa. Multiple studies show self-injection of DMPA-SC offers many benefits including privacy, convenience, improved contraceptive continuation, and time and cost savings due to fewer in-person clinic visits.

- **Novel compact, prefilled, autodisable (CPAD) devices:** PATH is partnering with developers to evaluate the technical, cost, and programmatic suitability of novel CPAD devices for delivery of injectable contraception and HIV prevention, including in-country usability assessments in Uganda and Zambia. Compared to a standard vial and needle/syringe, CPADs offer improved ease of use, reduced COGS, and supply chain simplicity.
- **Dualject:** PATH designed a dual-chambered, prefilled, single-dose injection device compatible with lyophilized products. This device could allow self-administration of various therapeutics.
- **Microarray patches:** For more than a decade, PATH has been instrumental in advancing microarray patch (MAP) technology as a transformative platform to address urgent global health needs. Along with our multisectoral partners, PATH's MAP work spans early-stage research, product development, clinical trials, thermostability assessments, human factors assessments, regulatory strategy, and global advocacy, paving the way for private-sector product introductions. MAPs could improve patient compliance, simplify supply chain requirements, and enable self-injection.
- **Implant inserters:** A generic inserter can deliver a wide variety of subcutaneous long-acting drug-eluting implants. PATH supported design modifications, test method development, and technology transfer to a manufacturing facility, including risk management. Beginning in early-stage development, PATH has conducted usability testing and supported a commercialization strategy. Long-acting implants paired with a generic inserter provide sustained therapeutic levels over months to years, improving adherence, reducing training requirements, and ensuring more consistent clinical outcomes with minimal patient burden.

Collaborate with us

PATH serves as a critical partner with end-to-end product development expertise to advance long-acting products intended for low- and middle-income countries and maximize the probability of technical and regulatory success.

Connect with portfolio leader Jessica Mistilis, PhD, to learn more at jmistilis@path.org.



PATH is a global nonprofit dedicated to achieving health equity. With nearly 50 years of experience forging multisector partnerships, and with expertise in science, economics, technology, advocacy, and dozens of other specialties, PATH develops and scales up innovative solutions to the world's most pressing health challenges.

path.org

Address
437 N 34th Street
Seattle, WA 98103 USA

Date Published
January 2026