
Background
In the field of safe injection, PATH has served for over 20 years in a global leadership role, championing improved approaches to injection safety for the developing world. As one of the first organizations to advocate for specific classes of safe injection devices, PATH, in collaboration with multiple partners, has designed, developed, tested, patented, licensed, and/or facilitated the availability of multiple new, appropriate, and affordable technologies that address different issues related to injection safety. These have included Uniject® prefilled injection devices, autodisable syringes, disposable-syringe jet injector devices, and safety syringes (syringes with built-in reuse prevention and/or needlestick protection features). One device developed at PATH, the SoloShot™ autodisable syringe, is now supplied by the licensee BD, who had distributed over 5.4 billion devices by mid-2009.

PATH has also worked on developing and advancing medical waste technologies such as needle removers and syringe melters for disposal of used syringes and needles. PATH’s work has included technology evaluation both in the laboratory and in health care settings, with the latter work focused on understanding the cost-effectiveness, usefulness, and acceptability of the technologies. Much of this work has been supported by the United States Agency for International Development (USAID) under the HealthTech program.

Advocacy
Working closely with international agencies and decision-makers, PATH has advocated for policy reform and participated actively in the founding and implementation of the Safe Injection Global Network (SIGN). As a founding member and chair of the Injection Safety Alliance in India—whose objectives and activities include reducing unnecessary injections—PATH has carried out nationwide studies of injection safety in association with the Government of India. PATH has also published relevant training materials and tools and trained health care workers, primarily in Africa, India, and Indonesia, on appropriate safe injection techniques.

Waste management and procurement
PATH acted as chair of the Implementation Task Force on the disposal of sharps waste from 2002–2003 for the GAVI Alliance. During this time PATH initiated and jointly organized with the World Health Organization (WHO) five health care waste management workshops in Africa and Southeast Asia. At these sessions, attendees formulated short- and medium-term policies for waste disposal and determined their best options for disposal of immunization sharps waste. In these capacities, PATH works with communities to generate “innovative local solutions” to injection safety and sharps waste management problems.

This work continued under the Making Medical Injections Safer (MMIS) project funded by the President’s Emergency Plan for AIDS Relief (PEPFAR) and managed by John Snow, Inc., with PATH as the partner responsible for sharps waste management activities. PATH has worked in 11 PEPFAR countries, assessing local waste management practices and providing technical assistance and training in appropriate procedures. In the area of international procurement, PATH has worked to train and build country capacity in procurement methodologies and procedures for safe injection equipment. In the MMIS project, PATH is responsible for the procurement of safe injection equipment for all the countries—with over 250 million safety syringes introduced for curative use.

Technologies and product evaluations
The following pages outline the technologies, evaluations, introduction efforts, and policy work that PATH has undertaken over the last ten years in an effort to improve the safety of injections around the world and support the efforts of SIGN.
Policy and standards regarding injection safety

PATH has contributed to the development of key global policies for injection safety over the last ten years including:


2. In 2009, UNICEF began to phase out the distribution of standard disposable syringes for vaccine reconstitution and replace them with reuse-prevention (RUP) syringes. A full transition is expected by the end of 2010.

PATH has provided technical advice on the development of a number of WHO Performance, Quality and Safety (PQS) specifications including those related to:

1. Safety boxes
2. Safety syringes
3. Lower-cost needle removers

Table 1. Availability of safe injection devices

<table>
<thead>
<tr>
<th>Product</th>
<th>Status</th>
<th>Global distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SoloShot™</td>
<td>Commercially available</td>
<td>5.4 billion</td>
</tr>
<tr>
<td>Uniject®</td>
<td>Commercially available</td>
<td>73 million</td>
</tr>
<tr>
<td>Needle-remover devices</td>
<td>Commercially available</td>
<td>unknown</td>
</tr>
<tr>
<td>Disposable-syringe jet injectors</td>
<td>In clinical trials</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Evaluations of safe injection technologies conducted by PATH

<table>
<thead>
<tr>
<th>Technology evaluated</th>
<th>Location</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniject® (with oxytocin)</td>
<td>Angola, Guatemala, Indonesia, Mali, Vietnam</td>
<td>1999–2009</td>
</tr>
<tr>
<td>Uniject® (with Cyclofem®)</td>
<td>Mexico</td>
<td>1999–2000</td>
</tr>
<tr>
<td>Uniject® (with hepatitis A &amp; B vaccines)</td>
<td>China, India, United States</td>
<td>2000–2003</td>
</tr>
<tr>
<td>Electric needle destroyers</td>
<td>United States</td>
<td>2000</td>
</tr>
<tr>
<td>Uniject® (with tetanus toxoid)</td>
<td>Afghanistan, Burkina Faso, Ghana, Mali, Somalia, Southern Sudan</td>
<td>2003</td>
</tr>
<tr>
<td>Needle removers</td>
<td>India, Senegal, Uganda, Vietnam</td>
<td>2001–2007</td>
</tr>
<tr>
<td>Sharps barrel and funnel</td>
<td>Senegal, United States</td>
<td>2004</td>
</tr>
<tr>
<td>Disposable cartridge jet injector</td>
<td>Brazil, China, India, South Africa, Tanzania</td>
<td>2004–2009</td>
</tr>
<tr>
<td>Multiuse nozzle jet injector</td>
<td>China, Senegal, United States</td>
<td>2002–2007</td>
</tr>
<tr>
<td>Syringe melters</td>
<td>India, Indonesia</td>
<td>2007–2008</td>
</tr>
<tr>
<td>Reuse-prevention feature reconstitution syringe</td>
<td>India, Indonesia</td>
<td>2007–2009</td>
</tr>
<tr>
<td>Retractable syringes</td>
<td>Peru, South Africa</td>
<td>2007–2008</td>
</tr>
<tr>
<td>Intradermal adapter</td>
<td>India</td>
<td>2009</td>
</tr>
<tr>
<td>Plastic spike reconstitution syringe</td>
<td>Oman</td>
<td>2009</td>
</tr>
<tr>
<td>Uniject® (with gentamicin)</td>
<td>Nepal</td>
<td>2009</td>
</tr>
</tbody>
</table>
At the country level, PATH’s work to introduce new technologies and provide technical assistance for health care waste management under the MMIS project has led to significant policy shifts around the world including:

(2) Development of national health care waste management plans in Nigeria, Mozambique, Kenya, and Tanzania.
(3) The successful introduction of needle removers in India and national policy supporting their use in 2006.

PATH reports and technical resources

**Historical profiles**


**Technology updates**


Technology Update: SoloShot™. 2009


**Health care waste management**


**Immunization safety**


**Technology evaluations**


Training materials


Resources for introduction


Journal articles


Funding sources

PATH’s work in the area of injection safety is supported by the United States Agency for International Development through funding for the HealthTech Program, by the Bill & Melinda Gates Foundation, by PEPFAR under the MMIS Project, and other donors.

For more information

For more information on injection safety, please visit our vaccine resources webpage at www.path.org/vaccineresources/injection-safety.php. For more information on managing sharps and other infectious waste, please visit our health care waste management resources page at www.path.org/projects/health_care_waste_resources.php.

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