Photo: Jacques Daniel Ly

Senegal: Changing the Face of Immunization in West Africa

Practical solutions transform vaccine delivery and injection safety

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PATH
A catalyst for global health

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Since 2002 PATH's Children's Vaccine Program has worked with the Senegalese government, health care workers, and local communities to introduce innovative, practical technologies to improve vaccine delivery and safety in two remote, underserved provinces.[1] In less than two years, coverage rates for DPT3 (diphtheria, pertussis, and tetanus) increased from 51 percent to 91 percent in St. Louis and Matam. This achievement stands out in Senegal, where health indicators are among the lowest in the world.[2]

The Senegalese provinces of St. Louis and Matam have become a showcase for innovative, practical community health systems in West Africa.

St. Louis and Matam are vast, with health posts few and far between.[3] Under these challenging circumstances, PATH worked in partnership with the government to change the face of immunization. Taking a systematic approach, they developed micro-plans to identify where immunization sessions should take place to reach every child, devised outreach strategies, and identified new technologies to improve service delivery. Previously no viable means of handling and disposing of syringes and other medical waste could be found in these provinces, but today waste management solutions are functioning at every health post.

Empowering health workers and communities to assess their needs and take action

PATH worked as a close partner with regional and district health post staff and national authorities to build ownership from the outset. A situational analysis was done early on to assess immunization coverage, management, and logistics practices. Knowledge, attitudes, and practices were captured through a survey. A comprehensive package of tools and training was then developed to strengthen the vaccine delivery system. It includes:

- District micro-planning to identify challenges and solutions.
- Fixed and outreach service delivery strategies.
- Interactive performance monitoring tools to track improvements in immunization delivery.
- Refresher training for health workers to update their immunization skills and introduce new practices and technologies.
- Improved waste management processes to ensure the safety of immunization to both the child and the community.

Enhanced information systems and behavior change communication (BCC) techniques are also relied upon to promote immunization and build commitment among influential stakeholders.

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[1] Companion papers on "PATH's Children's Vaccine Program—Increasing Immunization Coverage, Improving Immunization Safety, Expanding Protection," "Andhra Pradesh—Building a Model Immunization system" and Cambodia—Coverage Improvement Planning Pays Off are available from *www.ChildrensVaccine.org.*

[2] Immunization coverage in Senegal is estimated to range from 45 to 50 percent nationally, according to the most recent national reporting and WHO/UNICEF estimates for DPT3 coverage. Senegal Country Fact Sheet. GAVI 2004. GAVI web site: *www.VaccineAlliance.org.*

[3] The province of St. Louis covers 19,044 km^2; Matam province covers 25,083 $km.^2$

Reaching every child

Micro-planning brings together district officials and head nurses from each health post to plan how best to reach more children and improve the efficiency of immunization services. Micro-plans map communities, using population data from the catchment area to plan the number and timing of immunization sessions through fixed centers (within 5 km of a person's home), through outreach (5 to 10 km), and through mobile strategies (for those farther than 10 km from a health post). By knowing where children can best be reached, health staff can achieve better results.

Other strategies to improve coverage, such as reducing dropouts, also can be strengthened through micro-planning. Micro-plans enabled health staff in St. Louis and Matam to more accurately estimate the number of vaccines, syringes, safety boxes, fuel, and other resources needed to achieve target coverage rates. PATH helped refine this comprehensive approach by forecasting other crucial logistical needs, such as motorcycles, driver training, and vehicle maintenance—all critical to timely and safe delivery of vaccine.

Micro-planning has been completed by over 150 health posts in the two provinces. The project plans encompass the full spectrum of a quality immunization program: safe, efficacious vaccine; efficient delivery systems; and appropriate handling and disposal of sharps and other medical waste.

Managing information and monitoring performance indicators

Monitoring indicators at the service delivery and district level has been key to improving performance in Senegal, as disparities in coverage, vaccine wastage, or reporting can be easily revealed and addressed. District teams identified key indicators, intentionally limiting the number for more efficient data analysis within and across districts. The health staff record and relay the data to other district and provincial health managers through an interesting feedback mechanism that promotes friendly competition. Every two months district staff come together to discuss the numbers and current challenges. At the community level, meetings are usually held more frequently, depending on what community workers deem necessary.

Five Key Indicators

- DPT coverage rates
- DPT1 to DPT3 dropout rates
- Vaccine wastage rates
- Completeness of reporting
- Timeliness of reporting

The feedback mechanism allows managers and supervisors to identify district health posts that need to be strengthened and take appropriate action. Importantly, engagement of the Ministry of Health staff has led to direct linkage of district-level reporting to national health information and logistics systems. The bi-monthly district coordination meetings PATH introduced have been instrumental in ensuring this linkage and for ongoing monitoring of immunization coverage.

> "Analysis is necessary, and it's entirely possible to do…. It's up to us to do it."
>
> Dr. Papa Coumba Faye,
> Director of the Expanded Program for Immunization (EPI), Senegal

Updated training and innovative communication for social change

Communication strategies also are part of each micro-plan. Health workers identify their communication needs and, together with communities, develop strategies to better inform people about immunization and the importance of fully vaccinating their children. PATH led a team that updated training modules covering topics such as vaccine management, the cold chain, vaccine safety, surveillance, BCC techniques, monitoring, and micro-planning. And the project trained over 250 nurses and 482 community health care workers. PATH also provided technical advice and training on waste management technologies.

In Dagana, for example, the community initiated an innovative school-based approach to encourage children to learn more and care about immunization. The "adoption strategy" relies upon secondary students to monitor the number of vaccinations of infants in their community. The students track the immunizations of children assigned to them—those they have "adopted"—and remind the parents when the next immunization is due. This approach has helped instill pride by encouraging communities to take responsibility for their own health and future.

Photos: Jacques Daniel Ly

Students from Dagana with their immunization monitoring notebooks.

This boy "adopted" an infant from his village to help ensure it was fully immunized.

Demonstrating appropriate waste management and disposal systems

PATH has actively promoted efforts to deal with the problem of improper disposal of used syringes and other health care waste. Prior to the technology introduction and training that PATH offered in this area, used syringes could be found on the grounds of many health posts, posing a serious threat to the neighboring community's health. St. Louis and Matam provinces now have successfully integrated waste management systems to reduce the risk of injury and reuse. These include use of auto-disable syringes and safety boxes, needle removers, protected pits to dispose of needles, and introduction of small-scale incinerators and other disposal alternatives.

Needle removers and protected disposal pits

Safely removing needles from used syringes offers several benefits: it can prevent the reuse of potentially contaminated syringes, ensure proper containment of contaminated syringes for disposal, and reduce the volume of dangerous "sharps" waste. The cut needles are disposed of in concrete-lined, protected pits. Today *every* health post in St. Louis and Matam uses needle removers, safety boxes, and protected needle disposal pits. In Matam alone, 46 health posts were equipped with these innovations. The effect of these changes is tangible, especially to the surrounding communities.

Photo: Jacques Daniel Ly

Needle tips, removed from syringes after injection, can safely be poured into a concrete-lined pit.

Sharps waste disposal through small-scale incinerators

Together with the World Health Organization, PATH sponsored an Africa-wide regional workshop on medical waste management held in St. Louis in 2003. Over 19 countries participated, with ministry of health, environment, and education staff, and other immunization partners in attendance. Field site visits allowed participants to see the systems and technologies in use and generated high levels of interest among the visitors.

Waste disposal units such as the De Montfort incinerator destroy large quantities of sharps yet are affordable, efficient, and environmentally acceptable in many communities. PATH worked with the Senegalese to test the De Montfort unit and further optimize its design and applications.

Every district in the two provinces now has at least one De Montfort incinerator or other disposal device. The government plans to install at least 54 De Montfort incinerators countrywide.

Photo: Jacques Daniel Ly

Another view of the pit.

Below, an incinerator and safety box.

Photo: Mutombo wa Mutombo

"Before these changes came, we found medical trash all over the place. We would worry about the children playing over near the health post. Now it's much better. The children can play, and it's no problem. We are very pleased with everything that has happened."

A village chief in Dagana, Senegal

Testing other innovative solutions

PATH is pioneering work on a solar melter to destroy filled safety boxes. A box is placed in the center of the solar melter, and with sufficient heat from the sun, the box and syringes inside melt to a flattened cake. The heat compression ensures that this wax-like plate is no longer infectious and is therefore easier to handle for disposal or recycling.

Together with its Senegalese partners, PATH is also testing a new solar-powered storage system for keeping vaccines cold. Solar panels on the top of a health post in Dagana are a sign that solar fridges are in use.

Solar melters can compress a full safety box—including syringes and needles—into a cake the size of a compact disc.

Going national: policy support and strengthening of national programs

The Senegalese often refer to the *vitrine* or showcase that the St. Louis and Matam accomplishments offer—a window into what is possible to improve health systems in West Africa. Citing the two provinces' success stories, the director of preventative health, Colonel Cheikh Fall, stated that the Senegalese government intends to replicate the interventions in other parts of the country. Additional small-scale incinerators now are under construction and UNICEF is supporting their use throughout the country. And other health system improvements are underway based on the St. Louis and Matam examples.

Plans for integration of hepatitis B and *Haemophilus influenzae* type b (Hib) vaccine into Senegal's immunization program also are in motion. PATH helped the Ministry of Health to secure support from the Global Alliance for Vaccines and Immunization (GAVI) and The Vaccine Fund for hepatitis B and Hib vaccine, as well as to strengthen its immunization system. Colonel Fall and his colleagues are aware of the challenges that lie ahead. Yet the record of achievement in St. Louis and Matam in improving coverage and handling medical waste more efficiently are reminders to them—and to West Africa as a whole—of what is possible to protect children's lives and secure a safer environment.

Key Accomplishments in Senegal

- Innovative systems and processes have resulted in an increase in immunization coverage from 51 to 91 percent in the project areas.
- Vaccine waste technology used in the project areas is now being introduced nationwide.
- District-level micro-planning processes now are routinely used for better immunization management.
- Monitoring of indicators through a feedback process is improving the quality of information and performance.
- The innovative “adopting a child” social mobilization strategy is fully integrated in schools.
- New vaccines—hepatitis B and *Haemophilus influenzae* type b (Hib)—and immunization system support were secured for Senegal through GAVI and The Vaccine Fund, to protect even more lives.

For more information

USA

Immunization Solutions
PATH
1455 NW Leary Way
Seattle, Washington 98107 USA
Tel: (206) 285-3500
Fax: (206) 285-6619
Email: info@childrensvaccine.org
Web: www.ChildrensVaccine.org

PATH Immunization Publications

These documents are available from *www.ChildrensVaccine.org*
Most are available in both English and French; some are available in Spanish and Russian as well.
Use the site search engine to locate titles of interest
(or click on the titles below if you are reading an electronic version).

Advocacy for Immunization

- The Case for Childhood Immunization
- Fragile Lives—Immunization at Risk (film)
- Childhood Immunization: A Worthwhile Investment (PowerPoint show)
- Advocacy for Immunization
- Childhood Immunization: What You Need To Know (for parents)
- Hepatitis B Vaccine Introduction: Lessons Learned in Advocacy, Communication and Training
- Realizing the Full Potential of Childhood Immunization: How Health Professionals Can Make a Difference
- Helping Young People Become Youth Advocates for Immunization

Immunization Management and Training

- Immunizing Children Against Hepatitis B
- Immunizing Children Against *Haemophilus influenzae* type B
- Immunizing Children Against Japanese Encephalitis
- Immunization and Child Health Materials Development Guide
- Preventing Vaccine Freezing in the Cold Chain
- Guidelines for Supportive Supervision
- Training Vaccinators in a Time of Change
- Advanced Immunization Management (AIM) e-learning modules

Injection Safety

- Giving Safe Injections
- Proper Handling and Disposal of Auto-Disable Syringes and Safety Boxes
- Designing Safe Syringe Disposal Systems for Immunization Services
- Using Uniject™ to Increase the Safety and Effectiveness of Hepatitis B Immunization
- Unsafe Injections, Fatal Infections
- Practical, Local Solutions for Safely Managing Contaminated Syringes and Other Medical Waste
- Technologies for Vaccine Delivery in the 21st Century
- Perceptions About Injections and Private Sector Injection Practices in Central Nepal
- Immunization Injection Safety in Nepal

Other papers describing PATH's immunization solutions

- Andhra Pradesh—Building a Model Immunization System
- Cambodia—Coverage Improvement Planning Pays Off
- Senegal—Changing the Face of Immunization in West Africa
- Vietnam—Progress Beyond High Coverage
- PATH's Children's Vaccine Program—Increasing coverage, improving safety, expanding protection