

HPV Vaccination in Africa

LESSONS LEARNED FROM A PILOT PROGRAM IN UGANDA



HPV Vaccination in Africa

LESSONS LEARNED FROM A PILOT PROGRAM IN UGANDA

JANUARY 2011



PATH is an international nonprofit organization that creates sustainable, culturally relevant solutions, enabling communities worldwide to break longstanding cycles of poor health. By collaborating with diverse public- and private-sector partners, we help provide appropriate health technologies and vital strategies that change the way people think and act. Our work improves global health and well-being.

Headquartered in Seattle, Washington, PATH has offices in 31 cities in 22 countries.

The global *HPV Vaccines: Evidence for Impact* project is being implemented by PATH and our partners and is being funded in whole by a grant from the Bill & Melinda Gates Foundation. The views expressed herein are solely those of the authors and do not necessarily reflect the views of the Foundation.

Copyright © 2011, Program for Appropriate Technology in Health (PATH). All rights reserved. The material in this document may be freely used for educational or noncommercial purposes, provided that the material is accompanied by an acknowledgment line.

For more information, please contact:

PATH

Mailing address:

PO Box 900922
Seattle, WA 98109

Street address:

2201 Westlake Avenue
Suite 200
Seattle, WA 98121
Tel: (206) 285-3500

info@path.org

www.path.org/cervicalcancer

RHO Cervical Cancer resource library: www.rho.org

Suggested citation: PATH, Child Health and Development Centre (CHDC), and the Uganda National Expanded Program on Immunization (UNEPI). *HPV Vaccination in Africa: Lessons Learned From a Pilot Program in Uganda*. Seattle: PATH; 2011.

All photos: PATH. Cover photo: PATH/Jacqueline Sherris.

Acknowledgments

This document is a synthesis of the research reports:

PATH, Uganda National Expanded Program on Immunization (UNEPI), and the Child Health and Development Centre (CHDC). *HPV Vaccine Demonstration Project in Uganda: Results, Lessons Learnt, and Recommendations*. Seattle: PATH; 2010.

PATH, UNEPI, and CHDC. *HPV Vaccine Demonstration Project Operations Research Report*. Seattle: PATH; 2010.

The demonstration project and operations research that serve as the basis for all documents were implemented by UNEPI in collaboration with PATH and CHDC, as part of the *HPV Vaccines: Evidence for Impact* project. This work was funded in whole by a grant from the Bill & Melinda Gates Foundation.

We would like to thank all those who contributed to the operational research in Uganda:

- The research team at CHDC: Anne Katahoire, Dan Murokora, John Arube Wani, John Odaga, and Achilles Katamba.
- The *HPV Vaccines* project team at PATH: Emmanuel Mugisha, Edward Kumakech, Stella Ekallam, D. Scott LaMontagne, Aynah Janmohamed, Aisha Jumaan, Carol Levin, Proma Paul, Vivien Tsu, and Scott Wittet.
- The Government of Uganda: Senior officials and staff from the Ministry of Health, the Ministry of Education and Sports, and UNEPI, especially Anthony Mbonye, Issa Makumbi, Posy Mugenyi, Rachel Seruyange, Irene Mwenyango, Alex Jurua, Betty Irwasi, and Pamela Zaninka.
- Local district administration leadership of Ibanda and Nakasongola, especially Julius Bamwine, Gerald Ssekitto, Louis Kaboine, Vincent Mugisha, and Kiddaga Constantine.
- The World Health Organization team, led by Joaquim Saweka.

This report was prepared by Jennifer Kidwell Drake of PATH. The teams at PATH, CHDC, and UNEPI provided technical review of this document. The report was designed by Patrick McKern and proofread by Rachel Moorhead and Rica Asuncion.

We would also like to acknowledge the administrative support received throughout the research process from Rica Asuncion, Beth Balderston, Colleen Kuehl, Stella Ekallam, and Christina Smith.

Finally, we would like to express our gratitude to the parents, guardians, children, teachers, community leaders, health workers, and local, district, and national leaders who participated in the project and shared their time and thoughts to help us understand the issues.

Contents

Executive summary	5
Introduction	7
Lessons learned: Developing and implementing an HPV vaccination strategy	10
Target groups and venues for vaccination	10
Operational issues	12
Lessons learned: Training, community mobilization, and information and education	16
Health worker and teacher training	16
Community outreach	17
Messaging	19
Conclusion	22
References	23



Primary school girls wait to receive HPV vaccinations, as part of a demonstration project implemented by the government of Uganda with technical support from PATH.

Executive summary

Two vaccines to prevent human papillomavirus (HPV) infection, the primary cause of cervical cancer, are now approved for use in many countries. Low- and middle-income countries often face significant obstacles to integrating new vaccines into their national immunization programs, meaning that the people living in these countries must wait many years for access to life-saving interventions currently available in higher-income settings. In 2006, PATH initiated the *HPV Vaccines: Evidence for Impact* project in order to generate evidence to help policymakers and planners worldwide make informed decisions regarding regional and national vaccine-introduction efforts and international financing for improved cervical cancer prevention.¹

Uganda is one of the countries chosen by PATH as a site for the *HPV Vaccines* project, along with India, Peru, and Vietnam. In Uganda, cervical cancer accounts for 40 percent of all cancers recorded by the cancer registry, and over 80 percent of women with cervical cancer are diagnosed with advanced disease. Through a demonstration project conducted in 2008–2009 in selected districts, HPV vaccine was made available to more than 10,000 girls. The Uganda project was implemented by the Uganda National Expanded Program on Immunization (UNEPI) of the Ministry of Health with technical support from PATH, and operations research was conducted by the Child Health and Development Centre (CHDC) and PATH.

The data resulting from the project provide critical evidence to the government of Uganda about when and how best to introduce cervical cancer vaccine nationwide. The experience of Uganda is and will be helpful to neighboring countries and other countries in the African region. This report interprets the results and summarizes helpful lessons for policymakers and program managers, especially those in sub-Saharan Africa, looking to shape their own HPV vaccination programs.

Lessons learned: Developing and implementing an HPV vaccination strategy

TARGET GROUPS AND VENUES FOR VACCINATION

- Lesson 1:* Schools can successfully be used as a venue for HPV vaccinations.
- Lesson 2:* Identifying eligible girls based on their grade/class in school may be easier than identifying them by age in some contexts, but may also present challenges for age-focused reporting and evaluation systems.
- Lesson 3:* Adding HPV vaccine to an existing health program can reduce the incremental costs of including HPV vaccine in the national immunization schedule.

OPERATIONAL ISSUES

- Lesson 4:* Adequate preparation of health and education systems, including human resources, facilitates success.
- Lesson 5:* Close coordination by the health and education sectors leads to effective community mobilization and vaccine delivery.
- Lesson 6:* Monitoring and supportive supervision strengthen health worker capacity and improve performance.

Lessons learned: Training, community mobilization, and information and education

HEALTH WORKER AND TEACHER TRAINING

Lesson 7: Separate training of teachers and health workers allows for focus on their specific roles, complemented with a joint session for both groups to solidify collective understanding.

Lesson 8: Adequate time and consistent content for training sessions help ensure health worker and teacher motivation and capacities.

COMMUNITY OUTREACH

Lesson 9: Vaccine uptake can be improved by providing evidence-based education and outreach at least one month before immunization begins.

Lesson 10: Visible endorsement by national and district government leaders is critical to community acceptance.

Lesson 11: Additional support is needed to ensure that remote areas are reached by educational outreach activities.

Lesson 12: Teachers and health workers play complementary roles in raising awareness in communities.

MESSAGING

Lesson 13: Information on preventing cervical cancer, HPV vaccination, and the three-dose schedule are key building blocks for community education messages.

Lesson 14: Communities become reassured as they gain direct experience with HPV vaccine.

Lesson 15: Making comprehensive educational materials with simple language and graphics widely available can help raise community awareness.

Introduction

The World Health Organization (WHO) projects that without immediate action, the global number of deaths from cervical cancer will increase by nearly 80 percent over the next decades, mainly in low- and middle-income countries.² The unnecessary and preventable deaths of women in the prime of their lives affect families, communities, and broader societies. In Uganda, cervical cancer accounts for 40 percent of all cancers recorded by the cancer registry, and over 80 percent of women with cervical cancer are diagnosed with advanced disease. Although it is the leading cause of cancer death among women in Uganda,³ cervical cancer can be prevented.

Two vaccines to prevent human papillomavirus (HPV) infection, the primary cause of cervical cancer, are now approved for use in many countries. Low- and middle-income countries often face significant obstacles to integrating new vaccines into their national immunization programs, meaning that the people living in these countries must wait many years for access to life-saving interventions currently available in higher-income settings. In 2006, PATH initiated

Unique characteristics of HPV vaccines

Although countries often face a common set of challenges introducing new vaccines into their national immunization programs (including financing, health worker training, strengthening cold chain and storage capacity, and educating communities), some attributes of HPV vaccines require special consideration. A robust evidence base from diverse countries, like that generated through the *HPV Vaccines: Evidence for Impact* project, is therefore especially important in facilitating access for girls everywhere.

- **Optimal age range for vaccination:** HPV vaccines are 90 percent effective in preventing infection with the two types of HPV that cause about 70 percent of cervical cancer cases (HPV-16 and -18)—but only in girls and women with no prior HPV-16 or -18 infection.⁴⁻⁸ Because peak incidence of HPV occurs soon after the onset of sexual activity, immunization should occur before sexual initiation. Therefore, young adolescent girls (aged 9 or 10 to 13) are the appropriate target group for HPV vaccination, as recommended by WHO (see resources at the end of this document). However, this age group is not normally targeted for vaccination.⁹
- **Gender:** HPV infection is common among boys and girls; however, while boys can transmit HPV, they cannot develop cervical cancer. Some communities may question a program that targets only girls for vaccination. The potential benefit of vaccinating boys is still under investigation.¹⁰
- **Sexually transmitted infection and disease of the reproductive system:** HPV is a sexually transmitted infection, and parents in some high-resource countries have worried that the vaccine might encourage their daughters to initiate sexual activity at an earlier age.¹¹⁻¹³ However, project results from India, Peru, Uganda, and Vietnam have shown that this was not a major concern for parents in those countries.¹⁴ On the other hand, because the cervix is part of the reproductive system, some parents in project countries were concerned that the vaccine might adversely affect their daughter's future fertility; this concern was addressed during community outreach.
- **Long delay in benefit:** Many vaccines prevent diseases that progress rapidly in young children; by contrast, cervical cancer does not usually develop until a woman is an adult, decades after the target age of vaccination. The benefits of HPV vaccination are therefore less immediate than with other vaccines.

the *HPV Vaccines: Evidence for Impact* project in order to generate evidence to help policymakers and planners worldwide make informed decisions regarding regional and national vaccine introduction efforts and international financing for improved cervical cancer prevention.¹

Uganda is one of the countries chosen by PATH as a site for the *HPV Vaccines* project, along with India, Peru, and Vietnam. The information resulting from the project provides critical evidence to the government of Uganda to assist in informed decision-making about when and how best to introduce cervical cancer vaccine nationwide. The experience of Uganda is and will be helpful to neighboring countries and others in the African region.

Formative research conducted in 2007 in Uganda gathered information on cervical cancer-related beliefs, values, attitudes, and behaviors of girls, their parents, health workers, teachers, community leaders, and policymakers.^{15,16} The formative research helped shape two vaccine delivery strategies (a school-based strategy and an integrated Child Days Plus, or CDP, strategy delivered through schools; see box, below) that were implemented through a demonstration project. The demonstration project was conducted in 2008–2009 in Ibanda (school-based) and Nakasongola (CDP) districts.

The Uganda National Expanded Program on Immunization (UNEPI) of the Ministry of Health provided vaccinations in close collaboration with the Ministry of Education and Sports and district health and education leadership in Ibanda and Nakasongola. Vaccine implementation

Comparing two vaccine delivery strategies

Two different school-based vaccine delivery strategies were identified for the pilot vaccination program in Uganda.

Ibanda District implemented a **school-based, grade-based vaccine delivery program**, and girls enrolled in or attending primary grade five (P.5) were eligible for HPV vaccine. Girls aged ten years who were not enrolled or did not attend school were also eligible. In 2008 and 2009, three doses of vaccine were administered in June, July, and December.

Nakasongola District delivered HPV vaccines through an **age-based strategy in conjunction with the Child Days Plus (CDP) program**, which utilizes schools as a venue to distribute vitamin A and albendazole twice a year in April and October. Girls who were aged ten years were eligible for HPV vaccination. Since three doses of HPV vaccine are necessary, the first and third doses were administered at the CDP events in the district and a special outreach was scheduled for the second dose.



involved the use of existing health and education staff, systems and structures for training, community sensitization and mobilization, vaccine delivery, cold chain maintenance, monitoring, advocacy, and other activities. During the project, UNEPI and PATH monitored and provided technical support for all vaccination activities in the districts.

During and after vaccinations, operations research was done by both PATH and the Child Health and Development Centre (CHDC) on four main components of the HPV vaccination strategies: vaccine coverage, vaccine acceptability, feasibility of implementation, and costs. The methodology and results of the research will be published in detail elsewhere (see box, below). This report interprets the results and summarizes helpful lessons for policymakers and program managers, especially those in sub-Saharan Africa, looking to shape their own HPV vaccination programs.

Results from Uganda's demonstration project

Over two years, almost 10,000 girls in Uganda were fully vaccinated (received all three doses). Coverage and acceptability were high, and data demonstrated that it was feasible to deliver the vaccine using the existing health and education infrastructure. Detailed results on coverage, acceptability, feasibility, and implementation costs from the demonstration project in Uganda will soon be available in the peer-reviewed literature; a brief overview is presented below.

- **Coverage** rates were above 85 percent in Ibanda and above 50 percent in Nakasongola. The lower rates in Nakasongola were due to the challenges of identifying girls for an age-based vaccination strategy, rather than vaccinating girls by grade or class (see page 11).
- **Acceptability** of the vaccine in the community was very high. Reasons for accepting HPV vaccination included protection from disease or cervical cancer and a positive belief that vaccines are generally good for health. This was mentioned by more than 80 percent of parents in both districts. The most frequent reasons for non- or partial vaccination were girls' absences from school on vaccination days and, in the case of Nakasongola, difficulty in determining the correct ages of girls.
- **Feasibility:** As with all new programs, HPV vaccination impacted the health and education systems both positively and negatively. Vaccine logistics, such as the cold chain, and coordination mechanisms between the health and education systems were strengthened. However, increased workload and some disruption of activities did occur as a result of HPV vaccination activities (see page 12). Both health workers and teachers indicated that the increased workload was manageable, as it occurred for only a few days around each dose.
- The incremental **cost** of providing a single dose of HPV vaccine through the school-based model (excluding the cost of vaccine) was higher than through the integrated CDP approach. Whereas personnel cost was the most significant cost driver in the school-based model, it was trivial in the CDP model (because the health workers were already at the school to deliver other interventions)—and lower by more than 90 percent. The difference in personnel cost, which included both allowances and salaries, was responsible for much of the overall difference in cost observed between the two models.

LESSONS LEARNED:

Developing and implementing an HPV vaccination strategy

TARGET GROUPS AND VENUES FOR VACCINATION

LESSON 1: Schools can successfully be used as a venue for HPV vaccinations.

Both vaccine delivery strategies (see box, page 8) used schools as the main sites for vaccination. Almost all girls of the proper age attend school due to the universal and free primary education program in Uganda. Schools therefore provided an easy and convenient site to access the eligible population; nearly all 35,000 doses of HPV vaccine administered during the project were given in schools by trained health workers. In Ibanda, health workers made special trips to the schools for HPV vaccinations; in Nakasongola, they added HPV vaccinations to trips already scheduled under the CDP program for doses 1 and 3.

Teachers and school management embraced the program. Teachers reported that there was generally little disruption to classes (students were out of class for less than an hour per dose in Ibanda, for example). It was reported in Ibanda that some lessons had to be canceled when the head teacher and senior woman teacher attended vaccination workshops. In Nakasongola, it appears that relatively more students who were ineligible for vaccination may have unnecessarily missed classes due to efforts to identify their ages (many Ugandan girls don't know their birthdays). Teachers in both districts reported that the benefit of providing HPV vaccination outweighed the few disruptions. Additionally, some teachers felt that vaccinating children at the health center would have been more disruptive, as they may have had to be absent from school to travel to the facilities.

Dealing with absenteeism in a school-based vaccination strategy

Some students will inevitably be absent on vaccination days. It will be necessary to plan in advance for how to complete vaccination for these girls. This may be especially important for girls in places where absenteeism is high; for example, some communities in Nakasongola have high mobility and girls continuously move from one school to another as families migrate with their cattle. One girl in Ibanda missed her third dose of HPV vaccine because she dropped out of school before the scheduled vaccination day. Later, she reported that she was not aware that she could get her third dose at the health center instead. In the second year of the project, more efforts were made to educate both health workers and communities on what to do in cases of missed doses, and it was subsequently found that more girls sought doses from health centers if they missed the vaccines at school. As one girl reported, "There was a day when I fell sick and we were supposed to be vaccinated at school. When I was better, I decided to go to the health center at Wampu and be injected."

Vaccination days must be scheduled in consultation with school administrators and head teachers to avoid disruption to school activities and exams, and to avoid periods where expected absences might be higher. For example, a health worker in Ibanda reported that "there are those who missed because it was a market day, so we had to go back to their schools and vaccinate them."

One important component of a school-based strategy is including back-up measures to account for student absences, including mop-up sessions or alternative vaccination sites at health centers (see box, page 10). Although most girls were successfully reached during the first school visit in Ibanda, one of the most frequent reasons for non- or partial vaccination in that district was girls' absence from school on the day of vaccinations. Mop-up campaigns helped to achieve higher coverage with all three doses in those rare cases where girls were not reached during the first visit.

Some health workers reported that they were not sure how to deal with missed doses. For example, if girls had missed a second or third dose at school and reported to the health center for that dose much later, health workers were not sure if it was still acceptable to administer the vaccine. Others were not sure how to document situations where girls received a dose at the health unit and then received a second dose at school. In general, those who participated in longer training sessions with opportunities for questions and clarification felt more prepared to deal with these situations.

LESSON 2: Identifying eligible girls based on their grade/class in school may be easier than identifying them by age in some contexts, but may also present challenges for age-focused reporting and evaluation systems.

While most guidelines define the target population for HPV vaccination by age, it may be difficult to establish girls' ages in some contexts. The difference in coverage of ten-year-olds observed between the two delivery strategies in the Uganda project were in fact due to the criteria used to select eligible girls for vaccination (i.e., selection by grade or by age). Birth date records were often not available, and it was difficult to know which girls in Nakasongola were ten years old when they were at school (though some parents knew at home). It was therefore easier to select, vaccinate, and follow up girls based on class and therefore achieve higher coverage, as occurred in Ibanda. However, age-based vaccination is the international norm and extra effort may be required to reconcile a grade-based strategy with global or national monitoring and evaluation systems.

Teachers in Nakasongola ended up assisting health workers to identify eligible girls as best they could, without documented ages or dates of birth in the school records. This task had not been expected and was fairly complex, involving several teachers, and sometimes parents, to confirm girls' ages. In areas where many girls were partially vaccinated or not vaccinated at all, teachers reported that they were not given sufficient time to identify eligible girls, sensitize parents, and cross-check with them about their children's dates of birth.

LESSON 3: Adding HPV vaccine to an existing health program can reduce the incremental costs of including HPV vaccine in the national immunization schedule.

Integrating the HPV vaccination program into an existing community health program—in this case, the CDP program—provided the opportunity to utilize existing resources including personnel, cold chain, and transport. Especially when integrated with a well-funded and efficient program, personnel costs (including salaries and allowances) and transportation costs may be covered by the existing program. However, if HPV vaccination is integrated with an under-funded and/or less efficient program, the national immunization budget will

need to include personnel allowances and transportation costs for vaccine delivery in order to achieve high coverage levels. In addition, program planners will need to assess the feasibility of integrating all three HPV vaccine doses with the existing program. In the case of CDP, only the first and third doses were integrated, and the second dose was delivered through its own campaign, incurring additional costs and logistical requirements.

Most health leaders acknowledged that delivery of HPV vaccination along with CDP activities did not cause much of a disruption, and that the services could easily be integrated and implemented together. For example, HPV vaccine integrated well into the vaccine management system for routine vaccines (such as tetanus toxoid) and does not necessitate creation of new systems. On the other hand, more staff were required during HPV vaccination implementation. In other words, adequate planning, staffing, facilitation, and support are required for effective integration.

In fact, careful planning and other critical start-up activities, such as development of training materials, training activities, and the development of information, education, and communication materials for awareness-raising are also essential for reaching high coverage for all three HPV vaccine doses. These start-up activities are likely to account for 30 to 40 percent of total program costs in the first year, regardless of which vaccine delivery strategy is used. Planners will need to consider these activities as they develop their budgets for both pilot introduction and wider scale-up.

OPERATIONAL ISSUES

LESSON 4: Adequate preparation of health and education systems, including human resources, facilitates success.

The *HPV Vaccines* project in Uganda provided the opportunity to review the existing health and education system infrastructure and determine where strengths could be leveraged and improvements were needed. This also helped improve the functionality of these systems for future health and education programs. In particular, the current vaccine supply, storage, management, and distribution systems were assessed in advance to facilitate integration of HPV vaccine into the system at the district level. For example, the cold chain in Ibanda was strengthened by UNEPI providing an extra ice-lined refrigerator and two additional refrigerators to health centers which previously had none. In addition, extra equipment at district and lower levels helped ensure a steady supply of vaccines, and technical support and supervision were provided to help improve record keeping.

On the other hand, it was clear from the outset of the project that both the health and education sectors were already overstretched, and the program did not have resources to recruit new permanent health workers. Due to HPV vaccination, workload increased in both health centers and schools. As a result, services were either postponed or cancelled for a very short time in some health facilities, and some schools experienced temporary disruption of scheduled activities. This was especially true during the age identification activities in Nakasongola. By and large, however, interruptions to other health services were brief, since HPV vaccine was delivered at predetermined times and it was possible to plan for additional coverage in advance. In Ibanda, some temporary workers were hired to cover some duties during vaccination periods,

and in Nakasongola, health workers from other programs were engaged to help cover for their colleagues involved with the vaccinations.

LESSON 5: Close coordination by the health and education sectors leads to effective community mobilization and vaccine delivery.

Joint planning meetings in advance of vaccinations were essential to the success of the vaccination program. The participation of teachers, health workers, and community leaders in the meetings provided an opportunity to coordinate work plans, timelines, resources, interventions, monitoring, and reporting. This also promoted close collaboration between the departments of health and education and encouraged a cooperative environment during vaccination sessions. Especially in Ibanda, this collaborative approach was seen as a departure from the usual single-sector approach to program planning in both districts (CDP in Nakasongola had already enabled some degree of collaboration). Going forward, operationalizing the school health policy, including school-based vaccinations on the school calendar, and developing clear guidelines on the roles of teachers and health workers in the school-based programs would help to institutionalize this process.

District officials in Ibanda reported that joint planning increased effectiveness of community mobilization and sensitization prior to vaccination. Involvement by health workers, community leaders, teachers, and parents in the same meetings helped eliminate the possibility of



Health workers transport HPV vaccines to a vaccination site.

contradictory messages to the public. Key messages were instead communicated consistently and mutually reinforced, which was seen as helping to promote the acceptability of the vaccine.

In addition, advance planning between sectors enabled schools to prepare themselves as vaccination sites and to mobilize girls and parents for the program. Most teachers reported that they were informed of the vaccination day more than one week in advance, which was an adequate amount of time in their view. Of those who were not informed that far in advance, about half of them would have appreciated a week's notice, and about half would have preferred more than seven days' notice. Reaching out to schools one to two weeks prior to vaccination would provide sufficient time to address parental concerns after they learn that children will be vaccinated at their school. Those teachers in Nakasongola who were not given advance notice felt that they did not have time to identify the girls who were eligible or prepare them for the vaccinations; in some cases, teachers had to quickly identify girls who they thought were ten years old without confirming with their parents.

LESSON 6: Monitoring and supportive supervision strengthen health worker capacity and improve performance.

Intensive monitoring and evaluation was conducted as part of the HPV vaccination program, guided by a comprehensive monitoring and supportive supervision plan developed during initial program planning and training. Regular and targeted supervision visits by the Ministry of Health and district health teams helped make health providers feel more supported and accountable for performing key tasks. For example, supportive supervision involved helping health workers understand that collection of accurate and complete data would be critical to planning subsequent vaccination activities. In general, health workers stated that in places where monitoring and supportive supervision were more intense and frequent, significant effort was invested in ensuring that all eligible girls were identified, vaccinated, or followed up.



Members of the HPV vaccination team review vaccination logbooks as part of a monitoring visit at Ibanda Kyarukumba Primary School.

In addition, monitoring and supervision provided an opportunity for troubleshooting at vaccine storage sites, health facilities, and actual vaccination sites. Site visits, review meetings, and record reviews provided opportunities for corrective actions around challenges with cold chain, vaccine management, data management, and waste management. For example, monitoring

visits by UNEPI and PATH uncovered deficiencies in the completion of the daily tally sheets at vaccination sessions and the subsequent reporting to the sub-county and district levels. Feedback meetings were held and improvements were made, resulting in more complete forms and better subsequent reporting.



PATH/Aisha Jumaan

Girls who have received a dose of HPV vaccine hold up their vaccination cards.

LESSONS LEARNED:

Training, community mobilization, and information and education

HEALTH WORKER AND TEACHER TRAINING

LESSON 7: Separate training of teachers and health workers allows for focus on their specific roles, complemented with a joint session for both groups to solidify collective understanding.

All field workers involved in implementing HPV vaccination activities, including district health office authorities, health workers, teachers, and community mobilizers, were trained on the basics of cervical cancer, HPV vaccination, and fundamental program components such as data collection. More detailed information on vaccine supply and transport, vaccine administration, monitoring of adverse events, and supportive supervision were included in the training for health workers only. In all, the training was deemed effective in preparing health providers to deliver the HPV vaccine. The performance of the health workers was perceived to be closely related to the quality of their training. Participants in the training rated the following topics most highly: facts about cervical cancer, logistics for HPV vaccination, social mobilization for HPV vaccination, and data management.

A joint meeting for both groups prior to implementation can also help to harmonize understanding of the roles and responsibilities of each. Given that the teachers played roles originally intended for health workers (see box, below), advance planning and clear understanding would help to make implementation more efficient.

Different groups also preferred different methods in their trainings. Most health workers preferred open discussion, demonstrations, group work, and role plays, because they allowed maximum interaction and the opportunity to ask more questions and get clarifications. By contrast, teachers preferred lectures, because they felt this approach was more helpful for them when trying to absorb so much new health-related content.

Accurate expectations for teachers' roles

Teacher training for school-based vaccination should be based on their actual roles. In this project, teachers assumed roles and responsibilities beyond what was expected, and therefore beyond the general scope of their training. For example, teachers ended up helping out with vaccination record keeping, preparing girls and parents for vaccination, and following up with girls who missed vaccinations. Those teachers who had received a more comprehensive training demonstrated greater willingness to perform these activities.

LESSON 8: Adequate time and consistent content for training sessions help ensure health worker and teacher motivation and capacities.

A cascade model for training, in which individuals trained at higher levels are responsible for training those at lower levels, provided an opportunity to cover both districts within the available time and resources. While generally the trainings were highly rated, inconsistencies occurred in the duration and content of the training sessions at various levels. For example, most trainings were planned to last three days, but some health workers, teachers, and community mobilizers reported that some trainings were as short as one day or less. A few health workers at sub-county level expressed concern regarding poor time management during the training, and explained that the training was rushed on the first day and that they were not given enough time to ask questions. It was recommended that in the future, the number of days allotted for training should be increased, perhaps even to four or five days, especially for those who will be responsible for training others.

There were also reports from almost all the sub-counties that the trainings had experienced interruptions that included health providers being called to patients, poor weather, or disturbing ambient noise. It was recommended that future training at sub-county level should be conducted in venues where trainees experience minimal disruptions. Other challenges included the need to increase transport allowances and to schedule the trainings to minimize late arrivals by trainees, or very late return trips for trainees.

COMMUNITY OUTREACH

LESSON 9: Vaccine uptake can be improved by providing evidence-based education and outreach at least one month before immunization begins.

This project found that vaccine acceptability among different stakeholders changed over time, from, in some cases, initial reluctance or unwillingness to participate in vaccination to willingness and even enthusiasm. Parents reported that they were initially reluctant to have their daughters vaccinated because they did not know about cervical cancer or understand the purpose of the HPV vaccines. As they learned more, they became less reluctant. Giving parents time to understand and accept the information was therefore a beneficial strategy. Parents of many girls who were fully vaccinated reported that they had received information about HPV vaccination more than one month prior to the vaccination session. In some cases, parents noted that this enabled them to go to schools and seek clarifications if the initial information they heard was unclear. By contrast, lower coverage seemed to occur in places where



A mother reviews an educational poster about HPV vaccination with her daughters.

girls did not have the opportunity to discuss vaccination with their parents in advance. Some district officials, health workers, teachers, and community leaders felt that the time provided for this type of education was insufficient for questions and doubts in the community to be addressed. That said, overall vaccine acceptability was high among parents, girls, and communities in both districts.

LESSON 10: Visible endorsement by national and district government leaders is critical to community acceptance.

The pilot vaccination program in Uganda was planned and implemented by the government. This not only involved the immunization unit of the Ministry of Health, but also included officials in the Ministry of Education and Sports, members of Parliament, and even support from the First Lady of Uganda. In addition, leaders in health and education at the district level helped plan educational activities, participated in radio talk shows, organized meetings at local levels, and mobilized local leaders.

In Ibanda in particular, the involvement of top district officials was seen by parents as an endorsement of HPV vaccination by the government, which increased their willingness to have their daughters vaccinated. In general, parents noted that most people in Ibanda trust the leaders there and believed them when they stated that the vaccine is safe and effective. This was helpful especially to counteract rumors that the HPV vaccine was intended to harm Ugandan children; parents in Ibanda felt that the government would not promote a program with that purpose. In Nakasongola, district leadership was less visibly involved in HPV vaccination because it was integrated in the CDP program, compared with the stand-alone effort implemented in Ibanda.

LESSON 11: Additional support is needed to ensure that remote areas are reached by educational outreach activities.

Stakeholders in harder-to-reach communities often reported that efforts to educate and prepare the community in advance were inadequate. For example, where homes were located very far apart, local leaders were not provided with sufficient transport to reach them all, or roads were made impassable during the rainy season. Advance planning could help address these obstacles. Some teachers in Ibanda reported that places with difficult physical terrain, like Kicuzi and parts of Rukiri, were not visited in advance and provided with information and education. In places that received no advance outreach, communities saw health workers associated with the vaccine program for the first time when they came to vaccinate. This is perceived to have contributed to lower coverage.

LESSON 12: Teachers and health workers play complementary roles in raising awareness in communities.

Both the education and health sectors played important roles in community outreach. For example, teachers ranked talks by health workers as the most informative communications strategy by far. Teachers reported that health workers explained the problem and prevention of cervical cancer very clearly, in ways that were “not easy to forget” and “eye-opening,” and were able to answer questions that came up from participants. Community leaders also highlighted

talks from health workers as the most informative strategy. Girls who were fully vaccinated mentioned that health workers who came to schools helped them understand the need for vaccination.

In turn, teachers played an important role in educating girls about cervical cancer and the importance of vaccination. As one girl reported, “Our teacher went to the sub-county headquarters...she came back with booklets and gave them to us to read and take home to our parents.” Teachers confirmed that they not only worked with girls, but also helped to educate their fellow teachers who had questions and, in some cases, even organized meetings for parents at school. Most teachers appreciated an opportunity to take a proactive role in the vaccination program. In addition to education, teachers played other roles as well. In Ibanda, teachers and health workers worked together to ensure that girls who had missed vaccinations at school were later vaccinated. Teachers also took on the responsibility of taking girls who had missed vaccination to the health center so that they could be vaccinated. Girls also reported that some of their teachers reminded them to attend school on vaccination days.

On the other hand, girls who were not fully vaccinated reported that teachers had been their only source of information, which was clearly not sufficient. In one of the schools, girls reported that they were told by the teacher on the very day of vaccination that all the girls aged ten years old should go under the tree in the compound and be vaccinated. The girls expressed concern that they had not understood why they were the only ones being vaccinated and for what health condition they were being vaccinated.

MESSAGING

LESSON 13: Information on preventing cervical cancer, HPV vaccination, and the three-dose schedule are key building blocks for community education messages.

Parents’ initial skeptical feelings about HPV vaccine were lessened by key messages about the severity of cervical cancer and the vaccine’s ability to prevent it. The belief by parents that vaccines are generally good for health facilitated acceptance of the HPV vaccine program. Even parents who did not have detailed facts about cervical cancer understood that it had no cure and that it could be prevented through vaccination; this was sufficient to convince them that their daughters should be vaccinated.

Parental influence was a key factor in the decision to be vaccinated

As one parent in Ibanda noted, “As parents, we played a very important role in encouraging our daughters to be vaccinated and to complete all three doses.” In fact, discussions with girls reinforced that those who had been fully vaccinated cited parental encouragement and support as a key factor. There were two parents in Nakasongola who reported that they had personal experiences with cervical cancer and because of this they had encouraged their daughters (who feared injections) to complete all the three doses. Those girls who were partially vaccinated were more likely to report that their parents or guardians had not been aware of the vaccination exercise in advance.



PATH/Amynah Jannohamed

A group of mothers gather in Soroti, Uganda, for a focus group to inform the design of the HPV vaccination pilot program.

Information about the three-dose schedule was also crucial to ensuring that girls would be fully vaccinated. For example, the father of one partially vaccinated girl in Ibanda reported that he had temporarily moved his family to a neighboring district after his daughter had received her first dose of HPV vaccine. By the time they returned to Ibanda, HPV vaccinations had ended for the year. While he was willing to have his daughter receive the HPV vaccine, he didn't know until later that there were three doses and that she had missed receiving two of them.

LESSON 14: Communities become reassured as they gain direct experience with the HPV vaccine.

The lack of frightening adverse events after the first doses were given was also cited as a reason why the vaccine was subsequently embraced by so many groups. Given that the HPV vaccine was a new intervention for young adolescent girls, many people had initial doubts and fears. Some parents even quietly withheld their daughters during the first dose to observe what would happen to those who were vaccinated. Some health workers and teachers noted afterward that they had shared similar concerns. When no serious adverse events were observed, other girls (although a small number, given the high coverage) then came forward during administration of the second dose to request their first dose, with the encouragement of their parents. Health workers and teachers also expressed more confidence in performing their roles during the second dose, as they felt more confident that the vaccine was safe.

LESSON 15: Making comprehensive educational materials with simple language and graphics widely available can help raise awareness.

The printed educational materials distributed for the project were reportedly very informative. For example, health workers and teachers noted that they found them useful in explaining to others about the vaccine, its importance, and why girls need to complete all three doses. Health

workers in particular noted that they referred back to educational booklets when answering questions during the vaccination process. Teachers expressed appreciation for the role played by posters and booklets in educating children and parents.

In particular, respondents appreciated that the language in the materials was simple and the pictures were clear and understandable. Teachers and community leaders felt that they made it easier to explain to others about cervical cancer and the need for vaccination to prevent HPV infection. One community leader in Ibanda explained, “The books were written in layman’s language. The words used were not difficult. One copy was written in Luganda which the pupils understand very well...” The diagrams and pictures also helped dispel some of the negative misinformation about the vaccination, as they demonstrated clearly what the vaccination program was about.



School girls in Nakasongola share educational materials about cervical cancer and HPV vaccine.

At the same time, the quantities of printed materials available were reportedly insufficient. In general, bulk materials were distributed during training sessions at the district level and in sub-counties, and participants were expected to distribute them at the lower levels. However, the numbers of materials given to each participant were not planned or recorded. Very few parents and community leaders at the village level reported seeing any printed materials, apart from some posters. A few teachers reported receiving copies of brochures or booklets at the trainings they attended, but they kept them; further, more than two-thirds of teachers reported that they had not received any copies. To ensure appropriate distribution of print materials at all levels, an effective and efficient distribution strategy should be developed early, and materials should be ready for dissemination well in advance (e.g., one month) of vaccination sessions.

Conclusion

Experience in Uganda demonstrates that high coverage for HPV vaccines can be achieved through various vaccine delivery strategies. Program acceptability within communities can be achieved through a comprehensive understanding of information needs, targeted messaging, and effective communication strategies using multiple channels. HPV vaccine delivery is feasible to implement in schools; however, eligibility for vaccination based on grade/class in school, rather than age, was easier to implement and track in Uganda to ensure administration of all three doses. Health workers and teachers can be trained and systems strengthened to successfully implement HPV vaccinations, in conjunction with other work and priorities at the district, sub-county, and lower levels. Implementation costs may be less when combining HPV vaccine delivery with another program, provided adequate funding for that program has already been secured.

Uganda is now well-placed to be a leader in Africa regarding experience with HPV vaccine as a prevention strategy for cervical cancer. Uganda also is leading the way with new, high-tech HPV DNA testing using the *careHPV™* Test, a screening tool designed for low-resource settings. Representatives from nine African countries met in Kampala, Uganda, in late 2010 to shape strategies for cervical cancer prevention at a conference that was planned and led by WHO, PATH, and other partners in Kampala. By the end of the meeting, countries had set short-, medium-, and long-term priorities and had pinpointed areas in which they needed technical assistance.

Acknowledging the debt that the rest of the continent owes to Uganda for this groundbreaking work, one participant noted that improving cervical cancer prevention in Africa is like climbing a snow-covered mountain: “There are plenty of rocks and crevasses barring the way, and sometimes you lose your shoes! But with these new data, I can see a rope being lowered down from the summit. Uganda is already up there, ready to help us on our way to the top!”

Cervical cancer prevention resources

RHO Cervical Cancer library
www.rho.org

Cervical Cancer Prevention Action Planner
www.rho.org/actionplanner

World Health Organization (WHO) cervical cancer publications
www.who.int/reproductivehealth/topics/cancers

WHO position paper on HPV vaccines
www.who.int/wer/2009/wer8415.pdf

Alliance for Cervical Cancer Prevention
www.alliance-cxca.org

Cervical Cancer Action coalition
www.cervicalcanceraction.org

WHO/Institut Català d’Oncologia Information Center on HPV and Cervical Cancer
www.who.int/hpvcentre

Cervical Cancer: The Real Lady Killer
Film from BBC World’s “Kill or Cure?” series
<http://www.rho.org/multimedia.htm>

REFERENCES

1. Wittet S. Cervical cancer vaccine project [fact sheet]. Seattle: PATH; 2006.
2. UICC calls for coordinated action against infections that contribute to the global cancer burden [press release]. Lyon, France: International Agency for Research on Cancer (IARC), World Health Organization (WHO); February 4, 2010.
3. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 10. Lyon, France: IARC; 2010. Available at: <http://globocan.iarc.fr>. Accessed December 2, 2010.
4. Clifford G, Franceschi S, Diaz M, Munoz N, Villa LL. Chapter 3: HPV type-distribution in women with and without cervical neoplastic diseases. *Vaccine*. 2006;24(Suppl 3):S26-S34.
5. Smith JS, Lindsay L, Hoots B, et al. Human papillomavirus type distribution in invasive cervical cancer and high-grade cervical lesions: a meta-analysis update. *International Journal of Cancer*. 2007;121(3):621-632.
6. Ault KA, FUTURE II Study Group. Effect of prophylactic human papillomavirus L1 virus-like-particle vaccine on risk of cervical intraepithelial neoplasia grade 2, grade 3, and adenocarcinoma in situ: A combined analysis of four randomized clinical trials. *The Lancet*. 2007;369(9576):1861-1868.
7. Paavonen J, Naud P, Salmeron J, et al. Efficacy of human papillomavirus (HPV)-16/18 AS04-adjuvanted vaccine against cervical infection and precancer caused by oncogenic HPV types (PATRICIA): Final analysis of a double-blind, randomized study in young women. *The Lancet*. 2009;374(9686):301-314.
8. Schiller JT, Castellsague X, Villa LL, Hildesheim A. An update of prophylactic human papillomavirus L1 virus-like particle vaccine clinical trial results. *Vaccine*. 2008;26:K53-K61.
9. WHO. Human papillomavirus vaccines: WHO position paper. *Weekly Epidemiological Record*. 2009;84(15):118-131.
10. Giuliano AR, Salmon D. The case for a gender-neutral (universal) human papillomavirus vaccination policy in the United States: Point. *Cancer Epidemiology Biomarkers & Prevention*. 2008;17(4):805-808.
11. Zimet GD, Liddon N, Rosenthal SL, Lazcano-Ponce E, Allen B. Chapter 24: Psychosocial aspects of vaccine acceptability. *Vaccine*. 2006;24(Suppl 3):201-209.
12. Kahn JA, Burk RD. Papillomavirus vaccines in perspective. *The Lancet*. 2007; 369(9580):2135-2137.
13. Mays RM, Sturm LM, Zimet GD. Parental perspectives on vaccinating children against sexually transmitted infections. *Social Science and Medicine*. 2004;58(7):1405-1413.
14. Bingham A, Drake JK, Lamontagne DS. Sociocultural issues in the introduction of human papillomavirus vaccine in low-resource settings. *Archives of Pediatric and Adolescent Medicine*. 2009;163(5):455-461.
15. Katahoire A, Jitta J, Kivumbi G, et al. An assessment of the readiness for introduction of the HPV vaccine in Uganda. *African Journal of Reproductive Health*. 2008;12(3):159-172.
16. PATH and Child Health and Development Centre (CHDC). *Shaping a Strategy to Introduce HPV Vaccines in Uganda: Formative Research Results from the HPV Vaccines: Evidence for Impact Project*. Seattle: PATH; 2009.

