

Introduction

Cervical cancer is a preventable disease that affects an estimated 529,000 women each year and leads to more than 275,000 deaths.² Cervical cancer is largely a disease of poor women who have limited access to health services; about 88% of women who die from cervical cancer reside in developing countries.² If current global trends continue, by the year 2050, there will be more than one million new cases of cervical cancer each year.³

Human papillomavirus (HPV) is the primary cause of cervical cancer.* Two types of HPV, 16 and 18, account for 70% of cervical cancer cases, although some regional variations exist.⁴ Women are usually infected with HPV soon after initiation of sexual activity, often in adolescence. Most HPV infections spontaneously resolve. However, approximately 5% to 10% of women infected with tumor-causing HPV types develop persistent infections. These women have an increased risk of developing precancerous cervical lesions. If untreated, the lesions can progress to cancer over a period of years, with cervical cancer most common in women after age 40.

Currently, there are two HPV vaccines—Merck’s Gardasil® and GlaxoSmithKline’s Cervarix™. The two vaccines have been licensed in more than 100 countries, of which approximately one third has introduced the vaccines into their national health programs. Both vaccines have been proven at least 90% effective in preventing persistent genital infection with HPV types 16 and 18 in women who have no prior infection with those types and 100% effective in preventing moderate to severe cervical lesions caused by types 16 and 18. Recently released data have also illustrated some cross-protection with subtypes related to types 16 and 18, specifically subtypes 31 and 45.⁵

PATH’s HPV Vaccines: Evidence for Impact project in Vietnam aims to address several of the particular challenges likely to face HPV vaccination programs. The first phase of the project, “Formative research for informing the introduction of HPV vaccine in Vietnam,” was conducted from 2006 to 2007 to build our understanding of critical issues that may affect vaccine delivery and a supportive environment for individual acceptance and understanding among key stakeholders. We conducted the research in three representative regions of Vietnam, including the north, central, and south, to identify the critical factors for HPV vaccine introduction. The research findings indicated a supportive environment (from policymakers’, health workers’, and community members’ perspectives) for introducing cervical cancer vaccine in Vietnam.⁷

* Since audiences in Vietnam are more familiar with “cervical cancer vaccine” than “HPV vaccine,” the terms will be used interchangeably throughout this report.

Project description

Many countries with limited resources lack the infrastructure and systems needed to support effective secondary prevention services for the detection and treatment of precancerous lesions. Because of this, most cervical cancer cases are detected when the disease has advanced to a stage at which treatment becomes difficult or impossible, if treatment is available. In Vietnam, cervical cancer has traditionally not been considered a priority health issue for women. New and effective methods of screening and treatment are not yet widely accessible for women. In addition, women lack knowledge of the disease, and as a result, they do not have a good understanding of disease prevention. According to an assessment by the World Health Organization in 2007,[†] Vietnam had an official cervical cancer screening system, but it was limited in geographic scope and did not include population-based screening, as it was mostly opportunistic and based on diagnosing symptoms. Individual projects or studies have supported some provinces and cities to establish screening programs. Wide use of the HPV vaccine, along with increased knowledge on cervical cancer prevention, could lead to effective primary prevention of this disease.

The first cervical cancer vaccine was approved only in 2006, and therefore, data on delivery strategies (either through schools or commune health centers) in Vietnam to a population of young adolescent girls, not normally targeted by the routine immunization program are not yet available. Questions related to HPV vaccine introduction in a national program include issues related to health policy, health systems, school systems, current EPI capacity, and acceptance among the target population, the community, and policymakers, among others. Since many of these factors were unknown, the demonstration project tested new vaccine delivery strategies in a small, focused way to learn which aspects are important for effective national introduction. Therefore, the evaluation of different HPV vaccine delivery strategies in Vietnam was designed to generate specific scientific evidence on alternative vaccination delivery strategies, the capacity of the existing immunization system, implementation costs, and community acceptance of HPV vaccine, which will help provide policy makers with the necessary information for making decisions about whether and how to introduce HPV vaccine into the national immunization program.

Informed by the formative research findings, for the second phase of this project, we designed the two-year demonstration project to identify appropriate strategies for HPV vaccine delivery that can be integrated into the NEPI system in Vietnam. The project included the following three components:

- *Component 1: Information, education, and communication.* The National Center for Health Education and Communication (NCHEC) conducted IEC activities, which provided knowledge on cervical cancer and prevention measures, including HPV vaccine, to groups within the communities in participating districts via various IEC channels. IEC activities were implemented before and during vaccination sessions to encourage HPV vaccination for young girls in Grade 6, or 11 years of age.
- *Component 2: Immunization.* The National Expanded Program on Immunization (NEPI)/NIHE implemented vaccination using the two vaccine delivery strategies in the four selected districts. Each HPV vaccination strategy for girls in Grade 6 (school-based) or age 11 years (health center-based) was implemented in urban, rural, and mountainous regions. . HPV

[†] World Health Organization and Vietnam Ministry of Health. Đánh giá nhu cầu các chương trình phòng chống UTCTC tại Việt nam năm. Hanoi:2007.

vaccination activities included planning, creating a list of targeted girls, transporting and storing vaccines and supplies, organizing vaccination sessions, monitoring adverse events following immunization (AEFI), managing medical waste, providing supportive supervision and monitoring, and managing and analyzing data.

- *Component 3: Evaluation.* PATH, in collaboration with NIHE and NCHEC, conducted an evaluation of the project. The evaluation collected qualitative and quantitative data after the first round of vaccinations (midterm) and after the second round (final) to assess coverage, acceptability, feasibility, and cost of the two delivery strategies.

In consultation with NIHE and NEPI, two districts were selected in Thanh Hoa province (Nong Cong and Quan Hoa) and two districts in Can Tho city (Ninh Kieu and Binh Thuy) for vaccination. The selection was based on multiple criteria, including: cervical cancer disease burden, geography, socioeconomic status, EPI performance, population size, and staff capacities. The following sections present a description of the project design and implementation as well as findings from the evaluation.



Fully vaccinated girls during a focus group discussion in midterm evaluation.

Project design

Communication strategy

The formative research findings played a crucial role in structuring key elements of the communication plan, which the project used to sensitize and mobilize the community. NCHEC, in collaboration with NIHE, the National Institute of Cancer, and PATH, developed various IEC messages and materials on cervical cancer, HPV infections, and HPV vaccine. These documents also included instructions on conducting IEC activities for different populations. Communication experts developed several IEC materials including leaflets, posters, panels, and radio spots for communities, and a handbook for village health workers and teachers. Experts and community members reviewed and pre-tested the materials before finalization.

In addition to IEC materials, the project team designed and conducted a series of trainings to ensure project stakeholders (e.g., communicators, health providers, and school teachers) had adequate knowledge about HPV vaccine, cervical cancer, and communication skills. Four training curricula were developed: for training of trainers (TOT), health workers, teachers, and village health communicators. TOT courses were organized at the provincial level with an extension to selected participants from the district level. Following their training, these individuals became trainers for other groups (e.g., commune health workers, teachers, and village health communicators). During these trainings, the project team conducted supportive supervision to ensure the quality for trainers and participants.

Vaccination strategies

Based on input from the formative research and discussion with immunization experts, the project team designed two vaccine delivery strategies to test for suitability for Vietnam. Strategy A was implemented at schools for girls enrolled in Grade 6, with a “mop-up” session (active follow-up) later in the community. Strategy B was implemented in commune health centers for girls aged 11 years (Figure 1).

Prior to vaccination sessions, project staff conducted many activities to prepare stakeholders for the upcoming vaccination activities.

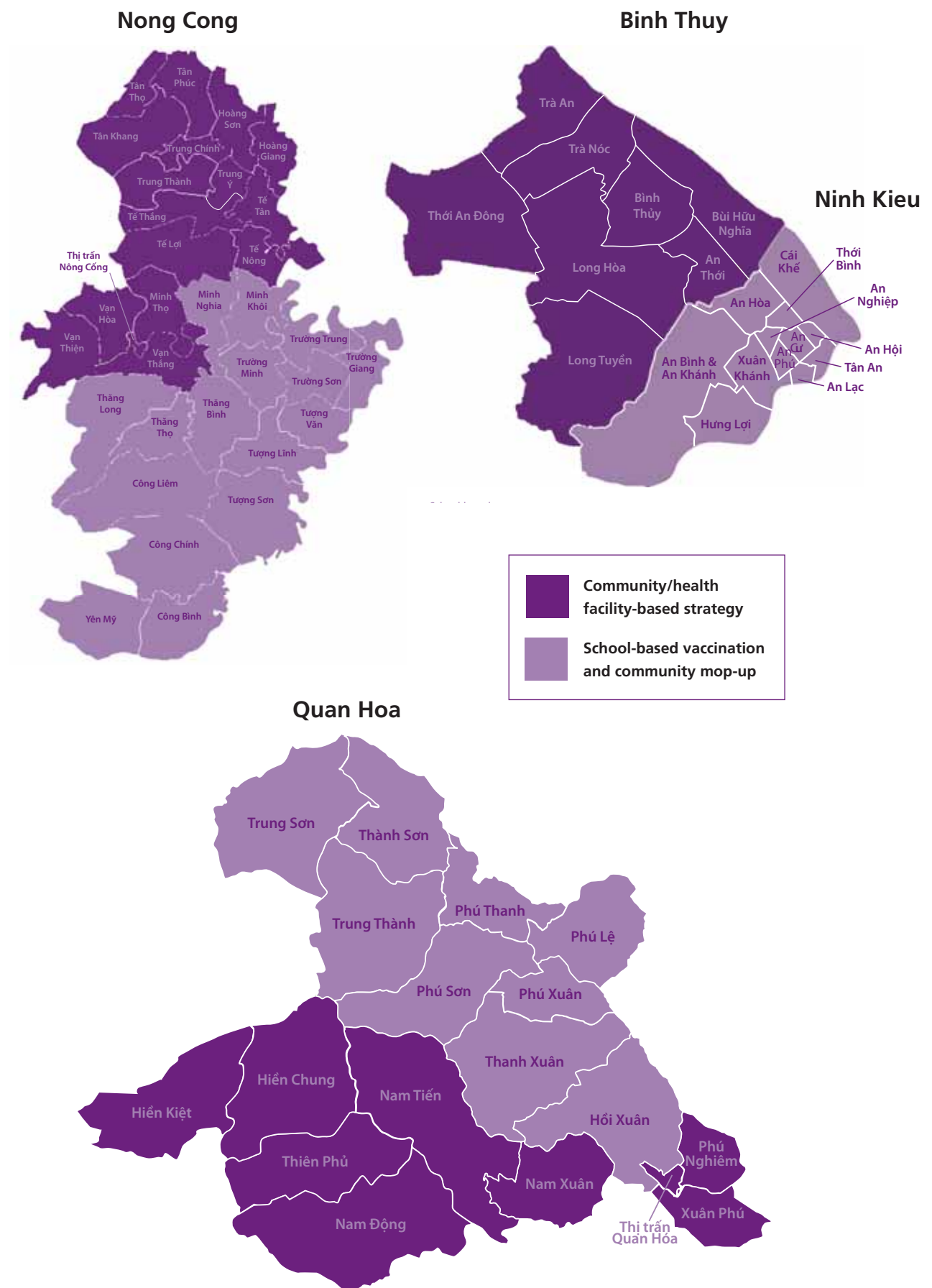
Planning workshop for HPV vaccination at provincial, district, and commune levels

NIHE and PATH organized a workshop for provincial and district staff in order to prepare for vaccination in the provinces. The district Preventive Medicine Centers (PMCs), in close collaboration with the provincial PMC and education departments, conducted planning sessions for staff involved in health care, immunization, and education in the communes. Then, commune health station staff organized meetings with representatives from the commune People’s Committees and Women’s and Youth Unions to plan for HPV vaccination.

Creation of lists of eligible girls for HPV vaccination

Eligibility for participation in HPV vaccination was different from routine vaccination because of the need to identify eligible girls for receipt of a limited supply of HPV vaccine. PATH and national and local partners developed tools for identifying eligible girls, while communes, village health workers, and teachers worked to complete the lists. Schools provided lists of all girls in Grade 6, and commune health workers were responsible for checking the lists with population books and other available sources to ensure the accuracy of the information.

Figure 1. Maps of demonstration project districts



Vaccine transport, storage, and logistics

During the course of the project, national regulations on vaccine transport were adhered to. The vaccine was licensed for use in Vietnam by the Ministry of Health. After licensure, the vaccine was shipped to Noi Bai International Airport. NIHE completed all administrative procedures for receiving the vaccine and initially stored the vaccine at their cold storage facility in Hanoi. The vaccine was then transported to regional, provincial, and district levels. EPI staff from the communes traveled to the districts to receive HPV vaccine for vaccination sessions. In total, there were two shipments of vaccine to Noi Bai International Airport and six shipments of vaccine from NIHE to project sites.

Supplies for vaccination such as syringes and safety boxes were procured in accordance with EPI regulations. EPI staff at all levels of the health care system were responsible for examining cold chain capacity. Their assessment informed the plan for distribution, transport, and storage of vaccine and/or other supplies to introduce the HPV vaccine. When cold chain capacity at the commune level was insufficient, the project provided a cold box.

Training for health workers and teachers

NEPI staff developed training curricula and tailored them for each target group. National trainers conducted TOTs for provincial and district staff, who then conducted trainings for commune health workers and teachers. NEPI staff also provided supportive supervision during trainings conducted by provincial and district trainers.

Organization of HPV vaccination sessions

HPV vaccination sessions were arranged separately from the scheduled monthly vaccination day for routine EPI vaccines. Prior to vaccination day, health workers checked the lists of subjects, vaccine and immunization materials, and task assignments for staff. Health workers were responsible for coordinating with schools and local authorities at project sites to prepare the vaccination locations. Each vaccination session was carried out in compliance with the assigned vaccine delivery strategy, and each vaccination site was required to have at least four health workers present, with two trained on HPV vaccination, per MOH regulations.[‡]

Monitoring and management of adverse events following immunization

Health workers who participated in HPV vaccination and emergency teams at district hospitals were trained on monitoring and management of AEFI in general and with HPV vaccination in particular.[§] Resources for AEFI management were available at all vaccination sites, including trained health workers and an anaphylaxis kit. District PMCs and emergency departments were responsible for organizing emergency points and informing people about their locations.

Vaccination waste management

Health workers were trained on medical waste management according to Ministry of Health and NEPI regulations/guidelines. At the end of vaccination days, health workers collected and disposed of used syringes and other medical waste appropriately, overseen by trained supervisors.

[‡] Decision No. 23/2008/QĐ-BYT on the regulations of using vaccine and biological sample in prevention and treatment. July 7, 2008.

[§] Emergency teams at district hospitals in project sites were asked to be ready to address any serious AEFI.

Supportive supervision of HPV vaccination

Regular supportive supervision visits have been conducted to ensure that all project activities complied with project goals and MOH, NEP, and manufacturer regulations. Supportive supervision at the commune level focused on planning, preparation, and organizing for vaccination sessions, to identify solutions for possible challenges. After each visit, a review meeting was held at the district level to discuss the achievements and lesson learned of a given activity. Results of monitoring and supervision activities served as the basis for planning corrective activities, such as reviewing and revising materials for refresher trainings.

Monitoring and reporting

National/regional EPI staff developed a set of indicators (e.g., eligible girls, vaccinated girls, number of IEC materials distributed, number of training and participants), a database, and forms for periodic monitoring. Commune health workers were responsible for recording all data and regularly submitting reports to the district level.

Operational research to evaluate vaccine delivery

Operational research included four components: coverage, acceptability (including knowledge, attitudes, and practice, or KAP), feasibility, and implementation cost. Each component was designed to assess specific objectives and measure a wide range of indicators. The research team used a mix of quantitative and qualitative methods, such as questionnaires, key informant interviews, focus group discussions, and observation checklists. The target population for each research component varied by type and level and included parents, eligible girls, teachers, health workers, communicators, and community leaders. Table 1 presents more detailed information about the operational research components.

Although different methods were used, the findings from these components were designed to provide answers to a common set of research questions, including:

1. Coverage: what level of coverage (three doses of vaccine given on time to the eligible population) was achieved by each of the strategies?
2. Acceptability: what were the facilitating factors or barriers to individual, interpersonal, community, or institutional acceptance of HPV vaccination?
3. Feasibility: what were the facilitating factors or barriers to implementation of the HPV vaccination program?
4. Costs: what were the costs, both start-up and recurrent, incurred to implement each of the HPV vaccination strategies for a fully vaccinated girl?

Table 1. Study population, data collection methods, and sample size of four operational research components of the HPV vaccine project in Vietnam from 2008 to 2010

Component	Study population		Data collection methods		Sample size (in proposal design)	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Coverage	Parents	Parents	Questionnaire	Questionnaire	780 parents	504 parents
Acceptability, including KAP	Parents	Parents	Questionnaire	Questionnaire	780 parents	504 parents
	Girls	Girls	FGDs	FGDs	780 girls	13 FGDs
	Community leaders		SSIs		40 FGDs	
	Health workers				120 SSIs	
	Teachers					
Feasibility	Health workers	Health workers	KIIs	KIIs	110 KIIs	22 FGDs
	Teachers	Teachers	Facility visit	FGD	12 facility visits	9 KIIs
		Trainers/ Trainees	Observation		30 observations	
Cost	Health workers	Health workers	Micro-costing techniques	Micro-costing techniques	12 communes	12 communes
				Stakeholders workshop		

Abbreviations: FGD: focus group discussion; KII: key informant interview; SSI: semi-structured interview.

Results

HPV vaccine uptake

Program achievement

One of the project objectives was to estimate the HPV vaccination coverage for each delivery strategy of HPV vaccination. Data in Table 2 indicated that high coverage was reached with both strategies, and there was improvement in coverage in the second year. According to records at NEPI, coverage achieved in the school-based delivery strategy (strategy A) was 83.4% in the first year and 93.4% in the second year. The results from the commune health center-based delivery strategy (strategy B) were reported as 92.8% in the first year and 98.0% in the second year. In reviewing the district-level reported data from NEPI, Ninh Kieu was consistently the district with the lowest coverage; however, it is worth noting that coverage increased to nearly 90% in the second year.

Table 2. HPV vaccine coverage rates in years one and two from NIHE's 2010 report

Location	Year 2008-2009		Year 2009-2010	
	Total eligible girls	Coverage rate	Total eligible girls	Coverage rate
All sites	3919	87.0%	3095	95.2%
Strategy A	2412	83.4%	1890	93.4%
Strategy B	1507	92.8%	1205	98.0%
Thanh Hoa	1728	96.7%	1527	98.7%
Quan Hoa	368	97.6%	342	98.2%
Nong Cong	1360	96.5%	1185	98.8%
Can Tho	2191	79.4%	1568	91.8%
Ninh Kieu	1499	75.4%	1064	89.3%
Binh Thuy	692	88.2%	504	97.2%

A very low rate of AEFIs (a total of 64 reports out of 19,145 doses) was seen during the project, and most were mild, with symptoms such as headache, dizziness, and vomiting.

Coverage survey

The estimates of coverage measured by the household surveys after the first and second rounds of vaccination were similar to those reported by NEPI. Coverage achieved in strategy A (school-based delivery) was 83.0% in the first year and 96.1% in the second year. For strategy B (commune health center-based), coverage was 93.9% in the first year and 98.6% in the second year. Data are presented in Table 3.

Table 3. HPV vaccine coverage rates from the midterm and final surveys conducted in Vietnam in 2009 and 2010

Strategy	Midterm survey (2009)		Final survey (2010)	
	N	Coverage rate (95% CI*)	N	Coverage rate (95% CI*)
School-based (A)	500	83.0% (77.6–87.3)	285	96.1% (93.2–97.8)
Health center-based (B)	280	93.9% (88.2–97.1)	219	98.6% (95.7–99.6)
Total	780	86.9% (84.4–89.1)	504	97.2% (95.2–98.4)

*CI: confidence interval.

In the first year, the coverage achieved through delivery in health centers was higher than that attained in school-based vaccination. However, improvements in coverage between the first and second year for strategy A and B resulted in a similar level of coverage in second year.

The high levels of coverage achieved by both strategies in the second year means that very few eligible girls either did not receive any doses of vaccine or received only one or two (of the required three) doses.

The vaccination coverage was high in all study clusters, and all clusters were similar to each other, with the exception of the urban A cluster (Ninh Kieu). The survey data showed that the coverage in Ninh Kieu was significantly lower than in other clusters. This finding was also identified in the midterm survey; however, improvements made in Ninh Kieu facilitated an increase in vaccine coverage in the second year (from 75.4 to 89.3%).