

- *Learning activities* of pupils were affected the most when vaccination was organized on work days (regardless of the vaccination strategy). In general, pupils needed 45 minutes to complete the vaccination process.
- *Regular school activities* were affected on vaccination days. Due to the shortage of physical space, many schools mobilized meeting rooms and libraries for vaccination, significantly disrupting activities in these sections on those few days.
- *Teacher's workload* increased, notably for those who were directly involved in the project.

Participants, however, described these impacts as minor and able to be accommodated, especially as they occurred just three times in the school year. In general, in the vaccination session, the responsible teacher invited students to come during their 'less important lesson' in the schedule. Many schools organized vaccination sessions outside of usual school hours. Teachers also confirmed that their increased workload was acceptable when considering the benefit of the vaccine. In addition, the health sector gained a good collaborator in the education sector; personnel accepted an increased workload to accomplish the goal of vaccinating eligible girls and improving their health.

Partnership for vaccine delivery implementation

Various partnerships throughout the project allowed for successful implementation. Collaborations between the health and education sectors, local authorities, PATH, and other national partners are highlighted below.

Findings from both the midterm and final evaluations showed that the *health and education* sectors closely collaborated at all levels, from provincial to commune, to various degrees. At the provincial level, the collaboration between the two sectors focused more on broader issues, such as policies to facilitate vaccination at the lower levels. In that case, the health sector played a key implementation role, while the education sector provided support. At the lower levels, collaboration between the two was evident in efforts to create a favorable environment for vaccination.

Regarding the *participation of other stakeholders*, evaluation findings showed active participation of local authorities and other departments. People's Committee leaders not only mobilized the participation of other organizations, but also directly launched the first dose of the HPV vaccine and actively supervised and encouraged vaccination during the vaccination days. The participation of local authorities in coordinating vaccination activities was crucial. Under the direction of local authorities, many other organizations, such as cultural and information departments, commune health centers, Women's Unions, and Youth Unions also participated in the vaccination effort.

Collaboration between PATH and partners changed substantially during the course of the project. For advocacy and communication activities, PATH played an active role in coordinating and mobilizing partners' participation. An obvious improvement compared to year one was the timely response from NIHE to incorrect information about the vaccine or the project.

Training

Data from the training evaluation showed that most participants agreed that training content was relevant to the objectives of each training session and also relevant to the knowledge and experience of the trainees. The participants felt that the content was concise, clear, and arranged in a logical way to make it easy to understand.

As indicated in the teaching plan, various training methods were used, including presentations, demonstrations, group discussions, role-plays, and games. All respondents, both trainers and trainees, highly appreciated the training methods used in the training courses, since they promoted two-way communication and interaction between trainers and participants. Some trainers and trainees who were teachers recognized the sequence of applying these methods as a strong point of the teaching methodology.

Feedback from respondents after each training session was generally positive. For example, most participants thought that the layout was clear, with systematic numbering and bullets that helped readers to understand and remember the content. More than 80% of the respondents agreed that no adaptation is needed for the learning materials and there is no need for additional learning materials. However, some respondents noted small font size and poor print quality of the materials, and requested the addition of more pictures in the presentations.

Through group discussions and interviews, the impact of training was seen in the various targeted groups, including health staff, IEC motivators, local leaders, and community members, as seen in the training evaluations within the feasibility study. The trainings strengthened the capacity of health staff at various levels, from the provincial to the commune level, on different issues such as:

- Vaccination skills.
- Planning and monitoring activities.
- Communication skills.

Cost

The results are presented as three related unit cost indicators, described below.

- The project incremental economic cost per dose of HPV vaccine delivered and per fully immunized girl. This indicator captures the cost associated with reaching the coverage levels measured in the second year of the HPV vaccine demonstration project.
- The national incremental economic cost per dose per girl fully immunized under a scenario of introducing the HPV vaccine as part of Vietnam's routine vaccination program (rather than in a small-scale demonstration project). This indicator can provide an estimate for the national immunization program that reflects likely overall resource use related to HPV vaccination if it were integrated into Vietnam's national immunization program.
- The national incremental financial outlay per dose and per girl fully immunized under a scenario where the HPV vaccine would be integrated into the expanded program on immunization (EPI). This indicator provides an estimate of the expected budgetary outlay needed to scale up HPV vaccination at a national level.

The economic incremental cost includes the opportunity cost of all resources used to vaccinate girls with the HPV vaccine, including all personnel and depreciation costs. The financial outlay estimate excludes all capital depreciation costs for vehicles and cold chain and excludes health worker salaries at all levels and assumes that current human resource and vaccine supply chain capacity are sufficient for introducing a new vaccine into the national immunization system.

Incremental economic cost at project scale per dose and per fully immunized girl and per geographical region

Tables 7 and 8 summarize the incremental economic cost per dose and by fully immunized girl associated with reaching the estimated coverage levels in the second year of the HPV vaccination project. The total delivery cost per dose was lowest in the urban areas and highest in the mountainous settings, ranging from an average of US\$5.27 to US\$7.98 for strategy A (the school-based strategy) and US\$5.45 to US\$8.02 for strategy B (the health facility-based strategy). The cost per dose to reach girls in the mountainous areas was 50% higher than the cost of reaching girls in urban areas. The average delivery cost per fully immunized girl ranged from around US\$16.00 per fully immunized girl in urban areas to almost US\$24.00 in mountainous areas. In general, the data did not reveal any clear difference in cost between strategy A and strategy B.

Table 7. Incremental economic cost at project scale per dose by strategy and geographic region, 2010 (US\$)

	Urban		Rural		Mountainous	
	Strategy A	Strategy B	Strategy A	Strategy B	Strategy A	Strategy B
Start-up cost per dose	1.35	1.58	1.84	1.74	2.68	2.71
Implementation cost per dose	3.91	3.87	4.35	4.20	5.29	5.31
Total cost per dose	5.27	5.45	6.19	5.94	7.98	8.02

Table 8. Total delivery cost at project scale per fully vaccinated girl by strategy and geographic region, 2010 (US\$)

	US\$ (2010)		
	Urban	Rural	Mountainous
Strategy A	15.81	18.56	23.93
Strategy B	16.36	17.81	24.06

Table 9 provides a description of the cost profile for HPV program costs by geographical region. A cost profile provides information on how resources are used to support different aspects of the HPV vaccination program. The costs associated with start-up activities, including planning and preparation, IEC activities, and training and consultation, comprised approximately 30% of total program cost, depending on the geographic region. Start-up costs

Table 9. Cost profile at project scale by activity, strategy, and geographic region, 2010

Activity	Urban		Rural		Mountainous	
	Strategy A	Strategy B	Strategy A	Strategy B	Strategy A	Strategy B
Planning and preparation	5%	6%	5%	5%	4%	5%
IEC activities	12%	13%	11%	11%	10%	9%
Training and consultation	9%	11%	13%	14%	20%	20%
Subtotal start-up costs	26%	29%	30%	29%	34%	34%
Personnel	51%	49%	46%	47%	46%	47%
Vaccination supplies	2%	1%	1%	1%	1%	1%
Cold chain storage	1%	1%	1%	1%	1%	0%
Transport	3%	3%	5%	5%	4%	4%
Other implementation costs	18%	18%	17%	17%	14%	13%
Subtotal implementation costs	74%	71%	70%	71%	66%	66%

were highest in the mountainous region, at 34%, where training and consultations accounted for almost 20% of total costs. For example, training costs were higher in Thanh Hoa province, which is both rural and mountainous, compared to Can Tho province, which is an urban area. Personnel costs comprised the largest share of implementation costs, at around 50% across both strategies and all regions. Vaccine supplies and supply chain logistics, such as cold chain, vehicles, and transport accounted for 7% or less across both strategies and all regions.

Incremental economic cost per dose and cost per fully vaccinated girl for HPV vaccine integrated into a typical EPI system, by strategy and geographic area

To address government questions about costs for HPV introduction into the current EPI system, the incremental costs of a more typical scenario of introducing the HPV vaccine as part of Vietnam's routine vaccination program were estimated. Information was collected on likely resource use of HPV vaccination if it were integrated into Vietnam's national immunization program. These results reflect the necessary activities and inputs that the government would support for HPV vaccine introduction in the future at national scale, using current available human resources, infrastructure and equipment of the EPI system, as obtained from interviews with EPI staff at all levels (national, regional, provincial, district and commune). The incremental cost estimates were then adjusted for a more typical scenario by excluding costs associated with activities done specifically to support the HPV demonstration project.

Tables 10 and 11 show the incremental economic cost at national scale per dose and the cost per fully immunized girl for a scenario in which HPV vaccine is introduced and implemented as part of national immunization services. The average delivery cost per dose would range from US\$1.49 to US\$3.59 for strategy A (the school-based strategy), depending on the geographic region. The average cost per dose would be slightly lower in strategy B (the health facility-based strategy), ranging from US\$1.39 to US\$3.42, depending on the geographic region. The mountainous region would have both higher start-up and recurrent implementation costs compared to rural and urban areas in both strategies. The start-up costs per dose would be around US\$0.90 in strategies A and B in urban areas; US\$1.26 and US\$1.17 in strategies A and B, respectively, in rural areas; and around US\$3.59 and US\$3.42 in strategies A and B, respectively, in mountainous regions. In rural areas, the recurrent implementation cost per dose would be less than US\$1.00 per dose in both strategies. In urban areas, the recurrent implementation cost would be less than US\$0.60 per dose in strategy A and less than

Table 10. Delivery cost at national scale per dose for a typical scenario of introducing HPV vaccine as part of Vietnam's routine vaccination program, by strategy and geographic region, 2010 (US\$)

Activities	Urban		Rural		Mountainous	
	Strategy A	Strategy B	Strategy A	Strategy B	Strategy A	Strategy B
Start-up costs	0.92 (62%)	0.95 (68%)	1.26 (57%)	1.17 (59%)	1.76 (49%)	1.79 (52%)
Implementation costs	0.57 (38%)	0.44 (32%)	0.94 (43%)	0.81 (41%)	1.84 (51%)	1.64 (48%)
Total cost per dose	1.49	1.39	2.19	1.99	3.59	3.42

Note: figure in parenthesis is the share of out of total cost per dose.

Table 11. Total delivery cost at national scale per fully immunized girl for a typical scenario of introducing the HPV vaccine as part of Vietnam's routine vaccination program, by strategy and geographic region, 2010 (US\$)

	US\$ (2010)		
	Urban	Rural	Mountainous
Strategy A	4.47	6.57	10.78
Strategy B	4.17	5.96	10.26

US\$0.45 per dose in strategy B. In urban areas, the cost per fully immunized girl would be approximately US\$4.00 to US\$4.50. The cost per fully immunized girl would be approximately US\$6.00 in rural areas and approximately US\$10.00 in mountainous areas.

With regard to the cost profile, start-up costs in a more typical program would comprise the largest share of the total cost per dose, at approximately 50% to 70% depending on the region, since there is an overall reduction in the total cost per dose due to a reduction in the personnel cost per dose. The share of personnel costs in a more typical scenario would decline to around 18% to 37%, depending on the strategy and geographic region. When focusing only on implementation costs (excluding start-up costs), personnel would comprise the largest share, at around 60% in urban regions, 65% in rural regions, and more than 70% in mountainous regions. The share of transport and cold chain costs as a percentage of implementation costs would be around 13%, 12%, and approximately 6% to 8% in urban, rural, and mountainous regions, respectively.

Financial costs at national scale of introducing HPV vaccination into the NEPI, by strategy and geographic area

These results represent an estimate of the incremental financial outlay that may be required to scale up the program; they reflect the economic incremental cost per dose, but without capital depreciation costs for vehicles and cold chain and without health worker salaries at all levels. As shown in Table 12, the financial cost per dose of HPV vaccine would be approximately US\$1.20 in urban areas, regardless of strategy. It would be slightly higher for rural areas, where the cost per dose for strategy A would be approximately US\$1.76 and the cost per dose for strategy B would be slightly lower, at approximately US\$1.65. In the mountainous region, the cost of introducing the HPV vaccine would be around US\$2.60 per dose for both strategy A and strategy B. Focusing on the incremental recurrent cost to the government, the cost per dose would be US\$0.27 for strategy A and US\$0.22 for strategy B in urban areas. In rural areas, the cost per dose would increase to US\$0.50 for strategy A and US\$0.47 for strategy B. In mountainous areas, the delivery cost per dose would be about three times higher than in rural flat areas. The cost per dose for start-up activities would range from around US\$0.90 in urban areas to approximately US\$1.75 in mountainous areas. Table 13 summarizes the total financial cost per fully immunized girl, which would range from around US\$3.50 in urban areas to approximately US\$8.00 in mountainous areas.

Table 12. Incremental financial cost at national scale per dose, by strategy and geographic region, 2010 (US\$)

	Urban		Rural		Mountainous	
	Strategy A	Strategy B	Strategy A	Strategy B	Strategy A	Strategy B
Start-up cost per dose	0.92	0.95	1.26	1.17	1.76	1.79
Implementation cost per dose	0.27	0.22	0.51	0.47	0.85	0.78
Total cost per dose	1.20	1.17	1.76	1.65	2.61	2.56

Table 13. Total incremental financial cost at national scale per fully immunized girl, by strategy and geographic region, 2010 (US\$)

	US\$ (2010)		
	Urban	Rural	Mountainous
Strategy A	3.59	5.28	7.82
Strategy B	3.51	4.94	7.68

As expected, with the introduction of a new vaccine into an existing national immunization program, the largest share of the total cost is the start-up costs, accounting for approximately 70% to 80% of the total cost per dose. The share of total financial cost to personnel would decline to less than 10% in urban and rural areas and around 15% in mountainous regions, reflecting the exclusion of salaries in the financial cost per dose estimates.

In comparison to the cost per dose of other vaccines in EPI system in Vietnam, the total incremental program cost per dose is higher. However, when the recurrent delivery unit cost per dose (without start-up costs) is considered, especially for the urban and rural areas (Table 10), the cost per dose is more in line with the average delivery cost per dose (US\$0.7) reported in another study in Vietnam.⁶

Lessons learned and recommendations

The HPV vaccine project demonstrated that high coverage could be achieved by either delivering vaccine through a school-based program (strategy A) or through commune health centers (strategy B), although higher coverage was observed in strategy B during the first year. Coverage as measured by survey was similar to that collected through the routine health information system, which suggests accurate recordkeeping in the routine system. The findings showed a very low drop-out rate for the first and second doses (less than 1%).

Direct communication, according to evaluation results, was preferred by many people because of its interactive nature. However, using direct communication at the national level would be very costly. Information may reach a larger coverage when using multiple mass media channels, because (1) mass media covers a wide range of audiences, and (2) people appreciate information from mass media channels and consider them reliable sources. Findings also showed communication at lower levels played an important role in clarifying people's concerns related to HPV vaccine and the project.

The high HPV vaccine coverage, as well as generally positive attitudes toward the vaccine in communities, demonstrates the level of acceptance seen for the vaccine. The evaluation results confirmed that vaccine acceptance was influenced by multiple factors, notably those directly related to the vaccine itself. However, parents' acceptance may also be influenced by other parents' decisions to have their daughters vaccinated or by speaking with trusted persons in the community, such as health workers and teachers. Despite the general level of acceptance seen in this project, concerns about effectiveness and overall quality of the vaccine still persist. These concerns will need to be addressed when introducing this vaccine in new communities.

The project negatively impacted regular activities at commune health centers and schools in minor ways. For commune health centers, the effects mainly occurred during preparation and implementation of the first dose, due to time and effort spent on preparation (e.g., training, planning, identifying eligible girls, and communication). However, health workers at the commune level consistently noted that this impact was acceptable and under control. Support from local authorities and smooth, cross-sector collaboration were key factors in mitigating negative impacts. The project reinforced existing collaboration between the health and education sectors. Transport and storage of other vaccines were not affected by the addition of HPV vaccine, and it is anticipated that this will not change if HPV vaccination is scaled up as part of the national EPI. The primary reason is the cold chain system is adequate and functions well. However, long-term program planning should take into account the fact of unstable electricity and poor infrastructure, which is a common problem in mountainous areas of Vietnam.



A girl being vaccinated with HPV vaccine in a commune health center.

Project trainings provided knowledge and basic skills for staff involved in the HPV vaccination program, and training sessions achieved their objectives. The content of the trainings was considered useful and necessary for the planning and implementation of immunization and communication activities at various levels.

In general, start-up costs comprised the largest share of incremental unit costs in both the economic and financial analyses. These costs were incurred primarily in the first year and declined in the second. It is expected that start-up costs will be an important investment but will be limited in duration to about two years. While there were no clear differences in actual incremental program costs per dose between the vaccine delivery strategies as part of the HPV vaccination project, small differences in unit costs between strategies are expected to occur for the scenarios of typical use at national scale. The estimated cost per dose for school-based strategy A would be slightly higher than the cost per dose for health facility-based strategy B in all geographic areas. The differences in incremental costs across geographic regions reflected the remote locations of the mountainous regions and lack of economy of scale to efficiently deliver the vaccine at a lower unit cost.

Based on the above findings, summarized below are key lessons learned and suggested recommendations for future HPV vaccine implementation.

Lesson 1. Both school-based and commune health center-based strategies can achieve high vaccine coverage.

Both administrative and survey data showed a relatively high vaccine coverage that substantially increased in the second year. Among others, one key factor contributed to this achievement: the work was conducted by a capable system (NEPI) that was fully equipped (with personnel, technical expertise, cold chain, and materials) to perform this assignment,



Parents of fully vaccinated girls during a focus group discussion in final evaluation.

and with NEPI staff present in all communes throughout Vietnam. That will allow a smooth operation from national level downward of any new government-funded vaccination program. NEPI has nearly 30 years of experience in immunization in communities and schools. Other vaccination program in schools demonstrated not only their expertise, but also the willingness of the education sector to collaborate.

Recommendation: Since both strategies are feasible and can yield potentially high coverage rates, the choice of strategy can be based on factors such as local context and number of eligible girls to optimize the use of available resources.

Lesson 2. A communication plan will enhance new vaccine acceptance through an informed decision-making process and will support response to any crisis situations involving unexpected or incorrect information.

IEC activities are key to raising awareness and promoting healthy behavior. From the HPV vaccine project experience, it appears that an adequate communication plan enhances community acceptance of a given new health service. The communication messages and channels need to be tailored to specific audiences and reflect regional differences (e.g., different preferences for communication channels or messages). This approach will allow maximum reach to various audiences. Plans for responding to resistance or incorrect information are also needed to make sure all emerging issues will be adequately addressed.

Recommendation: During new vaccine introduction, it is important to develop a comprehensive communication strategy, including a crisis communication plan to address unexpected or incorrect information.

Recommendation: Communication messages and channels need to be tailored to specific conditions, including geographic regions and audience segment. Based on project findings, it is recommended that mass media be used in urban settings while direct/interactive communication should be used more broadly in rural and mountainous areas.

Lesson 3. Strong partnership leads to effective implementation.

The HPV vaccine project in Vietnam demonstrated the value of effective collaboration between health and other sectors. With interconnected systems, collaboration is key to achieving program success. In addition to a long-term partnership between health and education sectors in a broader health program, participation from other stakeholders, like local authorities, mass media, and community-based organizations, also played a role in building trust and mobilizing the community during the demonstration project.

Recommendation: Program design should create a mechanism that involves relevant stakeholders and enables a partnership among them. Participation of local authorities, especially leaders, is essential for smooth implementation.

Lesson 4. Introducing new vaccine can strengthen compliance with Ministry of Health regulations on vaccination organization, IEC, training, and adverse event surveillance and management.

Supportive supervision was conducted on a regular basis at all levels, which enhanced the capacity of local health workers by providing regular guidance and feedback on Ministry of Health procedures and regulations. Health workers recognized the importance of following regulations, and leaders of relevant agencies confirmed that the HPV vaccine project provided a chance to standardize the skills and capacity of staff.

Recommendation: Supportive supervision should be included as a key assignment of designated health workers. A supportive supervision plan should be created to facilitate this procedure.

Lesson 5. Adequate training materials are essential for program success.

As with every new vaccine, training for health workers and other relevant actors was crucial for program success. Trainings provided an opportunity for participants to revisit and update their existing knowledge. Skills and knowledge gained during these trainings may also be applied in other similar work (e.g., cross-cutting areas), thus enhancing health workers' overall capacity in the long run.

Recommendation: An adequate training program should be developed that provides knowledge about cervical cancer, HPV vaccine, and HPV, as well as implementation-related information. Training content should be tailored to specific trainee groups (e.g., health workers, teachers, communicators).

Lesson 6. Integrating the work into an existing system can reduce costs to an affordable level.

The estimated average delivery costs per dose and per girl fully immunized were much lower for national scale implementation than they were for the small-scale demonstration projects. Although costs were high compared to other vaccines currently in the EPI, that the HPV vaccine is targeted to a new group (young adolescent girls), this increased incremental unit cost should be acceptable.

Recommendation: Incremental cost of adding HPV vaccine into the current EPI system is feasible and affordable when activities are integrated well into currently routine EPI practices.

Recommendation: The incremental delivery cost per dose at national scale in a typical scenario of use as part of the existing EPI should be considered affordable for HPV vaccine, given that it is a new vaccine targeted to a new group (young adolescent girls), when compared to other EPI vaccines and given that the recurrent costs are likely to be in line with other vaccine delivery costs.

Lesson 7. An evidence-based approach to new vaccine introduction is both feasible and effective.

From the formative to operational research via the implementation of demonstration project, we learned that an evidence-based approach can be a successful platform for introduction of a new vaccine. Although this process may not be feasible for low-resource settings without external support to do at the level done in this project, this model of research to support decision-making could be implemented at a more basic scale if national partners are able to identify ways to integrate this into their regular work and some modest additional resources. This will really enhance the decision-making process based on evidences.

Recommendation: An evidence-based approach using basic operational research should be used to guide new vaccine introduction.

Conclusion

PATH's five-year HPV Vaccines: Evidence for Impact project has demonstrated a practical approach for new vaccine introduction through formative research, communication and advocacy, and a demonstration project. The demonstration project estimated HPV vaccine coverage, evaluated vaccine acceptability, measured the feasibility of vaccine introduction for the health and education systems, and calculated the delivery cost of vaccine introduction. Together, these findings provide crucial data for policymakers when considering whether and how to include HPV vaccine in the national health program.

The project identified important results for moving forward with the introduction of HPV vaccine in Vietnam. Both vaccination strategies worked well at the local level, resulting in a high HPV vaccine coverage. Although various concerns about HPV vaccine still exist (e.g. long-term potential impact of HPV vaccine), the new vaccine was well received in project provinces due to its perceived benefit of preventing cervical cancer. The health and education sectors demonstrated their ability to collaborate effectively regardless of delivery strategy, which, coupled with participation from other community-based organizations, led to vaccination success. Finally, although the delivery cost of the vaccine in the project was relatively high, the costs for HPV vaccine introduction may approach normal costs over time and at greater scale.

Cervical cancer continues to be a leading cause of death for women throughout the world. Experiences in Vietnam and other project countries could be shared in a wider context to reduce the lag time between when a new vaccine is available in the market and when it is included in national health programs of low-income countries. Although the price of HPV vaccines has come down dramatically in recent years, it is still too high for low-income countries and serves as an important barrier to widespread access. This issue and the additional cost of delivering HPV vaccines in

national immunization programs will be important in the decision-making process, but cost should not be the sole criterion. With the evidence on operational feasibility and community acceptance provided in this project, when the cost question is resolved, Vietnam will be ready to move forward in introducing this new vaccine.

References

1. Nghi NQ, LaMontagne DS, Bingham A, et al. Human papillomavirus vaccine introduction in Vietnam: formative research findings. *Sexual Health*. 2010;7(3):262-270.
2. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 10 [Internet]. Lyon, France: International Agency for Research on Cancer; 2010. Available at: <http://globocan.iarc.fr>.
3. Boyle P. Cervical cancer prevention: current situation. Presented at: EUROGIN International Expert Meeting on HPV Infection and Cervical Cancer Prevention, October 22, 2004; Nice, France.
4. Muñoz N, Bosch FX, Castellsague X, et al. Against which human papillomavirus types shall we vaccinate and screen for? The international perspective. *International Journal of Cancer*. 2004;111(2):278-285.
5. GlaxoSmithKline Vaccine HPV-007 Study Group, Romanowski B, de Borja PC, et al. Sustained efficacy and immunogenicity of the human papillomavirus (HPV)-16/18 AS04-adjuvanted vaccine: analysis of a randomised placebo-controlled trial up to 6.4 years. *The Lancet*. 2009;374(9706):1975-1985.
6. Hoang M, Nguyen TB, Kim BG, et al. Cost of providing the expanded programme on immunization: findings from a facility-based study in Viet Nam, 2005. *Bulletin of the World Health Organization*. 2008;86(6):429-434.
7. PATH and National Institute of Hygiene and Epidemiology. *Shaping a Strategy to Introduce HPV Vaccine in Vietnam: Formative Research Results from the HPV Vaccines: Evidence for Impact Project*. Seattle: PATH; 2009.



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