

Policy brief



Innovative approaches to cervical cancer screening:

community-based HPV sample collection and centralized testing

Here, we present a policy brief outlining innovative approaches to enhance cervical cancer screening by introducing community-based human papillomavirus (HPV) sample collection combined with centralized laboratory testing to improve feasibility, efficiency and accessibility.

HPV testing model for cervical cancer screening

Sample collection model: sample collection was either performed by commune health stations (CHSs) as part of their daily routine activities or by the Department of Reproductive Health of the provincial Centre for Disease Control (CDC) at CHSs as part of their community mass screening programme. As CHSs are the health facilities that are nearest to the people using them, this sampling approach helps increase women's access to the screening programme.

Sampling method: women had the option of either self-collecting a sample or requesting a healthcare

worker (HCW) to collect a sample for them. Testing performance when using either of these sampling methods has been demonstrated to be comparable. Self-collection of samples has been shown to increase testing coverage by making it more accessible to women, simplifying the process and reducing the resources needed when HCWs conduct sampling.

Testing location: testing for HPV DNA was performed centrally using a high-throughput platform at the provincial CDC, which fulfils the requirements for qualified molecular laboratories and testing staff.

Effectiveness of this model

- 8.1% of women tested positive for at least one high-risk HPV type
- 2.1% of women tested positive for type 16, type 18 or both
- 1.5% of women tested positive for type 16
- 0.6% of women tested positive for type 18
- 6.9% of women tested positive for one of the other high-risk HPV types

The sample collection model and sampling method did not affect the positivity rate. In both sample collection models (CHS sample collection and CDC sample collection) and both sampling methods (self-sampling and HCW sampling), the positivity rate of the screened women was consistent, at 8.1%.

Feasibility of this model

Women's opinions:

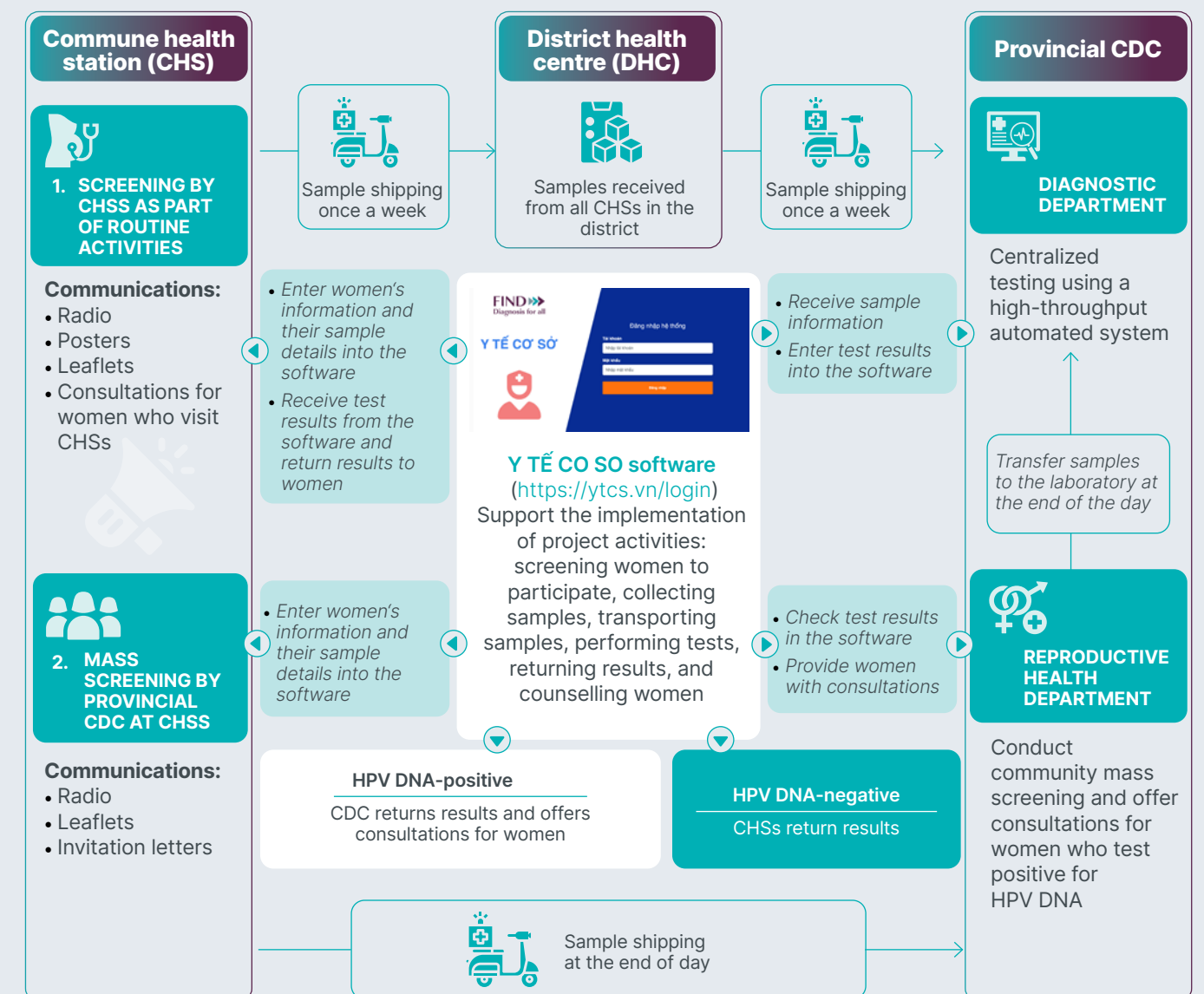
- 95% agreed with HPV DNA testing
- 99% supported self-sampling
- 99% supported HCWs taking samples

Health workers' opinions:

- 97% supported sampling at CHSs
- 100% were willing to collect samples or instruct women in how to collect a sample themselves
- 77% believed that sampling is easy and can be carried out regularly
- 74% reported no difficulties in collecting samples

Women's willingness to pay:

- 75% were willing to pay 400,000 Viet Nam dong (VND) per test
- 63% were willing to pay VND 712,000 per test (current price)
- 50% were willing to pay VND 1,000,000 per test



OVERVIEW

Cervical cancer (CC) is the fourth most common cancer in women, with an estimated 660,000 new cases and 350,000 deaths worldwide in 2022. Approximately 94% of deaths occur in low- and middle-income countries. The highest incidence and mortality rates are seen in sub-Saharan Africa, Central America and South-East Asia. Regional variations in the burden of CC are related to disparities in access to vaccination, screening and treatment services, as well as differences in HIV prevalence, gender inequality and poverty levels. CC disproportionately affects young women, accounting for 20% of cases in which children lose their mothers to cancer¹.

In Viet Nam, with a population of more than 99 million, approximately 39 million women aged 15 years and over are at risk of CC. It is estimated that in 2010 there were 5,664 new cases and more than 3,000 deaths due to CC; in 2021, CC accounted for 4,369 deaths, with age-standardized incidence, prevalence and mortality per 100,000 being 17, 88 and 8 cases, respectively². CC is the eighth most common cancer among Vietnamese women and the fifth most common cancer among women aged 15 to 44 years³.

CC is primarily caused by infection with high-risk HPV types, with types 16 and 18 posing the greatest risk. Worldwide, an estimated 2.1% of women are infected with HPV types 16 or 18, and approximately 83% of invasive CC cases are caused by infection with these types¹.

Cervical cancer screening methods

Traditional CC screening methods, such as visual inspection with acetic acid (VIA) and the Pap test/ Pap smear, cannot detect early-stage CC. They can only detect the later stages of CC, when lesions have already appeared. Neither can they detect the presence of high-risk HPV types. Furthermore, these methods depend on the skills and experience of the examiners, samplers and readers, leading to low accuracy and inconsistent results⁴.

The new screening approach for CC, based on testing for high-risk HPV DNA, has been shown to

be a more effective method due to its high level of accuracy, with fewer errors in sampling and result reading compared with traditional methods. The high accuracy of this method means that women can self-collect samples for testing and still receive reliable test results. The World Health Organization recommends HPV DNA testing as the first-line test for CC screening to enable the early detection of infections with high-risk HPV types and the treatment of any precancerous lesions, thereby helping to prevent CC⁵.



A COMMUNITY-BASED CERVICAL CANCER SCREENING PROJECT USING HPV DNA TESTING

This project was designed to demonstrate the effectiveness of the community-based HPV DNA testing model and to obtain evidence on the acceptability, feasibility and willingness to pay for the testing service. The programme used HPV DNA testing with sample collection at commune-level health facilities and centralized testing at a provincial CDC. The project was implemented in Hai Phong City, with coordination and technical support from FIND and Roche Viet Nam. The project was approved by the Hai Phong City People’s Committee, managed by the Hai Phong Department of Health and coordinated by the Hai Phong CDC.

Project objectives

- Organize community-based CC screening using HPV DNA testing, offering self-sampling or HCW sampling, with the aim of increasing coverage and promoting early detection of CC and timely access to treatment when required
- Demonstrate that a decentralized sampling and centralized HPV DNA testing model can effectively scale up screening
- Provide evidence regarding the use of the decentralized sampling and centralized HPV DNA testing model to enhance technical feasibility and support the Ministry of Health in building a model for the scaling up of HPV DNA testing

Project intervention activities

Establish and implement an effective CC screening model using centralized HPV DNA testing at Hai Phong provincial CDC laboratory and decentralized sampling at CHSs by:

- Deploying a comprehensive training package for 180 HCWs, including staff at Hai Phong CDC and HCWs at two district health centres (DHCs) and 40 CHSs, to train them in conducting sample collection, processing and transportation, HPV DNA testing, and consultations for women.
- Establishing an HPV DNA testing platform at the provincial CDC laboratory and providing test kits, reagents and consumables to the CDC and CHSs for sample collection and testing.
- Conducting sample collection activities via two models: (i) sample collection at CHSs as part of routine CHS activities or (ii) sample collection at mass-screening events organized by the Department of Reproductive Health of Hai Phong CDC at CHSs, using two sampling methods: (a) self-sampling or (b) sampling by HCWs. Samples were processed and transported to the DHCs and from there to Hai Phong CDC for centralized testing.

Project effectiveness

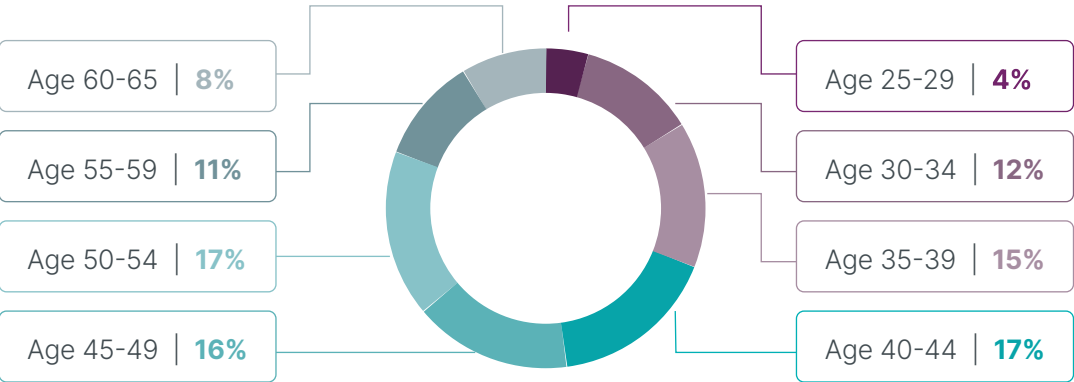
The project successfully developed a CC screening model using testing for high-risk HPV DNA. During the project implementation period, in total, out of 5,288 women approached, 5,004 women aged 25 to 65 years and who had engaged in sexual activity agreed to participate. Of these women, 2,502 were sampled through routine activities at 40 CHSs, and 2,502 were sampled during 15 days of community mass-screening events organized by the Department of Reproductive Health of Hai Phong CDC; these were conducted at CHSs in 10 districts of Hai Phong City from August to December 2023. All women whose test results were positive for HPV were contacted and offered a consultation with a staff member from the Department of Reproductive Health of Hai Phong CDC. The numbers of women sampled by sample collection model and sampling method are summarized in **Table 1**.

Table 1. Number of women sampled by sample collection model and sampling method

NUMBER OF WOMEN SAMPLED	CHS SAMPLE COLLECTION	CDC SAMPLE COLLECTION	TOTAL
	n (%)	n (%)	n (%)
SELF-SAMPLING	978 (39.1%)	1,454 (58.1%)	2,432 (48.6%)
SAMPLED BY AN HCW	1,524 (60.9%)	1,048 (41.9%)	2,572 (51.4%)
TOTAL	2,502 (100%)	2,502 (100%)	5,004 (100%)

The women tested represented all age groups aged 25 years and older. The proportions of women in each age group were relatively comparable, the exceptions being the youngest (25–29) and oldest (60–65) age groups, which accounted for lower proportions (Figure 1).

Figure 1. The proportion of women tested by age group



The proportion of women who tested positive for at least one high-risk HPV type was 8.1%; 2.1% tested women positive for type 16, type 18 or both. The proportion of women who tested positive for type 16, type 18 or other high-risk types was 1.5%, 0.6% and 6.9%, respectively (Table 2).

Table 2. HPV DNA test results for women who participated in the project

NUMBER OF WOMEN SAMPLED	CHS SAMPLE COLLECTION	CDC SAMPLE COLLECTION	TOTAL
	n (%)	n (%)	n (%)
HPV 16 (+)	24 (1%)	18 (0.7%)	42 (0.8%)
HPV 18 (+)	10 (0.4%)	7 (0.3%)	17 (0.3%)
HPV 16 (+) AND OTHER HIGH-RISK TYPE (+)	19 (0.8%)	12 (0.5%)	31 (0.6%)
HPV 18 (+) AND OTHER HIGH-RISK TYPE (+)	9 (0.4%)	3 (0.1%)	12 (0.2%)
OTHER HIGH-RISK TYPE (+)	140 (5.6%)	163 (6.5%)	303 (6.1%)
HPV 16 (+), HPV 18 (+) AND OTHER HIGH-RISK TYPE (+)	1 (0.04%)	0 (0.00%)	1 (0.02%)
NEGATIVE	2,299 (91.9%)	2,299 (91.9%)	4,598 (91.9%)
TOTAL	2,502 (100%)	2,502 (100%)	5,004 (100%)

The results showed that the sample collection model and sampling method did not affect the HPV DNA positivity rate. For both sample collection models (by CHS and by CDC) and both sampling methods (women self-sampling and HCW sampling), the rate of women positive for one of the high-risk HPV types remained consistent at 8.1% (Table 3 and Table 4).

Table 3. HPV DNA test results by sample collection model

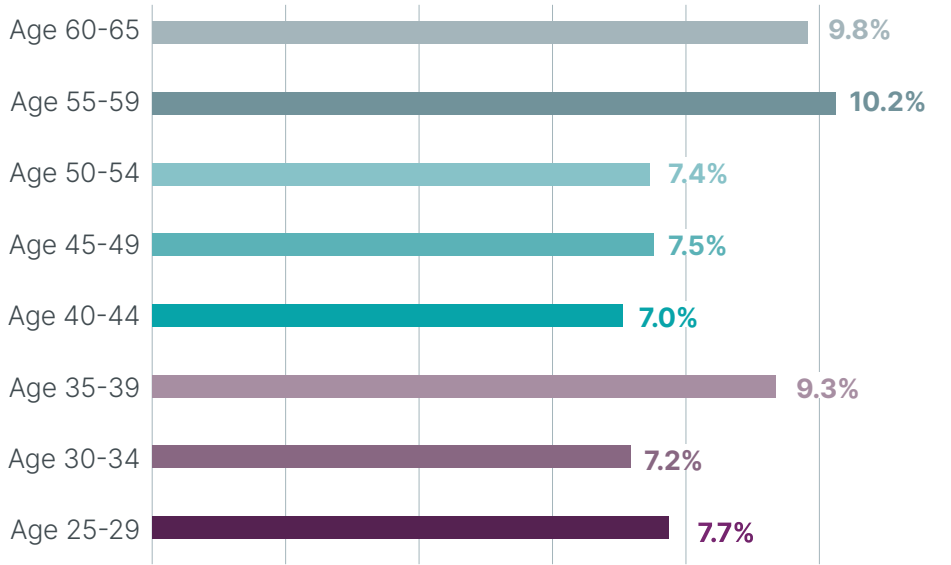
TEST RESULT	CHS SAMPLE COLLECTION	CDC SAMPLE COLLECTION	TOTAL
	n (%)	n (%)	n (%)
POSITIVE	203 (8.1%)	203 (8.1%)	406 (8.1%)
NEGATIVE	2,299 (91.9%)	2,299 (91.9%)	4,598 (91.9%)
TOTAL	2,502 (100%)	2,502 (100%)	5,004 (100%)

Table 3. HPV DNA test results by sampling method

TEST RESULT	CHS SAMPLE COLLECTION	CDC SAMPLE COLLECTION	TOTAL
	n (%)	n (%)	n (%)
POSITIVE	198 (8.1%)	208 (8.1%)	406 (8.1%)
NEGATIVE	2,233 (91.9%)	2,365 (91.9%)	4,598 (91.9%)
TOTAL	2,431 (100%)	2,573 (100%)	5,004 (100%)

The proportion of women who tested positive for high-risk HPV types by age group ranged from 7% to 10.2% (Figure 2).

Figure 2. Percentage of high-risk HPV type positivity by age group



Feasibility of the demonstration model

The project's HPV DNA testing model for CC screening was highly accepted by women and HCWs:

- 95% of counselled women agreed to participate in HPV DNA testing for CC screening
- 98% of tested women supported self-sampling
- 99% of tested women supported sampling by HCWs97% of HCWs supported CHS screening and community mass-screening organized by the CDC at CHS
- 100% of HCWs were willing to guide women on how to self-sample or directly collect samples for them

The project's HPV DNA testing model for CC screening is highly feasible:

- The majority of HCWs (77%) agreed that sampling is easy and can be performed regularly
- The majority of HCWs (74%) reported no difficulty in obtaining samples
- Several factors influence the feasibility of implementing HPV DNA testing, including testing costs and women's awareness of CC

Women's willingness to pay for HPV DNA testing:

- HPV DNA testing using self-sampling or by HCW sampling had the same total cost, which was approximately 712,000 VND/test
- 75% of women were willing to pay at the price of 400,000 VND per test, while 50% were willing to pay at the price of 1,000,000 VND per test. At the price of 712,000 VND (the current price), 63% of women were willing to pay.

Conclusions and recommendations

- The high proportion of women (8.1%) infected with high-risk HPV types that can cause CC suggests that there is a need for investment and attention from authorities and the health sector to promote CC screening programmes for women.
- The positivity rate for high-risk HPV types was the same regardless of the sample collection model and the form of sampling employed.
- The model of centralized testing at the provincial level and decentralized sampling at the commune level as part of the routine activities of CHSs and the provincial CDC community mass-screening programme was highly acceptable to both women and the primary healthcare system; it was also highly feasible for this to be conveniently and easily implemented.
- A large proportion of women were willing to co-pay for HPV DNA testing. Specifically, 75% were willing to pay 400,000 VND, 63% were willing to pay 712,000 VND, and 50% were willing to pay 1,000,000 VND for a single HPV DNA test.

ACKNOWLEDGEMENTS

FIND funded this project and provided technical support. FIND is a non-profit organization headquartered in Geneva, Switzerland, with regional offices in India, Kenya, South Africa and Viet Nam. FIND promotes research and development programmes and access to new diagnostic tools, aimed at achieving equitable access to quality, tailored testing in low- and middle-income countries. In addition, FIND provides hands-on training and capacity development support, invests in health facilities and provides online training modules.

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