World Health Organization
Thailand

สมาคมมะเร็งนรีเวชไทย

Eradicating Cervical Cancer in Thailand

A Journey of Hope and Progress

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World Health Organization
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THAI GYNECOLOGIC CANCER SOCIETY
TGOG 1996 to 2002 TGCS
สมาคมมะเร็งนรีเวชไทย

Eradicating cervical cancer in Thailand: A journey of hope and progress

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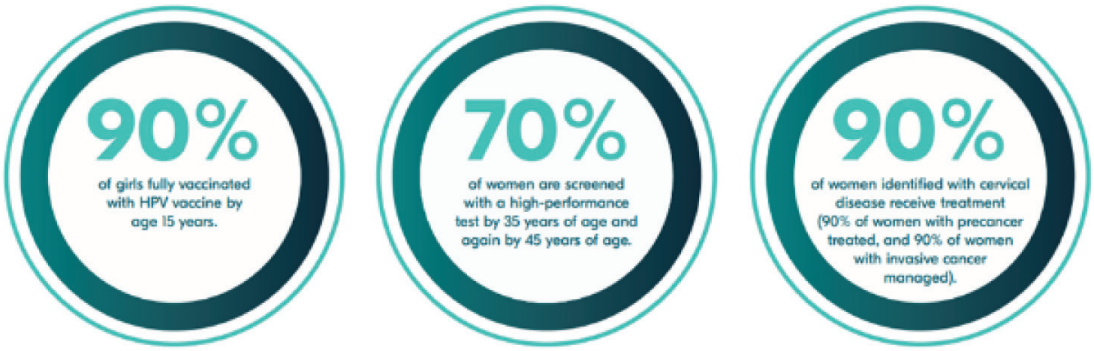
Abbreviations and acronyms

ACIP	Advisory Committee on Immunization Practices
AIDS	Acquired immunodeficiency syndrome
ASCUS	Atypical squamous cells of undetermined significance
ASR	Age-standardize incidence rate
BTS	Bangkok Mass Transit System
EGAT	Electricity Generating Authority of Thailand
EPI	Expanded Programme on Immunization
HIV	Human Immunodeficiency Virus
HPV	Human papillomavirus
hrHPV	High-risk type human papillomavirus
IARC	International Agency for Research on Cancer
LEEP	Loop electrosurgical excision procedure
LGBTQ	Lesbian, gay, bisexual, transgender and queer
MoPH	Ministry of Public Health
MSM	Men who have sex with men
NCI	National Cancer Institute
NIP	National Immunization Program
NHSO	National Health Security Office
NVI	National Vaccine Institute
Pap smear	Papanicolaou smear
PIDST	Pediatric Infectious Disease Society of Thailand
RTCOG	Royal Thai College of Obstetricians and Gynecologists
SAGE	Strategic Advisory Group of Experts on Immunization
TGCS	Thai Gynecologic Cancer Society
TSCCP	Thai Society for Colposcopy and Cervical Pathology
VIA	Visual Inspection after Acetic Acid
WHO	World Health Organization
2v, 4v and 9v HPV vaccine	Bivalent, Quadrivalent and Nine-valent HPV vaccine

Key messages

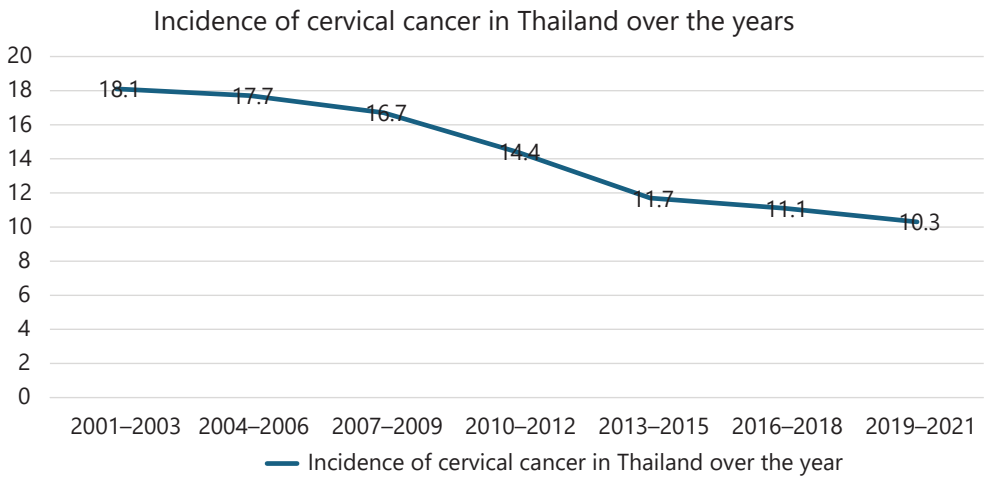
Cervical cancer, preventable and curable, remains the 4th most common cancer among women worldwide, claiming 350 000 lives in 2022. **94% of these cases are detected in women from low- and middle-income countries** where the burden of cervical cancer is greatest, because access to public health services is limited and screening and treatment for the disease have not been widely implemented.

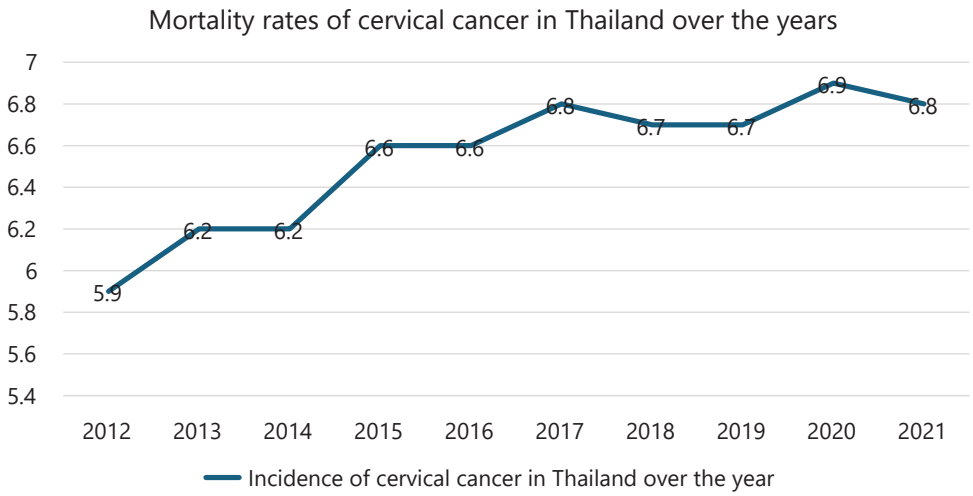
In 2020 during the World Health Assembly, WHO adopted the Global Strategy for Cervical Cancer Elimination which aims to eliminate it by reducing incidence below 4 per 100 000 women. To achieve this goal of elimination, three interim targets have been set for achievement by 2030.



Thailand situation highlights:

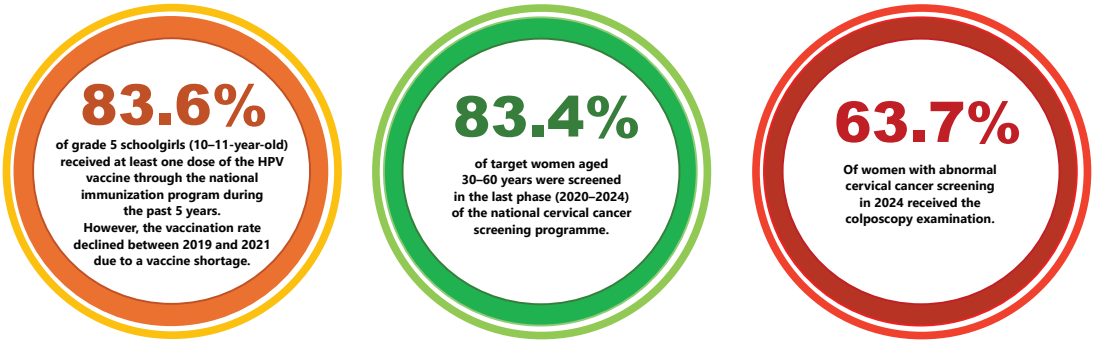
- Cervical cancer is Thailand's second most common female cancer after breast cancer.
- Although the incidence has declined from 18.1 to 10.3 per 100 000 women between 2001–2003 to 2019–2021, the mortality rate has risen, from 5.9 to 6.8 deaths per 100 000 women from 2012 to 2021 (about 3326 deaths).





- HPV infection rates are higher among young women, those with multiple sexual partners, lower-income groups, and rural residents.
- In 2024, Thai women aged 30–60 had an 8.8% HPV prevalence, of which 2.3% tested positive for HPV 16/18 and 6.5% tested positive for other high-risk HPV types.

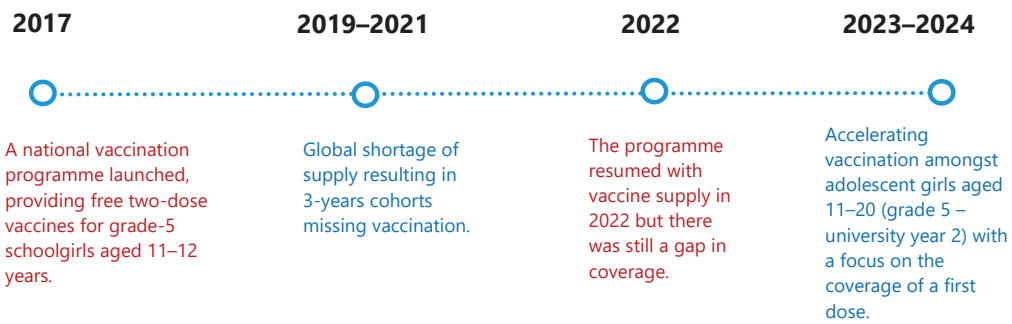
Thailand has been implementing various initiatives to achieve the WHO 90-70-90 targets. While the country has performed well in screening, there remains a gap in providing treatment for detected cases.



Refer to the detailed information on Page 2

Strategic actions of Thailand to achieve the 90-70-90 global targets

Vaccination



Screening

2005–2009 (Phase 1)	2010–2014 (Phase 2)	2015–2019 (Phase 3)	2020	August 2023
A national cervical screening programme initiated using pap smear and VIA (77.5% of target population reached).	Reached but very low follow-up (less than 10%) due to poor recording of follow-up results.	Change of monitoring software programme to enable linking of screening, follow up procedure and treatment with the ID number of patients.	New screening paradigm shifted to HPV DNA test. Full operation in March 2022.	HPV DNA Self-sampling was introduced to enable privacy for women.

Treatment

- Management of Pre-cancer: Between 2020 and 2024, 63.7% of women aged between 30 and 60 whose screening result is abnormal have received colposcopy.
- Treatment of Invasive cancer: The Guideline for the Prevention and Treatment of Cervical Cancer by the MOPH recommends providing surgical care within 4 weeks, and radiation and chemotherapy within 6 weeks.

Key success factors

**The Quick Win initiative by MoPH, in 2024, aimed to accelerate 1 million doses of HPV Vaccination in 100 days among adolescent girls and catching up for those who have missed the vaccine earlier.*

***Thailand's Cancer Anywhere program, launched in 2021, allows Universal Coverage Scheme patients to receive cancer treatment at any participating public hospital, eliminating the need for transfer approvals.*

Challenges

- Vaccine cost and supply constraints limiting widespread immunization.
- Geographic disparities in healthcare access, leaving remote populations underserved.
- Cultural and social barriers hindering vaccination and screening uptake.
- Limited awareness and knowledge gaps, reducing preventive action.
- Low adherence to screening schedules, increasing missed detections.
- Delays in diagnosis and treatment, compromising patient outcomes.
- Insufficient palliative care services, impacting quality of life for late-stage patients.

Way forward

1. Cervical cancer in Thailand and the path to elimination

1.1 Incidence and mortality rates compared to global trends

Cervical cancer remains a major global health concern, particularly in low- and middle-income countries. In Thailand, it is the second most common cancer among women, after breast cancer. As of 2024, the global age-standardized incidence rate (ASR) is 14.1 per 100 000 women-years, with a mortality rate of 7.1 per 100 000 women-years. In Thailand, the ASR is 14.9 per 100 000 women-years and a mortality rate of 6.9 per 100 000 women-years *(1)*. This equates to approximately 8662 new cases and 4576 deaths annually.

Data from the National Cancer Institute, Department of Medical Services, Ministry of Public Health of Thailand indicates a slight decline in cervical cancer incidence over time, from 18.1 per 100 000 women in 2001–2003 to 10.3 per 100 000 women in 2019–2021 *(2)*. In contrast, mortality rates have increased, with the age-standardized mortality rate rising from 5.9 deaths per 100 000 women in 2012 to 6.8 per 100 000 women in 2021. These trends highlight the urgent need for strengthened prevention and control strategies in Thailand.

1.2 Cervical cancer and HPV prevalence

In 2018, the World Health Organization (WHO) called for the elimination of cervical cancer, setting a target incidence rate of fewer than 4 cases per 100 000 women. To accelerate this effort, WHO launched a global strategy in 2020 centered on a triple-pillar approach known as the 90-70-90 targets by 2030.

- Vaccinate **90% of girls** with the HPV vaccine by age 15.
- Screen **70% of women** using a high-performance test by age 35 and again by age 45.
- Ensure **90% of women** diagnosed with cervical disease receive appropriate treatment—covering **90% of women** with precancerous lesions and **90% of women** with invasive cancer.

In line with these goals, Thailand has implemented various initiatives aimed at realizing WHO's recommendations. Thailand's progress toward these targets is outlined in Table 1, which compares the country's current achievements with WHO benchmarks. Key efforts

include expanding HPV vaccination coverage, transitioning to HPV-based screening, and enhancing access to treatment through initiatives such as "Cancer Anywhere". While notable progress has been made, challenges persist, including vaccine affordability, geographic disparities, and social barriers. Thailand remains committed to addressing these obstacles to achieve WHO's 2030 elimination goals.

Table 1. The WHO '90-70-90' target to eliminate cervical cancer and the current situation in Thailand (2024)

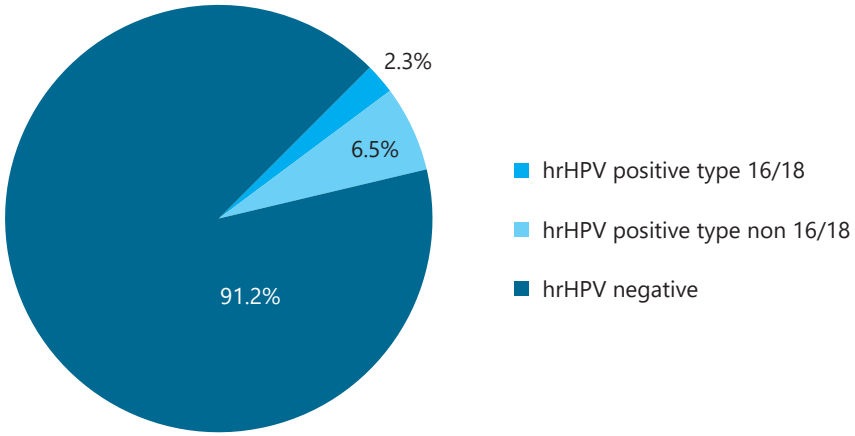
	WHO	Thailand
Primary prevention	90% of girls fully vaccinated with the HPV vaccine by age 15.	**83.6%** of grade 5 schoolgirls received at least one dose of the HPV vaccine via the national immunization program during the last 5 years. Note: The vaccination rate declined between 2019–2021 due to vaccine shortage.
Secondary prevention	70% of women screened using a high-performance test by age 35 and again by age 45.	**83.4%** of target women aged 30–60 years were screened in the last phase (2020–2024) of national cervical cancer screening.
Tertiary prevention	90% of women diagnosed with cervical disease receiving appropriate treatment (including 90% of women with precancerous lesions treated, and 90% of women with invasive cancer managed	**63.7%** of women with abnormal cervical cancer screening in 2024 received the colposcopy examination. (Data from the Government Inspection and Supervision Round 2/2024) Note: The rate of tertiary prevention of cervical cancer in Thailand are currently under-reported with incomplete available data particularly treatment for invasive cervical cancer.

In Thailand, the prevalence of human papillomavirus (HPV) among women varies by region and socioeconomic factors. Higher infection rates are observed among younger women, those with multiple sexual partners, individuals living in rural areas, and low-income populations *(4–6)*.

Of the more than 100 HPV types, at least 14 are classified as high-risk or oncogenic, capable of causing pre-invasive and invasive cervical cancers. HPV 16 and HPV 18 are the most significant, accounting for 53.3% and 14.3% of cervical cancer cases in Thailand, respectively *(7)*.

The integration of HPV testing into Thailand's cervical cancer screening program has provided more accurate data on HPV prevalence, enabling better-targeted interventions. According to the National Health Security Office (NHSO), HPV prevalence among women aged 30–60 years in the 2024 National Cervical Screening Program was 8.8%. Among these cases, 2.3% tested positive for HPV 16/18, while 6.5% were positive for other high-risk HPV types *(8)* (Fig. 1).

Fig. 1. Prevalence of HPV among 1 053 458 Thai women from National Cervical Cancer Screening Program in 2024



1.3 Cervical cancer and HIV prevalence

A systematic review and meta-analysis found that HIV-positive women have a 2.6-fold higher risk of acquiring an HPV infection, including a 2.4-fold increased risk of high-risk HPV, a 3.1-fold risk of HPV 16, and a 2.64-fold risk of HPV 18 *(9)*. As a result, these women face a greater likelihood of developing low-grade squamous intraepithelial lesions (3.7-fold) and high-grade squamous intraepithelial lesions (1.3-fold), primarily due to persistent HPV infection *(9)*.

Women living with HIV have a 5- to 6-fold increased risk of cervical cancer, which often develops at a younger age compared to women without HIV *(10,11)*.

With advancements in medical care, women with HIV are now living longer. In response, Thailand has implemented measures to ensure that these women receive comprehensive cervical cancer prevention and treatment, similar to the general population but following a tailored protocol *(12)*.

2. Strategic actions of Thailand to achieve the 90-70-90 global targets

2.1 Primary prevention: HPV vaccination

Since the launch of the HPV vaccine in 2006, its efficacy and effectiveness have been consistently demonstrated in clinical trials and real-world studies. In response, WHO set a goal of achieving 90% vaccination coverage for the target population. Recognizing the benefits of the HPV vaccine, and with the endorsement of the Advisory Committee on Immunization Practices (ACIP) of Thailand, the vaccine was introduced into the Expanded Programme on Immunization (EPI) in 2012. A subsequent study in Thailand confirmed that HPV vaccination is highly cost-effective in reducing cervical cancer within the country's context *(13)*.

Thailand's HPV vaccination rollout began with a pilot program in 2014, targeting grade 5 schoolgirls. The program demonstrated a high acceptability rate of over 90% *(14)*. A major milestone in cervical cancer prevention was achieved in 2017, when HPV vaccination was officially integrated into the national immunization program for the same target group. Under this initiative, the national program provides two doses of the bivalent (2v) HPV vaccine to grade 5 schoolgirls (aged 11–12 years) free of charge.

On December 2017, the Department of Medical Services, Disease Control, and Health, along with the Royal Thai College of Obstetricians and Gynecologists, signed an MOU to "Eradication of Invasive Cervical Cancer Project" (Fig. 2), committing to eliminating cervical cancer.

Under this partnership, there are several commitments that serve to set the direction for the elimination of Cervical Cancer including:

- Developing an operational plan with representatives from all sectors to control cervical cancer.
- Raising public awareness about cervical cancer, particularly the importance of screening.
- Enhancing workforce capacity by promoting and supporting the development of medical personnel in gynecological oncology.

Fig. 2. The Memorandum of Understanding for the "Eradication of Invasive Cervical Cancer Project" among the Department of Medical Services, the Department of Disease Control, the Department of Health under the Ministry of Public Health, and the Royal Thai College of Obstetricians and Gynaecologists

- Strengthening expertise by improving the knowledge and skills of obstetricians and gynecologists in managing abnormal cervical cancer screening results.
- Conducting research to assess and implement cervical cancer screening technologies suitable for the Thai population.

Through the network of expert groups in Thailand including the Thai Gynecologic Cancer Society (TGCS), the National Cancer institute (NCI), and the Royal College of Thai Obstetricians and Gynecologists (RTCOG), several evidence-based guidelines for HPV vaccination, cervical cancer screening, and management have been made available in Thailand.

However, a global vaccine shortage from 2019 to 2021 disrupted the program, leading to a three-year gap for the second dose among affected cohorts. With the vaccine supply stabilizing, the program resumed in 2022. The timeline of HPV vaccination implementation in Thailand is shown in Fig. 3.

Fig. 3. The 10-year timeline of HPV vaccination in Thailand from 2012 to 2022

2012	2014	2017	2019–2021	2022
The Advisory Committee on Immunization Practices (ACIP) agreed to introduce HPV vaccination as routine immunization	Piloting HPV vaccine implementation among grade 5 female students in Phra Nakhon Sri Ayutthaya province	Nationwide implementation of HPV vaccination in grade 5 female students	Global shortage of HPV vaccine	Restarting HPV vaccination service

In 2023–2024, HPV vaccination rates surged under the **'Quick Win'** initiative led by the Ministry of Public Health. This policy aimed to rapidly expand vaccination coverage among adolescent girls and provide catch-up doses to those who had missed earlier vaccinations. The initial goal was to administer 1 million doses within 100 days (Fig. 4).

Beginning in November 2023, a robust school health program was launched to:

- Administer the first dose of the HPV vaccine to adolescent girls aged 11–20 years.
- Provide catch-up doses to cohorts affected by the previous vaccine shortage, covering grade 5 through university year 2.

The program exceeded expectations, delivering 2 million doses by 2024, including 1.4 million first doses. As a result, HPV vaccination coverage of at least one dose among girls by age 15 reached 80% in 2023 *(15)*.

Following this success, national health authorities have escalated the target, aiming to administer a total of 1 million more doses within 2025.

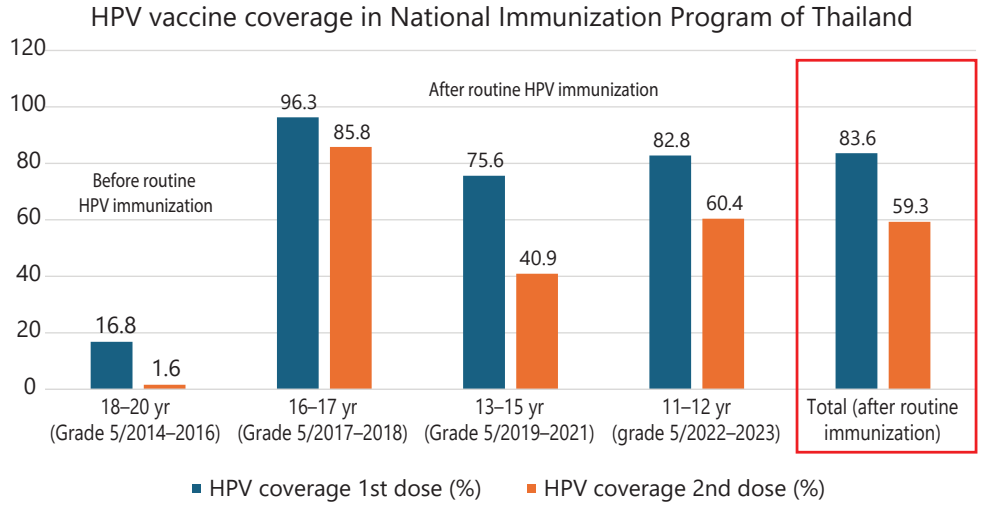
Fig. 4. "Quick Win" initiative by the Ministry of Public Health to administer 1 million doses of HPV vaccine

The summary of overall coverage of HPV vaccination for schoolgirls in Thailand since 2014 to 2023 are shown in Fig. 5. Between 2014–2016 prior to the national immunization program (NIP), only 16.8% and 1.6% of the 5th grade schoolgirls (now aged 18–20 years old) had received one and two doses of the HPV vaccine respectively *(16)*. After the implementation of the NIP in 2017 until 2018, 96.3% of 5th grade schoolgirls received one dose and 85.8% had two doses of HPV vaccine (now aged 16–17 years).

In Thailand, free two-dose HPV vaccinations—using either the bivalent (2v) or quadrivalent (4v) vaccine—are provided to girls aged 11–12 through school-based programs. A study in Thailand found that a two-dose 9-valent (9v) HPV vaccine, combined with primary HPV

screening, is the most cost-effective approach for school-based vaccination programs targeting 12-year-olds *(17)*. In the future, Thailand may consider introducing the 9v HPV vaccine to expand HPV prevention coverage, depending on affordability and availability.

Fig. 5. Rates of HPV vaccination among grade 5 schoolgirls in Thailand before and after an inclusion in the National Immunization Program



Achieving WHO's target of 90% HPV vaccination coverage by 2030 remains a challenge. Coverage rates vary widely, with urban areas achieving higher rates than rural regions. Key barriers include low awareness of the benefits of HPV vaccination, logistical challenges in vaccine distribution, and vaccine availability issues. To address these challenges, a single-dose vaccination strategy is being considered as a sustainable approach to increase vaccine uptake, reach out-of-school girls, and enhance overall program access and effectiveness.

The 'Single-Dose HPV Vaccine Evaluation Consortium' supports the adoption of a single-dose HPV vaccination, emphasizing that it would prevent more cases of cervical cancer by reaching a larger number of girls compared to the current two-dose regimen *(18)*. The two-dose strategy is considered less effective, efficient, and equitable when compared to a single-dose, multi-age cohort approach.

In 2018, Jiamsiri et al., from the Ministry of Public Health in Thailand, conducted a study among grade 8 girls in two provinces, involving 8000 participants in each province, to assess the effectiveness of one- vs. two-dose vaccination *(19,20)*. Both regimens significantly reduced HPV prevalence, showing over 90% effectiveness four years after vaccination. **These findings provide substantial evidence supporting the global benefits of a single-dose strategy.**

This data offers valuable insights for national policymakers seeking to enhance cervical cancer prevention. The Advisory Committee on Immunization Practices (ACIP) of Thailand has recommended a shift to **a single-dose vaccination schedule**, which will be implemented for grade 5 schoolgirls under an upcoming policy from the National Immunization Program (NIP).

In April 2022, WHO's Strategic Advisory Group of Experts (SAGE) concluded that one dose provides protection comparable to two doses and recommended offering a single-dose option for girls and young women aged 9–20. This approach is more cost-effective, easier to administer, and allows more girls access to cervical cancer protection *(21)*. As of 10 September 2024, 57 countries are implementing the single-dose schedule. WHO estimates that the single-dose schedule adoption has resulted in at least 6 million additional girls being reached with HPV vaccines in 2023.

Given the continuing supply challenges and aiming to provide more choice of vaccines to reach more girls, WHO recently announced on 4 October 2024 that the additional vaccine, Cecolin®, which is initially prequalified for use in a 2-dose schedule can now be used in a single-dose schedule *(22)*.

Current recommendations for HPV vaccination in Thailand, based on evidence and the guidance of international organizations, are provided by several societies. Their recommendations are shown in Fig. 6.

Currently, some individuals in Thailand, regardless of gender and age beyond the target group of girls, have sought HPV vaccination on their own. Unfortunately, data on the number of vaccinations and the characteristics of these non-target individuals who have received the vaccine are unavailable. The National Strategic Health Plan Committee aims to **expand the vaccination program under universal health coverage to include non-adolescent girls, boys, and at-risk adults of all gender identities who could benefit from the vaccine.**

Public-Private partnership to secure affordable vaccine

The cost of the HPV vaccine remains a significant barrier to access, particularly in low- and middle-income countries, including Thailand. In response, the Ministry of Public Health has made extensive efforts to secure affordable vaccine supplies by collaborating with pharmaceutical companies to increase the availability of HPV vaccines. Under the National Vaccine Security Act B.E. 2561 and the regulations of the National Vaccine Committee on the selection and purchasing methods for vaccines, one project is currently underway to procure the HPV vaccine at a reduced cost.

On 26 June 2023, the National Vaccine Institute (NVI) signed a Memorandum of Understanding with Innovax-NVI®: Global Biotech Products Co. Ltd. for the technology transfer of the 9-valent HPV vaccine. Subsequently, on 8 October 2024, the National Vaccine Committee agreed to support the project by preparing the necessary infrastructure for technology transfer throughout the production process until the product is available for use in the target population.

Fig. 6. Recommendations for HPV vaccination in Thailand

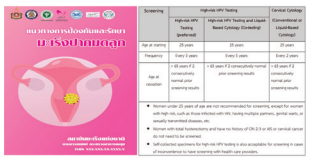
(A) Pediatric Infectious Disease Society of Thailand

The national immunization program provides a free two-dose HPV vaccine for grade-5 schoolgirls aged 11–12. The Society recommends a two-dose schedule (6–12 months apart) for boys and girls aged 9–26, prioritizing those aged 11–12.

(B) Infectious Disease Association of Thailand

HPV vaccination is recommended for girls/women aged 9–26 and can be considered for boys/men in the same age range. Priority is given to girls aged 9–15 and high-risk groups, such as the immunocompromised (e.g., HIV-positive or organ transplant recipients), who require three doses. Vaccination may also benefit individuals aged 27–45 and those over 45 at risk of HPV infection, based on shared decision-making.

(C) Thai Gynecologic Cancer Society/National Cancer Institute/Royal Thai College of Obstetricians and Gynaecologists



The primary target group for HPV vaccination is women aged 9–26, with three doses at 0, 1–2, and 6 months. Girls under 15 can receive two doses 6–12 months apart. Immunocompromised individuals (e.g., HIV-positive) require three doses. Vaccination may also benefit women over 26, sexually active individuals, those with a history of genital warts, precancerous lesions, or abnormal cytology/HPV testing, and men aged 9–26, based on shared decision-making after risk-benefit counseling.

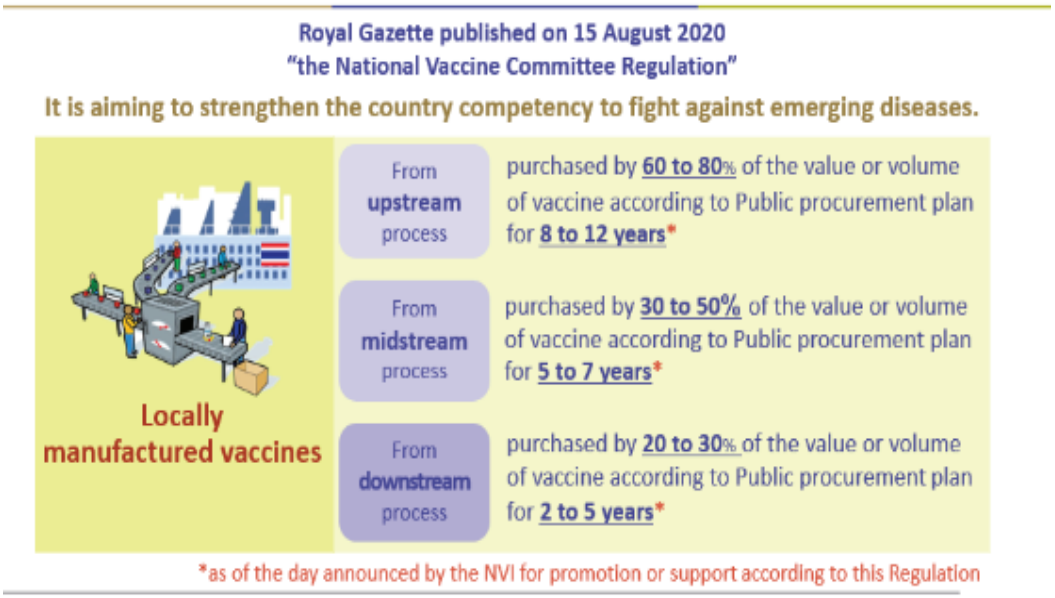
(D) Department of Disease Control

The Thailand National Guidelines on HIV/AIDS Treatment and Prevention 2021/2022 recommend the 2v, 4v, or 9v HPV vaccine for girls/women aged 9–26, with three doses at 0, 1–2, and 6 months. Women over 26 may also benefit from vaccination. For boys/men who have sex with men (MSM) aged 9–26, only the 4v or 9v HPV vaccine is advised.

The technology transfer will follow a midstream process, where the active pharmaceutical ingredient (absorbed monovalent bulk) of the vaccine will undergo formulation, sterile filling, and quality control testing (in collaboration with the Department of Medical Science) before submission to the Thai Food and Drug Administration for product registration. The annual plan for national vaccine procurement is shown in Fig. 7.

Fig. 7. HPV vaccination procurement (after the midstream technology transfer) according to the National Vaccine Committee Regulation

Recent National Vaccine Committee Regulation:
Privilege to local manufacturers



2.1.1 Highlights on the path to success

Below are the key highlights that contributed to the success of the initiative:

1. **Political recognition of HPV Vaccination**: Policymakers and health professionals have recognized the significant role of HPV vaccination in preventing cervical cancer.
2. **Efforts by Policymakers**: Through various strategies, policymakers have worked to acquire large quantities of vaccine products at a lower cost, ensuring widespread access though consistent policy.
3. **Mobile Vaccination Units and Community Outreach**: To enhance vaccination coverage, especially among non-school girls and women (e.g., female factory workers and residents in remote areas), mobile vaccination units and community outreach programs have been implemented.

4. **Collaboration with Pharmaceutical Companies:** Strong partnerships between healthcare providers and pharmaceutical companies have facilitated the promotion of vaccination, making it more accessible at marginal costs. Regular activities have been carried out, such as meetings, media campaigns to inform the public about the vaccine (Fig. 8), and fundraising efforts to support vaccination for non-targeted groups, including girls in Juvenile Observation and Protection Centers (Fig. 9).

Fig. 8. Solicited social media for HPV vaccination 'No delay for Cancer Prevention'

Fig. 9. Fund-raising activities to mobilize funds for girls in the Juvenile Observation and Protection Center.

2.1.2 Challenges in improving HPV vaccination rates in Thailand

1. **Awareness and Knowledge Gaps**

   (a) **Public Awareness**: Limited understanding of HPV's link to cervical and other type of cancer has resulted in low awareness of the benefits of vaccination, leading to lower vaccine uptake.

   (b) **Healthcare Providers' Knowledge**: Not all healthcare providers are adequately informed about the HPV vaccine, resulting in inconsistent recommendations and guidance for patients.

2. **Cultural and Social Barriers**

   (a) **Cultural Perceptions**: Stigma surrounding HPV as a sexually transmitted infection, along with misinformation about vaccine's safety and side effects, especially on social media, can contribute to vaccine hesitancy.

   (b) **Gender Misconceptions**: The HPV vaccine is often viewed as only for girls/women, despite its protective benefits for boys/men and LGBTQ individuals against HPV-related cancers.

3. **Access and Availability**

   (a) **Geographic Barriers**: Limited access to healthcare facilities and vaccination programs in rural and remote areas restricts vaccination opportunities.

   (b) **Cold Chain Management**: Ensuring the vaccine's cold chain storage in remote areas presents logistical challenges that may affect vaccine quality.

4. **Cost and Funding Issues**

   (a) **Vaccine Cost**: Despite the inclusion of the HPV vaccine in some public health programs, costs remain a barrier for individuals outside these programs.

   (b) **Government Funding**: Limited government resources can impact the procurement and distribution of vaccines, hindering broader vaccination coverage.

   (c) **One-Dose HPV Vaccination**: The clinical efficacy of the single-dose regimen requires an effective follow-up program and robust data management to ensure its success.

5. **Policy and Program Implementation**

   (a) **Inequity in Vaccination Coverage**: While HPV vaccination is recommended, enforcement and coverage rates can vary across different regions, leading to inequities in vaccination access.

   (b) **Underserved Populations**: Vulnerable individuals outside the education system, such as those in rehabilitation centers, immunocompromised individuals, and LGBTQ communities, are not always covered by vaccination programs.

2.2 Secondary prevention: screening and treatment of precancerous lesions

Thailand's cervical cancer screening program began with opportunistic cytology-based screening in 1985. A pilot project for systematic cytology screening ran from 1999 to 2002, leading to the establishment of the National Cervical Cancer Screening Program and related guidelines between 2002 and 2004.

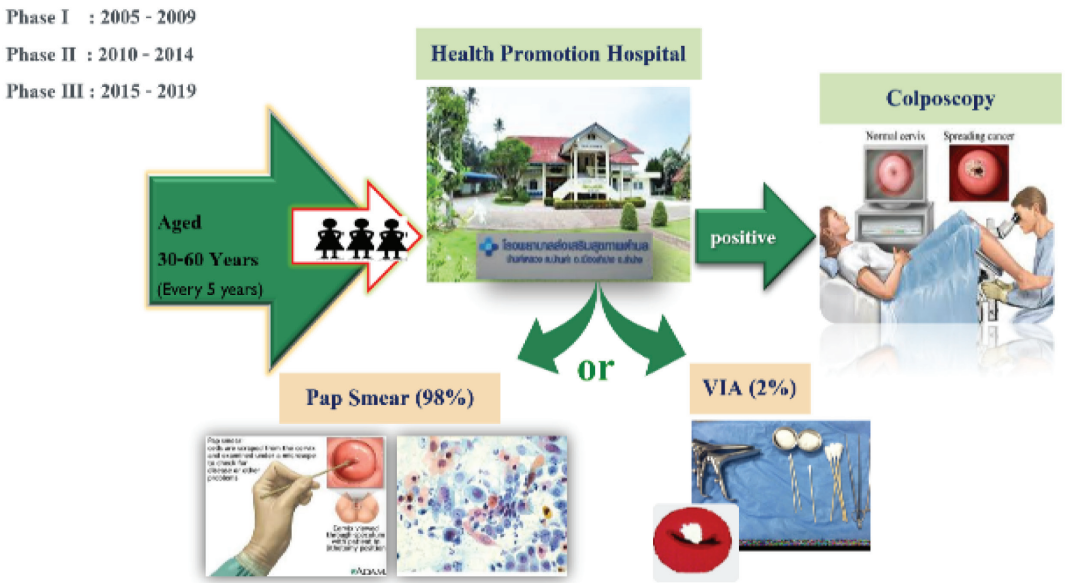
Since 2005, the national cervical cancer screening program has integrated Pap smears and Visual Inspection after Acetic Acid (VIA) and has been provided under the Universal Coverage Scheme to women aged 35–60 every five years. The program has been implemented in phases,

- **Phase I,** from 2005 to 2009, targeting 4 030 833 women and achieving a coverage rate of 77.5% *(23)*.
- **Phase II,** from 2010 to 2014, targeted 9 577 840 women and achieved a coverage rate of 54.99%. However, follow-up data was limited, with less than 10% of women returning for follow-up due to poor documentation.
- **Phase III,** from 2015 to 2019, sought to improve monitoring by linking screening and treatment to women's ID numbers.

Over the past two decades, the age-standardized cervical cancer rate in Thailand dropped from 24.7 to 11.1 per 100 000 women *(24)*. The decline in coverage observed in Phases II and III was likely due to the expanded number of targeted women.

The screening process involves cytology testing, including Pap smears or liquid-based cytology, conducted in primary care units or health promotion hospitals, while VIA is used in low-resource settings. Women with abnormal results are referred to secondary or tertiary hospitals, where colposcopy is performed by a gynecologic oncologist or trained gynecologist for further management.

Fig. 10. Cervical cancer screening program during the 3 phases of the National Cervical Cancer Screening Program

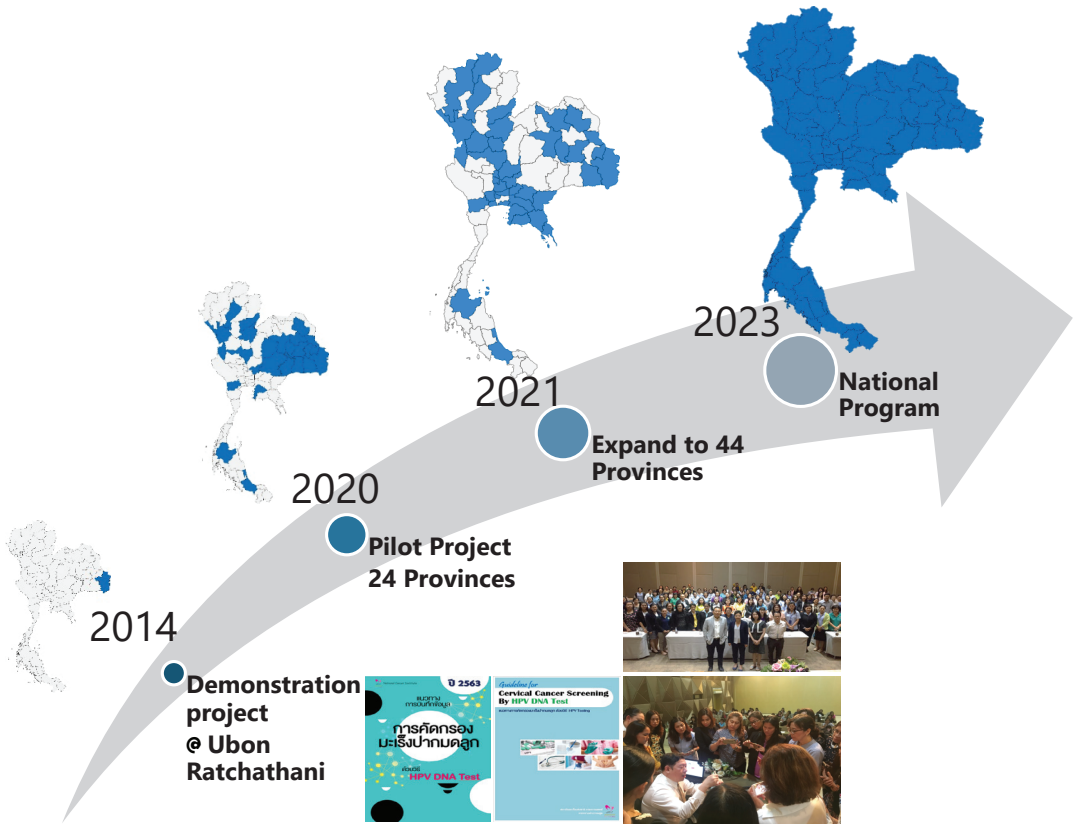


There has been a paradigm shift in cervical cancer screening methods in Thailand based on emerging evidence. **For decades, cytologic testing and VIA screening have been used as the primary methods for cervical cancer screening. However, their low sensitivity and the need for frequent testing have prompted the consideration of HPV testing as an alternative.** Studies have demonstrated the superior effectiveness of HPV testing over cytology *(25)*. In 2021, the WHO recommended HPV testing as the primary screening method for women starting at age 30, to be conducted every 5–10 years *(26)*.

Several studies in Thailand *(27–29)* have supported the effectiveness of HPV testing for cervical cancer screening in public health. Two population-based studies in Chiang Mai showed that HPV testing outperformed cytology in detecting precancerous lesions, with sensitivities of 100% for HPV testing compared to 65% for cytology *(28)*. A study in Ubon Ratchathani province (2014–2015) also indicated that Pap smear screening was less effective than primary HPV testing for identifying high-grade cervical neoplasia *(29)*.

In October 2020, Thailand launched the "Cervical Cancer Screening 2020" program, which implemented primary HPV screening with partial HPV 16/18 genotyping for women aged 30–60, to be conducted every five years. In 2022, the Ministry of Public Health announced a policy to replace cervical cytology with primary HPV testing by 2023. This decision was based on evidence supporting the effectiveness of HPV testing and a cost-effectiveness study in Thailand, which showed a saving of $ 1 523 011 and an additional 506 cases of high-grade cervical neoplasia detected through primary HPV testing *(30)*. The introduction of HPV testing for cervical cancer screening in Thailand over the years is shown in Fig. 11.

Fig. 11. Timeline of incorporating HPV test for cervical cancer screening in Thailand



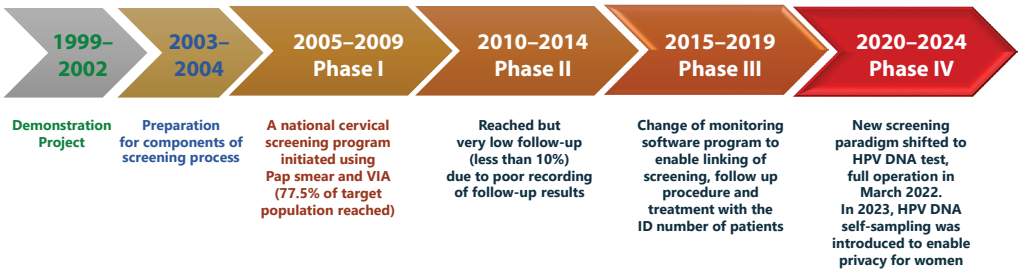
Currently, laboratories for HPV DNA tests and colposcopy clinics are available at all healthcare levels in Thailand. The number of provinces with available laboratories for HPV tests and colposcopy clinics are shown in Table 2.

Phase IV of the cervical screening program has been underway since 2020, targeting all **Thai women aged 30 to 60 years, as well as high-risk women aged 15 to 29**, for HPV DNA screening every five years. The screening is covered under all three health coverage schemes. The evolution of the cervical cancer screening program in Thailand is demonstrated in Fig. 12.

Table 2. Increasing number of provinces with available laboratories for HPV DNA test in Thailand over the years 2020 to 2024

Year	Number of provinces	Number of Lab centers (HPV DNA Test)
2020	24 Provinces	8
2021	44 Provinces	51
2022	71 Provinces	123
2023	77 provinces	178
2024	77 provinces	186

Fig. 12. The evolution of cervical cancer screening program in Thailand

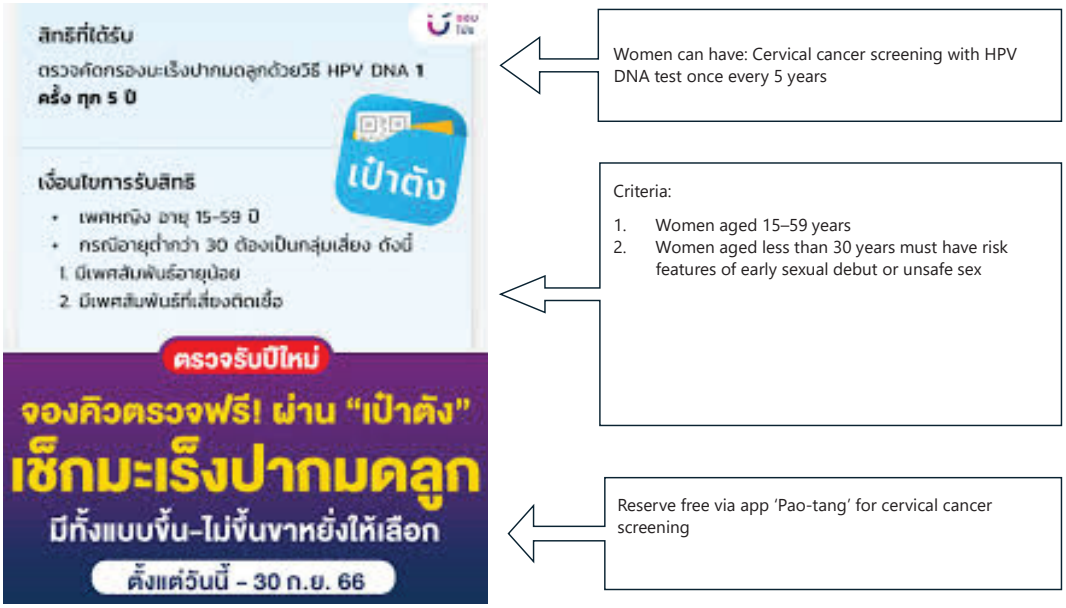


A significant challenge in achieving cervical screening targets in Thailand is the non-adherence of women to recommended programs, often due to the inconvenience or reluctance of accessing healthcare services. **Self-sampling for HPV testing offers a solution, as it has been shown to increase acceptability**, especially among women who face cultural or personal barriers, or live in areas with limited healthcare access.

Evidence indicates that self-sampling has comparable sensitivity and negative predictive value for detecting high-risk HPV and high-grade lesions when compared to physician sampling *(31)*. The WHO recommends self-sampling as a screening test to help reach the 70% screening target. Several studies in Thailand have also demonstrated the reliability and high acceptance rates of self-sampling among Thai women *(32–36)*.

Since late 2022, the cervical cancer screening program utilizing self-sampling has been implemented, with a pilot project for HPV DNA self-sampling launched in August 2023. Currently, the target women are solicited to have the screening by an appointment via a user-friendly mobile app 'Pao-tang' to register and get the self-sampling test kit at

Fig. 13. Thailand mobile application "Pao-tang" by the Department of Medical Science under the Ministry of Public Health provided appointments and the self-sampling test kits for HPV testing



pharmacies and community clinics in the vicinity of their house or postal mail to the targeted women (Fig. 13).

In summary, according to the National Screening Program for women aged 30–60 years, approximately 4 000 000 women had been screened in phase I and increased to approximately 5 000 000–6 000 000 women in phases II-III, and 7 600 000 women in phase IV.

As of October 2024, after completing phase IV of the national cervical screening, more than 679 000 women had been screened using the HPV self-sampling method *(37)*. The numbers and percentages of target women who had been screened in each phase by each method are shown in Table 3.

Table 3. Number of women who underwent different methods of cervical cancer screening in phase I to phase IV of the National Screening Program

Phase	Women aged 30–60 yr target (N)	Number of women who had screening by each method			Total	
		Pap smear	VIA	HPV test	N	%
Phase I 2005–2009	4 030 833	3 062 358	62 497	–	3 124 855	77.52
Phase II 2010–2014	9 577 840	5 164 751	101 683	–	5 266 434	54.99
Phase III 2015–2019	10 355 152	5 862 324	107 302	–	5 969 626	57.65
Phase IV 2020–2024	9 141 488	4 589 964	140 044	2 893 167	7 623 175	83.39

2.2.1 Highlights on the path to success

1. **Improved service availability**: The implementation of the national screening plan has enhanced primary healthcare services by making screenings free of charge and strengthening provincial and regional laboratory capacities. Screening has also been expanded to community, workplace, rehabilitation, and prison settings.

2. **Free self-sampling HPV tests**: Offering self-sampling HPV tests through the NHSO has improved acceptability among unscreened and under-screened women.

3. **Mobile screening and outreach programs:** Mobile screening units and outreach programs have been deployed to reach remote and underserved populations, including rural and migrant communities. To mark the 6th Anniversary of His Majesty the King's Birthday, the Kanjanabaramee Foundation, supported by EGAT and the Ministry of Energy, launched mobile gynecologic cancer screening units (Fig. 14) providing free breast and cervical cancer screenings across various regions in Thailand.

4. **Digital access and social media campaigns**: Social media campaigns have been used to encourage women to use self-sampling, while access to **cervical cancer screening** has been improved through apps like **Pao-tang** (Fig. 13).

5. **Educational resources for healthcare providers**: Resources such as books on HPV and cervical cancer, information on HPV-related diseases and vaccines (Fig. 15,16), and cervical cancer screening guidelines (Fig. 17) have been made available for healthcare professionals.

Fig. 14. Mobile unit with modern medical equipment for gynecologic cancer screening

Fig. 15. Soliciting media **inviting women for self-cervical cancer screening**

Fig. 16. Books about HPV medicine: nature, its relationship with cervical cancer, HPV-related diseases, cervical cancer screening and HPV vaccine

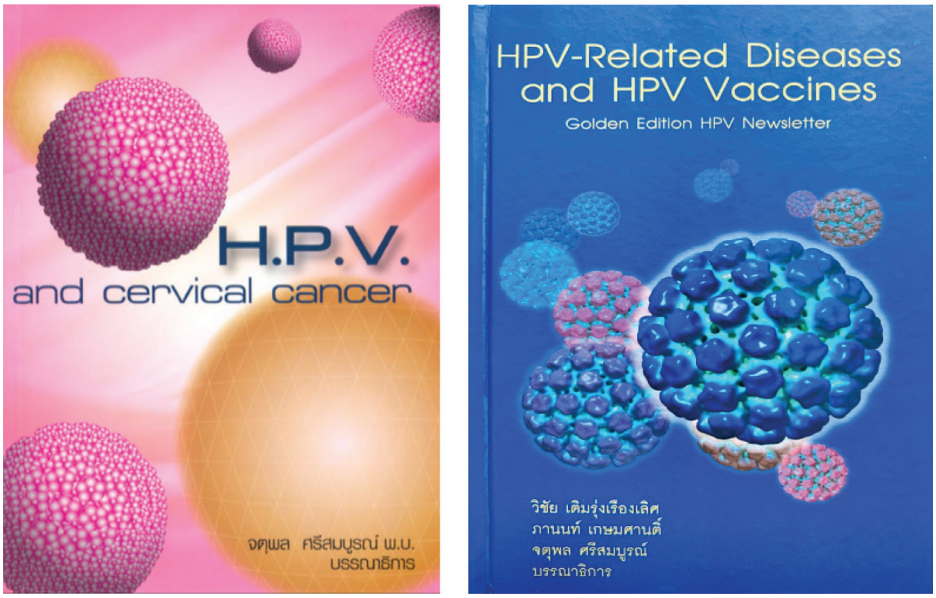


Fig. 17. Educational booklets of HPV testing for cervical cancer screening

2.2.2 Challenges in screening precancerous lesions

1. **Limited HPV screening accessibility**: Despite its higher sensitivity than Pap cytology, primary HPV screening remains inaccessible to many, particularly high-risk groups like migrants and underserved populations. Stronger promotion of self-collection is needed to improve coverage.

2. **Gaps in service provider's training**: Inconsistent training on HPV screening and self-collection limits participation, especially in rural areas. Ongoing education and support are essential to maintaining high screening coverage and ensuring providers follow best practices.

3. **Lack of integration into routine care**: Cervical cancer screening is not yet fully embedded in maternal and child health programs and other related primary healthcare, missing an opportunity to increase accessibility during regular health visits.

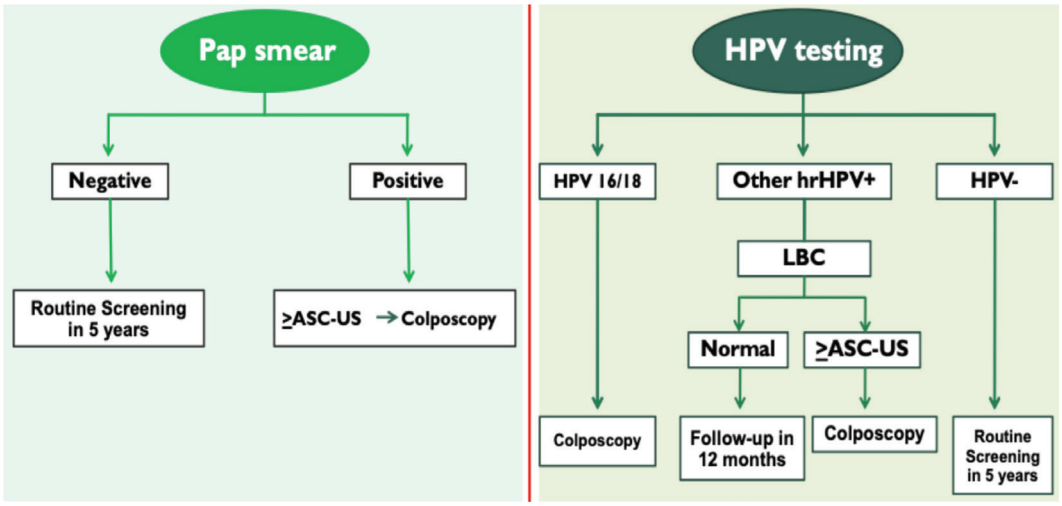
4. **Low adherence to screening schedules:** Many women do not follow recommended screening intervals, reducing overall participation and weakening the effectiveness of the screening program.

2.3 Tertiary prevention: cervical cancer treatment

The final essential step to eliminate cervical cancer is effectively managing women with abnormal screening results. Ensuring seamless care involves strategies for further evaluation and management of positive test results. This includes a comprehensive plan for administration and various established efforts. The Thai Gynecologic Cancer Society (TGCS), in collaboration with the Royal Thai College of Obstetricians and Gynecologists (RTCOG) and the National Cancer Institute (NCI), has reviewed evidence-based data and provided guidelines for investigating and managing abnormal screening tests, as well as pre-invasive and invasive cervical cancer.

Management of abnormal cervical cancer screening and pre-invasive cervical cancer – Management of women with abnormal cervical cancer screening results has evolved significantly over the years. Initially, the focus was primarily on further investigation of abnormal cytology or co-testing results. However, with the introduction of HPV testing as a primary screening method, the investigation and follow-up protocols have been updated. These protocols are now based on HPV type risk categories and subsequent cytologic findings, ensuring a more accurate and systematic approach to managing women at risk for cervical cancer (Fig. 18).

Fig. 18. Transition from Pap smear to HPV testing and management of abnormal testing results



In addition to the 'see and treat' approach using Visual Inspection with Acetic Acid (VIA) in limited-resource areas, the national policy aims for 70% of women aged 30 to 60 with HPV 16 or 18 positive results to receive colposcopy and biopsy.

For women with other high-risk HPV types, reflex cytology is offered as a triage method, or an alternative triage method of p16/Ki-67 dual staining is used. This dual staining method has been shown to have higher specificity and greater cost-effectiveness compared to cytology triage *(38)*. Women who show ≥ ASCUS from positive p16/Ki-67 dual staining are

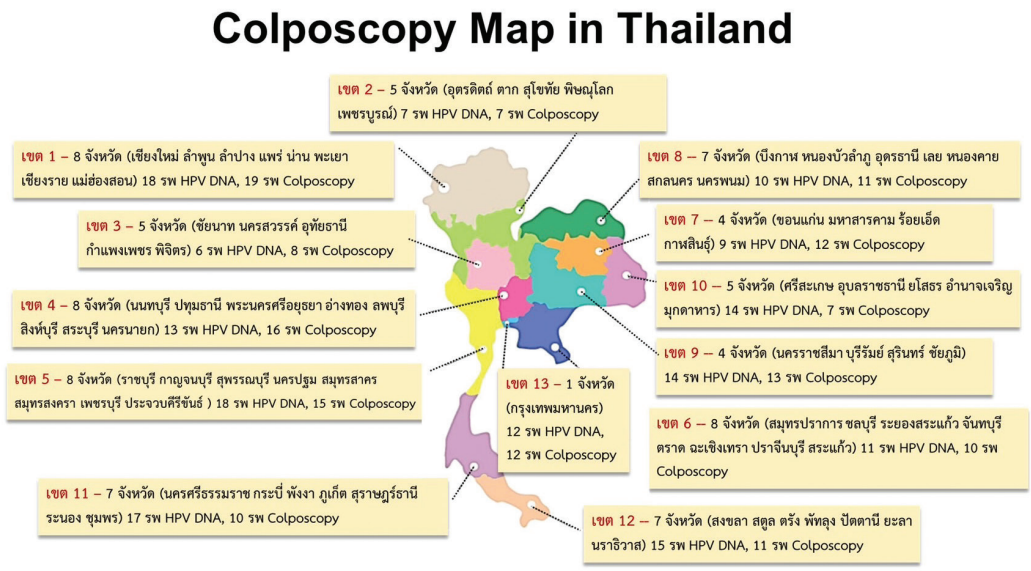
referred for colposcopy. If a biopsy reveals CIN2 or higher, women will undergo cervical ablation or conization via LEEP.

To ensure effective follow-up, nurses or paramedical personnel are tasked with reaching out to women for further investigations, particularly colposcopy, and management. Numerous hospitals across Thailand have established colposcopy units staffed by gynecologic oncologists or trained gynecologists. From 2020 to 2024, the number of provinces and colposcopy clinics has increased, with coverage expanding across all 13 geographical health regions (Fig. 19). Secondary and tertiary hospitals, as well as university hospitals, serve as referral centers for uncertain diagnoses or further management.

Table 4. Number of provinces with available colposcopy clinics in Thailand from 2020 to 2024

Year	Number of provinces	Number of colposcopy clinics
2020	24 Provinces	36
2021	44 Provinces	129
2022	71 Provinces	150
2023	77 provinces	150
2024	77 provinces	151

Fig. 19. Distribution of colposcopy clinics in all 13 geographical health regions of Thailand



The National Cancer Institute (NCI), in collaboration with the Thai Society of Colposcopes and Cervical Pathology (TSCCP), has implemented periodic basic and advanced colposcopy training courses for medical and paramedical professionals, including general practitioners, gynecologists, and nurses nationwide. This training also covers treatment for pre-invasive cancer.

For women diagnosed with invasive cervical cancer, timely and effective treatment is crucial for reducing disability, improving quality of life, and increasing survival. The goal of achieving 90% treatment coverage by 2030 underscores the need for accessible and affordable comprehensive cancer care. Accurate staging and appropriate treatment are key to successful outcomes. Referral to experienced physicians and well-equipped facilities is essential for women with suspected or confirmed cervical cancer. The recent national policy **"Cancer Anywhere" aims to facilitate early treatment by providing free cancer care under universal coverage schemes in specialized facilities across 192 hospitals nationwide**. This approach ensures that patients can access the nearest treatment facility, reducing referral times and waiting periods, while addressing co-morbidities and treatment complications.

In Thailand, women diagnosed with cervical cancer undergo comprehensive staging investigations. Treatment decisions are based on the disease stage, patient performance, preferences, and the physician's expertise. **The Ministry of Public Health has established timelines for management: surgery should occur within 4 weeks, and radiation and/or chemotherapy should begin within 6 weeks of diagnosis**. Management guidelines for invasive cancer generally align with international standards while considering the national context and health reimbursement policies (Fig. 20).

Fig. 20. Guidelines for prevention and treatment of cervical cancer by the health organizations in Thailand

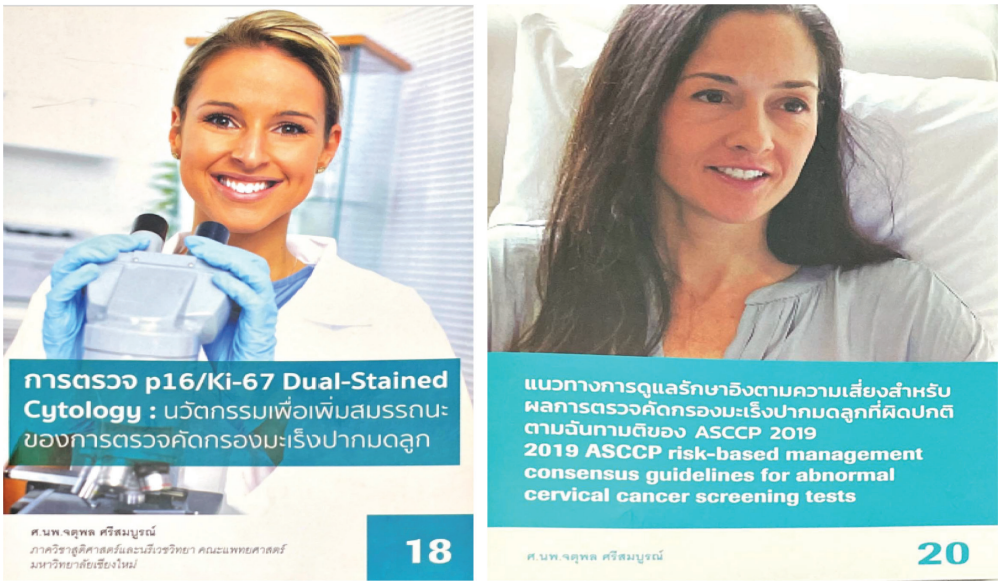
Palliative care, which includes pain management and support for treatment side effects, is integrated throughout the disease course, both during and after treatment. The latest 2024 guidelines by the Thai Gynecologic Cancer Society (TGCS) and the National Cancer Institute (NCI) for cervical cancer management include a section on palliative care. These

guidelines help medical practitioners provide appropriate support alongside cancer treatment, ensuring that patients receive comprehensive care that addresses their physical, emotional, and psychological needs throughout their cancer journey.

2.3.1 Highlights on the path to success

1. **Strengthen Referral Systems**: A well-established referral system aims to minimize delays in accessing care. Investment in healthcare infrastructure and workforce capacity is essential for managing women with abnormal screening results in a timely and effective manner. Ensuring access to comprehensive cancer care, including surgery, radiation therapy, chemotherapy, and palliative care services for all women. Regional cancer centers can help decentralize care and reduce the burden on provincial hospitals. Currently, over 400 registered gynecologic oncologists serve throughout Thailand.
2. **Education Materials for Healthcare Providers**: Materials have been developed for healthcare providers to enhance their understanding of managing abnormal cervical screening results (Fig. 21). These resources help ensure the quality and consistency of care across the country.

Fig. 21. Educational booklets for management of abnormal cervical cancer screening tests



2.3.2 Challenges of the cervical cancer treatment

1. **Delays in Investigations or Management**: Delays in investigations or management often stem from patients' misconceptions, such as myths about the potential risks of radiation or chemotherapy. Educating patients and healthcare providers is critical to reducing delays and ensuring timely treatment.

2. **Gap in Competency and Facilities in Palliative Care**: Palliative care should be integrated into the entire continuum of care for cervical cancer patients. Providing adequate training for healthcare providers in palliative care and ensuring access to pain relief and supportive services are essential for improving the quality of life for women with advanced cancer.

3. **Quality of Data for Monitoring**: The quality of data used for monitoring the cervical cancer screening and treatment process can be inconsistent. Improving data collection and analysis will be necessary to enhance program effectiveness, monitor progress, and identify areas for improvement.

3. Health system enablers and partnerships

High rates of HPV vaccination and cervical cancer screening are crucial indicators of effective preventive measures against cervical cancer. Overcoming social, economic, and cultural barriers that limit access to these vital services is essential. The role of public-private partnerships in combating cervical cancer highlights the importance of collaborative efforts to achieve its elimination.

3.1 Multisectoral collaboration

Several non-governmental organizations support the national policy to eliminate cervical cancer. For example, the Thai Gynecologic Cancer Society (TGCS) has been involved in fundraising as part of its corporate social responsibility initiatives (Fig. 9), aiming to provide consistent education and HPV vaccination to vulnerable populations, including adolescent girls in rehabilitation centers. They also offer comprehensive information on sexual and reproductive health and safe sexual practices, addressing topics such as the age of sexual debut, reducing the number of sexual partners, and promoting condom use to reduce the risk of HPV infection (Fig. 22).

Fig. 22. The corporate social responsibility project of the Thai Gynecologic Cancer Society donating HPV vaccine and education about cervical cancer prevention

Pharmaceutical participation in the campaign "No Delay in Cancer Prevention" (Fig. 8) featured real cervical cancer patients sharing their stories to promote HPV vaccination. The campaign utilized mass communication efforts, including messages on billboards and digital screens in BTS stations. A short video emphasized the importance of HPV vaccination, targeting mothers, working women, and the LGBTQ+ community. Outreach events were organized to educate and provide HPV vaccination and screening for employees, students, and vulnerable groups in shelters and prisons.

3.2 Advocacy and communication

Some potential barriers to HPV vaccination persist, including cultural and educational factors such as limited knowledge about HPV infection and cervical cancer, concerns about vaccine safety, and perceptions of low-risk sexual behaviors. Continual communication and social mobilization efforts are essential for promoting the benefits and safety of the HPV vaccine, as well as addressing misconceptions about the disease, its prevention, and treatment. This collaborative effort involves partnerships among the national government, non-government organizations, private sectors, communities, and pharmaceutical companies.

3.3 Strengthening health system enablers

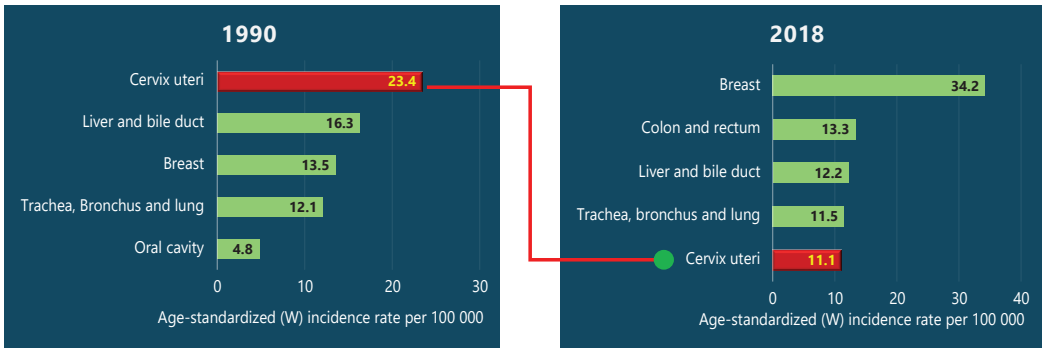
In 2021, the National Health Security Office (NHSO) launched the Cancer Anywhere program, allowing individuals under the Universal Coverage Scheme (which covers 72% of Thailand's population) to access cancer care in all 192 public hospitals across regional health borders. The CA program provides services such as diagnosis, cancer staging, surgery, chemotherapy, radiotherapy, treatment for complications, and follow-up care. Patients can receive medical care in nearby hospitals without delay. This initiative aims to reduce waiting times for diagnosis and treatment, minimize medical record errors, particularly from referrals, and improve outcomes through earlier-stage diagnosis.

4. Surveillance, monitoring and evaluation

The processes of surveillance, monitoring, and evaluation enable health authorities to track progress, identify gaps, and make data-driven decisions to improve program effectiveness in cervical cancer elimination.

- **Ensuring Program Effectiveness**: Regular monitoring of HPV vaccination, screening, and treatment with data collection and evaluation help Thailand to meet the targets and improve cervical cancer prevention.
- **Strengthening Cancer Registries**: Thailand's National Cancer Institute manages a population-based cancer registry, covering 35.3% of the population across 14 regions, officially published as *Cancer in Thailand*. It is also important to strengthen the hospital based cancer registries and to use the data to monitor treatment outcomes of cervical cancer patients (Fig. 23).
- **Enhancing Vital Registration**: Improving death certificate accuracy and completeness, especially in rural areas, strengthens Thailand's ability to track cervical cancer mortality effectively.
- **Strengthening data infrastructure and capacity** is crucial for effective surveillance and monitoring. This includes upgrading cancer registries, implementing electronic health records, and training healthcare workers in data management and analysis.
- **Regular reporting and feedback mechanisms** ensure accountability and continuous improvement. Annual reports on cervical cancer program performance and real-time feedback loops enable swift strategy adjustments.
- **International collaboration with IARC and WHO** enhances Thailand's surveillance and monitoring capacity by providing technical assistance, training, and resources to support national efforts.

Fig. 23. Cancer registry showing the trend of cervical cancer incidence in Thailand



Source: National Cancer Institute. Cancer in Thailand year 2018

Conclusion

Thailand has made significant progress in cervical cancer control and is on track to achieve the 90-70-90 targets by 2030, particularly through HPV vaccination and screening programs. The HPV vaccine has been included in the national immunization schedule since 2017 and is offered free of charge to girls aged 11–12. However, challenges remain in reaching 90% coverage, including issues with vaccine supply, logistical barriers, and regional disparities. Cervical cancer screening has transitioned from cytology to HPV-based methods since 2020, with self-collection options introduced in 2023 for women aged 30–60. The Cancer Anywhere program, launched in 2021, aims to provide timely cancer care. Nevertheless, challenges persist, especially in rural areas, where personal knowledge, attitudes, and socioeconomic factors continue to be barriers despite universal health coverage across public hospitals. Advanced-stage diagnoses are common among underserved populations. To improve outcomes, Thailand is focusing on population education, expanding oncology services, investing in workforce development, strengthening referral networks, and promoting the best clinical practices through standardized treatment protocols.

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