DOI:10.31557/APJCC.2026.11.6.903

RESEARCH ARTICLE

Cervical Cancer Screening Practices in a Private Tertiary Hospital in Thailand: Age-Based Alignment and Screening Modality Patterns

Wanchat Komon[1,2]*, Chote Luangchosiri[1]

[1]Phyathai 2 Hospital, Bangkok, Thailand. [2]Phramongkutklao Hospital, Bangkok, Thailand.

Abstract

Introduction: Cervical cancer screening is essential for reducing disease burden. This study aimed to evaluate age-based alignment with screening recommendations and describe screening modality patterns in a private tertiary hospital in Thailand. **Materials and Methods:** A retrospective cross-sectional analysis was conducted using electronic medical record data of cervical cancer testing encounters at a private tertiary hospital in Bangkok during January 2024. Screening encounters were assessed according to national age-based recommendations, and screening modalities were analyzed. **Results:** A total of 875 cervical cancer testing encounters were included. Overall, 93.0% of encounters occurred within the recommended age range of 25–65 years. Cytology-based screening predominated (82.3%), while primary HPV testing was rarely used (0.8%). Subgroup analysis restricted to asymptomatic women showed similar patterns, suggesting minimal impact of symptomatic encounters on the main findings. **Conclusion:** Cervical cancer screening practices in this private tertiary hospital were largely aligned with age-based recommendations, with cytology remaining the predominant modality. These findings provide baseline evidence prior to the transition toward HPV-based screening strategies.

Keywords: Cervical cancer screening, Pap smear, Human papillomavirus testing, Thailand, Cancer prevention

Asian Pac J Cancer Care, **11 (6)**, 903-908 Submission Date: 07/15/2026 Acceptance Date: 09/16/2026

Introduction

Cervical cancer remains one of the leading causes of cancer-related morbidity and mortality among women worldwide, particularly in low- and middle-income countries [1, 2]. Despite the availability of effective preventive strategies, substantial gaps in screening coverage and implementation continue to contribute to preventable disease burden [3, 4]. In Thailand, cervical cancer remains a major public health concern and is among the leading causes of cancer-related death in women [5, 6], highlighting the importance of effective and guideline-concordant screening programs [7].

Multiple cervical cancer screening modalities including cytology-based screening (Pap smear), high-risk human papillomavirus (hrHPV) testing, and co-testing have been shown to reduce the incidence of invasive cervical cancer and disease-related mortality [8]. Evidence from population-based screening programs and systematic reviews consistently demonstrates that participation in organized screening programs substantially reduces cervical cancer incidence and mortality at the population level [7, 9]. Consequently, international guidelines increasingly recommend HPV-based screening strategies as the preferred approach while allowing flexibility in screening modalities depending on healthcare system capacity, resource availability, and local implementation context [6, 10].

In Thailand, national cervical cancer screening recommendations are issued by the Royal Thai College of Obstetricians and Gynaecologists (RTCOG). The RTCOG 2021 clinical practice guideline recommends initiation of cervical cancer screening at age 25 years, with cytology-based screening, HPV testing, and co-testing considered acceptable screening modalities for women aged 30–65 years [11]. These recommendations remained

Corresponding Author:
Dr. Wanchat Komon
Phyathai 2 Hospital, Bangkok, Thailand; Phramongkutklao Hospital, Bangkok, Thailand.
Email: wanchat_kom@phyathai.com

in effect throughout 2024, prior to the release of updated national guidance in 2025 that places greater emphasis on HPV-based screening strategies [12].

Private tertiary hospitals play an increasingly important role in healthcare delivery in Thailand, particularly in preventive health services [13]. Screening practices in private healthcare settings may be influenced by factors distinct from those in the public sector, including patient preferences, provider familiarity with specific screening modalities, availability of laboratory infrastructure, and reimbursement structures [14]. However, real-world evidence describing cervical cancer screening practices in private healthcare settings in Thailand remains limited [15].

In addition, interpretation of screening practices should consider the broader literature on screening intensity and implementation context. Over-screening may lead to unnecessary follow-up procedures, increased psychological burden, and higher healthcare costs without proportional clinical benefit [16]. At the same time, HPV-based screening strategies have been increasingly recognized as effective and cost-effective approaches in low- and middle-income settings [17]. However, their implementation may be influenced by health-system capacity, affordability, and provider practices, particularly in opportunistic screening environments and mixed public-private healthcare systems [18].

Therefore, this study aimed to assess age-based alignment with screening recommendations of cervical cancer screening practices and describe screening modality patterns in a private tertiary hospital in Thailand using routinely collected clinical data. The findings provide baseline evidence on real-world screening practices prior to the implementation of updated national recommendations emphasizing HPV-primary screening.

Materials and Methods

This study was a retrospective cross-sectional analysis using routinely collected electronic medical record (EMR) data from a private tertiary hospital in Bangkok, Thailand. The hospital provides comprehensive gynecologic services and serves a diverse patient population, including both Thai nationals and international patients. The study aimed to evaluate real-world cervical cancer screening practices in an opportunistic clinical screening environment within the private healthcare sector.

All cervical cancer screening encounters recorded at the gynecology outpatient clinic between 1 January and 31 January 2024 were included in the analysis. Screening encounters were identified through EMR documentation of cervical cancer screening procedures. No encounters were excluded due to missing information on age or screening modality because these variables were completely documented for all cases. A total of 875 screening encounters were included in the final dataset.

January 2024 was selected to capture routine clinical practice during the final full year of implementation of the cervical cancer screening recommendations issued by the Royal Thai College of Obstetricians and Gynaecologists (RTCOG) in 2021, prior to the release of updated national guidance in 2025 that places greater emphasis on HPV-primary screening strategies.

Data were extracted from the hospital EMR system using a standardized data extraction protocol. The dataset included patient age at screening, nationality, residence status, patient type (new or returning), payment method, physician type, reason for visit (asymptomatic screening or symptomatic presentation), and cervical cancer screening modality. All data were de-identified prior to analysis to ensure patient confidentiality. The dataset included cervical cancer testing encounters from both asymptomatic women undergoing routine screening and women presenting with symptoms. In routine clinical practice, cervical testing may be performed in both contexts, particularly in opportunistic screening settings. Each screening encounter was treated as an independent observation. Due to the structure of the dataset, repeated encounters from the same patient could not be identified and excluded. No additional exclusion criteria were applied due to the limitations of routinely collected data. Information on prior cervical cancer diagnosis, hysterectomy status, and specific clinical indications for testing was not consistently available.

Age-based alignment with screening recommendations was defined according to the RTCOG 2021 clinical practice guideline, which recommends cervical cancer screening for women aged 25–65 years. Screening encounters were categorized as either within the recommended age range (25–65 years) or outside the recommended age range (<25 years or >65 years).

Due to the retrospective nature of the study and limitations of routinely collected electronic medical record data, information on prior screening history, hysterectomy status, immunocompromised conditions, HPV vaccination status, and other individual risk factors was not consistently available. Therefore, screening assessment was operationalized based on age as a proxy for alignment with national recommendations.

Descriptive statistics were used to summarize patient characteristics and cervical cancer screening practices. Continuous variables were presented as mean and standard deviation, while categorical variables were summarized as frequencies and percentages. The primary outcome was the proportion of screening encounters performed within and outside the recommended age range. Screening modality patterns were also described. Additional subgroup and comparative analyses were performed to assess the potential impact of symptomatic presentations.

All statistical analyses were performed using R statistical software (version 4.5.2).

The study protocol was approved by the Institutional Review Board of the Phyathai-Paolo Hospital Group (Approval No. 019-2568). The requirement for informed consent was waived due to the retrospective design and the use of de-identified routinely collected clinical data.

Results

A total of 875 cervical cancer screening encounters were included in the analysis. The mean age of screened women was 44.9 ± 11.5 years. The majority of women were within the age group of 30–65 years (88.0%), while 5.0% were aged 25–29 years. Screening among women younger than 25 years accounted for 1.5%, whereas 5.5% occurred among women older than 65 years.

Most participants were Thai nationals (83.7%), while 16.3% were international patients. Nearly half of the patients resided in Bangkok (49.3%), followed by those from other provinces (35.4%) and international residents (15.3%).

Regarding healthcare utilization, most screening encounters involved returning patients (88.7%), whereas 11.3% were new patients. Payment methods varied, with 42.9% of encounters being self-paid, followed by corporate contracts (27.5%), insurance coverage (14.5%), and international patient programs (15.1%). Most screenings were performed by full-time staff physicians (68.0%), while 32.0% were conducted by part-time physicians. The majority of visits were for asymptomatic screening (72.5%), while 27.5% of women presented with symptoms (Table 1). A substantial proportion of encounters involved symptomatic presentations (27.5%, 95% CI: 24.5–30.5%), indicating that not all cervical testing in this dataset represents routine screening.

Table 1. Demographic and Clinical Characteristics of Women Undergoing Cervical Cancer Screening (n = 875).

Demographic characteristic	
Age, mean ± SD (years)	44.9 ± 11.5
Age group, n (%)	
<25	13 (1.5)
25-29	44 (5.0)
30-65	770 (88.0)
>65	48 (5.5)
Nationality, n (%)	
Thai	732 (83.7)
International	143 (16.3)
Residence status, n (%)	
Bangkok	431 (49.3)
Other provinces	310 (35.4)
International patients	134 (15.3)
Healthcare utilization	
Patient type, n (%)	
New patient	99 (11.3)
Returning	776 (88.7)
Payment method, n (%)	
Self-pay	375 (42.9)
Corporate contract	241 (27.5)
Insurance	127 (14.5)
International patients	132 (15.1)
Provider characteristics	
Physician type, n (%)	
Full-time staff	595 (68.0)
Part-time staff	280 (32.0)
Clinical presentation	
Reason for visit, n (%)	
Asymptomatic screening	634 (72.5)
Symptomatic presentation	241 (27.5)

Table 2. Distribution of Cervical Cancer Screening Modalities.

Screening modality	n (%)
Cytology-based screening	720 (82.3)
Conventional Pap smear	32 (3.7)
Liquid-based Pap test	688 (78.6)
HPV testing alone	7 (0.8)
Co-testing	148 (16.9)

Table 3. Age-Based Alignment with Cervical Cancer Screening Recommendations According to RTCOG 2021.

Age-based alignment with screening recommendations	n (%)
Within recommended age range	814 (93.0)
Outside recommended age range	61 (7.0)

Cytology-based screening was the most frequently used modality, accounting for 82.3% of all screening encounters. Among these, liquid-based cytology represented the vast majority (78.6%), while conventional Pap smear accounted for only 3.7%. Co-testing with cytology and HPV testing was performed in 16.9% of cases. Primary HPV testing alone was rarely used, representing only 0.8% of screening encounters (Table 2).

Overall, 93.0% (95% CI: 91.3–94.7%) of cervical cancer testing encounters were performed within the recommended age range of 25–65 years. Screening outside the recommended age range accounted for 7.0% (95% CI: 5.3–8.7%) of encounters (Table 3).

In the subgroup analysis restricted to asymptomatic women (n = 634), 586 encounters (92.4%) were within the recommended age range of 25–65 years. Cytology-based screening remained the predominant modality, accounting for 83.9% of asymptomatic encounters, while primary HPV testing alone remained uncommon (0.9%). Compared with asymptomatic encounters, symptomatic encounters showed a similar age-based alignment pattern, with 94.6% occurring within the recommended age range. Co-testing was numerically more common among symptomatic encounters than asymptomatic encounters (21.6% vs 15.1%), although this analysis was exploratory (Table 4).

Discussion

This study provides real-world evidence on cervical cancer screening practices in a private tertiary hospital in Thailand during the period preceding the national

Table 4. Cervical Cancer Testing Characteristics Stratified by Clinical Presentation (Asymptomatic vs Symptomatic).

Characteristic	Overall (n=875)	Asymptomatic screening (n = 634)	Symptomatic screening (n = 241)	p-value
Age, mean ± SD, years	44.9 ± 11.5	45.3 ± 11.7	43.8 ± 11.1	0.411
Age-based alignment, n (%)				0.327
Within recommended age range, 25–65 years	814 (93.0)	586 (92.4)	228 (94.6)	
Outside recommended age range	61 (7.0)	48 (7.6)	13 (5.4)	
Screening modality, n (%)				0.050
Cytology-based screening	720 (82.3)	532 (83.9)	188 (78.0)	
HPV testing alone	7 (0.8)	6 (0.9)	1 (0.4)	
Co-testing	148 (16.9)	96 (15.1)	52 (21.6)	

P-values compare asymptomatic screening and symptomatic presentation groups. Age was compared using the independent t-test. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. This analysis was exploratory and intended to assess the potential impact of symptomatic presentations on the main descriptive findings.

transition toward HPV-based screening strategies [1- 3, 15]. Understanding how screening recommendations are implemented in routine clinical practice is essential for evaluating cervical cancer prevention efforts [6].

More than 90% of screening encounters occurred within the recommended age range of 25–65 years, suggesting overall alignment with national age-based recommendations. Appropriate age targeting is an important component of effective screening, as screening outside recommended age groups may reduce efficiency without substantial clinical benefit.

A small proportion of encounters occurred outside the recommended age range, particularly among women older than 65 years. Similar patterns have been observed in opportunistic screening settings, where decisions may be influenced by patient concerns, clinician discretion, or uncertainty regarding prior screening history [19]. Importantly, screening beyond age 65 may still be clinically justified in selected cases, and age-based classification should be interpreted as reflecting general alignment rather than definitive appropriateness.

Cytology-based screening remained the predominant modality, accounting for more than 80% of encounters, while primary HPV testing was rarely used. This likely reflects the transitional phase of screening policy implementation in Thailand, where adoption of HPV-based strategies requires changes in infrastructure, clinical workflows, and reimbursement systems [20- 22].

In routine clinical practice, both asymptomatic screening and symptom-driven diagnostic testing may coexist, particularly in opportunistic settings. In this study, a substantial proportion of encounters involved symptomatic women, which may influence interpretation. However, in additional analyses stratified by clinical presentation (Table 4), the subgroup analysis restricted to asymptomatic women showed patterns consistent with the overall findings, suggesting that inclusion of symptomatic encounters did not substantially alter the main conclusions. Co-testing was numerically more frequent among symptomatic encounters, although this analysis was exploratory.

Private healthcare facilities play an important role in preventive services in Thailand, particularly in urban populations accessing screening through employer-sponsored programs, insurance, or self-payment. Real-world evidence from this sector is therefore important for understanding implementation across healthcare contexts [23].

This study has several limitations. It was conducted in a single private tertiary hospital and may not be generalizable. The one-month study period represents a snapshot of clinical activity and may not capture temporal variation. Inclusion of symptomatic encounters reflects real-world practice but limits distinction between screening and diagnostic testing. Repeated encounters from the same patient could not be identified, and the use of age alone does not fully capture clinical appropriateness [19].

Despite these limitations, this study provides baseline evidence on cervical cancer screening practices in the private healthcare sector in Thailand. These findings may inform monitoring of updated screening policies and the transition toward HPV-based strategies in similar settings [20, 21].

In conclusion, cervical cancer screening practices in this private tertiary hospital were largely aligned with national age-based screening recommendations, with cytology-based screening remaining the predominant modality, and these findings should be interpreted within the context of routine clinical practice and the limitations of the study design.

Declarations

Funding

Financial support for the publication and presentation of this study was provided by the Center of Private Research and Innovation Accelerator (CPRIA), Phyathai Hospital Group and Paolo Hospital Group.

Clinical trial registration

Not applicable

Conflicts of interest/Competing interests

The authors declare that they have no conflicts of interest.

Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Code availability

Not applicable.

Authors' contributions

Wanchat Komon contributed to the conception, study design, data analysis, and drafting of the manuscript.

Chote Luangchosiri contributed to data collection and manuscript revision.

All authors approved the final version of the manuscript.

Ethics approval

This study was approved by the Institutional Review Board of the Phyathai-Paolo Hospital Group (Approval No. 019-2568).

Consent to participate

Not applicable.

Consent for publication

Not applicable.

Originality Declaration for Figures

All figures included in this manuscript are original and have been created by the authors specifically for the purposes of this study.

Acknowledgments

The authors would like to thank the clinical staff of Phyathai2 Hospital for their support in data collection and patient care. We also extend our gratitude to the Center of Private Research and Innovation Accelerator (CPRIA), Phyathai Hospital Group and Paolo Hospital Group, for their support.

Declaration on generative AI and AI-assisted technologies in the writing process

No generative AI tools were used in the writing of this manuscript.

References

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians. 2024 05;74(3):229-263. https://doi.org/10.3322/caac.21834
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: A Cancer Journal for Clinicians. 2021 05;71(3):209-249. https://doi.org/10.3322/caac.21660
3. Arbyn M, Weiderpass E, Bruni L, De Sanjosé S, Saraiya M, Ferlay J, Bray F. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. The Lancet Global Health. 2020 02;8(2):e191-e203. https://doi.org/10.1016/S2214-109X(19)30482-6
4. Munizar M, Ar Royan H, Yolanda F. Barriers to Cervical Cancer Screening through Pap Smear Examination among Women Attending the Gynecology Polyclinic at Dr. Zainoel Abidin General Hospital in 2024: A Cross-Sectional Study. Asian Pacific Journal of Cancer Prevention. 2025 09 01;26(9):3309-3317. https://doi.org/10.31557/APJCP.2025.26.9.3309
5. International Agency for Research on Cancer. Thailand fact sheet: GLOBOCAN 2022 [Internet]. Geneva: World Health Organization; 2024 [cited 2026 Mar 9]. Available from: https://gco.iarc.who.int/media/globocan/factsheets/populations/764-thailand-fact-sheet.pdf..
6. World Health Organization. WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention [Internet]. 2nd ed. Geneva: World Health Organization; 2021 [cited 2026 Mar 9]. Available from: https://www.who.int/publications/i/item/9789290221074..
7. Jansen EE, Zielonke N, Gini A, Anttila A, Segnan N, Vokó Z, Ivanuš U, et al. Effect of organised cervical cancer screening on cervical cancer mortality in Europe: a systematic review. European Journal of Cancer. 2020 03;127:207-223. https://doi.org/10.1016/j.ejca.2019.12.013
8. Curry SJ, Krist AH, Owens DK, Barry MJ, Caughey AB, Davidson KW, Doubeni CA, et al. Screening for Cervical Cancer: US Preventive Services Task Force Recommendation Statement. JAMA. 2018 08 21;320(7):674. https://doi.org/10.1001/jama.2018.10897
9. Peirson L, Fitzpatrick-Lewis D, Ciliska D, Warren R. Screening for cervical cancer: a systematic review and meta-analysis. Systematic Reviews. 2013 Dec;2(1):35. https://doi.org/10.1186/2046-4053-2-35
10. Fontham ETH, Wolf AMD, Church TR, Etzioni R, Flowers CR, Herzig A, Guerra CE, et al. Cervical cancer screening for individuals at average risk: 2020 guideline update from the American Cancer Society. CA: A Cancer Journal for Clinicians. 2020 09;70(5):321-346. https://doi.org/10.3322/caac.21628
11. Srisomboon J, Rattanasrithong P, editors. Clinical Practice Guidelines for Prevention, Screening, and Treatment of Cervical Cancer [Internet]. Bangkok: National Cancer Institute, Department of Medical Services, Ministry of Public Health; 2021 [cited 2026 Apr 25]. Available from: https://www.nci.go.th
12. Royal Thai College of Obstetricians and Gynaecologists. Clinical Practice Guidelines for Cervical Cancer Screening [Internet]. Bangkok: Royal Thai College of Obstetricians and Gynaecologists; 2021 [cited 2026 Apr 25]. Available from: https://www.rtcog.or.th
13. Tangcharoensathien V, Witthayapipopsakul W, Panichkriangkrai W, Patcharanarumol W, Mills A. Health systems development in Thailand: a solid platform for successful implementation of universal health coverage. The Lancet. 2018 03 24;391(10126):1205-1223. https://doi.org/10.1016/S0140-6736(18)30198-3
14. Ploysawang P, Rojanamatin J, Prapakorn S, Jamsri P, Pangmuang P, Seeda K, Sangrajrang S. National Cervical Cancer Screening in Thailand. Asian Pacific Journal of Cancer Prevention. 2021 01 01;22(1):25-30. https://doi.org/10.31557/APJCP.2021.22.1.25
15. Chua B, Ma V, Asjes C, Lim A, Mohseni M, Wee HL. Barriers to and Facilitators of Cervical Cancer Screening among Women in Southeast Asia: A Systematic Review.

International Journal of Environmental Research and Public Health. 2021 04 26;18(9):4586. https://doi.org/10.3390/ijerph18094586
16. Habbema D, Weinmann S, Arbyn M, Kamineni A, Williams AE, M.C.M. De Kok I, Van Kemenade F, et al. Harms of cervical cancer screening in the United States and the Netherlands. International Journal of Cancer. 2017 03;140(5):1215-1222. https://doi.org/10.1002/ijc.30524
17. Simms KT, Keane A, Nguyen DTN, Caruana M, Hall MT, Lui G, Gauvreau C, et al. Benefits, harms and cost-effectiveness of cervical screening, triage and treatment strategies for women in the general population. Nature Medicine. 2023 Dec;29(12):3050-3058. https://doi.org/10.1038/s41591-023-02600-4
18. Devarapalli P, Labani S, Nagarjuna N, Panchal P, Asthana S. Barriers affecting uptake of cervical cancer screening in low and middle income countries: A systematic review. Indian Journal of Cancer. 2018;55(4):318. https://doi.org/10.4103/ijc.IJC_253_18
19. Dillner J, Rebolj M, Birembaut P, Petry K, Szarewski A, Munk C, De Sanjose S, et al. Long term predictive values of cytology and human papillomavirus testing in cervical cancer screening: joint European cohort study. BMJ. 2008 Oct 13;337(oct13 1):a1754-a1754. https://doi.org/10.1136/bmj.a1754
20. Clifford GM, Smith JS, Plummer M, Muñoz N, Franceschi S. Human papillomavirus types in invasive cervical cancer worldwide: a meta-analysis. British Journal of Cancer. 2003 01;88(1):63-73. https://doi.org/10.1038/sj.bjc.6600688
21. Schiffman M, Wentzensen N, Wacholder S, Kinney W, Gage JC, Castle PE. Human Papillomavirus Testing in the Prevention of Cervical Cancer. JNCI: Journal of the National Cancer Institute. 2011 03 02;103(5):368-383. https://doi.org/10.1093/jnci/djq562
22. Arbyn M, Ronco G, Anttila A, Meijer CJ, Poljak M, Ogilvie G, Koliopoulos G, et al. Evidence Regarding Human Papillomavirus Testing in Secondary Prevention of Cervical Cancer. Vaccine. 2012 Nov;30:F88-F99. https://doi.org/10.1016/j.vaccine.2012.06.095
23. Global strategy to accelerate the elimination of cervical cancer as a public health problem [Internet]. Who.int. World Health Organization; 2020 [cited 2026 Apr 25]. Available from: https://www.who.int/publications/i/item/9789240014107.



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.