

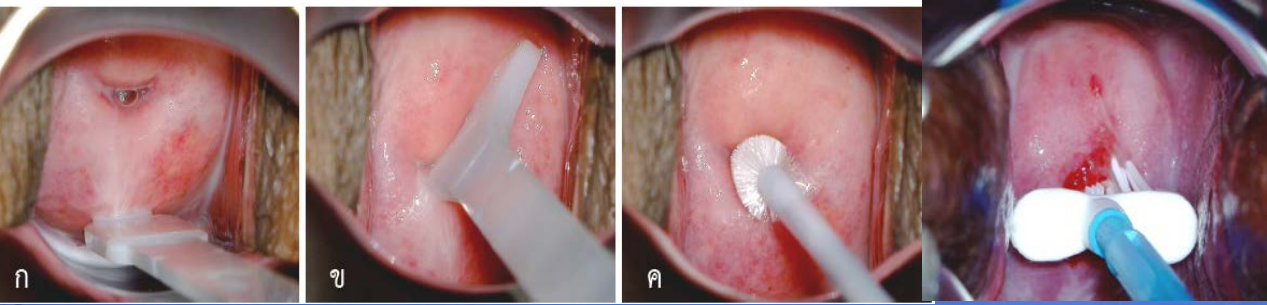
Genotyping Specific high-risk HPV Testing in Cervical Cancer Screening: Clinical Impact and Practice Implications

Theme: Virus across Life' Journey: Old, New and Unforeseen
November 18, 2025 (11:00-11:20 AM)

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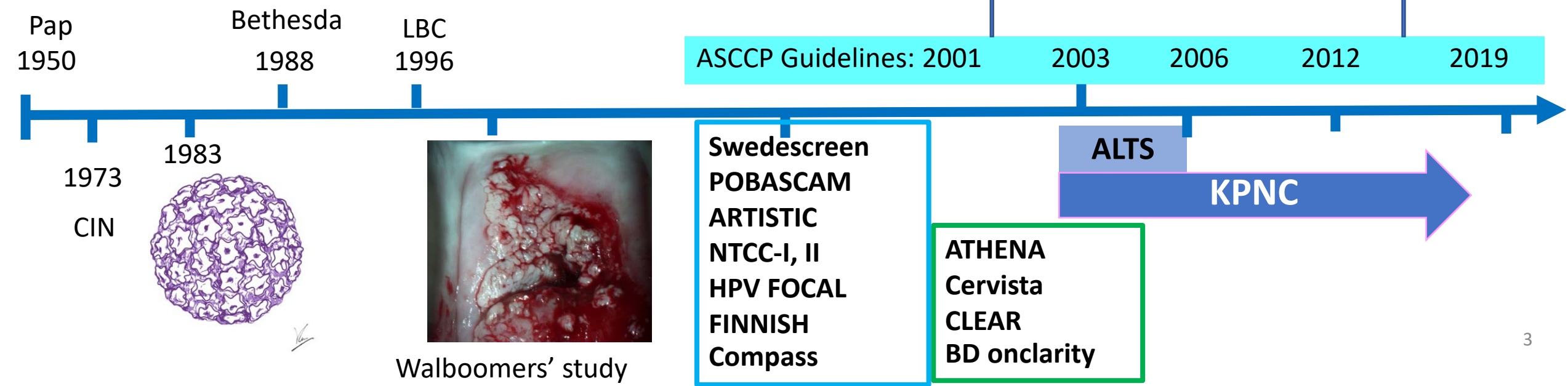


No conflict of interests



Reflex hrHPV test
Cotesting

Primary hrHPV testing



Guidelines	Cytology	hrHPV testing	Cessation	Post hysterectomy
USPSTF & AAFP 2018 *very small benefit of adding cytology	≥21 years q 3 years	≥30 years q 5 years primary hr-HPV testing*	65 years with normal optimal screening in 10 yrs and the most recent within 5 yrs	CIN2+ ≥20 years Benign cause: discontinue
ACS, ASCCP, ASCP 2019	≥21 years q 3 years (≥30 yr, cytol)	Co-testing ≥30 years q 5 years primary hr-HPV testing	65 years with normal optimal screening in 10 yrs and the most recent within 5 yrs should not resume for any reason	CIN2+ ≥20 years Benign cause: discontinue
ACS 2020 ASCCP 2021 endorsement	≥25 years q 3 years HIV+ q 1 yr	≥25 years primary hr-HPV testing/ co-testing q 5 years	65 years with normal optimal screening in 10 yrs and the most recent within 3-5 yrs	CIN2+ ≥25 years Benign cause: discontinue
European 2018	20-35 yrs q 3 years	≥35 years q 5 years primary hr-HPV testing*	Stop at age 60-65 and insufficiency data to optimal age to stop	CIN2+ ≥20 years Benign cause: discontinue
WHO July 2021 Dec 2021 2022	≥30 yrs q 3 yrs or VIA, 30-50 yr HIV, ≥25 yrs q 3 yrs	≥30 yrs q 5-10 yrs primary hr-HPV testing* HIV, ≥25 yrs q 3-5 yrs	50 years with 2 consecutive negative both general & HIV The most important thing is to get screened regularly, no matter which test you get	No comment

HIV women	Start on Age	Methods		Stop
ASCCP 2019	21 within 1 st yr of sexual debut	21-29 yrs Cytology q 6-12 mo If 3 consecutive neg→ q 3 yr	≥30 yrs Co-testing q 3 yr Cytology q 1 yr If 3 consecutive neg→ q 3 yr	No cessation
WHO 2021-2022	25	hrHPV DNA q 5 yr (both physician or self-collected) Cytology q 3 yr VIA q 3 yr		50 yrs and 2 consecutive neg
ACS 2020	More frequent, as CDC			
NYSDOH AI 2017-2022	21 Or After have sex ≥2 yrs	21-29 yrs Cytology q 1 yr, if neg→ q 3 yr	≥30 yrs Co-testing q 3 yr Cyto q 1 yr, if neg→ q 3 yr ≥35 yrs consider anal cytolo	No cessation Even posthysterec.
Robbins HA AIDS 2017	Not mention	Co-testing q 2-3 yr Cytology q 1 yr if 3 consecutive neg→ q 2-3 yr		-

แนวทางเวชปฏิบัติของราชวิทยาลัยสูตินรีแพทย์แห่งประเทศไทย

เรื่อง การตรวจคัดกรองมะเร็งทางนรีเวช

RTCOG Clinical Practice Guideline

เรื่อง Gynecologic Cancer Screening



เอกสารหมายเลข

GY 68 - 038

จัดทำโดย

คณะกรรมการมะเร็งวิทยานรีเวช พ.ศ. 2568 - 2570

คณะกรรมการมาตรฐานวิชาชีพ พ.ศ. 2568 - 2570

วันที่อนุมัติต้นฉบับ

15 สิงหาคม พ.ศ. 2568

	การตรวจหาเชื้อเอชพีวีกลุ่มความเสี่ยงสูง (High-risk HPV Testing)		การตรวจเซลล์วิทยา (Conventional หรือ Liquid-Based Cytology)
	ตรวจหาเชื้อเอชพีวี กลุ่มความเสี่ยงสูง (แนะนำมากกว่า)	ตรวจหาเชื้อเอชพีวีกลุ่มความเสี่ยงสูง ร่วมกับการตรวจเซลล์วิทยา (Co-testing)	
อายุที่เริ่มตรวจ	25 ปี	25 ปี	25 ปี
ความถี่	ทุก 5 ปี	ทุก 5 ปี	ทุก 2 ปี
อายุที่หยุดตรวจ	>65 ปี ถ้าผลการ ตรวจปกติ ติดต่อกัน 2 ครั้ง	>65 ปี ถ้าผลการตรวจปกติ ติดต่อกัน 2 ครั้ง	>65 ปี ถ้าผลการตรวจ ปกติ ติดต่อกัน 5 ครั้ง

- สตรีที่อายุน้อยกว่า 25 ปี ไม่แนะนำให้ตรวจคัดกรอง ยกเว้นในสตรีที่มีความเสี่ยงสูง เช่น ติดเชื้อเอชไอวี มีคู่นอนหลายคน เป็นหูดหงอนไก่หรือเป็นโรคติดเชื้อทางเพศสัมพันธ์ เป็นต้น
- สตรีที่ตัดมดลูกพร้อมกับปากมดลูกออกแล้วและไม่มีประวัติ CIN 2-3 หรือ AIS หรือมะเร็งปากมดลูก ไม่จำเป็นต้องตรวจคัดกรอง
- การเก็บส่งตรวจด้วยตัวเอง (self-collected) เพื่อตรวจหาเชื้อเอชพีวีกลุ่มความเสี่ยงสูงสามารถใช้ตรวจคัดกรองได้ในกรณีที่ไม่สามารถมาตรวจคัดกรองกับบุคลากรทางสาธารณสุข

หมายเหตุ: ในสถานพยาบาลที่การดำเนินการตรวจคัดกรองโดยเซลล์วิทยาหรือตรวจหาเชื้อเอชพีวีกลุ่มความเสี่ยงสูงไม่สามารถเชื่อมโยงกับการรักษาได้อย่างมีประสิทธิภาพ และ/หรือมีความครอบคลุมต่ำกว่าเป้าหมาย การตรวจคัดกรองทุก 5 ปี โดยวิธี VIA และรักษาโดยวิธีจี้เย็นเป็นอีกทางเลือกหนึ่งของการตรวจคัดกรองมะเร็งปากมดลูกในสตรีช่วงอายุ 30 - 45 ปี

FDA-approved HPV testing platforms

Test	HC II®	Cervista®	Cobas®	Aptima®	Onclarity®
Manufacturer	Qiagen PreservCyt	Hologic PreservCyt	Roche ThinPrep	Hologic PreservCyt	Becton Dickinson SurePath
For primary testing	N/A	N/A	2014	N/A	2018
For co-testing and reflex HPV testing	2003 2000	2009	2011	2011	2018
Method	DNA (non-PCR based) Signal amplification: full genome probe	DNA (non-PCR based) Signal amplification: L1, E6, and E7 genes	DNA (PCR based); Target amplification: L1 gene target	mRNA (PCR based); Target amplification: E6/E7 gene target	DNA (PCR based); Target amplification: E6/E7 gene target
Genotypes detected	16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68	16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68	16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68	16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68	16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68
Clinical trial	ALTS, 2006 CAP	Cervista HPV HR	ATHENA	CLEAR trial	Onclarity trial
Sen./Spec.	63.6-100%/6.2-98.4%	92.8-100%/-	71.1-99%/24-86.2%	55.3-100%/28.8-99.2%	85.7-100%/17-98.8%
	"No Genotyping"	"Limited/Partial Genotyping"			"Extended Genotyping"

Studies	Populations	Tests	hrHPV, N (% of screened)	CIN2+, n (% of pos hrhPV)
POBASCAM Bulkmans WJ et al Int J Cancer 2005	44102 30-60 yrs Netherlands	Cotesting PCR GP5+/6+	2154 (4.9%) Most 16, 33 Single 81%	233 (10.8%) Sig increase risk HPV 16, 33
NTCC2 Rossi PG et al JNCI 2021	40509 25-64 yrs Italy	hrHPV DNA and cyto triage	3147 (7.8%)	174 (5.5%)
Onclarity trial Stoler MH et al Gynecol Oncol 2023	33858 US	BD Onclarity®	2978 (8.8%)	352 (11.2%) NNT 7-11
ATHENA Monsonago J et al Gynecol Oncol 2015	40901 ≥25 yrs US & Canada	Linear array HPV genotyping/Roche® and cyto	4220 (10.3%) Single 86.6%	378 (8.9%)
Cenci M et al In vivo 2023	30445 30-64 yrs Italy	Anyplex II®	4244 (13.9%) Most 16, 31, 68, 52, 58	Not report

4.9-13.9%

5.5-10.8%

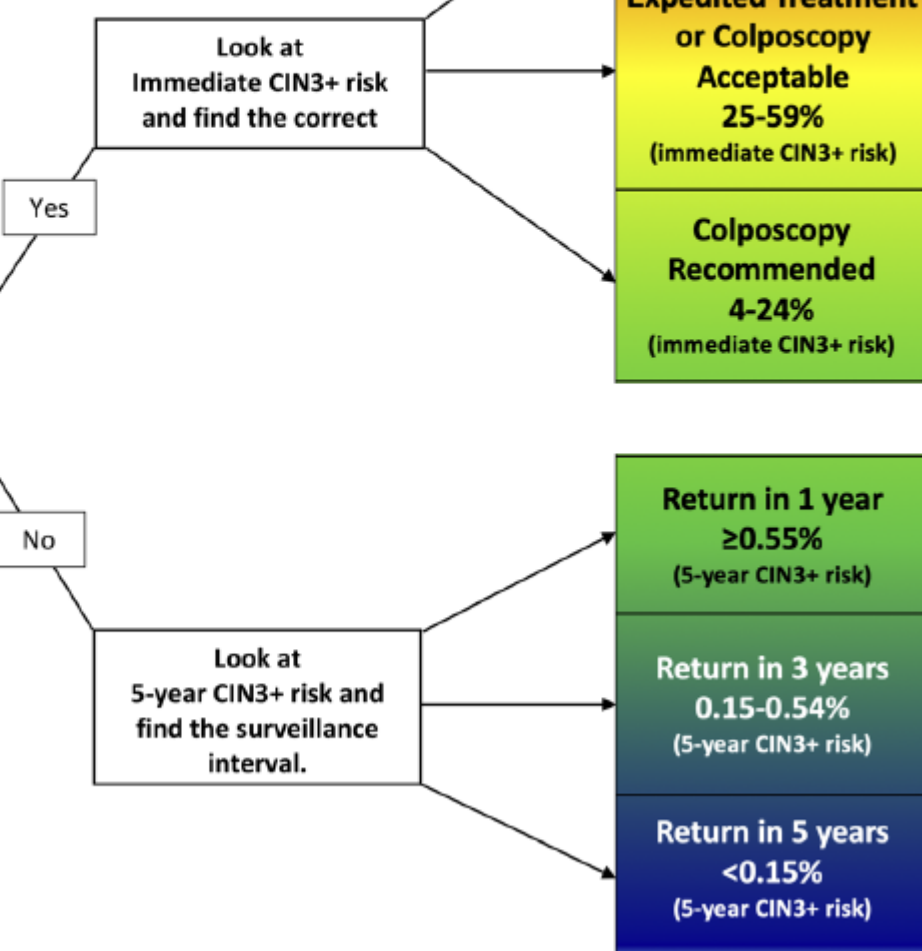
POBASCAM, Population Based Screening Study Amsterdam;
NTCC2, New Technologies for Cervical Cancer Screening 2;
ATHENA, Addressing the Need for Advanced HPV Diagnostics

Studies	Populations	Tests	hrHPV, N (% of screened)	CIN2+, n (% of pos hrhPV)
Song F et al BMC Cancer 2022	73699 30-64 yrs China	Self-collected Cobas® or HC2® →PCR	2811 (7.6%) Most 16, 52, 18, 58, 51 Single 73.1%	440 (15.6%) HPV 16, 27.5% HPV 33, 26%
Xie H et al Clin Chem Lab Med 2023	8000 20-45 yrs China	Cobas® and Cyto PCR	761 (9.5%) Most 52, 16, 51, 68, 18	83 (10.9%) Sig increase risk HPV 16, 52, 33, 58, 18
Li X et al JNCCN 2022	8370 ≥21 yrs China	Cotesting Bioperfectus®	1062 (12.7%) Most 52, 56, 16, 58	109 (10.2%)
Xu HH et al BMJ Open 2017	37967 15-90 yrs China	GP5+/bioGP6+- PCR/MPG assay by Luminex 200	4278 (14.1%) Most 52, 16, 58	Not report
SPOCCS Dun C et al Cancer Med 2024	16982 17-69 yrs China	HC2→ PCR	2703 (15.3%)	117 (4.3%)

7.6-15.3%

4.3-15.6%

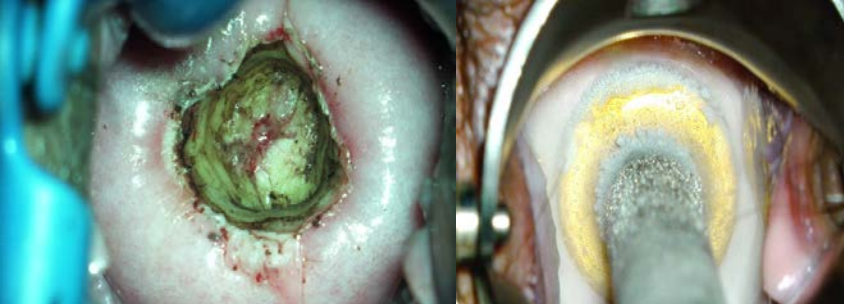
SPOCCS, Shanxi Province Cervical Cancer Screening Study



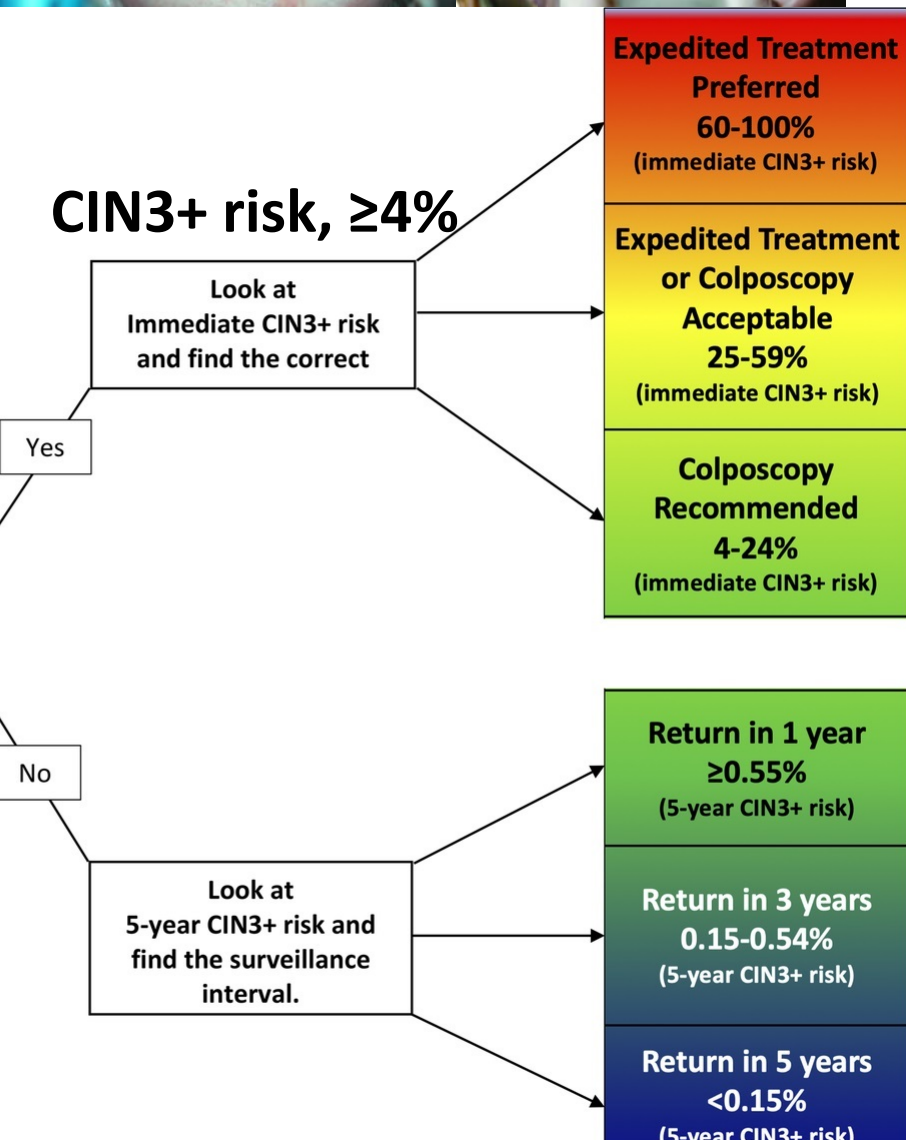
Imm. CIN3+ risk, <4%

Screening Results	Immediate CIN3+ (%)	5-yr risk CIN3+ (%)
Positive hr-HPV, NILM	2.1	4.8
negative hr-HPV, LSIL	1.1	2.0
	Immediate CIN3+ (%)	5-yr risk CIN3+ (%)
negative hr-HPV, ASC-US	0.04	0.4
NILM	N/A	0.33-0.52
	Immediate CIN3+ (%)	5-yr risk CIN3+ (%)
negative primary hr-HPV test	0.01	0.14
negative cotesting	0.00	0.12

All



CIN3+ risk, $\geq 4\%$



Expedited Treatment	Immediate CIN3+ (%)
HPV 16, HSIL	60
hrHPV-positive, HSIL	64

CDB vs Exp Rx	Immediate CIN3+ (%)
hrHPV-neg, HSIL	25
hrHPV-positive, AGC	26
hrHPV-positive, ASC-H	26

Colposcopy Recommended	Immediate CIN3+ (%)
Repeated hrHPV-positive, NILM 	4.0
hrHPV-positive, ASC-US 	4.5
hrHPV-positive, LSIL	4.3
HPV 16, NILM	5.3
* HPV 18, NILM	3.0
* hrHPV-neg, ASC-H	3.4
* After 2 consecutive unsatisfactory screening test	n/a



Screening Results	Management	neg hr-HPV	neg hr-HPV, ASC-US	neg hr-HPV, LSIL	Positive hr-HPV, NILM
neg hr-HPV, NILM	5 years return	5 years	5 years	3 years	1 year
neg hr-HPV	5 years return	5 years	N/A	N/A	N/A
neg hr-HPV, ASC-US	3 years return	3 years	1 year	1 year	1 year
NILM	3 years return	N/A	N/A	N/A	N/A
neg hr-HPV, LSIL	1 year return	1 year	1 year	1 year	1 year
Positive hr-HPV, NILM	1 year return	1 year	1 year	1 year	Colposcopy
Positive hr-HPV, ASC-US	Colposcopy	1 year	1 year	Colposcopy	Colposcopy
Positive hr-HPV, LSIL	Colposcopy	1 year	1 year	Colposcopy	Colposcopy
HPV 16, NILM	Colposcopy	Colposcopy	Colposcopy	Colposcopy	Colposcopy
HPV 18, NILM	Colposcopy	Colposcopy	Colposcopy	Colposcopy	Colposcopy
Repeated positive hr-HPV, NILM	Colposcopy	N/A	N/A	N/A	N/A
neg hr-HPV, ASC-H	Colposcopy	Colposcopy	Colposcopy	Colposcopy	Colposcopy
neg hr-HPV, AGC	Colposcopy	Colposcopy	Colposcopy	Colposcopy	Colposcopy
Positive hr-HPV, ASC-H	Colposcopy/Treatment	Colposcopy	Colposcopy	Colposcopy	Colposcopy/Treatment
Positive hr-HPV, AGC	Colposcopy/Treatment	Colposcopy	Colposcopy	Colposcopy	Colposcopy/Treatment
neg hr-HPV, HSIL	Colposcopy/Treatment	Colposcopy	Colposcopy	Colposcopy	Treatment
Positive hr-HPV, HSIL	Treatment	Treatment	Treatment	Treatment	Treatment
HPV 16, HSIL	Treatment	Treatment	Treatment	Treatment	Treatment

IMPACT : Improving Primary screening And Colposcopy Triage trial

Magkana K et al. Dual stain. Anti Cancer Res 2022

KPNC

Improving Risk Informed HPV Screening study (IRIS)

Studying Risk and Improving DisparitiES of Cervical Cancer in Mississippi (STRIDES)

History	HPV	DS	N	CIN3+ Imm risk	CIN3+ 3-yr cum risk	Management
Not considered	+ pos	+ pos	3384 vs 768	9.5 vs 11.5	12.3	Colposcopy
	+ pos	- neg	3458 vs 1113	0.75 vs 0.7	1.5	1-yr return
neg HPV	+ pos	+ pos	710	4.9	7.9	Colposcopy
	+ pos	- neg	991	0.16	1.2	1-yr return
Partial genotyping	16	+ pos	681 vs 178	23 vs 24.2	29.4	Colposcopy
	16	- neg	325 vs 110	2.6 vs 1.8	5	Colposcopy
	18	+ pos	200 vs 72	11.3 vs 5.6	15.2	Colposcopy
	18	- neg	137 vs 84	1.1 vs 0	2.4	Colposcopy
	Other 12	+ pos	2503 vs 518	5.6 vs 7.9	7.6	Colposcopy
	Other 12	- neg	2996 vs 919	0.53 vs 0.5	1.1	1-yr return
Cotesting results of hrHPV & ≤LSIL	+ / NILM	+ pos	1003 vs 332	4.6	8.6	Colposcopy
	+ / NILM	- neg	1864 vs 929	0.6	1.5	1-yr return
	+ / ASCUS	+ pos	978 vs 145	6.6 vs 7.5	9.9	Colposcopy
	+ / ASCUS	- neg	954 vs 95	0.87 vs 1.1	1.6	1-yr return
	+ / LSIL	+ pos	942 vs 150	4.1 vs 8	5.9	Colposcopy
	+ / LSIL	- neg	595 vs 68	0.53 vs 0	0.92	1-yr return



Recommendations for Use of p16/Ki67 Dual Stain for Management of Individuals Testing Positive for Human Papillomavirus

Megan A. Clarke, PhD, MHS,¹ Nicolas Wentzensen, MD, PhD,¹ Rebecca B. Perkins, MD,² Francisco Garcia, MD, MPH,³ Deborah Arrindell,⁴ David Chelmow, MD,⁵ Li C. Cheung, PhD,¹ Teresa M. Darragh, MD,⁶ Didem Egemen, PhD,¹ Richard Guido, MD,⁷ Warner Huh, MD,⁸ Alexander Locke, MD,⁹ Thomas S. Lorey, MD,¹⁰ Ritu Nayar, MD,¹¹ Carolann Risley, PhD,^{1,12} Debbie Saslow, PhD,¹³ Robert A. Smith, PhD,¹⁴ Elizabeth R. Unger, MD, PhD,¹⁵ L. Stewart Massad, MD,¹⁶ and for the Enduring Consensus Cervical Cancer Screening and Management Guidelines Committee



Figure 2. Carcinogenic Human Papillomavirus Types

Carcinogenic human papillomavirus (HPV) type	Proportion of cervical cancers, %	9-Year risk of progression of incident HPV infection to cervical intraepithelial neoplasia grade 3 or worse (CIN3+)	HPV species	Risk group
16	60.3	6.3	Alpha-9	Highest
18	10.5	3.0	Alpha-7	High
45	6.1	2.2	Alpha-7	High
33	3.7	4.5	Alpha-9	Medium
31	3.6	2.2	Alpha-9	Medium
52	2.7	2.2	Alpha-9	Medium
58	2.2	1.9	Alpha-9	Medium
35	2.0	2.8	Alpha-9	Medium
39	1.6	1.1	Alpha-7	Lower
51	1.2	1.1	Alpha-5	Lower
59	1.1	0.9	Alpha-7	Lower
56	0.9	0.8	Alpha-6	Lower
68	0.6	1.0	Alpha-7	Lower

BD Onclarity

HPV 16

HPV 18

HPV 45

HPV 33/ 58

HPV 31

HPV 52

HPV 35/ 39/ 68

HPV 51

HPV 56/ 59/ 66

BD Onclarity	CIN3+ risk (%) ^{IRIS}	CIN3+ risk (%) ^{STRIDES}	
HPV 16	16.8	22.2	Colpo Imm
HPV 18	8.2	3.8	
HPV 45	2.7	0	
HPV 33/ 58	5.5	8.1	Triage DS or Cytology
HPV 31	6.3	6.4	
HPV 52	4.7	3.3	
HPV 35/ 39/ 68	1.7	5.9	
HPV 51	1.5	6.3	1yr Repeat
HPV 56/ 59/ 66	0.8	0.7	



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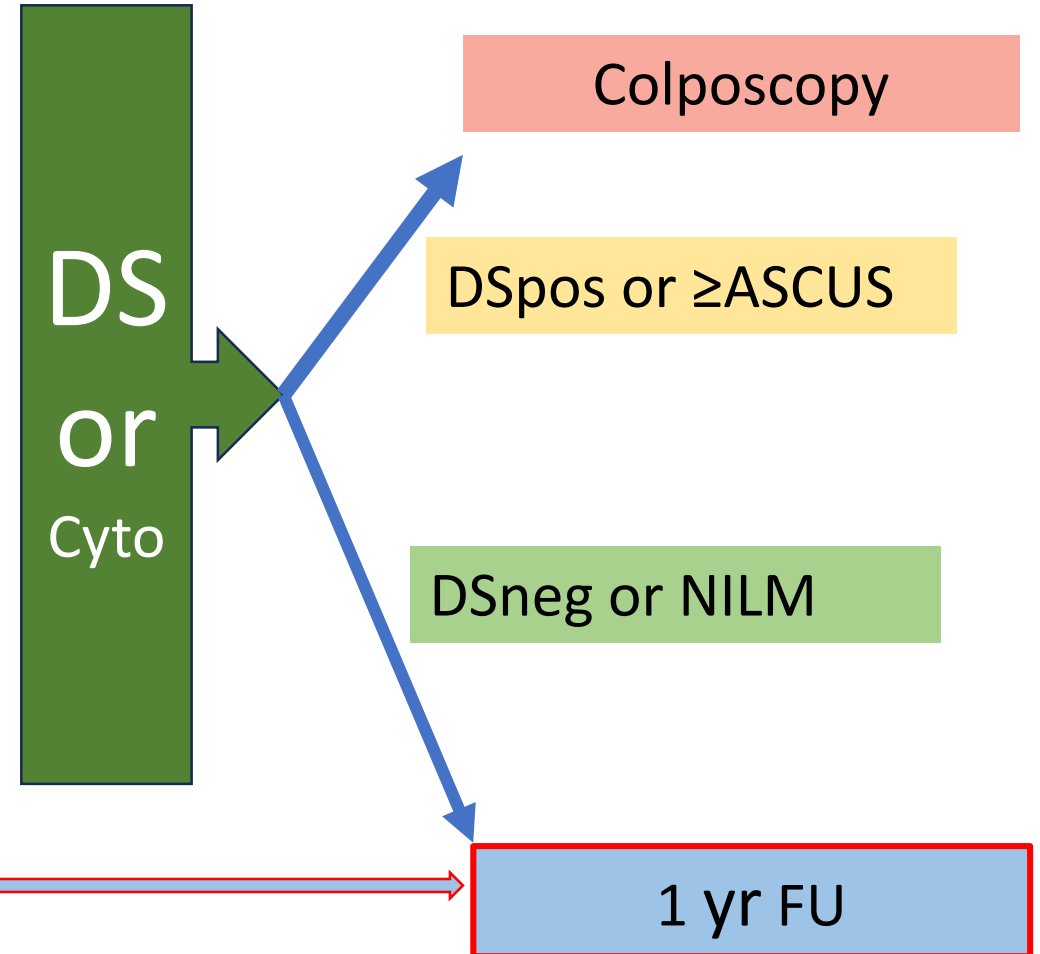
Positive hrHPV

Positive hrHPV non 16/18

45, 31, 33/58, 51, 52/35/39/68

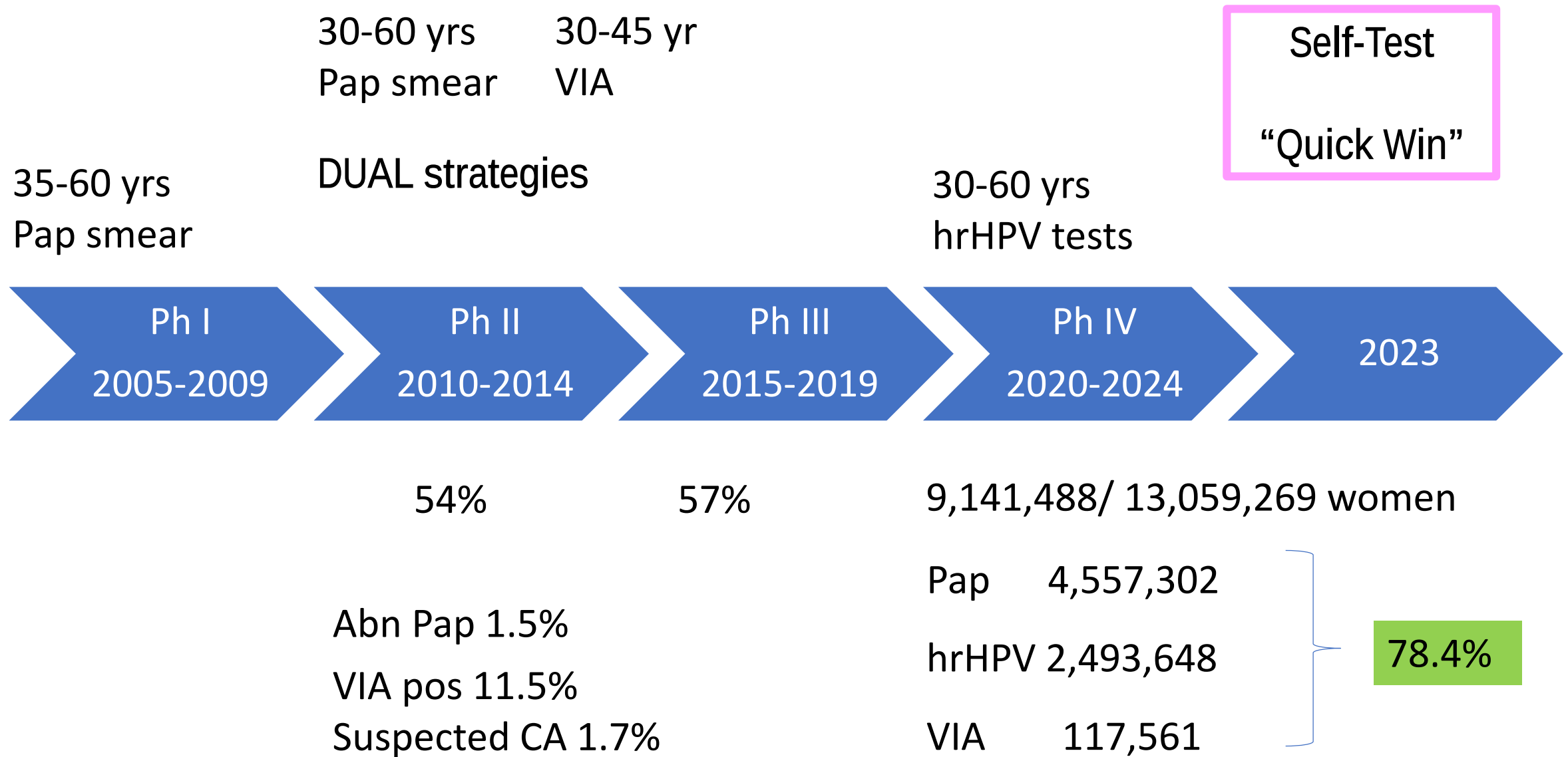
56, 59, 66 +/- NILM /ASCUS/ LSIL

Positive hrHPV & NILM /ASCUS/ LSIL



*** Served BD Onclarity ***

Approved Assays	Gene targeted	Internal control	Separated Genotypes
HC2	L1	No	13 hrHPV
Cervista	L1/E6/E7	Human histone 2	16, 18, other 12 hrHPV
Cobas	L1	β-globin	16, 18, other 12 hrHPV
Abbott Realtime hrHPV test	L1	β-globin	16, 18, other 12 hrHPV
HybriBio	E region	β-globin	16, 18, other 12 hrHPV
Amplifire HPV screening	L1/E6/E7	β-globin	16, 18, other 13 hrHPV including 53
HPV-risk Assay	E7	β-globin	16, 18, other 13 hrHPV including 67
Alinity m HR	L1/E6/E7	β-globin	16/ 18/ 45/ 31 33 52 58/ 35 39 51 56 59 66 68
Xpert HPV	E6/E7	Hydroxymethylbilane synthase	16/ 18 45/ 31 33 52 58/ 51 59/ 39 56 66 68
BD Onclarity	E6/E7	β-globin	16/ 18/ 45/ 31/ 51/ 52/ 33 58/ 39 58/ 56 59 66
Anyplex II	L1	β-globin	Separated identification of 14 hrHPV
MALDI-TOF	L1	β-globin	Separated identification of 14 hrHPV
PapilloCheck	E1	ADAT1	Separated identification of 14 hrHPV
SeqHPV	L1	β-globin	Separated identification of 14 hrHPV
LMNX Genotyping	L1	Human DNA on chr 14	Separated identification of 14 hrHPV
Bioperfectus	L1	β-globin	Separated identification of 14 hrHPV & 26, 53, 73, 82



MOPH

Studies	Participants	Tests	Pos. hr-HPV (%)	Pos hr-HPV in each Cytologies (%)	Remarks
Kantathavorn N Infect Agent Cancer 2015	5,906 20-70 yrs 2011-12	Cotesting/ Genotyping	6.4 HPV52, 21&26% HPV 16, 21% HPV58, 12% HPV51, 12&21%	NILM 5.1 ASCUS 31.2 LSIL 45.5 ASCH 86.4 HSIL 90	Abn cytology, 4.9% pos.hr-HPV in abn.cyto, 31.2% No pathology report
Phoolcharoen N Gyn Oncol Report 2017	1,523 20-70 yrs 2013	Cotesting/ Genotyping Any abn→CDB	5.6	NILM 4.1 ASCUS 24.3 LSIL 46.7 ASCH 100 HSIL 100 SCCA 100 AGC-FN 0	167 NILM & pos. hr-HPV, HSIL+, 7.2% NO cancer case Pos. hr-HPV had abn cyto 30.2% HSIL+ had hrHPV 100%; Type 16, 42.3%; non 16/18, 30.8% and Type 18, 7.7%
Tangjitgmol S APJCP 2016	4,442 25-65 yrs 2014	Cotesting/ Cobas®	6.7 HPV 16, 21.7% HPV 52, 16.3% HPV 58, 12.9% HPV 18/51, 10.5%	NILM 5.4 ASCUS 12.9 LSIL 39.5 ASCH 30.8 HSIL 56.3 SCCA 100 AGC-NOS 40 AGC-FN 20 AIS 100	Abn cytology, 6.3% pos.hr-HPV in abn.cyto, 25.4% Pos. hr-HPV had abn cyto 24.1% No pathology report

Studies	Participants	Tests	Pos. hr-HPV (%)	Pos hr-HPV in each Cytologies (%)	Remarks
Laowahutanont P APJCP 2014	2,897 20-55 yrs 2011 Cancer centers	Cotesting/ Cervista®	9.3 HPV 16, 12% HPV 18, 12% Other HPV, 56%	NILM 6.7 ASCUS 46.7 LSIL 54.8 HSIL 80	54 NILM, pos hr-HPV, HSIL+ 12.9% (HPV 16/18, 12.5% vs non 16/18 , 15.6%) Pos. hr-HPV had abn cyto 31.9% (HPV16/18, 64% vs non., 30.8%)
Paengchit K APJCP 2014	2,000 30-70 yrs 2012-2013	Cotesting	5.4	NILM 4.2 ASCUS/LSIL 60 ≥HSIL 89.5	No pathology report
Paengchit K APJCP 2014	4,583		4.2 HPV 52 , 18% HPV 16, 15% HPV 58, 14% HPV33/51, 11% HPV 18, 6%		169 NILM, pos hr-HPV, HSIL+ 11.2% (HPV 16/18 , 15.6% vs non 16/18, 9.7%)
Siriaungkgul S APJCP 2014	2,752 30-60 yrs 2011 Chiangmai	Cotesting/HC2 FU cyto q 6 mo, HPV q 12 mo	8.4	NILM 4.2 ASCUS 47.6 LSIL 93.3 ≥ASCH 100	Baseline: 109 underwent CDB Neg hr-HPV & ASCUS/LSIL, no HSIL+ Pos hr-HPV & ASCUS/LSIL, HSIL+23.1% ≥ASCH, HSIL+ 95.5% Pos. hr-HPV had abn cyto 42.9% FU period, pos.HC2→HSIL+ 9.8% Abn.cyto→ HSIL+ 23%, all pos.HC2

Authors	Number	Pos. hr-HPV N, (%)	CIN2+ (%)	Remark
Khunamornpong S APJCP 2014 HC2 , Colpo. Unit 2010-2014	121 ASCUS	48 (41)	9 (7.4)	1SCCA, 1ADA
	117 LSIL	89 (74.8)	16 (13.7)	Neg hr-HPV, NPV 100%
Siriraj Hospital Prospective 2016-2018 Anyplex II®	376 ASCUS	242 (64.4) HPV 16, 64 (17) HPV 52, 51 (13.6) HPV 58, 44 (11.7) HPV 51, 28 (7.4) HPV 18 39 68, 21 (5.6)	55 (14) Pos hrHPV, 50 (20.7) neg hrHPV, 5 (3.7)	1 SCCA with Pos HPV 18
	318 LSIL	188 (59.1) HPV 66, 59 (18.6) HPV 51, 31 (9.7) HPV 58, 30 (9.4) HPV 16, 29 (9.1) HPV 56, 26 (8.2) HPV 52, 25 (7.9) HPV 18, 15 (4.7)	23 (7.2) Pos hrHPV, 18 (9.3) neg hrHPV, 5 (4)	1 ADA with Pos HPV 18

HPV genotyping	Number	Positive hr-HPV N (%)	CIN2+ (%)	Remark
Siriraj Hospital Prospective 2016-2018 Anyplex II®	376 ASCUS	242 (64.4) HPV 16, 64 (17) HPV 52, 51 (13.6) HPV 58, 44 (11.7) HPV 51, 28 (7.4) HPV 18 39 68, 21 (5.6)	55 (14.4) Pos hrHPV, 50 (20.7) neg hrHPV, 5 (3.7)	Isolated 44.7% HPV 16, 58 commom coexisting
	318 LSIL	188 (59.1) HPV 66, 59 (18.6) HPV 51, 31 (9.7) HPV 58, 30 (9.4) HPV 16, 29 (9.1) HPV 56, 26 (8.2) HPV 52, 25 (7.9) HPV 18, 15 (4.7)	19 (6) Pos hrHPV, 15 (8) neg hrHPV, 4 (3.1)	Isolated 40%

HPV genotyping	Number	Positive hr-HPV N (%)	CIN2+ (%)	Remark
Siriraj Hospital Prospective 2016-2018 Anyplex II®	376 ASCUS	242 (64.4) HPV 16, 64 (17) HPV 52, 51 (13.6) HPV 58, 44 (11.7) HPV 51, 28 (7.4) HPV 18 39 68, 21 (5.6)	55 (14) Pos hrHPV, 50 (20.7) neg hrHPV, 5 (3.7)	1 SCCA in Pos HPV 18
	318 LSIL	188 (59.1) HPV 66, 59 (18.6) HPV 51, 31 (9.7) HPV 58, 30 (9.4) HPV 16, 29 (9.1) HPV 56, 26 (8.2) HPV 52, 25 (7.9) HPV 18, 15 (4.7)	19 (6) Pos hrHPV, 15 (7.9) neg hrHPV, 4 (3.1)	1 ADA in Pos HPV 18

ASCUS HPV genotypes	CIN2+ in Pos. index HPV (%)	P value
hrHPV (n=242)	20.2 (1 cancer)	<0.001
16, n=64	31.3	<0.001
18, n=21	28.6 (1 cancer)	<0.001
31, n=15	20	0.908
33, n=1	14.3	0.762
35, n=8	0	0.684
39, n=21	9.5	0.351
45, n=4	0	0.495
51, n=28	17.9	0.931
52, n=51	17.9	0.207
56, n =10	10	0.224
58, n =44	25	0.027
59, n=4	25	0.831
66, n=19	21.1	0.761
68, n=21	23.8	0.568
Colpo Imp HG	44.9	<0.001

colposcopy imp. of high-grade
(OR 35.26, 95% CI 4.44-279.83, P=.001),

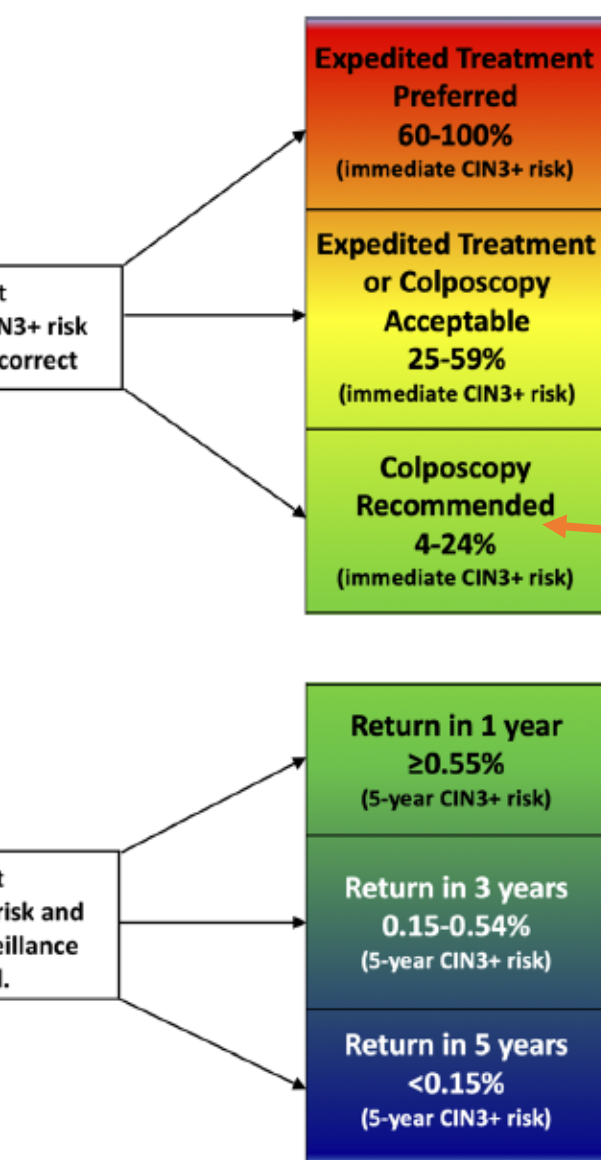
positive hr-HPV
(OR 3.91, 95% CI 1.43-10.64, P=.008),

positive HPV 16
(OR 2.19, 95% CI 1.08-4.44, P=.029).

Multiple infection, NS

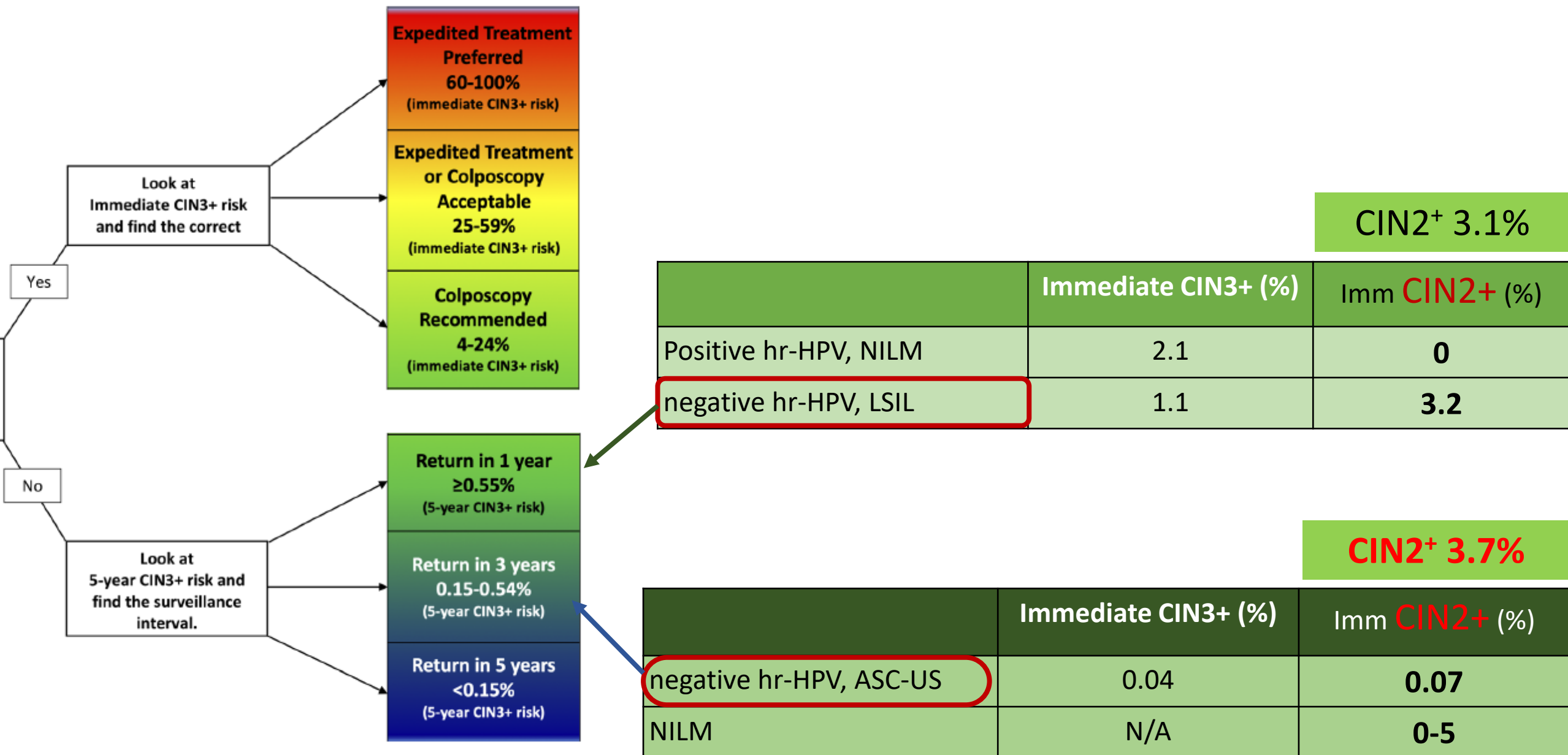
HPV 52/58, should CDB

ASCUS HPV genotypes	ASCUS & CIN2+ in Pos. index HPV (%)	LSIL & CIN2+ in Pos. index HPV (%)	LSIL HPV types
hrHPV (n=242)	20.2 (1 cancer)	8	hrHPV (n=188)
16, n=64	31.3	20.7	16, n=29
18, n=21	28.6 (1 cancer)	13.3	18, n=15
31, n=15	20	0	31, n=8
33, n=1	14.3	10	33, n=10
35, n=8	0	0	35, n=2
39, n=21	9.5	7	39, n=14
45, n=4	0	0	45, n=3
51, n=28	17.9	6.5	51, n=31
52, n=51	17.9	8	52, n=25
56, n =10	10	7.7	56, n=26
58, n =44	25	6.7	58, n=30
59, n=4	25	0	59, n=12
66, n=19	21.1	5.1	66, n=59
68, n=21	23.8	11.2	68, n=9
Colpo Imp HG	44.9	19	



Colposcopy Recommended	Imm CIN3+ (%)	Imm CIN2+ (%)
HPV 16, NILM	5.3	
* HPV 18, NILM	3.0	
Repeated hrHPV-positive, NILM	4.0	
hrHPV-positive, ASC-US	4.5	13.5
hrHPV-positive, LSIL	4.3	15
* hrHPV-negative, ASC-H	3.4	
* After 2 consecutive unsatisfactory screening test	n/a	

CIN2+
14%
6%



Siriraj Hospital

Cytologies	hrHPV status	Imm. CIN2 ⁺ N, (%)	3 yr-period	
			CIN1	CIN2-3
376 ASCUS	Pos hrHPV n=242	50 (20.7)	9 (3.7)	7 (2.9)
	Neg hrHPV n=134	5 (3.7)	5 (3.7)	1 (0.7)
318 LSIL	Pos hrHPV n=188	15 (7.9)	9 (4.7)	2 (1)
	Neg hrHPV n=130	4 (3)	1 (0.7)	1 (0.7)

Should 1-yr Follow-up

RESEARCH ARTICLE OPEN ACCESS

Significance of Genotype-Specific High-Risk Human Papillomavirus Testing in Cervical Cancer Screening: A Hospital-Based Study

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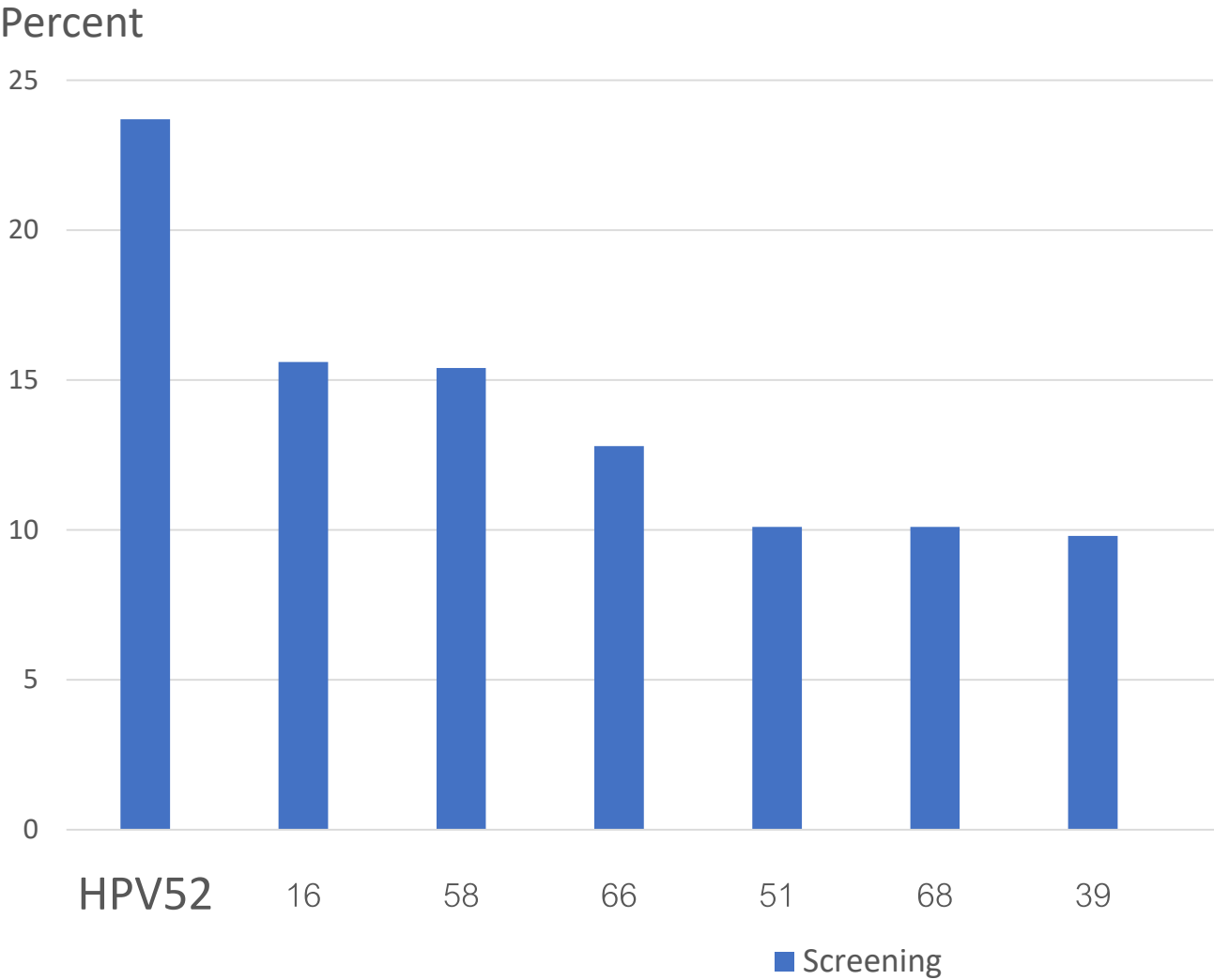
Keywords: cervix | developing countries | extended genotyping | HPV | prevention | screening | women

- Retrospective review women who screened **positive hrHPV**
- January 1, 2020 to December 31, 2023
- No previous CIN2/3 or cancer, non-pregnant, immunocompetent

1,981 Women
mdAge 40 years [IQR 32.0-49.0]

Previous cytology tests, 1215 women (61.3%)
Previous hrHPV screening, 107 women (5.4%)

CIN2+, 152 women (7.7%); 22 with cancer



16	60.3	6.3	Alpha-9	Highest
18	10.5	3.0	Alpha-7	High
45	6.1	2.2	Alpha-7	High
33	3.7	4.5	Alpha-9	Medium
31	3.6	2.2	Alpha-9	Medium
52	2.7	2.2	Alpha-9	Medium
58	2.2	1.9	Alpha-9	Medium
35	2.0	2.8	Alpha-9	Medium
39	1.6	1.1	Alpha-7	Lower
51	1.2	1.1	Alpha-5	Lower
59	1.1	0.9	Alpha-7	Lower
56	0.9	0.8	Alpha-6	Lower
68	0.6	1.0	Alpha-7	Lower

Isolated infection 1,480 (74.7%)

Multiple types 501 (25.3%)

16 and 18 7

16 and 18 and others 8

16 and non-18 105

18 and non-16 49

non-16/18 332

HPV types cover by 9-valents

Noncovered 118 (6.0)

Partial 306 (15.4)

Fully 954 (48.2)

Cytology

Not done 118 (6.0)

NILM 1154 (58.3)

ASCUS, LSIL, ASCH, HSIL, SCCA 703 (35.4)

AGC, ADA 6 (0.3)

} 40%

Isolated infection 1,480 (74.7%)

Multiple types 501 (25.3%)

16 and 18 7

16 and 18 and others 8

16 and non-18 105

18 and non-16 49

non-16/18 332

HPV types cover by 9-valents

Noncovered 118 (6.0)

Partial 306 (15.4)

Fully 954 (48.2)

Cytology

Not done 118 (6.0)

NILM 1154 (58.3)

ASCUS, LSIL, ASCH, HSIL, SCCA 703 (35.4)

AGC, ADA 6 (0.3)

Pathology CIN2+	152 women (7.7%)
CIN2	89
CIN3	36
AIS	5
SCCA	15
ADA	6
SCNE	1

Genotypes	CIN2+ in hrHPV positive (%)
16	20.3
18	11.8
31	3.3
33	7.3
35	13.3
39	3.1
45	5.4
51	7.0
52	8.7
56	2.2
58	7.5
59	5.6
66	3.5
68	3.5

HPV16, OR 4.534 (95%CI 3.197-6.430)

Multiparity, OR 1.497 (95%CI 1.070-2.094)

NS

Age ≥40 yrs

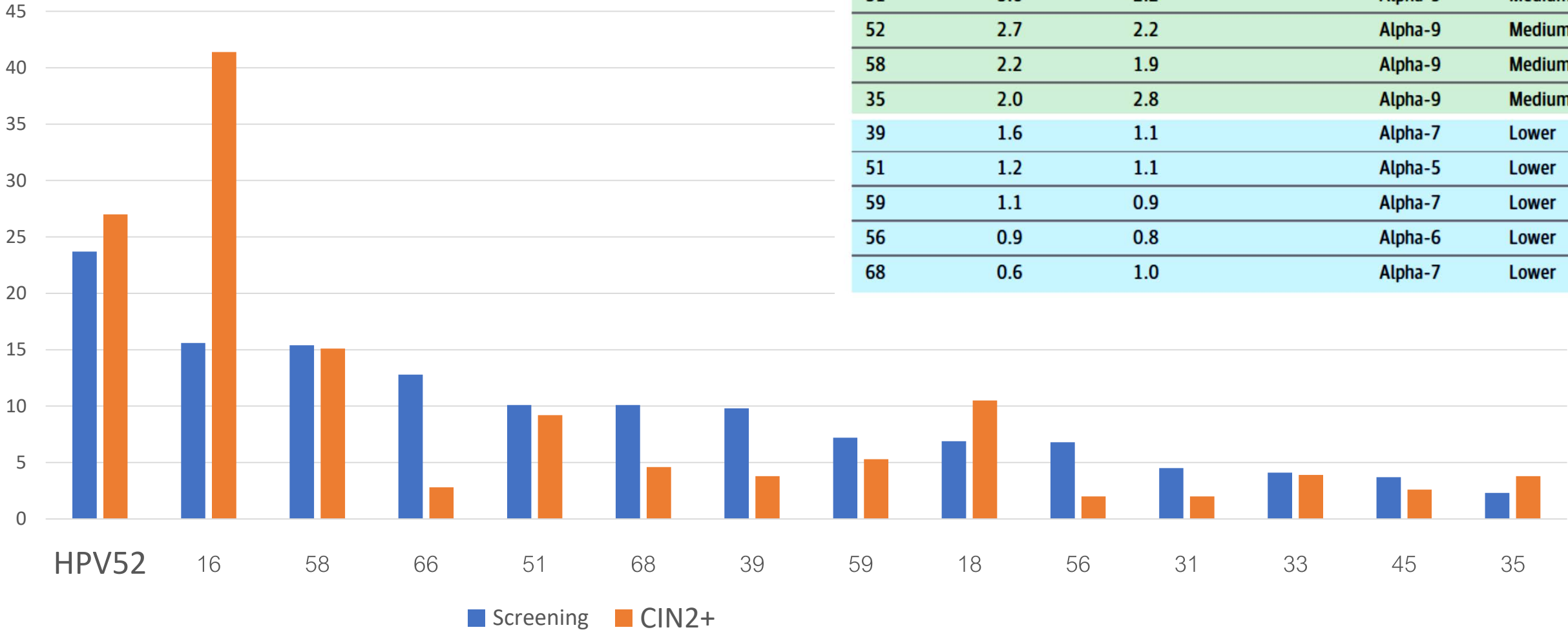
Hormonal contraception

Postmenopause

Never screen

Single infection

Percent



16	60.3	6.3	Alpha-9	Highest
18	10.5	3.0	Alpha-7	High
45	6.1	2.2	Alpha-7	High
33	3.7	4.5	Alpha-9	Medium
31	3.6	2.2	Alpha-9	Medium
52	2.7	2.2	Alpha-9	Medium
58	2.2	1.9	Alpha-9	Medium
35	2.0	2.8	Alpha-9	Medium
39	1.6	1.1	Alpha-7	Lower
51	1.2	1.1	Alpha-5	Lower
59	1.1	0.9	Alpha-7	Lower
56	0.9	0.8	Alpha-6	Lower
68	0.6	1.0	Alpha-7	Lower

Histology	FIGO stage	HPV types	Cytology
SCCA, 15	IA1	16	ASCH
	IA1	16	ASCH
	IA1	16 and 18	HSIL
	IA1	52	ASCH
	IA1	35 and 39	HSIL
	IA2	58	HSIL
	IB1	16	HSIL
	IB1	16	HSIL
	IB1	16	ASCUS
	IB1	52	ASCUS
	IB2	16	Not done
	IB2	52	Not done
	IIB	33	ASCUS
	IIB	45	AGC-NOS
	IVB	35 and 39	NILM

Histology	FIGO stage	HPV types	Cytology
ADA, 6	IA1	18	NILM
	IB1	18	NILM
	IB1	18	NILM
	IB1	16 and 31	NILM
	IB2	45	ADA
	IIIB	16	Not done
SCNE, 1	IB1	52	ASCUS

16	α 9	Highest
18	α 7	High
45	α 7	High
31	α 9	Medium
33	α 9	Medium
35	α 9	Medium
52	α 9	Medium
58	α 9	Medium
39	α 7	Lower

Genotypes	CIN2+ in hrHPV positive (%)
16	20.3
18	11.8
45	5.4
31	3.3
33	7.3
35	13.3
52	8.7
58	7.5
39	3.1
51	7.0
56	2.2
59	5.6
66	3.5
68	3.5

Need more populations
and
long term outcomes

BD Onclarity	CIN3+ risk (%) ^{IRIS}	CIN3+ risk (%) ^{STRIDES}
HPV 16	16.8	22.2
HPV 18	8.2	3.8
HPV 45	2.7	0
HPV 33/ 58	5.5	8.1
HPV 31	6.3	6.4
HPV 52	4.7	3.3
HPV 35/ 39/ 68	1.7	5.9
HPV 51	1.5	6.3
HPV 56/ 59/ 66	0.8	0.7

RESEARCH ARTICLE OPEN ACCESS

Diagnostic Accuracy of the Siriraj Portable Digital Cervicography Device Versus Standard Colposcopy for Detecting CIN2⁺ Lesions

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Keywords: cervical cancer screening | colposcopy | digital imaging | innovation | low-resource settings



- Prospective 450 women at colposcopy unit, 2023-2024
- No previous CIN2/3 or cancer, non-pregnant

mdAge 41 years [IQR 33.0-49.0]

CIN2+, 96 women (20.1%);

6 with cancer (HPVsingle:16,16,33,52,58,neg)

	CIN2+ (%)		P value
	neg	pos	
16	17.5	27.4	0.019
18	21.4	9.1	0.053
31	20.2	21.1	0.927
33	20	23.8	0.675
35	20.5	9.1	0.352
39	19.3	11.4	0.177
45	19.8	11.8	0.376
51	20.2	20.6	0.956
52	17.3	31.9	0.002
56	21.4	0	0.011
58	19.8	22.7	0.583
59	21.2	6.5	0.048
66	22.1	8.3	0.014
68	20.6	14.8	0.471

	CIN2+ (%)		
	neg	pos	P value
16	17.5	27.4	0.019
18	21.4	9.1	0.053
31	20.2	21.1	0.927
33	20	23.8	0.675
35	20.5	9.1	0.352
39	19.3	11.4	0.177
45	19.8	11.8	0.376
51	20.2	20.6	0.956
52	17.3	31.9	0.002
56	21.4	0	0.011
58	19.8	22.7	0.583
59	21.2	6.5	0.048
66	22.1	8.3	0.014
68	20.6	14.8	0.471

6 SCCA

2IA1; single type **52** and **58**

4IB1; neg, single type **16, 16, 33**

Unforeseen

- High-specificity triage tests are essential after a positive hrHPV result.
- Effective after self-sampling, using a single test, model, or scoring system.
- Can reduce unnecessary colposcopy referrals (NNT < 5).
- AI-assisted colposcopy can further improve diagnostic accuracy

Thank You

BD Onclarity FDA 2018

HPV 16

HPV 18

HPV 45

HPV 33/ 58

HPV 31

HPV 52

HPV 35/ 39/ 68

HPV 51

HPV 56/ 59/ 66

Abbot Alinity / FDA 2023

HPV 16

HPV 18

HPV 45

HPV 31/ 33/ 52/ 58

HPV 35/ 39/ 51/ 56/ 59/
66/68