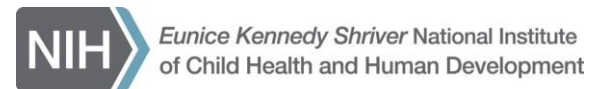


Incidence, persistence and factors associated with high-risk human papillomavirus infection among male adolescents with perinatally acquired HIV infection in Thailand

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Declaration

- Grants and travel support from ViiV Healthcare

Background

- Persistent HPV infection, especially with high-risk HPV (HR-HPV) genotypes, has been shown to be associated with anogenital cancers¹
- Infection with HR-HPV has been shown to be more prevalent and persistent over time in female adolescents with HIV²
- However, data among male adolescents with perinatally acquired HIV (PHIV) are limited

Hypothesis

- We aimed to evaluate the incidence and persistence of HR-HPV in anogenital compartments and associated factors among PHIV in comparison to HIV-uninfected (HU) male adolescents in Thailand

Methods

- A longitudinal observational cohort study was conducted in Thailand and Vietnam that compared the patterns of acquisition and clearance of HPV infection among PHIV and HU females¹ and males²
- PHIV and HU males were recruited from two study sites in Bangkok between June 2013 and October 2017, and matched by age and number of lifetime sexual partners
 - HIV-NAT, Thai Red Cross AIDS Research Centre
 - Siriraj Hospital Mahidol University

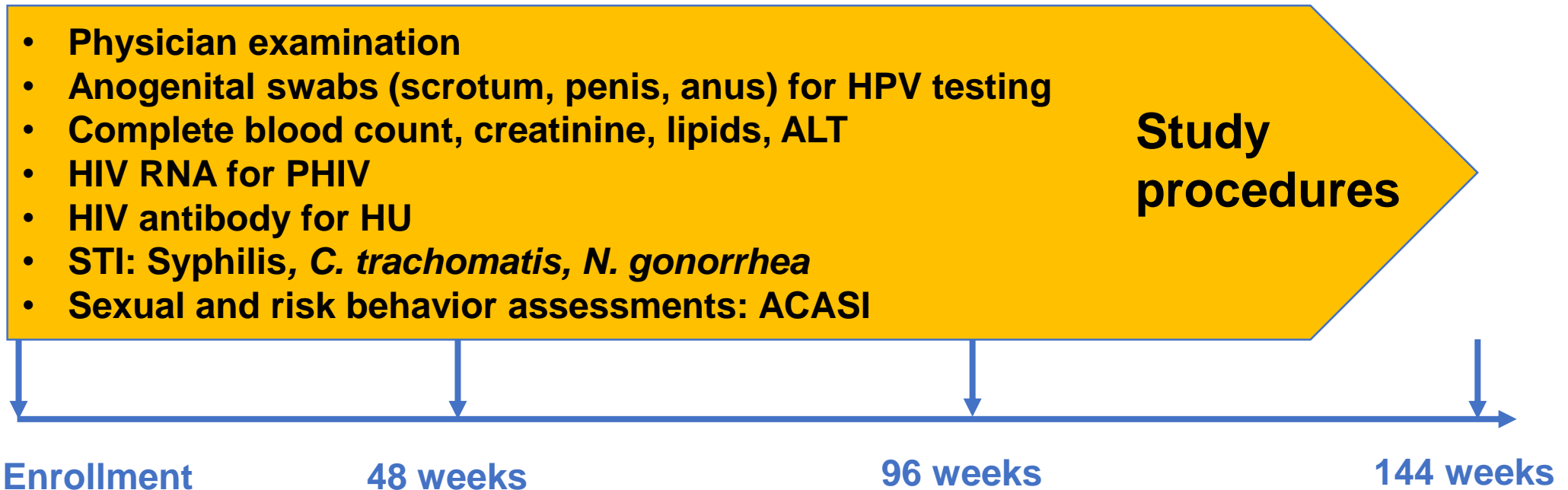
Methods

Inclusion criteria

- PHIV and HU male aged 12-24 years
- Never received HPV vaccine
- History of sexual intercourse
- Did not have symptomatic STI
- Able to independently complete the study's audio computer-assisted self interview (ACASI)

Exclusion criteria

- Using immunosuppressive medications
- Had other diseases that compromised the immune function



STI: sexually transmitted infections; ALT: alanine aminotransferase

Methods

- HPV genotyping was conducted using nucleic acid hybridization
- 13 HR genotypes identified based on the detection of at least one of the following subtypes:
 - 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68
- Infection with the 7 HR genotypes in HPV 9-valent vaccine was defined as the detection of at least one of the following subtypes:
 - 16, 18, 31, 33, 45, 52, 58
- Persistent HR-HPV infection was defined as detection of the **same** HR-HPV genotype(s) at any anogenital compartments for **≥ 2 consecutive visits**

Selected baseline characteristics of study participants

Characteristics	PHIV, n=49	HU, n=47	Total, n=96
Age, years, median (IQR)	18 (17-20)	19 (17-20)	18 (17-20)
History of male-to-male sex, N (%)	6 (12)	12 (26)	18 (19)
Current or highest education, N (%)			
High school	36 (73)	17 (37)	53 (56)
Pre-university	9 (18)	21 (46)	30 (32)
University	3 (6)	8 (17)	11 (12)
Other non-formal education	1 (2)	0 (0)	1 (1)
History of substance use, N (%)	9 (18)	17 (36)	26 (27)
CD4 count (cells/mm ³), median (IQR)	573 (434-747)		
HIV-RNA <40 copies/mL, N (%)	34 (69)		

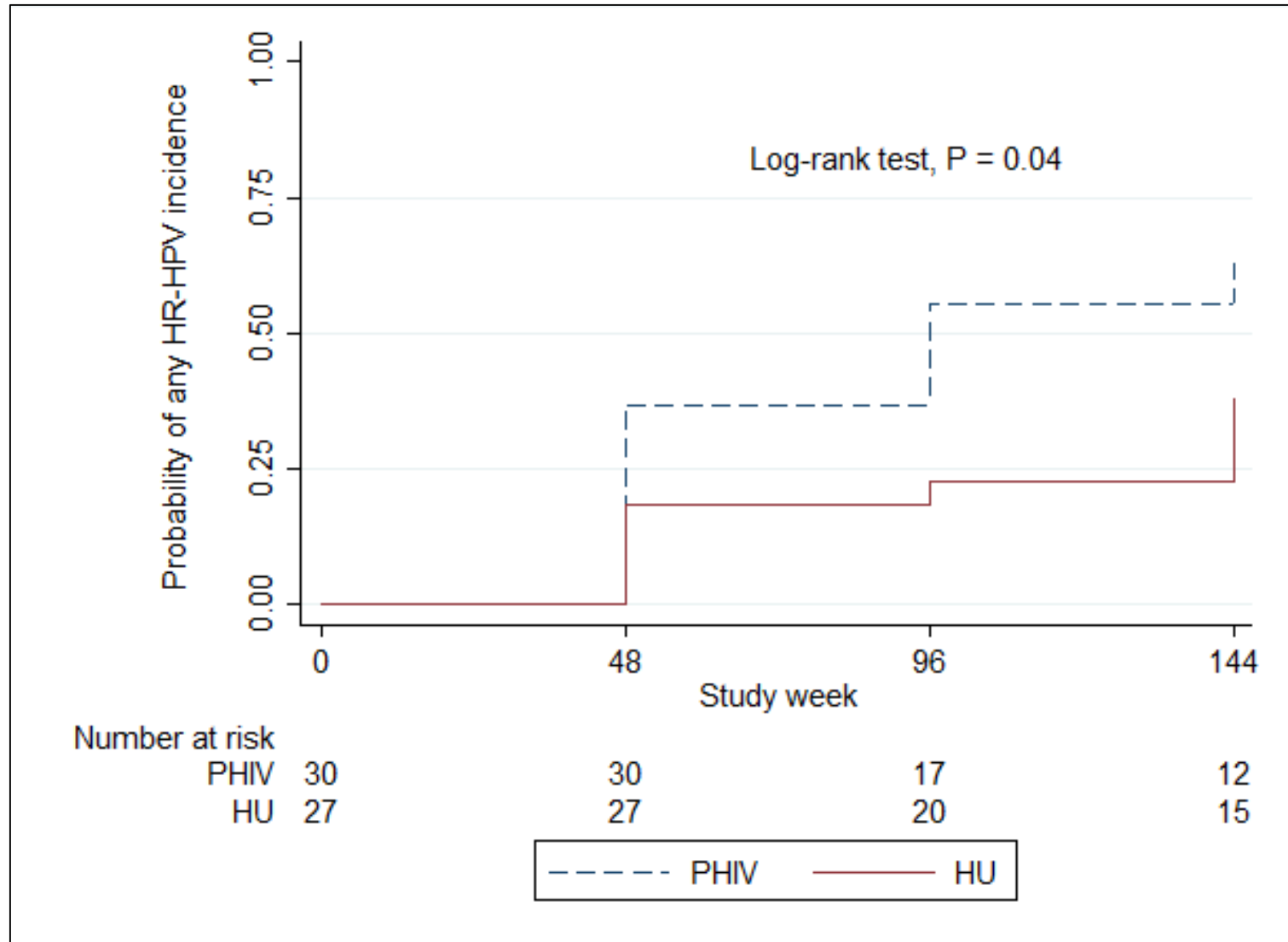
Selected baseline characteristics of study participants

Characteristics	PHIV, n=49	HU, n=47	Total, n=96
Number of partners in past 6 months, N (%)			
0	9 (18)	3 (6)	12 (13)
1	30 (61)	28 (60)	58 (60)
2-4	6 (12)	15 (32)	21 (22)
≥5	4 (8)	1 (2)	5 (5)
Condom use w/ vaginal sex, past 6 mo, N (%)			
Always	20 (41)	4 (9)	24 (25)
Sometimes/Never	22 (45)	27 (57)	49 (51)
Not Applicable/not having sex this route	7 (14)	16 (34)	23 (24)
Laboratory confirmed STIs at baseline, N (%)			
Syphilis	2 (4)	1 (2)	3 (3)
Chlamydia	6 (12)	4 (9)	10 (10)
Gonorrhoea	0 (0)	2 (4)	2 (2)

Prevalence, persistence, and incidence of anogenital HR-HPV infection in PHIV and HU

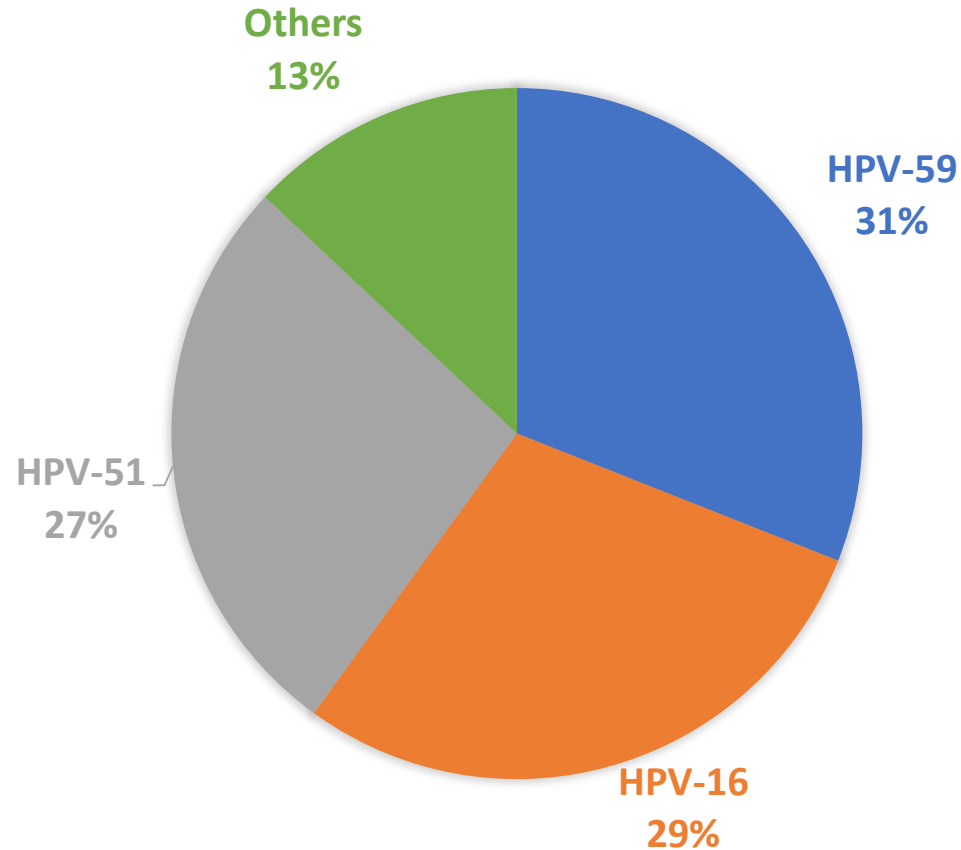
	PHIV	HU	Overall	p-value
Infection with <i>any HR-HPV</i> type				
Prevalent infection, N (%)	33 (67)	22 (47)	55 (57)	0.04
Incident infection, N (%)	18 (37)	9 (19)	27 (28)	
Incidence rate per 100 PY (95% CI)	33.05 (20.82-52.46)	15.73 (8.18-30.22)	24.17 (16.58-35.25)	0.04
Persistent infection, N (%)	9 (27)	5 (23)	14 (25)	0.75
Infection with <i>any of the 7 HR-HPV</i> types in the nonavalent vaccine				
Prevalent infection, N (%)	25 (51)	15 (32)	40 (42)	0.06
Incident infection, N (%)	15 (31)	7 (15)	22 (23)	
Incidence rate, per 100 PY (95% CI)	21.96 (13.24-36.43)	10.11 (4.82-21.21)	16.00 (10.53-24.29)	0.07
Persistent infection, N (%)	5 (20)	3 (20)	8 (20)	0.99

Kaplan-Meier estimates of the cumulative incidence of infection with any high-risk human papillomavirus genotypes

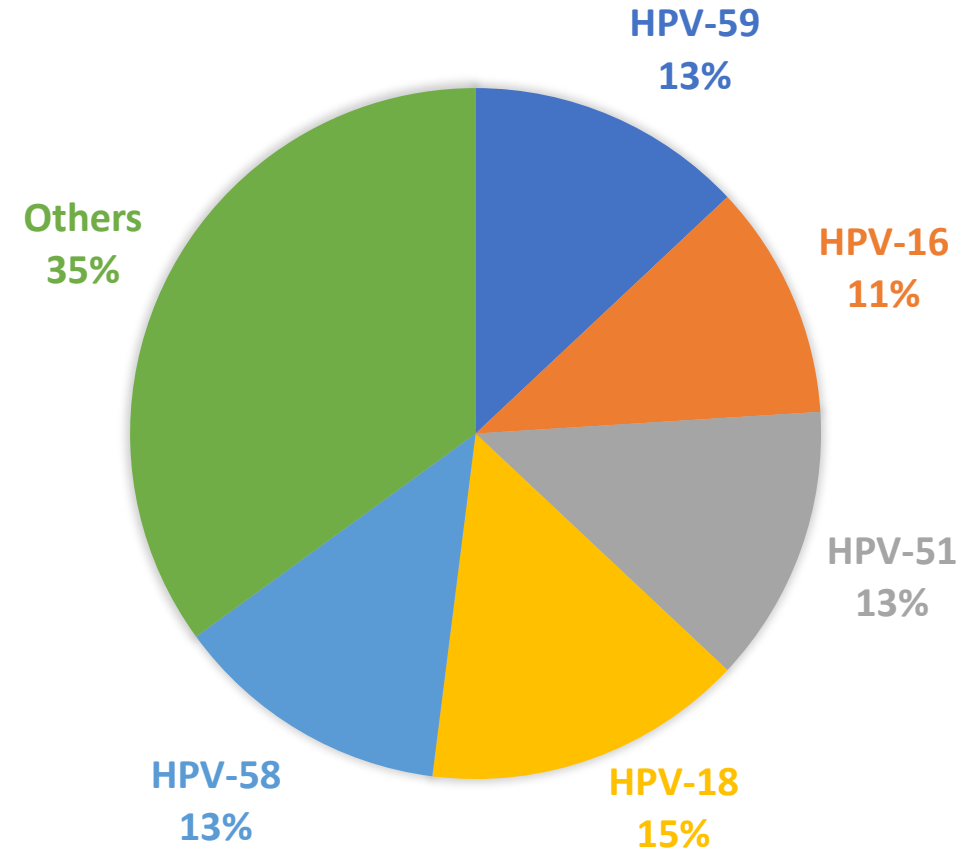


The most common HR-HPV genotypes in anogenital samples

PHIV



HU



Factors associated with persistence of anogenital HR-HPV infection in male adolescents

Covariate	Any HR-HPV				Any of the 7 HR-HPV in the 9-valent vaccine			
	Univariate PR (95%CI)	p-value	Multivariate aPR (95%CI)	p-value	Univariate PR (95%CI)	p-value	Multivariate aPR (95%CI)	p-value
HIV status	1.73 (0.62-4.80)	0.30			1.63 (0.40-6.68)	0.5		
History of male-to-male sex	1.73 (0.61-4.93)	0.30			2.42 (0.96-6.07)	0.06	2.60 (1.00-6.77)	0.05
Education		0.51				0.37		
Primary school or secondary school	ref				ref			
Pre-University	0.63 (0.19-2.05)				0.89 (0.17-4.54)			
University	1.10 (0.28-4.34)				3.36 (0.91-12.45)			
Other non-formal education	0.25 (0.03-1.94)				0.21 (0.02-1.86)			
Current age ≥21 (years)	2.41 (0.91-6.36)	0.08	1.82 (0.92-3.62)	0.09		0.88		
BMI ≥18 (kg/m ²)	1.36 (0.41-4.53)	0.61			1.00 (0.68-1.47)	0.99		
Alcohol use in the past 3 months	1.14 (0.36-3.62)	0.83			1.00 (0.77-1.29)	0.98		
Smoking history	1.58 (0.35-7.05)	0.55			1.84 (0.23-14.97)	0.57		
Smoked cigarettes in the past 3 months	0.88 (0.31-2.52)	0.81			0.99 (0.74-1.33)	0.97		
History of substance use	1.08 (0.34-3.43)	0.90			1.62 (0.39-6.76)	0.51		
Having ≥3 sexual partners in the past 6 months	1.03 (1.01-1.05)	0.01	2.39 (1.14-5.05)	0.02	1.00 (0.75-1.33)	0.99		
Lifetime number of sex partners		0.24				0.26		
<3	ref				ref			
3-9	1.41 (0.36-5.5)				2.54 (0.26-24.40)			
≥10	2.75 (0.76-9.98)				5.5 (0.61-49.21)			
Laboratory-confirmed STIs in the past 12 months	5.43 (2.11-14.01)	0.001	6.21 (2.87-13.41)	<0.001	6.25 (1.64-23.78)	0.01	1.37 (0.72-2.61)	0.34

Factors associated with persistence of anogenital HR-HPV infection in male adolescents

Covariate	Any HR-HPV				Any of the 7 HR-HPV in the 9-valent vaccine			
	Univariate PR (95%CI)	p	Multivariate aPR (95%CI)	p	Univariate PR (95%CI)	p	Multivariate aPR (95%CI)	p
History of male-to-male sex	1.73 (0.61-4.93)	0.30			2.42 (0.96-6.07)	0.06	2.60 (1.00-6.77)	0.05
≥3 sexual partners in the past 6 mo	1.03 (1.01-1.05)	0.01	2.39 (1.14-5.05)	0.02	1.00 (0.75-1.33)	0.99		
Lab-confirmed STIs in the past 12 mo	5.43 (2.11-14.01)	0.001	6.21 (2.87-13.41)	<0.001	6.25 (1.64-23.78)	0.01	1.37 (0.72-2.61)	0.34

Sub-group multivariate analysis of PHIV: baseline CD4 <350 cell/mm³ was associated with persistence of infection with nonavalent vaccine genotypes (aPR 1.61, 95%CI 1.03-2.50, p=0.03)

Conclusions

- Thai PHIV male adolescents had a higher incidence and persistence of HR-HPV infection than those without HIV
- Having ≥ 3 sex partners and co-infection with syphilis, *C. trachomatis*, and/or *N. gonorrhoeae* were associated with persistence of any HR-HPV infection
- Among male PHIV, CD4 < 350 cell/mm³ at enrollment was associated with persistence of the nonavalent vaccine genotypes
- Although this was an exploratory study, these data demonstrate the need for male PHIV to be included in regional HPV vaccination programs, and for adolescent catch-up vaccination opportunities

Acknowledgements

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