



Human Papillomavirus Prevalence and Behavioral Risk Factors among HIV-infected Men in Taiwan

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Background

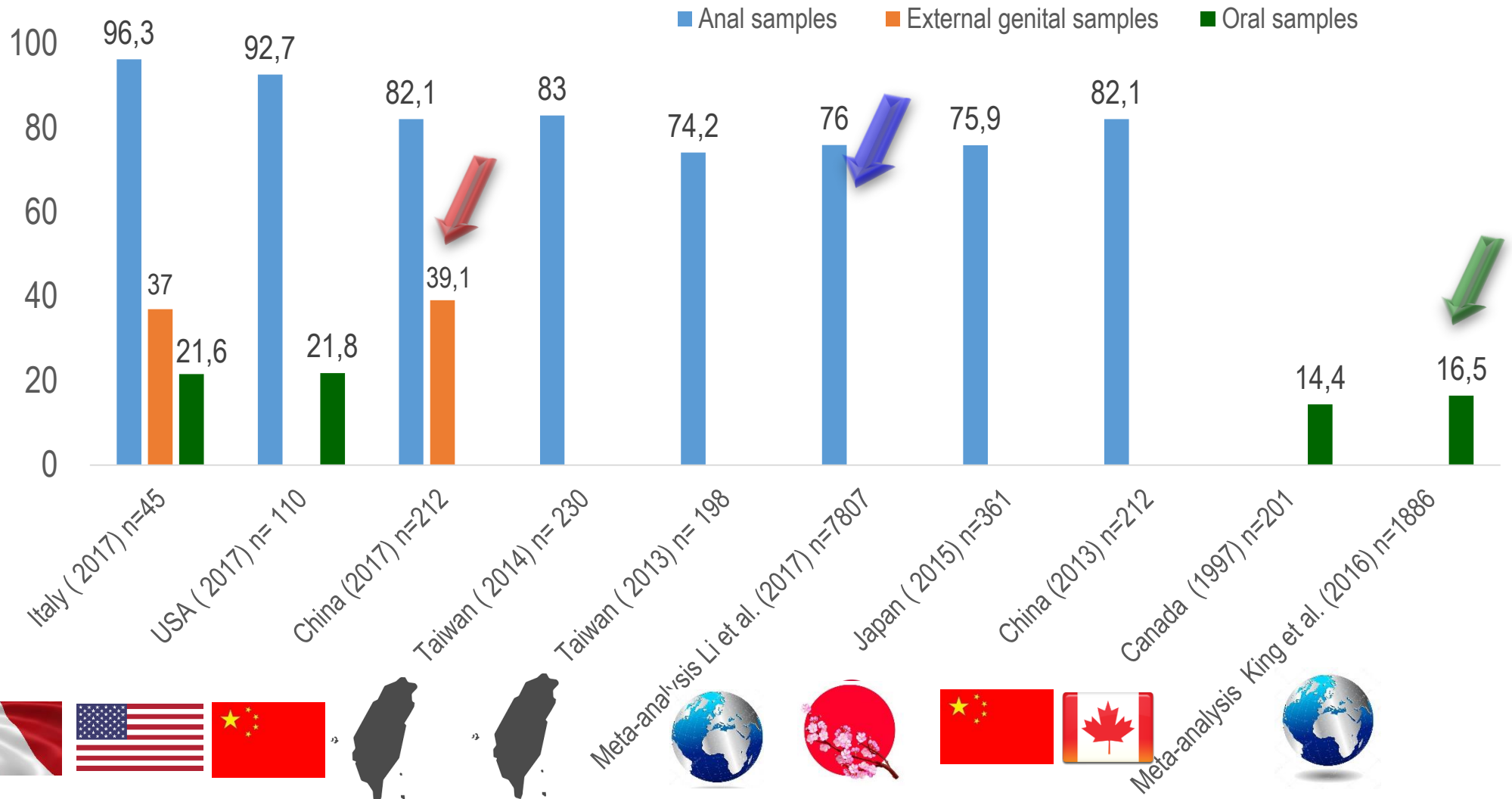
Sexually transmitted infections (STIs) a major public health issue.

They can facilitate the transmission of HIV and HPV.

HPV infection is primary cause of cervical cancer and HPV-related squamous cell cancers, especially among MSM.

More than 200 HPV types identified, >30 are sexually transmitted; of these 15 are considered oncogenic or high-risk HPV

Prevalence of Anal, Oral, and External Genital HPV in HIV infected MSM



Ucciferri C, et al. Journal of Medical Virology. 2018;90:358-366.;Steinau M, et al. The Journal of Infectious Diseases. 2017;215:1832-1835.;Qian HZ, et al Sexually Transmitted Diseases. 2017;44:656-662.;Cheng SH, et al. Journal of Medical Virology 2014;86:193-201;Li et al. Lancet Infect Dis 2017);30653-9.; Nagata N, et al. PLOS ONE 2015;10:e0137434; Hu Y, et al. JAIDS 2013;64:103-114; Coutlée F, et al. Sexually Transmitted Diseases 1997;24:23-31; King EM, PLoS ONE 2016;11:e0157976.

Objective

Determine the prevalence of HPV infection in Taiwan

Examine behavioral risk factors.

Explore the initiation of HPV vaccination strategy, especially among HIV-infected subjects.

Methods

Study design

Prospective cohort study and a questionnaire

- An HIV Counseling and Testing Center of Chung Shan Medical University Hospital in Taiwan
- From 2013-2016

Study population

Aged ≥ 20 years, HIV-infected and -uninfected men

Demographic data

Age, Marital status, Education, Employment status, Sexual orientation

Sexual behaviors

Receptive anal or oral sex, drug use in past 6 months, circumcised, one-night stand, number of sex partners, consistently condoms use

Study Procedures

History of STIs

Serum VDRL, *C. trachomatis*, *N. gonorrhoeae*, herpes simplex virus-2, oral, genital or anal warts, HIV

HPV infection

Samples: swabs from oral, genital, and anal sites

Statistical analysis

Subjects characteristics:

- Descriptive statistics
- Fisher's exact test, Mann-Whitney U test

Multivariate analysis

- Predict factors related to high-risk HPV infection
-

HPV Genotyping Test

All samples were processed at the central laboratory using PCR

The Roche Linear Array HPV genotyping test was performed on all specimens.

This assay can genotype 37 HPV types:

- **15 oncogenic or HR-HPV (16, 18, 31, 33, 35,39, 45, 51, 52, 56, 58, 59, 68, 73, and 82)**
- **3 probable HR (26, 53, and 66)**
- **19 low-risk HPV (6, 11, 40, 42, 54, 55, 61, 62, 64, 67, 69,70, 71,72, 81, 83, 84, IS39, and CP6108).**

Results

Demographic data

279 subjects, including 166 (59.5%) HIV-uninfected and 113 (40.5%) HIV-infected men

Median age: 26.0 (23.0-31.0) years

82.4% MSM

82.1% receptive anal sex

98.2% receptive oral sex

34.8% consistent condom use

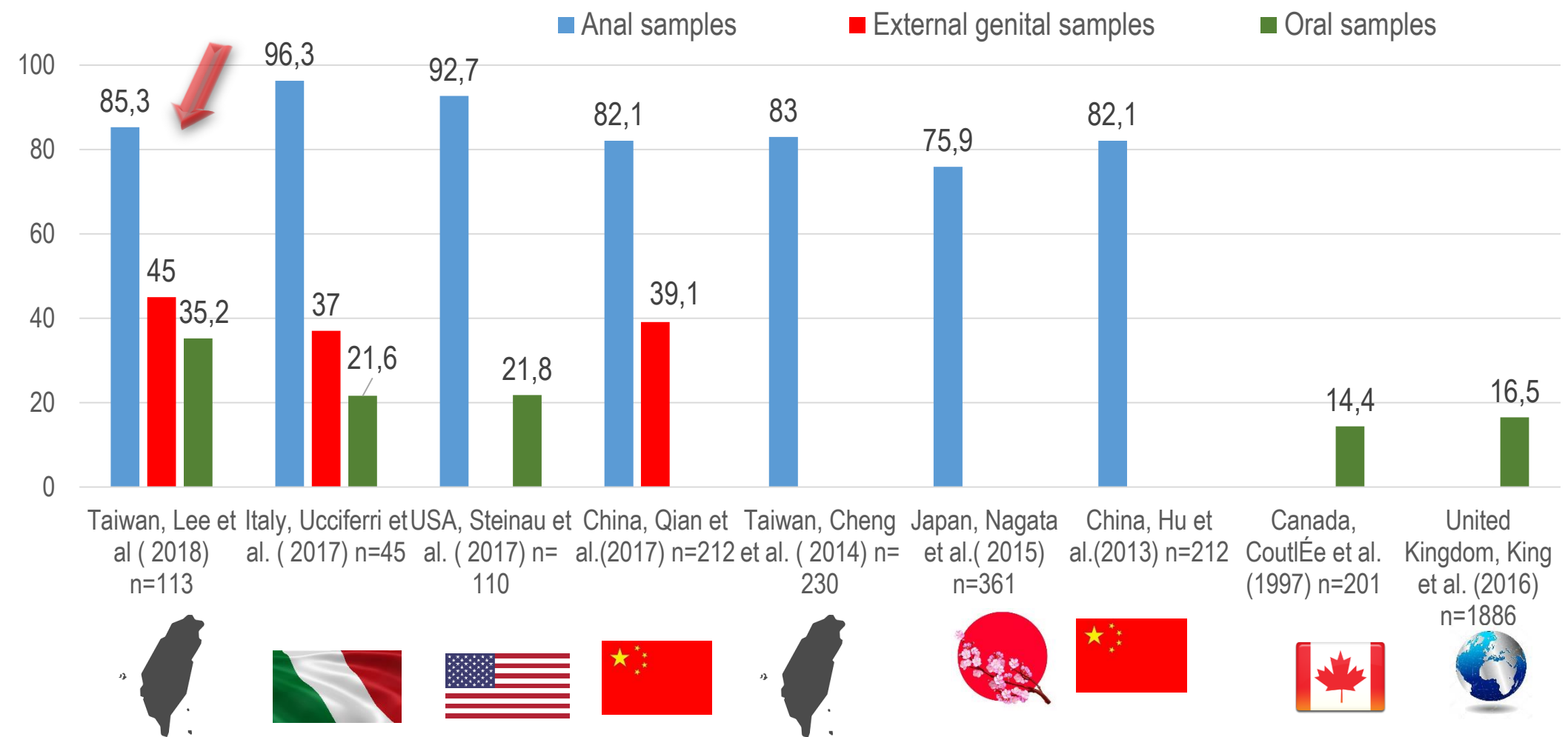
Results

Behavioral risks

HPV positive subjects had significantly higher rates in the following areas than HPV negative ones:

- Receptive anal sex (91.3% vs. 75.6%)
- Substance use (22.6% vs. 11%)
- History of sexually transmitted infections (75.7% vs. 38.4 %)
- Anal, genital, or oral warts (39.1% vs. 6.72%)
- Syphilis (32.2% vs. 11.6%)
- HIV infection (69.6% vs. 20.1%)

Prevalence of Anal, Oral, and External Genital HPV in HIV infected MSM



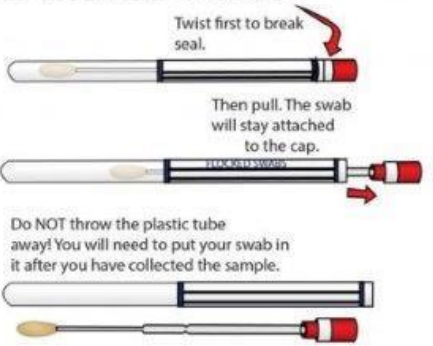
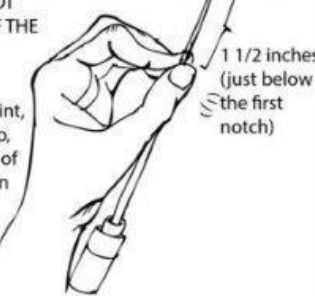

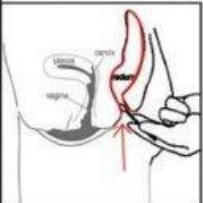
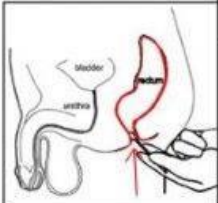






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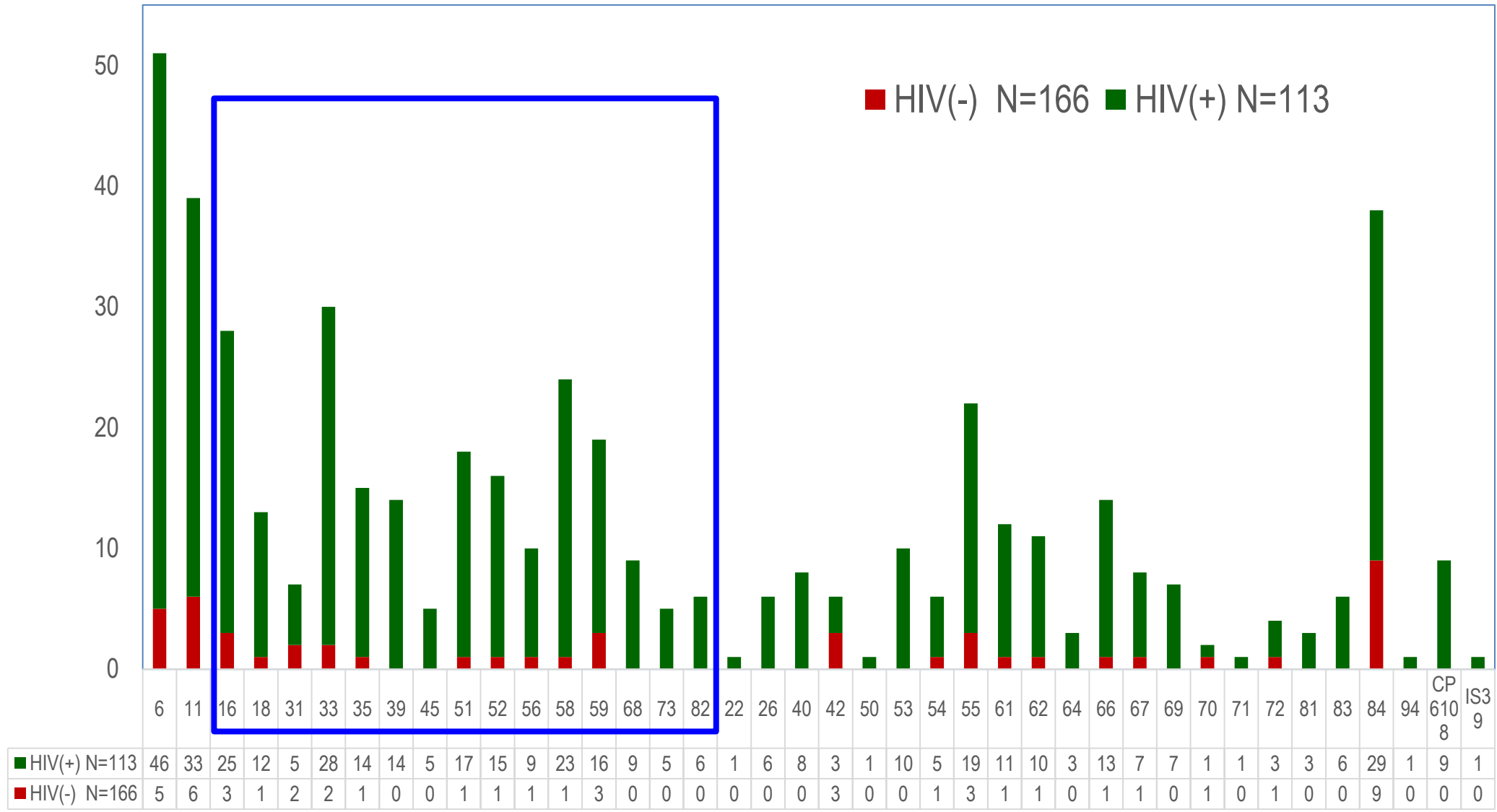
Self-Collection of Rectal Swab

Self-Collection of Rectal Swab

ATTENTION: Read ALL instructions before you begin!

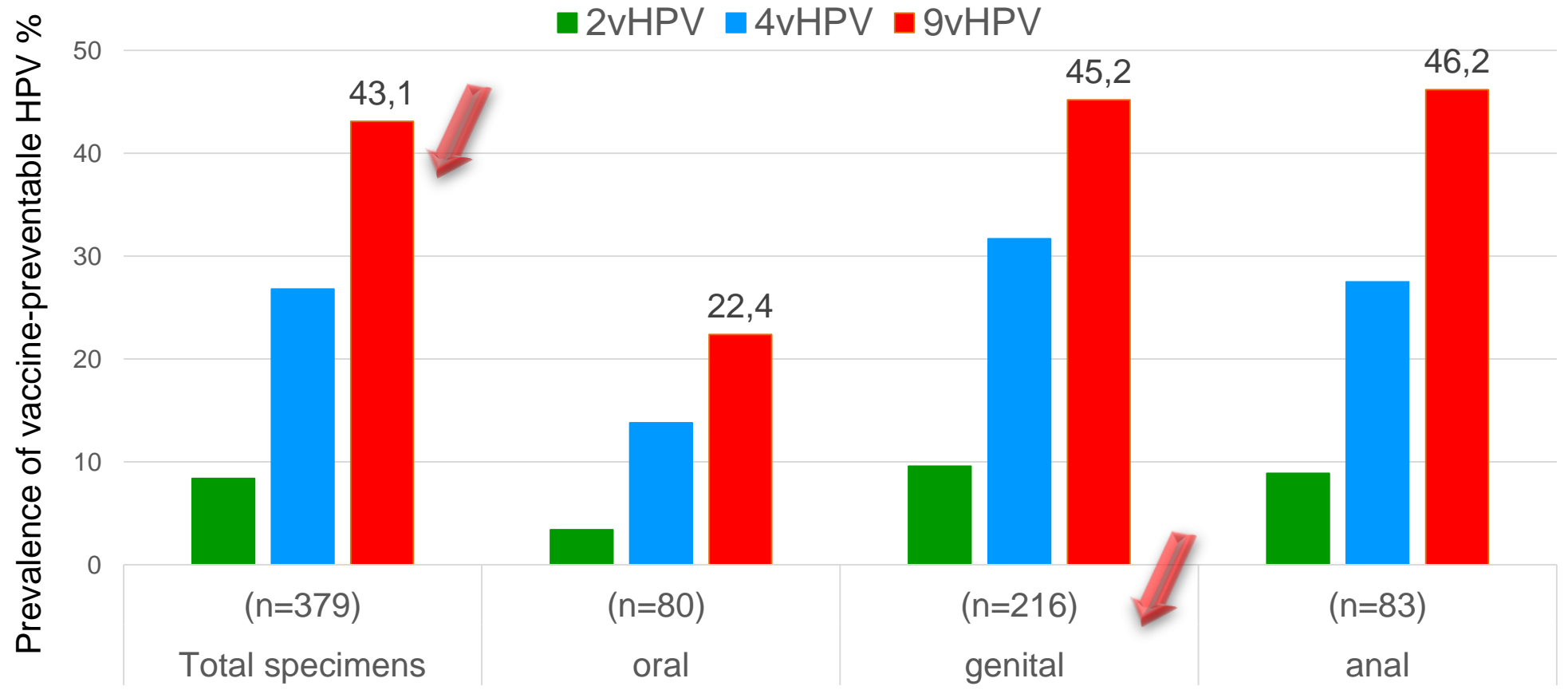
<p>STEP 1</p>  <p>Wash your hands thoroughly.</p>	<p>STEP 2</p> <p>Unopened Swab</p>  <p>Either squat down, or lift one leg on a toilet, ledge, or chair (as shown). Pull underwear down or off.</p>	<p>STEP 3</p> <p>Open the swab. DO NOT TOUCH THE TIP OF THE SWAB.</p>  <p>Twist first to break seal.</p> <p>Then pull. The swab will stay attached to the cap.</p> <p>Do NOT throw the plastic tube away! You will need to put your swab in it after you have collected the sample.</p>	<p>STEP 4</p> <p>With your dominant hand (right if you're right-handed, left if you're left-handed), grip the opened swab 1.5" away from the tip of the swab (just below the first notch). DO NOT TOUCH THE TIP OF THE SWAB.</p>  <p>1 1/2 inches (just below the first notch)</p> <p>Do NOT, at any point, use anything (soap, saliva, or any kind of lubricant) either on your body or on the swab.</p>
<p>STEP 5</p>  <p>With your other hand, position your bare buttock and lift one cheek for easy access to the rectum. (DO NOT use anything on your rectum or the swab.)</p> <p>Female Anatomy</p>  <p>Male Anatomy</p> 	 <p>STEP 6</p> <p>Insert the swab 1.5 inches into your rectum until you feel your fingers touch your anus.</p> <p>STEP 7</p> <p>Once the swab is in, walk your fingers halfway down the swab (away from your body) and grip it there, for stability. (The swab should stay where it is—only your fingers should move.)</p> <p>STEP 8</p> <p>Gently rub the swab in a circle, touching the walls of your rectum, to collect the specimen.</p> <p>STEP 9</p> <p>When removing the swab from your rectum, slowly turn it in a circle while pulling it out.</p>	<p>STEP 10</p> <p>Place used swab back into the transport tube. Close tightly to prevent leakage.</p>  <p>STEP 11</p> <p>Place closed tube into the red plastic zip-lock bag. Seal the bag.</p>  <p>STEP 12</p> <p>Place sealed zip-lock bag into the return mailer (white envelope with a blue diamond-shaped sticker on the front). Seal the envelope and drop it in any mailbox.</p>  <p>Peel off adhesive to reveal seal.</p>	

Prevalence of HPV DNA Types of All Specimens among 279 Subjects



Results

HPV vaccine prevention rates by specimen type from 279 subjects



HPV, human papilloma virus; 2vHPV, bivalent vaccine (16/18); 4vHPV, quadrivalent vaccine HPV type (6/11/16/18); 9vHPV, 9valent vaccine HPV type (6/11/16/18/31/33/45/52/58)

Factors Associated with Infection of High Risk HPV Types at Any Site

Covariate	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P-value	aOR (95% CI)	P-value
Age ≥31 years	0.33(0.11-0.98)	<0.05	0.46(0.18-1.16)	
Employed	3.39(1.48-7.80)	<0.05	3.85(1.54-9.66)	<0.05
Drug use	0.31(0.11-0.88)		0.25(0.07-0.91)	
Receptive anal sex	0.92(0.25-3.47)		3.1(0.12-80.63)	
Circumcised	0.77(0.28-2.09)		0.81(0.24-2.74)	
STIs	0.43(0.18-1.03)		0.67(0.15-2.88)	
Anogenital or oral warts	0.71(0.32-1.54)		1.08(0.38-3.07)	
One-night stand	0.95(0.44-2.03)		0.8(0.31-2.11)	
Number of sex partners > 10	0.87(0.36-2.11)		0.72(0.21-2.47)	
Consistent condom Use	2.09(0.89-4.89)		1.14(0.39-3.38)	
HIV positive	3.11(1.37-7.08)	<0.05	2.57(1.07-6.14)	<0.05

CI=confidence interval; HIV=human immunodeficiency virus; HPV=human papilloma virus; OR=odds ratio; STI= sexually transmitted infection

Limitations

The study subjects were exclusively from Taiwan.

Anal pap smears or cytology should be performed for HIV-infected MSM.

- We did not perform on any subjects.

Smoking increased risk of anal precancer in HR-HPV infected men.

- We did not include history of smoking as a risk factor.

Previous studies: nadir CD4 cell count <200 related to higher rates of HR-HPV in HIV infected subjects.

- We excluded the CD4-T cell count test results.

Conclusions

The following areas have higher rates in HIV-infected MSM with:

- HR-HPV**
- oral and external genital HPV**
- multiple type HPV**

We cannot say if safe sex and consistent condom use would change rates

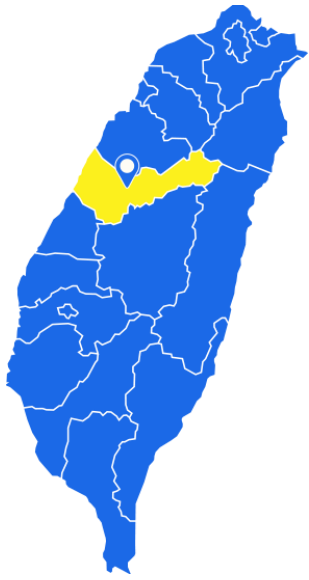
Recommend routine HPV vaccination with 9vHPV (or at least 4vHPV) vaccines for MSM or HIV-infected subjects.

It should be extended to all men.



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- **Conflict of interests:**
 - The authors declared no conflict of interests.



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Thank You !

