



CONFERENCIA DE ESTUDIOS POBLACIONALES DE PUERTO RICO  
15 de noviembre de 2013  
Universidad de Puerto Rico en Cayey



*Disparities in HPV-related cancer  
occurrence in  
Puerto Rico: Implications for prevention  
efforts and population-based research*

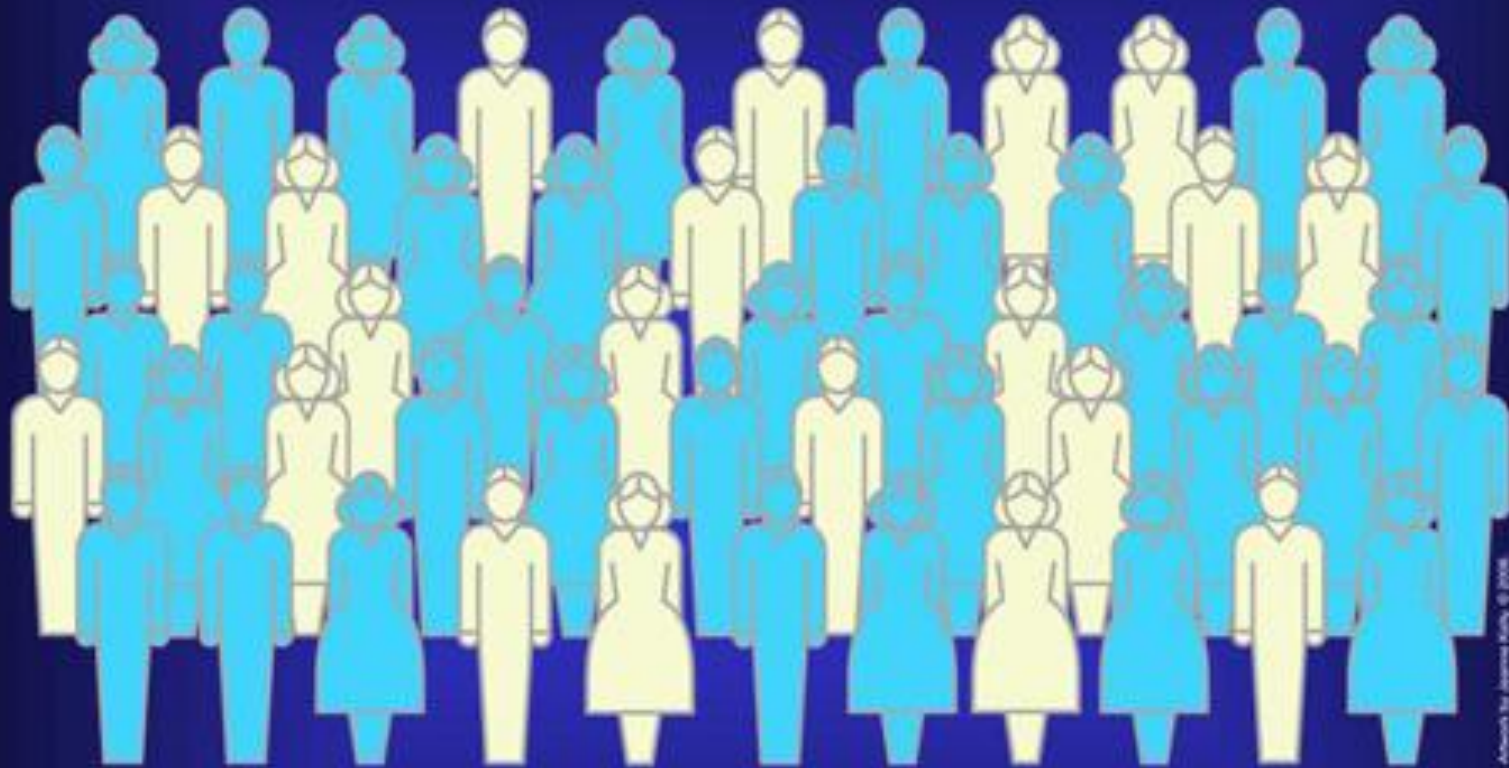
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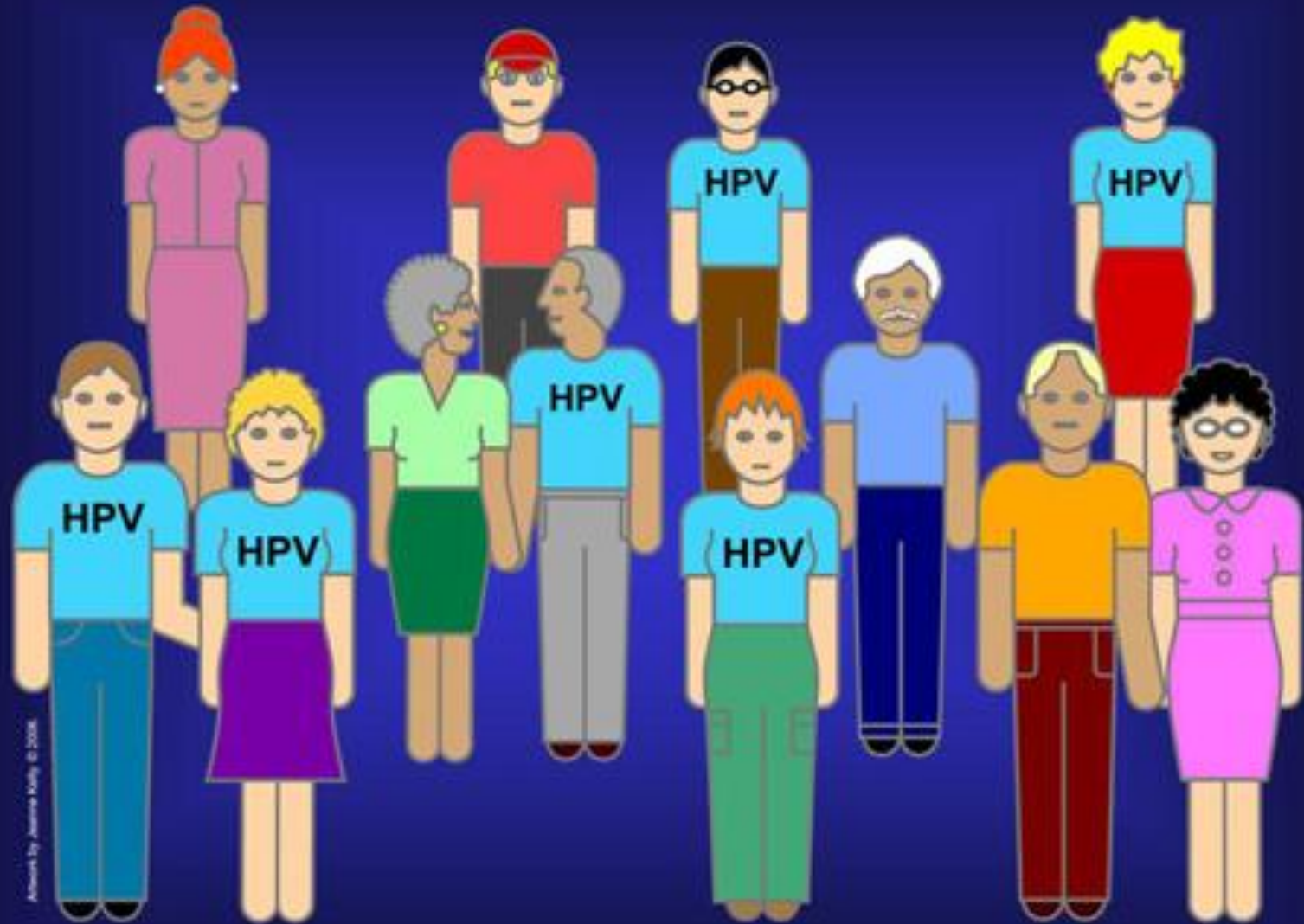
# Common Infection



■ Infected with HPV

\*\*\*80% of sexually active persons infected at some point

# Infection Is Sexually Transmitted



Adapted by Jennifer Kelly © 2008

\*\* Over 30 types can be passed from one person to another through sexual contact.

# Human papillomaviruses (HPV)

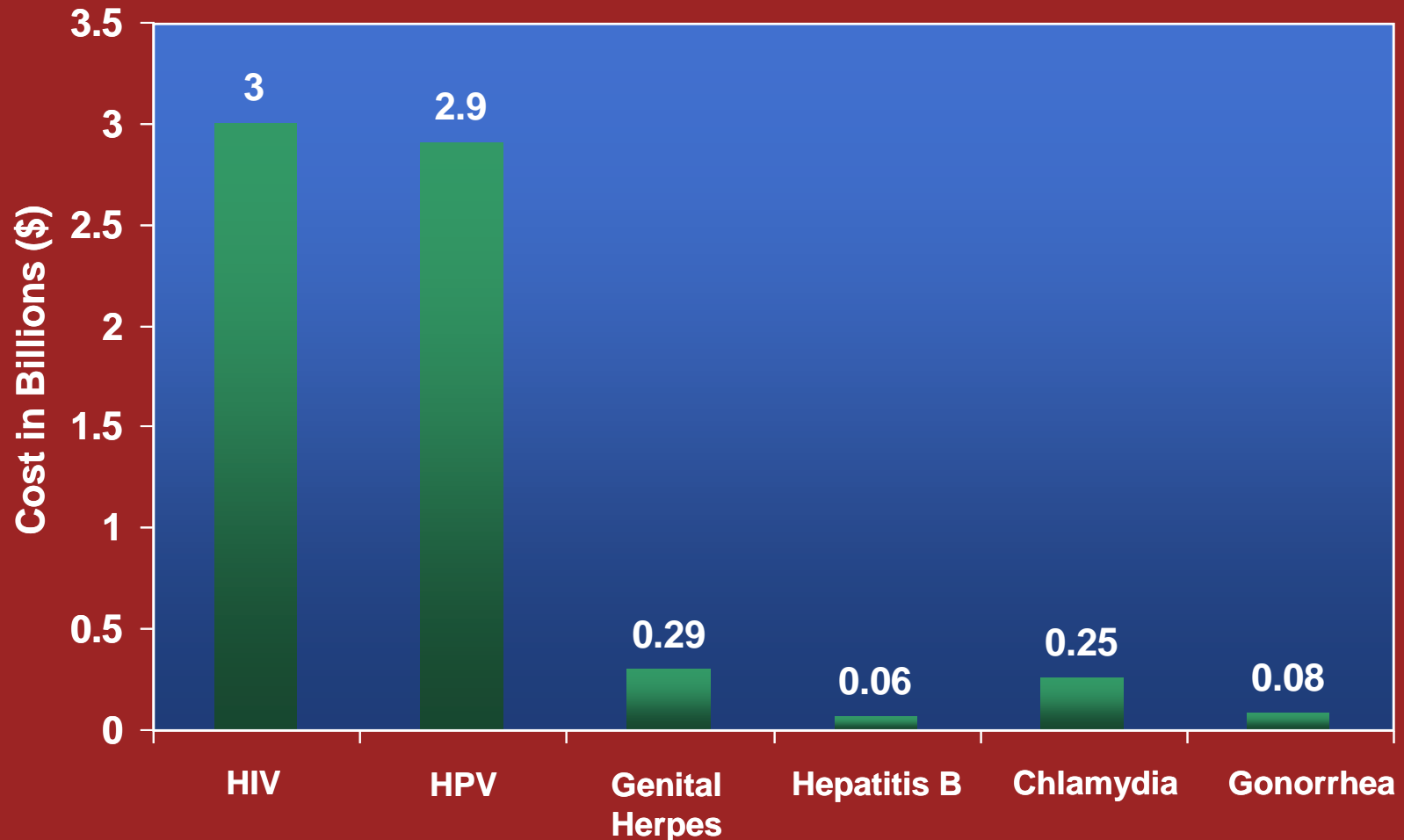
- HPV are a group of more than 100 viruses.
- Sexually transmitted, **high-risk** HPVs include types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 69, and possibly a few others.
- Types associated with warts include types HPV–6 and HPV–11.



# HPV and cancer

- ❑ 5.2% of world-wide cancer incidence HPV related
- ❑ Persistent infection with certain types of HPV established as a necessary cause for cervical cancer.
- ❑ Also associated to cancer of the anus, vulva and vagina, penis, mouth, and oro-pharynx.
  
- ❑ Current estimates of the population attributable fraction in the US are very high (MMWR, 2012):
  - ❑ 96% for cervical
  - ❑ 93% for anal
  - ❑ 51% for vulvar
  - ❑ 64% for vaginal
  - ❑ 36% for penile
  - ❑ 63% of oropharyngeal cancer

# Estimated Direct Medical Costs of HPV and Other STIs in Persons 15–24 Years of Age, 2000<sup>1</sup>



1. Chesson HW, Blandford JM, Gift TL, Tao G, Irwin KL. *Perspect Sex Reprod Health*. 2004;36:11–19.

# Prevalence of HPV infection in US women and men

- Self-sampled HPV DNA among US females enrolled in the 2003-2004 NHANES: 26.8% (Dunne, 2007).
- Anal and cervical HPV DNA among Hawaiian women, 29% and 27%, respectively (Hernández, 2005).
- Varies from 20-90% among HIV positive individuals.
- Penile/scrotal samples among men: 61.3% (Giuliano, 2008).

# Risk Factors for HPV Infection

## Women

- Young age (peak age group 20–24 years of age)<sup>1</sup>
- Lifetime number of sex partners<sup>2</sup>
- Early age of first sexual intercourse<sup>3</sup>
- Male partner sexual behavior<sup>3</sup>
- Smoking<sup>4</sup>
- Oral contraceptive use<sup>4</sup>
- Uncircumcised male partners<sup>5</sup>

## Men

- Young age (peak age group 25–29 years of age)<sup>1</sup>
- Lifetime number of sex partners<sup>6</sup>
- Being uncircumcised<sup>6</sup>

1. Insinga RP, Dasbach EF, Myers ER. *Clin Infect Dis*. 2003;36:1397–1403. 2. Burk RD, Ho GYF, Beardsley L, Lempa M, Peters M, Bierman R. *J Infect Dis*. 1996;174:679–689. 3. Murthy NS, Mathew A. *Eur J Cancer Prev*. 2000;9:5–14. 4. Winer RL, Lee S-K, Hughes JP, Adam DE, Kiviat NB, Koutsky LA. *Am J Epidemiol*. 2003;157:218–226. 5. Schiffman M, Castle PE. *Arch Pathol Lab Med*. 2003;127:930–934. 6. Svare EI, Kjaer SK, Worm AM, Osterlind A, Meijer CJLM, van den Brule AJ. *Sex Transm Infect*. 2002;78:215–218.



# HPV Prevention

- Abstinence
- Monogamous Relationship
- Condom use
- Vaccine

# HPV vaccines

- **Two licensed vaccines (safe and effective)**
  - a quadrivalent vaccine (HPV4) for the prevention of cervical, vaginal and vulvar cancers (in females) and genital warts and anal cancer (in females and males)
  - a bivalent vaccine (HPV2) for the prevention of cervical cancers in females.
- Vaccines most effective when given before exposure to HPV through sexual contact.
- Administered intramuscularly.
- Second dose should be administered 2 months after the first dose and the third dose 6 months after the first dose.




# The Recommended Immunization Schedules for Persons Aged 0 through 18 Years are approved by the Advisory Committee on Immunization Practices

(<http://www.cdc.gov/vaccines/recs/acip>), the American Academy of Pediatrics (<http://www.aap.org>), and the American Academy of Family Physicians (<http://www.aafp.org>).

## Recommended Immunization Schedule for Persons Aged 7 Through 18 Years—United States • 2010

For those who fall behind or start late, see the schedule below and the catch-up schedule

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years
Tetanus, Diphtheria, Pertussis <sup>1</sup>			Tdap	Tdap
Human Papillomavirus <sup>2</sup>	see footnote 2		HPV (3 doses)	HPV series
Meningococcal <sup>3</sup>		MCV	MCV	MCV
Influenza <sup>4</sup>		Influenza (Yearly)		
Pneumococcal <sup>5</sup>		PPSV		
Hepatitis A <sup>6</sup>		HepA Series		
Hepatitis B <sup>7</sup>		Hep B Series		
Inactivated Poliovirus <sup>8</sup>		IPV Series		
Measles, Mumps, Rubella <sup>9</sup>		MMR Series		
Varicella <sup>10</sup>		Varicella Series		

 Range of recommended ages for all children except certain high-risk groups  
 Range of recommended ages for catch-up immunization  
 Range of recommended ages for certain high-risk groups

# HPV vaccination among youth aged 11-18 years entered into the PR Immunization Registry (February 4, 2013)

	Both Sexes	Female	Male	Unknown**
1 dose	39%	45%	34%	28%
2 doses	26%	28%	26%	21%
3 doses	13%	17%	8%	7%
Total Population*(n)	467,865	233,788	224,481	9,596

\*Total de población por cada grupo entrada a PRIR (Registro de Vacunación de Puerto Rico) al lunes 4 de febrero de 2013.

\*\*Desconocidos: se desconoce el sexo ya que no lo entraron en el Registro.

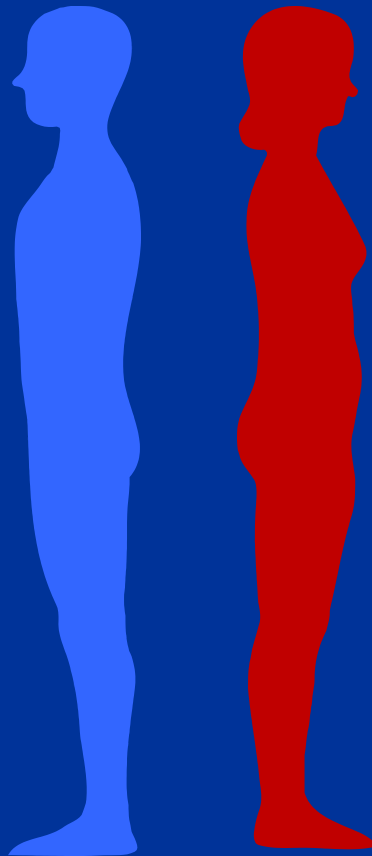


# Puerto Rico



# Top Ten Incidence Cancer Sites, 2005-2009\*

Males (N=32,714) %		Females (N=27,935) %	
Prostate	40.2	Breast	30.6
Colon and Rectum	13.4	Colon and Rectum	14.0
Lung and Bronchus	6.4	Thyroid	8.1
Urinary Bladder	4.1	Corpus and Uterus	7.1
<b>Oral Cavity and Pharynx</b>	<b>4.0</b>	Lung and Bronchus	4.2
Non-Hodgkin Lymphoma	3.4	Non-Hodgkin Lymphoma	3.8
Stomach	2.9	<b>Cervix Uteri</b>	<b>3.7</b>
Liver and Intrahepatic Bile	2.8	Stomach	2.6
Kidney and Renal Pelvis	2.1	Ovary	2.6
Leukemia	2.1	Leukemia	1.9
Other Locations	18.4	Other Locations	21.3



\*Statistics are from an average of the years 2005-2009/statistics that presents the year 2009 are preliminary.

Cases with age unknown were included/ Statistics were generated from malignant cases only

Rates are per 100,000 and age-adjusted to the 2000 PR population

Data Source: Puerto Rico Central Cancer Registry, Preliminary Puerto Rico Cancer Incidence File (December, 2011)

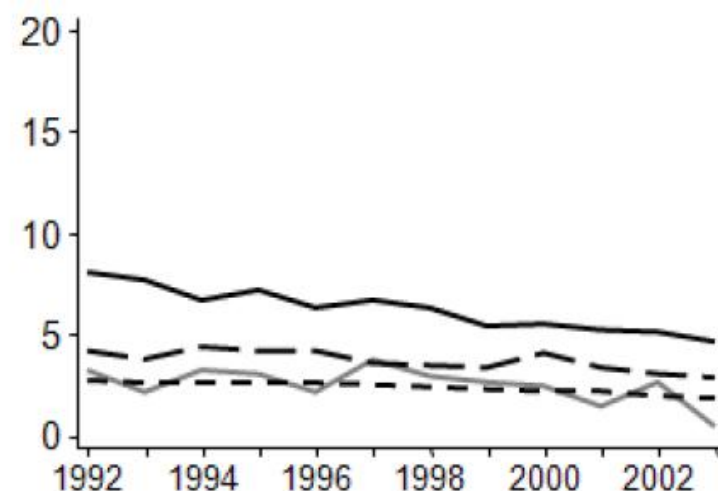
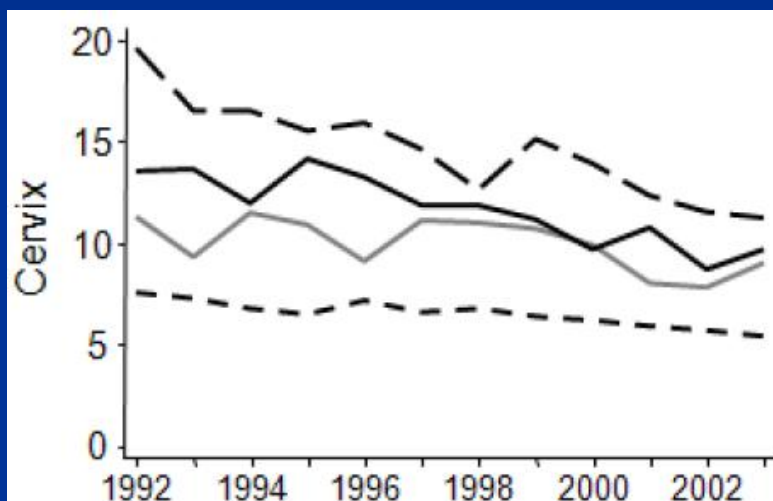
# HPV related cancer burden in PR

- In PR, the estimated economic impact of HPV related cancers in 2004 was high; approximately 7.5% (close to 5 million dollars) of the total cancer costs (Ortiz-Ortiz, 2010).
- High burden of cervical cancer in PR as compared with NHW in the US, as well as an increasing incidence of anal cancer (Ortiz, 2010; Colón-Lopez, 2010).
- Higher incidence and mortality from oral and penile cancer in PR as compared with NHW in the US (Suarez, 2009; Ho, 2009).
- Increasing trends of anal cancer (PRCCR, 2012).

# **Trends for cervical cancer ASR(Global) incidence and mortality rates (per 100,000) for Puerto Rico (PR) and Non-Hispanics whites (NHW), Non-Hispanics black (NHB) and US Hispanics (USH), 1992-2004.**

Incidence x 100,000

Mortality x 100,000



APC: PR= -2.2\* NHW= -2.6\* USH= -4.2\* NHB= -3.7\*

APC: PR= -4.0 NHW= -2.9\* USH= -2.8\* NHB= -3.7\*

Legend: PR — NHW - - - - USH - . - - - NHB - - - -

\* Statistically significant ( $p < 0.05$ )



# Oral and pharyngeal cancer

Table 1: ASR(World) for incidence and mortality (per 100,000) for oral and pharyngeal cancer during 1998–2002.

	Age Standardized Rate (ASR)				Standardized Relative Ratio <sup>a</sup> (SRR)		
	PR	USH	NHW	NHB	PR vs. USH <sup>b</sup>	PR vs. NHW <sup>b</sup>	PR vs. NHB <sup>b</sup>
<b>Incidence<sup>c</sup></b>							
Male	18.5	9.5	16.3	17.3	1.96 (1.69, 2.22)	1.14 (1.05, 1.22)	1.08 (0.96, 1.19)
Female	5.2	4.3	7.1	5.4	1.20 (1.00, 1.45)	0.74 (0.65, 0.83)	0.95 (0.81, 1.12)
SRR Men vs. Women <sup>b</sup>	3.56 (3.10, 4.12)	2.20 (1.83, 2.65)	2.30 (2.21, 2.41)	3.17 (2.79, 3.45)			
<b>Mortality<sup>c</sup></b>							
Male	7.9	3.5	4.4	6.8	2.27 (1.92, 2.70)	1.79 (1.59, 2.00)	1.15 (1.01, 1.30)
Female	2.3	1.2	2	2.1	1.82 (1.41, 2.33)	1.10 (0.88, 1.35)	1.09 (0.86, 1.33)
SRR Men vs. Women <sup>b</sup>	3.50 (2.78, 4.47)	2.80 (2.36, 3.35)	2.17 (2.10, 2.23)	3.29 (3.03, 3.46)			

<sup>a</sup> The ratio of two ASR (World) with 95% confidence interval between parentheses.

<sup>b</sup> Reference group

<sup>c</sup> × 100,000

Higher Risk

Lower Risk

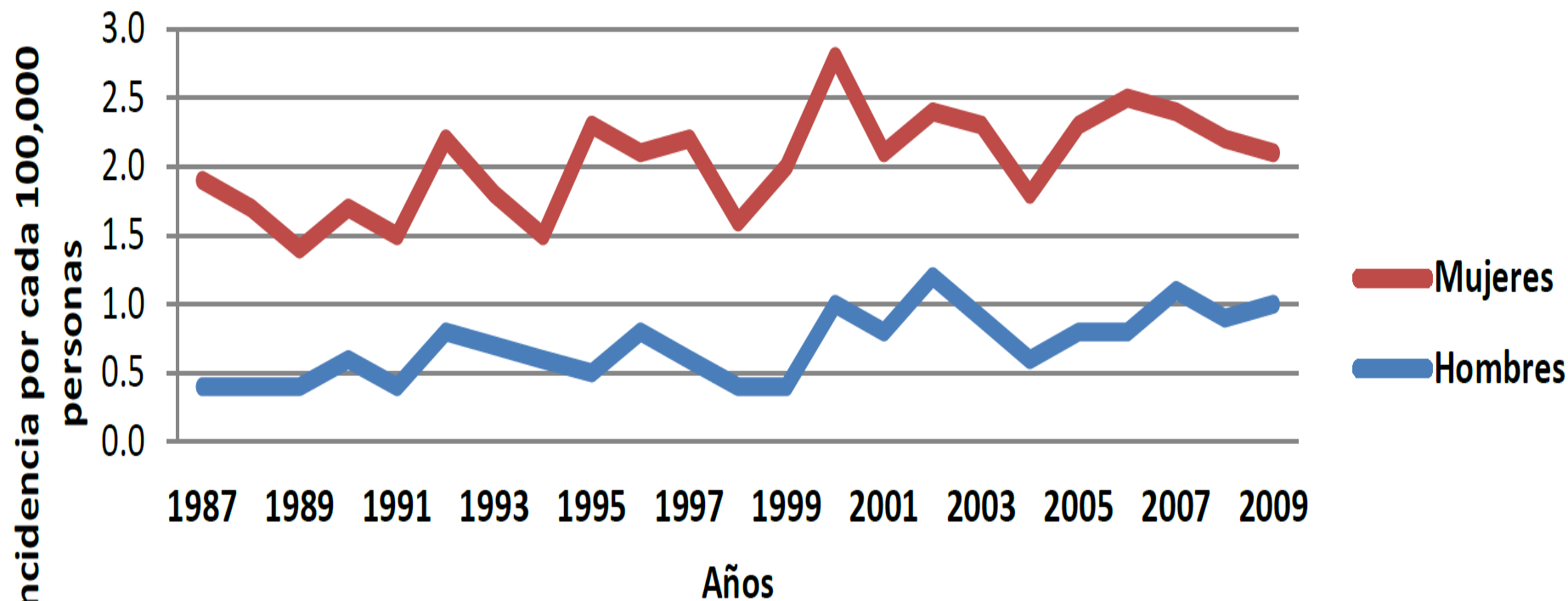
## Age-standardized (World) Incidence and Mortality Rates (per 100,000) for Penile Cancer: 2000-2004.

	PR	USH	NHW	NHB	SRR (95% CI)		
					PR vs. USH	PR vs. NHW	PR vs. NHB
Incidence	2.81	1.09	0.84	0.92	<b>2.59 (1.99-3.43)</b>	<b>3.33 (2.80-3.95)</b>	<b>3.04 (2.21-4.36)</b>
Mortality	0.63	0.33	0.19	0.25	<b>1.89 (1.30-2.68)</b>	<b>3.32 (2.38-4.43)</b>	<b>2.51 (1.71-3.55)</b>

Higher Risk

Source: Colón-López V, Ortiz AP, Soto-Salgado M, Torres-Cintrón M, Pettaway CA, Puras-Báez A, Martínez-Ferrer M, Suárez E. [Penile Cancer Disparities in Puerto Rican Men as compared to the United States Population](#). Int Braz J Urol. 2012 Nov;38(6):728-38.

# Incidencia de Cáncer de Ano en Hombres y Mujeres en Puerto Rico: 1987-2009



**Gráfica #5.** Incidencia de cáncer de ano por sexo en Puerto Rico.

**What have we learned from studies of HPV infection, awareness and related risk behaviors in Puerto Rico?**



# Results

# Population-based study of HPV infection among women in the San Juan Metropolitan Area of Puerto Rico

## ■ Study design and population:

- Cross-sectional study (2010-2013)
- Study sample is being identified through a complex sampling design of households in the San Juan Metropolitan Area, composed of seven municipalities, and includes non-institutionalized women aged 16-64 years old residing in this area.
- n=600 women

# Instructions for self-collection

## Instrucciones para el auto-examen anal del Virus de Papiloma Humano (VPH)

	<ol style="list-style-type: none"> <li>1. Relájese y lávese las manos.</li> <li>2. Póngase de pie con las piernas abiertas y ligeramente flexionadas (en cuclillas) o bien apoyando un pie en una superficie sobre-elevada (inodoro, bañera o taburete).</li> <li>3. Humedezca la parte algodónada del palillo con agua estéril.</li> <li>4. Coloque el palillo en la entrada del ano, y ejerciendo un poco de presión, introduzca la parte algodónada por lo menos una (1) pulgada en el canal anal.</li> </ol>
	<ol style="list-style-type: none"> <li>5. Suavemente rote el palillo aplicando un poco de presión sobre las paredes del canal anal, realizando un movimiento en espiral durante aproximadamente diez (10) segundos.</li> </ol>
	<ol style="list-style-type: none"> <li>6. Saque el palillo por completo. Destape el envase que se le entregó. Tenga cuidado con el líquido que hay dentro del envase. Coloque el palillo dentro del envase con la parte algodónada del palillo primero, procurando que no roce con nada alrededor. Rompa el palillo contra el borde del envase (solamente tiene que doblarlo y se partirá) para que éste quede dentro del envase y cierre el mismo.</li> <li>7. Entréguele el envase a la entrevistadora.</li> </ol>

Referencia: Female Swab Specimen Collection Kit, DIGENE Corporation, Gaithersburg, MD

## Instrucciones para el auto-examen vaginal del Virus de Papiloma Humano (VPH)

	<ol style="list-style-type: none"> <li>1. Relájese y lávese las manos.</li> <li>2. Póngase de pie con las piernas abiertas y ligeramente flexionadas (en cuclillas) o bien apoyando un pie en una superficie sobre-elevada (inodoro, bañera o taburete).</li> <li>3. Humedezca el cepillo con agua estéril.</li> <li>4. Coloque el cepillo en la vagina a la vez que mantiene los labios de la vulva abiertos. Trate de colocar el cepillo directamente dentro de la vagina sin que toquen nada de sus genitales.</li> </ol>
	<ol style="list-style-type: none"> <li>5. Inserte el cepillo dentro de la vagina lo más que pueda, sin soltar su parte inferior (como si fuera un tampón).</li> <li>6. Saque el cepillo un poco (hasta la mitad de la vagina aproximadamente) y vuélvalo a introducir hasta el fondo. Mueva el cepillo hacia arriba y hacia abajo cinco (5) veces, trate de apuntar al cuello de la cervix (cuello del útero, al fondo de la vagina).</li> </ol>
	<ol style="list-style-type: none"> <li>7. Al llegar al cervix, rote el cepillo tres (3) veces.</li> </ol>
	<ol style="list-style-type: none"> <li>8. Saque el cepillo por completo. Destape el envase que se le entregó. Tenga cuidado con el líquido que hay dentro del envase. Coloque el palillo dentro del envase con el cepillo primero, procurando que no roce con nada alrededor. Rompa el palillo contra el borde del envase (solamente tiene que doblarlo y se partirá) para que éste quede dentro del envase y cierre el mismo.</li> <li>9. Entréguele el envase a la entrevistadora.</li> </ol>

Referencia: DNA Collection Device, DIGENE Corporation, DIGENE Corporation, Gaithersburg, MD

## Instrucciones para el auto-examen oral del Virus del Papiloma Humano (VPH)

Vamos a pedirle que haga un enjuague bucal con el enjuagador bucal "Scope", y luego que escupa el enjuagador bucal en un envase, con el objetivo de hacer una prueba para identificar la presencia de un virus que algunas personas tienen en su boca llamado Virus del Papiloma Humano (VPH).

Primero, enjuagará su boca con el enjuague bucal por cinco (5) segundos y luego hará gárgaras por 5 segundos. Hará esto tres (3) veces y luego escupirá el enjuagador bucal en un envase. Yo (el entrevistador) le dejaré saber cuándo hacer cada uno de los pasos. ¿Tiene preguntas?

	<ol style="list-style-type: none"> <li>1. Lávese las manos.</li> <li>2. Enjuague su boca con aproximadamente 10 ml de enjuagador bucal por cinco (5) segundos y seguido haga gárgaras por cinco (5) segundos adicionales. Repita este proceso 3 veces, siguiendo las guías de tiempo del entrevistador: <ul style="list-style-type: none"> <li>• Enjuague (5 segundos)</li> <li>• Gárgara (5 segundos)</li> <li>• Enjuague (5 segundos)</li> <li>• Gárgara (5 segundos)</li> <li>• Enjuague (5 segundos)</li> <li>• Gárgara (5 segundos)</li> </ul> </li> <li>3. Escupa el enjuagador bucal en el envase sin que se derrame por el borde del mismo.</li> <li>4. Cierre el envase inmediatamente.</li> <li>5. Entréguele el envase a la entrevistadora.</li> </ol>
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\* En caso de que la boca del participante esté irritada, se hará el procedimiento con agua de sal.

Referencia: HPV Rinse (2009-2010), National Health and Nutrition Examination Survey (NHANES), Center for Disease Control and Prevention, Atlanta, GA

# Population-based study of HPV infection among women in the San Juan Metropolitan Area of Puerto Rico

Figure 1. San Juan Metropolitan Area

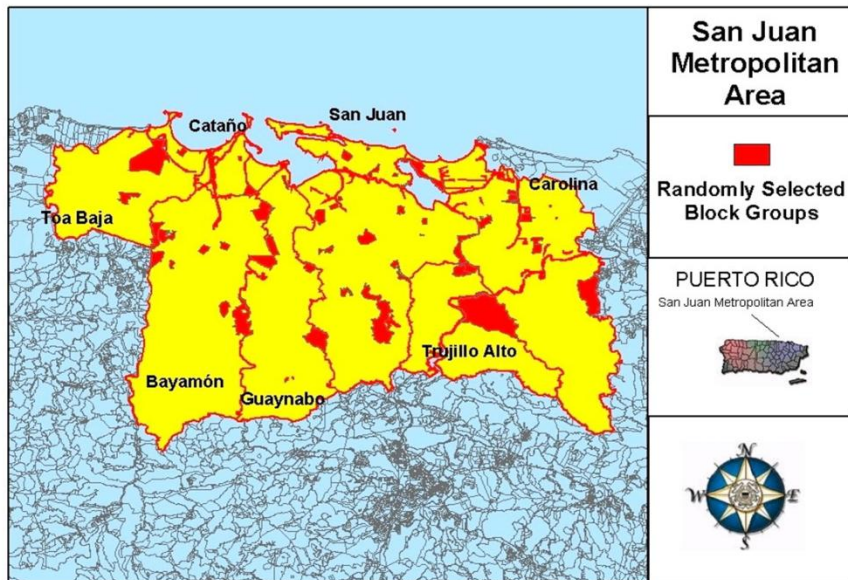
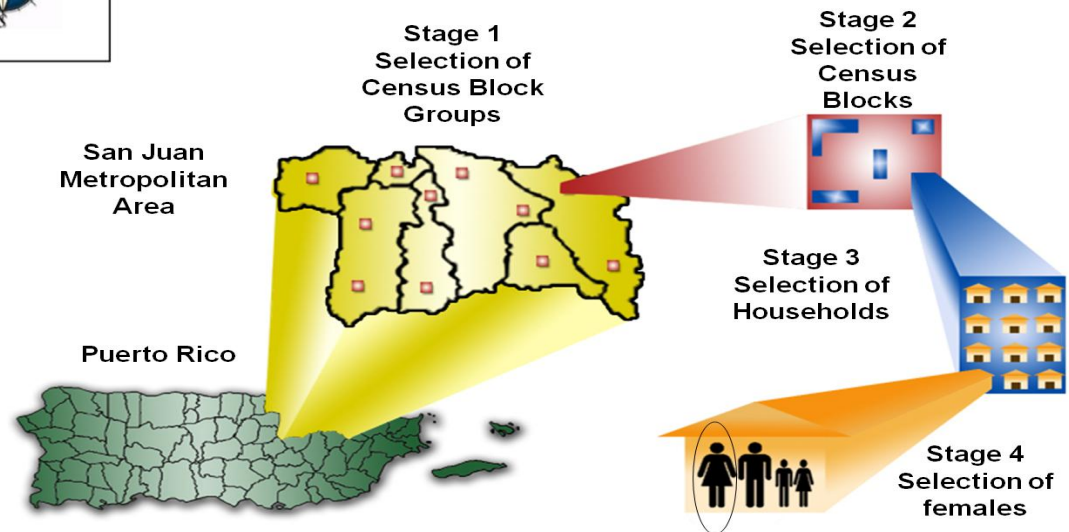


Figure 2. Sampling scheme



# Recruitment Overview

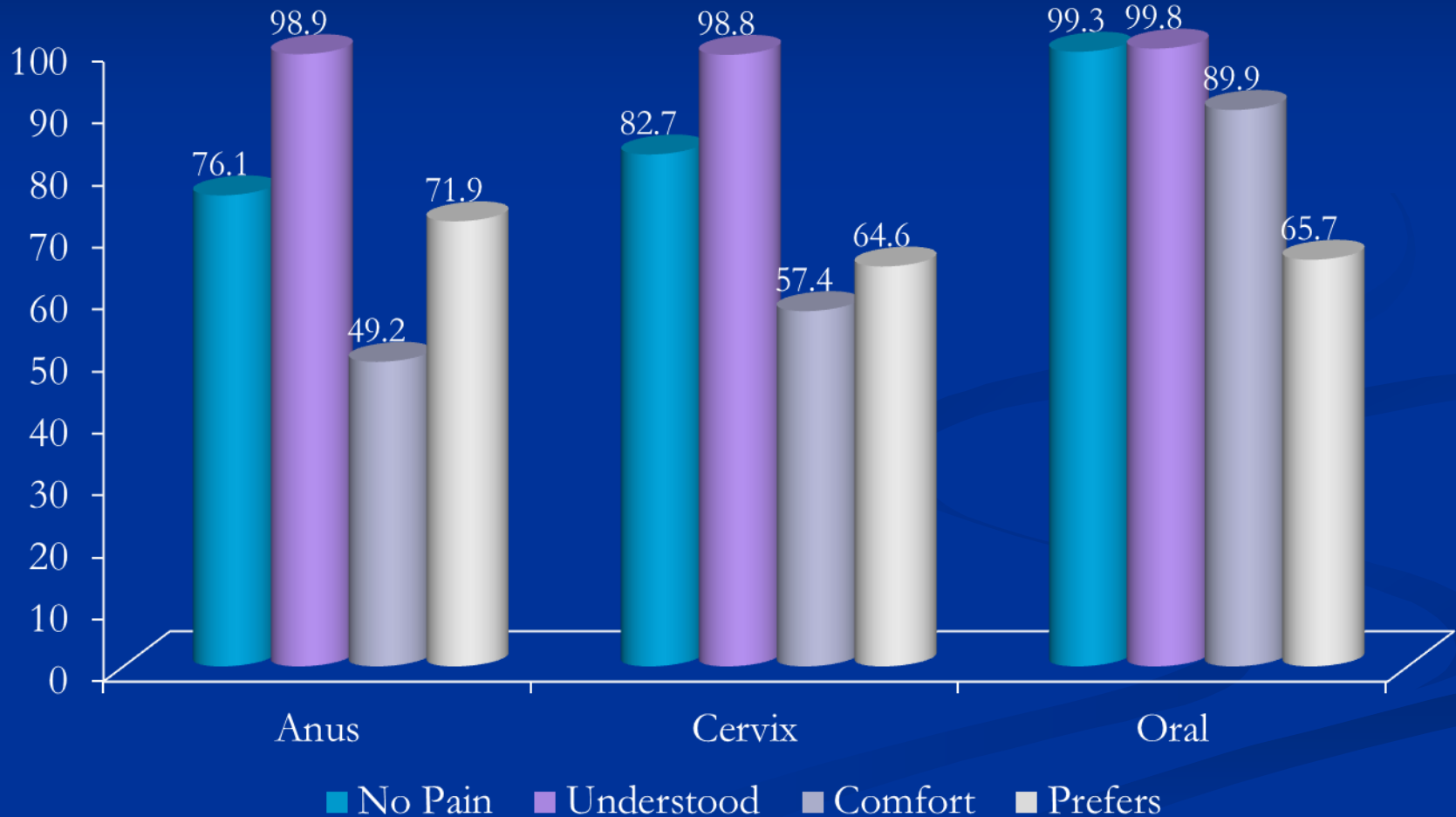
- Fifty randomly selected census tract blocks were sampled. We recruited 566 out of the 679 eligible women contacted, yielding an overall response rate of 83.4%.
- Response rates did not vary by age-group ( $p > 0.05$ ) and although they varied by socioeconomic (SES) census block strata ( $p < 0.05$ ), they were good ( $> 75\%$ ) in low, middle (87.6%), and high SES strata.
- The age distribution of the participants was 32.0% for the 16-34 age group, 35.5% for the 35-49 group and 32.5% for the 50-64 group.

## Demographics' of study population (n=566)

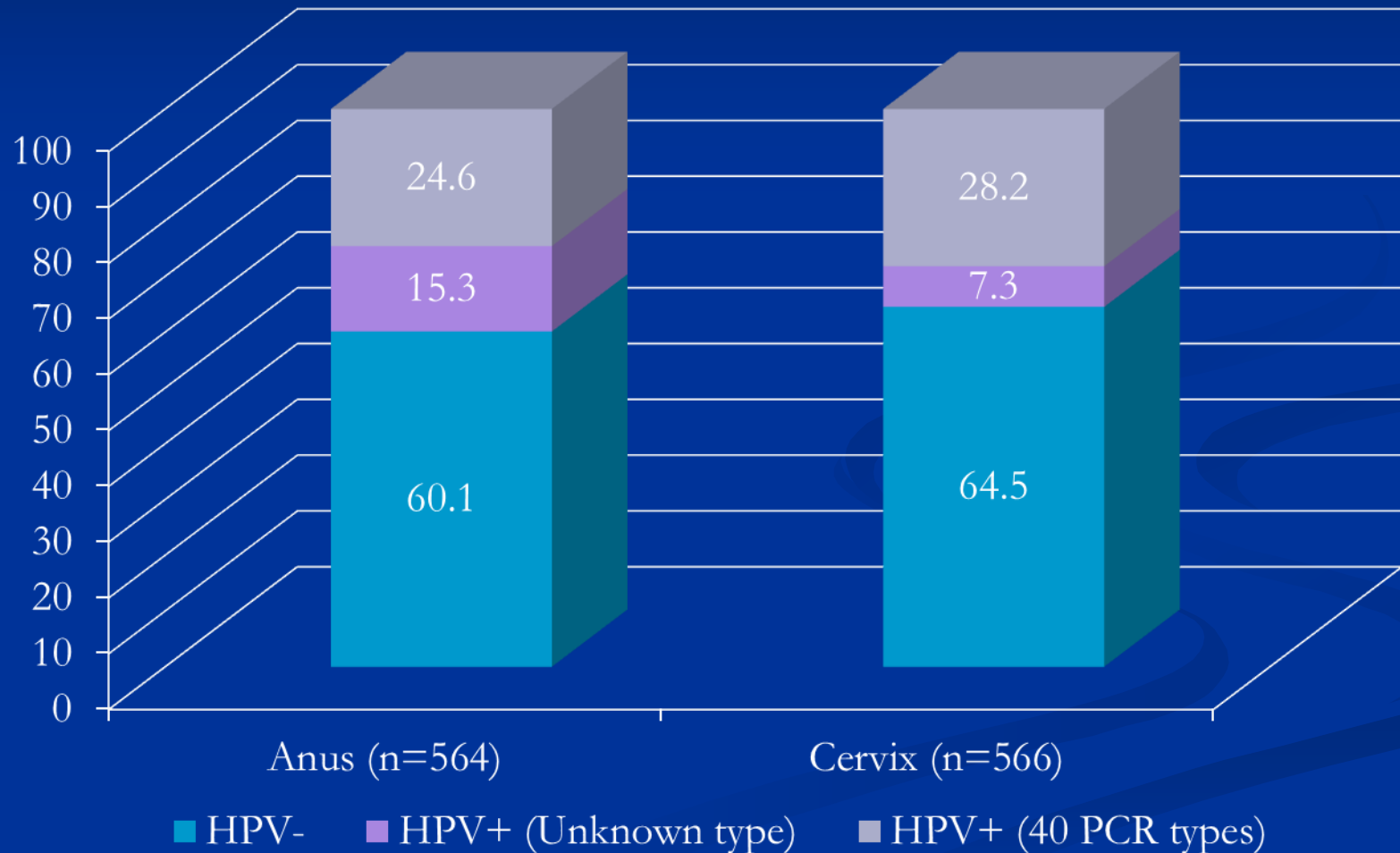
Variables	n* (%)
Age in years	
16-34	181 (32.0)
35-49	201 (35.5)
50-64	184 (32.5)
Birth place	
Puerto Rico	502 (88.7)
Dominican Republic	50 (8.8)
Other	14 (2.5)
Years of education	
$\geq 12$	475 (83.9)
$< 12$	91 (16.1)
Annual family income <sup>a</sup>	
$\geq \$20,000$	212 (41.2)
$< \$20,000$	303 (58.8)
Health care coverage	
Private	285 (50.4)
Public	228 (40.3)
None	53 (9.3)



# Women's perception of HPV self-collection methods (n=566)

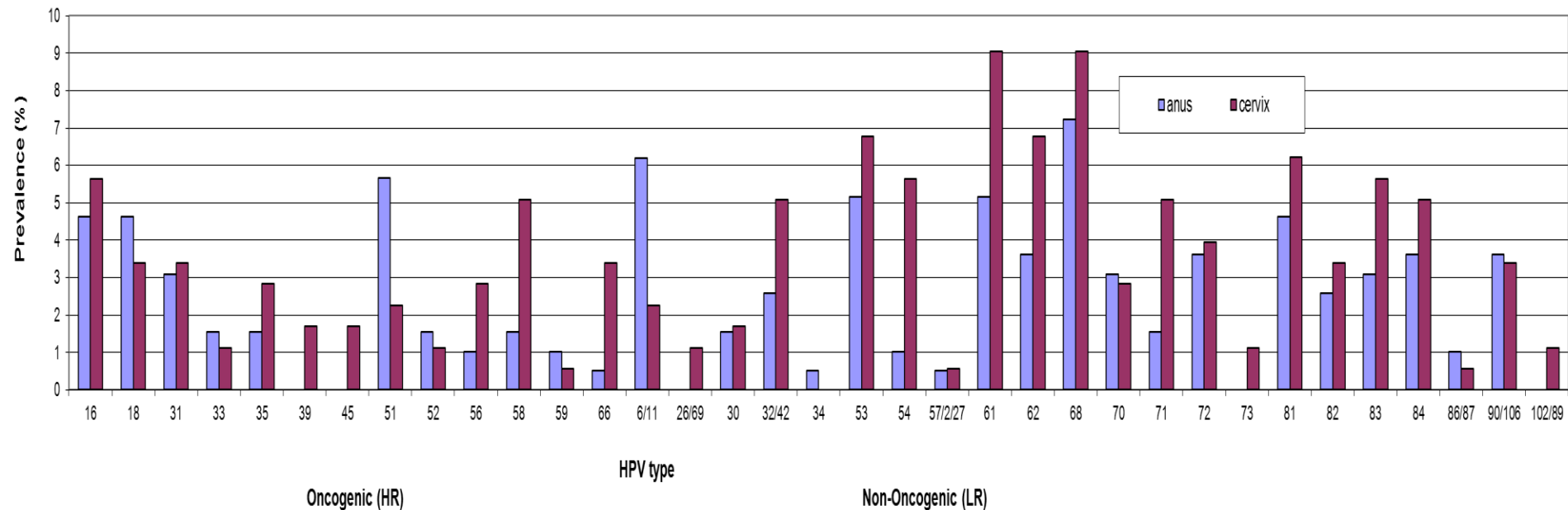


# HPV status in the cervix and anus of women aged 16-64 years: Population-based study of women in the San Juan Metropolitan Area, 2010-2013



# HPV type specific prevalence

Figure 1. HPV type-specific prevalence, among those HPV positive: Results from the Study among women living in the San Juan metropolitan area, PR (SC1 study)



# Logistic regression models to assess the strength of the association between anal and cervical HPV infection: 2010-2013

Cervical HPV Infection		
	Crude OR (95%CI)	Adjusted OR* (95%CI)
<b>Anal HPV Infection</b>		
Overall	4.01 (2.68-5.99)	3.51 (2.29-5.39)
Oncogenic	2.99 (1.62-5.47)	2.26 (1.21-4.25)
Non-Oncogenic	3.56 (2.22-5.71)	3.21 (1.96-5.25)

\*Adjusted for age, numbers of sexual partners and health care coverage.

# HPV vaccine awareness and vaccination: Population-based study of women in the San Juan Metropolitan Area, 2010-2013 (n=525)

Variables	n <sup>a</sup> (%)
Aware HPV	427 (81.2)
Aware HPV vaccine	340 (64.8)
Self-reported HPV vaccination	7(1.3)
Self-reported HPV vaccination among women aged 16-26	4 (5.1)
Self-reported HPV vaccination among women aged 27-64	3 (0.7)
Learned about HPV vaccine availability through a physician	135 (39.7)
Commonly reported reasons for not being vaccinated	
Lack of knowledge about the vaccine	102 (30.7)
Not considered at risk	76 (22.9)
Concern for secondary effects	58 (17.5)
Lack of physician recommendation	61(18.4)
Would consider vaccination if their physician recommended	431(92.7)

<sup>a</sup> Total may not equal the overall sample size because of non-response.

# Child's vaccination: parent with children aged 9-17 years

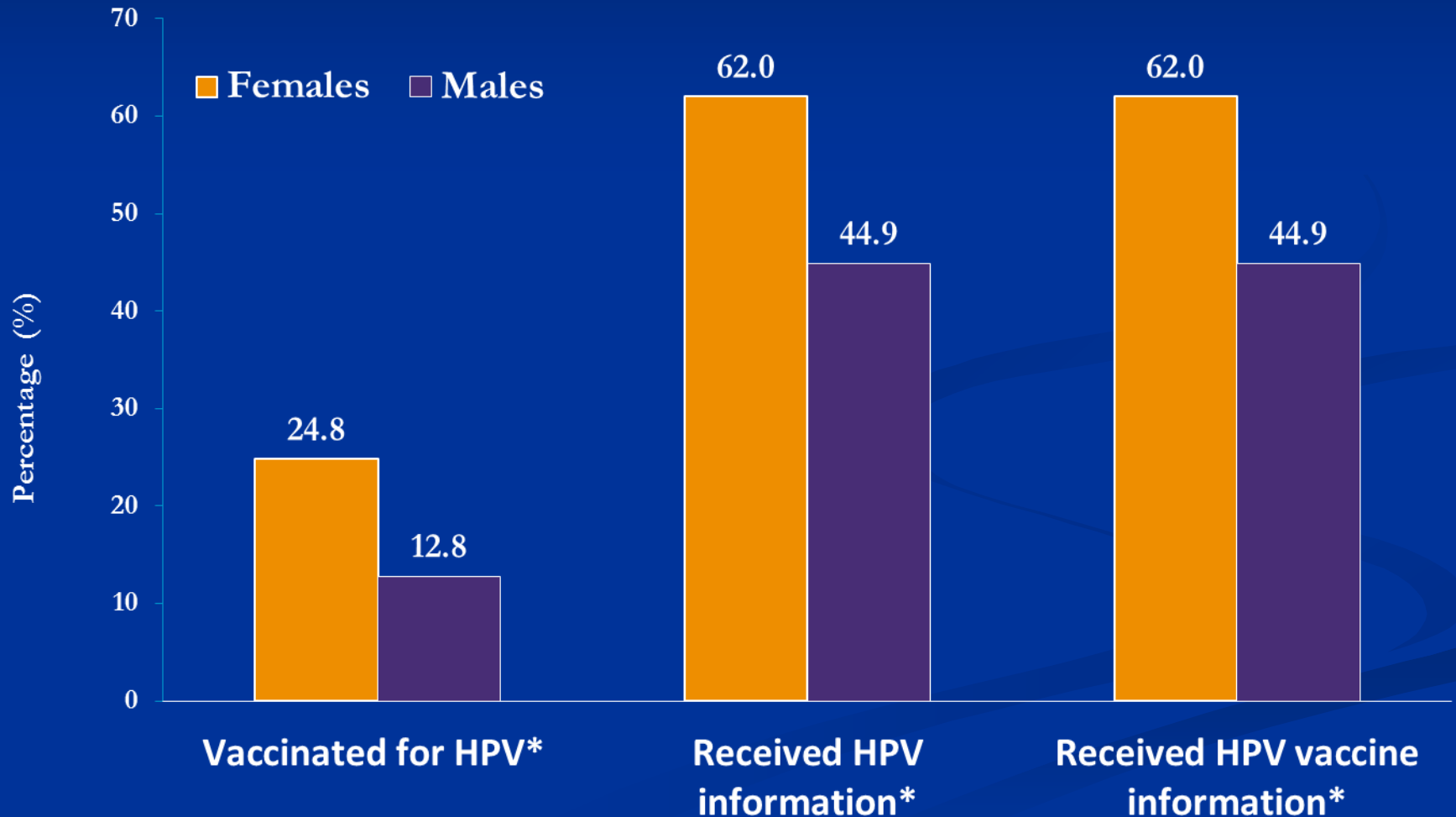
Variables	Boy (n=102)	Girl (n=94)
	%	%
Has child been vaccinated against HPV (any dose)	16.7	39.4
Would vaccinate child if doctor recommended it	<b>88.2</b>	<b>86.0</b>



# HPV vaccination among adolescents

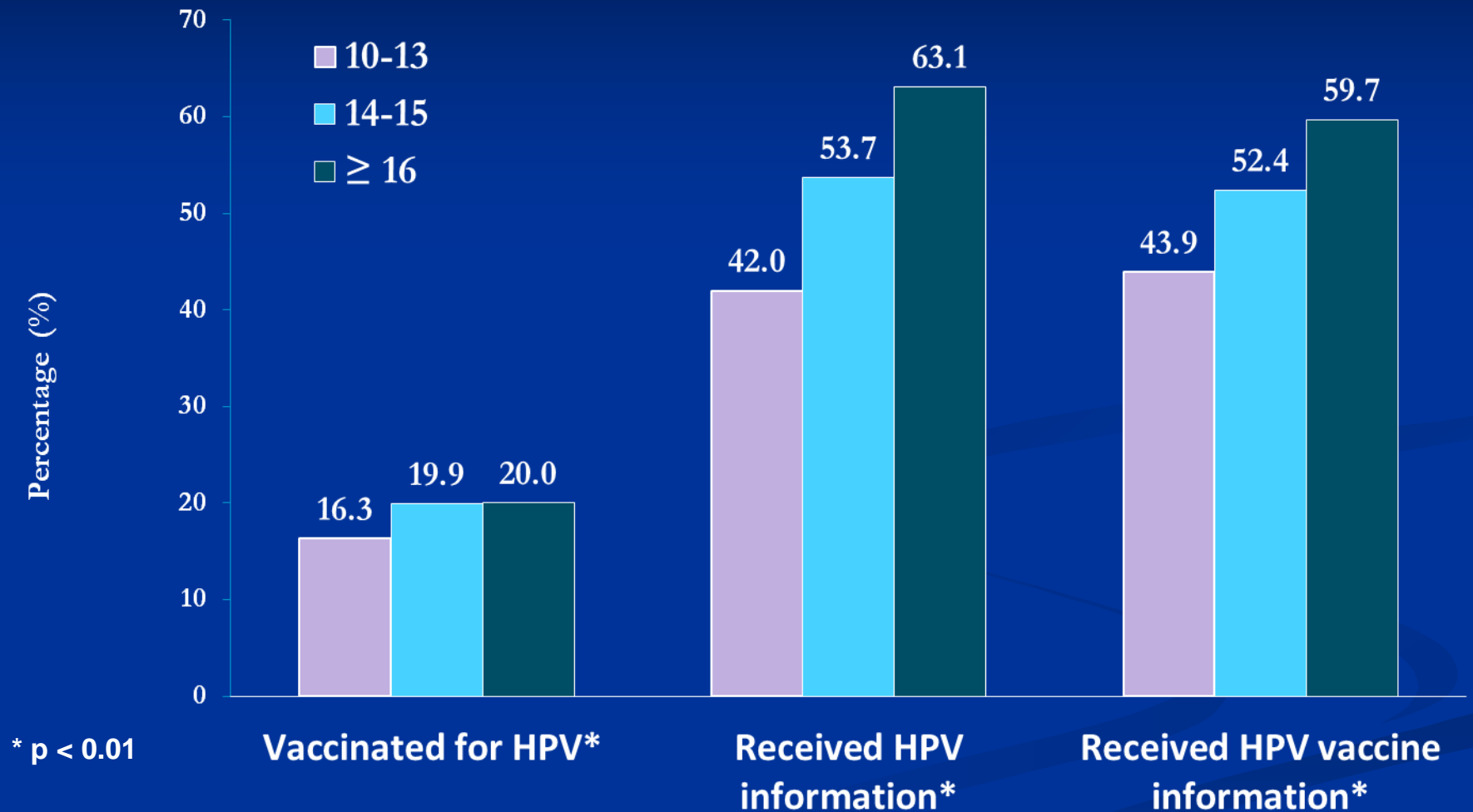
- "Consulta Juvenil VIII" survey
  - Periodic cross-sectional study
  - Designed to monitor the prevalence of substance use and other behaviors among 7<sup>th</sup> to 12<sup>th</sup> grade students
- Data collected over the period of two academic years 2010-11 and 2011-12
- Sample size = 10,134 students

# Prevalence of HPV-Related Variables by Gender among Adolescent Students, Puerto Rico, 2010-12



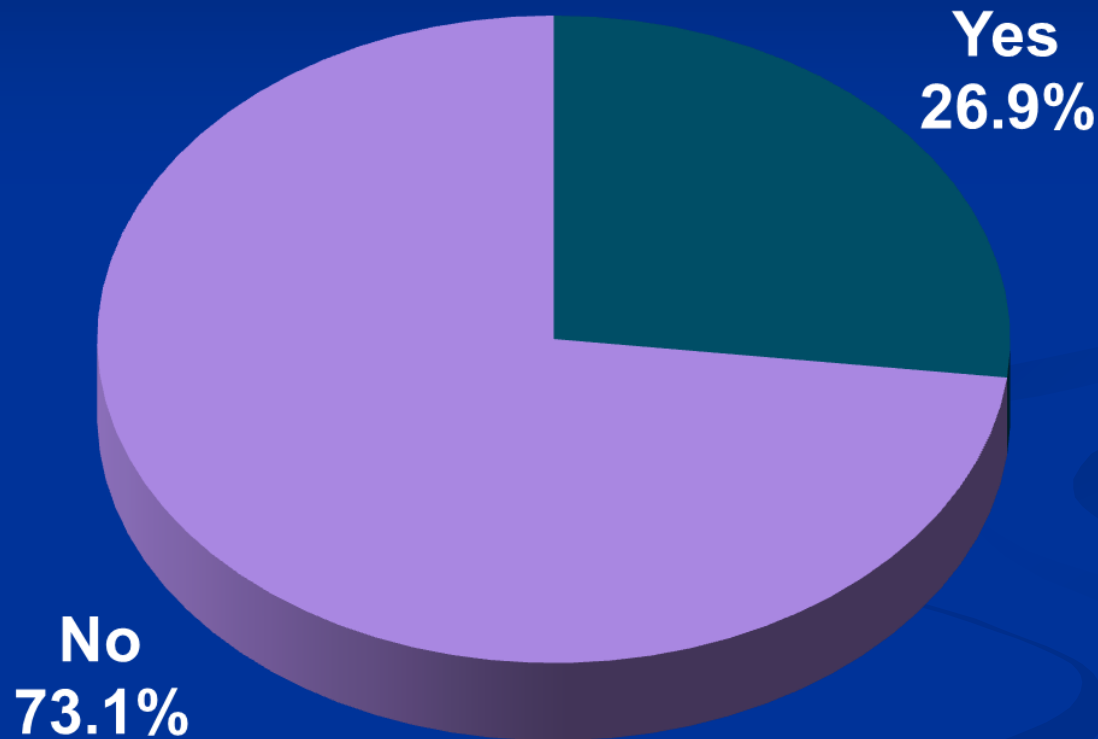
\*  $p < 0.01$

# Prevalence of HPV-Related Variables by Age Group among Adolescent Students, Puerto Rico: Consulta Juvenil 2010-12



Source: Unpublished data, Consulta Juvenil 2010-2012. Moscoso Álvarez MS, Reyes-Pulliza JC, Tortolero-Luna G, Ortiz AP, Rodríguez-Figueroa L, Sánchez-Vega H, Colón HM.

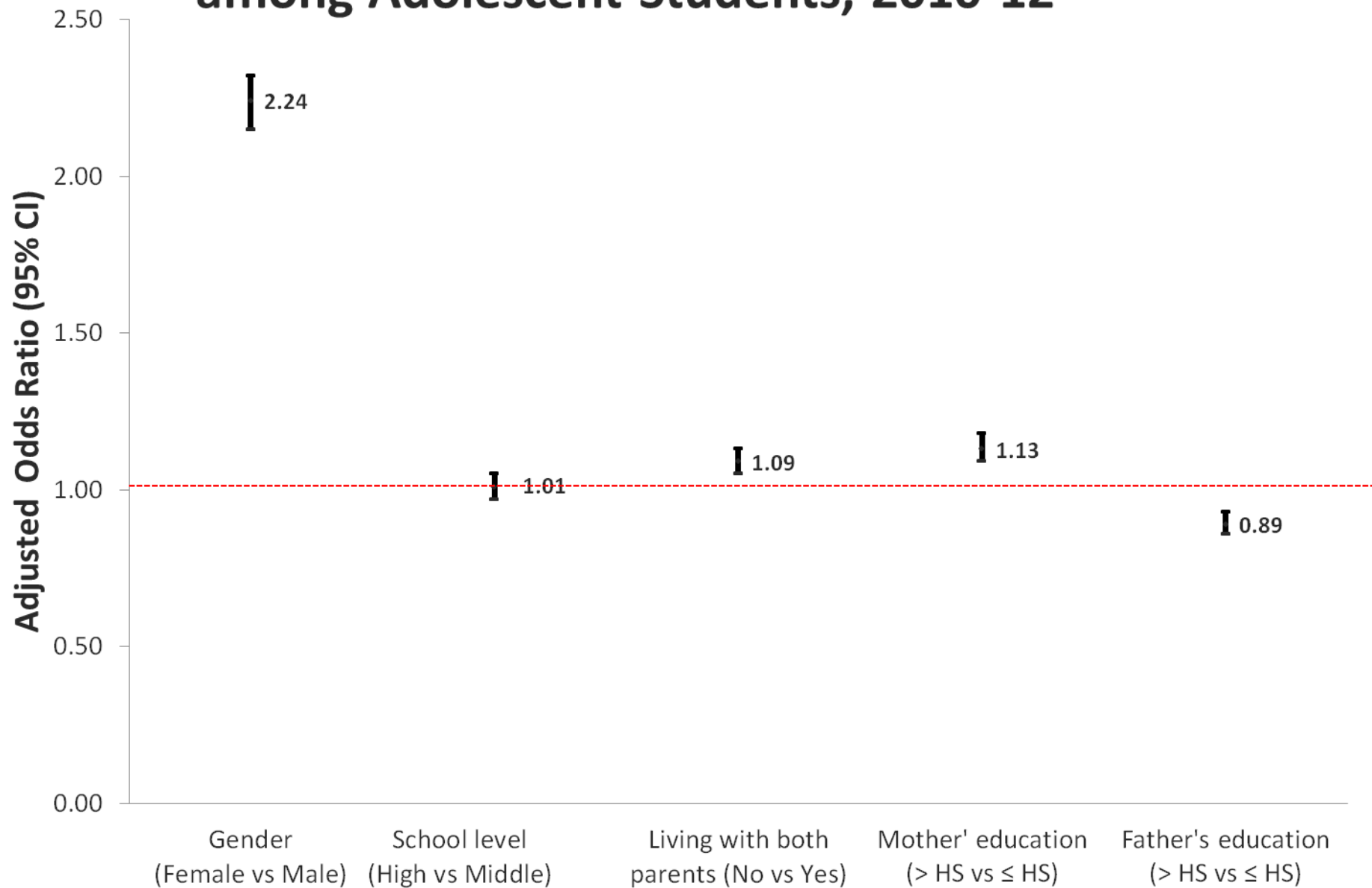
# Prevalence of Sexual Relations among Adolescent Students, Puerto Rico: Consulta Juvenil 2010-12 (n=9889)\*



\*Mean age of onset=14  $\pm$  2 years

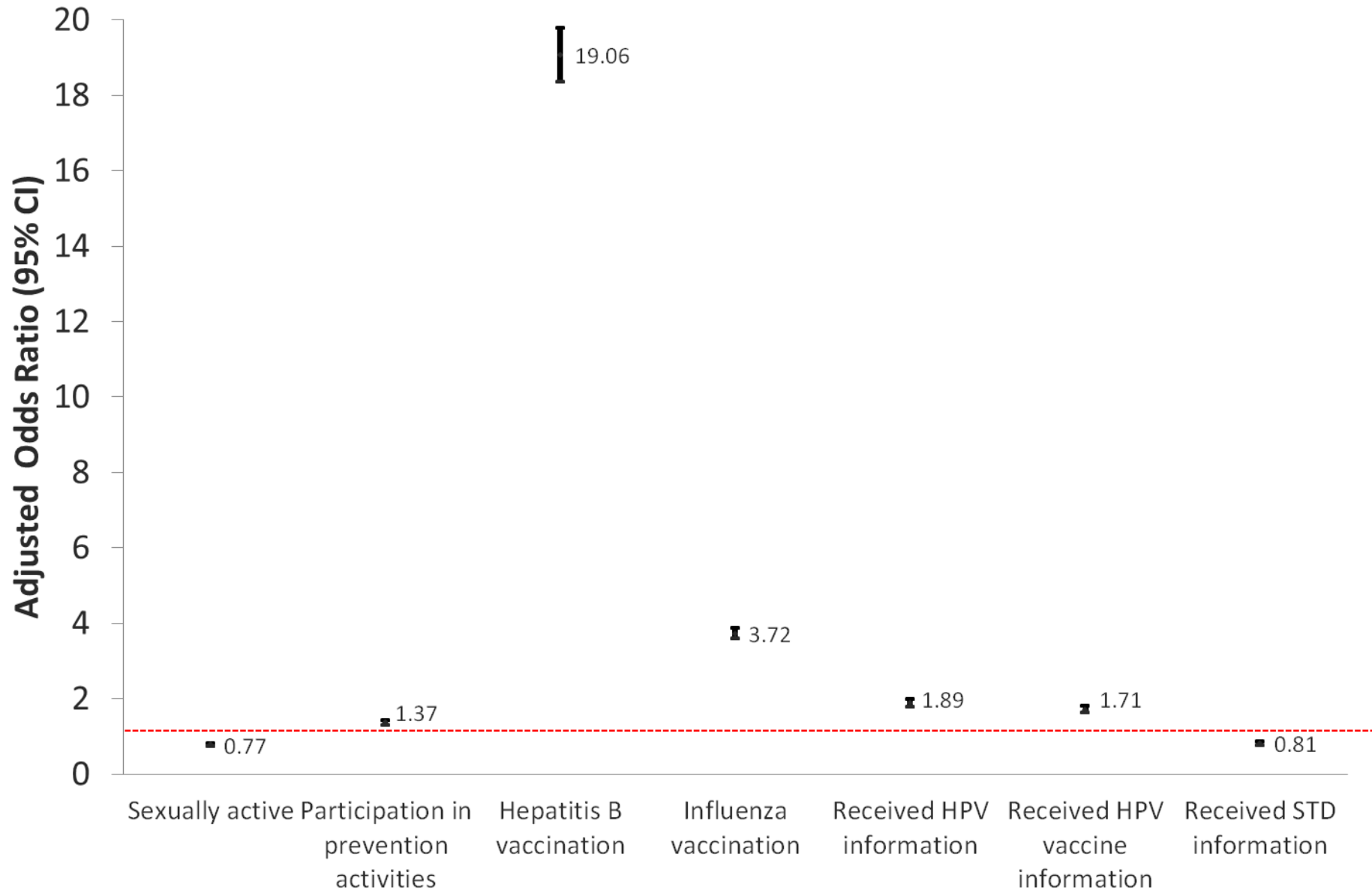
Source: Unpublished data, Consulta Juvenil 2010-2012. Moscoso Álvarez MS, Reyes-Pulliza JC, Tortolero-Luna G, Ortiz AP, Rodríguez-Figueroa L, Sánchez-Vega H, Colón HM.

# Characteristics Associated to HPV Vaccination among Adolescent Students, 2010-12\*



\* HS: High School

# Characteristics Associated to HPV Vaccination among Adolescent Students, 2010-12\*



\* Yes vs No

# Projecting the Potential Public Health Impact of a Quadrivalent HPV Vaccine in Puerto Rico

Source: Ortiz AP, Ortiz-Ortiz K, Pillsbury M, Kothari S, Rios M, Laborde J, 2013.



# Methods: Model Description

- The analysis was performed from a health care perspective.
- A previously published transmission dynamic model<sup>[1,2,3]</sup> for HPV types 6,11, 16, 18 was adapted to Puerto Rico.
- The model is an age-structured mathematical model that incorporates:
  - Demographic model describing birth, aging, and death.
  - Behavioral model describing sexual mixing patterns.
  - HPV infection and disease models describing transmission and disease occurrence.
- The model captured direct protective effects of vaccination and indirect effects (herd immunity).

1. Impact of vaccinating boys and men against HPV in the United States. Elbasha EH, Dasbach EJ, Vaccine 2010 Oct 4;28(42):6858-67

2. A multi-type HPV transmission model. Elbasha EH, Dasbach EJ, Insinga RP, Bull Math Biol. 2008 Nov;70(8):2126-76.

3. Model for assessing human papillomavirus vaccination strategies. Elbasha EH, Dasbach EJ, Insinga RP, Emerg Infect Dis. 2007 Jan;13(1):28-41

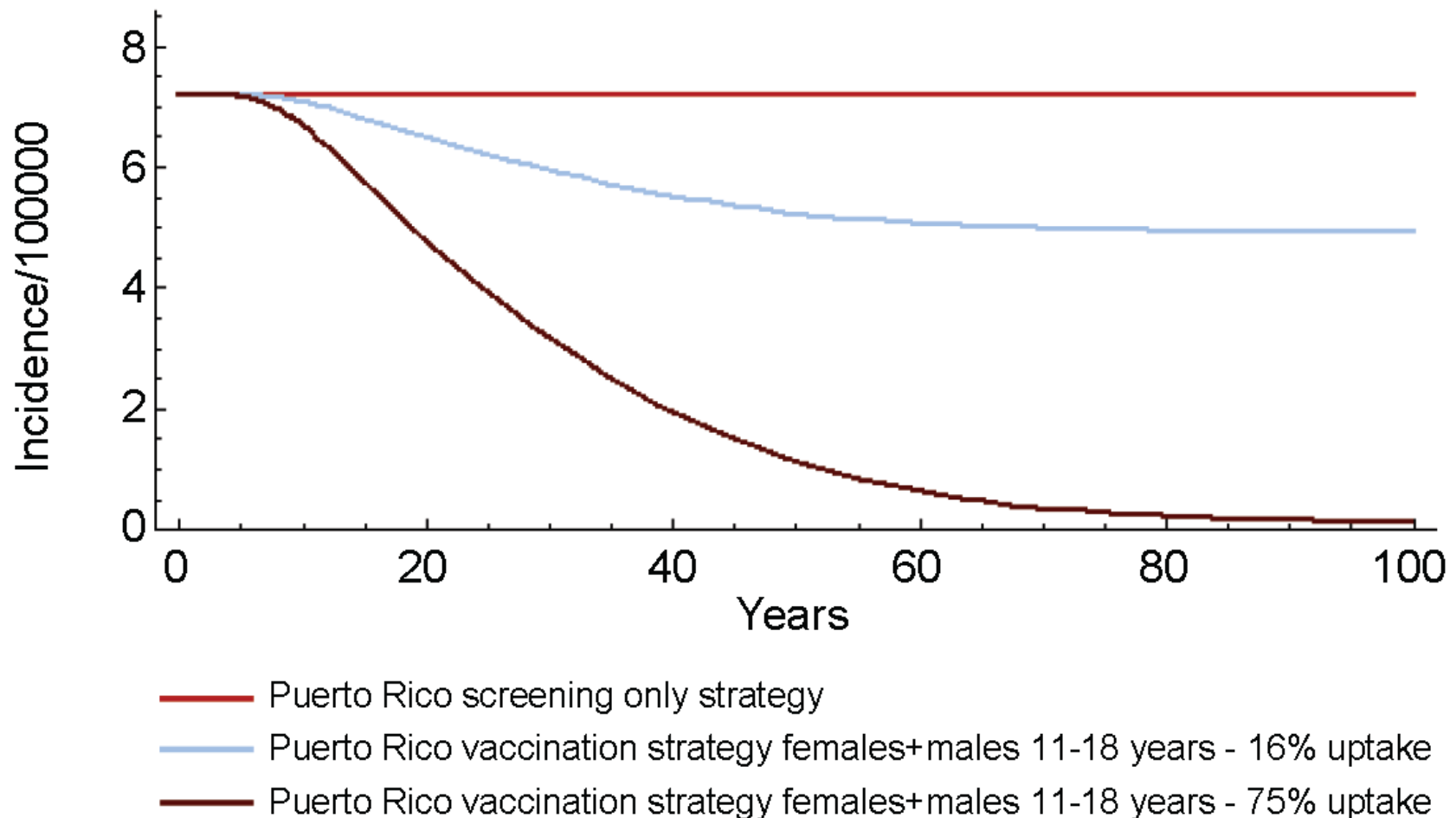
# Vaccination Strategy

Ages Vaccinated	Female Uptake	Male Uptake
11-18	16% and 75%	16% and 75%

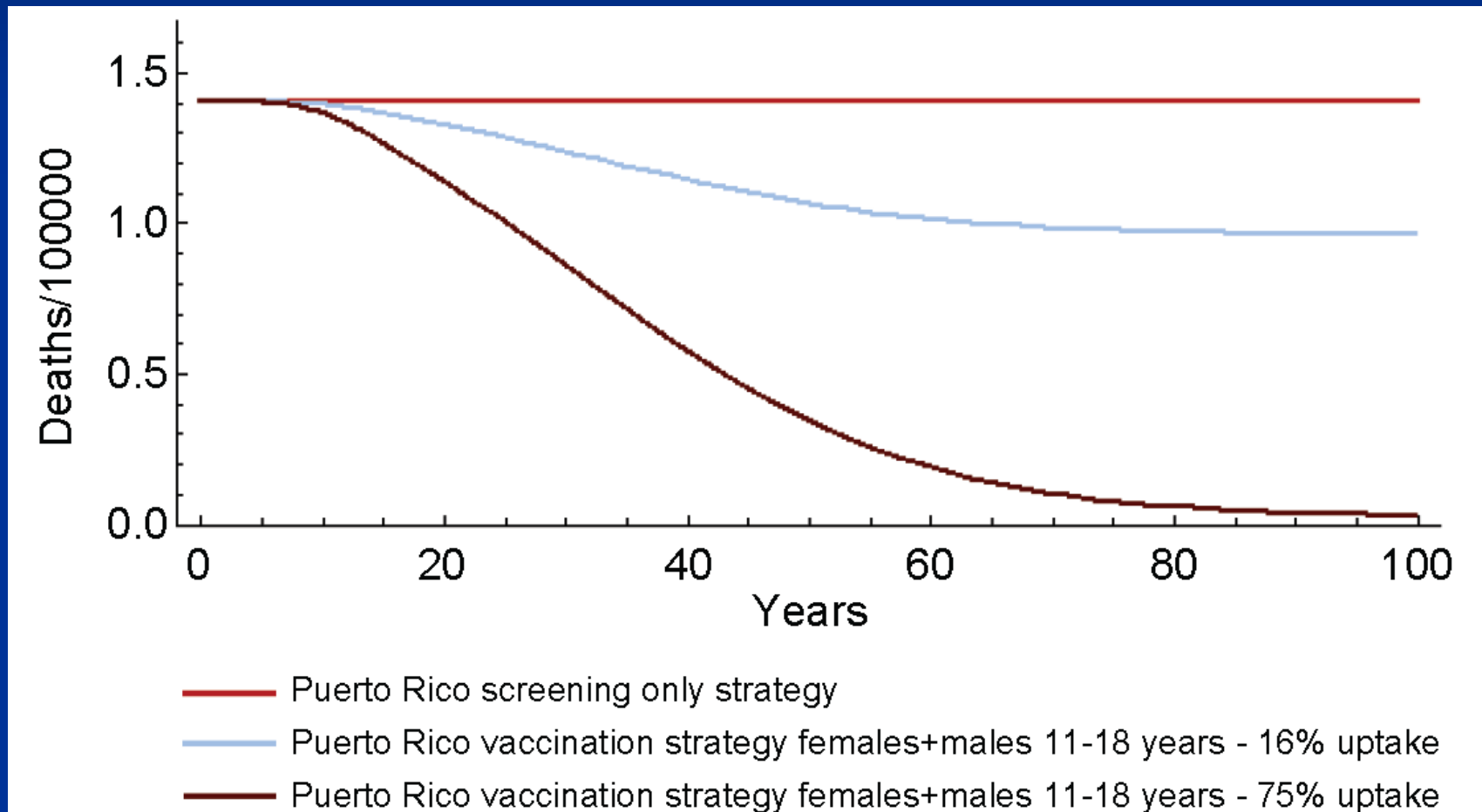
\*Assumes administration of all three doses

- Vaccination strategy of girls and boys 11-18 years of age compared to no vaccination strategy.
- Included all HPV related outcomes in women and men.
  - Incidence of Cancer and neoplasia: cervical, vaginal, vulvar, anal, penile, head and neck, CIN, VAIN
  - Incidence of 6,11 diseases: genital warts, Respiratory Papillomatosis (RRP)
  - Cancer related mortality
  - RRP related mortality

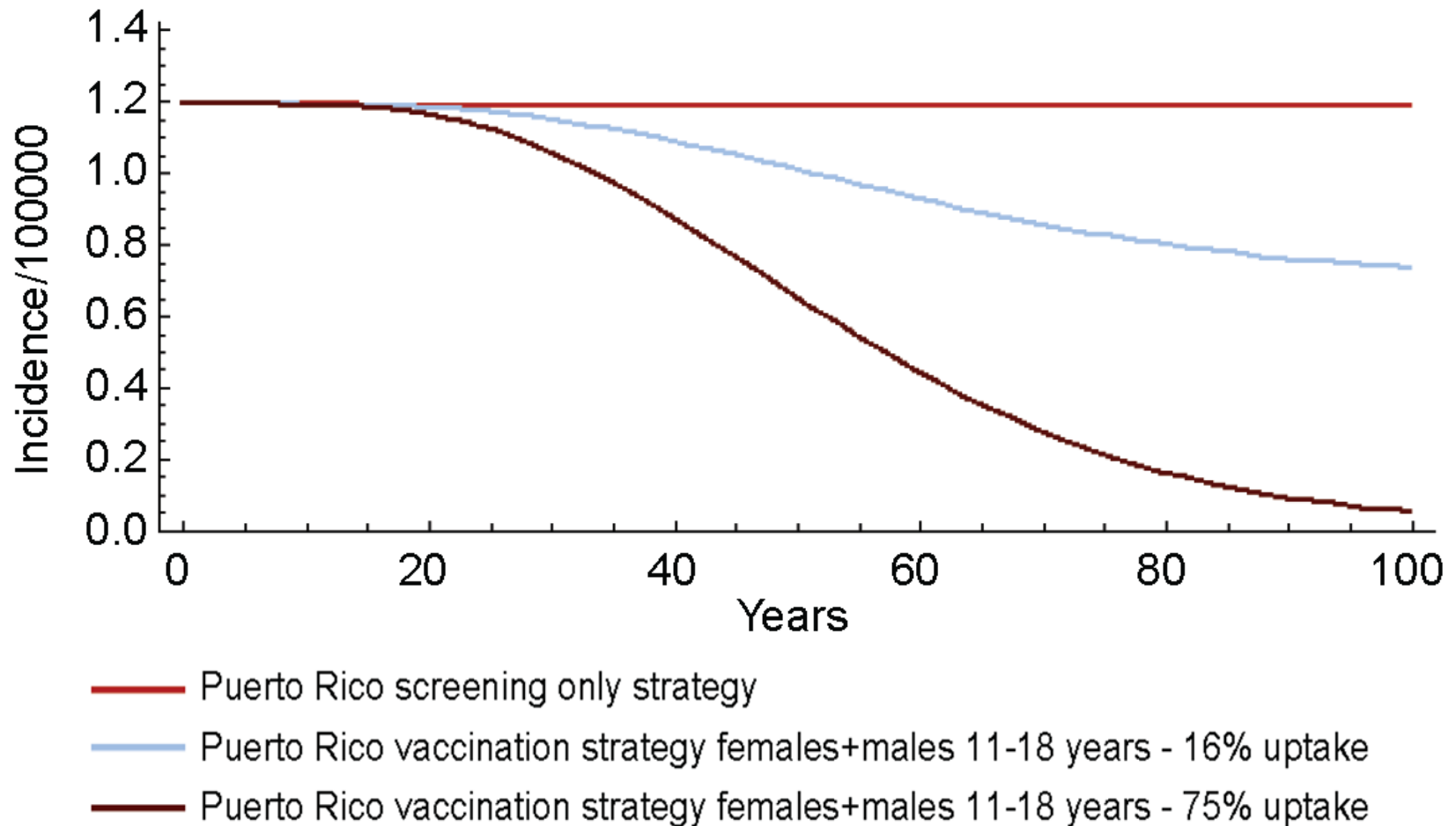
# Estimated HPV 16/18-Related Incidence of Cervical Cancer Among Females Over an 100 Year Period



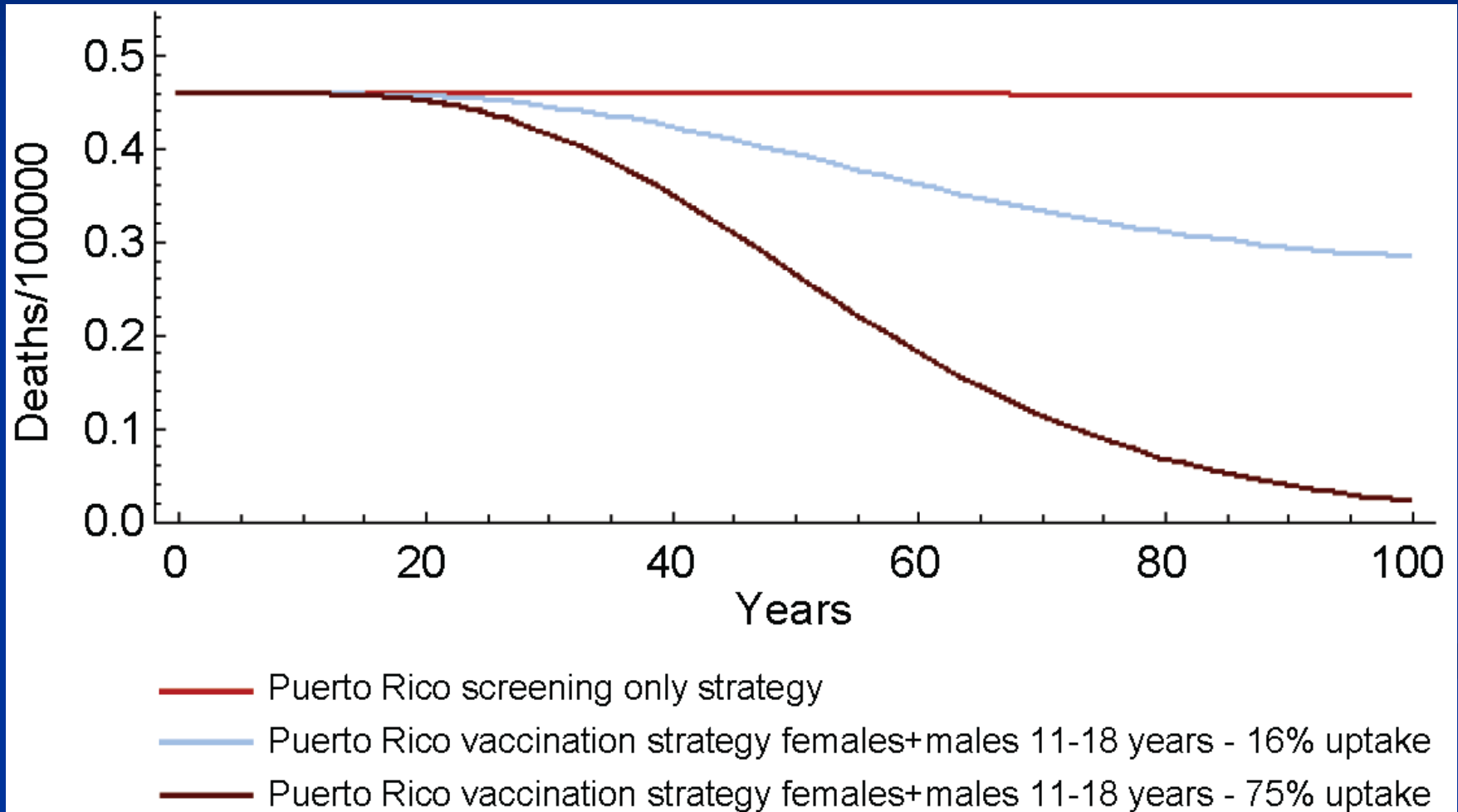
# Estimated HPV 16/18-Related Cervical Cancer Deaths Among Females Over an 100 Year Period



## Estimated HPV 16/18-Related Incidence of Anal Cancer Among Males Over an 100 Year Period



# Estimated HPV 16/18-Related Anal Cancer Deaths Among Males Over an 100 Year Period



# Cumulative Percent Reduction in HPV 6,11,16,18 Related Disease Incidence at 16% vs 75% Vaccine Uptake Rate

	16%			75%		
	5 years	25 years	50 years	5 years	25 years	50 years
Cervical cancer	0	4.7	13	0.1	16.6	68.4
CIN1	0.5	9.5	18.4	2.2	32.7	78.2
CIN2/3	0.4	8.7	17.4	1.7	30.2	76.6
Vaginal cancer	0	0.4	5.2	0	1.6	50.2
VAIN 2/3	0	0.7	5.4	0	2.3	50.8
Vulvar cancer	0	0.4	4.7	0	1.5	48.3
Genital warts (females)	6.1	14.7	16.4	26.6	59.8	73.4
Genital warts (males)	4	12.7	14.3	17.1	53.4	67.6
CIN1 (HPV 6,11 related)	2.2	9.7	11.6	10.3	44.2	61.7
Anal cancer (females)	0	0.3	3.9	0	1.3	45.0
Anal cancer (males)	0	0.3	3.9	0	1.1	45.1
Head/neck cancer (females)	0	0.3	3.8	0	1.2	45.1
Head/neck cancer (males)	0	0.3	4.3	0	1.2	47.1
Penile cancer	0	0.3	3	0	0.9	39.6
RRP (female)	5.1	14	15.7	22.1	57.7	71.8
RRP (male)	3.8	12.9	14.6	16.7	54.2	68.7



# Cumulative Reduction in HPV 6,11,16,18 Related Deaths at 16% vs 75% Vaccine Uptake Rate

	16%			75%		
	5 years	25 years	50 years	5 years	25 years	50 years
Cervical cancer	0	2.5	9.5	0	8.9	31.1
Vaginal cancer	0	0.3	4.4	0	1.1	13.9
VAIN 2/3	0	0.3	4.1	0	1.1	13.1
Anal cancer (females)	0	0.2	3.4	0	0.9	10.9
Anal cancer (males)	0	0.2	3.4	0	0.8	10.8
Head/neck cancer (females)	0	0.2	3	0	0.6	9.9
Head/neck cancer (males)	0	0.2	3.5	0	0.6	11.0
Penile cancer	0	0.2	2.7	0	0.7	9.3
RRP (female)	0	10.8	14.1	6.2	44.2	59.7
RRP (male)	0	9.9	13.1	4	41.4	56.8

# Overall Conclusions

## ■ Research studies in PR suggest...


- High burden of HPV and of HPV related cancers
- Lack of knowledge about HPV and the HPV vaccine among Puerto Ricans
- Low vaccine uptake
- HPV vaccination can significantly decrease incidence of HPV related diseases and associated mortality in both women and men.
- Public health impact derived is further increased if higher vaccine coverage rates are achieved.

# Overall Conclusions

- Future population-based studies are warranted to further understand disease burden and the impact of vaccination
- Multidisciplinary collaborative approaches should be used for the prevention and control of these morbidities in this PR
  - Epidemiologic research
  - Clinical trials
  - Patient and provider education
  - Clinical/System Interventions
  - Policy

# Resources

- Puerto Rico Cancer Control Coalition: Omayra Salgado: [osalgado@cccpr.org](mailto:osalgado@cccpr.org)
- Programa de Vacunación, Departamento de Salud: 787-765-2929 ext. 3338, 3336



**VPH INFORMATE**  
<http://www.cdc.gov/hpv/>

**¿Cómo obtener la vacuna para el Virus del Papiloma Humano (VPH)?**

La siguiente información es una guía, que esperamos le sea útil para identificar una clínica de vacunación o proveedor, donde pueda obtener la vacuna contra elVPH para su(s) hija(s), hijo(s) o usted.

**NIÑAS, NIÑOS Y JÓVENES DE 11-18 AÑOS:**

- Si su plan médico es El Plan del Gobierno de PR (MI Salud) o NO tiene plan médico.
  - o Si tiene MI Salud, el Departamento de Salud provee las vacunas libre de costo, solo se cobra un costo por administración de la vacuna de \$10.00. Para más información, llame al Programa de Vacunación al (787)765-2929 ext. 3338, 3336 ó 3337 o acceda a la siguiente dirección electrónica: [www.salud.gov.pr](http://www.salud.gov.pr)
  - o Si no tiene plan médico, La Red de Centros de Salud Primaria 330 de Puerto Rico administran las vacunas libre de costo. La administración de la vacuna tendrá un costo de \$10 por cada dosis. Para más información acceda a la siguiente dirección electrónica: [www.saludprimariapr.org](http://www.saludprimariapr.org)
- Si su plan médico es privado
  - o Verifique si su plan médico cubre la vacuna contra elVPH (Gardasil® y/o Cervarix®) y solicite información sobre proveedores que tengan la vacuna disponible en su área.
  - o Si su plan médico privado cubre la vacuna, comuníquese con su pediatra o ginecólogo y pregunte si tiene disponible la vacuna del VPH.
  - o Los Centros de Salud Esteban Calderón, administran la vacuna a aquellos pacientes que su plan médico cubre el costo de la vacuna. Existen 5 centros en toda la isla: Arecibo (tel. 787-817-1245), Bayamón (tel. 787-787-5151 ext. 2397), Ponce (787-843-3260 ext. 273 ó 246), Mayagüez (tel. 787-833-3085) y Las Piedras (787-733-8969).
- Si su plan médico privado no cubre la vacuna
  - o Llame a servicio al cliente de su plan médico y solicite la certificación de cobertura de la vacuna delVPH.
  - o Acuda a las clínicas de vacunación de La Red de Centros de Salud Primaria 330 de Puerto Rico con la certificación de cobertura para la vacuna contra el VPH. Estos centros administran la vacuna a los pacientes por un cargo de \$10 por cada dosis. Para más información o para identificar un centro cerca de usted llame al (787)- 758-3411 al Programa de Servicios Clínicos o acceda la siguiente dirección electrónica: [www.saludprimariapr.org](http://www.saludprimariapr.org)

**Coalición para el Control de Cáncer de Puerto Rico**  
 PROGRAMA DE CONTROL COMPRENSIVO DE CÁNCER  
[www.controldecancerpr.org](http://www.controldecancerpr.org)

CONSULTE CON SU MÉDICO O PROFESIONAL DE LA SALUD PARA OBTENER MÁS INFORMACIÓN SOBRE LA VACUNA CONTRA EL VPH



**VPH INFORMATE**  
<http://www.cdc.gov/hpv/>

**¿Cómo obtener la vacuna para el Virus del Papiloma Humano (VPH)?**

La siguiente información es una guía, que esperamos le sea útil para identificar una clínica de vacunación o proveedor, donde pueda obtener la vacuna contra elVPH para su(s) hija(s), hijo(s) o usted.

**ADULTOS JÓVENES DE 19-26 AÑOS:**

- Si su plan médico es El Plan del Gobierno de PR o no tiene plan médico:
  - o Los Centros de Salud Esteban Calderón, administran la vacuna, a un costo establecido, a aquellos jóvenes mayores de 18 años que su plan médico no cubre el costo de la vacuna o no poseen plan médico. Existen 5 centros en toda la isla: Arecibo (tel. 787-817-6772), Bayamón (tel. 787-787-5151 ext. 2397), Ponce (787-842-8881), Mayagüez (tel. 787-833-3085) y Las Piedras (787-733-2196).
  - o Industria Farmacéutica – existen programas por parte de las farmacéuticas que ofrecen las vacunas libre de costos, consulte a su médico acerca de estos programas.
- Si su plan médico es privado:
  - o Verifique con su seguro médico si le cubre la vacuna contra elVPH (Gardasil® o Cervarix®).
  - o Si su plan médico privado cubre la vacuna, comuníquese con su médico y pregunte si tiene disponible la vacuna delVPH o si la puede referir a un médico que la tenga disponible.
  - o Los Centros de Salud Esteban Calderón, administran la vacuna, a jóvenes mayores de 18 años. Existen 5 centros en toda la isla: Arecibo (tel. 787-817-6772), Bayamón (tel. 787-787-5151 ext. 2397), Ponce (787-842-8881), Mayagüez (tel. 787-833-3085) y Las Piedras (787-733-2196).
- Si su plan médico privado no cubre la vacuna:
  - o Existen programas por parte de las farmacéuticas que ofrecen las vacunas libre de costos, consulte a su médico a cerca de estos programas.

**Coalición para el Control de Cáncer de Puerto Rico**  
 PROGRAMA DE CONTROL COMPRENSIVO DE CÁNCER  
[www.controldecancerpr.org](http://www.controldecancerpr.org)

CONSULTE CON SU MÉDICO O PROFESIONAL DE LA SALUD PARA OBTENER MÁS INFORMACIÓN SOBRE LA VACUNA CONTRA EL VPH

# www.videosalud.tv

Internet Explorer browser window showing the website **www.videosalud.tv**.

**Address Bar:** <http://www.videosalud.tv/>

**Search Bar:** Norton Safe Search. Search results for "VPH como epidemia".

**Navigation Bar:** File, Edit, View, Favorites, Tools, Help. Links: AUTORIDAD ENERGIA ELE..., MSN (2), MSN, galleries page, contact page, Suggested Sites, Web Slice Gallery, Servio al Cliente, MSN (3), MSN (4), MSN (5), Home.

**Website Header:** **VIDEOsalud.TV**. Buttons: Noticias, Contáctanos.

**Navigation Bar:** HOME, VIDEOSALUD.TV, QUIÉNES VEN VIDEOSALUD.TV.

**Main Content:**

- VideoGuía de VPH
- Video player showing a man sitting at a desk with a laptop. The video is titled "VideoGuía de VPH".
- Right sidebar menu:

- Salud Femenina
- Salud Masculina
- Edad de Oro: Geriatria
- Nuestros Niños: Pediatría
- Maternidad
- Vida Saludable
- Emociones: Salud Mental
- Vida Familiar
- Saludable: Dieta y Ejercicios
- Ellos crecen: Adolescentes

**Footer:** Related Searches: Find A Physician | Local Doctor | La Salud | Cells Of The Immune System | DNA Synthesis | Immune System Diseases | RNA And DNA | Immune System Cell |

**Page Info:** 75%



# Related Publications

- Ortiz AP, Romaguera J, Pérez C, Palefsky J, Otero Y, Mendez K, Soto-Salgado M, Valle Y, Da Costa M, Tortolero-Luna G. **Human papillomavirus infection in women in Puerto Rico: Agreement between physician- versus self-collected anogenital specimens.** Journal of Lower Genital Tract Disease (In press)
- Ortiz AP, Alejandro N, Pérez C, Otero Y, Soto-Salgado M, Palefsky JM, Tortolero-Luna G, Romaguera J. **Acceptability of Cervical and Anal HPV self-sampling in a sample of Hispanic Women in Puerto Rico.** PRHSJ Vol. 31 No. 4 • December, 2012
- Colón-López V, Ortiz AP, Soto-Salgado M, Torres-Cintrón M, Pettaway CA, Puras-Báez A, Martínez-Ferrer M, Suárez E. **Penile Cancer Disparities in Puerto Rican Men as compared to the United States Population.** Int Braz J Urol. 2012 Nov;38(6):728-38. PubMed PMID: 23302411.
- Colón-López V, Ortiz AP, Del Toro-Mejías LM, García H, Clatts MC, Palefsky J. Awareness and knowledge of **Human Papillomavirus (HPV) infection among high-risk men of Hispanic origin attending a Sexually Transmitted Infection (STI) clinic.** BMC Infect Dis. 2012 Dec 12;12:346. doi: 10.1186/1471-2334-12-346. PubMed PMID: 23231727; PubMed Central PMCID: PMC3529119.

# Related Publications (cont.)

- Ortiz AP, Colón-López V, Girona-Lozada G, Botello-Harbaum MT, Sheon N, Guiot HM, Román-Torres L, Díaz-Santana MV, Miranda-De LS, Palefsky JM. **Report of the 2012 capacity building for HIV-HPV clinical trials recruitment among minority underserved populations of Hispanic origin in Puerto Rico.** P R Health Sci J. 2012 Sep;31(3):185-7. PubMed PMID: 23038895.
- Colón-López V, Ortiz AP, Palefsky J. **Burden of human papillomavirus infection and related comorbidities in men: implications for research, disease prevention and health promotion among Hispanic men.** P R Health Sci J. 2010 Sep;29(3):232-40. Review. PubMed PMID: 20799510; PubMed Central PMCID: PMC3038604.
- Ortiz AP, Soto-Salgado M, Suárez E, del Carmen Santos-Ortiz M, Tortolero-Luna G, Pérez CM. **Sexual behaviors among adults in Puerto Rico: a population-based study.** J Sex Med. 2011 Sep;8(9):2439-49. doi: 10.1111/j.1743-6109.2011.02329.x. Epub 2011 Jun 15. PubMed PMID: 21676177; PubMed Central PMCID: PMC3474935.
- Ortiz AP, Soto-Salgado M, Calo WA, Tortolero-Luna G, Pérez CM, Romero CJ, Pérez J, Figueroa-Vallés N, Suárez E. **Incidence and mortality rates of selected infection-related cancers in Puerto Rico and in the United States.** Infect Agent Cancer. 2010 May 14;5:10. doi: 10.1186/1750-9378-5-10. PubMed PMID: 20470399; PubMed Central PMCID: PMC2891681.