

Anil Chaturvedi, Ph.D., MPH

Disclosure of Commercial Interest

It is the policy of the Prevent Cancer Foundation and the Nurse Practitioners in Women's Health that the education presented at CE-certified activities will be unbiased and based on scientific evidence. To help participants make judgments about the presence of bias, the Prevent Cancer Foundation provides information that faculty have disclosed about financial relationships they have with commercial entities that produce or market products or services related to the content of this educational activity.

There will not be any off-label and/or investigational use of products discussed within the content at any of the presentations at this conference.

HPV-Associated Oropharyngeal Cancer and the Evidence for HPV Vaccination

Dr. Anil Chaturvedi has indicated his presentation will be covering that the prevention of oral HPV infection or oropharyngeal cancer is not a current indication for prophylactic HPV vaccine.

HPV-associated oropharyngeal cancer and the evidence for HPV vaccination

Anil K. Chaturvedi, PhD

Dialogue For Action[®] on Cancer Screening and Prevention

April 25, 2019

Arlington, VA

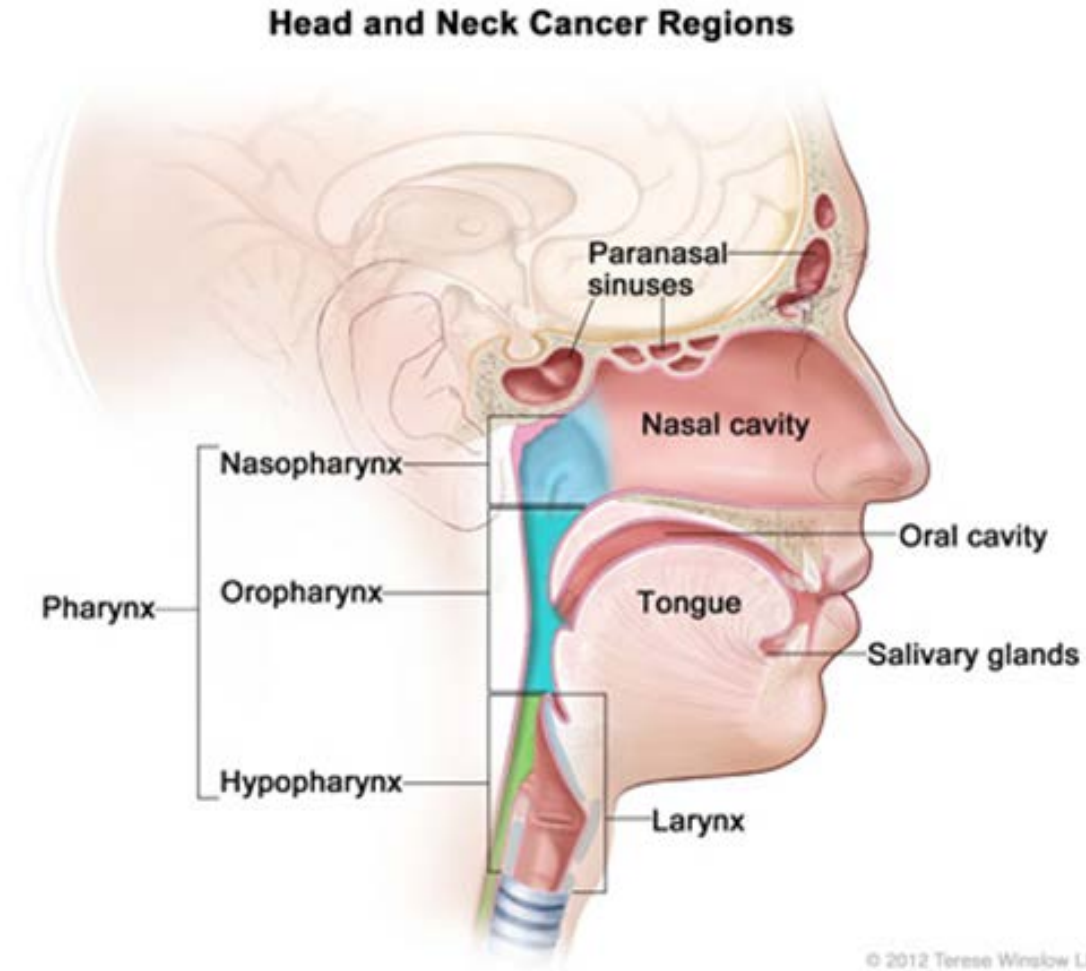
Disclosures

- No conflicts of interest
- Prevention of oral HPV infection/oropharynx cancer is not an FDA-indication for the HPV vaccine

Outline

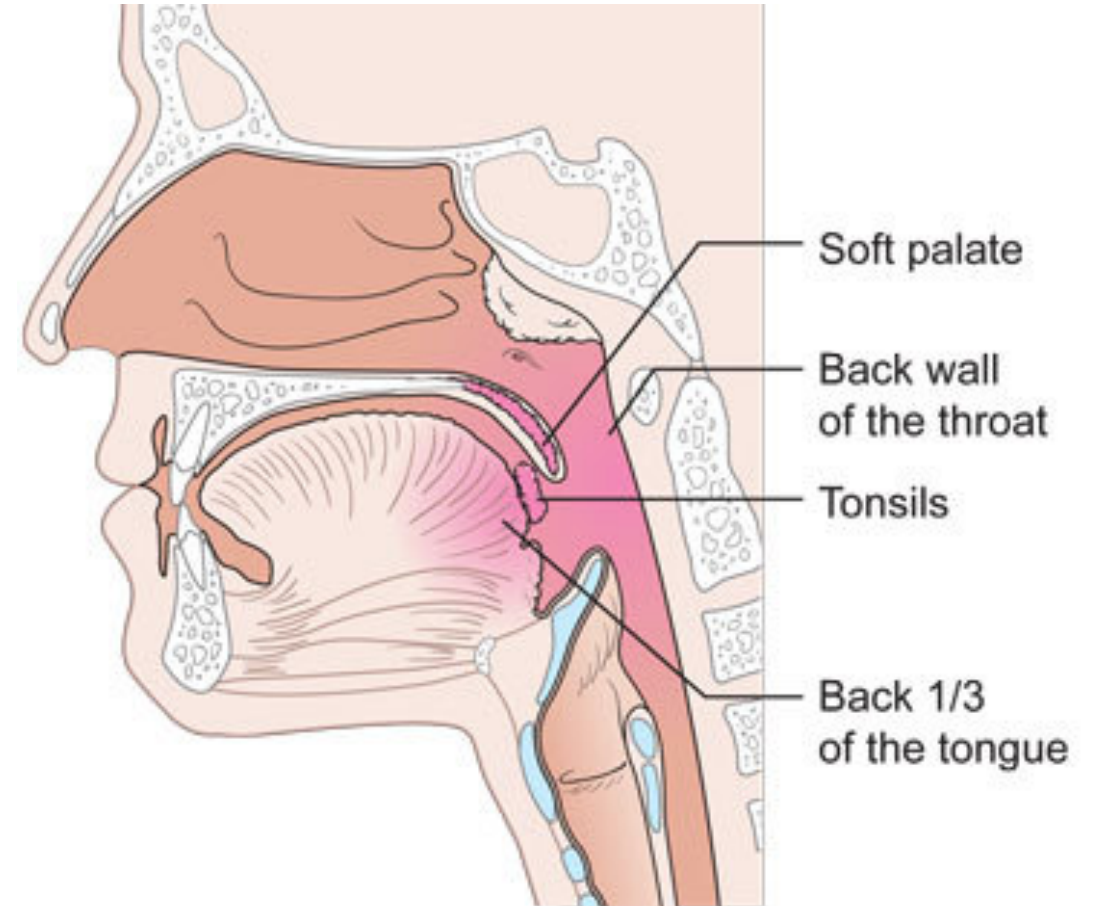
- Anatomy, nomenclature, and etiology
- Why we increasingly care: burden and epidemiology
- What we can do: Prevention

Anatomy: Head and neck cancer



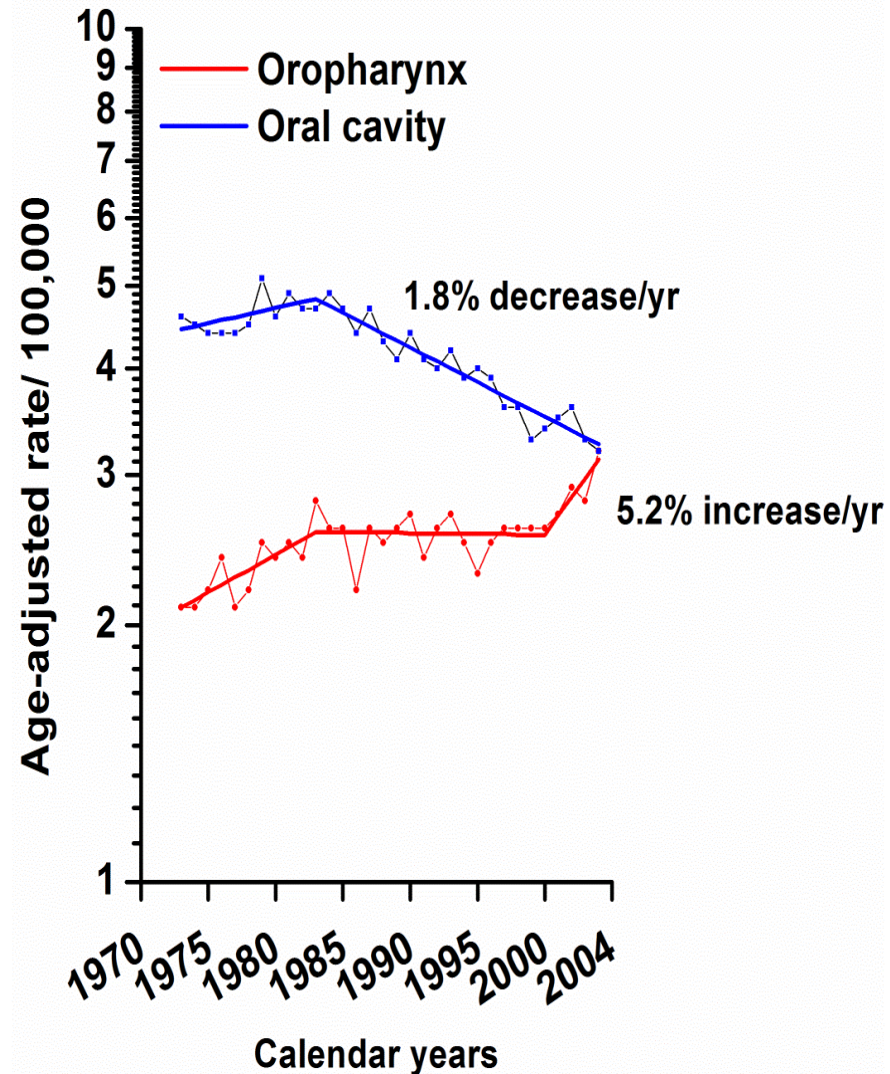
Etiologic role of HPV

- Specific to oropharynx
- Low etiologic fraction in other head and neck cancers (<5%)
- Burden
 - Global: ~25% of cancers
~25,000 per year
 - US: >70% of cancers
~12,000 per year
 - Over 90% caused by HPV16



Cancer Research UK

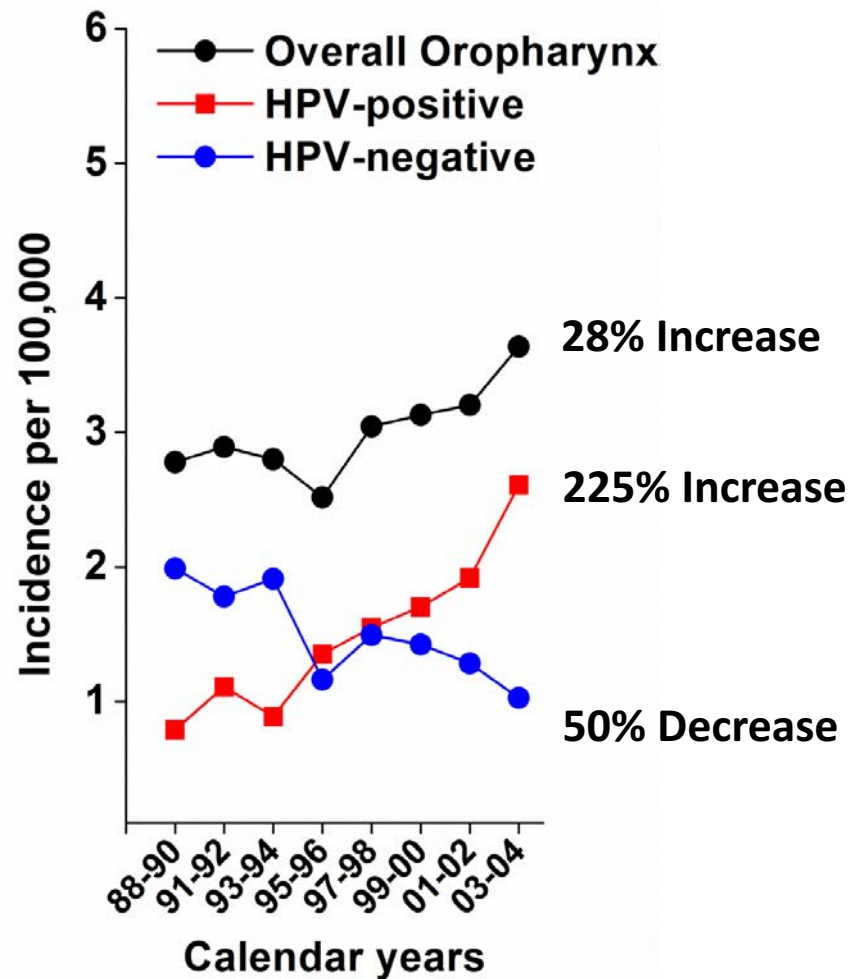
Rising OPC incidence in recent decades



Country	Years	Reference
Australia	1982-2005	Hocking, 2011
Canada	1980-2006	Auluck, 2010
Denmark	1978-2007	Blomberg, 2011
England	1985-2006	Reddy, 2010
Japan	1965-1999	Ioka, 2005
The Netherlands	1989-2006	Braakhuis, 2009
Norway	1981-2005	Mork, 2010
Sweden	1970-2002	Hammarstedt, 2006

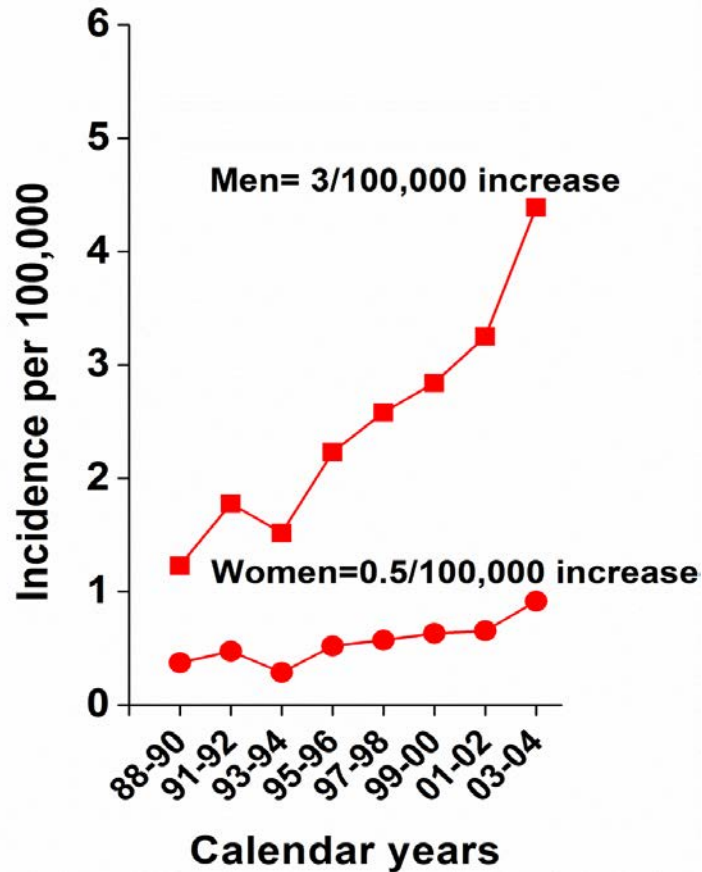
HPV is the cause of rising OPC incidence

USA

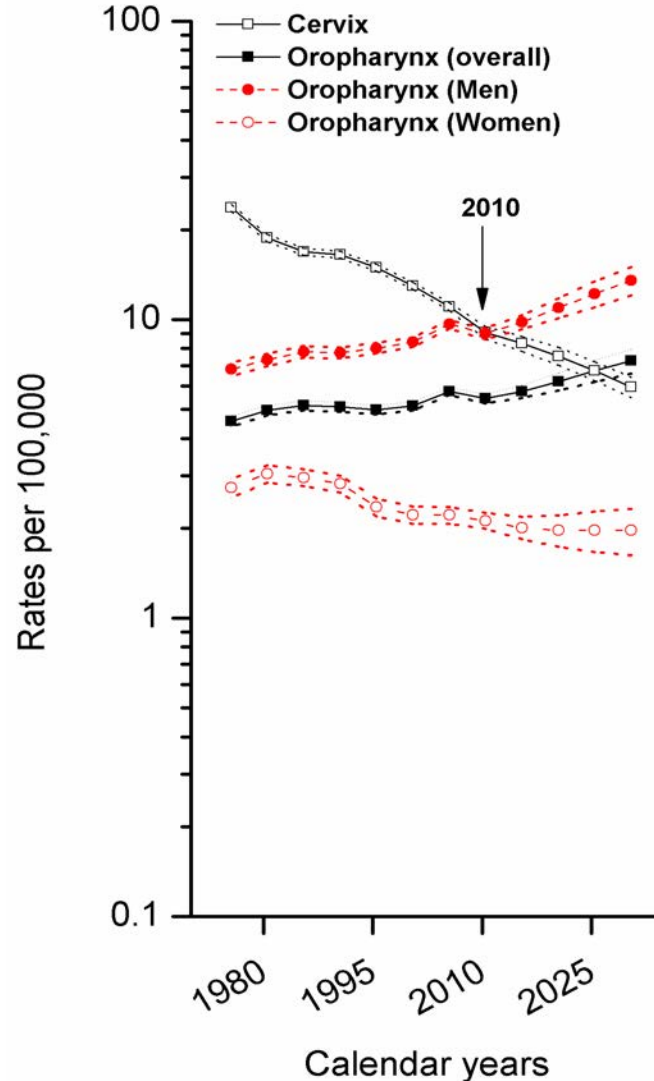


Predominance of oropharynx cancers in males

Observed incidence of HPV-positive Oropharynx cancer



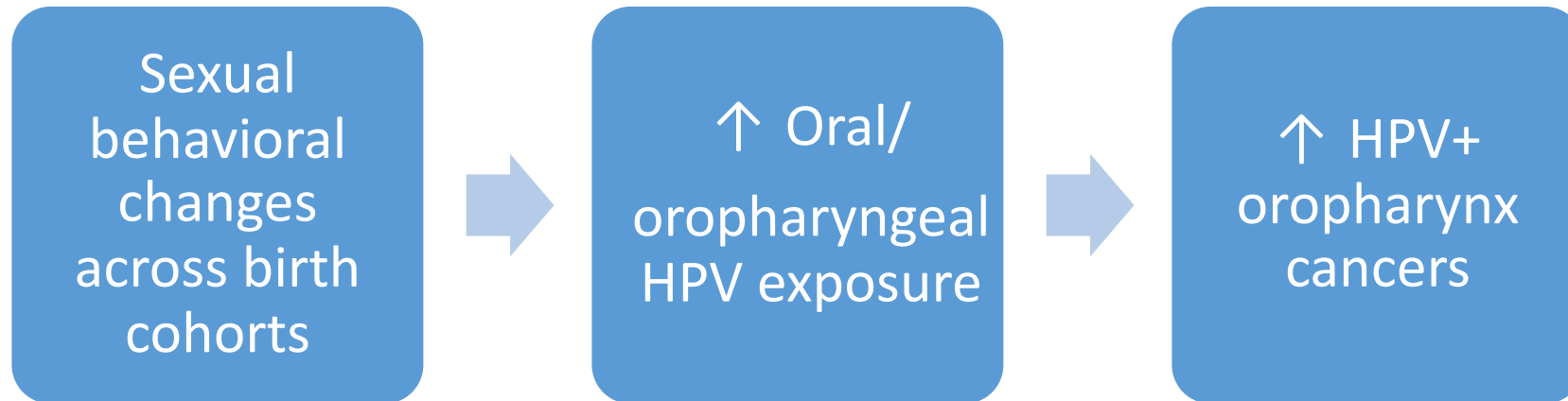
Projected incidence of Oropharynx cancer



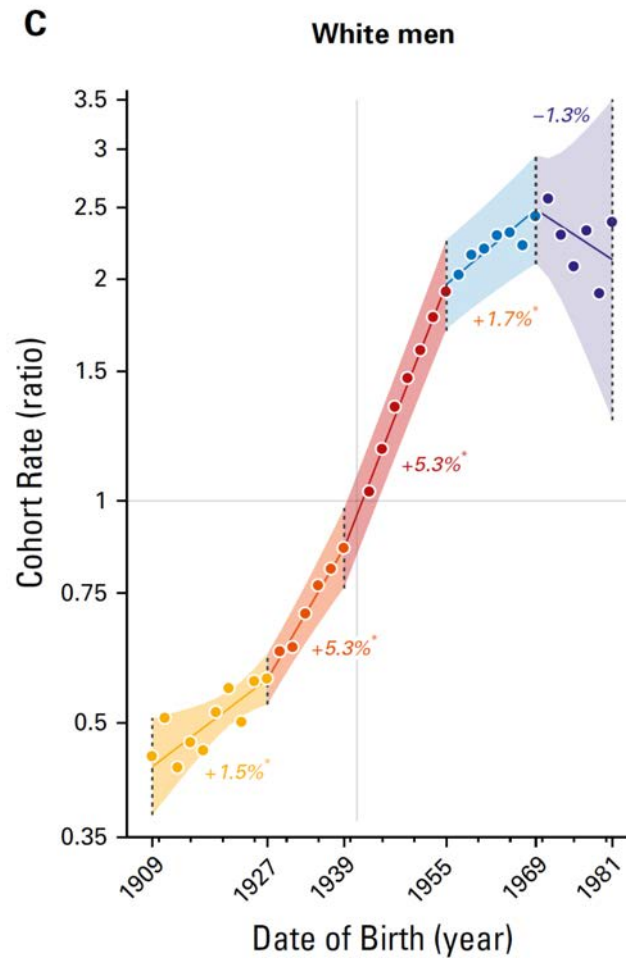
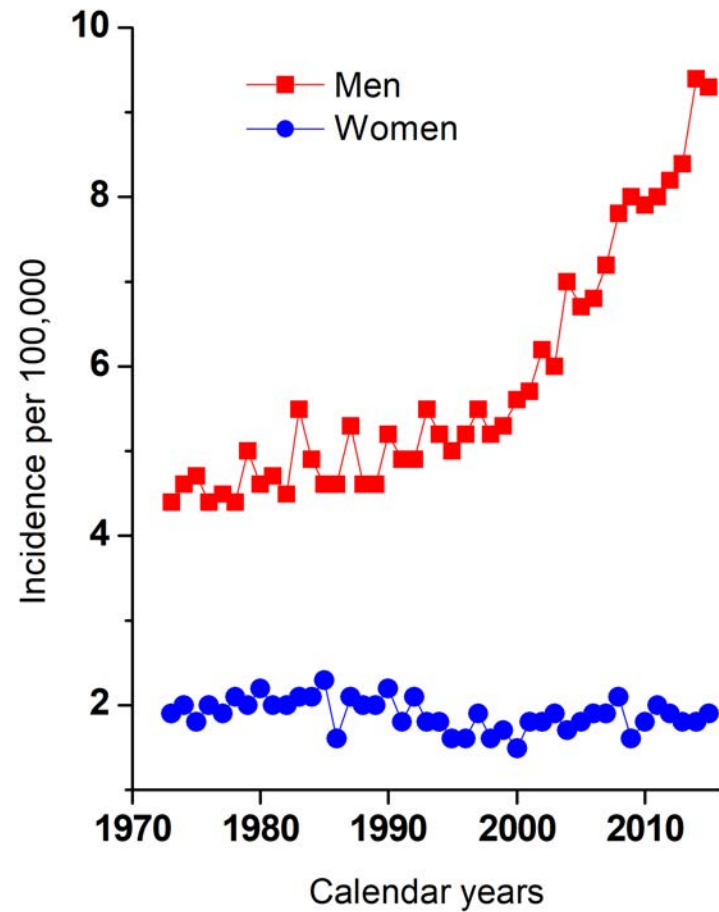
Projected incidence rates

- Most common HPV+ cancer
- 2030: Most common head and neck cancer
- Majority among men

Hypothesis for the increase in HPV-positive oropharynx cancers in recent years in the United States



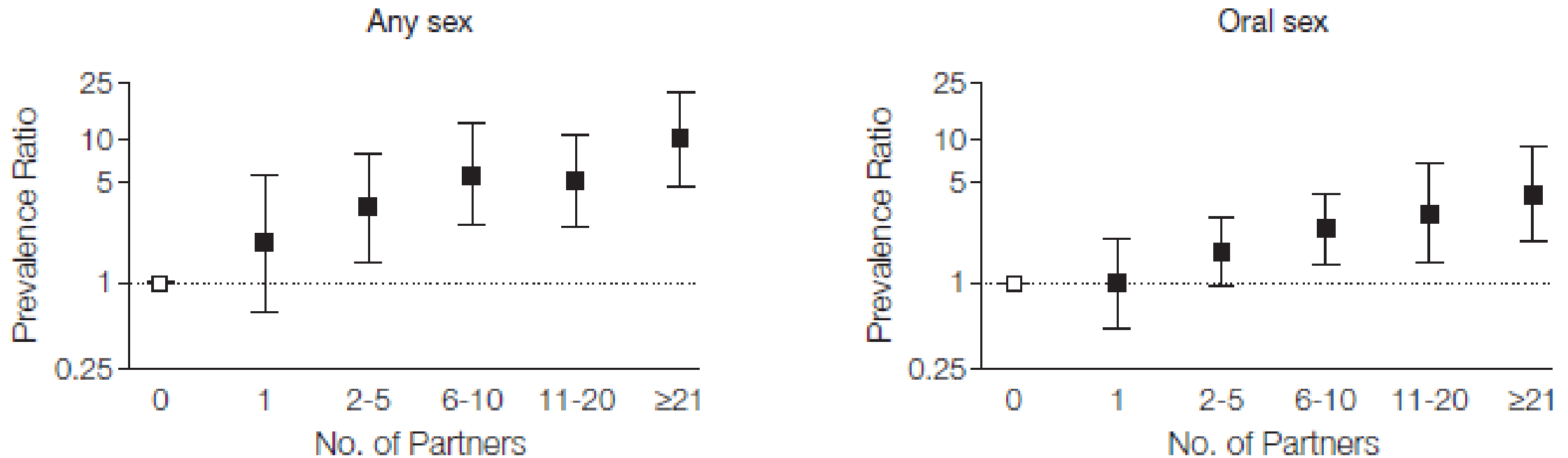
Evolution of oropharynx cancer trends, through 2015



- Continued increases in recent birth cohorts
 - Strong increases in 1939-1955 birth cohorts
 - Moderate increases in 1955+ birth cohorts
- Shift in burden of OPC from young to older men

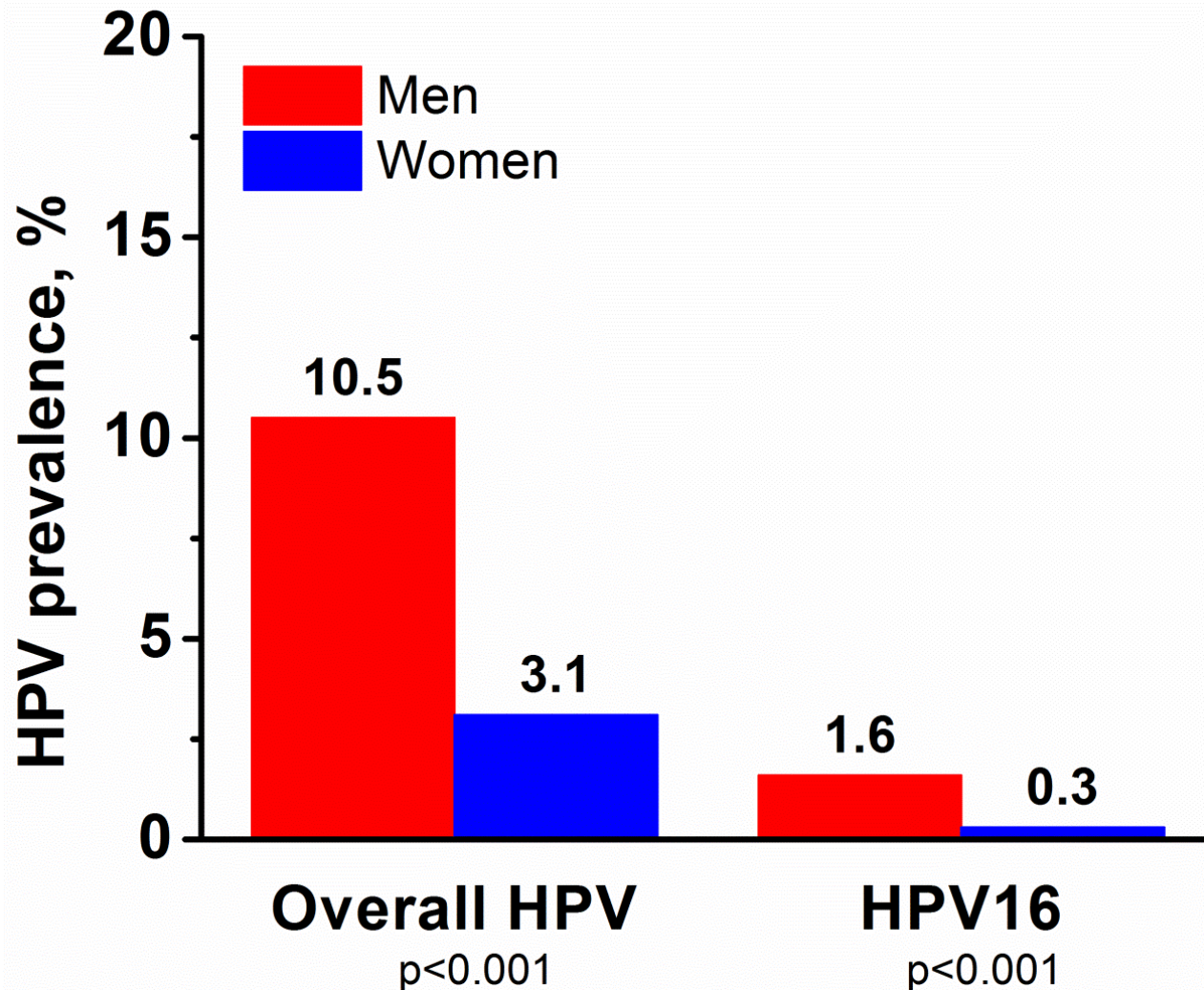
Oral HPV epidemiology

Association of sexual activity with oral HPV prevalence



- Oral HPV infection is very rare (<0.3%) in men and women in the absence of sexual activity

Higher oral HPV prevalence in men than women, United States NHANES 2009-2012

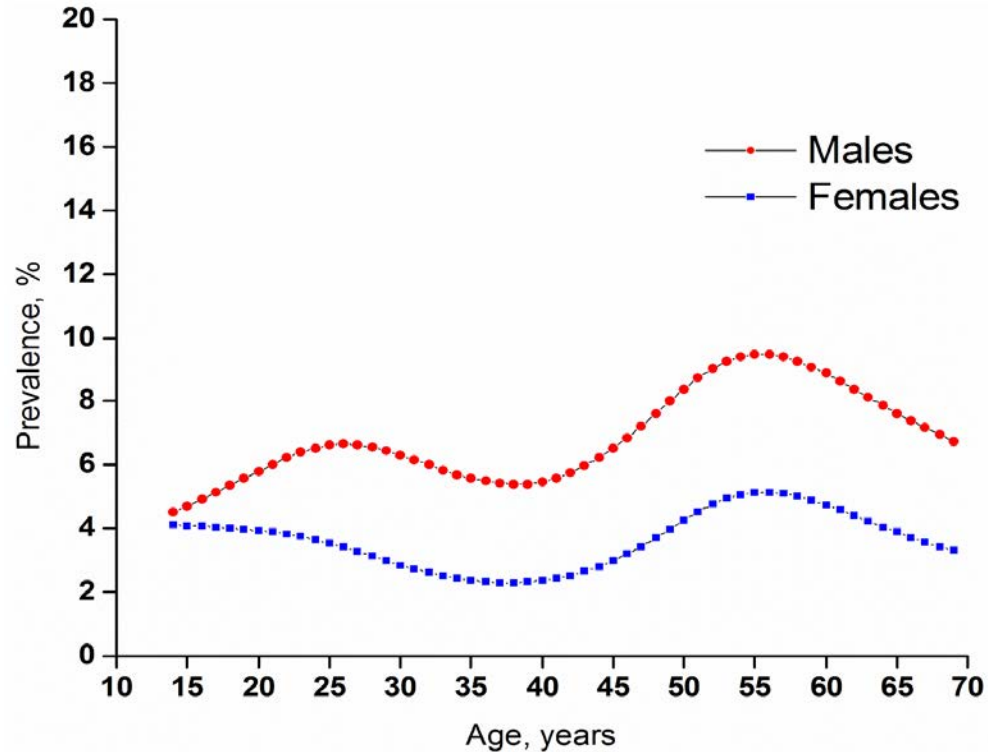


Male predominance

- Immunologic susceptibility?
- Lower rates of seroconversion after HPV infection in males vs. females (*Edelstein, JID 2011*)
 - Potentially related to differences in site of infection
 - Females: Mucosal epithelium
 - Males: Keratinized epithelium
- Higher transmissibility?

Bimodal age-prevalence for oral HPV infection

Oral HPV prevalence in U.S. males and females



Female and male: Bimodal pattern

- New acquisition?
- Reactivation of latent infection?
- Birth cohort effect?

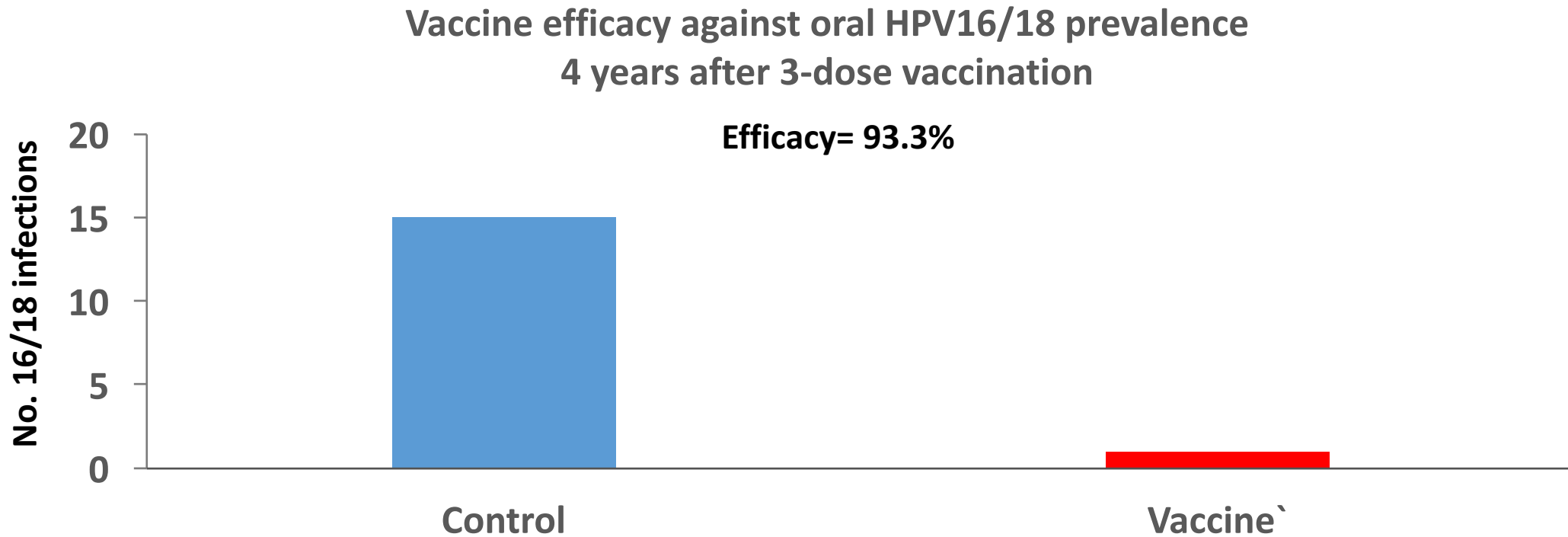
- Disease-relevance of infections acquired at older ages is unknown

Screening and prevention

Secondary prevention through screening

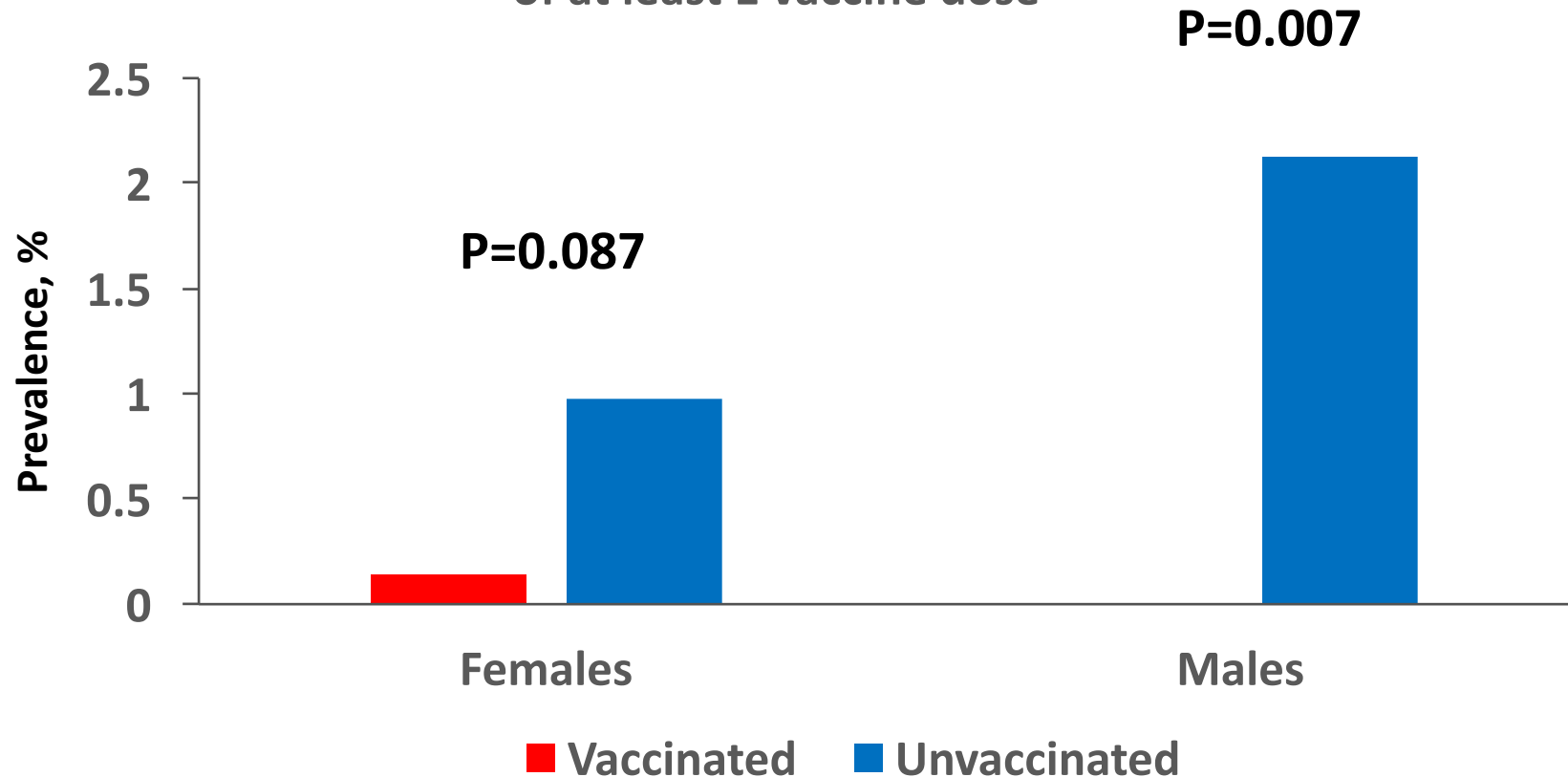
- Not feasible at this time
 - HPV-induced precancerous lesion has not yet been identified
 - Poorly characterized natural history
- Additional unanswered questions
 - Methods for screening
 - Treatments for risk-mitigation in screen-positives
 - Cost-effectiveness
- Screening with oral HPV tests is not recommended by the American Dental Association*

NCI Costa Rica Vaccine Trial in young women: Reduced prevalence in vaccinated women



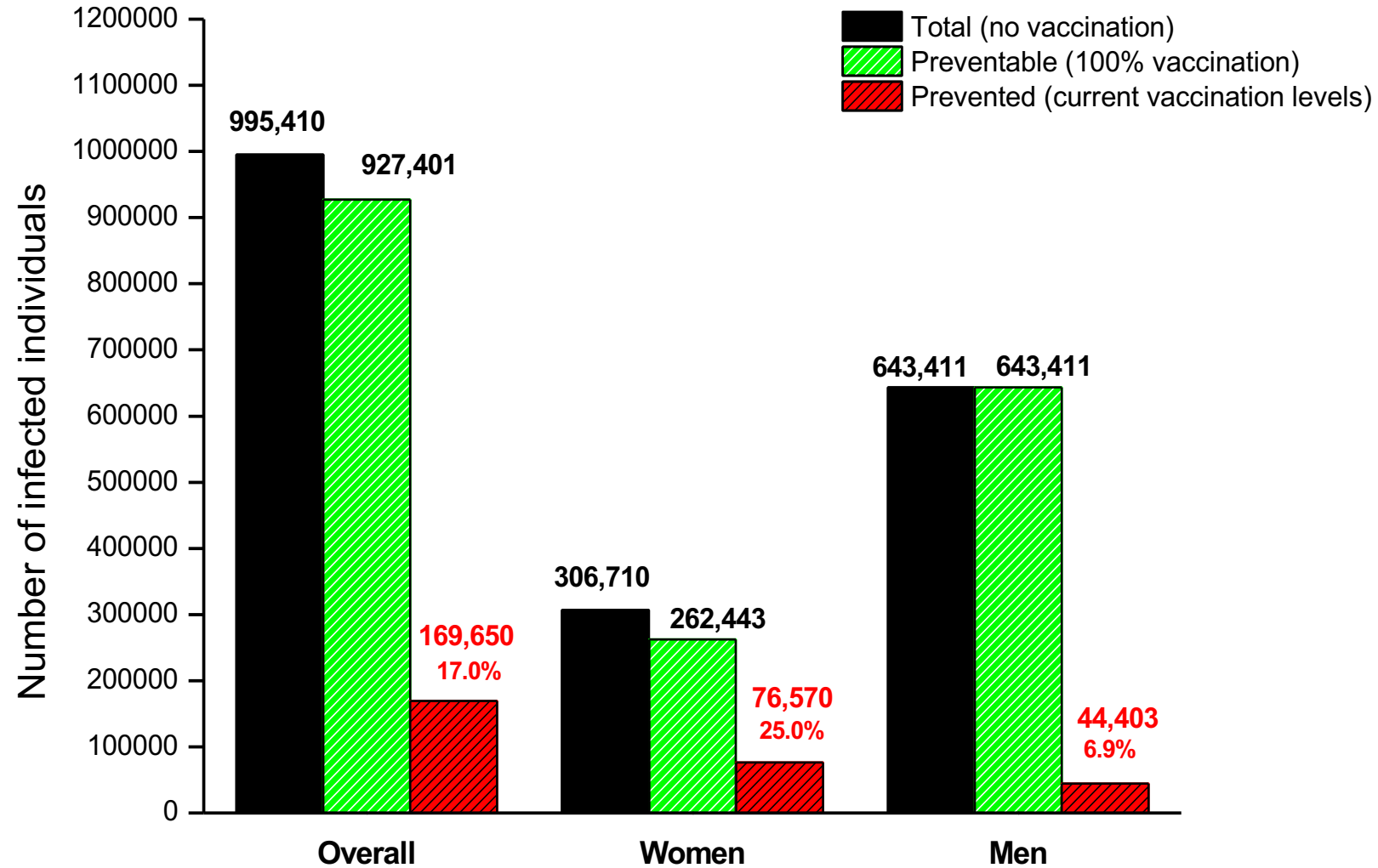
U.S. population of young adults (ages 18-33 years): Lower oral HPV prevalence in vaccinated men and women

Oral HPV prevalence for HPV 6/11/16/18
~4 years after self-reported receipt
of at least 1 vaccine dose



Modest population-level effectiveness in the US

HPV16/18/6/11



Chaturvedi, JCO 2017

HPV vaccination in the US

Vaccine indications

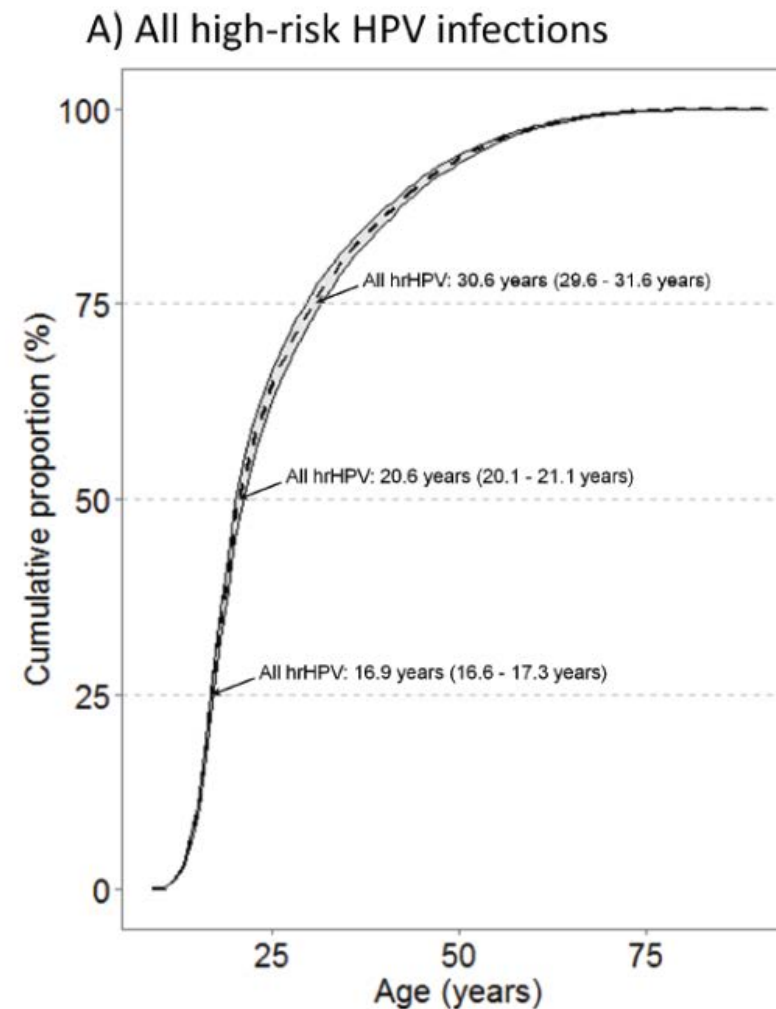
- Ages 9 years to 45 years
 - Females: Cervical, vulvar, vaginal, and anal precancer and cancer and genital warts
 - Males: anal precancer and cancer and genital warts

CDC ACIP recommendations

- Routine vaccination
 - Age 11 or 12 years
 - Vaccination can be started at age 9 years
- Catch-up vaccination
 - Females through age 26 years
 - Males through age 21 years
 - Males through age 26 years (MSM, transgender, immunosuppressed)
- Males aged 22 through 26 years may be vaccinated
- **Question: extended age-range of catch-up HPV vaccination?**

HPV vaccination and oropharyngeal cancer

- Not a current indication
 - No vaccine trials with disease endpoint
- Value of extended upper age-limit for catch-up vaccination?
 - Vaccines most-effective prior to sexual debut
 - Disease-relevance of infections acquitted at older ages unknown
 - Cervix model: 70% of cancer-causing infections are acquired by age 30 (Burger, CID 2017)
- Modeling studies underway



Summary

- HPV specifically associated with oropharyngeal cancers
- Epidemic increase in the incidence of oropharyngeal cancers
 - Caused by HPV
- Oral HPV acquired through sexual activity
 - Male predominance
- Screening not feasible at this time
- Prevention through prophylactic HPV vaccination
 - High efficacy against vaccine-type oral HPV prevalence
 - Oral HPV/OPC not a current indication
 - Value of vaccination at older ages uncertain