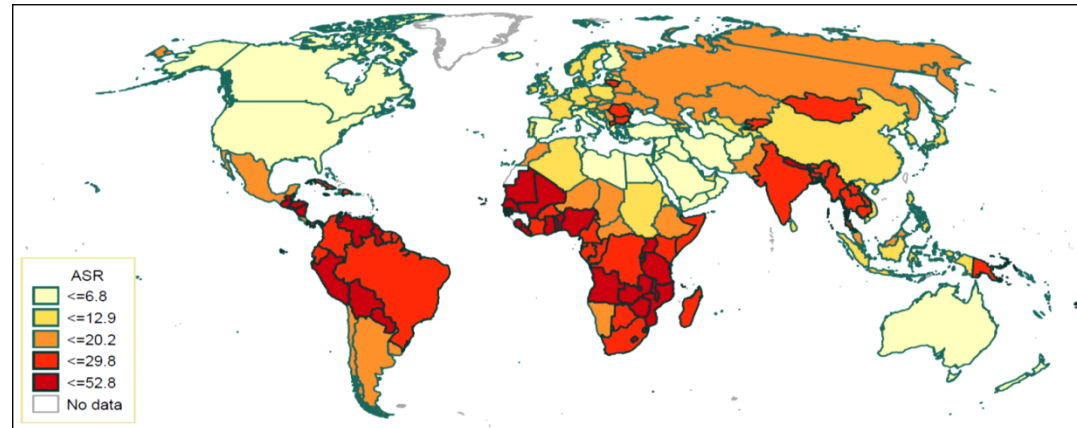




110 years of research

10 years of HPV vaccines & HPV vaccination



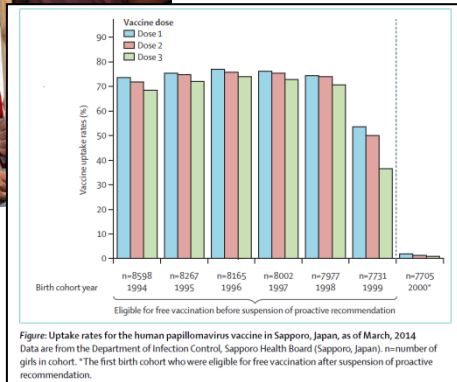
FX Bosch
Institut Català d'Oncologia
Marrakech 2017

Potential conflict of interest

- Research and educational institutional grants:
GSK, SPMSD, Merck, Qiagen
- Personal / speaking / travel grants:
GSK, SPMSD, Merck, Qiagen, RMS

This presentation is the sole responsibility of the author

Vaccine evaluation balance



Over 100,000 subjects in RCT
Over 240 M doses distributed
Estimated 60M girls vaccinated
8 major international reviews on safety
62 countries introduced the HPV vaccine



Trump taps vaccine skeptic Robert F. Kennedy Jr. to launch review

President-elect Trump has some doubts about the current vaccine policy, Kennedy says

Thomson Reuters | Posted: Jan 10, 2017 2:57 PM ET | Last Updated: Jan 11, 2017 8:44 AM ET



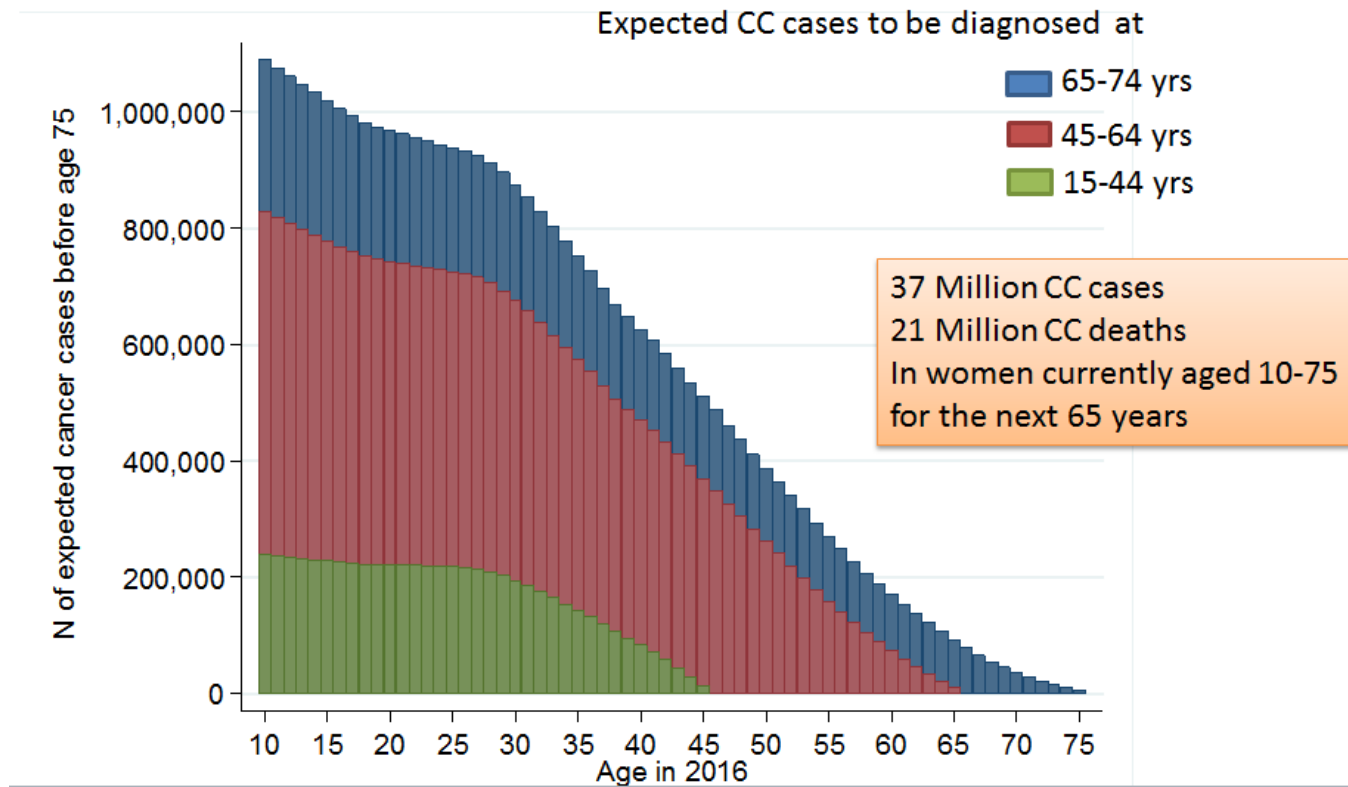
What is the expected impact if we continue to vaccinate and screen as we do now?

Burden of cervical cancer expected in the world's population of females 10- 75 living today over their life time expectancy



Worldwide number of CC cases expected in women 10-75 in 2016 and ages in which these diagnoses will occur

CERVICAL CANCER EXPECTED CASES



Bruni et al. in preparation



HPV vaccines in 2017

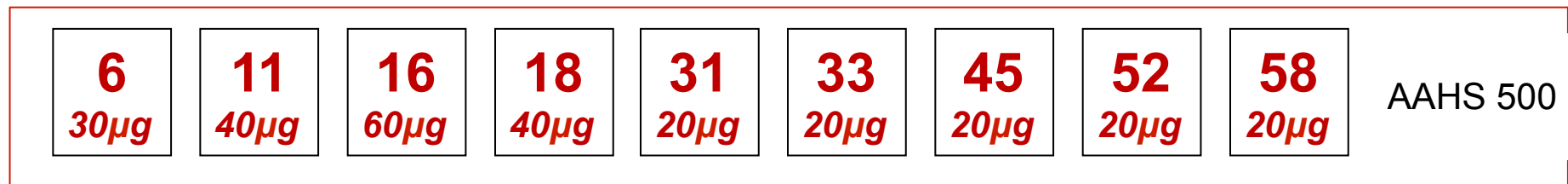
bi-valent HPV vaccine (Cervarix)



quadri-valent HPV vaccine (Gardasil)

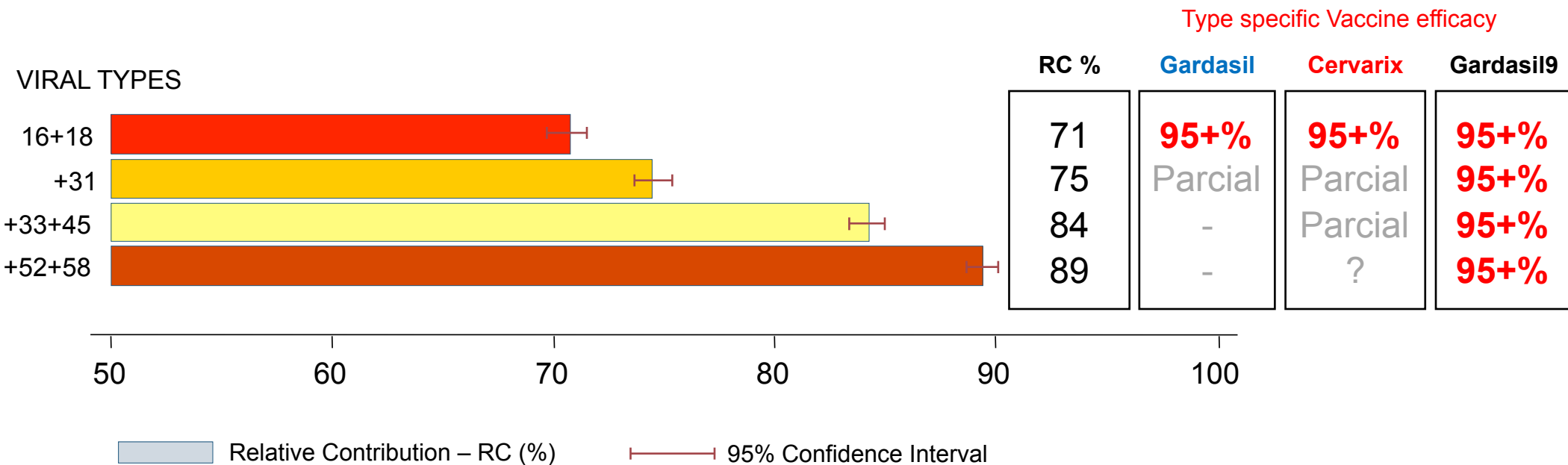


nine-valent HPV vaccine (Gardasil 9)



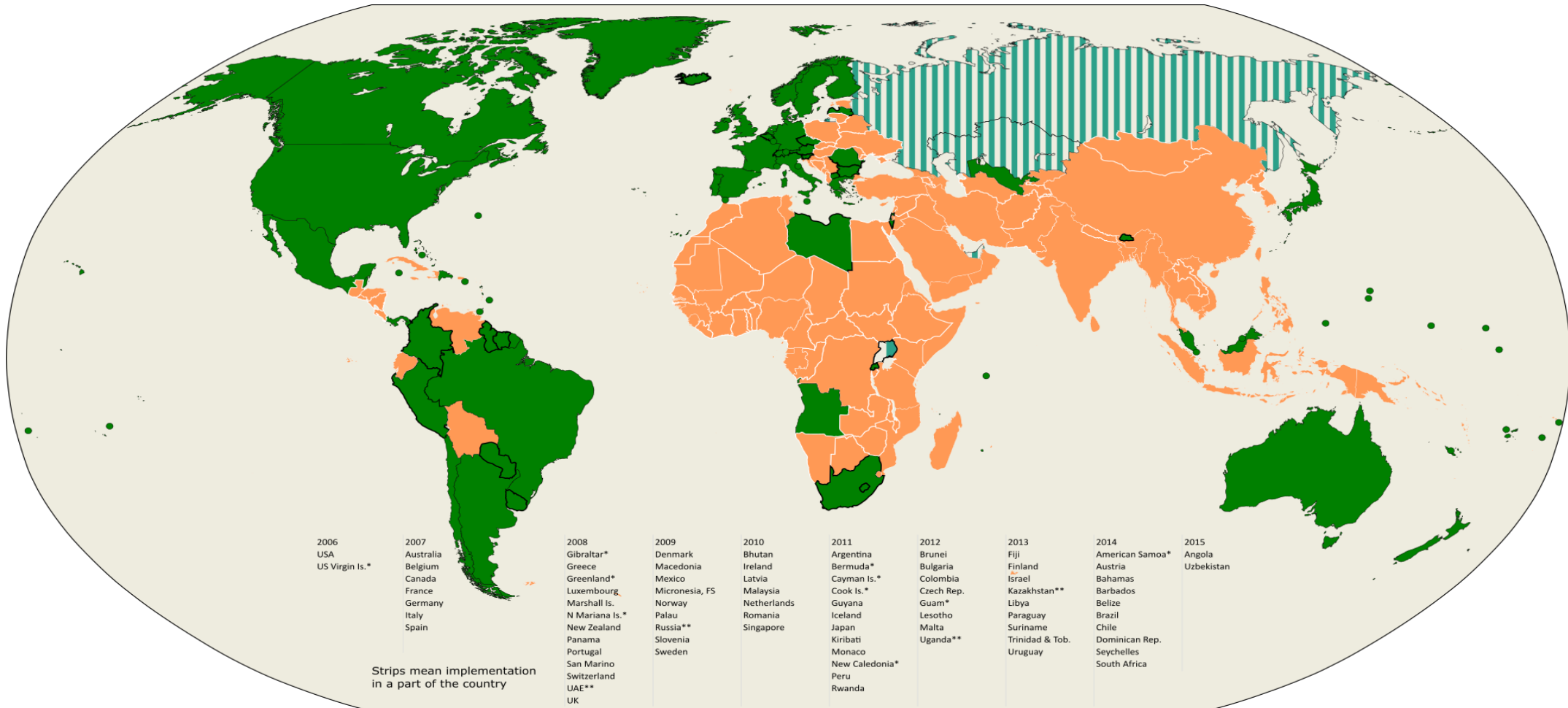


HPV type-specific contribution to cervical cancer and potential for prevention of existing vaccines



de Sanjosé S et al. Lancet Oncol, 2010
 Serrano B et al. Infect Ag Cancer, 2012
 Schiller J et al Vaccine 30 S 5 2012
 Lehtinen M et al. Nat Rev Clin Oncol. 10 2013

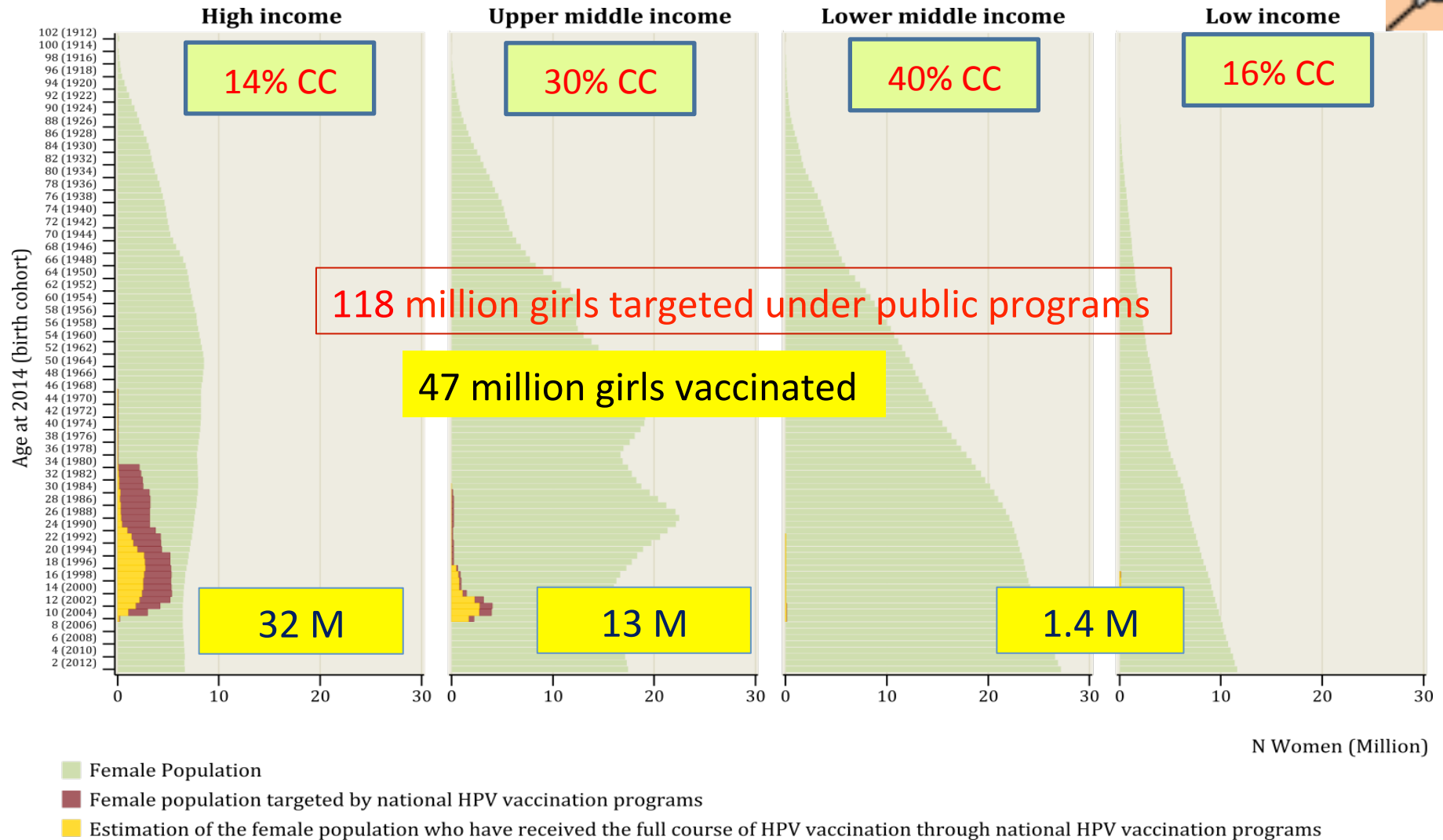
HPV VACCINATION PROGRAMS TO 2014/5



64 COUNTRIES, 4 REGIONAL & 12 TERRITORIES

Bruni et al. Lancet 2016

WORLD FEMALE POPULATION PYRAMID BY INCOME AND VACCINATION IN 2014



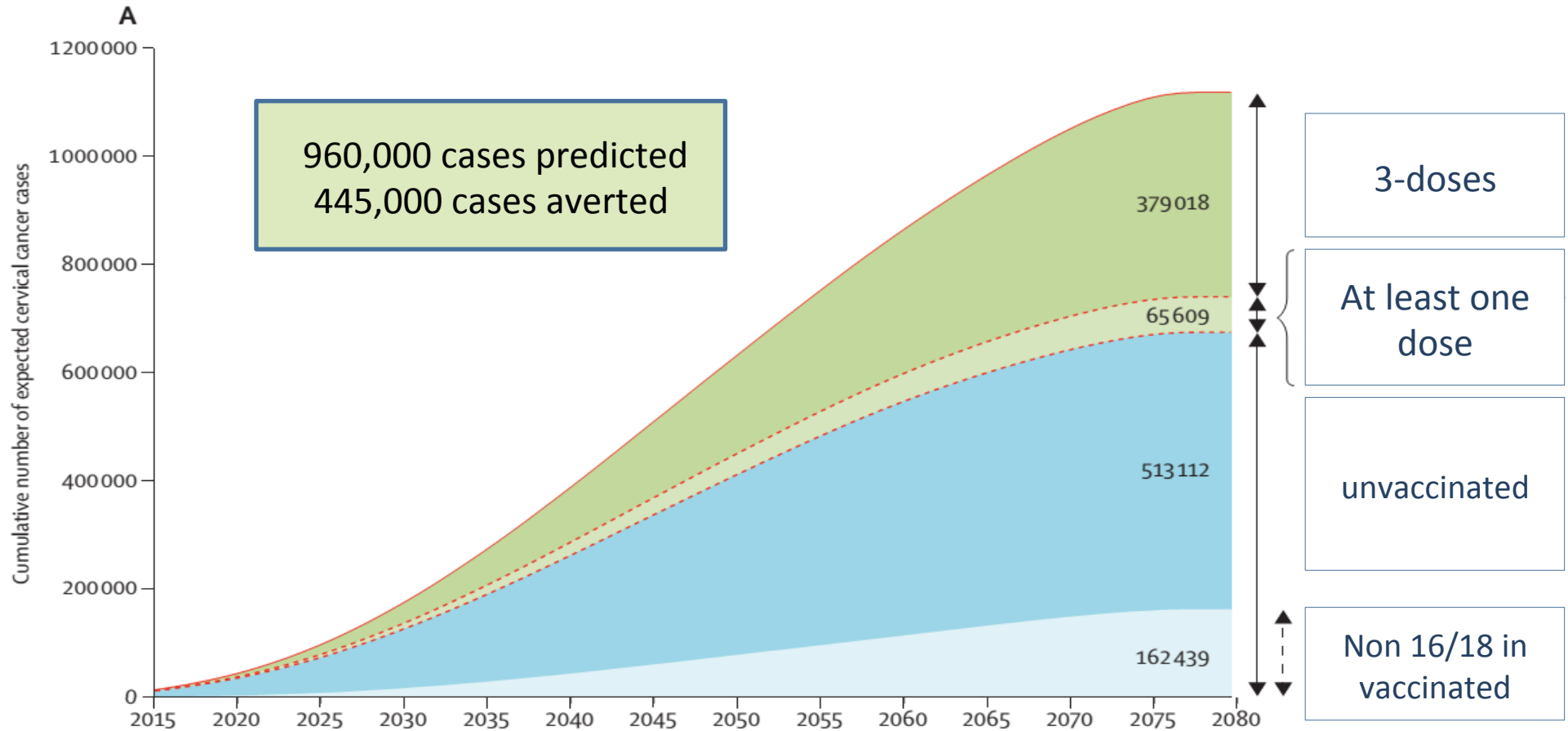
Bruni et al. Lancet PH 2016

PREDICTED IMPACT

Lifetime Cervical cancer reduction in the 2014 targeted girls assuming

- ◆ current life expectancy (75)
- ◆ current age-specific CC incidence rates
 - ◆ vaccines against HPV 16 & 18
- ◆ 70% effectiveness and lifelong protection
 - ◆ screening practices constant

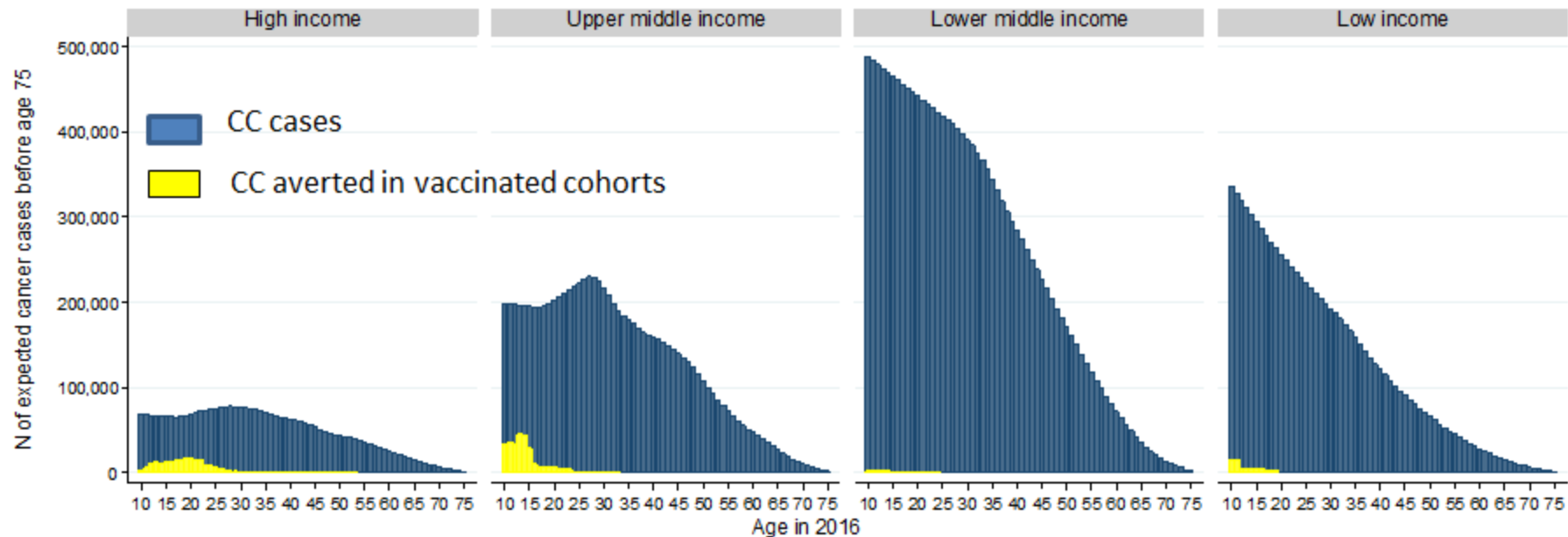
ESTIMATED INCIDENT CERVICAL CANCER AVERTED BEFORE AGE 75 YEARS IN 118 MILLION WOMEN EVER TARGETED BY HPV VACCINATION PROGRAMMES BY THE END OF 2014



Bruni 2016 Lancet Glob Health



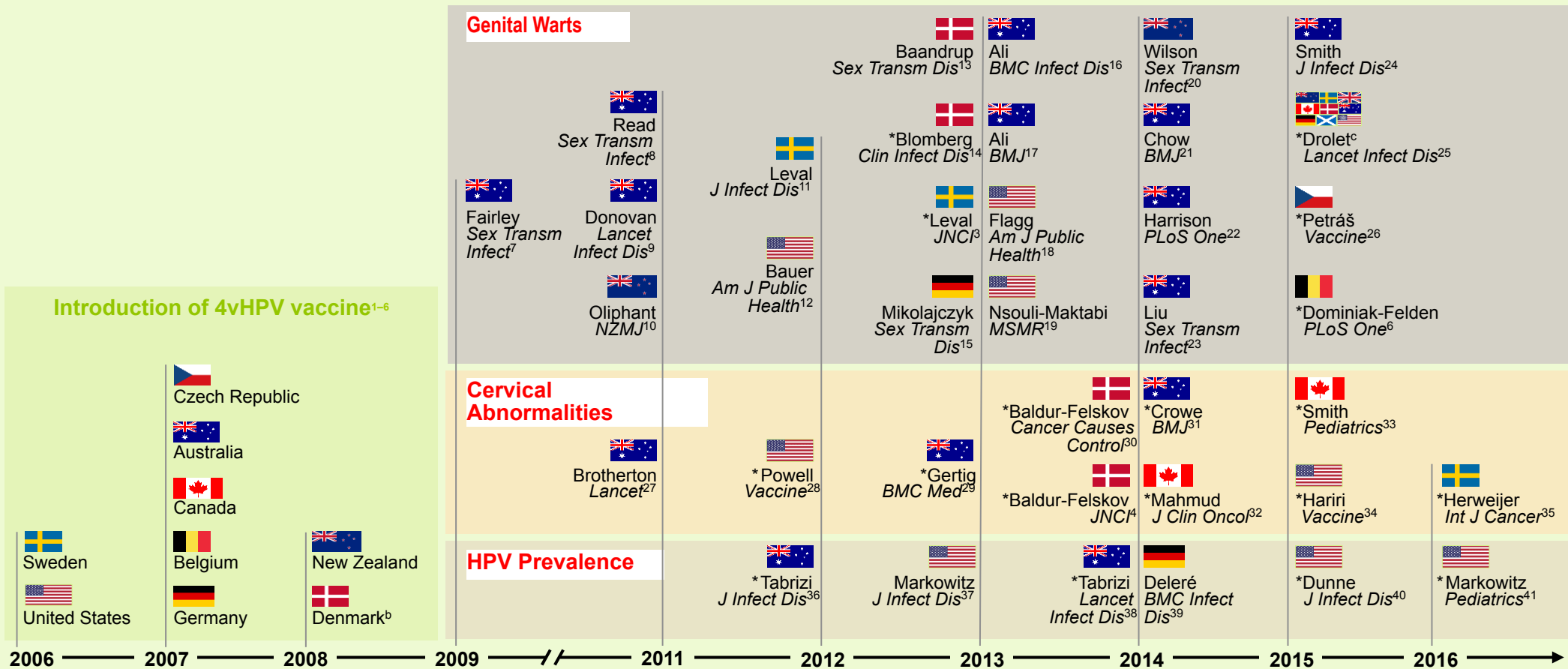
Worldwide number of CC cases expected in women 10-75 in 2017 (37 Million) by SES. and number prevented (some 500,000) having vaccinated some 61 million girls



Vaccination efforts need to be magnified
Screening efforts are mandatory

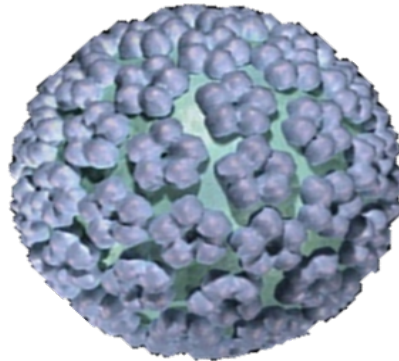
Bruni et al. in preparation

Effectiveness and Impact of 4vHPV Vaccine in Vaccination Programs demonstrated in numerous publications: Selected Reports



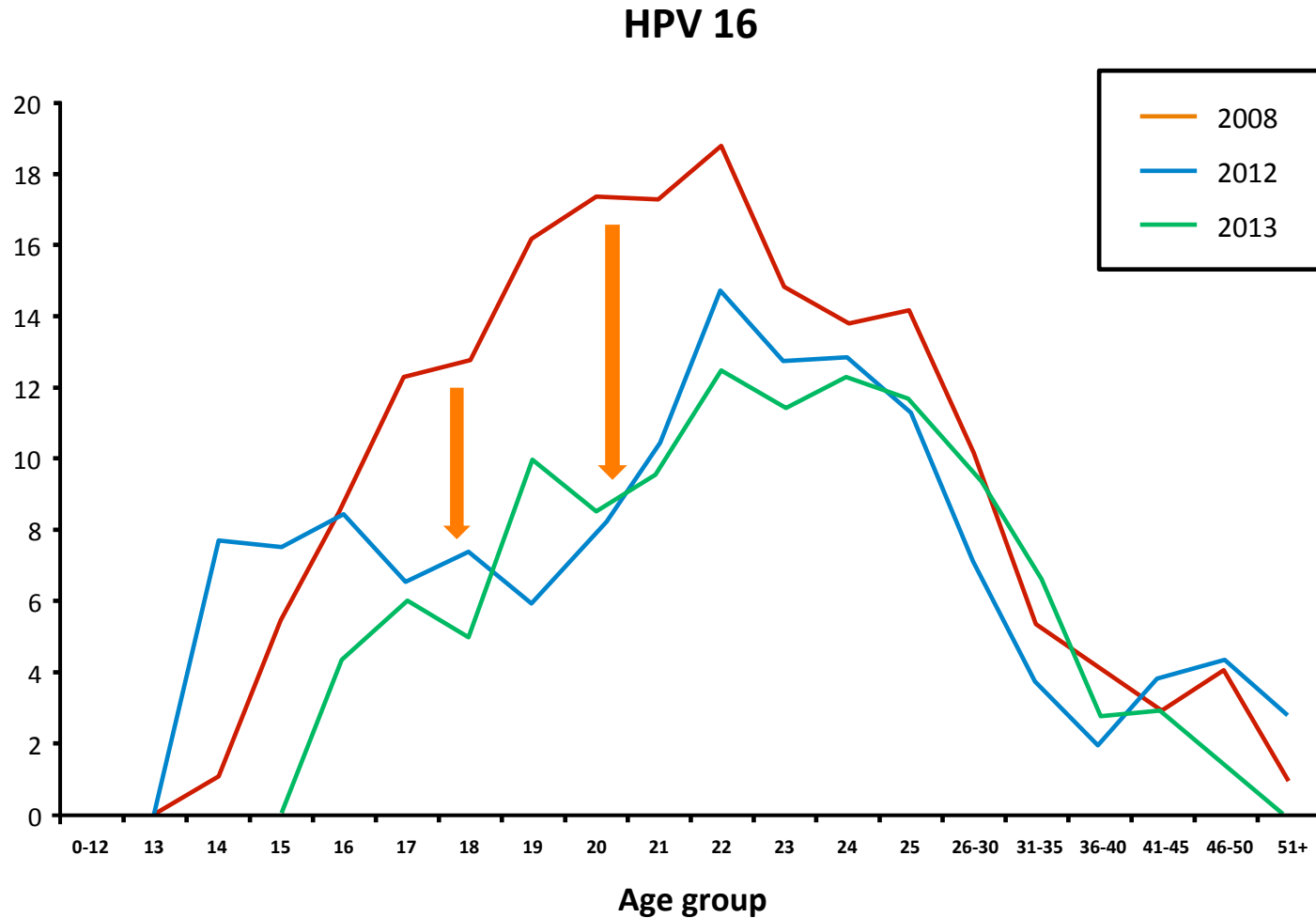
*Study links effectiveness data to vaccination status. ^aIncludes reports published in the peer-reviewed scientific literature, and does not encompass reports at scientific conferences. ^bBeginning on February 1, 2016 the childhood vaccination program switched to the 2vHPV vaccine. ^cMeta-analysis of data from 20 studies in 9 countries (United States, Australia, England, Scotland, New Zealand, Sweden, Denmark, Canada, and Germany), including both 4vHPV vaccine and 2vHPV vaccine.²⁵

OUTCOME HPV INFECTIONS



**STI registries and serum bank in Sweden
before and after HPV vaccine introduction**

HPV16 prevalence according to age in genital swabs with or without urine from women.

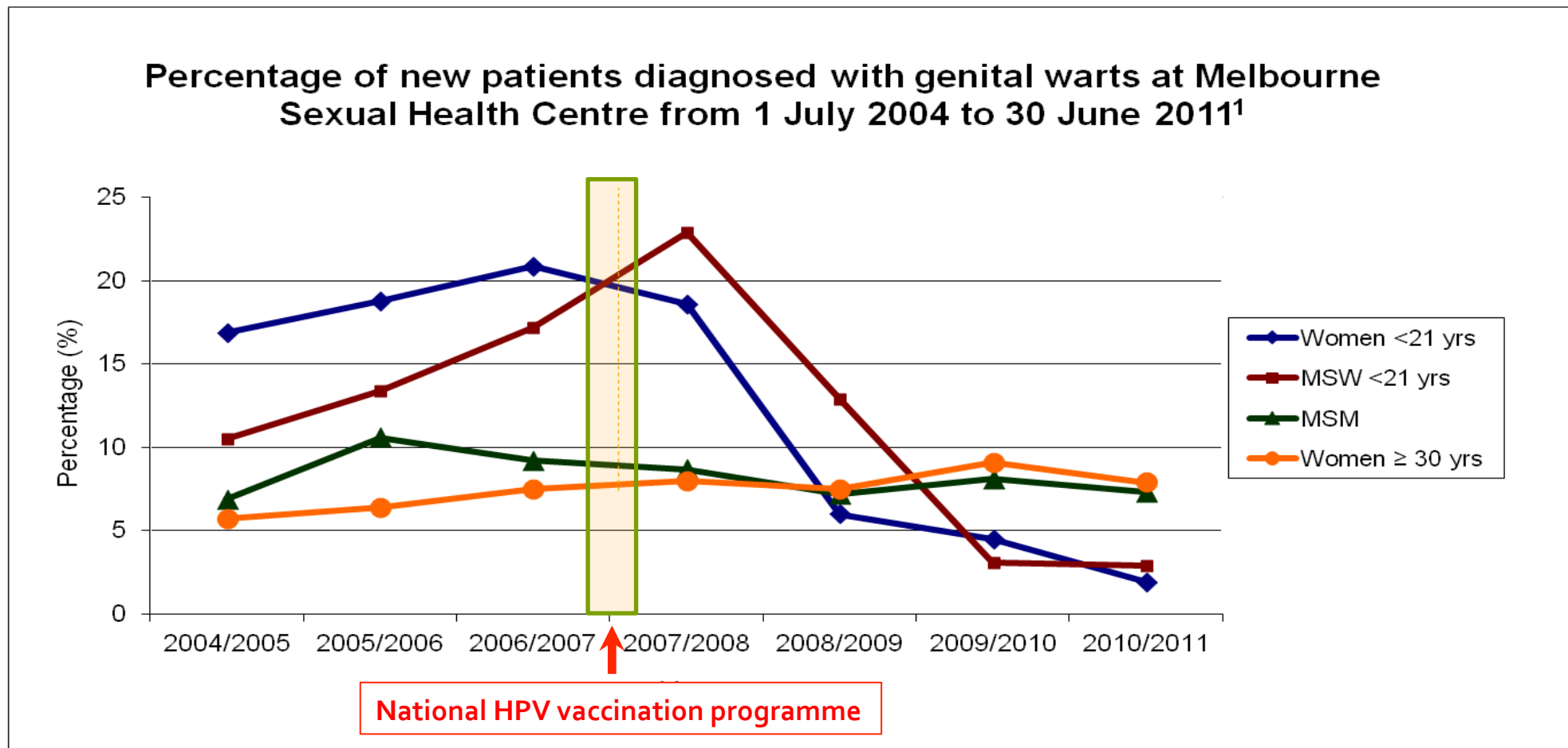




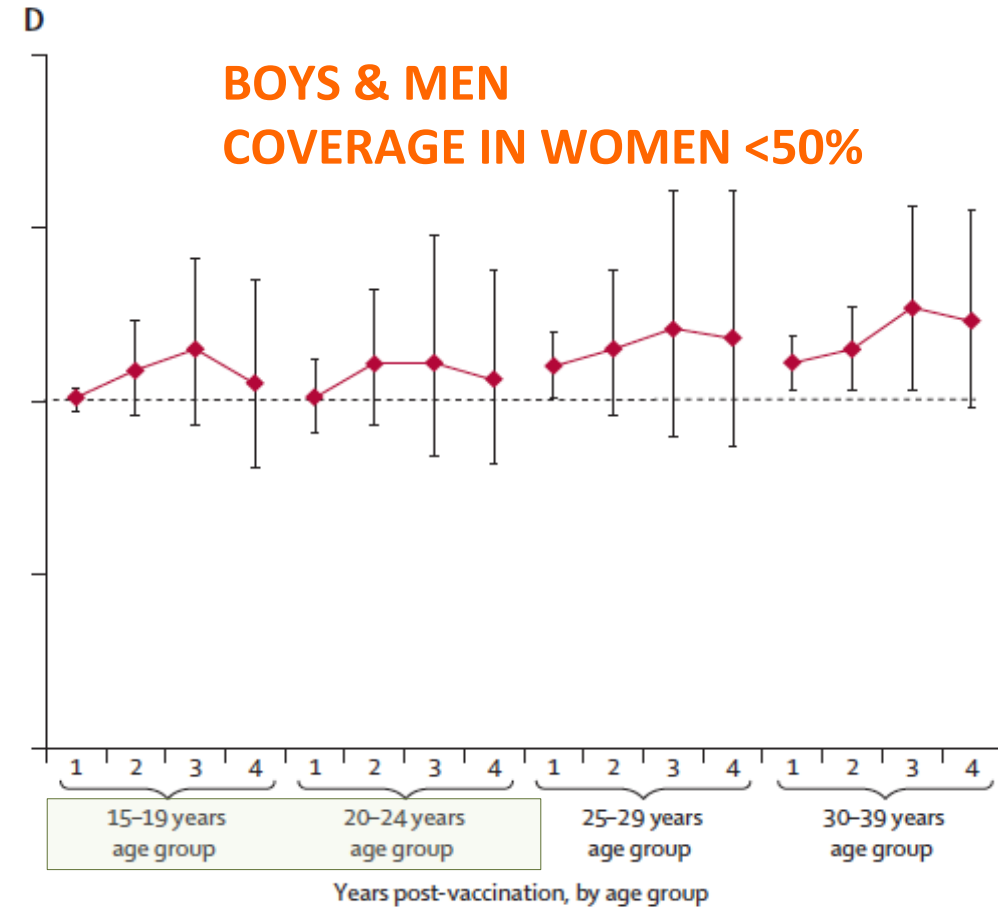
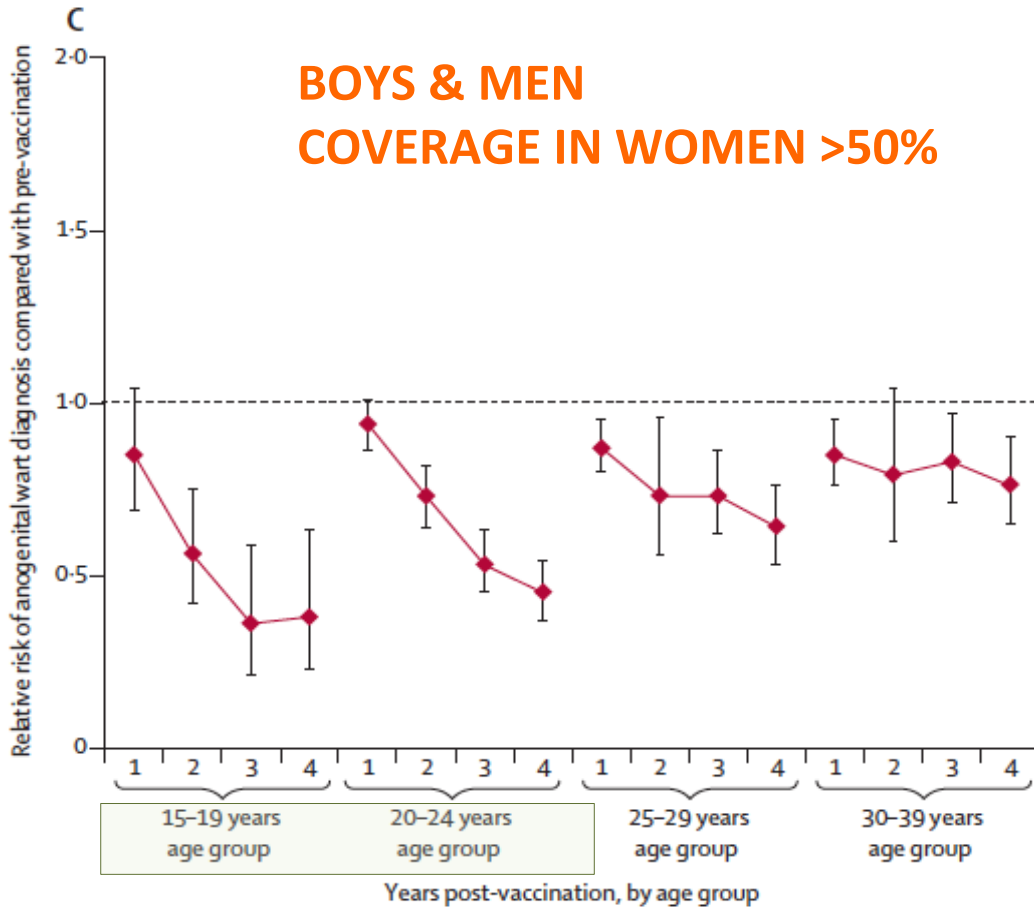
Outcome: Genital warts



AUSTRALIA: POPULATION IMPACT ESTIMATES ON GENITAL WARTS



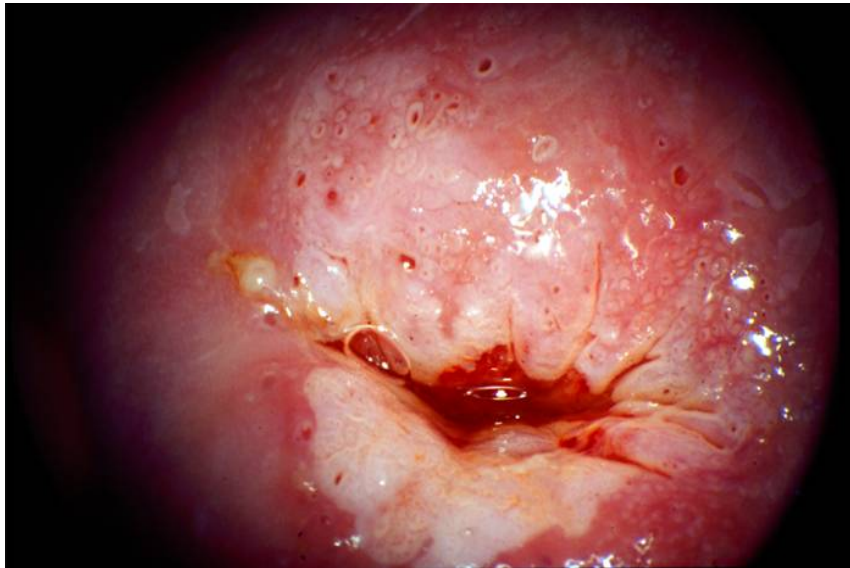
Declines in under 21 years of age: women from **18.6% to 1.9%** heterosexual men from **22.9% to 2.9%**
 Around 93% reduction of GW – this has been seen also in other countries



Target ages for female vaccination

Drolet et al, Lancet Infect Dis 2015

OUTCOME: CIN 3 - CARCINOMA IN SITU



Decline in pre-cancer now impacting up to 30 years

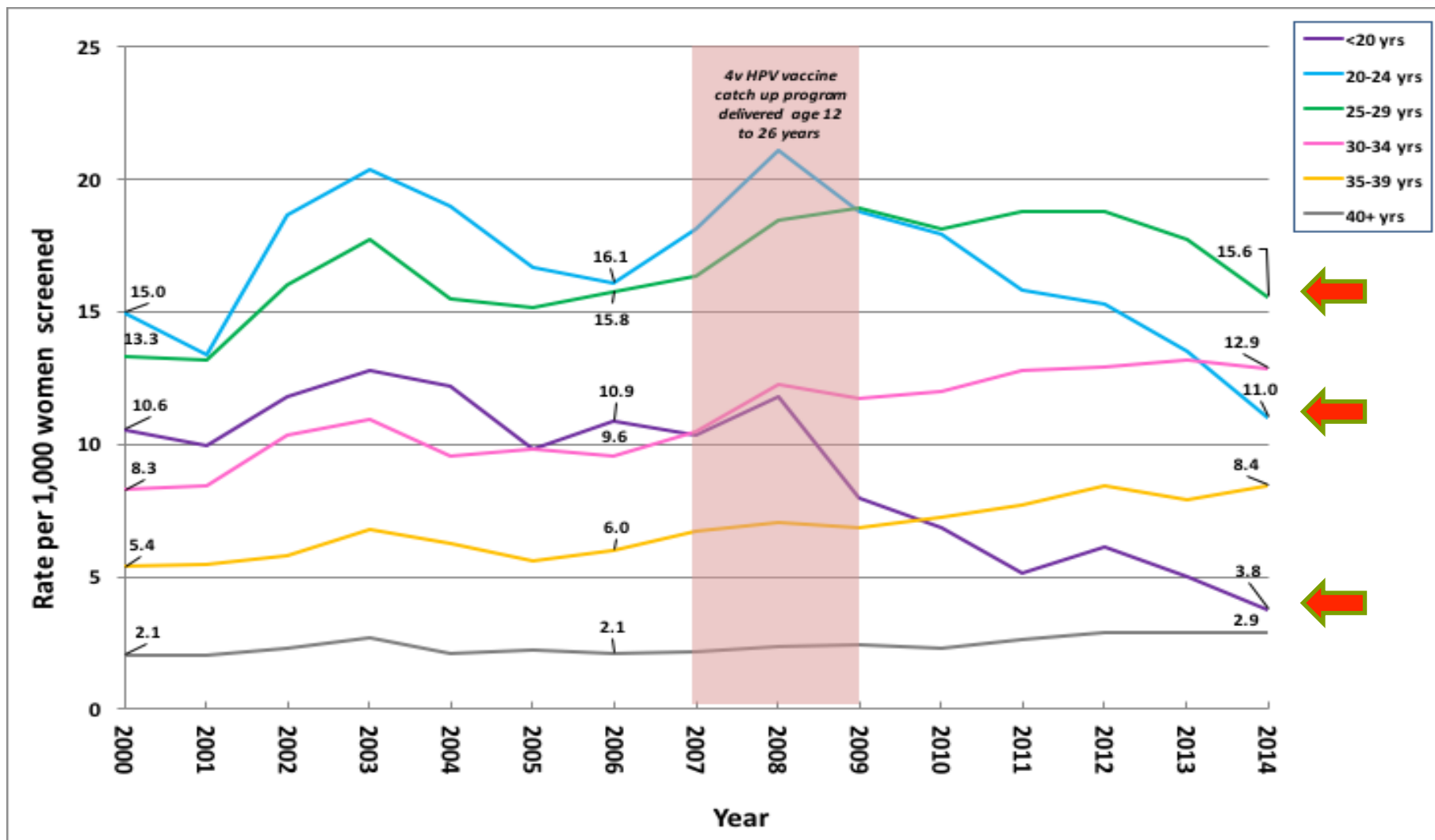
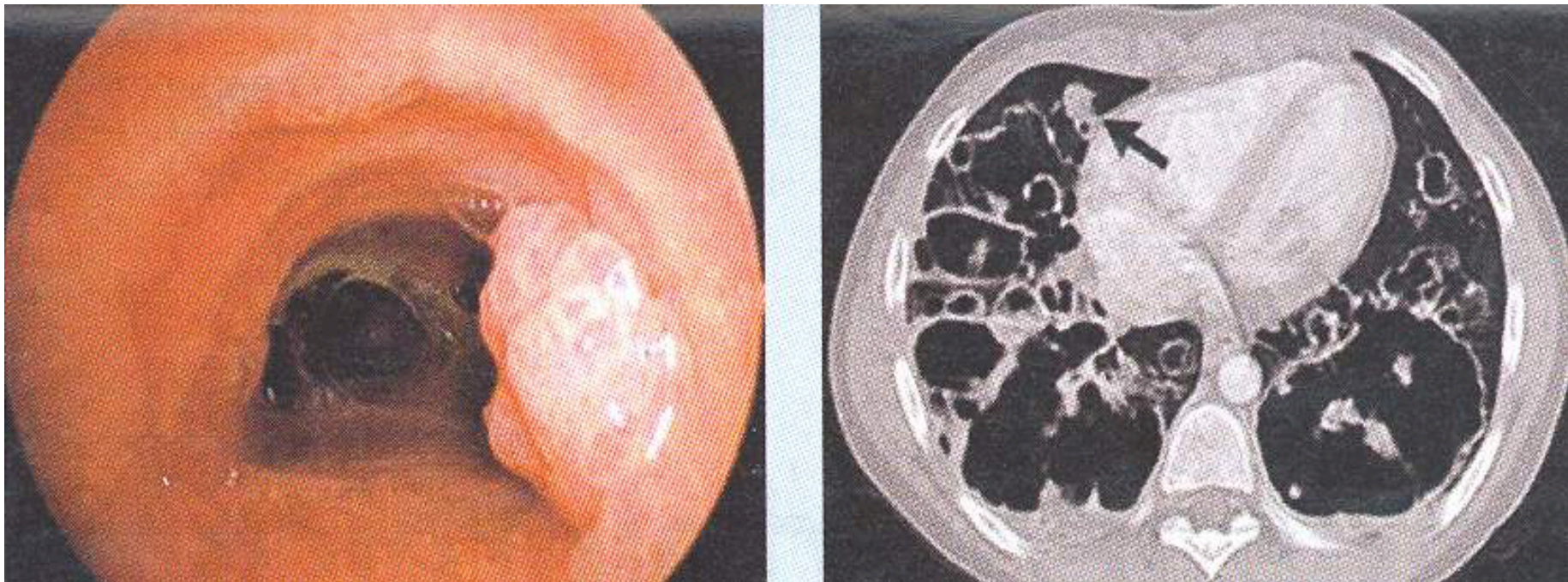


Figure 1: Trends in prevalence rates of high grade histologically confirmed cervical abnormalities (CIN2+)* diagnosed in Victorian women, Australia, by age group, 2000-2014

Source: Brotherton et al. Med J Aust 2016



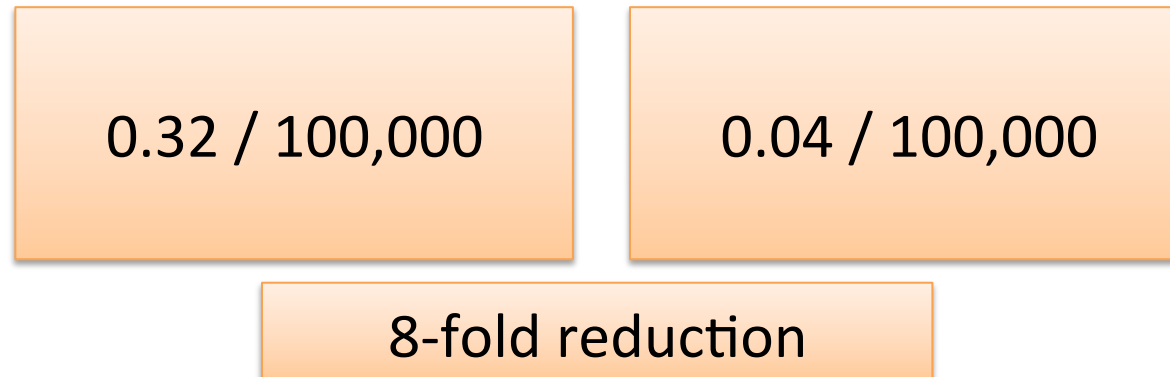
Outcome: Recurrent respiratory papillomatosis in infants





HPV VACCINATION IMPACT ON RESPIRATORY PAPILLOMATOSIS INCIDENCE IN AUSTRALIA

- Prospective surveillance of the population. Linkage to vaccination records
- Reduction of juvenile RRP between 2012 and 2016:



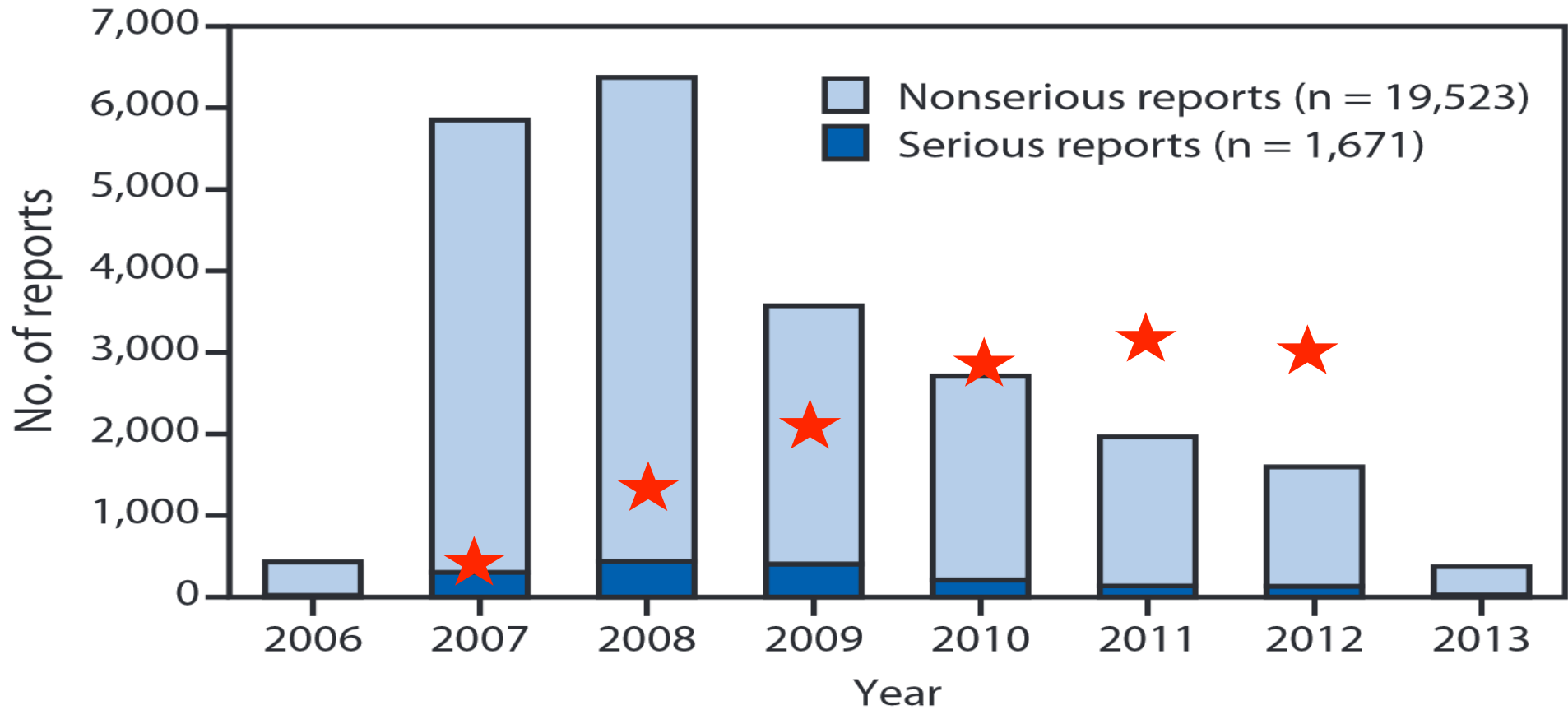
- None of the cases was born to vaccinated mothers

THE ANTI HPV VACCINE SPECIFICITY





Number of serious and non-serious reports of adverse events after administration of qHPV vaccine in females, by year. (VAERS 2006-2013 MMWR 2013)



**% of girls receiving
3 doses:**

6%

18%

27%

32%

35%

33%

* Total number of reports (serious and non-serious) = 21,194. In the Vaccine Adverse Event Reporting System, reports are classified as serious if the submitter reports one or more of the following: hospitalization, prolongation of an existing hospitalization, permanent disability, life-threatening illness, or death.



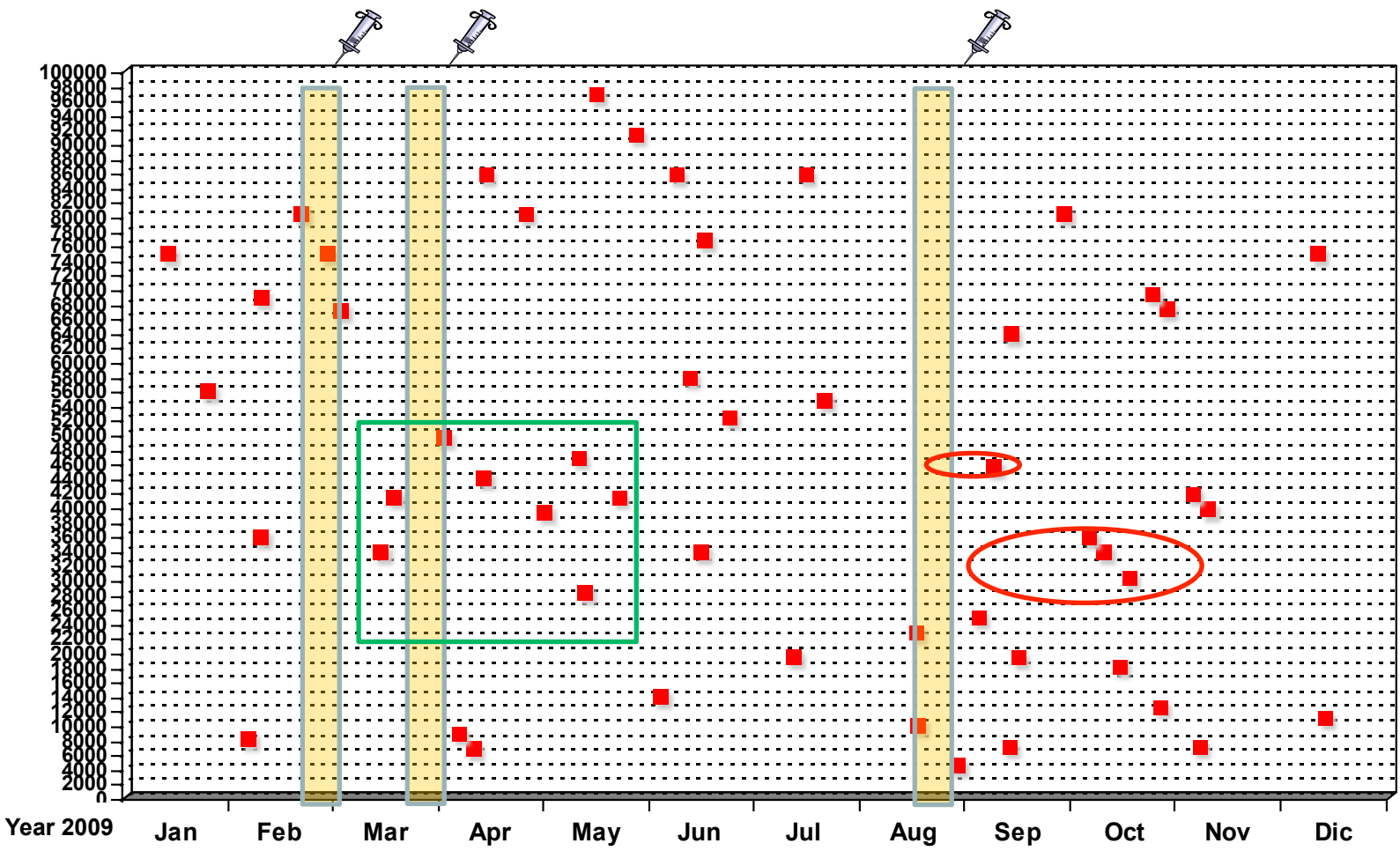
Inconsistency of adverse events in different populations unlikely to have biological plausibility.



Let alone rumors....



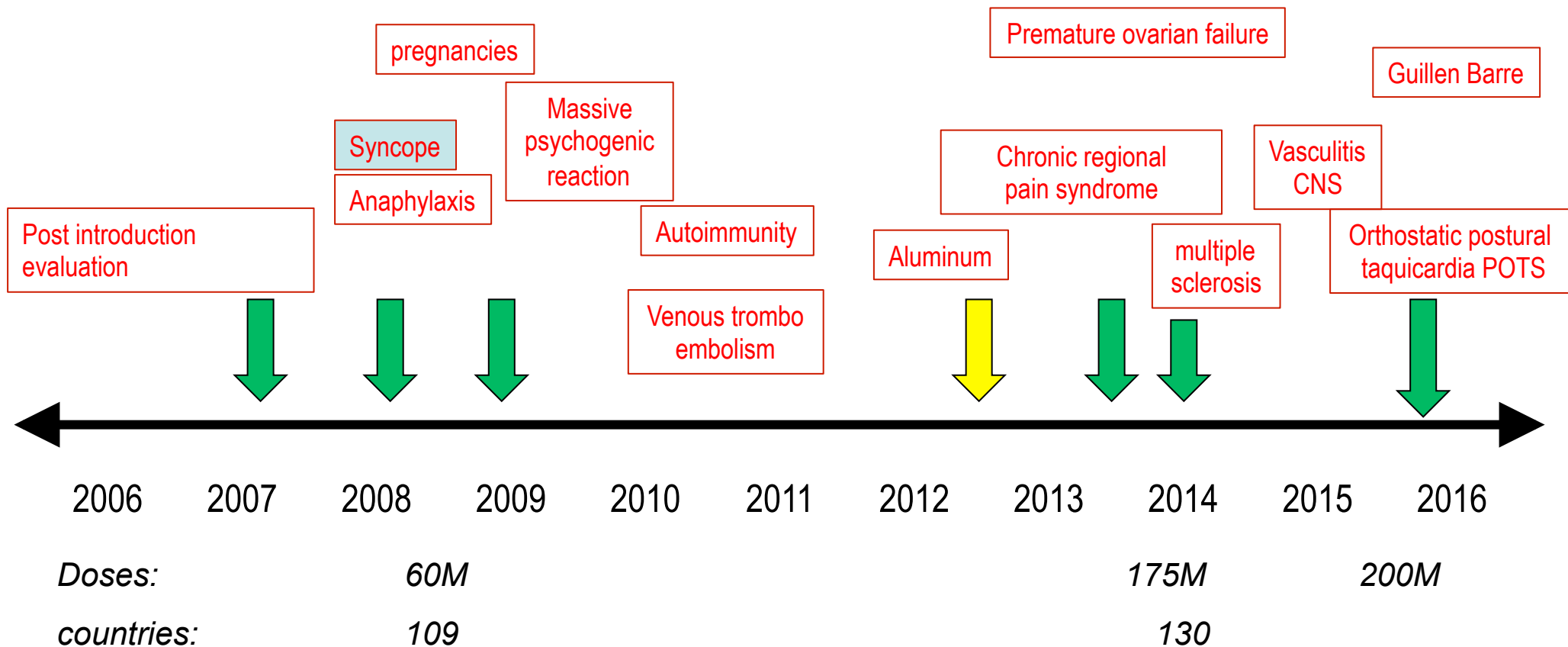
Temporal associations are unavoidable in the absence of any biological relationship



Emergency consultation of adolescents (9-18 years)
51,3 x 100.000 x year due to symptoms of diabetes onset

Siegrist et al. PIDJ 2007

Reports of the global committee on safety of vaccination in relation to the HPV vaccine (GACVS 2007/15) / Strategic Advisory Group of Experts in immunization (SAGE)

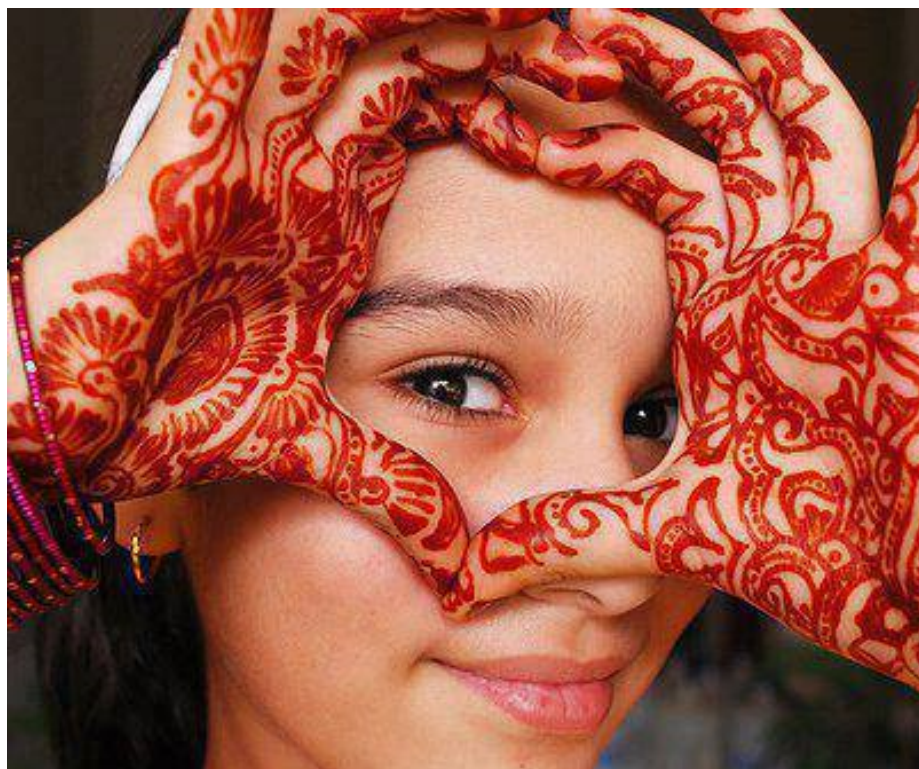




HOW TO BEST PROTECT WOMEN AND GIRLS TODAY

- Enter HPV vaccines into the *national routine vaccination program* of the country. Most likely focusing on school-based programs
- Use *currently available* vaccines (2-dose regimes)
- Focus all organizational efforts to achieve *high coverage* of the target population
- Consider wider *catch-up populations* (i.e. to age 26)
- Consider *male vaccination* as well
- Coordinate with the *screening programs*

Thank you for your interest



shukran