

# **Schedules and strategies for HPV immunization**

## **Conclusions and proposed recommendations for SAGE**

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**Andrew Pollard, SAGE Member**  
**SAGE meeting, 18–20 October 2016**

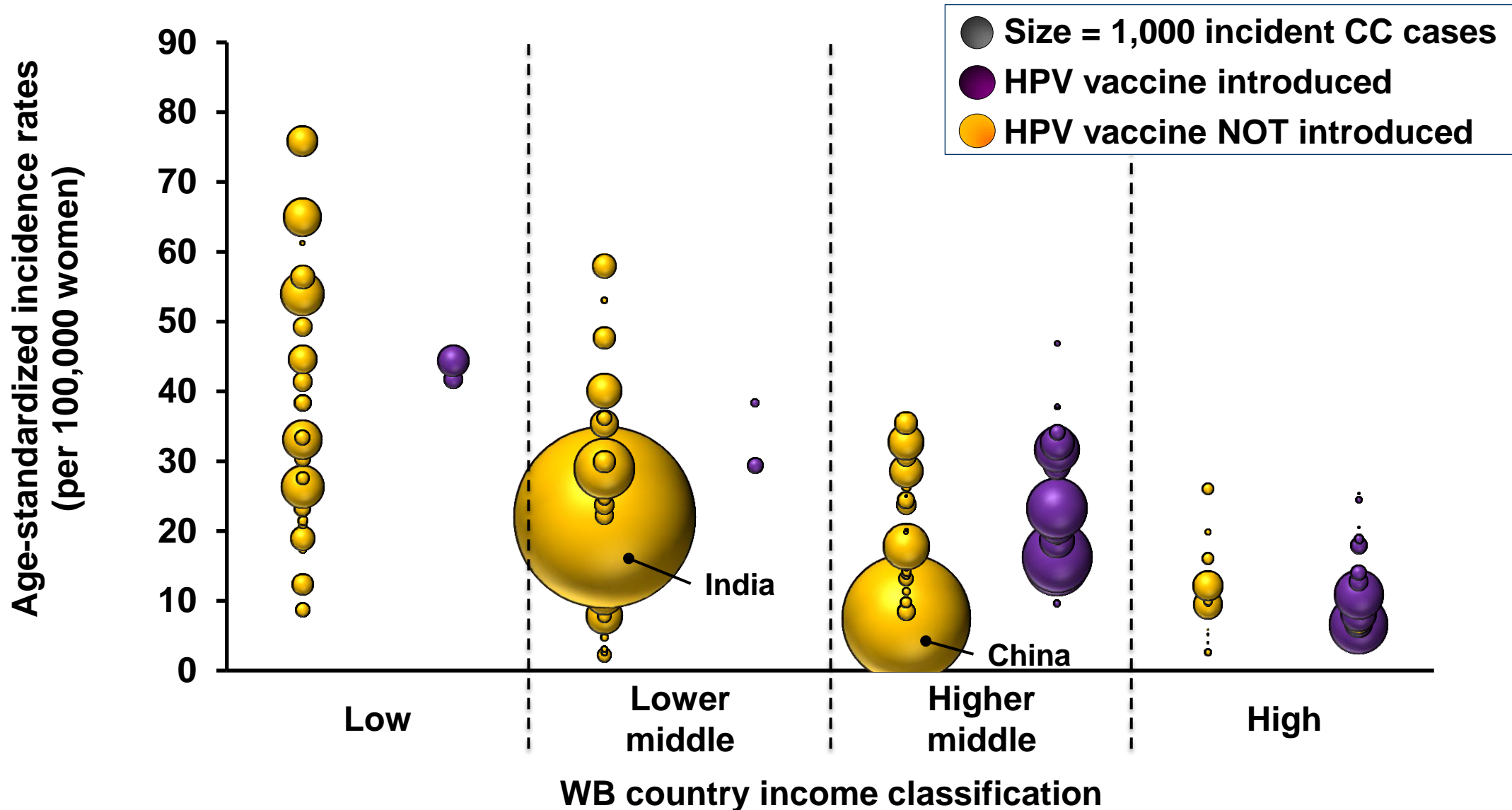
# Questions for SAGE

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1. What is the incremental effectiveness and cost-effectiveness for cervical cancer prevention of different HPV vaccines based on girls-only immunization?
2. What is the incremental effectiveness and cost-effectiveness for prevention of HPV-related diseases of adolescent gender-neutral HPV immunization compared to girls-only HPV immunization?
3. What is the incremental effectiveness and cost-effectiveness for cervical cancer prevention of immunization of multiple female cohorts (multiple age cohorts within a defined age range) compared to single age cohort immunization of only girls aged 9–13 years or of both girls and boys aged 9–13 years?

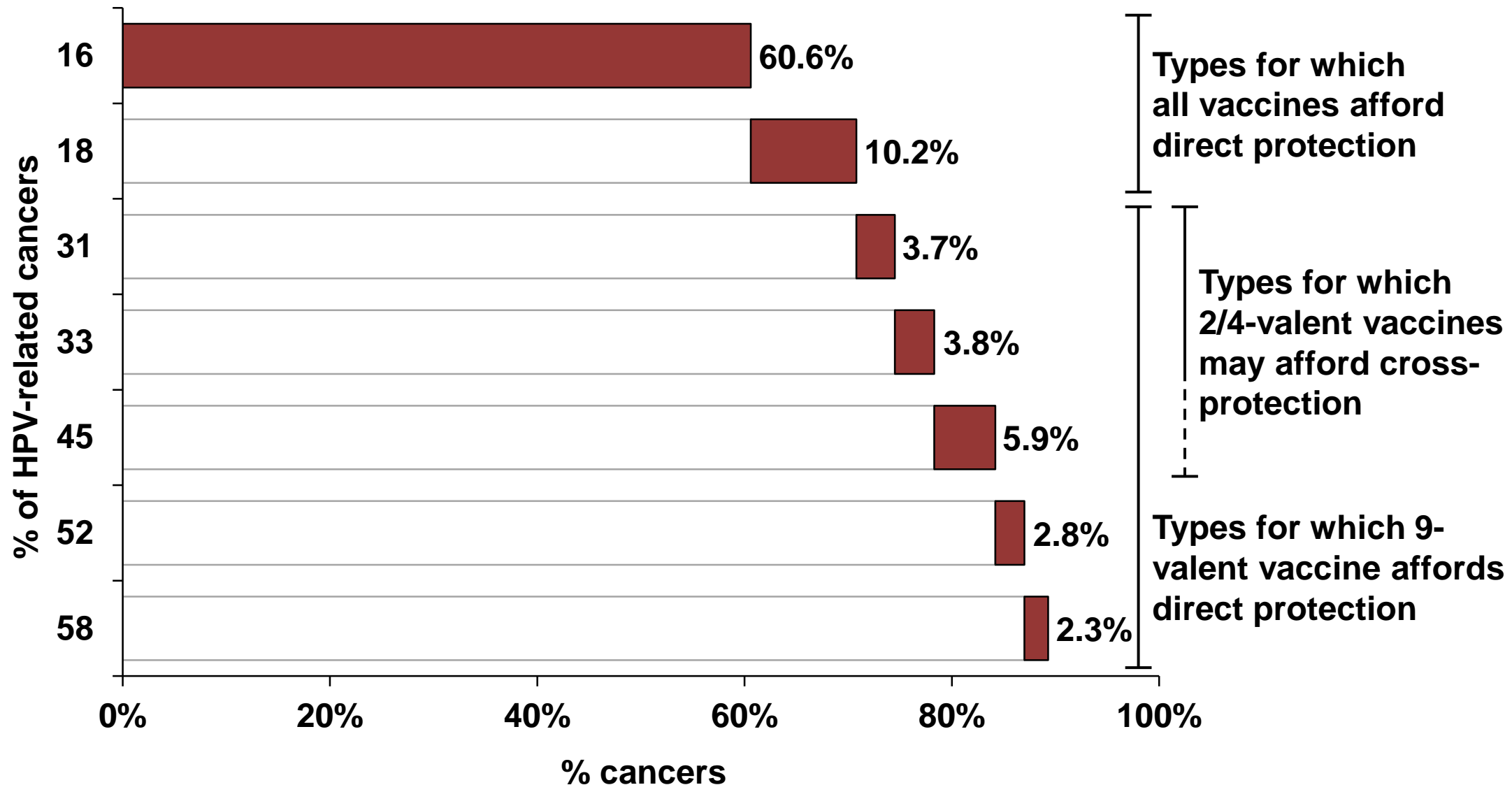
**(1) What is the incremental effectiveness and cost-effectiveness for cervical cancer prevention of different HPV vaccines based on girls-only immunization?**

# Comparison of cervical cancer incidence in countries that have and have not introduced HPV vaccine



Sources: IARC, GLOBOCAN 2012 (estimated annual number of new cervical cancer cases); World Bank, List of economies, July 2016; WHO/IVB Database, national HPV vaccine introductions as of 27 June 2016, based on country reports.

# Relative contribution of different viral types<sup>5</sup> to cervical cancer—World, 2012



# Vaccine choice

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- **Similar effectiveness of registered vaccines have to prevent cervical cancer due to HPV 16/18**
- **Clinical trials and post-introduction observational studies point to cross-protection for non-vaccine HPV types by 2/4-valent vaccines**
  - **Additional long-term data, including for CIN3, from post-introduction studies in near future**

# Question 1: Key modelling results

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- **Effectiveness**
  - High population-level impact and strong herd effects
- **Cost-effectiveness**
  - Immunization with any vaccine vs. no vaccination: Highly cost-effective, irrespective of vaccine and even w/o herd immunity or cross-protection
  - Immunization with 9-valent vs. 2/4-valent vaccines: Dependent on cross-protection by 2/4-valent vaccine and vaccine cost

# Question 1: Main considerations

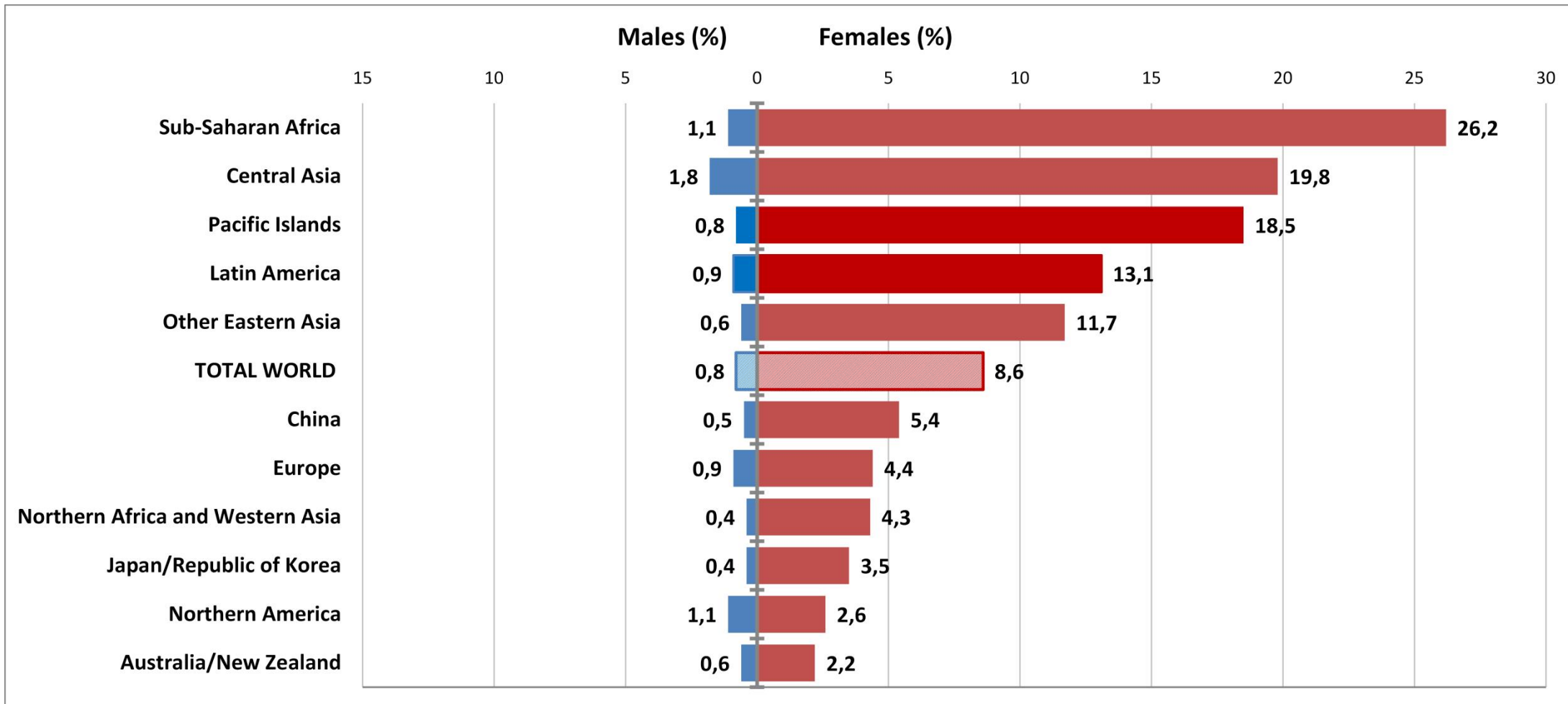
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- Priority remains cervical cancer prevention through the immunization of girls, prior to sexual initiation
  - Opportunity to harmonized age range to 9–14 years
- Introduction in national programmes should be *strongly* recommended, with current qualifiers
- At national level, country-wide introductions
  - Phased only when immediate country-wide vaccination not affordable or operational



**(2) What is the incremental effectiveness and cost-effectiveness for prevention of HPV-related diseases of adolescent gender-neutral immunization compared to girls-only HPV immunization?**

# Estimated cancer cases attributable to HPV, by regions—World, 2012



# **Burden of anogenital warts**

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- **Incidence/prevalence varies by study setting**
- **Impact on quality of life is difficult to relate to cancer burden**
- **Overall, very low quality of evidence**

## Question 2: Key modelling results

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- Effectiveness

- **HIC:** strong herd effects from girls-only vaccination (even at low coverage) → greater impact from increasing coverage in girls than including boys
- **LMIC:** same, but vaccinating boys can be beneficial under specific conditions

- Cost-effectiveness

- **HIC:** unlikely cost-effective if coverage in girls is >70–80%
- **LMIC:** lacking evidence, expected to vary by level of herd effects

## **Question 2: Main considerations**

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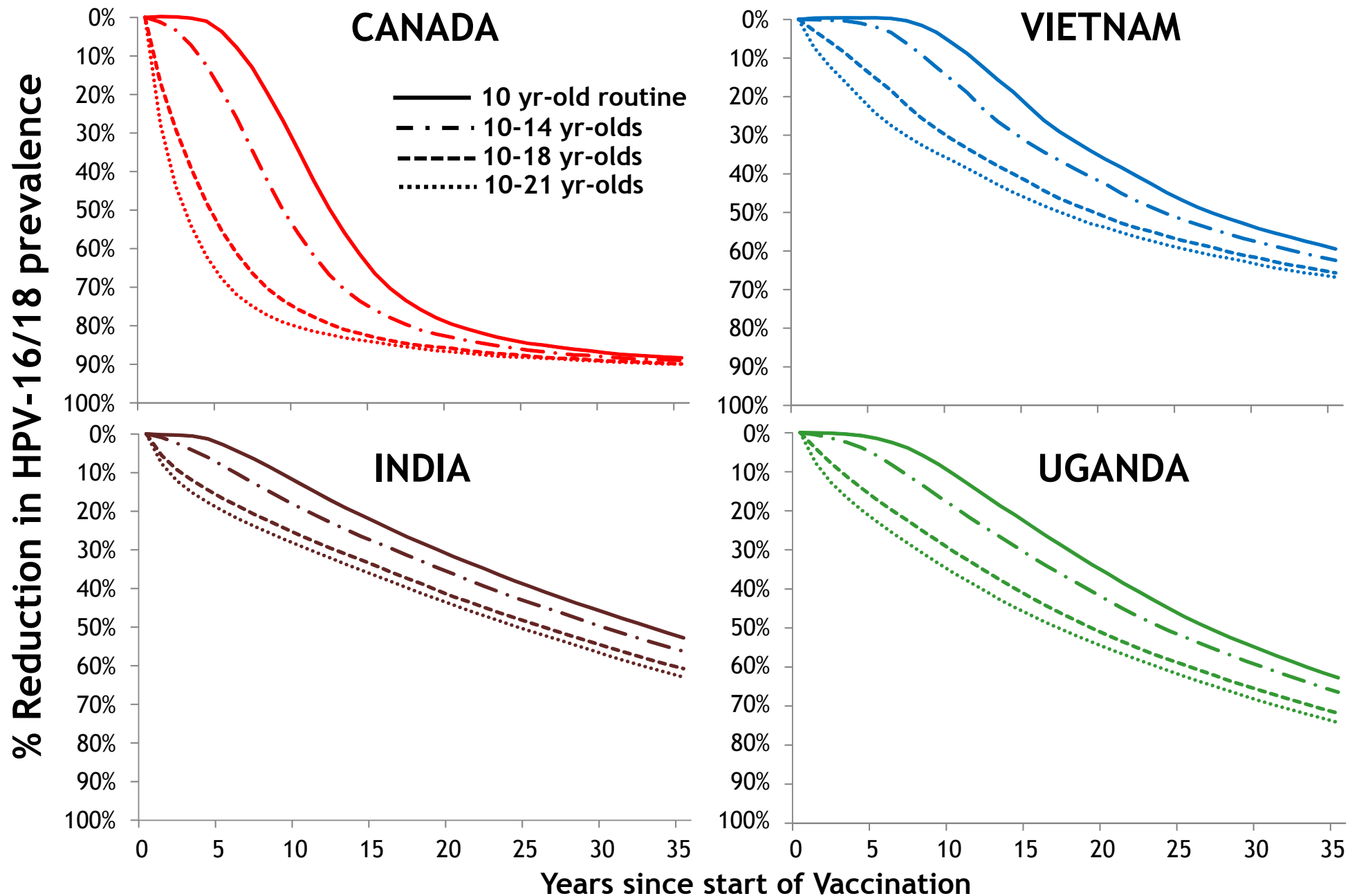
- **High coverage among adolescent girls is priority, then adding boys immunization generally not cost-effective**
- **Nonetheless, tangible benefits of gender-neutral immunization**
- **Gender-neutral immunization could be considered based on national context**

**(3) What is the incremental effectiveness and cost-effectiveness for cervical cancer prevention of immunization of multiple female cohorts (multiple age cohorts within a defined age range) compared to single age cohort immunization of only girls aged 9–13 years or of both girls and boys aged 9–13 years?**

# Multiple age cohort immunization: HPV-16/18&

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Girls-only vaccination, Coverage=80%, Vaccine duration=Lifelong, Vaccine Efficacy=95%



&: HPV-ADVISE, Median (line) of model predictions

# Question 3: Key modelling results

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- **Effectiveness**
  - Rapid impact with stronger herd effects
  - Greater impact by including additional cohorts
- **Cost-effectiveness**
  - Cost-effective in ages 9–14 years, specially with 2-dose schedule
  - Incremental cost-effectiveness in female ages  $\geq 15$  years dependent on country context



## **Question 3: Main considerations**

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- **Due to direct and herd effects, targeting multiple age cohorts results in faster population impact. Also, economies of scale in delivery and programme resiliency**
- **Immunization of multiple cohorts of girls aged 9–14 years should be recommended**
  - **As with single age cohort immunization, it will require adequate operational and financial planning**

**Thank you**