Decision making for vaccine policy - case study

Australian Vaccinology Course

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THE UNIVERSITY OF MELBOURNE

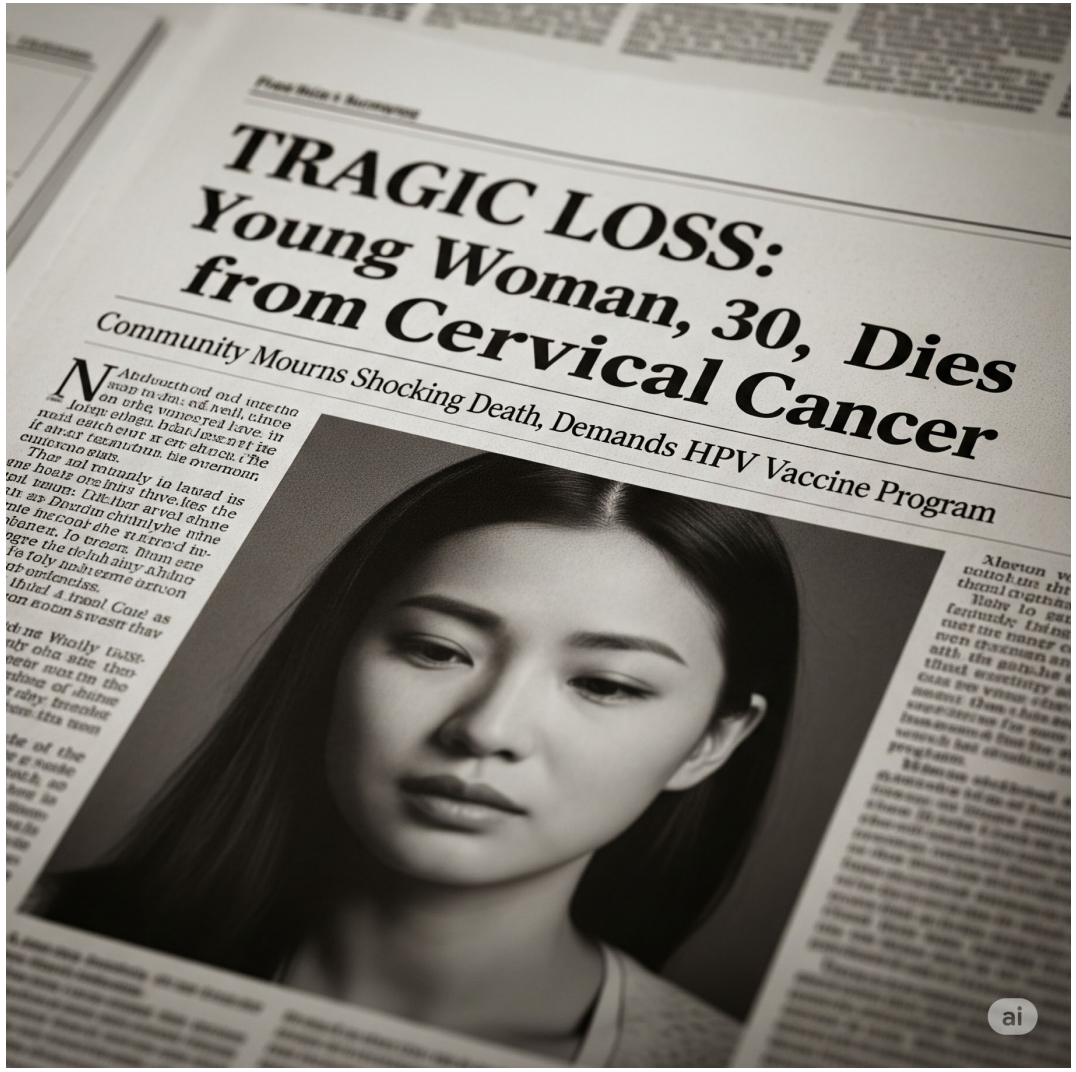
NCIRS National Centre for Immunisation Research and Surveillance Australia

Note

The following slides have been developed for educational purposes only. They are intended to demonstrate how a TAG may develop an HPV vaccine program and model some scenarios for discussion on how such policy decisions are made.

You work in the Ministry for Health in a medium income country in the Asia-Pacific…

- You arrive at work one morning to find a request from the Minister to know whether HPV vaccine could be introduced in your country before the next election in 6 months time….
- A young celebrity influencer has just died from cervical cancer at the age of 30, there is widespread media coverage and people are asking why the government is not acting to prevent further deaths.
- The Minister thinks there would be many votes in an election promise to start protecting people against cervical cancer.



Q1) What information would be needed to inform decision making about whether HPV vaccine

a) *could* be introduced

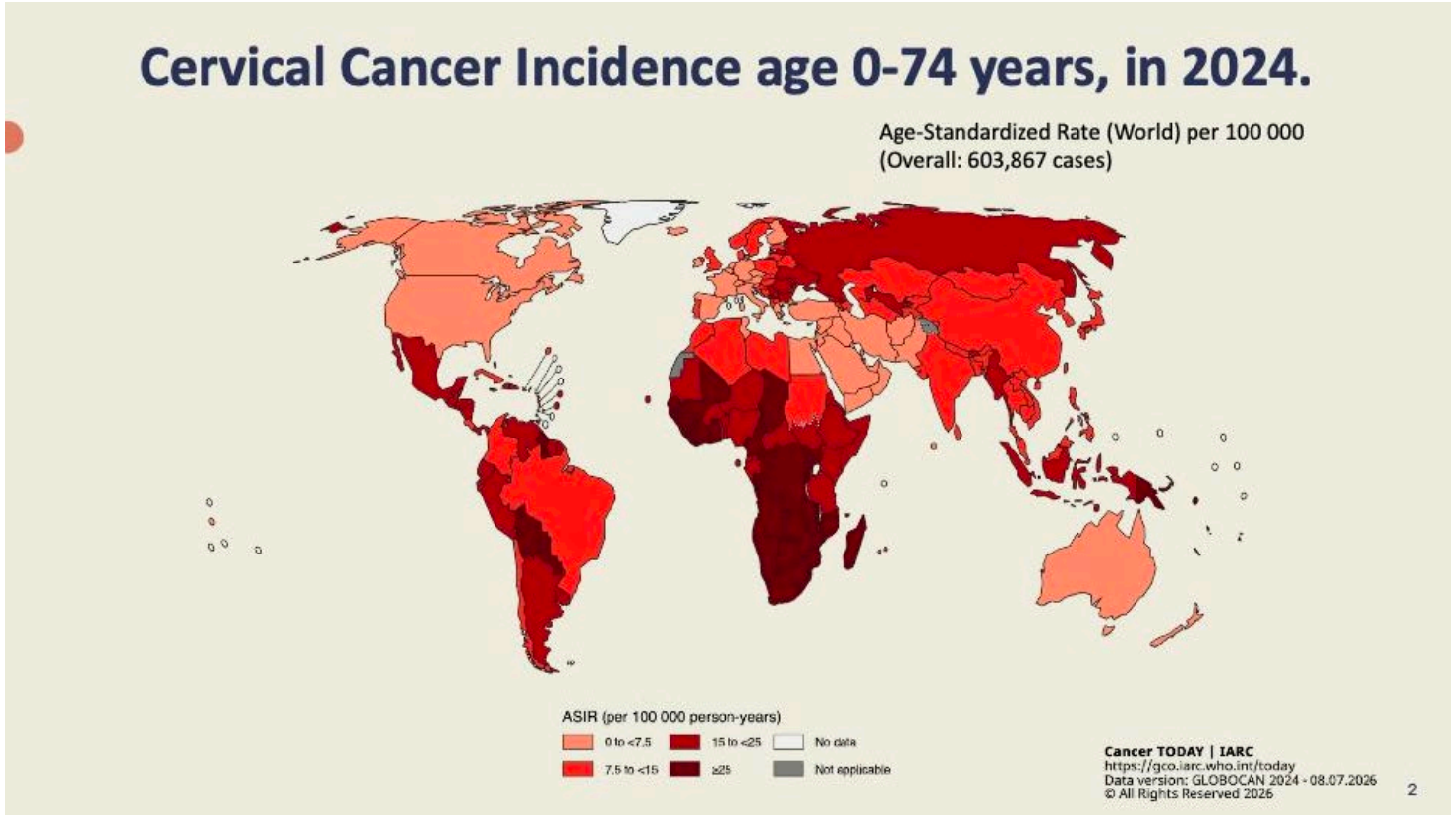
b) *should* be introduced

in 6 months time?

Take 5 minutes at your QTAG table to discuss

Evidence to decision framework

- Is this a priority problem?
- Benefits and harms of the options
- Resource use
- Equity
- Acceptability
- Feasibility



- GLOBOCAN 2024 estimated 604,000 cases, 280,000 deaths
- Risk to age 74 of 1.3%, 5th most common female cancer
- A disease of inequity - incidence and mortality, and their ratio, strongly correlated with human development index
- Commonest cancer in 19 countries, commonest ca mortality in 26

Issues to consider…

- **Disease burden and epidemiology** – is there a problem? How large is it? Who does it effect?
- **Vaccination as a possible solution** – Effective? Safe? Available? Timeline? Piloted in country/existing experience? Alternatives? Any other impacts of this vaccine?
- **Infrastructure and capacity of current National Immunisation Program**
- **Resources** – Sufficient? Available? Opportunity cost?
- **Politics, existing stakeholder and community buy in** (or not)

Q2) Who should be involved in this decision making?

What do you think about the role of politics in shaping vaccine policy and programs – what are the positives and negatives of this?

Introduction of the Australian HPV vaccination program 2007

TIMELINE FROM ANNOUCEMENT TO PROGRAM START 4 MONTHS!







- 29 November 2006 – Australian Government announces Program
- 1 April 2007 – Program start! Target 2.4 million girls/women!

**Koutsky 2005, Garland 2007, FUTURE study group 2007*

An urgent meeting of the QTAG is convened....

To develop the advice for the Minister, what information would you want to know as an QTAG member?

Disease burden

Epidemiology, HPV types causing disease, other HPV-related diseases, role of screening

Product availability

Valency, price, supply, registration status

Efficacy data

Number of doses needed, duration of protection, variability by product

Safety data

Well-tolerated? Are there any potential safety signals?

Existing recommendations

Global or in country

Equity and special populations

Impact on health inequalities between populations? High-risk populations, e.g. immunocompromised

Perception of risk

Sociocultural views on the disease or vaccination. Stigma or other cultural contexts

Modelling and cost effectiveness

Implementation issues

Eg workforce, integration, storage and cold chain

Funding and opportunity costs

Competing priorities for available budget (vaccines or other health priorities)

HPV is a very common infection

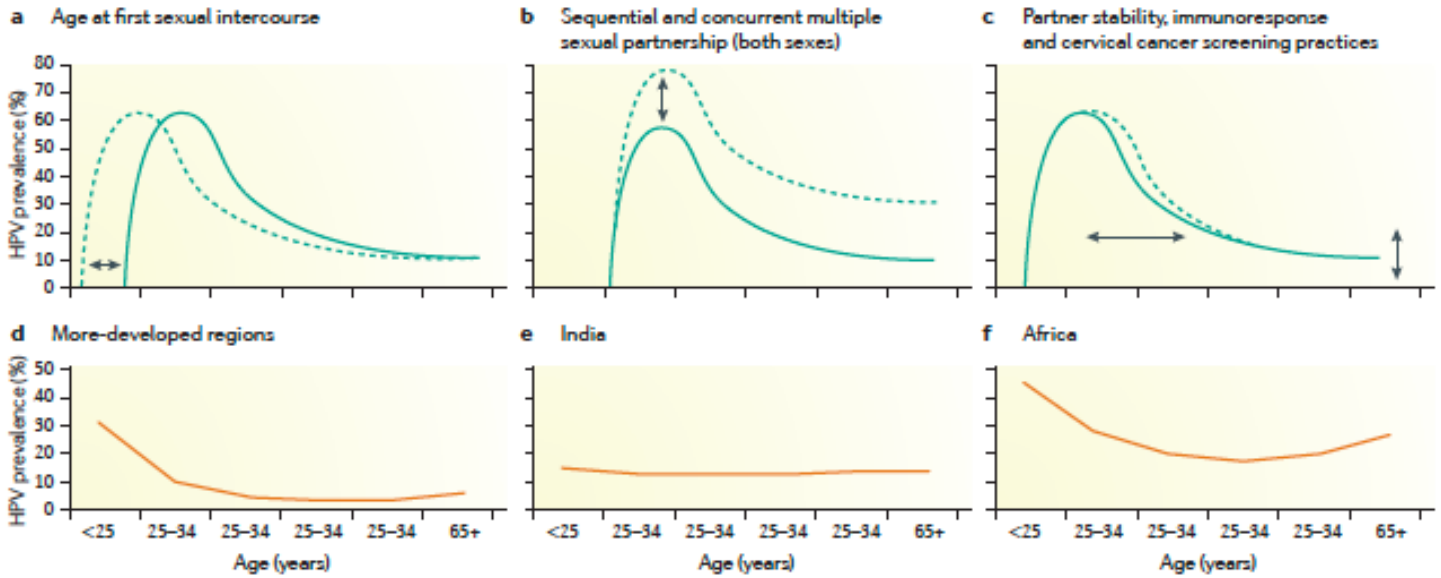
STI, skin to skin contact

80-90% lifetime infection probability (Chesson et al, STD 2014)

Usually asymptomatic, controlled within months- year

>200 types, tropism for skin or mucosa

13 oncogenic types (IARC)



Factors that influence the age-specific HPV prevalence in women

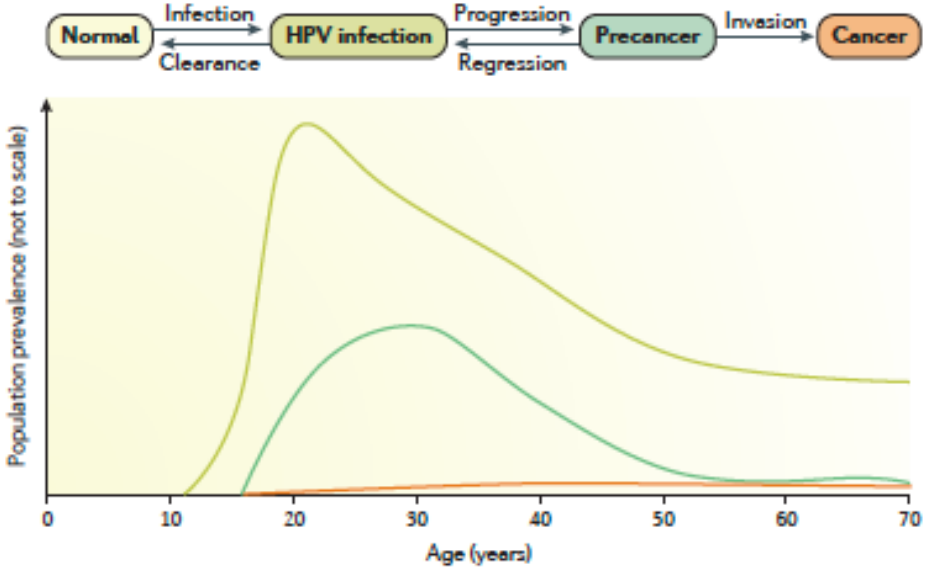


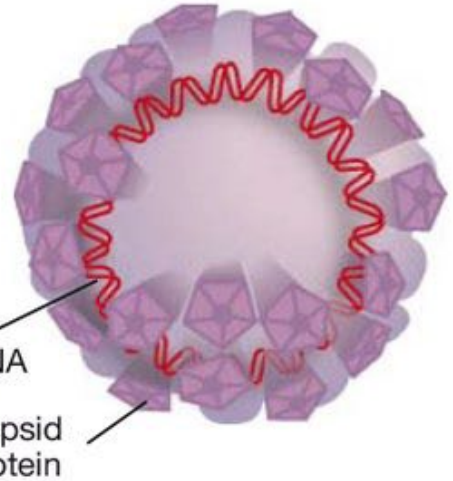
Figure 1 | **Conceptual model of HPV infection leading to cervical cancer.** Cervical cancer arises via a series of necessary steps (infection; persistence, rather than clearance; associated with precancer; and invasive cancer), with each stage mainly occurring at characteristic ages. The peak prevalence of human papillomavirus (HPV) infection is highly associated with sexual transmission in youth. The secondary peak of precancer occurs a number of years later depending on the intensity of screening, whereas the peak or plateau of invasive cancer occurs many years later. Thus, the slow growth of a precancer before invasion dictates the time taken between causative infection and a cancer diagnosis. From REF. 204. Adapted from *Cancer Epidemiol. Biomarkers Prev.*, 2013, **22**, 553–560, Schiffman, M. & Wentzensen, N., Human papillomavirus infection and the multistage carcinogenesis of cervical cancer, with permission from AACR.

Schiffman et al. Nature Rev 2016

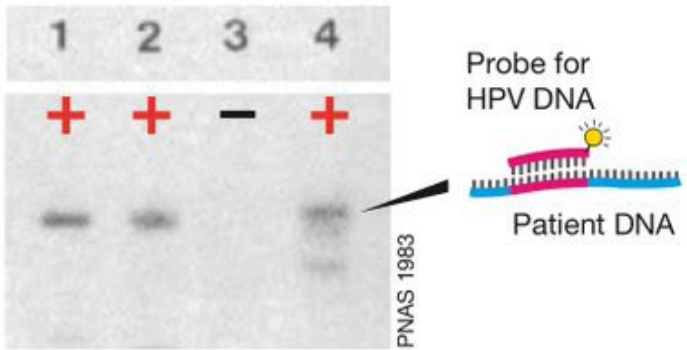
HPV – human papilloma virus

HPV has a circular, double stranded DNA, protected by capsid proteins.

More than 100 HPV-types are known. HPV16 and 18 cause 70% of all cervix cancers.



Discovery of HPV DNA in cancer cells



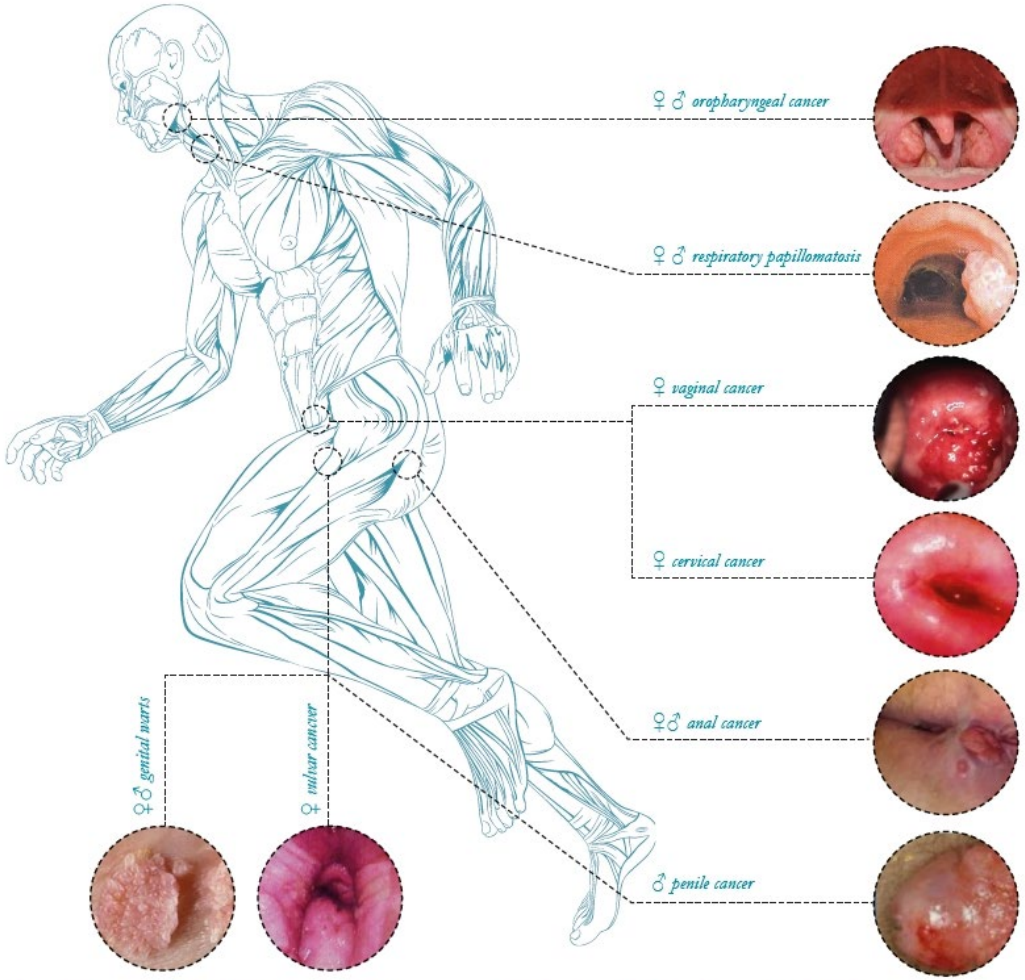
Harald zur Hausen found HPV DNA in patient DNA (+).

Infection by HPV

HPV infects epithelial cells in the cervical mucosa. HPV DNA integrates into the cellular genome when causing cancer.

(Copyright: The Nobel Committee for Physiology or Medicine. Illustrator: Mattias Karlen)

HPV-related diseases



Annually, in women HPV infections cause 530,000 cancer cases in the cervix, 18,000 in the anus, 8,500 in the vulva, 12,000 in the vagina and 5,500 in the oropharynx. In men, HPV infections cause 17,000 cancer cases in the anus, 13,000 in the penis and 24,000 in the oropharynx. Ref. (1)

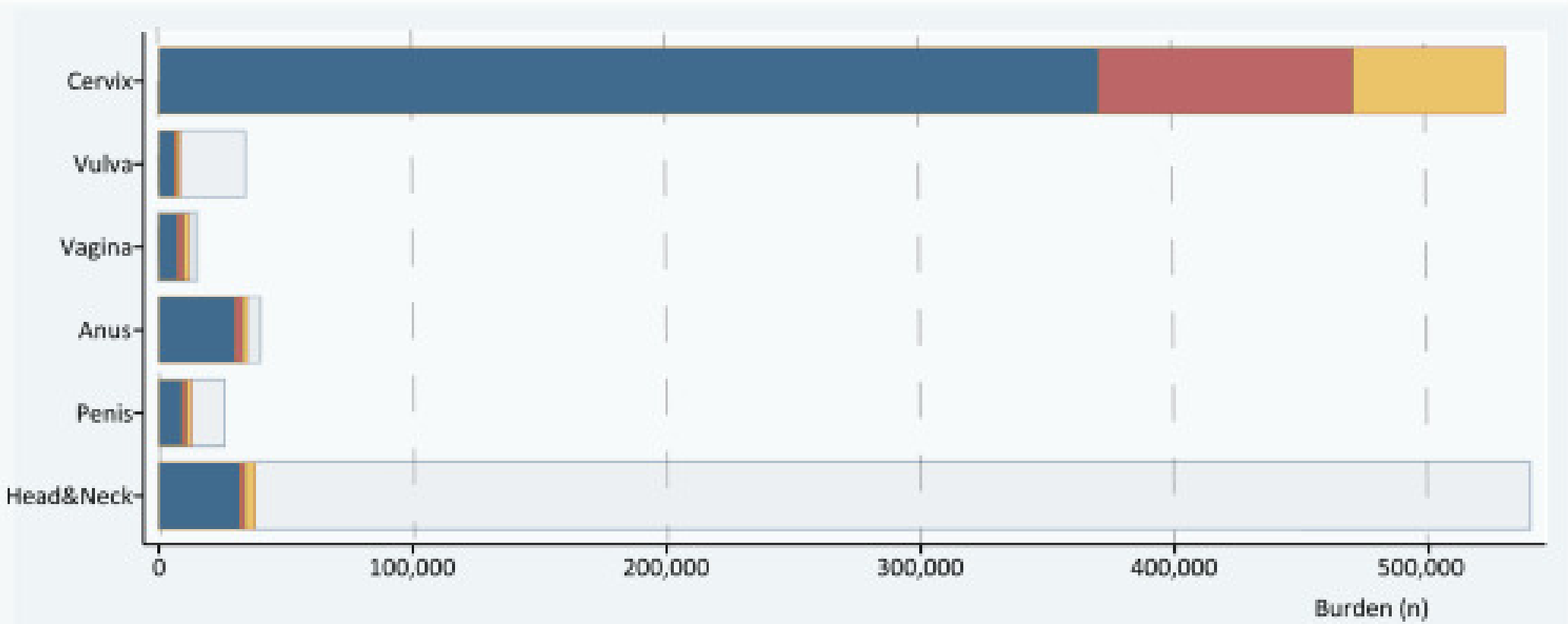
Source: Sanjose & Tsu. Spectrum of HPV related diseases, HPV world no.36

HPV attribution

- Anogenital warts -100%
- Recurrent respiratory papillomatosis - 100%
- Anal cancer – 88%
- Vaginal cancer – 78%
- Penile cancer -50%
- Vulval cancer – 25%
- Oropharyngeal cancer – 30% globally. Up to 80% in some settings.

de Martel C, et al Worldwide burden of cancer attributable to HPV by site, country and HPV type. Int J Cancer 2017; 141(4): 664-70.
de Martel C, et al. Global burden of cancer attributable to infections in 2018: a worldwide incidence analysis. Lancet Glob Health 2020; 8(2): e180-e90.

Global HPV related cancer burden by HPV type



	Cervix	Vulva	Vagina	Anus	Penis	Head&Neck
HPV16/18	370,000	6,200	7,400	30,000	9,100	32,000
HPV31/33/45/52/58/6/11	100,000	1,200	2,500	3,000	1,900	2,000
Other HPV	60,000	1,100	2,100	2,000	2,000	4,000
No HPV	0	25,000	3,000	5,000	13,000	502,000

Serrano et al 2018

Risk factors for HPV-related disease

Relate to risk of persistent HPV infection

- *Immunosuppression*
- *HIV – 6x risk of cervical cancer*
- *- Previous HPV-related disease (precancer or cancer)*
- *For cervical cancer, association with smoking, high parity, OCP use, earlier age of sexual activity, other STIs lower SES*
- *MSM – summary incidence rate anal cancer 19 per 100,000*
  - *HIV+MSM – 85 per 100,000 anal cancer*
- *Males higher risk of HPV-related oropharyngeal cancer and adult onset RRP*

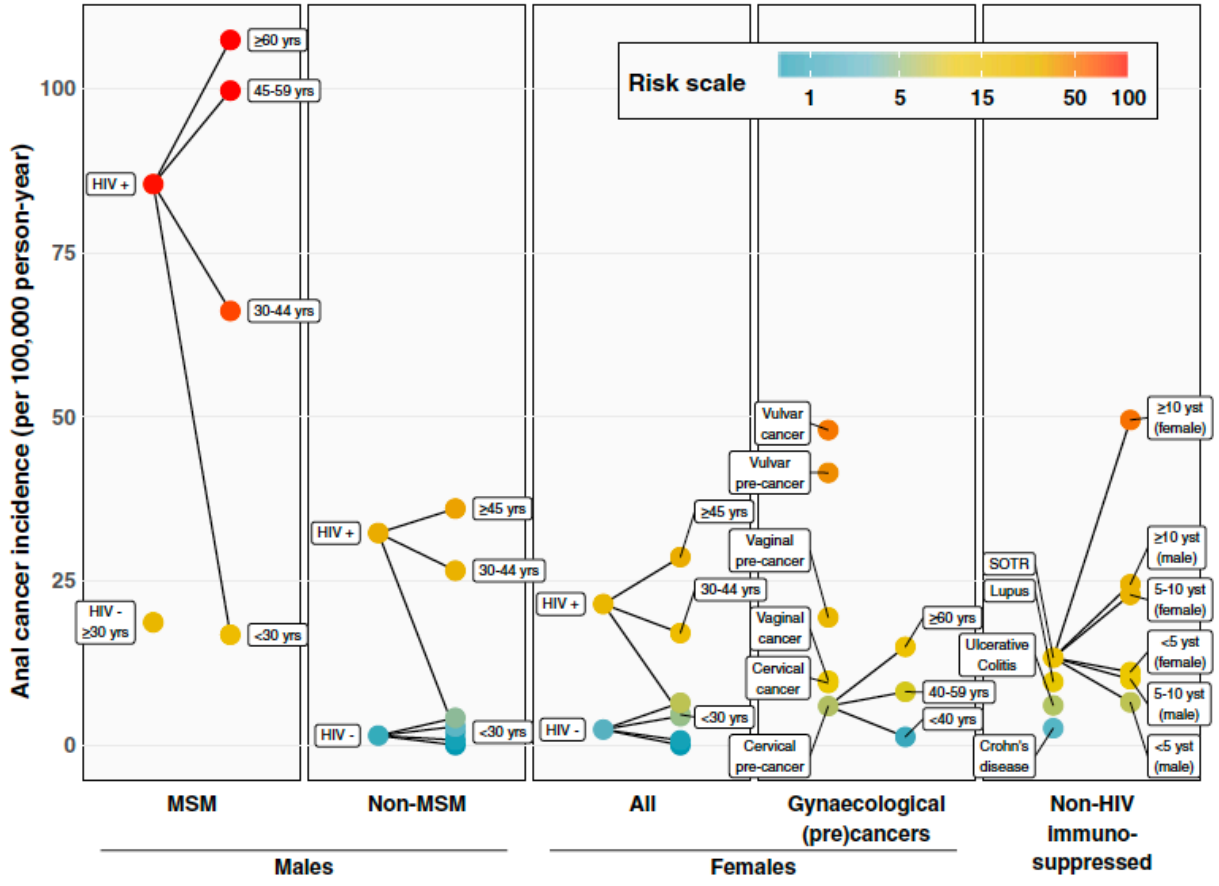
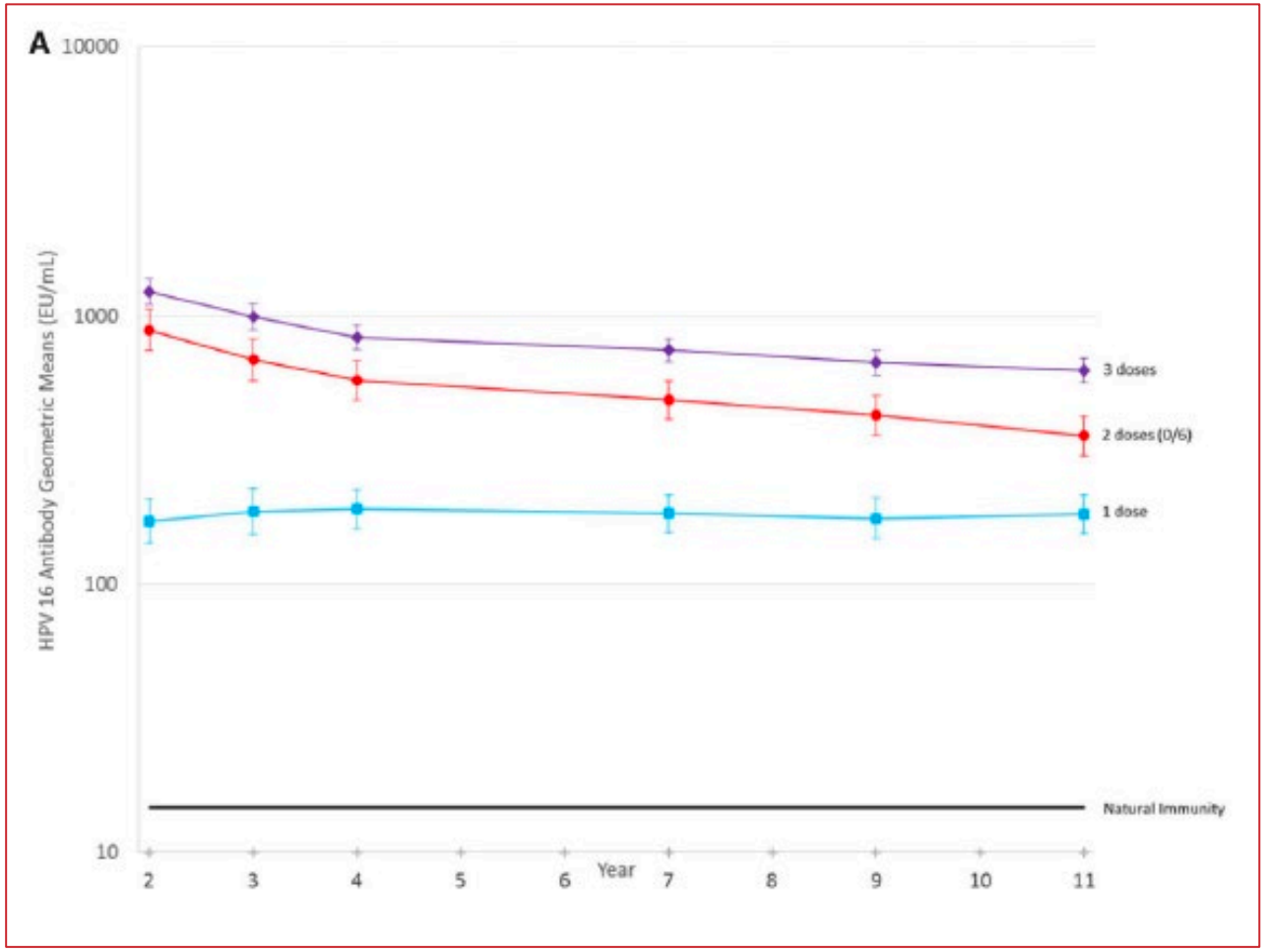


FIGURE 5 Anal cancer risk scale. 95% CIs around the point estimates can be found in the relevant Figures 1-4 and Tables S1 and S2. Estimates for HIV-negative men and men are shown, without labels, for age-groups <30, 30 to 44, 45 to 59, and ≥60 years (see Section 3). CI, confidence interval; MSM, men who have sex with men; MSW, men who have sex with women. yrs, years old; yst, years since transplant

Clifford et al, Int J Cancer 2021

Let’s talk about HPV vaccine….

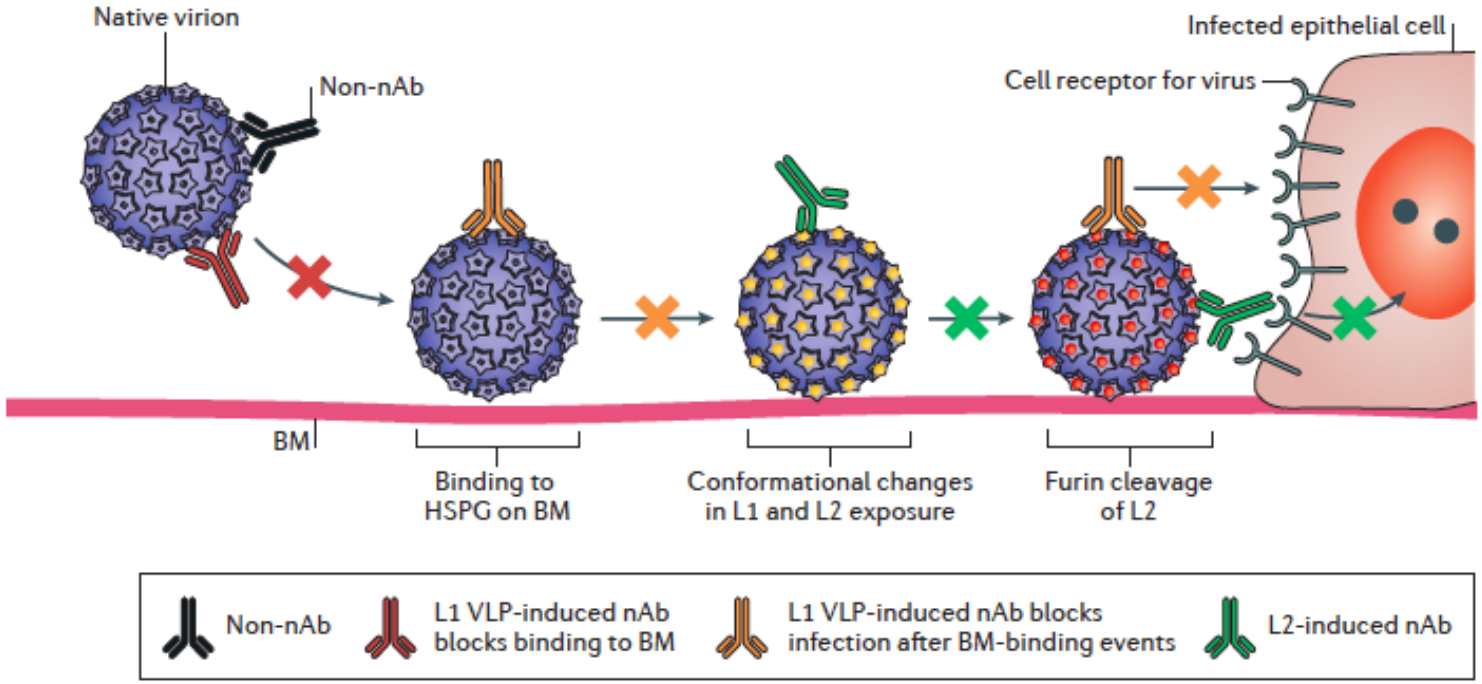
- Extremely effective and safe prophylactic vaccines in use since 2006 (over 850 million doses…)
- Initial RCTs - 94% +efficacy against persistent infection in those uninfected at baseline (2vHPV 94%, 4vHPV and 9vHPV 96%)
- Large declines seen in population use
  - HPV infection
  - Genital warts
  - Cervical (and other genital) precancer
  - Recurrent respiratory papillomatosis
  - Proven to prevent cervical cancer
- Substantial herd protection effects
- Reviewed multiple times by GACVS – most recently June 2026. No safety concerns.
- Originally trialled in women 15-26 as 3 dose schedule, immunobridged to 2 doses in 10-14 year olds, then (off label) single dose per WHO Dec 2022 to age 20 years



Sustained high level antibody after 1 dose 2vHPV vaccine and associated VE from Costa Rica trial (Kreimer et al JNCI 2020. See also Porras et al, JNCI Monograph 2024)

How do HPV vaccines work?

HPV vaccines *prevent* infection with targeted types by antibody binding to the virus, preventing it from entering the basal epithelial cell

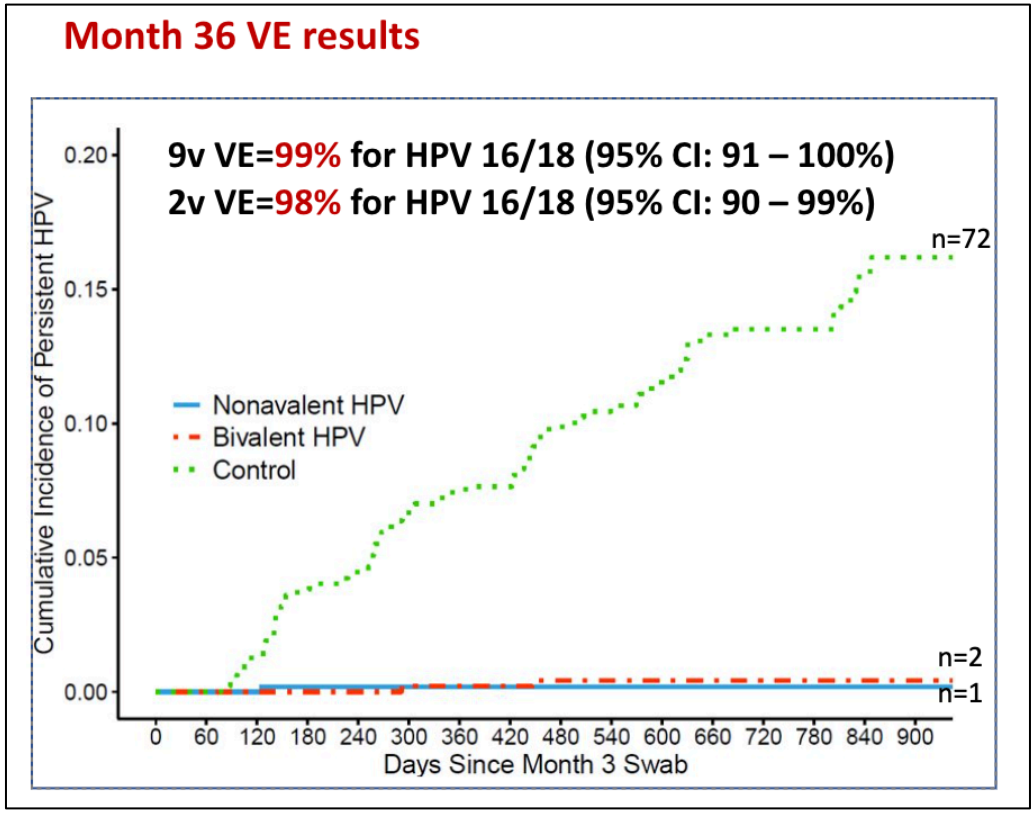


Roden R, Stern P. *Nat Rev Cancer* 18**,** 240–254 (2018)

Evidence to support a single dose schedule

- **Kenya RCT women 15-20 years, 2vHPV or 9vHPV vs meningococcal . Results after 3 years**
- Outcome: incident persistent infection (>=4 months apart)
  - VE 16/18 infection 98% (95%CI:90-99%) 2vHPV
  - VE 16/18 infection 99% (95%CI:91-100%) 9vHPV
  - VE HPV 16/18/31/33/45/52/58 96% (95%CI 89-98%) 9vHPV

- **India IARC study- girls aged 10-18 at vaccination 4vHPV**
- 10 yr incident persistent 16/18 infection (>=10 months apart)
  - Single dose VE 95·4% (95% CI 85·0-99·9%)
  - VE 93·1% (95% CI 77·3–99·8) 2-dose cohort
  - VE 93·3% (95%CI 77·5–99·7) 3-dose cohort



Barnabas et al 2023; Basu et al, 2021

Evidence to support a single dose schedule

- **ESCUDDO trial RCT 20,000 girls 12- 16 years**
  - showed non-inferior very high VE >97% against persistent 16/18 HPV 1 vs 2 doses for 9vHPV and 2vHPV
- **DoRIS trial: 2vHPV and 9vHPV non-inferiority and immunobridging study, Tanzania**
  - 10-14 yr old girls non inferiority of seroconversion to HPV16 of 1 dose vs 2 doses for 2vHPV and 9vHPV
  - Immunobridging of GMTs to IARC India, CVT, KENSHE
- **Single dose HPV vaccination endorsed for use by WHO up to age 20 years (Dec 2022)**

NOTE THERE IS NO TRIAL DATA OF 1 DOSE in MALES

- Lower GMTs 9vHPV single dose males vs females
- Duration of protection 1 dose CW 20 years

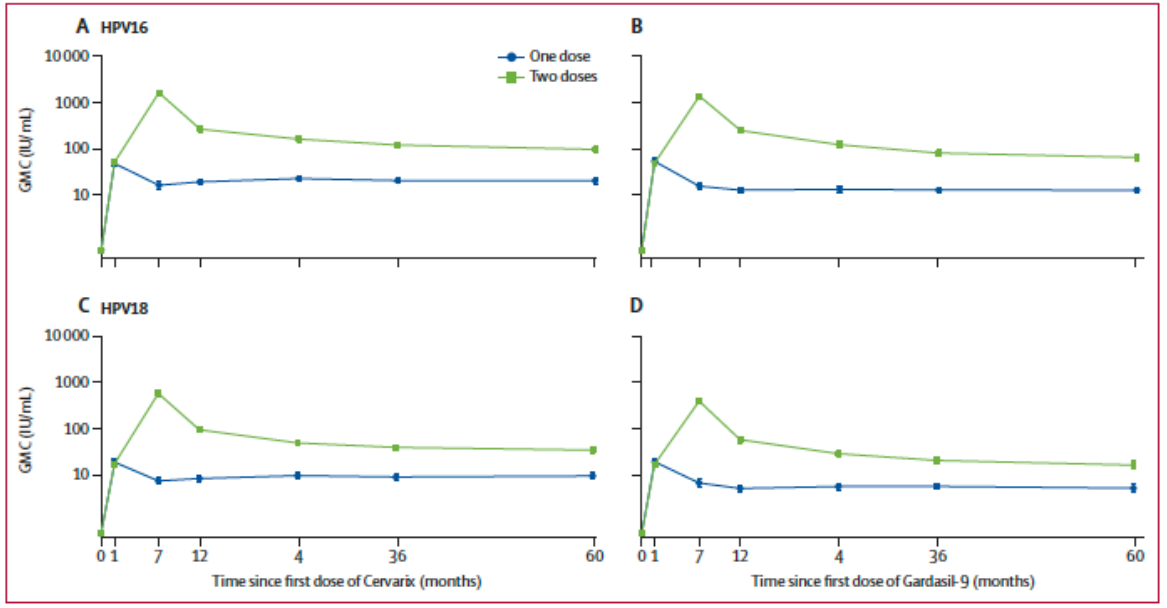


Figure 2: **Antibody GMCs over time by number of vaccine doses and study visit (per-protocol cohort)**
HPV16-specific antibody GMCs with the two-valent (A) and nine-valent (B) vaccine, and HPV18-specific antibody GMCs with the two-valent (C) and nine-valent (D) vaccine. GMC=geometric mean concentration. HPV=human papillomavirus.

Kreimer et al NEJM. 2025, Watson Jones et al Lancet Glob Health. 20
Baisley et al 2022, 2024 ,

Assessing evidence – GRADE framework

Grading of Recommendations Assessment, Development and Evaluation

Defining PICO questions

Summary of evidence - study quality

What outcomes are important?

What does the body of evidence say?

PICO question

In [population], does [intervention] when compared to [comparator] reduce [outcome]?

Q3) Write down three PICO questions you think QTAG should address regarding HPV vaccine

Do this in pairs at your table and take 3 minutes!

Background info (about your lower middle income majority world, non GAVI eligible Asia-Pacific country!)

- Pop 40 million women ages 15 years +. Average female life expectancy 74.5 years. Diverse ethnicities and languages and 100s of islands. Newly industrialised transforming from agricultural economy to services and manufacturing.
- 54% population live in urban areas.18% live in poverty.
- Universal health care (national insurance) since 2019.
- Functional literacy rate 91.6% age 10-64 years.
- Majority of population are religious.
- Median age of marriage 28 years women, 30 years men (rising)
- 96.5% of 10-14 year olds enrolled in school. 5.7 million girls aged 10-14 years

- 1 yr olds DTP3 coverage 71%, measles MVC1 72%
- 3 HPV vaccines registered for use in country – 2vHPV, 4vHPV and 9vHPV in 2/3 doses. Currently low uptake private market.
- No other adolescent immunisations given routinely.
- Deworming program in place in schools

Table 4. Factors contributing to cervical cancer (co-factors)

Smoking prevalence (%) [95% UI], women	7.2 [5.5-9.2]
Total fertility rate (live births per women)	2.9
Hormonal contraception use (%)	20.9
HIV prevalence (%) [95% UI] (15-49 years)	<0.1 [<0.1 -<0.1]

Table 5. Sexual behaviour

MEN	
Percentage of 15-year-old who have had sexual intercourse	2.8
Range of median age at first sexual intercourse	-
WOMEN	
Percentage of 15-year-old who have had sexual intercourse	2.2
Range of median age at first sexual intercourse	-

2017 data
18%, 56% and 73% females engaged in sexual intercourse before the ages of 18, 22 and 25 years respectively

Some background information

HPV related cancer

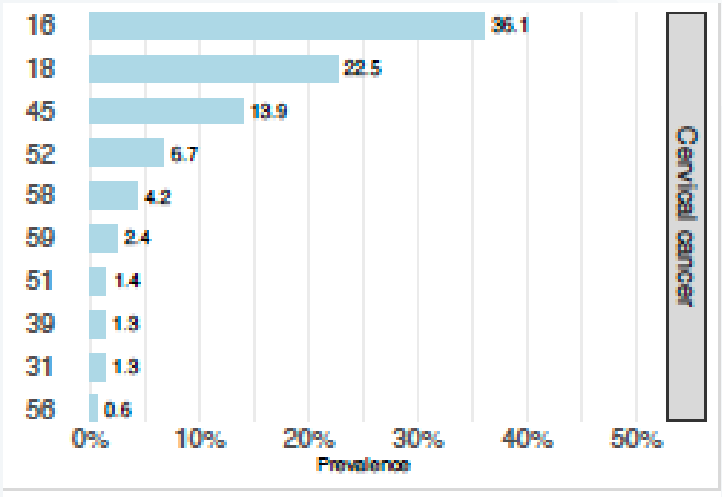
- Annually 8000 women are diagnosed with cervical cancer and 4000 die from the disease. 5 year survival 44%
- Increasing incidence over time.
- Cervical cancer 2nd most frequent cancer among women
- Prevalence of any cervical HPV 9.2%, HPV16/18 2.9%
- 58.6% of invasive cervical cancers are attributed to HPV 16 or 18.
- VIA based screening recommended every 5 years from age 25-45
- Screening coverage 4%

Table 1. Crude incidence rates of HPV-related cancers

	Male	Female
Cervical cancer	-	14.5
Anal cancer	0.21	0.16
Vulva cancer	-	0.29
Vaginal cancer	-	0.18
Penile cancer	0.23	-
Oropharyngeal cancer	0.62	0.23
Oral cavity cancer	1.59	1.26

Table 2. Burden of cervical cancer

	Incidence	Mortality
Annual number of new cases/deaths	7897	4052
Crude rate	14.5	7.43
Age-standarized rate	15.2	7.89
Cumulative risk 0-74 years (%)	1.61	0.88
Ranking of cervical cancer (all years)	2nd	4th
Ranking of cervical cancer (15-44 years)	2nd	4th

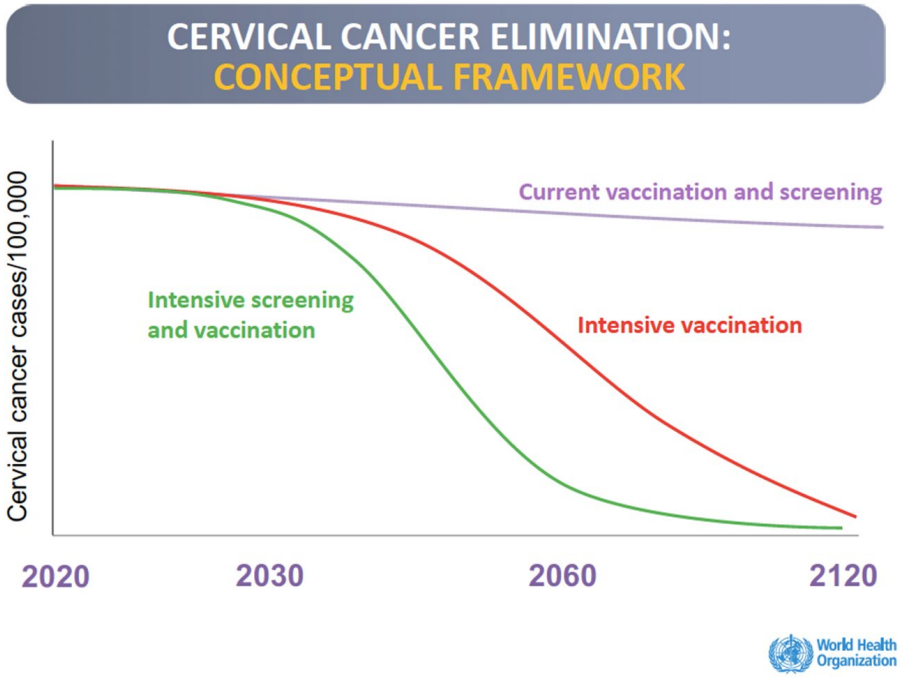


Global context: the effort to Eliminate Cervical Cancer



In Nov 2020, WHO launched the **Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem**

- Goal: <4 per 100,000 women in every country within the next 100 years



This global strategy to eliminate cervical cancer proposes:

- a vision of a world where cervical cancer is eliminated as a public health problem;
- a threshold of 4 per 100 000 women-years for elimination as a public health problem;
- the following 90-70-90 targets that must be met by 2030 for countries to be on the path towards cervical cancer elimination:

90% of girls fully vaccinated with HPV vaccine by age 15 years.

70% of women are screened with a high-performance test by 35 years of age and again by 45 years of age.

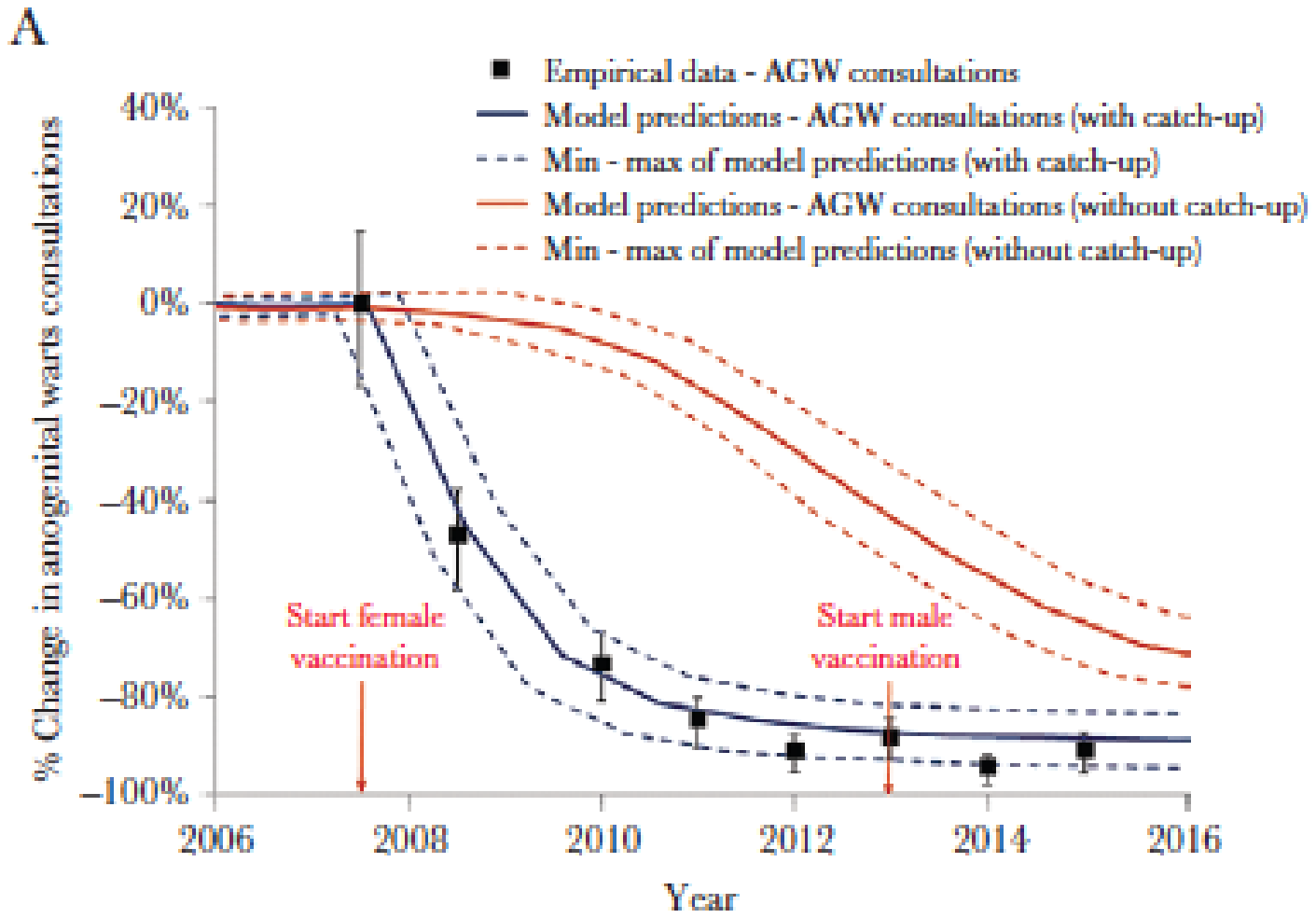
90% of women identified with cervical disease receive treatment (90% of women with precancer treated, and 90% of women with invasive cancer managed).

- a mathematical model that illustrates the following interim benefits of achieving the 90-70-90 targets by 2030 in low- and lower-middle-income countries:
  - median cervical cancer incidence rate will fall by 42% by 2045, and by 97% by 2120, averting more than 74 million new cases of cervical cancer;
  - median cumulative number of cervical cancer deaths averted will be 300 000 by 2030, over 14 million by 2070, and over 62 million by 2120.

WHO position paper on HPV vaccines (2022)

- WHO states *"The priority purpose of HPV immunization is the prevention of cervical cancer"*
- Recommends vaccination of 9-14 year old girls, with an initial multi-age cohort catch up at commencement where possible *'for faster and greater population impact.'*
- *Vaccination of secondary target populations, e.g. females aged ≥15 years, boys, older males or MSM, is recommended only if this is feasible and affordable, and does not divert resources from vaccination of the primary target population or effective cervical cancer screening programmes.*

Catch up vaccination brings forward benefits – demonstrated through reductions in genital warts

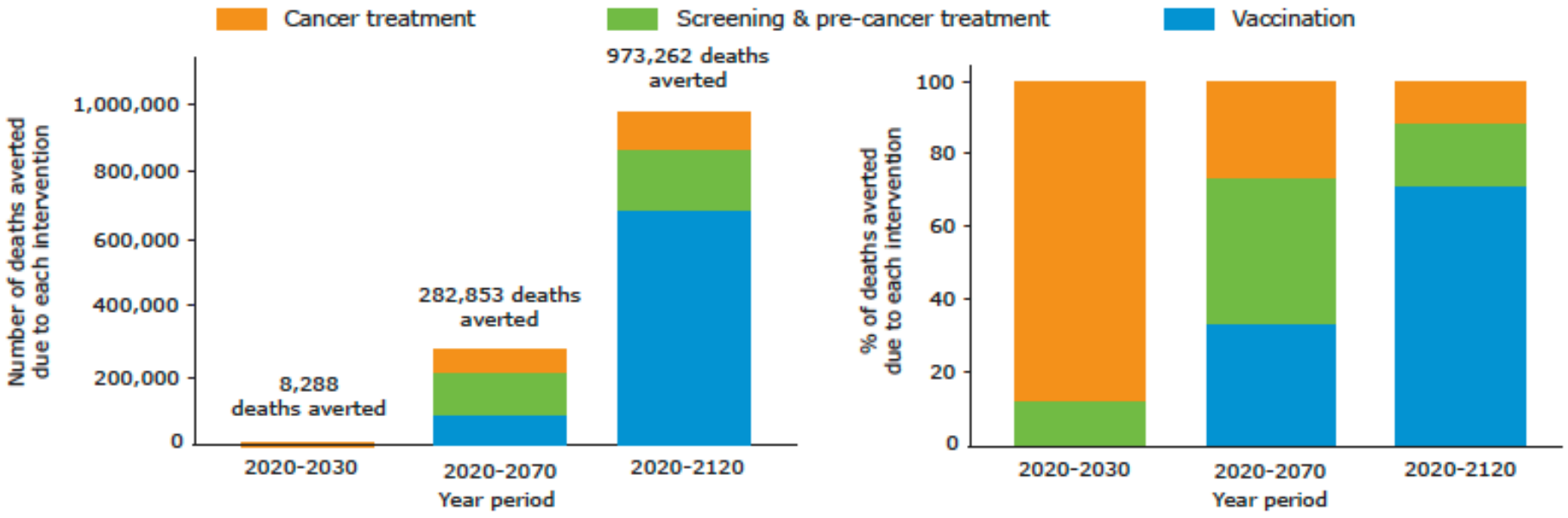


Drolet M, Laprise J-F, Brotherton JML, et al. The impact of human papillomavirus catch-up vaccination in Australia: Implications for introduction of multiple age cohort vaccination and post-vaccination data interpretation. *J Infect Dis.* 2017 Dec 5;216(10):1205-1209. doi: 10.1093/infdis/jix476.

Putting it together – modelling for cervical cancer elimination

Without any intervention, a total of 450,000 women will die from cervical cancer in your country by 2070 and 1,186,800 by 2120

If the WHO 90/70/90 target is met by 2030, deaths averted by 2120 shown below



The contribution of vaccination is calculated by comparing model outputs for vaccination versus status quo. The contribution of screening is calculated by comparing modelled outputs for vaccination and screening versus vaccination. The contribution of cancer treatment is calculated by comparing modelled outputs for vaccination, screening and cancer treatment versus vaccination and screening. Contributions of the pillars may not sum to total due to rounding.

Source: https://asiapacific.unfpa.org/en/cervical-cancer-elimination-asia-pacific-country-reviews-roadmaps-action

Q4 QTAG discussion: Who should be vaccinated? (each table has 10 mins to come up with their proposal)

Who would you recommend routine vaccination for assuming sufficient budget/supply is available?

Who would you recommend catch up vaccination (i.e. time limited campaign) for assuming sufficient budget/supply is available?

Who would you prioritise if there is limited supply/budget and why?

Key information to consider:

- Epidemiology of HPV and related disease across the life course
  - Who is at highest risk for disease? (are they identifiable?)
  - Vaccine timing and duration of protection
  - Practical issues (how do you choose the target age group in the window 9-14 years? grade based vs age based approach?)

NB There are approx. 1.1 million girls per birth cohort age 10-14 years

If the decision is made to proceed, choices will need to be made about:

- which vaccine to use
- how many doses to give
- girls only or all children
- what age to vaccinate and how many cohorts
- how best to deliver the vaccine



What product should you use to immunise the target population?

Key information to consider:

- Immunisation product effectiveness/efficacy/immunogenicity particularly co-administration and duration of protection *(EtR domain: desirable effects)*
- Immunisation product safety *(EtR domain: undesirable effects)*
- Programmatic considerations *(EtR domains: equity and feasibility)*
- Managing decisions in the absence of data

HPV vaccines – Overview of licensed products and tech transfers (Sept 2026)

WHO PQ status	Marketed products	1-dose indication
Merck/MSD **Gardasil** 4v & 9v	Licensed globally / WHO prequalified Adjuvant: Alum Sched.: 2 doses (9-14yo) or 3 doses (15+ yo) Pres.: 1 dose vial (PQ) / PFS (non PQ) 2dose vial (PQ)	1-Dose VE data
GSK **Cervarix** 2v	Licensed globally / WHO prequalified Adjuvant: AS04 Sched.: 2 doses (9-14yo) or 3 doses (15+ yo) Pres.: 1,2 dose vial (PQ)/ PFS (non PQ)	1-Dose VE data
Xiamen Innovax (Beijing Wantai) **Cecolin** 2v	Licensed in China / WHO prequalified Adjuvant: Alum Schedule: 2 doses (girls 9-14yo) or 3 doses (women 15-45) Presentation: 1 dose vial / PFS	1-Dose VE data
Shanghai Zerun (Yunnan Walvax) **Walrinvax** 2v	Licensed in China / WHO prequalified *Adjuvant: Alum* *Schedule: 2 doses (girls 9-14yo) or 3 doses (women 15-30yo)* *Presentation: 1 dose vial*	1- dose Trial ongoing
Serum Institute of India – SII *Under review*	*Licensed in India (March 2023)* *Adjuvant: Alum* *Schedule: 2 doses (9-14yo) or 3 doses (15-26 yo)*	
Xiamen Innovax (Beijing Wantai) Cecolin 9v *Under review*	*Licensed in China (June 2025)* *Adjuvant: Alum* *Schedule: 2 doses (girls 9-14) or 3 doses (Fem. 15-26)* *Presentation: tbc*	1- dose Trial ongoing
Nanolek LLC (NPK Combiotech, Russian Federation) Tsegardex 4v	*Licensed in Russia (March 2025)* *Adjuvant: Alum* *Schedule: 2 doses (9-13) or 3 doses (15-26*	

In parenthesis the holding company

Legend:

WHO PQ status

PQ-ed

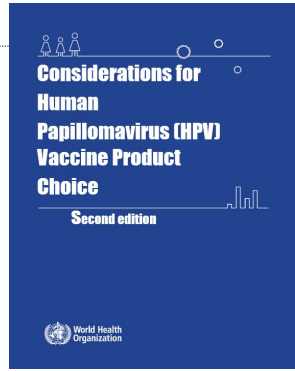
Submitted

Not submitted

Marketed products - tech transfer	
Incepta (Bangladesh)	*Papilovax 2v Licensed from Innovax (TBC)*
Sinergium (Argentina)	*4v Licensed from Merck/MSD*
Inst. Butantan (Brazil)	*4v Licensed from Merck/MSD*
PT Biofarma (Indonesia)	*4v Licensed from Merck/MSD*
Microgen/Rostec (Russian Federation)	*4v Licensed from Merck/MSD (TBC)*
National Vaccine Institute (NVI) (Thailand)	*9v from Innovax (TBC)*

Slide courtesy of Paul Bloem, WHO

Source: 2023 WHO MI4A Market Intelligence + updates



Lower prices for HPV vaccines

		2026 PRICE US$	2027 /indicative prices
Cervarix	GAVI	5.18	
	MIC	10.25 - 14.14	
Cecolin	GAVI	2.9	
	MIC	2.9 - 4.5	
	PAHO RF	2.9	
Walrinvax[1]	GAVI	2.8*	
	MIC	2.9 - 4.5	
Gardasil	GAVI	4.5	3.95
	MIC	13.5 - 26.75	
	PAHO RF	10.48	
Gardasil 9	GAVI	-	3.95*
	MIC	13.5 - 33.35	
	PAHO RF	14.99	
Cervavac 4v, Serum Institute India (under PQ)			3.4*
Cecolin 9v	Innovax (under PQ)		--

[1] No Single Dose data or immuno-bridging study underway

Slide courtesy of Paul Bloem, WHO

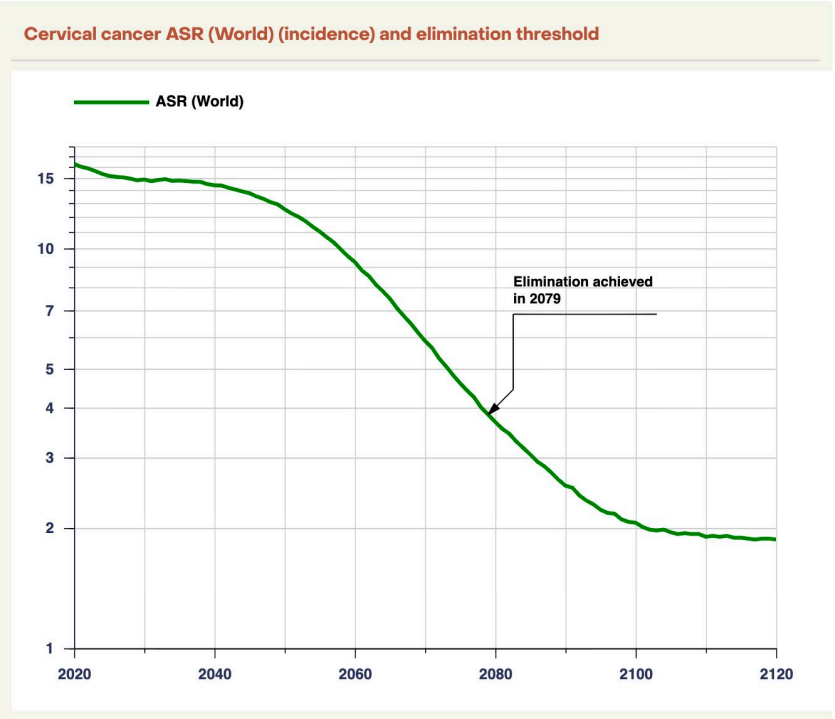
Sources: UNICEF Supply Division HPV-vaccine-prices-29062026b.pdf, PAHO Revolving Fund prices-vac-2025-eng-2-july-2025-v3.pdf

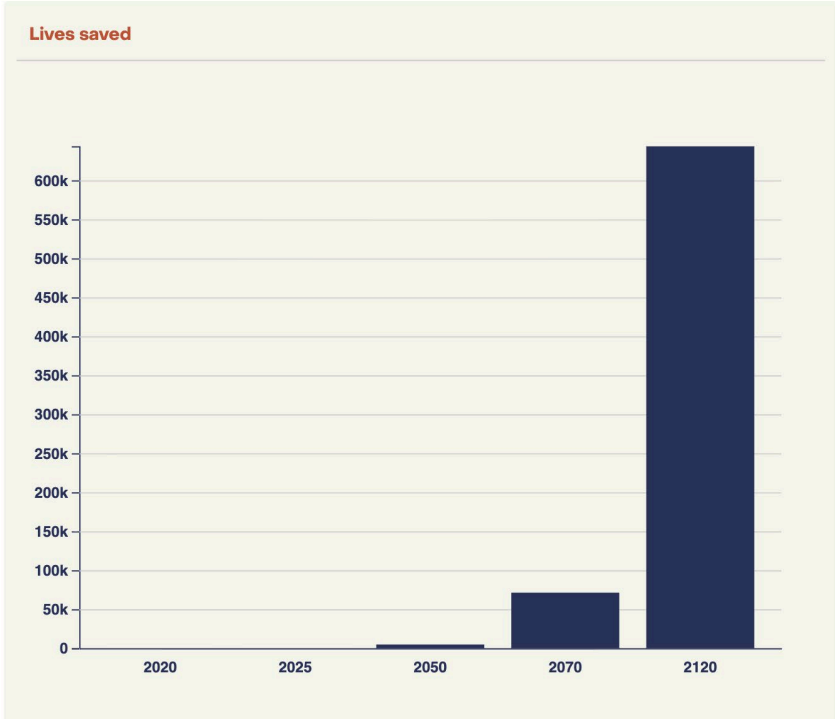
*GAVI DPP https://www.gavi.org/news/document-library/detailed-product-profiles, accessed 3 Sept 2026

Vaccination alone using 2 doses, 9vHPV at $15USD per delivered doses, 90% coverage

– 9 year old girls plus 10-14 year old catch up from 2025

Resource	Number required in the first 5 years	Cost in the first 5 years (in USD)	Number required in the first 10 year	Cost in the first 10 years (in USD)
Prophylactic HPV vaccine doses	20 308 316	255 149 766	30 831 705	365 944 821





Elimination year

2079

Return on investment *

$33.37

** Per dollar spent over 50 years*

Budget impact (in USD)

5-year	10-year
$263M	**$381M**

Ervik M et al (2025). Cervical Cancer Elimination Planning Tool. Lyon, France: International Agency for Research on Cancer. Available from: https://gco.iarc.who.int/ept, accessed Oct 2026.

Should HPV vaccination go beyond the primary target of girls?

New opportunities: Vaccine supply has increased & cost of vaccine has dropped

Optimization issue	Reduction of Cervical cancer/ Elimination	Vaccine Supply constraints	Budget constraints
Goal	Maximize health benefits	Maximize health benefits for Minimal number of doses	Maximize health benefits for Minimal cost
Analysis	Population-level impact	Efficiency	Cost-effectiveness
Outcome	Absolute reduction in cervical cancer incidence over time	Number needed to vaccinate to prevent 1 cervical cancer (NNV)	Cost per DALY

1-dose vaccination:

- Doses saved could be given to boys

Cheaper vaccines:

- Vaccinating older women and boys could become cost-effective

Budget:

- 1-dose & cheaper vaccines could allow MACs and/or boys to be vaccinated without substantially increasing HPV vaccination budgets

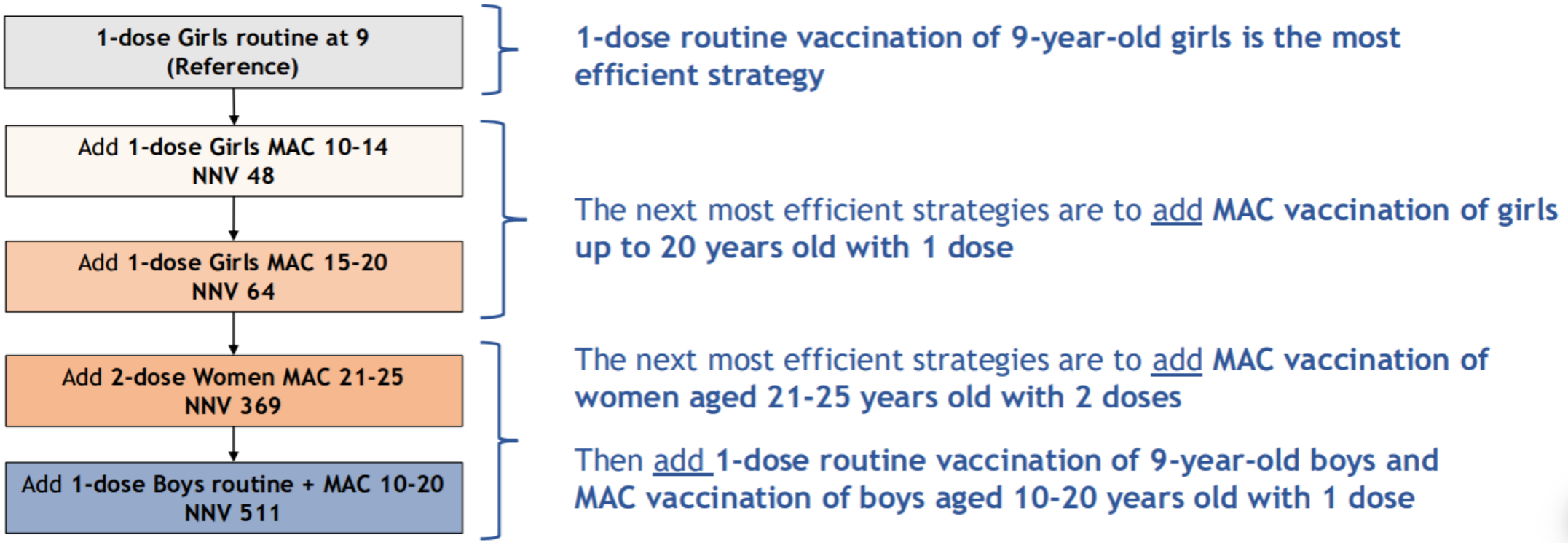
Slide courtesy of Marc Brisson

Single-dose & prioritizing secondary targets

HPV-ADVISE - Global analysis (67 LMICs)*

Vaccination strategies ranked from lowest to the highest NNV

NNV=Number of doses needed to prevent 1 cervical cancer; Vaccination coverage=80%



Benard E, et al. Ranking the most efficient human papillomavirus vaccination strategies in low- and lower-middle income countries: a mathematical modelling analysis. *The Lancet Global Health*. 2025; 13(12): e2153-e2164. https://doi.org/10.1016/S2214-109X(25)00376-6

Which option should QTAG choose? Justify your choice

1. **9vHPV vaccine for 9 year olds - routine cohort only with 1 dose (2 doses not affordable $$$)**
2. **2vHPV universal (girls and boys) 9 year olds 2 doses (no catch up)**
3. **2vHPV routine 9 year olds, initial catch up females to 20 years 1 dose**
4. **2vHPV routine 9 year olds girls 10-14 years 1 dose girls and and targeted MSM vaccination 18-30 2vHPV 3 doses**
5. **WAIT – delay implementation until 9vHPV vaccine price drops and 1 dose immunobridging is available for that product**

Key information to consider:

- Immunisation product effectiveness/efficacy/immunogenicity *(EtR domain: desirable effects)*
- Immunisation product safety *(EtR domain: undesirable effects)*
- Likely uptake and acceptability of an immunisation program *(EtR domains: values and acceptability)*
- Programmatic considerations *(EtR domains: equity and feasibility)*
- Legislative and funding considerations *(EtR domain: feasibility)*

Who would be the key stakeholders to consult with before an HPV Vaccine program was rolled out?

Diverse stakeholders for this particular vaccine…

- Ministry of Health and National Immunisation Program lead
  - Health system from national to regional to local levels including community health
- Ministry of Education and education stakeholders at all levels (national, regional, local) including teachers. Across sectors (public and private)
- Ministry of Finance, Prime Minister's office – aim for bipartisan support
- Cancer stakeholders across spectrum from prevention (screening) to treatment to palliative care
- Sexual health
- Adolescent health
- Obstetricians and gynaecologists
- Women's health advocates
- Primary care
- Religious and community leaders
- Media

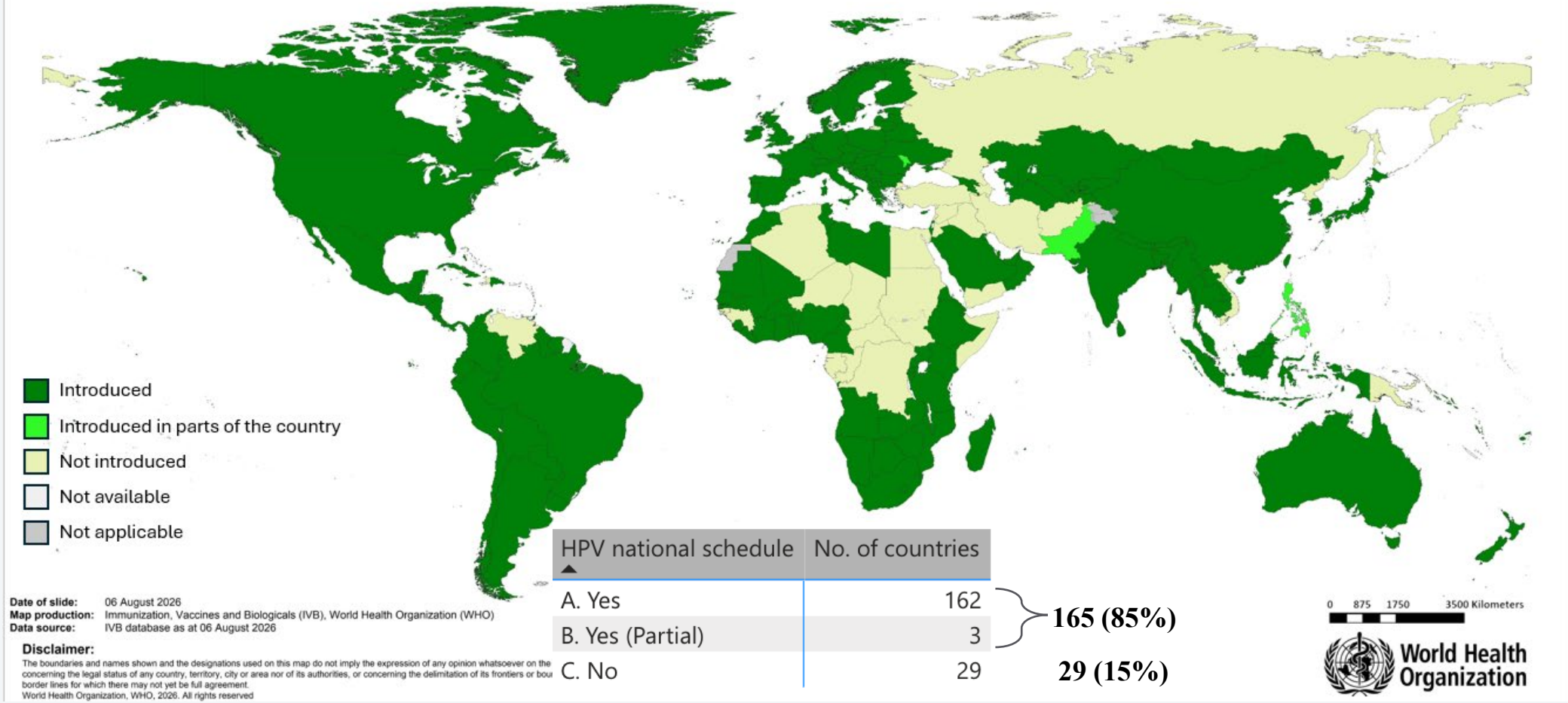
Summary and closing remarks

NCIRS National Centre for Immunisation Research and Surveillance Australia

What have countries decided?

Introduced as prices have come down, supply constraints eased, GAVI acceleration post pandemic

165 Countries have HPV vaccine in national program



HPV national schedule	No. of countries
A. Yes	162
B. Yes (Partial)	3
C. No	29

165 (85%)

29 (15%)

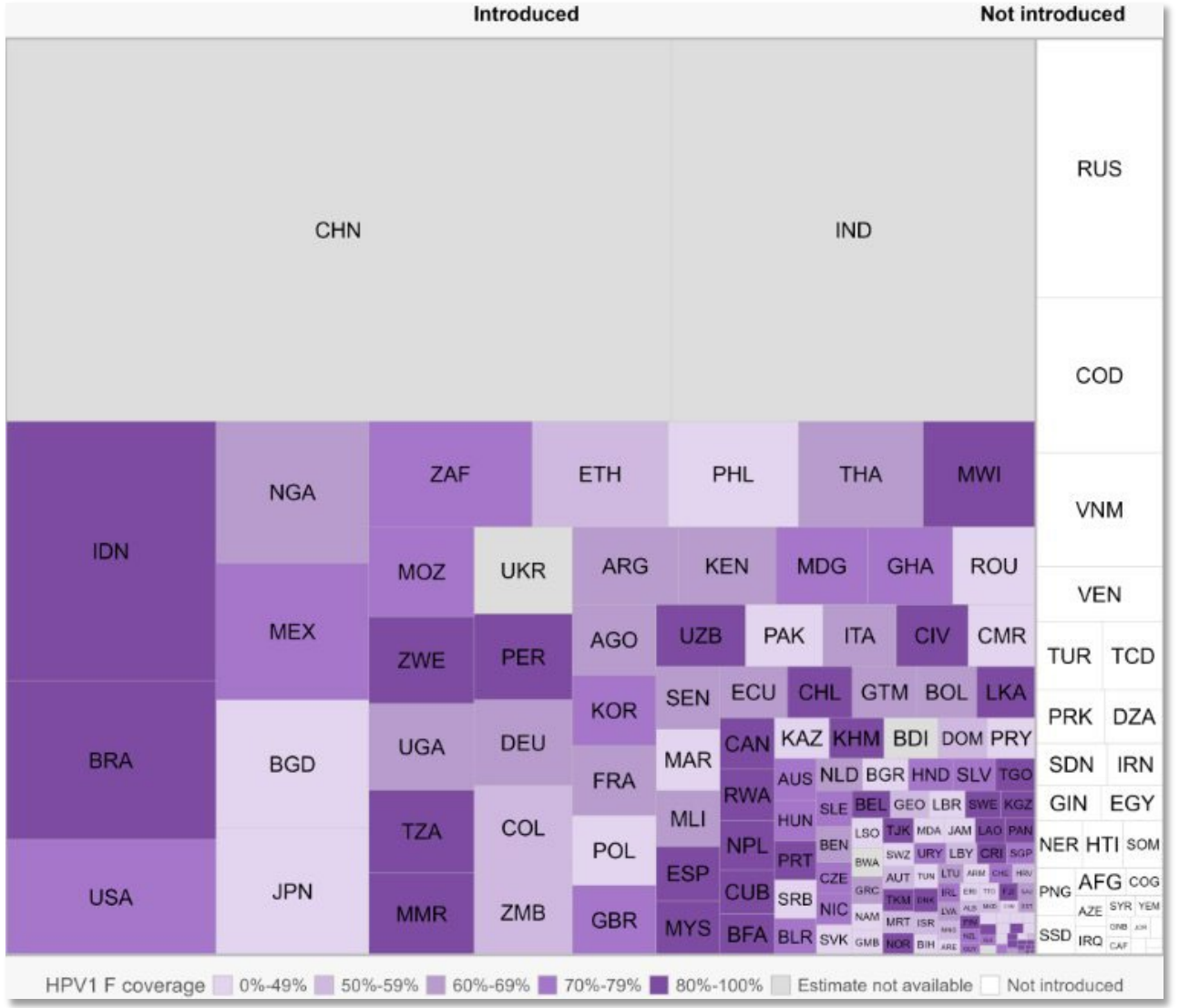
Global burden of Cervical Cancer by HPV introduction status and coverage

By August 2026, **165 countries (85%)** introduced HPV vaccines.

>80% of global cohort of girls aged 9-14 years live in these 165 countries

90% of the global burden of cervical cancer is in countries that introduced the HPV vaccine

The size of each country box in the graph is proportional to the number of cervical cancer cases, darker shade of purple represent higher HPV vaccine coverage.



Coverage based on WUENIC 2025

Single-dose adoption globally: 96 countries (Sept 2026)

Of 165 countries that introduced HPV vaccine by Sept 2026:

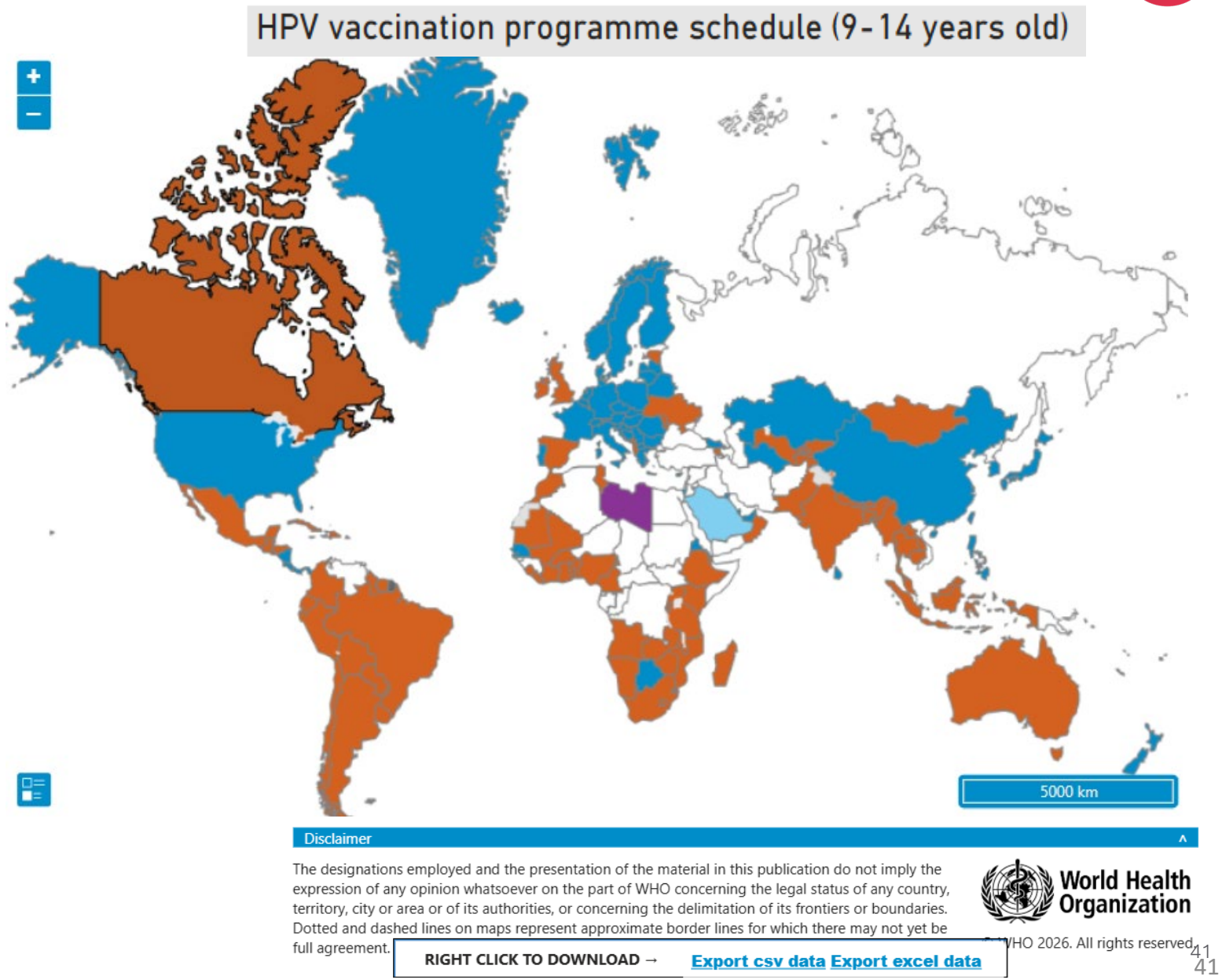
96 countries (58%) use single-dose

Further notes on single- or two-dose adoption:

➢Some countries adopted single-dose up to 25 yrs (UK, IRE, Solomon Islands & Samoa)

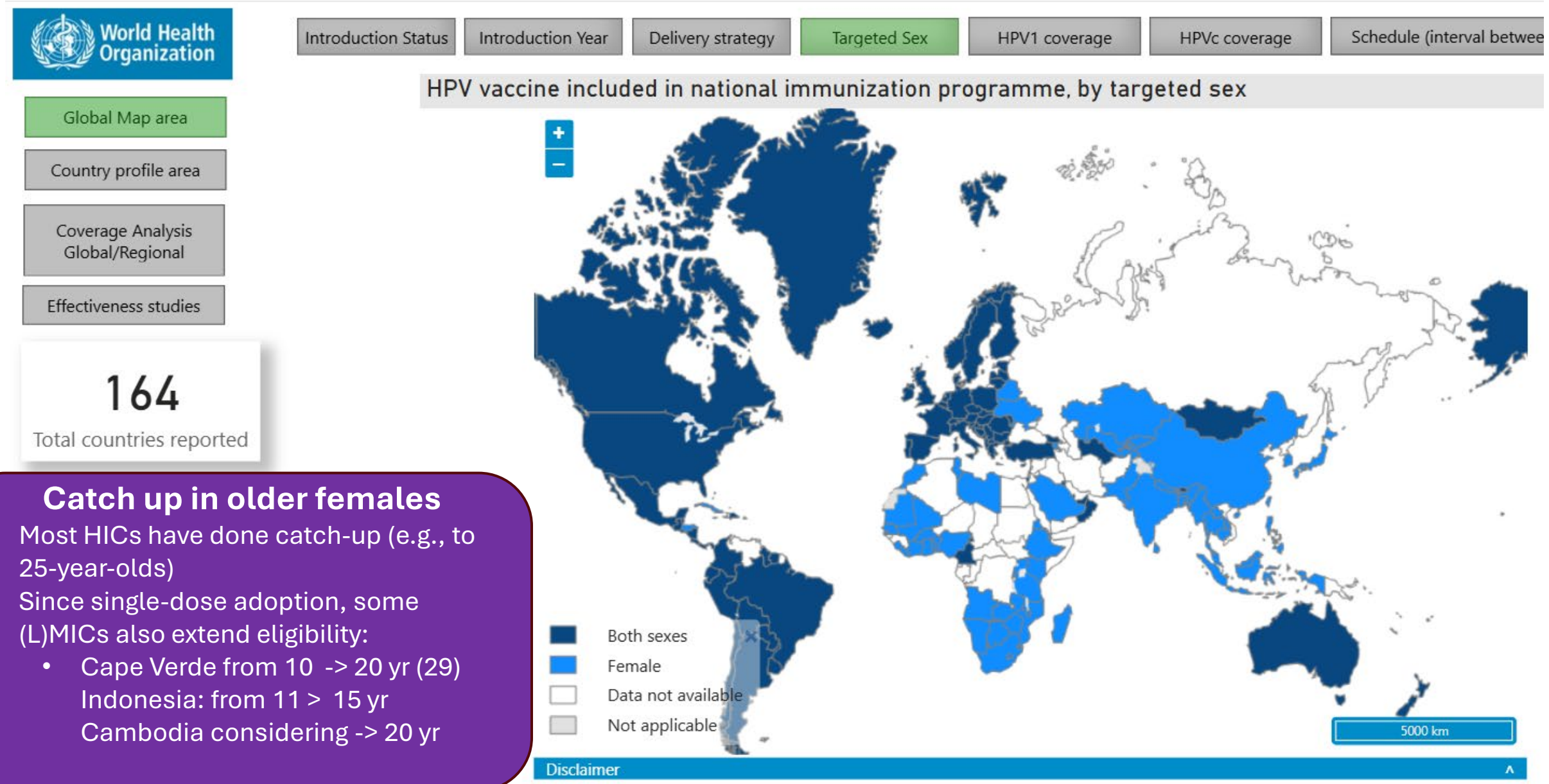
➢Generally, single-dose adopters also adopted two-dose in older cohorts (e.g., through to 45-year-olds)

➢Selected HIC have only adopted two-dose use in over 15-year-olds (Netherlands, Belgium)



41

Secondary targets: Boys and older female cohorts



Catch up in older females

- Most HICs have done catch-up (e.g., to 25-year-olds)
- Since single-dose adoption, some (L)MICs also extend eligibility:
  - Cape Verde from 10 -> 20 yr (29)
    Indonesia: from 11 > 15 yr
    Cambodia considering -> 20 yr

Extensive experience and documentation of HPV vaccine implementation

https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-vaccines-(HPV)/hpv-clearing-house

HPV Vaccine Introduction Clearing House

- Policy
- Planning
- Financing & Supply
- Vaccines & Safety
- Communication
- Implementation
- Monitoring
- Partners
- HPV Dashboard

The **HPV Vaccine Introduction Clearing House** is a unique space to find WHO publications, tools and other important resources on the human papillomavirus vaccine.

The purpose is to help guide HPV vaccine policy, programme and communications managers in the development of successful strategies for the introduction and sustained delivery of HPV vaccination at a national level.

New resources will be added as they become available. We welcome your feedback on their usefulness.



HPV vaccine introduction dashboard

Global maps and country based information on introduction status with graphs on the WHO/UNICEF coverage estimates.

Visit each area for related resources:


Policy


Planning


Financing and Supply


Vaccines and Safety

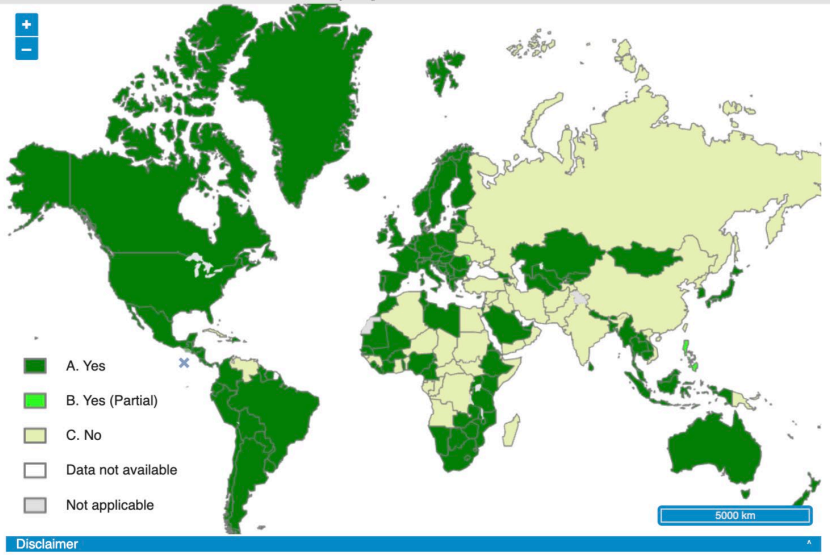

Communication


Implementation


Monitoring and Surveillance


HPV Partners

HPV vaccine included in national immunization programme

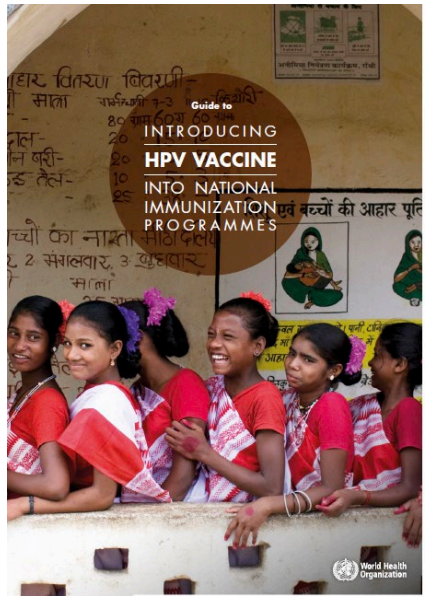


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World Health Organization

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WHO Cervical Cancer Prevention and Control Costing (C4P) Tool

WHO C4P tool has been developed specifically to assist low- and middle-income countries in planning and costing cervical cancer control strategies.



HPV introduction - toolbox

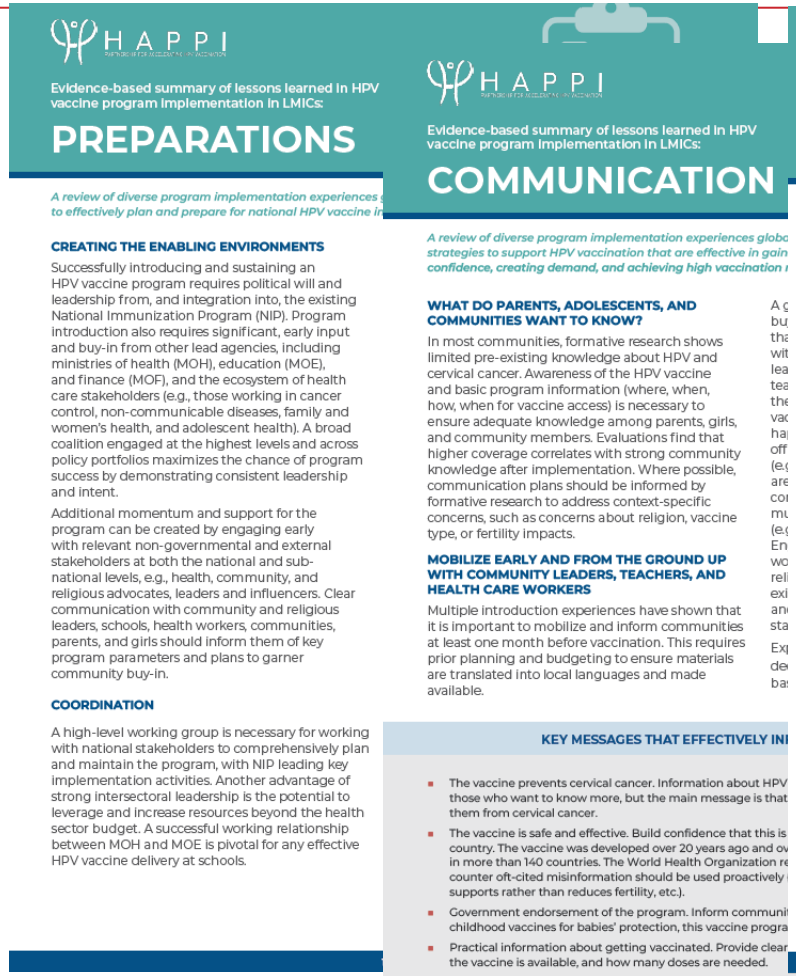
This toolbox on the TechNet-21 website contains practical tools often developed by EPI programmes and partners and is regularly updated.



HPV vaccine introduction dashboard

This dashboard contains both introduction status data and coverage data.

Updated Evidence Briefs (JSI/HAPPI)– five themes



HAPPI

Evidence-based summary of lessons learned in HPV vaccine program implementation in LMICs:

PREPARATIONS

A review of diverse program implementation experiences g... to effectively plan and prepare for national HPV vaccine in...

CREATING THE ENABLING ENVIRONMENTS

Successfully introducing and sustaining an HPV vaccine program requires political will and leadership from, and integration into, the existing National Immunization Program (NIP). Program introduction also requires significant, early input and buy-in from other lead agencies, including ministries of health (MOH), education (MOE), and finance (MOF), and the ecosystem of health care stakeholders (e.g., those working in cancer control, non-communicable diseases, family and women's health, and adolescent health). A broad coalition engaged at the highest levels and across policy portfolios maximizes the chance of program success by demonstrating consistent leadership and intent.

Additional momentum and support for the program can be created by engaging early with relevant non-governmental and external stakeholders at both the national and sub-national levels, e.g., health, community, and religious advocates, leaders and influencers. Clear communication with community and religious leaders, schools, health workers, communities, parents, and girls should inform them of key program parameters and plans to garner community buy-in.

COORDINATION

A high-level working group is necessary for working with national stakeholders to comprehensively plan and maintain the program, with NIP leading key implementation activities. Another advantage of strong intersectoral leadership is the potential to leverage and increase resources beyond the health sector budget. A successful working relationship between MOH and MOE is pivotal for any effective HPV vaccine delivery at schools.

HAPPI

Evidence-based summary of lessons learned in HPV vaccine program implementation in LMICs:

COMMUNICATION

A review of diverse program implementation experiences globa... strategies to support HPV vaccination that are effective in gain... confidence, creating demand, and achieving high vaccination r...

WHAT DO PARENTS, ADOLESCENTS, AND COMMUNITIES WANT TO KNOW?

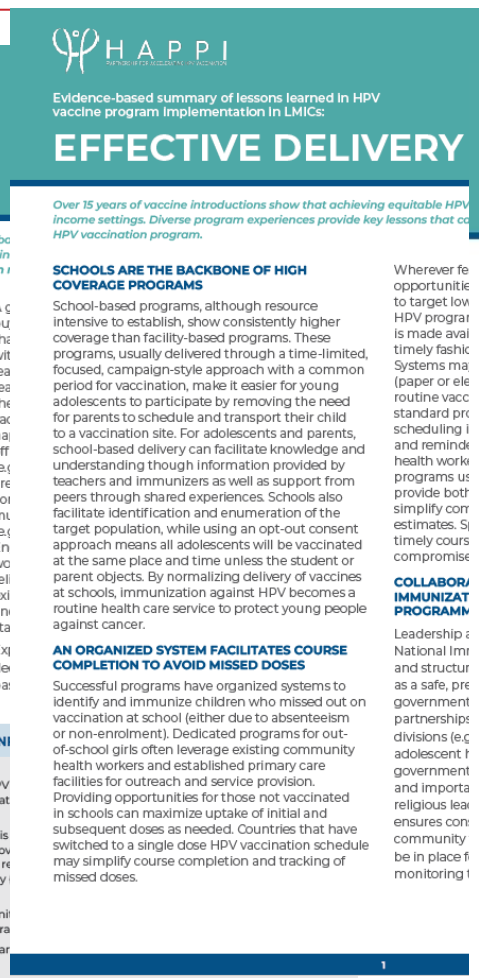
In most communities, formative research shows limited pre-existing knowledge about HPV and cervical cancer. Awareness of the HPV vaccine and basic program information (where, when, how, when for vaccine access) is necessary to ensure adequate knowledge among parents, girls, and community members. Evaluations find that higher coverage correlates with strong community knowledge after implementation. Where possible, communication plans should be informed by formative research to address context-specific concerns, such as concerns about religion, vaccine type, or fertility impacts.

MOBILIZE EARLY AND FROM THE GROUND UP WITH COMMUNITY LEADERS, TEACHERS, AND HEALTH CARE WORKERS

Multiple introduction experiences have shown that it is important to mobilize and inform communities at least one month before vaccination. This requires prior planning and budgeting to ensure materials are translated into local languages and made available.

KEY MESSAGES THAT EFFECTIVELY IN...

- The vaccine prevents cervical cancer. Information about HPV... those who want to know more, but the main message is that... them from cervical cancer.
- The vaccine is safe and effective. Build confidence that this is... country. The vaccine was developed over 20 years ago and ov... in more than 140 countries. The World Health Organization re... counter oft-cited misinformation should be used proactively... supports rather than reduces fertility, etc.).
- Government endorsement of the program. Inform communi... childhood vaccines for babies' protection, this vaccine progra...
- Practical information about getting vaccinated. Provide clear... the vaccine is available, and how many doses are needed.



HAPPI

Evidence-based summary of lessons learned in HPV vaccine program implementation in LMICs:

EFFECTIVE DELIVERY

Over 15 years of vaccine introductions show that achieving equitable HPV... income settings. Diverse program experiences provide key lessons that c... HPV vaccination program.

SCHOOLS ARE THE BACKBONE OF HIGH COVERAGE PROGRAMS

School-based programs, although resource intensive to establish, show consistently higher coverage than facility-based programs. These programs, usually delivered through a time-limited, focused, campaign-style approach with a common period for vaccination, make it easier for young adolescents to participate by removing the need for parents to schedule and transport their child to a vaccination site. For adolescents and parents, school-based delivery can facilitate knowledge and understanding though information provided by teachers and immunizers as well as support from peers through shared experiences. Schools also facilitate identification and enumeration of the target population, while using an opt-out consent approach means all adolescents will be vaccinated at the same place and time unless the student or parent objects. By normalizing delivery of vaccines at schools, immunization against HPV becomes a routine health care service to protect young people against cancer.

AN ORGANIZED SYSTEM FACILITATES COURSE COMPLETION TO AVOID MISSED DOSES

Successful programs have organized systems to identify and immunize children who missed out on vaccination at school (either due to absenteeism or non-enrolment). Dedicated programs for out-of-school girls often leverage existing community health workers and established primary care facilities for outreach and service provision. Providing opportunities for those not vaccinated in schools can maximize uptake of initial and subsequent doses as needed. Countries that have switched to a single dose HPV vaccination schedule may simplify course completion and tracking of missed doses.



HAPPI

Evidence-based summary of lessons learned in HPV vaccine program implementation in LMICs:

SUSTAINING PROGRAMS

A review of diverse program implementation experiences globally shows remarkable ... enablers and obstacles for a sustainable national HPV vaccination program.

THE CHALLENGE OF DEFINING SUSTAINED PROGRAMS

HPV vaccination programs in low- and middle-income countries (LMICs) have been operational for more than a decade. In Africa, Rwanda was the first country to introduce HPV vaccines in 2011, and first dose HPV vaccination coverage has averaged around 80% every year since 2016. Many other countries have similarly been operating programs continuously since the initial introduction year.

However, there is not an agreed-upon definition for program sustainability for HPV vaccinations. Some have suggested consistent high coverage as a proxy measure, though "high" is also not defined. The WHO cervical cancer elimination strategy sets a target of 90% for HPV vaccination coverage. By this definition of "high coverage," only a handful of countries have "sustained" their program continuously for more than three years: Bhutan, Cape Verde, Iceland, Niue, Norway, Portugal, Spain, Sweden, Turkmenistan, and Uzbekistan. Others have suggested funding and affordability as key indicators of sustainability; again, "sufficient funding" and "affordable" have not been defined. Recently, Waheed et al. characterized sustainability as "the ability to sustain high coverage within a smoothly running program," with neither "high coverage" nor "smoothly running" defined.

PROGRAM ACTIVITIES

Despite the absence of precise definitions, recent studies have summarized the operations of ongoing national HPV vaccinations programs in a variety of country settings. These studies augment a prior review of HPV vaccination experiences in 45 LMICs, representing 12 national programs and 60 pilot or demonstration programs. As all of these countries continue to provide HPV vaccines (with the exception of the global interruptions due to the



HAPPI

Evidence-based summary of lessons learned in HPV vaccine program implementation in LMICs:

PITFALLS

A review of diverse program implementation experiences globally provide lessons on how previous programs can be improved upon. Learning from others' experiences can help low- and middle-income countries avoid common pitfalls and maximize their chance of success when introducing and sustaining HPV vaccinations for adolescent girls between the ages of 9 and 14 years.

PITFALLS TO AVOID IN PLANNING AND PREPARATION

Some delays are inevitable when coordinating a vaccine introduction across multiple sectors and levels. However, experience shows that delays in planning affect both the timing and quality of introduction activities. It is critical to avoid protracted delays in obtaining memoranda of understanding (MOUs) and funding, including funding distribution to lower levels, to avoid further delays across planning activities. Clear communication at all levels is vital to avoid mistimed implementation activities and loss of trust.

Low coverage is common in countries that did not undertake a successful planning process (i.e., failure to design detailed plans, microplanning activities, stakeholder consultation and coordination). Similarly low coverage is associated with countries that have struggled to create an enabling environment through demonstrable political will, creation of a strong National Immunization Program (NIP)-led multisectoral implementation committee, clear communication, and strong community engagement.

Clear leadership and communication are vital to ensure that all stakeholders are aware of and understand the plan for HPV vaccine delivery. Limitations in program reach are inevitable if vaccines are only provided once or at a single location, and the delivery plan should address this. The ministry of education's (MOE) leadership and support at the highest level needs to be communicated across all levels of the education sector.

PITFALLS TO AVOID IN COMMUNICATIONS

When IEC materials are delayed, rushed, or not effectively disseminated (including in local languages), misinformation and rumors can arise and result in hesitancy. Local communications should be disseminated and reinforced by trusted voices, such as health workers, schools, community leaders, or religious leaders.

Failure to anticipate and manage rumors at all levels, including in schools, will result in hesitancy and low coverage or pockets of low coverage.

Regaining trust is far more challenging than implementing a proactive communications approach that anticipates and preempts potential rumors, including a plan for their immediate and ongoing management.

Community trust in the vaccine can be lost during an uncoordinated and poor response to crisis in the absence of an effective crisis communication plan.

PITFALLS TO AVOID IN EFFECTIVE DELIVERY

Failure to leverage existing health care and vaccination delivery mechanisms at the local level frequently results in missed opportunities, lack of confidence in the program, and poor coverage. Using these mechanisms well can include assigning community health care workers to reach out-of-school girls, assigning village health teams to conduct immunization sessions, and using existing vaccine transport systems and schedules. Consent procedures that do not align with those implemented for infant vaccines creates mistrust.

Not adequately coordinating vaccine delivery with school breaks or other known events (e.g., school holidays, rainy season, or exam periods) can lead to low coverage and less support for future vaccine rounds.

Vaccination eligibility and how this is determined should be clearly communicated with school staff, parents, and health care workers. Failure to do so can lead to missed vaccinations and vaccine leakage into the non-target population. Similarly, adequate planning for and communication about out-of-school vaccination sessions, especially for those who missed in-school sessions, is vital.

Available on TechNet at: https://www.technet-21.org/en/hpv-vaccine-introduction