

HPV

Complications & Prevention

From infection to preventable disease

Pediatric focus

Cancer prevention

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HPV: From a Common Infection to Preventable Disease



Key message

- HPV positivity does not equal cancer
- Persistent oncogenic infection is the key step in HPV-related carcinogenesis.

Source: NCI — HPV and Cancer; CDC — HPV vaccination and HPV-associated cancers (accessed 2026).

The Spectrum of HPV-Related Disease

BENIGN DISEASE

- Anogenital warts
- Recurrent respiratory papillomatosis

Often caused by low-risk HPV types, especially 6 and 11.

PRECANCER

- CIN
- VIN
- VaIN
- AIN

Persistent high-risk HPV creates the opportunity for detectable and treatable precursor disease.

CANCER

- Cervical
- Anal
- Oropharyngeal
- Vulvar
- Vaginal
- Penile

Sources: NCI HPV and Cancer; WHO HPV vaccine position information.

Low-Risk HPV: Not Always “Harmless”

HPV 6 & 11

ANOGENITAL WARTS

Benign but clinically important

- May be recurrent
- Can cause pain, bleeding or irritation
- Can produce psychological and social burden

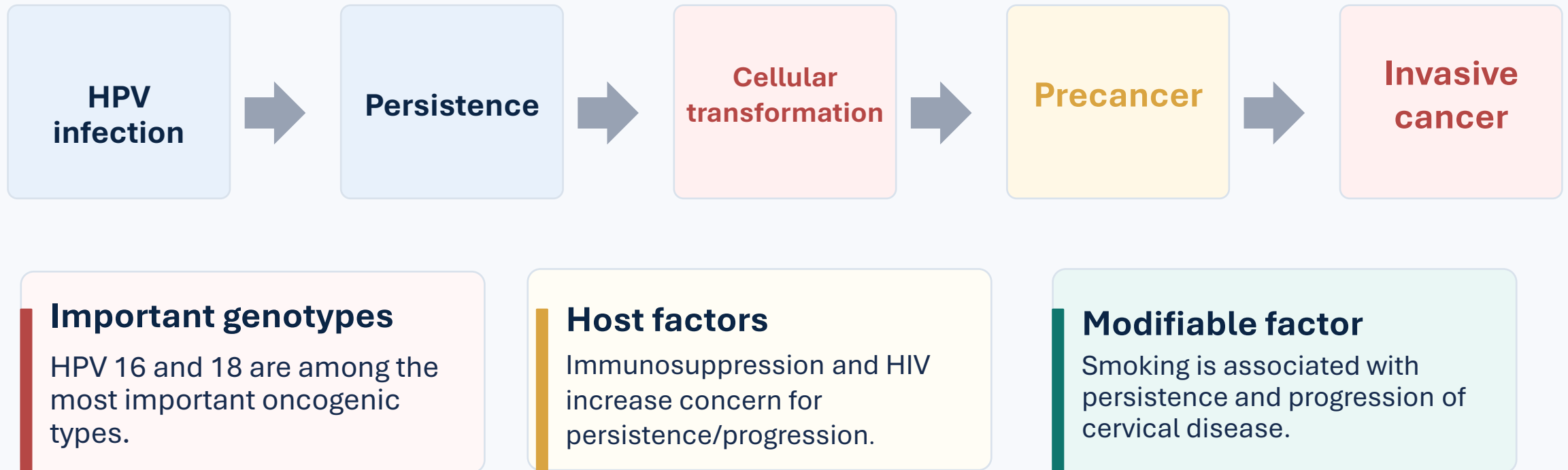
RECURRENT RESPIRATORY PAPILLOMATOSIS

Usually associated with HPV 6 and 11

- Recurrent laryngeal/airway papillomas
- Can require repeated procedures
- Juvenile-onset disease is particularly relevant to pediatrics

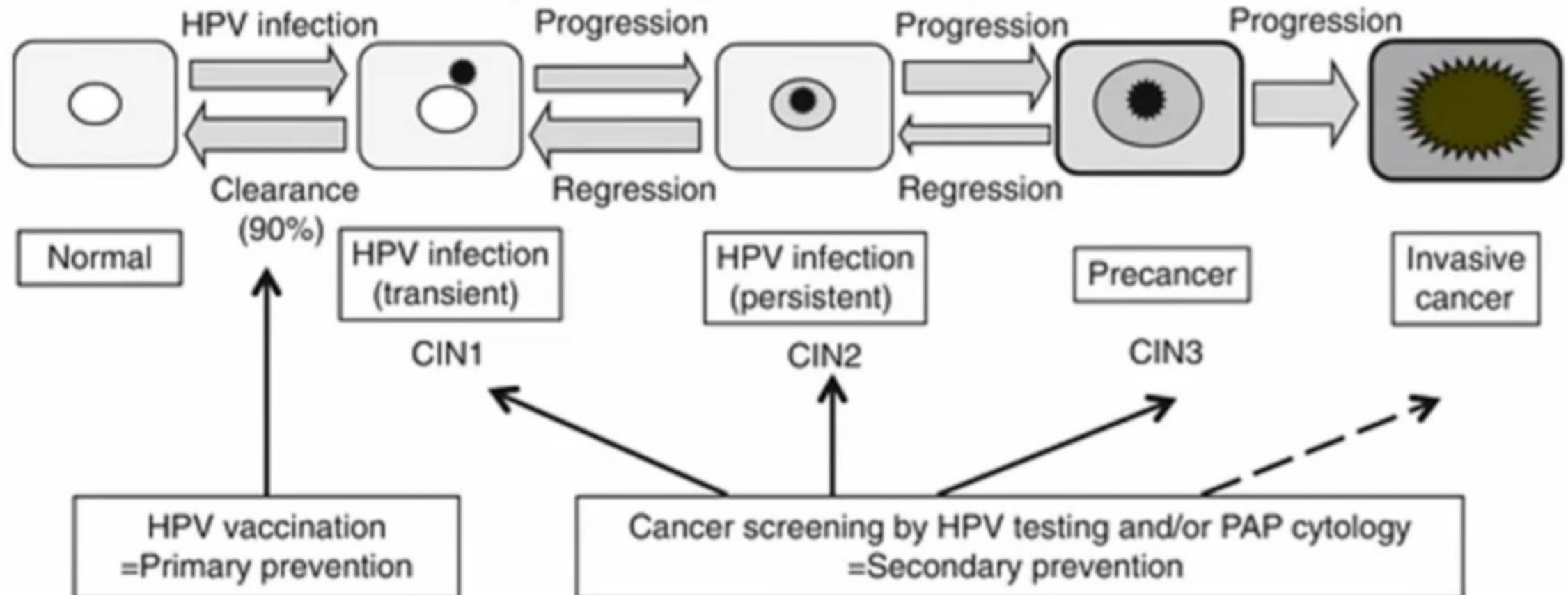
Sources: CDC; WHO HPV vaccine position information.

Persistent High-Risk HPV Is the Key Event

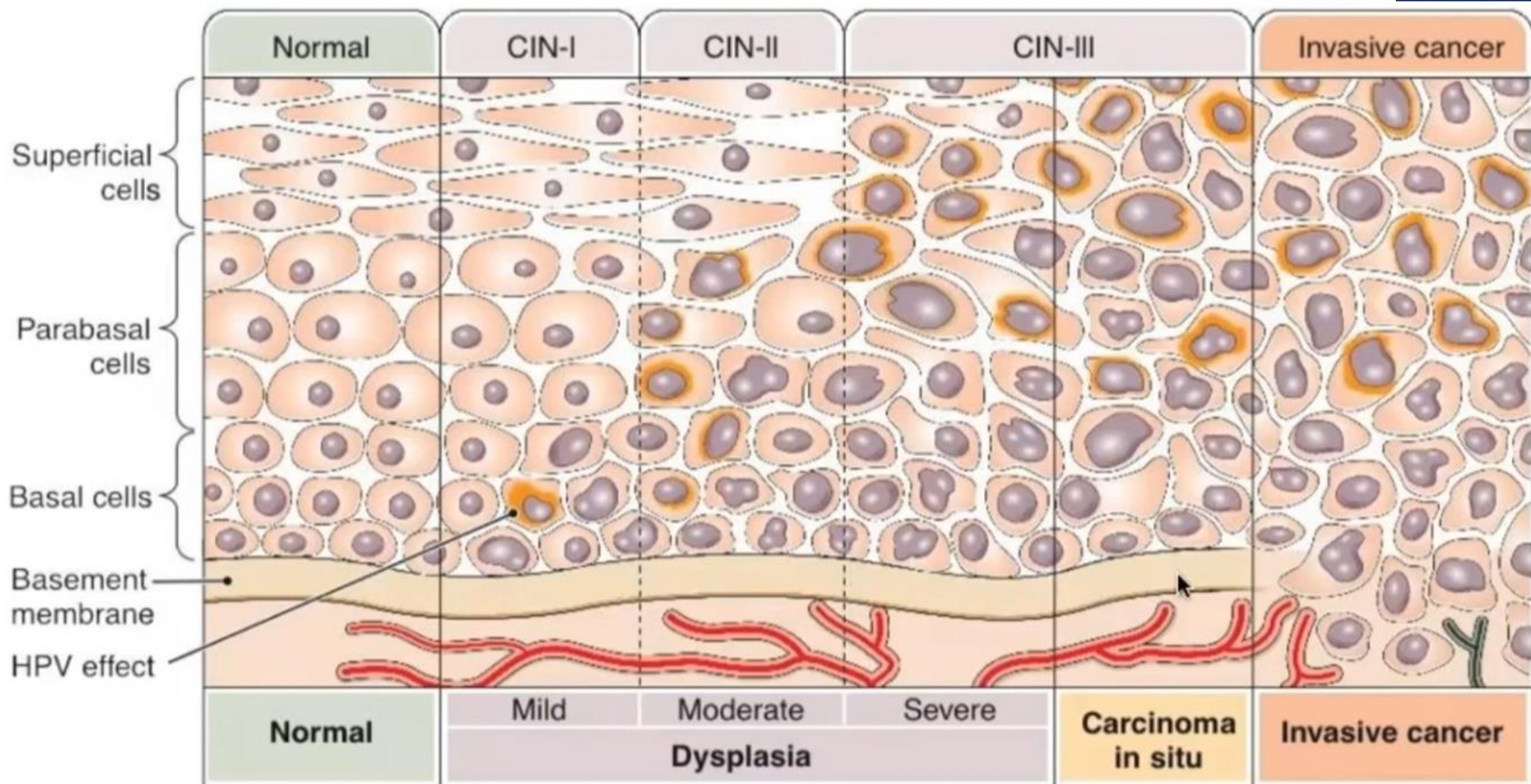


Source: NCI — HPV and Cancer.

Cervical cancer prevention strategies



Ino K. (2017) Prevention of Cervical Cancer: Era of HPV Testing and Vaccination. In: Konishi I. (eds) Precision Medicine in Gynecology and Obstetrics. Comprehensive Gynecology and Obstetrics. Springer, Singapore



HPV-Related Precancer

CIN

Cervical intraepithelial
neoplasia

VIN

Vulvar intraepithelial
neoplasia

VaIN

Vaginal intraepithelial
neoplasia

AIN

Anal intraepithelial
neoplasia

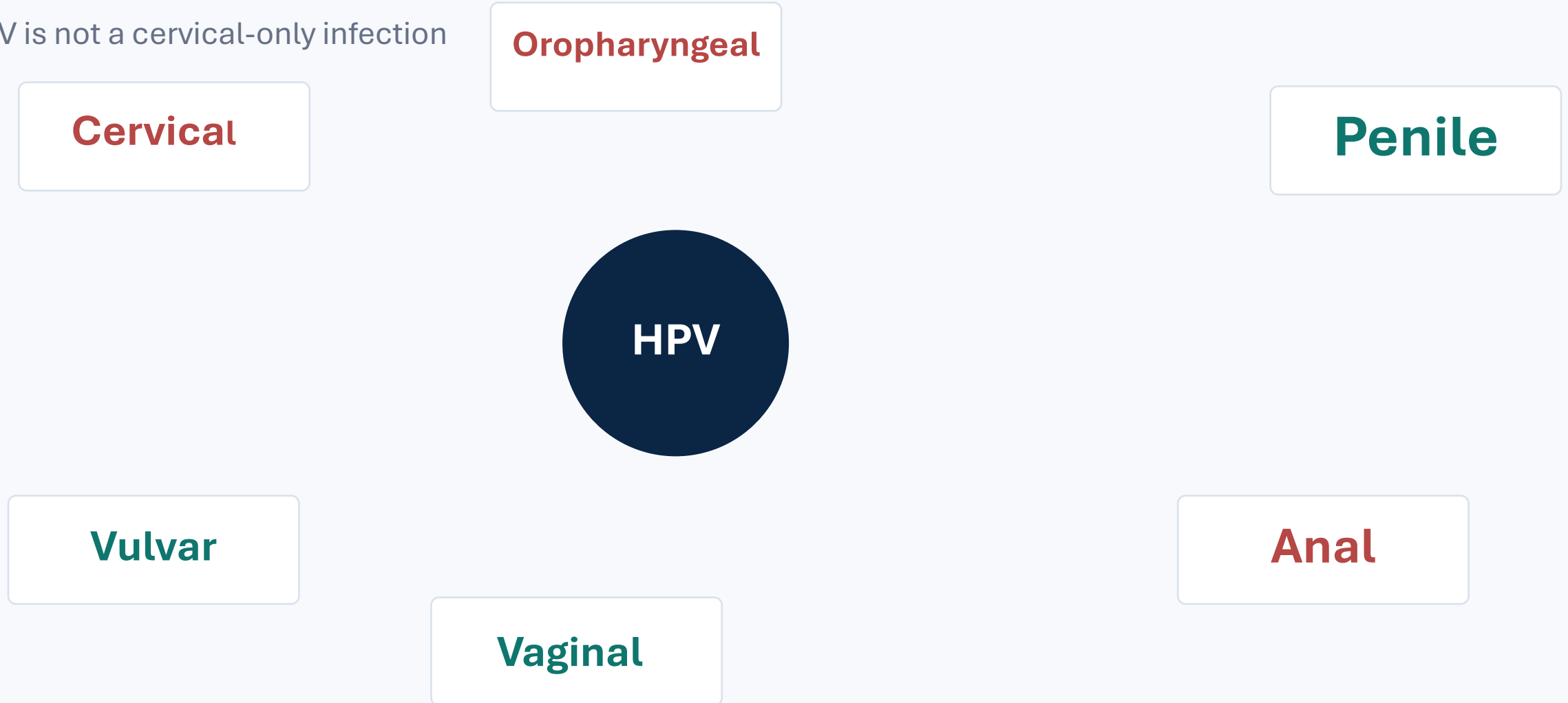


DETECT + TREAT

before invasive cancer develops

Six HPV-Associated Cancers

HPV is not a cervical-only infection



Source: CDC HPV-associated cancers, 2018–2022 data (published 2026).

HPV-Associated Cancer Is Not an Immediate Complication



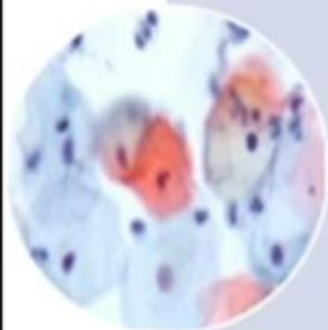
Prevention opportunity

This long natural history gives us time to prevent infection, detect precancer, and prevent invasive cancer.

What's the difference between colposcopy and Pap smear taking

SCREENING

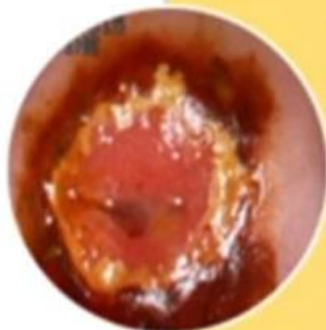
- Cytology or HPV test
- Screening test
- Tells whether you are high or low risk of getting pre-cancer/cancer in future



Women go for screening and screening result is abnormal

DIAGNOSIS

- Colposcopy
- Biopsy
- Tells you where on the cervix the pre-cancer is and confirm by cervical biopsy



TREATMENT

- Treat pre-cancer on cervix
- Up to 99% cure rate
- Simple and effective



Womens' journey towards cervical cancer prevention

Future cervical cancer prevented.

02

PREVENTION

Prevent the infection • detect precancer • prevent cancer

The prevention strategy is layered: primary prevention + secondary prevention + risk reduction.

Prevention of HPV-Related Cancer

PRIMARY PREVENTION

HPV vaccination

SECONDARY PREVENTION

Cervical screening
+ treatment of
precancer

RISK REDUCTION

Smoking cessation
+ barrier protection

Vaccination and screening are complementary—not competing—strategies.

Source: WHO cervical cancer prevention framework.

HPV VACCINATION

=

CANCER PREVENTION

Not simply an STI vaccine.

It prevents infection with HPV types responsible for most HPV-related cancers and HPV 6/11–associated anogenital warts.

WHY VACCINATE BEFORE HPV EXPOSURE?

HPV vaccines are prophylactic.

PREVENTS

New HPV infection

DOES NOT TREAT

Established HPV infection

DOES NOT TREAT

**Existing HPV-related
disease**

BEFORE EXPOSURE = MAXIMUM PREVENTIVE POTENTIAL

The Value of Vaccination in Early Adolescence

PRIMARY TARGET GROUP

Girls 9–14 years

WHO: priority target in most programs

**CDC: routine vaccination at 11–12 years
(can start at age 9)**

The objective: vaccination before HPV exposure, long before HPV-related cancer could develop.

Sources: WHO HPV vaccination program guidance; CDC routine vaccination guidance.

HPV Vaccination Protects Against More Than Cervical Cancer

WOMEN

- Cervical
- Vulvar
- Vaginal
- Anal
- Oropharyngeal

MEN

- Penile
- Anal
- Oropharyngeal

HPV-related cancer prevention is relevant to both sexes.

Source: CDC and NCI HPV-associated cancer information.

Vaccination + Screening

VACCINATION

Primary prevention



Prevents new HPV infection

SCREENING

Secondary prevention



Detects precancer before
invasion

VACCINATION ≠ NO SCREENING

Source: WHO cervical cancer prevention guidance. Vaccination does not replace recommended cervical screening.

Additional Prevention Measures

SMOKING CESSATION

Smoking is associated with persistence and progression of HPV-related cervical disease.

For prevention, cessation is a practical modifiable intervention.

BARRIER PROTECTION

Condom use can reduce, but does not eliminate, HPV transmission because HPV spreads through skin-to-skin contact beyond condom coverage.

These reduce risk — they do not replace vaccination.

Sources: NCI; WHO cervical cancer prevention guidance.

HPV Vaccination Is Not a Girls-Only Strategy

Why vaccinate boys?

HPV-associated cancers occur in males.

- Oropharyngeal cancer
- Anal cancer
- Penile cancer

Vaccination also reduces HPV circulation at population level.

A counseling line that works

“HPV vaccination is not a vaccine only for cervical cancer.

HPV can cause cancer in men as well, particularly cancers of the oropharynx and anus.”

HPV Vaccination in Immunocompromised Individuals

Persistent HPV infection and HPV-related disease can be more problematic in immunocompromised patients.

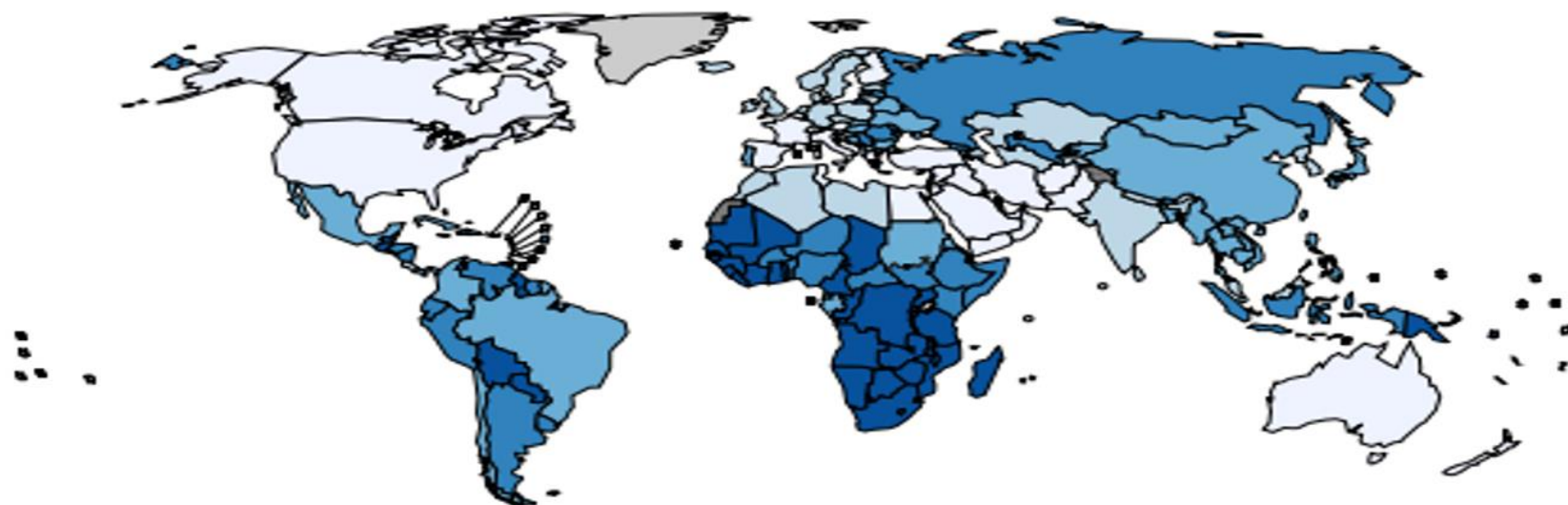
CDC: 3-dose series for immunocompromised persons aged 9–26 years

Source: CDC HPV vaccination recommendations (2026).

USPSTF and ACS/ASCCP/ASCP Guidelines at a Glance

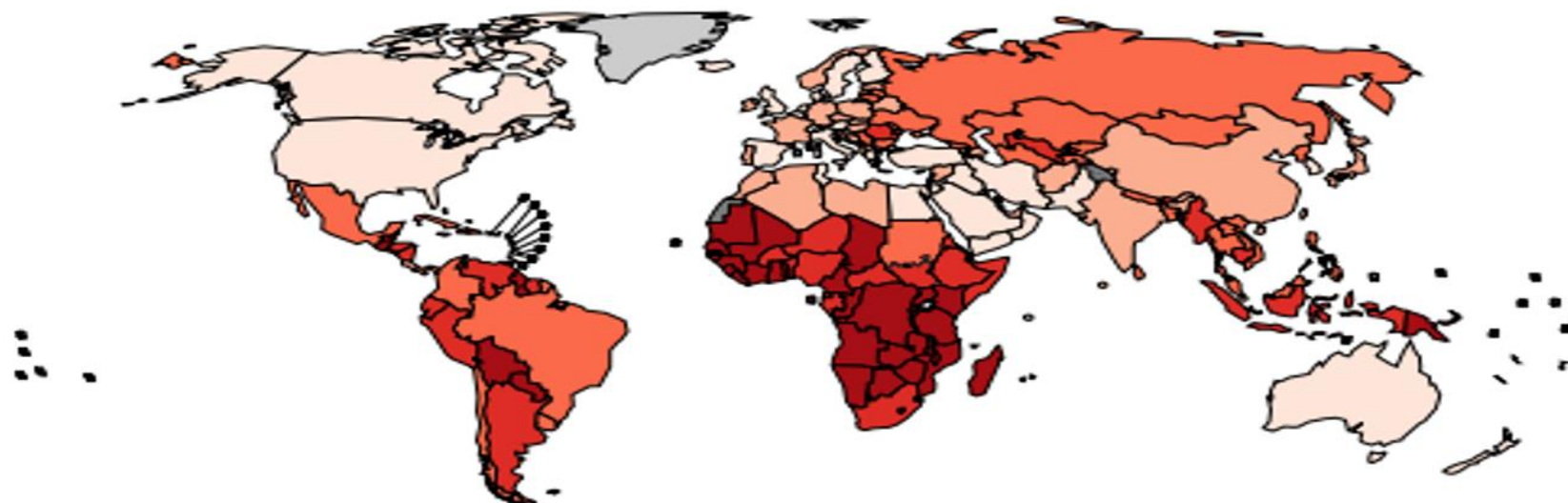
Population	USPSTF	ACS/ASCCP/ASCP
Younger than 21 years	Recommends against screening. Grade: D recommendation.	Women should not be screened regardless of the age of sexual initiation or other risk factors. [?]
21–29 years	Recommends screening with cytology every 3 years. Grade: A recommendation.	Screening with cytology alone every 3 years is recommended.
30–65 years	Recommends screening with cytology every 3 years or for women who want to lengthen the screening interval, screening with a combination of cytology and HPV testing every 5 years. Grade: A recommendation.	Screening with cytology and HPV testing (“co-testing”) every 5 years (preferred) or cytology alone every 3 years (acceptable) is recommended.

Incidence



Age standardized (World) incidence rates, Cervix uteri, females, all ages

Mortality



Age standardized (World) mortality rates, Cervix uteri, females, all ages

WHO 90–70–90 STRATEGY

The Roadmap to Eliminate Cervical Cancer

90%

HPV VACCINATION

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

PREVENT

70%

SCREENING

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

DETECT

90%

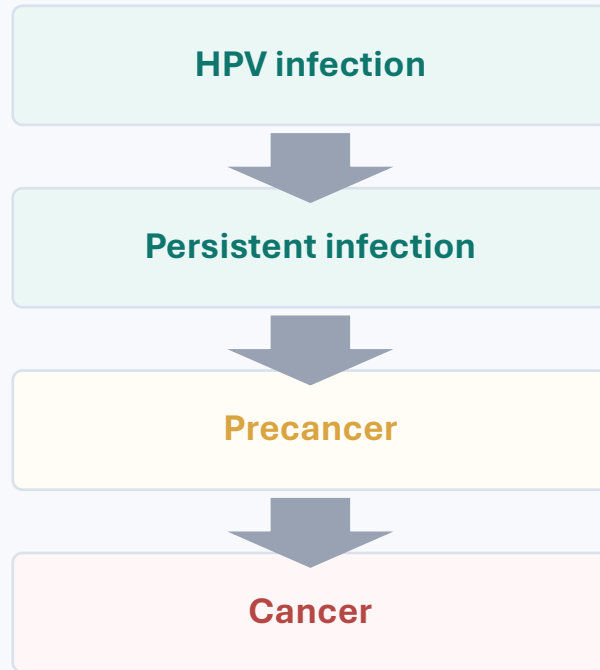
TREATMENT

90% of women with cervical disease
receive appropriate treatment:
90% precancer treated + 90%
invasive cancer managed

TREAT

ELIMINATION THRESHOLD • < 4 NEW CASES / 100,000 WOMEN / YEAR

What Can We Prevent?



PREVENTION WORKS AT MULTIPLE LEVELS

Vaccination
+
Screening
+
Risk reduction

The earlier we intervene, the greater the prevention opportunity.

Sources: WHO and CDC HPV prevention guidance.

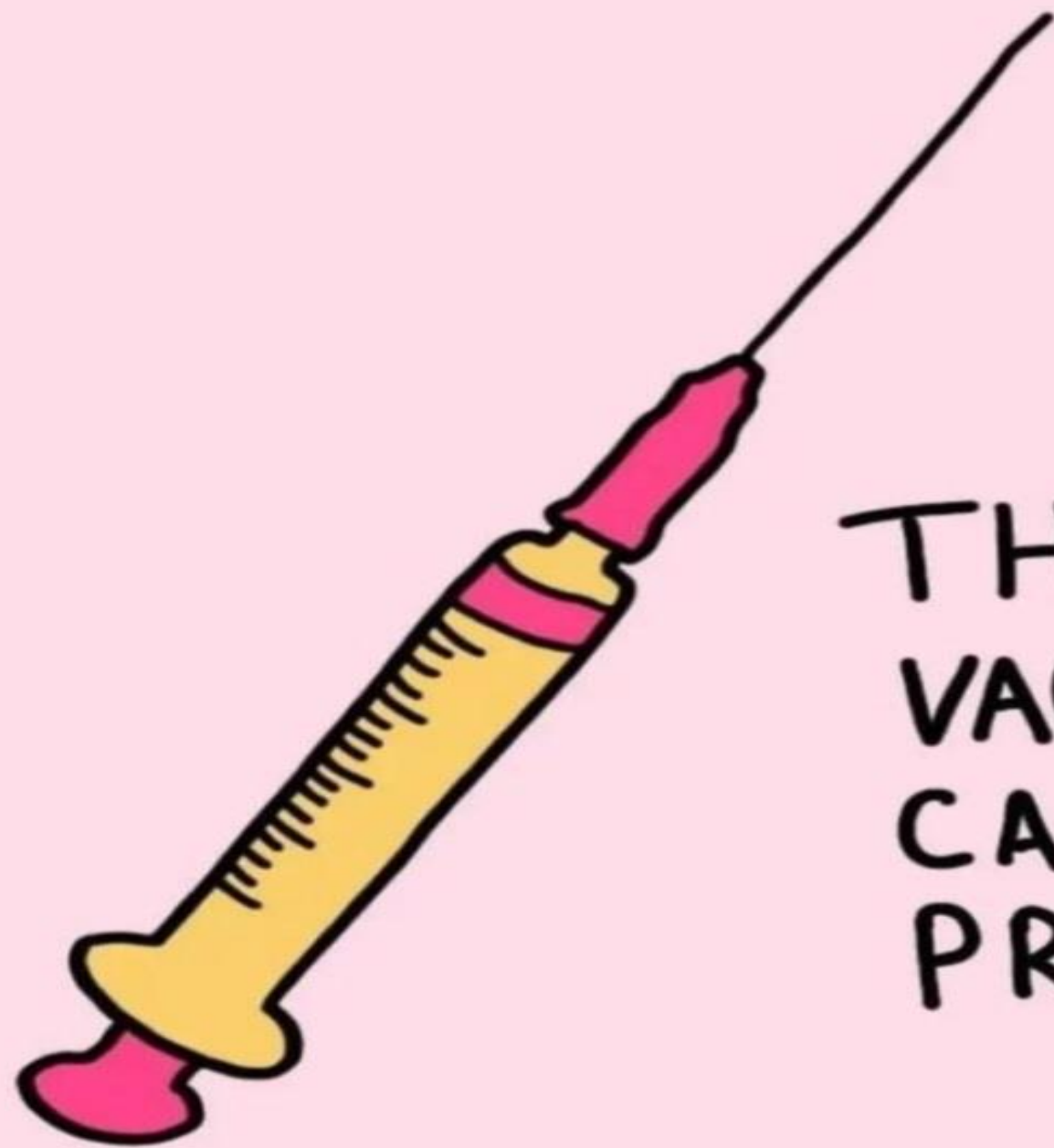
TAKE-HOME MESSAGES

- 1 Most HPV infections clear spontaneously, but persistent high-risk HPV can cause cancer.
- 2 HPV causes benign disease, precancer, and six major cancers.
- 3 HPV vaccination is a primary cancer-prevention strategy.
- 4 The greatest preventive benefit comes from vaccination before HPV exposure.
- 5 Vaccination and cervical screening are complementary—not competing—strategies.

HPV PREVENTION IS CANCER PREVENTION.

Take-Home Messages

- 1 HPV is a pediatric prevention issue, not only a gynecologic disease.
- 2 Benign disease can be clinically burdensome; persistent high-risk infection drives cancer risk.
- 3 Immunocompromised children deserve proactive HPV prevention.
- 4 HPV vaccination is primary cancer prevention—and the best time is before exposure.
- 5 A clear, confident pediatrician recommendation can change vaccination behavior.



THE HPV
VACCINE IS
CANCER
PREVENTION