



Brigham and Women's Hospital
Founding Member, Mass General Brigham

Hot Topic in Women's Health New Options & Guidelines Screening & Prevention HPV and Cervical Cancer

Annekathryn Goodman, MD, MPH

Gynecologic Oncologist

Division of Gynecologic Oncology

Massachusetts General Hospital

Professor Obstetrics, Gynecology, Reproductive Biology

Harvard Medical School

July 2026

CONTINUING MEDICAL EDUCATION DEPARTMENT OF MEDICINE



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



Annekathryn Goodman, MD, MPH

Tufts University School of Medicine

Residency in OB GYN at Tufts

Gynecologic Oncology Fellowship at MGH

Professor of Obstetrics, Gynecology, Reproductive Biology

Harvard Medical School

Clinical focus: gynecologic cancers

- Research focus: development of infrastructure for cancer care for women in resource limited countries; structural violence against women and reproductive outcomes



Brigham and Women's Hospital
Founding Member, Mass General Brigham

Disclosures

NONE

July 2026

CONTINUING MEDICAL EDUCATION DEPARTMENT OF MEDICINE



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

OBJECTIVES

UNDERSTAND CURRENT SCREENING GUIDELINES FOR CERVICAL CANCER

UNDERSTAND EFFICACY OF HPV SCREENING AND ADVANTAGES OF SELF SAMPLING

UNDERSTAND RISK TRIAGE BY HPV GENOTYPE AND DUAL STAINING

AWARENESS OF THE COMPLEX INTERPLAY OF SOCIAL, INDIVIDUAL, AND BIOLOGIC FACTORS
LEADING TO THE DEVELOPMENT OF CERVICAL CANCER AND TO DYING FROM CERVICAL CANCER



OUTLINE

Big Picture

Resources

What constitutes prevention?

Guidelines

Reflections on Making it better



This image is a photograph by **Jodi Cobb** capturing the private world of **Geisha**

Background

Cervical Cancer Statistics 2026

Globocan 2025

Worldwide: 660,00 women diagnosed with invasive cervical cancer

Worldwide: 350,000 women will die from cervical cancer

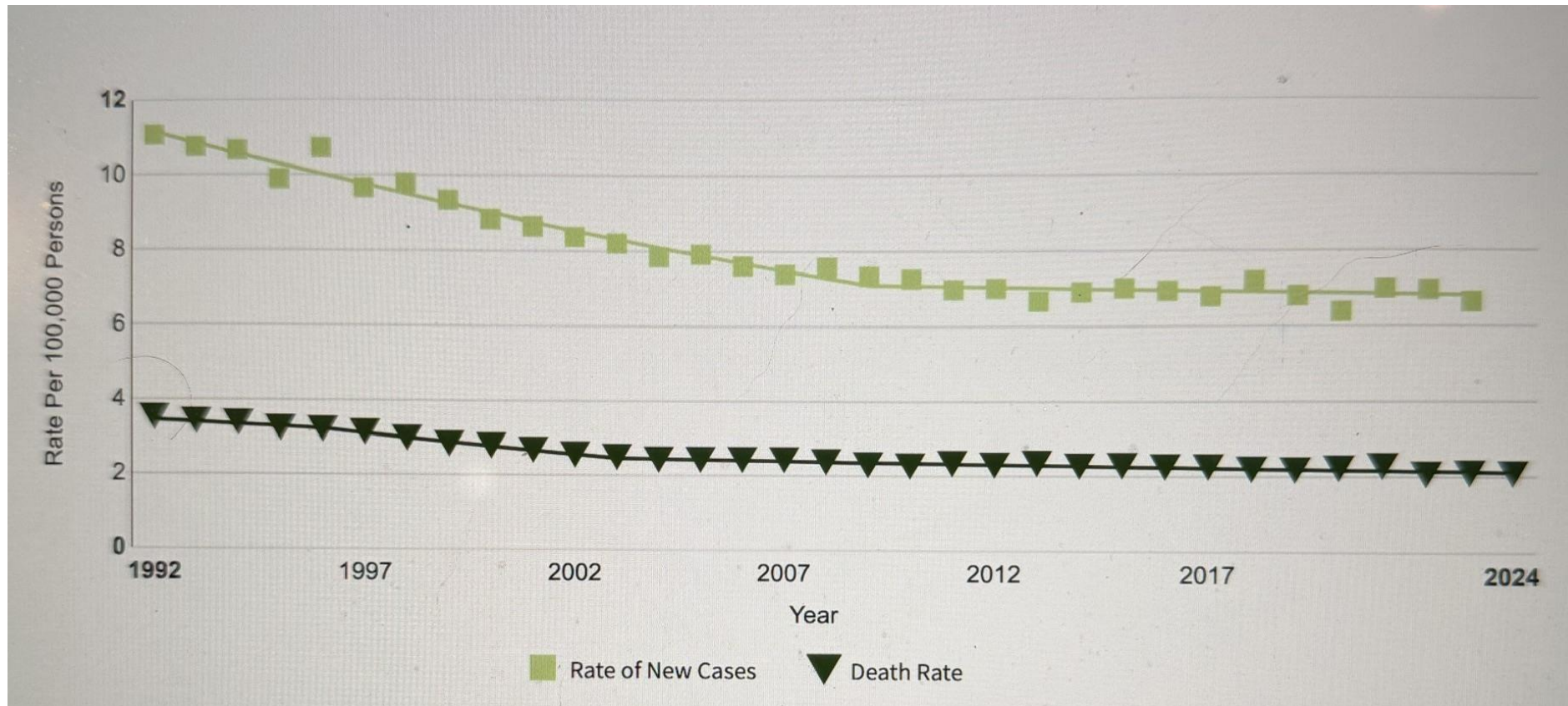
United States: 13,490 women diagnosed with invasive cervical cancer

United States: est. 4200 women will die from cervical cancer

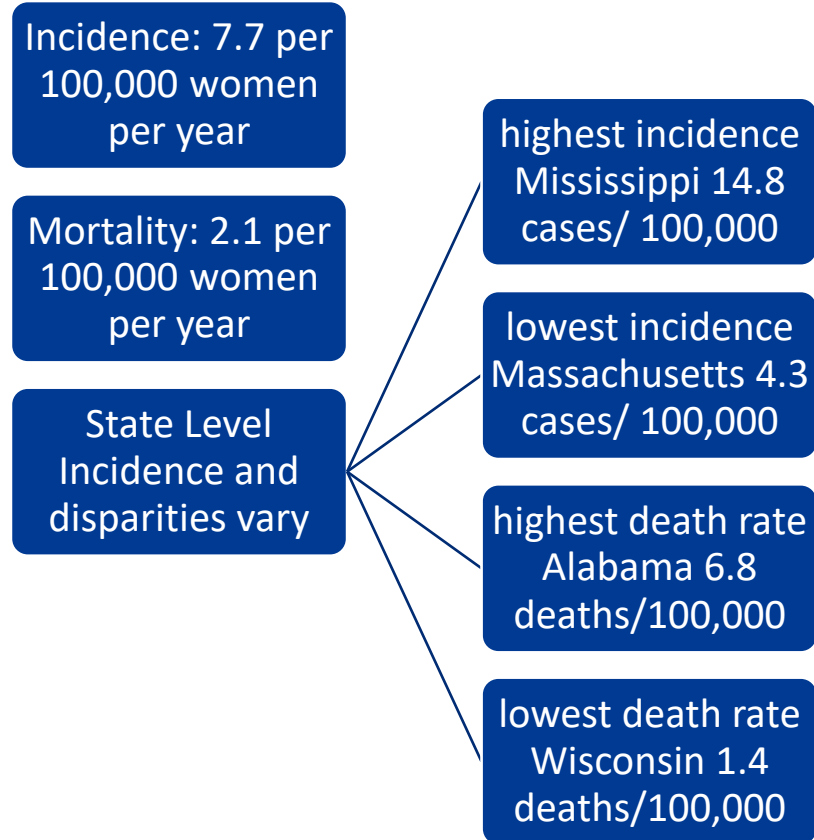
Probability of developing cervical cancer (birth to death): 1 in 158 women in USA (0.6%)



National Cancer Institute: SEER 2026



USA 2026 Cervical Cancer



Social Ecology of Cervical Cancer

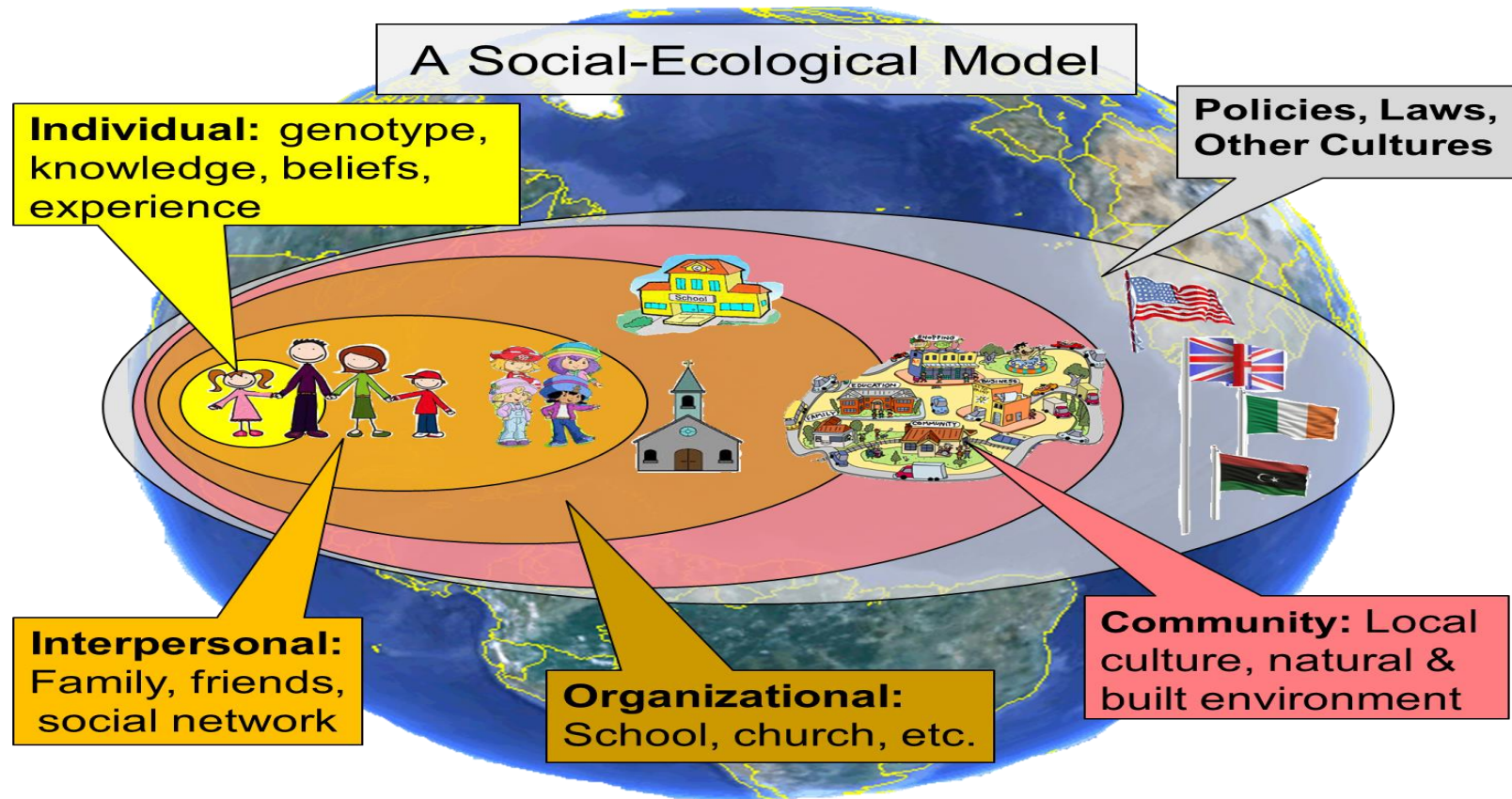


Image of the Social-Ecological Model (from: Simmons, P. and Bowler, M. (2020) *Introducing a new pedagogical model from health-based PE*)

Cervical Cancer Incidence & Outcomes

Societal and Medical Resources

Refugee women who leave their country due to persecution and violence have **multiple barriers** to sexual and reproductive health (SRH) services (de Bocanegra et al., 2023)

Despite efficacy of HPV vaccination, HPV vaccination rates vary, especially among migrant and refugee populations (Graci et al., 2024)



WHAT DEFINES RESOURCES FOR POPULATION HEALTH?

People, Stuff, & Money

PEOPLE

- Healthcare Providers- community workers, nurses, doctors
- Pharmacists
- Researchers
- Security
- Support Staff

STUFF

- Infrastructure – hospitals, clinics, outpatient services, pharmacies
- Supplies
- Medications

MONEY

- Gross National Product of Country
- How much is spent of healthcare?
- How do people pay for it?



PREVENTION

Cervical Cancer

Vaccination

Screening



Background Rationale for Screening

Cervical cancer has a long preinvasive phase

There are effective and cheap screening tests for preinvasive and invasive cervical cancer

Cervical cancer can be prevented with adequate screening



Cervical Cancer Screening

HPV SUBTYPES

45 mucosal/genital subtypes

high risk : HPV - 16, 18, 31, 33, 35,
39, 45, 51, 52, 56, 58, 59, 66, 68

low risk: HPV - 6, 11, 40, 42, 43,
44

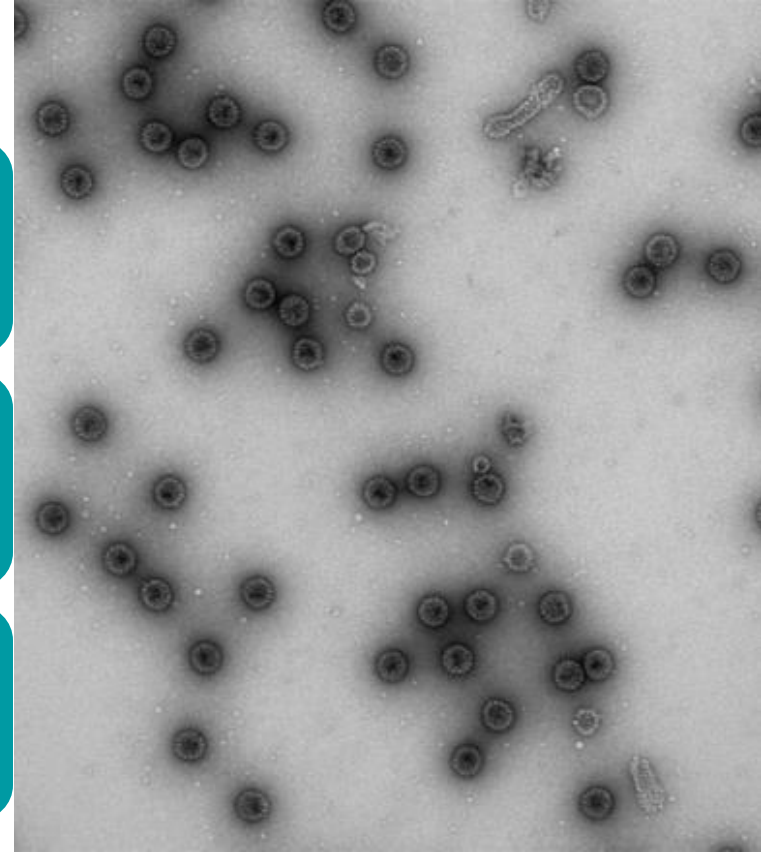


Image from Prophylactic human papillomavirus vaccines
Douglas R. Lowy & John T. Schiller, 2006

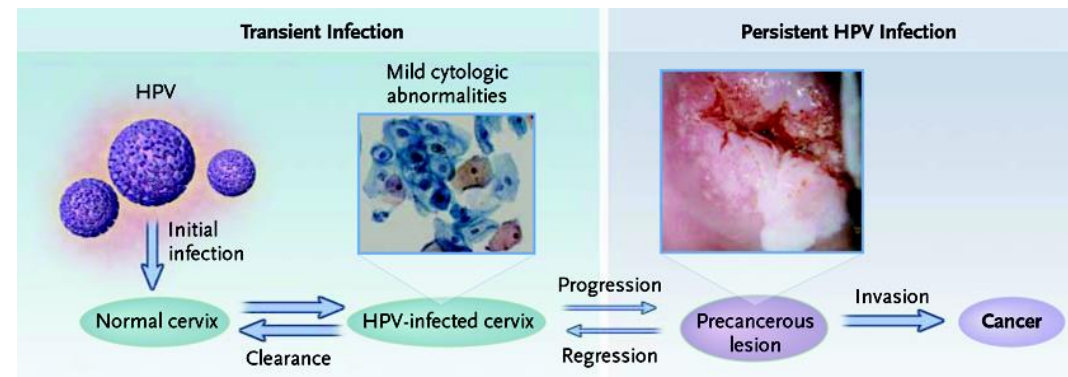
HPV(HIGH RISK) NATURAL HISTORY

-3–8-month incubation period

-80% cleared in 12 months

-95% cleared by three years

Less than 1% of all HPV high risk infections lead to invasive cancer-



From Markowitz, 2024, Introduction to Policy Considerations.
Reduced number of HPV vaccine doses



Not All HPV-HR are created Equal

Figure 2

Hierarchical positive predictive values (PPVs) for 13 high-risk HPV types overall and stratified by viral load (high, intermediate and low) for cervical intraepithelial neoplasia grade 2 or worse (CIN2+).

HPV type	PPV (%) by Viral Load (CIN2+)				Risk Ratio High vs Low
	Low	Medium	High	All*	
16	3.89	6.76	17.64	11.91***	4.53***
33	4.39	9.94	10.56	8.12***	2.40*
31	4.01	8.90	10.94	6.77***	2.73**
35	3.49	6.00	10.10	5.40***	2.90**
18	2.01	2.83	7.90	5.10***	3.93**
58	1.14	2.11	6.11	3.94***	5.35**
51	2.27	4.38	4.47	3.35***	1.97
45	1.32	2.35	3.37	2.34***	2.56
39	1.98	2.77	2.11	2.20***	1.06
52	0.39	1.15	4.57	2.03***	11.72***
59	0.93	1.09	2.79	1.84***	3.01
56	0.17	2.42	1.32	1.04***	7.57
68	1.02	0.00	0.82	0.58	0.80

*Star system for significance of odds of CIN2+

Significant after adjusting for highest HPV types in hierarchy at *p<0.05,

p<0.001, *p<0.0001

Colour coded for 3 year risk of CIN2+ (<2%, 2-5%, 5-10%, >10%)

Reproduced with permission from Adcock R et al. Role of HPV Genotype, Multiple Infections, and Viral Load on the Risk of High-Grade Cervical Neoplasia. Cancer Epidemiol Biomarkers Prev. 2019 Nov;28(11):1816-1824.

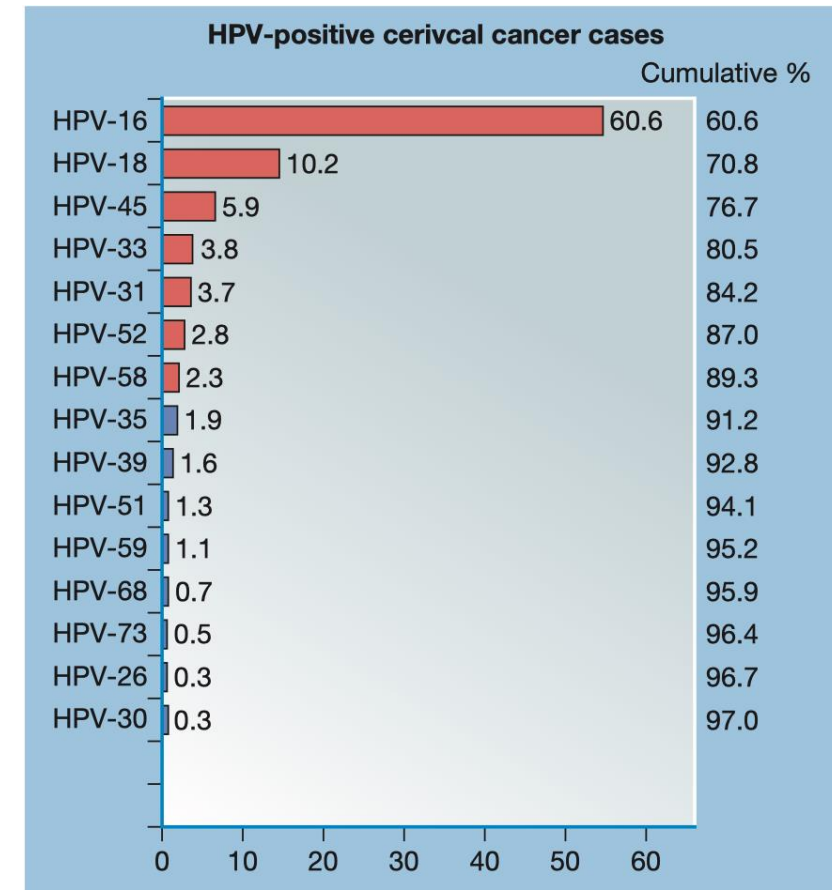
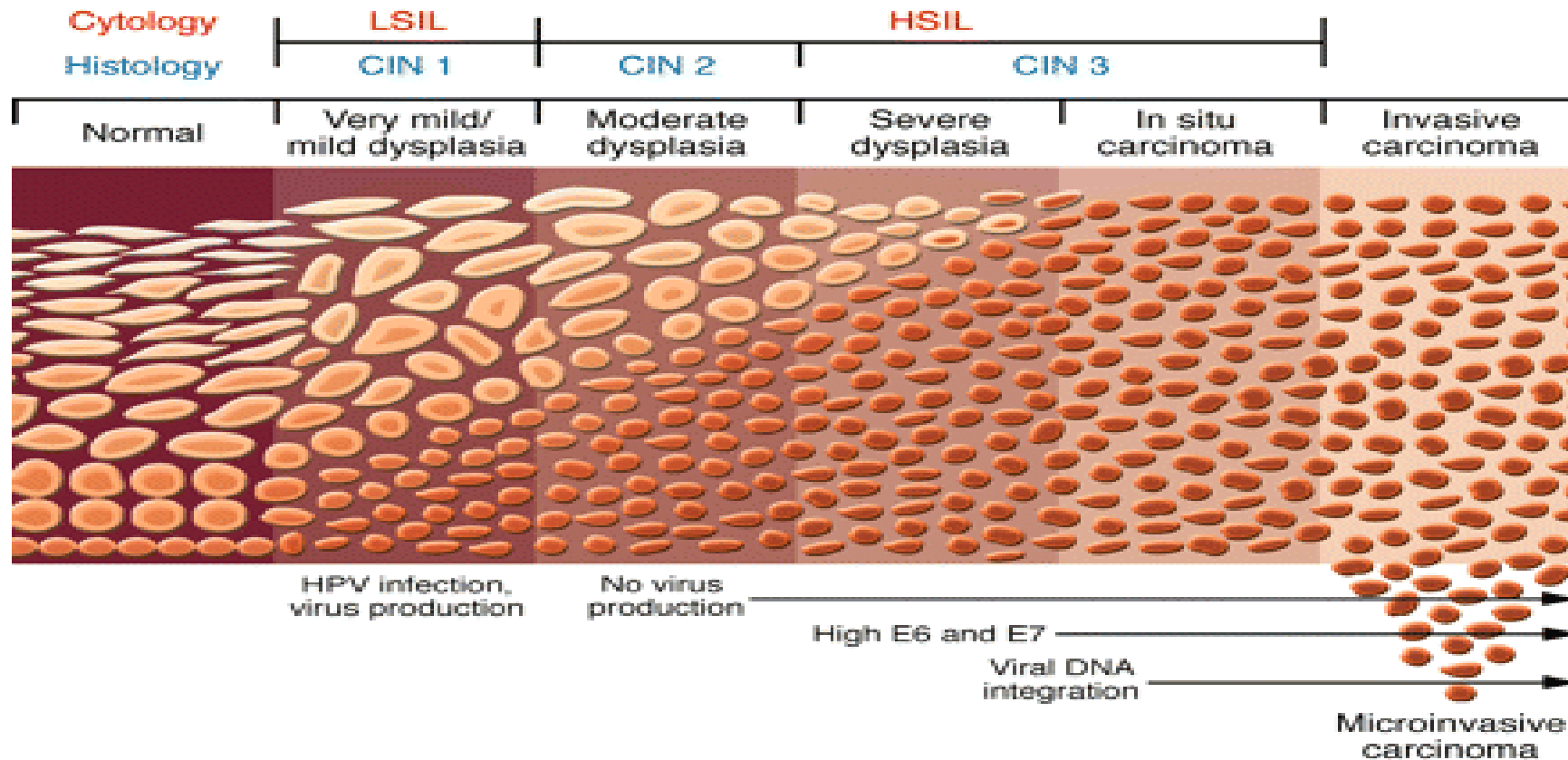


Figure 30.7. Human papillomavirus (HPV) genotypes in cases of invasive cervical cancers that were positive for HPV DNA. The seven high-risk HPV types included in Merck's nonavalent vaccine Gardasil-9 are indicated in red. (Modified from data on 8977 cases worldwide as reported in de Sanjose S, Quint WG, Alemany L, et al. Human papillomavirus genotype attribution in invasive cervical cancer: a retrospective cross-sectional worldwide study. Lancet Oncol. 2010;11[11]:1048–1056.)

Cervical Cancer Screening

Preinvasive Disease



From Schiller, J., & Lowy, D. (2006). Prophylactic human papillomavirus vaccines. *Journal of Clinical Investigation*, 116(5), 1167–1173.

Cervical Cancer Screening

Techniques of Screening

- Physical Exam
- Visual Inspection with Acetic Acid
- Pap Smear
- HPV Testing
- Cervical Biopsies



ARTISTIC trial

- ARTISTIC stands for 'A Randomised Trial in Screening to Improve Cytology' (NIHR funded)
- The aim of the trial was to evaluate the effectiveness of HPV primary screening
- The Participants:** 24,510 women aged 20–64 were recruited from general practices in the NHS program between 2001 and 2003.
- The trial compared liquid-based cytology (LBC) and HR-HPV testing



ARTISTIC trial

Over 3 screening rounds primary HR-HPV screening:

Showed improved sensitivity compared to liquid based cytology testing

Gave women longer term protection following a negative HR-HPV test result than a normal cytology result



Guidelines 2019 (2020)

applies **ONLY to individuals with a cervix who do not have any signs or symptoms of cervical cancer*

***DOES NOT APPLY** to high-risk individuals*

-dx of precancerous lesion

-in utero exposure to DES

-immunocompromised individuals

Population*	Recommendations ACS (2020)	Recommendation USPSTF (2018)
Aged less than 21 years		No screening
Aged 21-25 years	No screening	Cytology alone every 3 years
Aged 25-29 years	Preferred primary HPV test every 5 years	
Aged 30-65 years	Acceptable -contesting every 5 years -cytology alone every 3 years	Anyone of the following --Cytology alone every 3 years --FDA-approved primary high-risk HPV testing alone every 5 years --co-testing (HPV & cytology) every 5 years
aged greater than 65 years	No screening necessary	No screening after adequate negative prior screening results
Hysterectomy with removal of the cervix	No screening in individuals who do not have a history of high grade cervical precancerous lesions or cervical cancer	No screening in individuals who do not have a history of high grade cervical precancerous lesions or cervical cancer

By The Way: The over 65-year crowd...

Mills et al “Eligibility for cervical cancer screening exit” Gynecol Oncol 2021

Ages greater than 65: No Further Pap Smear Testing **ONLY IF**

- who have had > 3 consecutive normal pap tests
- or > 2 consecutive negative HPV tests and pap tests in last 10 years with the most recent pap occurring within the last 5 years
- or women who have had hysterectomies for benign disease

Most older women do not meet criteria to stop cervical cancer screening

Analysis of national insurance claims: only 22% of 600,000 women met criteria to stop screening

- 37% had too few screens to meet exit criteria
- 21.5% had medical or screening history that precluded screening exit

No patient should ever discontinue screening based on age alone without their HCP completing a thorough review of records



RISK FACTORS

SOCIAL ECOLOGY

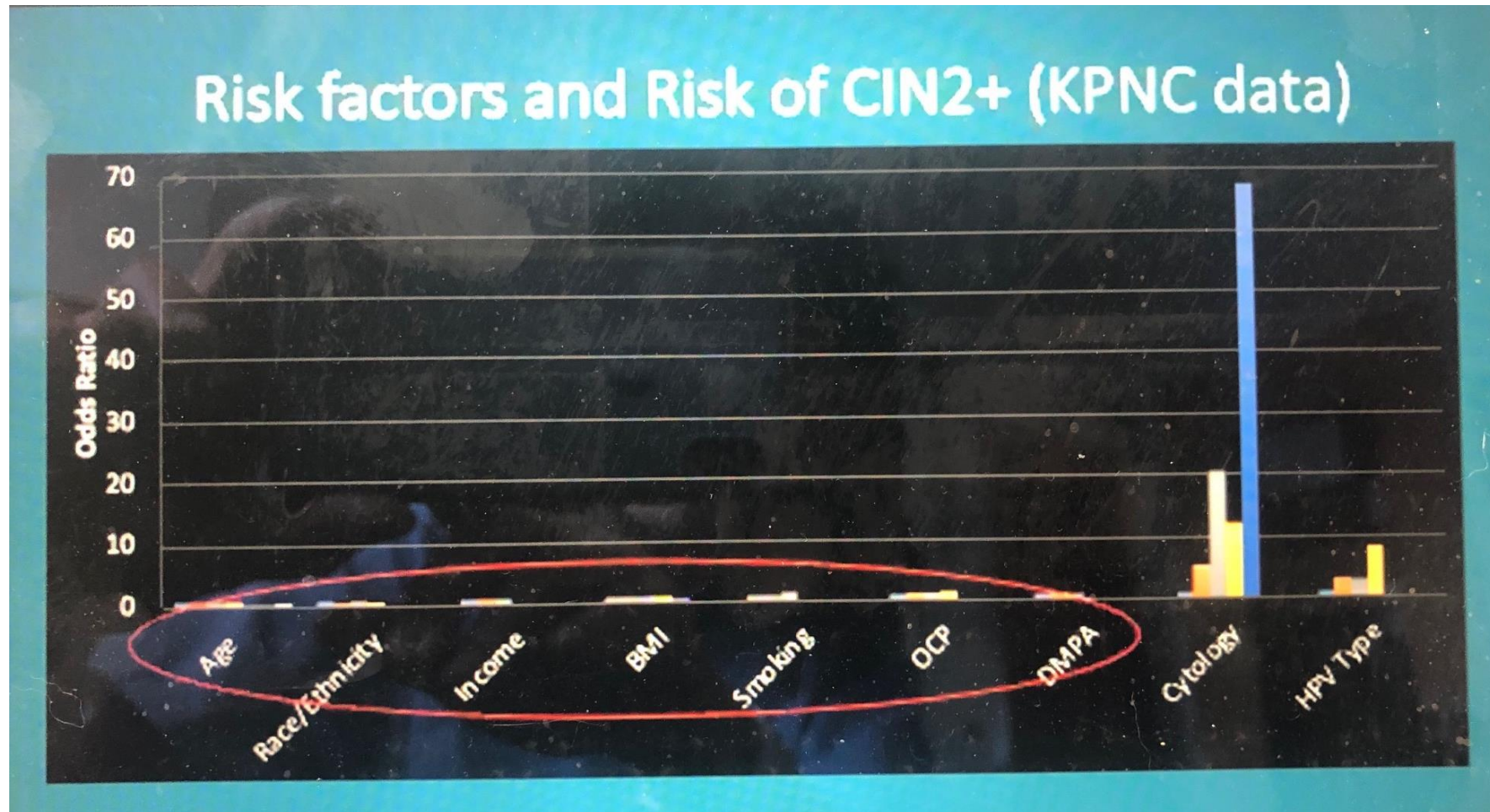
MULTIPLE SEXUAL PARTNERS
EARLY AGE OF FIRST INTERCOURSE
POVERTY
HORMONAL ENVIRONMENT (OCP USE?)
TOBACCO USE
IMMUNE SUPPRESSION
HIGH RISK MALE PARTNER
LACK OF HPV VACCINATION
LACK OF SCREENING



"The Damm Family in Their Car" 1987 in Los Angeles by Mary Ellen Mark



Which Risk Factors Influence pre-cancer development?



From: Demarco et al . A study of type-specific HPV natural history and implications for contemporary cervical cancer screening programs. EClinicalMedicine. 2020

Fundamental Concept

Persistent HPV Infections is important

The longer an HPV infection has been present, the higher the risk of pre-cancer and cancer

- Time matters
- Type matters (HPV 16 most dangerous)
- Other patient factors don't matter once you know about HPV
- CLINICAL CORRELATE: Colposcopy is always needed following two consecutive positive HPV tests



Given Risks, What Stops people from screening?

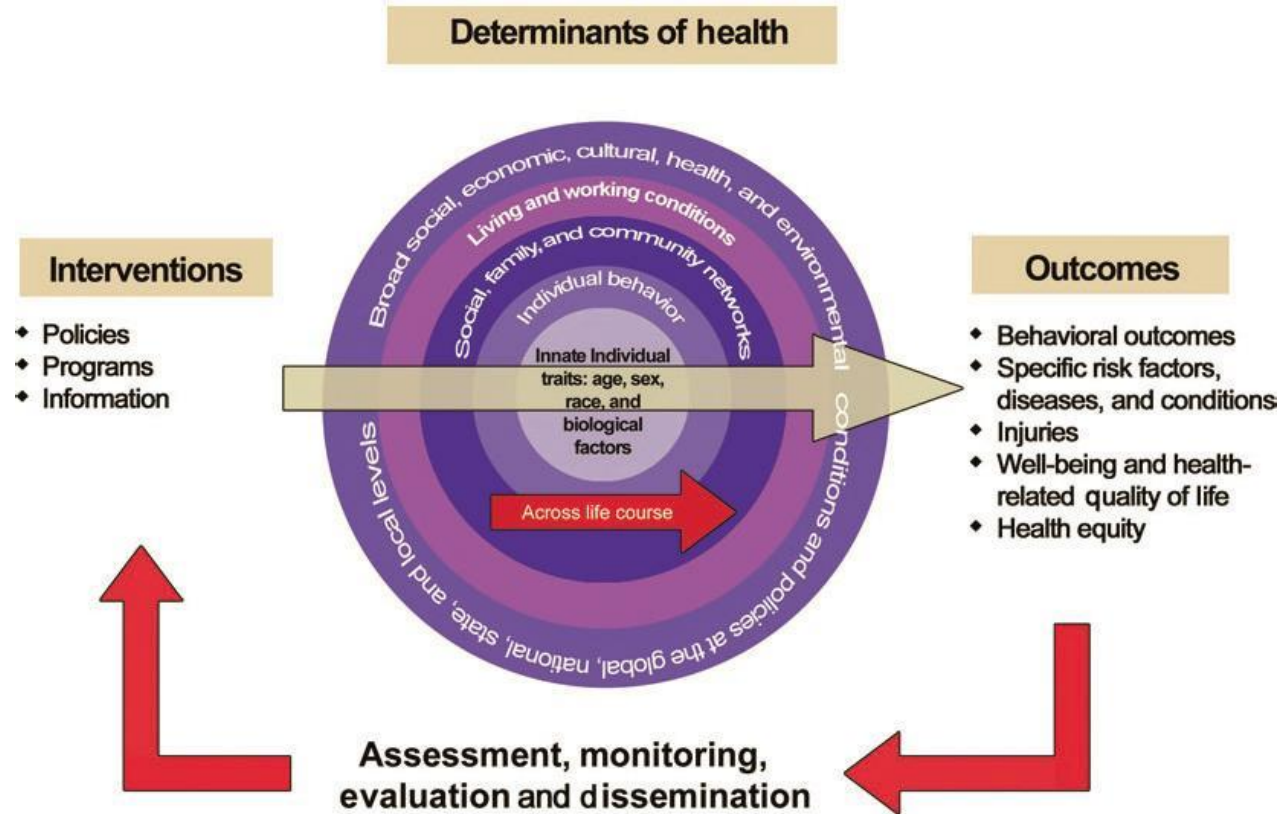
Barriers

Personal Challenges	pain, trauma association, religion, lack of awareness etc
Logistical Challenges	time off work, lack of transportation or childcare for apts, limited access to clinic apts or providers, remote living conditions
Catastrophic events	COVID-19 pandemic, hurricanes, wildfires, earthquakes, conflict zones
Test Methods Before 2025	lack of universal guideline acceptance for HR HPV primary screening & associated clinical guidelines



Social Ecology Levels

Intrapersonal
Interpersonal
Organizational
Community
Society



Deatrick JA. Where Is "Family" in the Social Determinants of Health?
Implications for Family Nursing Practice, Research, Education, and Policy. J Fam Nurs. 2017



Challenges to Cervical Cancer Screening

INTRAPERSONAL LEVEL

General Influences	Barriers to Screening
Personality	Depression, anxiety
Comprehension	Ability to navigate healthcare system
Genetics	Less common high risk subtype
Family	Family history of cervical cancer
Home environment	Shame, role of family decision maker

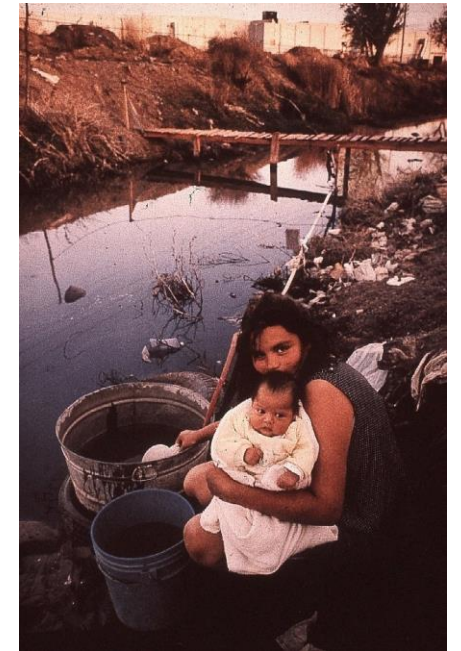


Photo From Cinthya Flores
"Una aproximación al periodismo ambiental:
tendencias regionales y claves para un mejor ejercicio de la profesión"

Challenges to Cervical Cancer Screening

INTERPERSONAL LEVEL

General Influences	Barriers to Screening
Culture	Fatalistic beliefs
Social Mores	Smoking
Employment	Unemployed

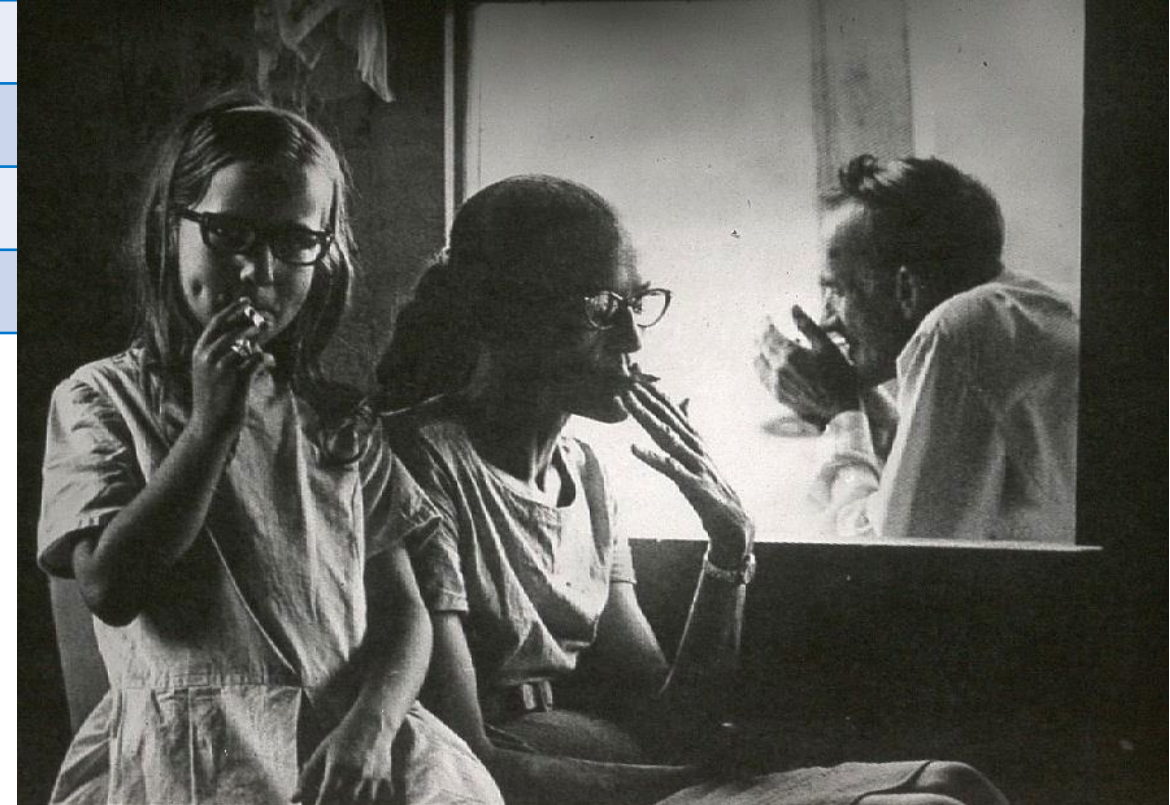
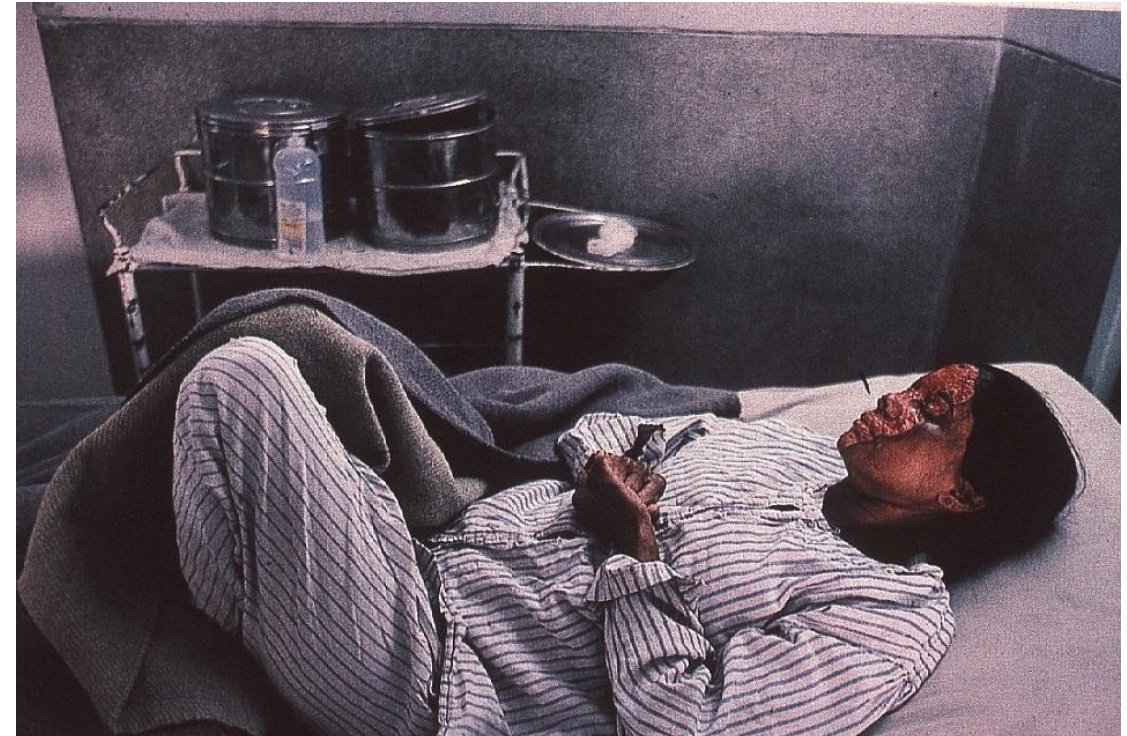


Photo from Mary Ellen Mark

Challenges to Cervical Cancer Screening

ORGANIZATIONAL LEVEL

General Influences	Barriers to Screening
School	Lack of healthcare awareness
Health Insurance	Lack of healthcare coverage
Race, Ethnicity	Minority status, discrimination, trust



Getty images 1984



Challenges to Cervical Cancer Screening

COMMUNITY LEVEL

General Influences	Barriers to Screening
Socio-economic status	Low socio-economic status
Public resources	Citizenship status
Healthcare facilities	Delay of services
Economics	Poverty



Drought Refugees from Oklahoma Camping by the Roadside, Blythe, California, photographer Dorothea Lange in 1936.

Challenges to Cervical Cancer Screening

NATIONAL LEVEL



https://en.wikipedia.org/wiki/1926_New_Zealand_census

General Influences	Barriers to Screening
Educational system	Utilization of healthcare
Governmental policy	Lack of financial support



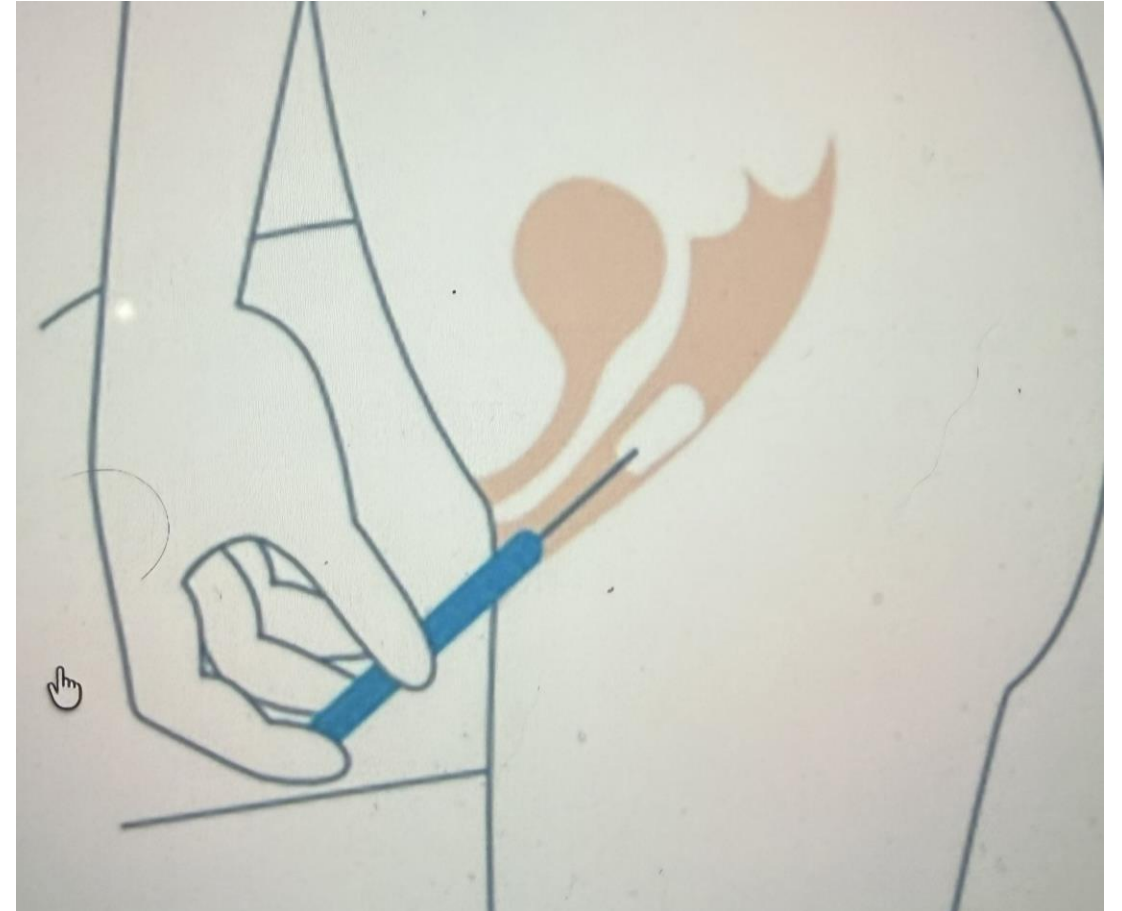
May 17, 2024: Self-collection for HPV screening was approved by the FDA

February 21, 2025 – Clinical Guidelines published
For negative results (aprox 90% of cases), the patient should retest in 3 years

For most positive results, the patient should undergo cervical cytology or dual stain test to determine if biopsies or treatment needed

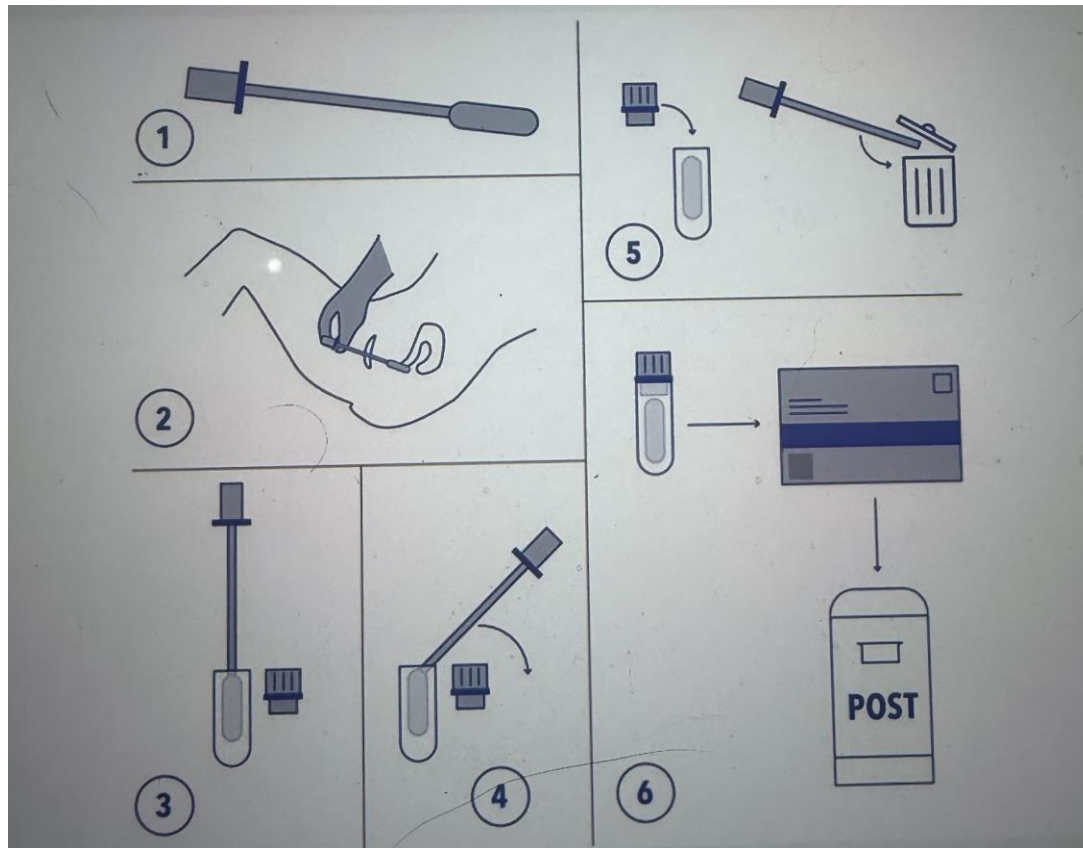
For HPV 16 or 18, proceed directly to biopsy

With extended genotyping positive for lower-risk HPV subtype (eg 56, 59,66), patients may repeat HPV test in 1 year



International Agency for Research on Cancer

World Health Organization



INSTRUCTIONS

BEFORE TAKING THE TEST:

- ✓ Read through these instructions.

DO NOT TAKE THIS TEST:

- ✗ When you are on your period. Wait until your period is over.
- ✗ If you are pregnant. See your health care provider about a Pap test.
- ✗ If you are HIV positive or have had solid organ transplant. See your health care provider once a year for a Pap test.

- 1 Wash your hands. Get undressed from the waist down.
- 2 Collect your sample: hold the red cap to remove the swab from the plastic tube. Put the tube on a clean surface. Do not touch the soft end of the swab.
- 3 Hold the swab at the red line.
- 4 Stand (A) or sit (B) with your legs apart. Using your other hand, hold back the folds of skin.
- 5 Insert the swab into your vagina until your fingers touch your external genitals. Rotate the swab for 10 to 20 seconds. Remove the swab.
- 6 Slide the swab into the plastic tube and close firmly.
- 7 CLEARLY write your collection date on the tube label and the lab requisition.

SUE
Susie
06 APR 1972 0676 543 214
COLLECTION DATE:
D D M M Y Y Y Y
(see the back)
- 8 Place the tube into the plastic bag. Seal the bag.
- 9 Put the sealed bag and your lab requisition into the return envelope.
- 10 Drop off the envelope today at a Canada Post office or post box.

Recommendations for Use of p16/Ki67 Dual Stain for Management of Individuals Testing Positive for Human Papillomavirus

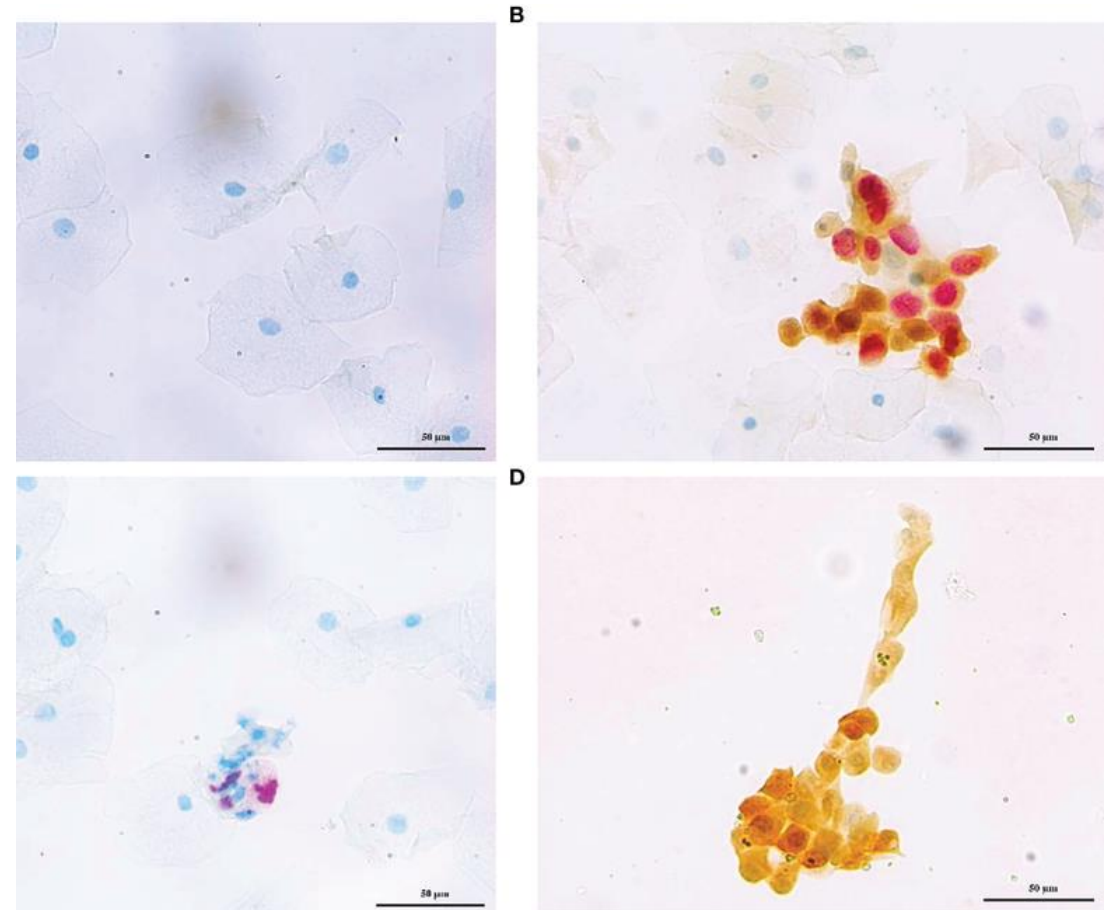
Clarke et al 2024

For triage of positive HPV results from screening with primary HPV testing (with or without genotyping) or with cytology contesting

colposcopy is recommended for individuals testing DS-positive.

One-year follow-up with HPV-based testing is recommended for individuals testing DS-negative

immediate colposcopy referral is recommended. for HPV16- and HPV18-positive results, or high-grade cytology

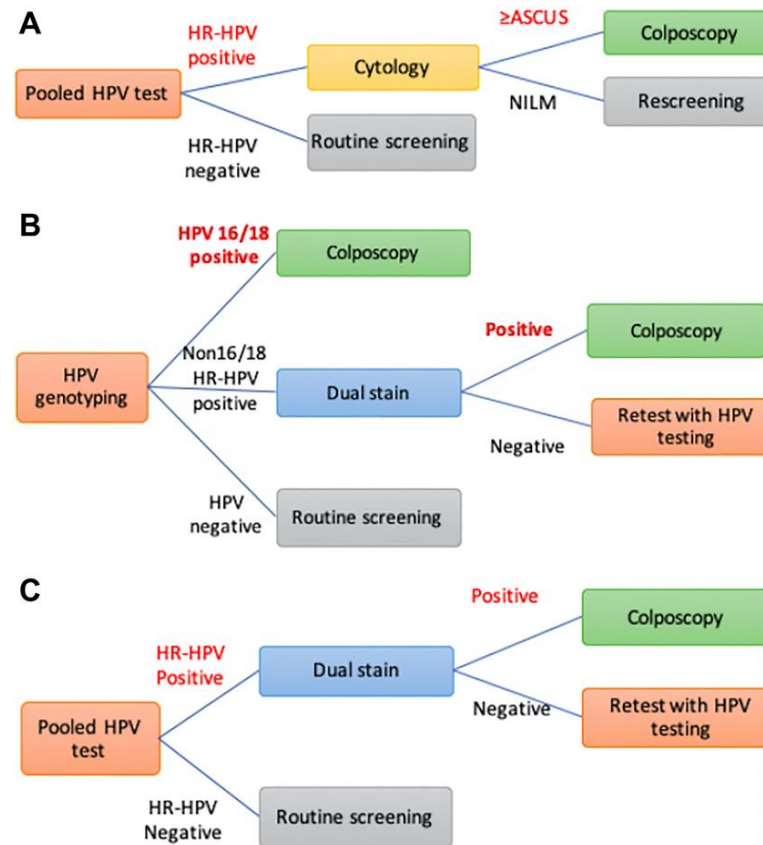


Li, Ying & Fu, Yunfeng & Cheng, Bei & Xie, Xing & Wang, Xinyu. (2022). A Comparative Study on the Accuracy and Efficacy Between Dalton and CINTec PLUS p16/Ki-67 Dual Stain in Triage HPV-Positive Women. *Frontiers in Oncology*.



Cost-Effectiveness of Primary HPV Screening Strategies and Triage With Cytology or Dual Stain for Cervical Cancer

Tantitamit et al 2020



Women's Preventive Services Guidelines

Patient-collected hrHPV testing appropriate method for cervical cancer screening & should be offered as an option for average risk aged 30 to 65 years

Organization Update	Age to Initiate screening	Pap alone, provider collected	hrHPV screening test	Cotesting (Pap & HPV), provider collected for high-risk	Discontinue screening
ACOG & ASCCP 2025	21	21-29 (3 year) 30-65 (3 year)	30-65 (5 year)	30-65 (5 year)	>65, no screening necessary after 2-3 negative tests & no history cancer or abnormal tests
ACS 2025	25	NR	25-65 (3 year)	25-65 (5 year)	>65, no screening necessary after negative prior screen at age 65 or contesting age 60-65
USPSTF 2025	21	21-29 (3 year) 30-65 (3 year)	30-65 (5 year)	30-65 (5 year)	>65, no screening necessary after negative prior screen at age 65 or contesting age 60-65

Average Risk 30–65-year-old: Definitions

Perkins et al, 2024

A person with a cervix who has not undergone a hysterectomy & removal of cervix

Is asymptomatic (ie: no abnormal bleeding or symptoms concerning for cervical cancer (eg pelvic pain) for which a more complete work-up is required

Has a history of normal cervical cancer screen results or

Has a remote history of abnormal results followed by a history of normal results

Able to balance to undergo self-collection & has cognitive or emotional capacity to understand instructions for use



HPV Test Agreement between Self-collected Vaginal & Clinical Collected Cervical Specimens

Cyriac et al JLGTD 2026

79 participants did vaginal swabs immediately before clinician swab

115 participants did home swab, mailed in and then had clinic visit

In-clinic and at home self collected vaginal HPV showed high agreement with clinician collected cervical specimens

Vaginal specimens showed prolonged stability and unaffected by extreme temperature



HPV Vaccination: Important and included in screening guidelines

HPV vaccination prior to age 18 reduces the CIN3+ risk by 50%

HOWEVER: 2015 was the first time that 50% of those age eligible to receive first dose of vaccine

These patients are just reaching their early 20s, a group already conservatively managed

Documentation of vaccine status and age of vaccination is challenging

Vaccination will likely impact age to start screening in the future



Barriers to & Facilitators of HPV Vaccination among People aged 9 to 26 years: A Systematic Review

Zheng et al Sex Transm Dis 2021

Barriers

- Lack of knowledge about HPV
- Lack of Knowledge HPV Vaccine
- Fear about safety & efficacy of HPV vaccine
- Fear about not being able to pay for Vaccine
- Fear of discrimination

Facilitators

- Trust in vaccine efficacy
- Trust in safety of vaccine
- Discounted pricing
- Positive recommendations of others
- Perceived risk of HPV



In Crisis Settings

Key impacts on the prevention pathway

HPV vaccination → Screening → Follow-up / treatment access

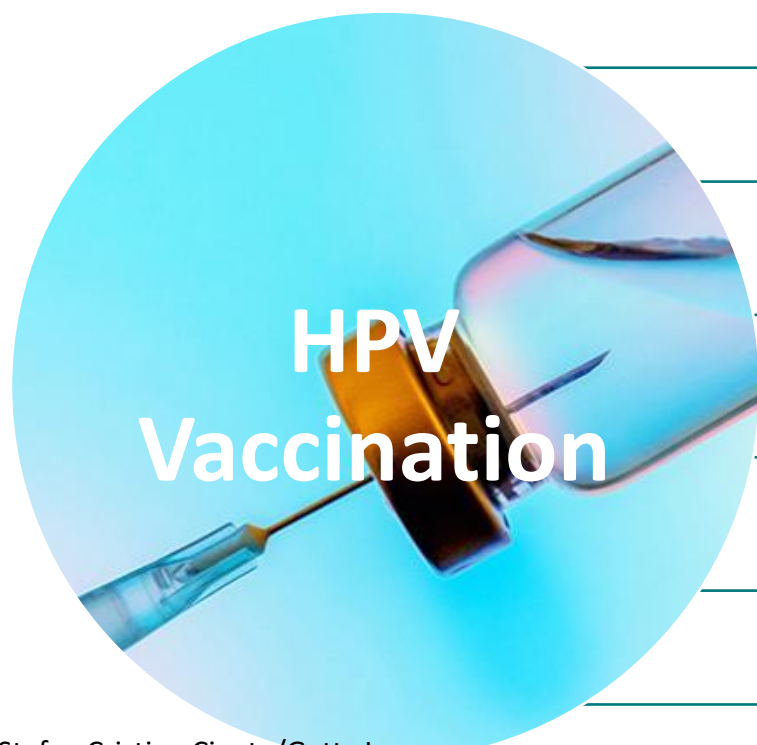


Photo: Stefan Cristian Cioata/Getty Images

 **Lower coverage / missed doses** (disrupted delivery, school-based programs pause)

 **Unequal access** (displacement, insecurity, mistrust, documentation barriers)

 **Interrupted continuity** (loss to follow-up, referral breakdown)

 **Reduced screening uptake** (services paused, reduced clinic capacity)

 **Delayed diagnosis** (fewer routine visits, competing priorities)

 **Delays in evaluation and care** (logistics, transport, system strain)

 **Net effect:** crises shift prevention from “routine + continuous” to “**interrupted + delayed,**” increasing downstream risk.

MOC REFLECTIVE STATEMENT

Cervical cancer can be understood through the Lens of Social Ecology

Prevention is two pronged: vaccination and screening

HPV Self Sampling is an acceptable triage for average risk people

Outreach and education are key interventions for prevention of cervical cancer



REFERENCES

--Clarke MA, Wentzensen N, Perkins RB, et al. Recommendations for use of p16/Ki67 dual stain for management of individuals testing positive for human papillomavirus. *J Low Genit Tract Dis*. 2024; 28(2): 124-130.

--Cyriac et al. Human Papillomavirus Test Agreement Between Self-Collected Vaginal and Clinician-Collected Cervical Specimens. *Journal of Lower Genital Tract Disease* 30(3):p 161-168, July 2026.

--Division of Cancer Prevention, National Cancer Institute. SHIP Trial—About the Study. National Cancer Institute; 2025. <https://prevention.cancer.gov/research-areas/networks-consortia-programs/last-mile/ship-trial>

--Lei J, Ploner A, Elfström KM, et al. HPV vaccination and the risk of invasive cervical cancer. *N Engl J Med*. 2020; 383(14): 1340-1348.

--Perkins RB, Feldman S. Why Are US Cervical Cancer Screening Exit Criteria Failing? *JAMA Netw Open*. 2025;8(3):e250488. doi:10.1001/jamanetworkopen.2025.0488

--Perkins RB, Wolf AMD, Church TR, et al. Self-collected vaginal specimens for human papillomavirus testing and guidance on screening exit: An update to the American Cancer Society cervical cancer screening guideline. *CA Cancer J Clin*. 2026;e70041.



Thank You!



MASSACHUSETTS
GENERAL HOSPITAL

GLOBAL INITIATIVE TO END
GENDER-BASED VIOLENCE



Photo: Ak Goodman After Nepal Earthquake 2015

