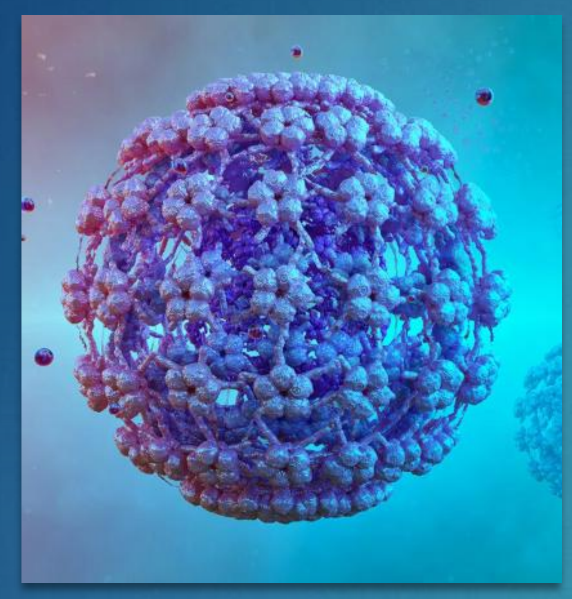


Human Papilloma Virus

What is HPV

- Human Papillomavirus (HPV) is a group of highly prevalent viruses that typically infect the reproductive tract.
- It is common for most adults to contract HPV at some stage in their lives, with some experiencing multiple infections. The majority of HPV infections clear spontaneously within a few months, and approximately 90% resolve within two years.*
- Individuals of reproductive age are most susceptible to HPV infections. While many HPV strains are benign, several high-risk types can lead to cancers such as cervical, vulvar, vaginal, or anal cancer.**
- **References:**

- World Health Organization. Human papillomavirus (HPV) and cancer. 2020. Available at: https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer *Accessed: February 14, 2024.*
- ** Centers for Disease Control and Prevention (CDC). Genital HPV Infection – Basic Fact Sheet. 2022. Available at: https://www.cdc.gov/sti/about/about-genital-hpv-infection.html *Accessed: February 14, 2024.*

WHO Director-General calls for all countries to take action to help end the suffering caused by cervical cancer

Woman being screened for cervical cancer in a rural clinic, Kenya
Jonathan Torgovnik

19th May 2018: Cervical cancer is one of the most preventable and treatable forms of cancer as long as it is prevented with HPV vaccination, detected early, and managed effectively. Prevention and early treatment are highly cost-effective. Worldwide however, cervical cancer remains one of the gravest threats to women's lives, and globally, one woman dies of cervical cancer every two minutes. This suffering is unacceptable, and cannot continue. In recognition of this, WHO Director-General, Dr Tedros Adhanom Ghebreyesus today made a global call for action towards the elimination of cervical cancer.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General

Call to action by Dr Tedros, Director General of the World Health Organization for

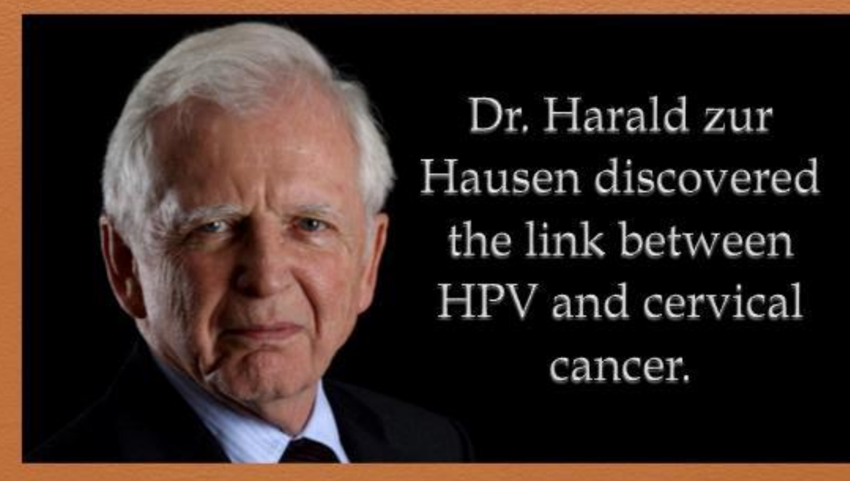
"coordinated action globally to eliminate cervical cancer by making sure that all women and girls, in particular those in low-income countries, have equal access to life- saving prevention technologies and services".

(https://www.who.int/reproductivehealth/DG_Call-to-Action.pdf

Human Papillomavirus (HPV) and Cancer

- Globally, one woman dies of cervical cancer every two minutes, which is unacceptable.
- Cervical cancer is largely preventable and treatable, when detected early.
- Nearly 90% of deaths from cervical cancer each year are of women living in low- and middle- income countries
  - Most of these women will not have had access to the key cervical cancer services which could have saved their lives, nor the palliative care to help them manage their symptoms with dignity and respect.
- Women living with HIV are at 4-5 times higher risk of cervical cancer.

- https://www.figo.org/Declaration-Cervical-Cancer2018



1983 he identified HPV 16 and HPV 18

In 1976, he published the hypothesis that human papillomavirus plays an important role in the cause of cervical cancer.

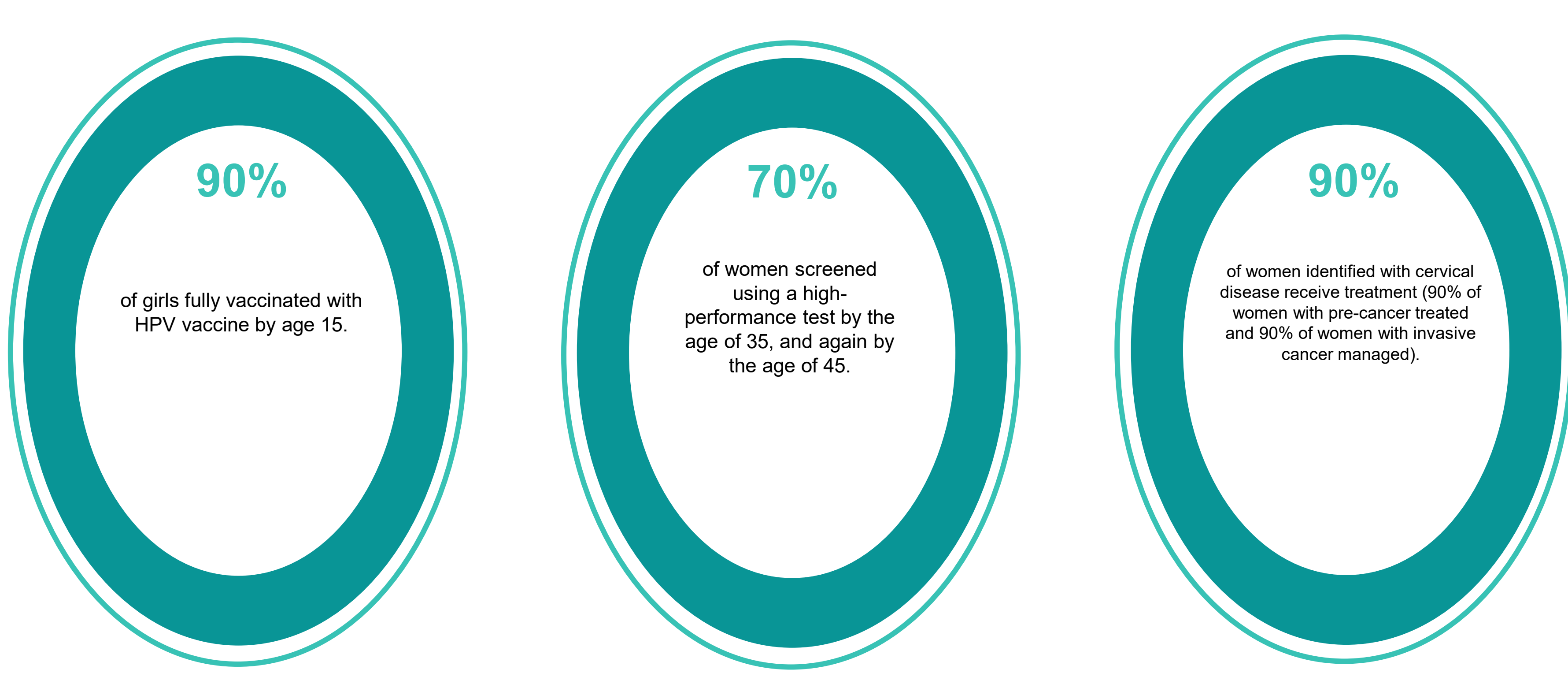
Success story of medicine

Nobel Price for Medicine 2008
to Harald zur Hausen...

...for the proof that cervical cancer is induced by Human Papillomaviruses (HPV)

Global Strategy to Eliminate Cervical Cancer

WHO launched a strategy in 2020: 90–70–90 targets for 2030



Estimates of Global Burden of HPV Associated Cancer

(Garland et al. (2016) Clinical Infectious Diseases)

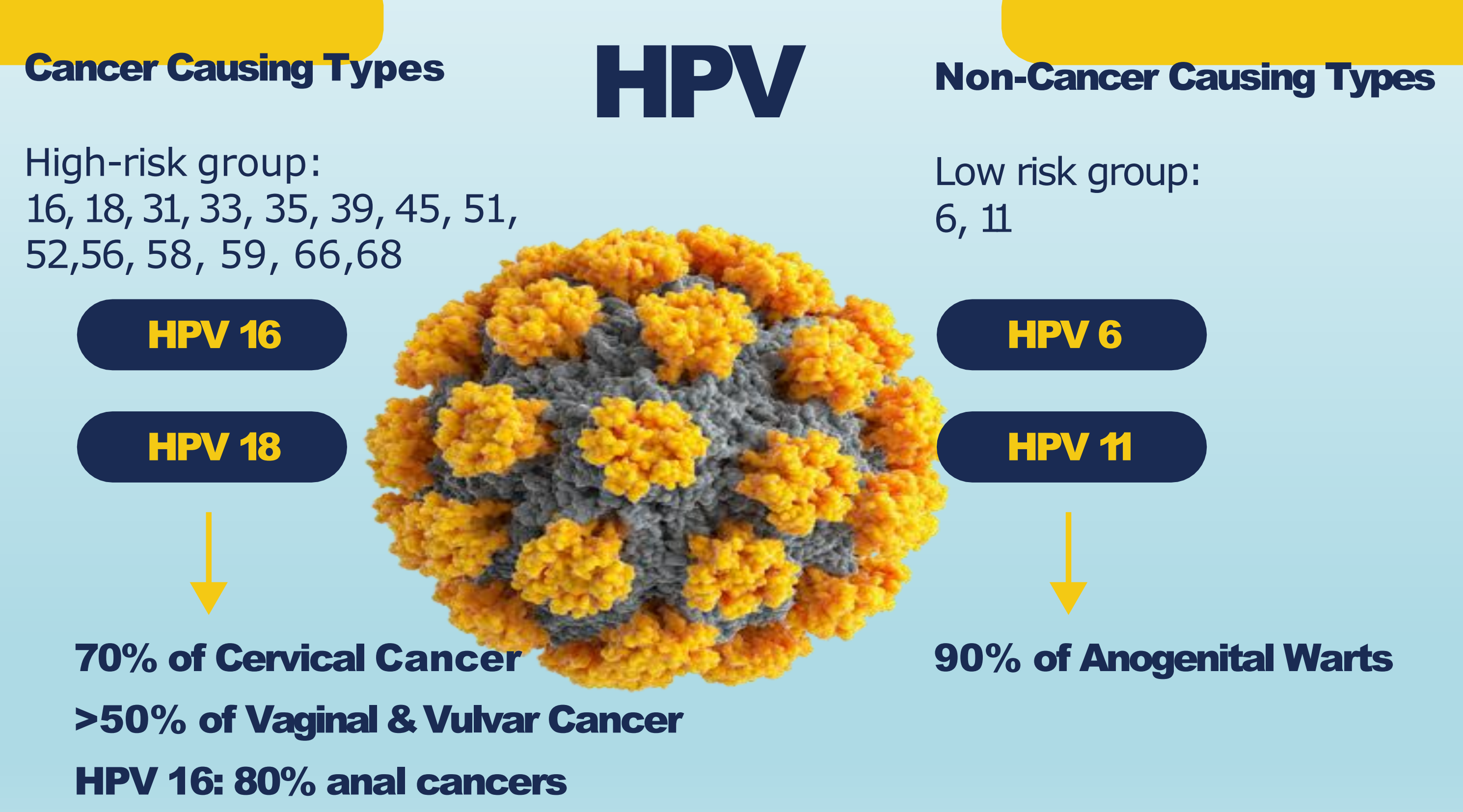
- 100% cervical cancers
- 90% anal cancers
- 40% of cancers of the vulva
- 70% of cancers of the vagina
- 50% of cancers of the penis
- 13-72% of oropharyngeal cancers

HPV Subtypes

HPV

Cancer Causing Types

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



HPV 16

HPV 18

70% of Cervical Cancer

>50% of Vaginal & Vulvar Cancer

HPV 16: 80% anal cancers

Non-Cancer Causing Types

Low risk group:
6, 11

HPV 6

HPV 11

90% of Anogenital Warts

PLWH are at increased risk of various HPV-related cancers

Anal cancer 40X
Vulvovaginal ca 8x
Penile ca 4x
Cervix cancer 6 x

Other cancers
PLWH are at increased risk of vulvar, vaginal, and head & neck cancers as well as genital warts

AGW ranges from 5.7% - 8.5% up to 19.1% in PLWH.

The estimated economic burden of AGW in

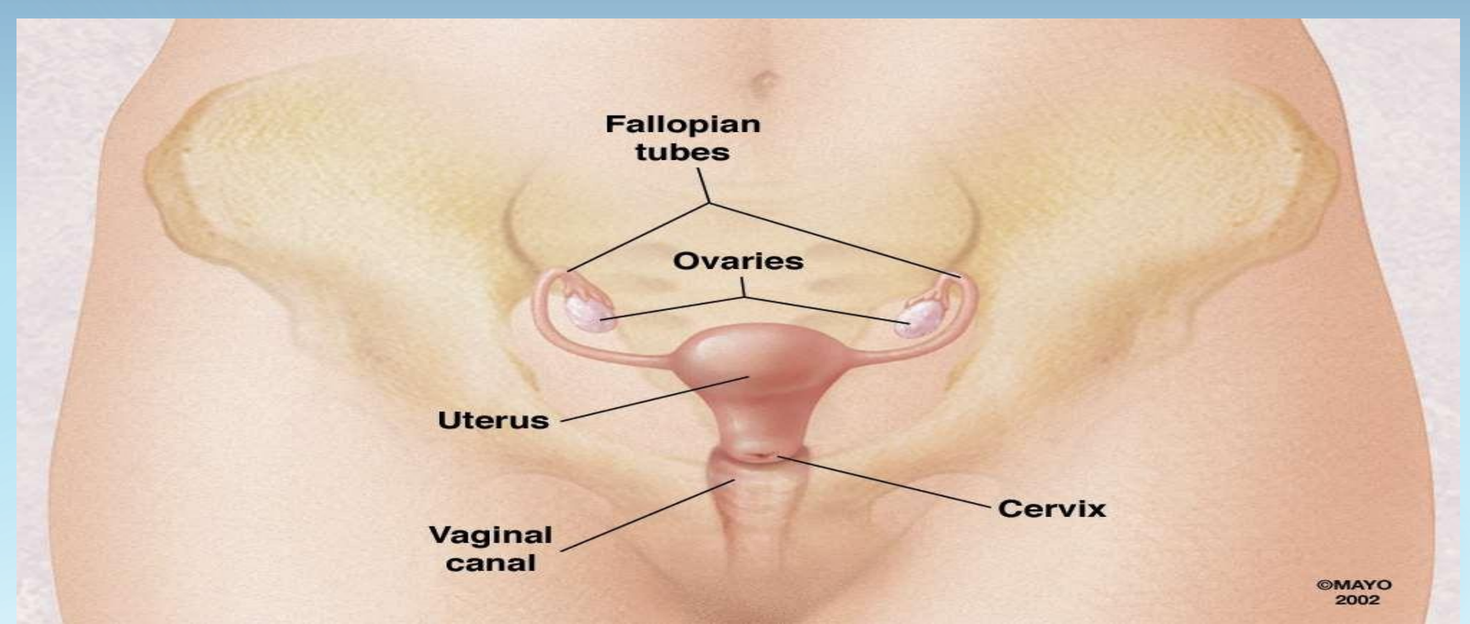
- **public sector** ranged from 228.8 bln ZAR to 346.2 bln ZAR ,
- **private market** - from 27.7 bln ZAR to 47.7 bln ZAR*.

Prevention and control of HPV-related cancers in people LIving with HIV Anneli Uusküla, Anna Tisler, Jack DeHovitz, Gad Murenzi, Philip E Castle*, Gary Clifford*
Lancet Vol 12 2025
Liu G, Sharma M, Tan N, Barnabas R**. HIV-positive women have higher risk of HPV infection, precancerous lesions, and cervical cancer**. AIDS 2018; 32: 795–808.
Stelzle D, Tanaka LF, Lee KK, et al. Estimates of the global burden of cervical cancer associated with HIV. Lancet Glob Health 2021;
9: e161–69.
Clifford GM, Georges D, Shiels MS, et al. **A meta-analysis of anal cancer incidence by risk group: toward a unified anal cancer** riskscale. Int J Cancer 2021; 148: 38–47.

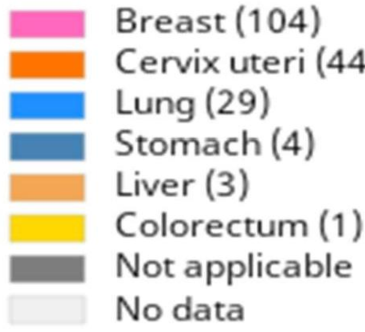
SPECIFIC TYPES OF 'HIGH-RISK' HPV ARE CAUSALLY INVOLVED IN CANCER OF THE CERVIX

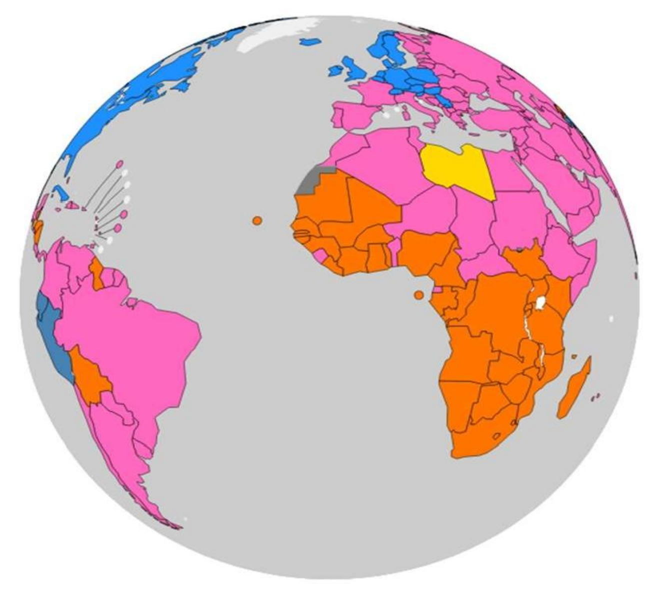
HIGHEST WORLDWIDE ATTRIBUTABLE FRACTION SO FAR REPORTED FOR A SPECIFIC CAUSE OF ANY MAJOR HUMAN CANCER

Not all women with HPV will get Ca Cervix but almost all cervical cancers have detectable "high-risk" HPV DNA



Top cancer per country, estimated age-standardized mortality rates (World) in 2018, females, all ages





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Data source: GLOBOCAN 2018
Graph production: IARC
(http://gco.iarc.fr/today)
World Health Organization

© International Age
Research on Canc

Breast
Cervix uteri
Colorectum
Liver
Ovary
Non-Hodgkin lymphoma
Stomach
Corpus uteri
Oesophagus
Thyroid

0 4.0 8.0 12 16 20 24 28 32 36

ASR (World) per 100 000

Incidence
Mortality

Data source: Globocan 2018
Graph production: Global Cancer Observatory (http://gco.iarc.fr)

International Agency for Research on Cancer
World Health Organization

Natural History of HPV Infection

Within 1 Year

1-5 Years

Up to Decades

Initial HPV Infection → Persistent Infection → CIN 2/3 → Cervical Cancer

Initial HPV Infection → Cervical Intraepithelial Neoplasia (CIN) 1

Cervical Intraepithelial Neoplasia (CIN) 1 → Persistent Infection

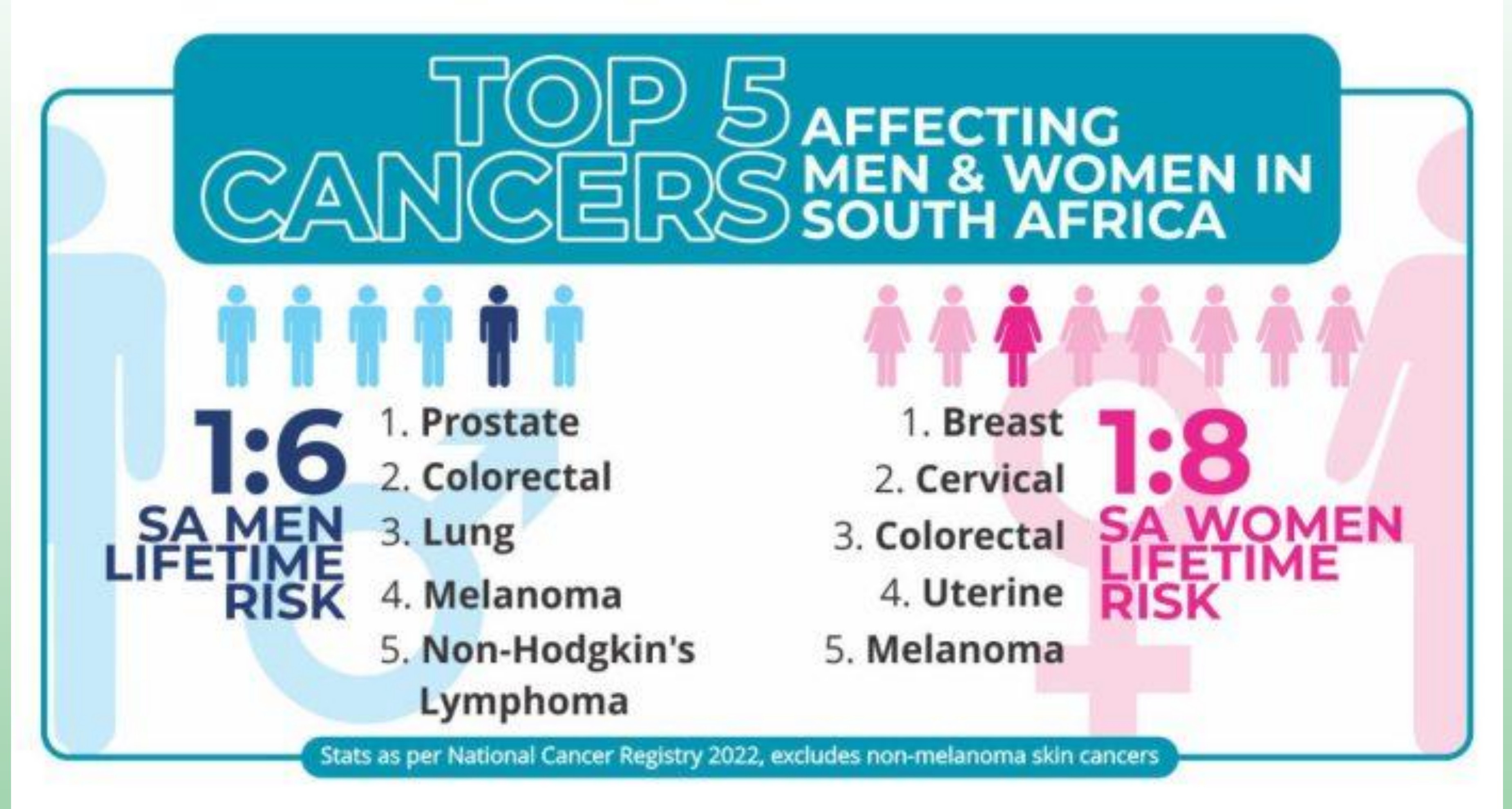
Cervical Intraepithelial Neoplasia (CIN) 1 → Cleared HPV Infection

CIN 2/3 → Cleared HPV Infection

Cleared HPV Infection

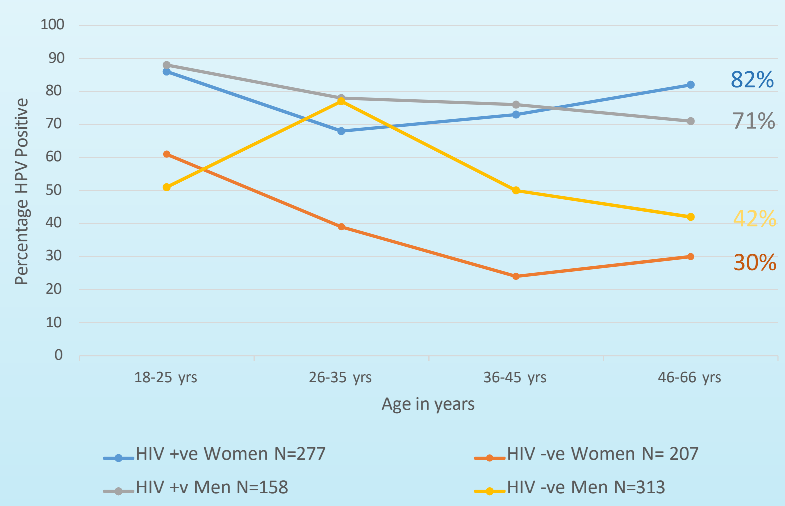
Because pre-cancerous lesions take many years to develop, screening is recommended for every woman from aged 30 to 49 at least once in a lifetime and ideally more frequently.

www.cdc.gov/vaccines/ed/adultimupdate/downloads/adultim10-hpv.ppt

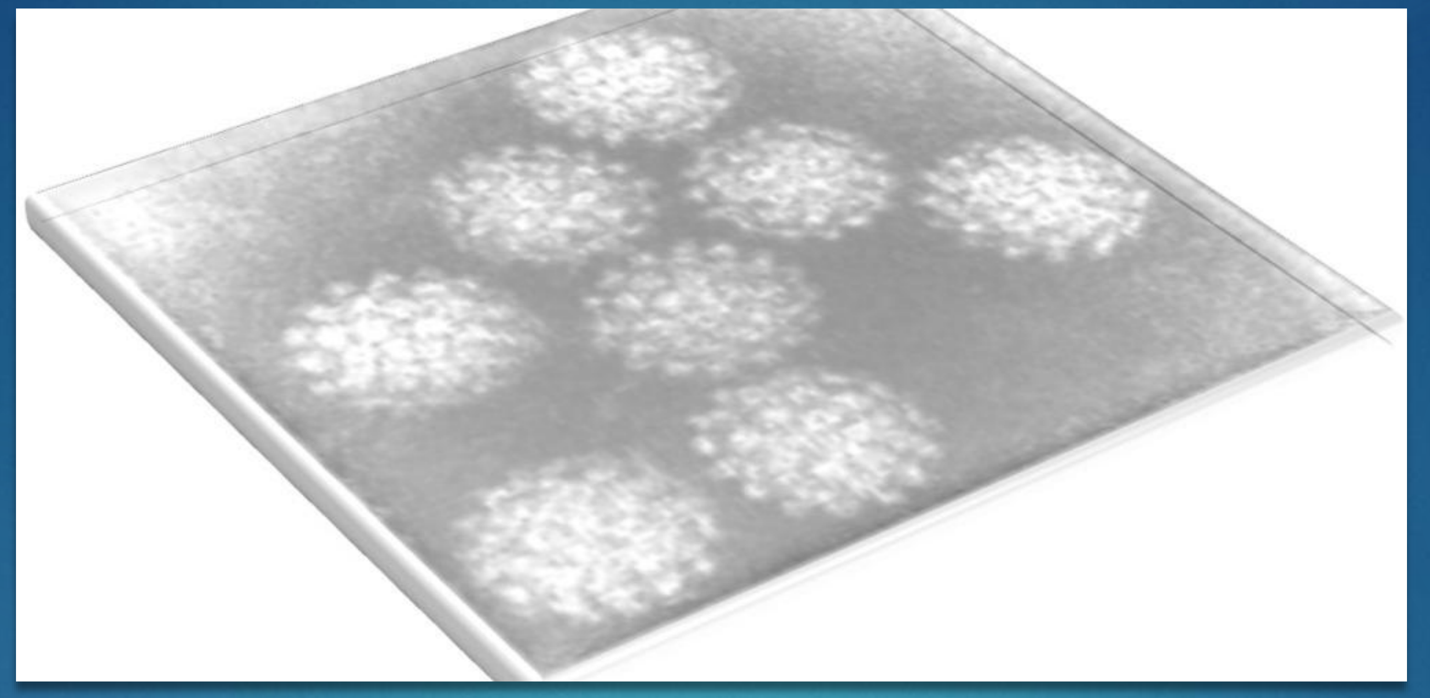


HTTPS://CANSA.ORG.ZA>SOUTH AFRICAN CANCER STATISTICS

Prevalence of HPV Among Men and Women in Cape Town by Age and HIV Status



Mbulawa, Coetzee, Williamson (2015) BMC Infectious Diseases



CERVICAL CANCER SCREENING

CERVICAL CANCER SCREENING OPTIONS

Platform	Technology	Application	Resources	
Cytology	Cytology/Automation	Screening and Triage	High/Middle	
	P16/Ki67 dual stain / Automation	Triage	High/Middle	
Molecular	HPV testing and Genotyping	Screening and Triage	All settings	
	Methylation	Triage	All settings	Not yet routine
Visual	Colposcopy	Triage	High/Middle	
	VIA/Automation	Screening and Triage	Low Resource	

MODIFIED FROM NICOLAS WENTZENSEN - IPVS PLENARY SESSION 2

South African Cervical Screening

Screening Recommendations

Women aged 30-65 are advised to undergo cervical cancer screening every 10 years with HPV testing for prevention.

Integration with HIV Care

Screening is integrated with HIV care, offering more frequent tests for women living with HIV to catch issues early.

Importance of Early Detection

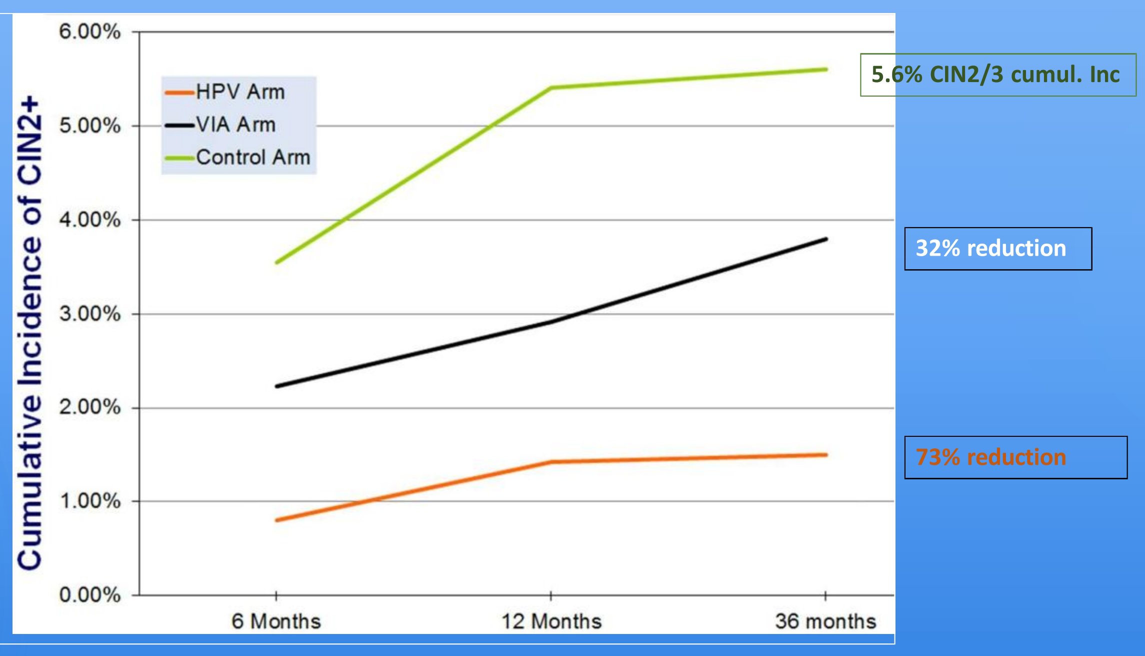
Early detection through regular screening significantly improves outcomes and survival rates for cervical cancer patients.

HPV Vaccination Encouraged

HPV vaccination is recommended as a key preventive measure to reduce the risk of developing cervical cancer.

Human Papillomavirus–Based Cervical Cancer Prevention: Long-term Results of a Randomized Screening Trial,

Screen (VIA or HPV) and Treat in South Africa



5.6% CIN2/3 cumul. Inc

32% reduction

73% reduction

Denny, Kuhn, Hu, Tsai, and Wright, Journal of the National Cancer Institute (JNCI), 2010

Australia

- Australia has had a comprehensive cervical screening program since 1991 – resulted in halving cervical cancer rates by 2010.
- In 2017 Australia transitioned to 5 year screening interval with validated HPV assays which is expected to reduce cervical cancer by a further 20%

K Canfell, M Hall, K Simms, M Smith, M Saville (2018). Australia on-track to be the first country to achieve cervical cancer elimination.

PROJECTED LONG TERM IMPACT OF SWITCHING TO PRIMARY HPV ON HEALTH OUTCOMES, COSTS AND HEALTH RESOURCES UTILZATION

	CYTOLOGY SCREENING		HPV: FINAL GUIDELINES*	
	If HPV vaccination had not been introduced	Cohort offered vaccination at age 12 year	If HPV vaccination had not been introduced (reduction compared to cytology screening program)	Cohort offered vaccination at 12 years (reduction compared to cytology screening program)
Cervical cancer incidence †	6·92	2·87	4·73 (-31%)	2·17 (-24%)
Cervical cancer mortality †	1·80	0·74	1·15 (-36%)	0·53 (-29%)
Cervical cancer cases (n) ‡	850	353	584 (-265;-31%)	267 (-85;-24%)
Cervical cancer deaths (n) ‡	227	94	145 (-82;-36%)	66 (-28;-29%)
Colposcopies (n) ‡	85795	60995	116889 (31094; 36%)	56479 (-4516;-7%)
Treatments (n) ‡	22661	13899	23963 (1302;6%)	13240 (-659;-5%)
Annual cost‡ of screening programme (AUS$)	$223 million	$192 million	$182 million ($41 million; -19%)	$142 million ($50 million; -26%)

†Age-standardised rate (0–84 years), standardised using the 2001 Australian standard population and represented per 100 000 women. ‡Using the female Australian standard population as predicted for 2017.

- Cytology Screening – 2-yearly cytology from 18-20 to 69 years
- HPV: Final guidelines 5-yearly HPV screening 25-74

K Canfell, M Hall, K Simms, M Smith, M Saville (2018). Australia on- track to be the first country to achieve cervical cancer elimination.

The goal of cervical cancer screening is to detect unsuspected cancer or precancerous lesions in asymptomatic women as early as possible, thus increasing the success rate of treatment interventions. A high prevalence of HPV and HIV co-infection is found in South Africa. This combination contributes to a more rapid rate of development of carcinoma of the cervix in HIV infected women.

Although both HPV PCR and cytology are suitable for cervical cancer screening, the current South African recommendations, as well as the WHO guidelines, recommend using HPV PCR as the primary screening method.[1,2] Screening for cervical cancer is required for women regardless of their HPV vaccination status.

ADVANTAGES OF HPV PCR SCREENING COMPARED TO CYTOLOGY SCREENING

- HPV PCR testing is more sensitive in detecting pre-cancerous and cancerous lesions compared to cytology (94.6% vs 55.4% for cytology).
- HPV PCR testing has a better negative predictive value compared to cytology, which allows for safely lengthening the screening interval.
- The primary screening recommendations using HPV DNA PCR are summarised in Table 1.

TABLE 1: PRIMARY SCREENING RECOMMENDATION USING HPV PCR

	General female population	HIV-positive patients
Age at initiation of screening	25-30 years of age	25 years of age
Frequency of screening	Every 5-10 years	Every 3-5 years
Negative HPV DNA screen	Continue with regular screening	
Positive HPV DNA screen	Can follow a screen-and-treat approach or a screen triage and treat approach	Follow a screen, triage and treat approach
Method of triage used	Partial genotyping, colposcopy, VIA or cytology can be used to triage women following positive HPV DNA testing	
Exit from screening	Age of 50 years after 3 consecutive negative HPV PCR tests or at 60 years if any abnormal result (SA guidelines)	

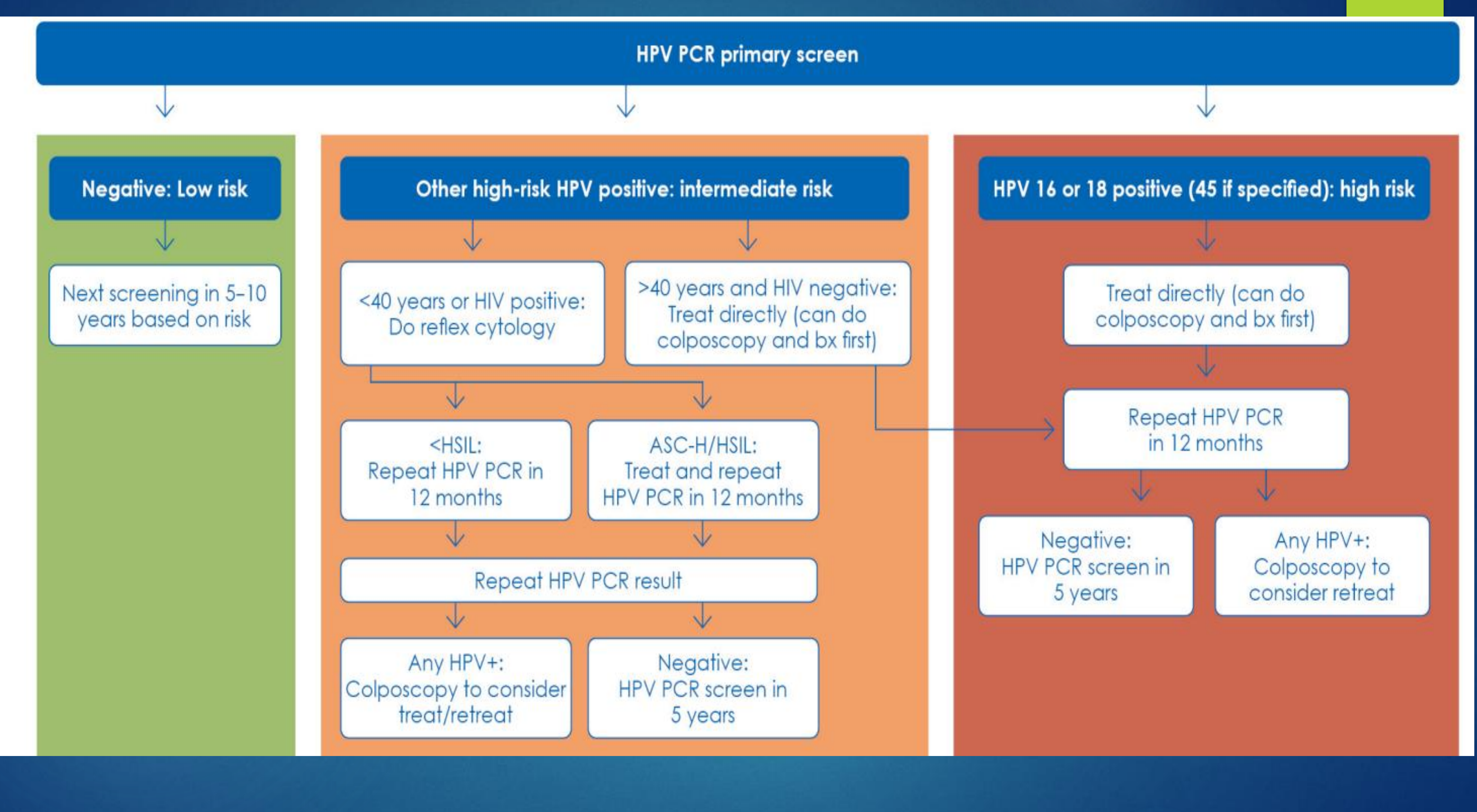
Entity	Initiation of screening	Exit from screening
WHO	Age 30, then every 5-10 years HIV positive: Age 25, then every 3 years *(Preference HPV test)*	Minimum of 2 lifetime screens
SA DoH	**Low risk:** (30-50 years. 1st screen Age 30, then at 10-year intervals. (3 tests in her lifetime). If abnormalities are found, screen at 3-year intervals until negative results are obtained. **High risk:** start at 25 years, 3-yearly intervals, end at 60 (*Applies to cytology and HPV test)*	Generally age 50
South African Society of Gynaecologists (SASOG)	**Low risk**: Age 30- HPV test with or without cytology. **High Risk**: 25 yrs- HPV test preferred **For women less than 25,** if there is an indication: cytology is preferred.	Generally age 60 after a normal test. ▪ 3 negative screening tests, screening can be stopped at 50 years of age. ▪ Any previous abnormal results, screening can be stopped at 60 years of age after a normal test.

INTERPRETATION OF HPV PCR SCREENING TEST RESULTS

Patients can be classified into 3 different risk categories based on the results of initial HPV DNA PCR screening:

1. **Low risk**
   - HPV PCR negative
2. **Intermediate risk**
   - Positive for other high risk HPV types
3. **High risk**
   - Positive for HPV type 16, 18 or 45 (if specified in the partial genotyping assay)

The further management of the different risk groups are summarised in Figure1.



HPV PCR primary screen
Negative: Low risk
Next screening in 5–10 years based on risk
Other high-risk HPV positive: intermediate risk
<40 years or HIV positive: Do reflex cytology
>40 years and HIV negative: Treat directly (can do colposcopy and bx first)
<HSIL: Repeat HPV PCR in 12 months
ASC-H/HSIL: Treat and repeat HPV PCR in 12 months
Repeat HPV PCR result
Any HPV+: Colposcopy to consider treat/retreat
Negative: HPV PCR screen in 5 years
HPV 16 or 18 positive (45 if specified): high risk
Treat directly (can do colposcopy and bx first)
Repeat HPV PCR in 12 months
Negative: HPV PCR screen in 5 years
Any HPV+: Colposcopy to consider retreat

FIGURE 1: APPROACH TO THE MANAGEMENT OF HPV PCR PRIMARY SCREENING RESULTS

Healthcare professionals may refer patients for HPV PCR self-collection or alternatively collect the swabs in their rooms. Request HPV PCR and provide the patient with the flocculated swab and instruction leaflet if self-collection is preferred by the patient. HPV PCR can also be performed on liquid based cytology specimens in conjunction with cytology as co-testing or as reflex if indicated based on HPV PCR result.

Pap Smear Tests during Pregnancy

- A Pap smear test should form a routine part of pre-natal care.
- It poses no risk to the foetus.
- It is recommended that every woman if they have not had cervical screening within the past two years.
- Pap smear tests can generally be undertaken ideally before 24 weeks gestation.
- There may be some spotting and minor bleeding after Pap smear.

Pap smear done: How About Colposcopy?

- Physiological oedema, cyanosis makes it difficult to grade lesion
- Cervix is friable and biopsy or LLETZ can present a challenge with haemostasis
- Decidualisation of stroma gives appearance of Dense Acetowhite area
- Spidey superficial vessels makes it difficult to interpret vessels assessment.
- Diagnosis of Intra-epithelial lesions can be a challenge with both Underdiagnosis and Overdiagnosis (REIDS and SWEDE Colposcopy Index Scores)

HGSIL Lesions Management

- With or without biopsy, may be followed with repeat Colposcopy in intervals not less than 12 weeks.
- Physicians discretion is needed
- There are no data in support of the value of repeat assessment
- American Society for Colposcopy Cervical Pathology advocates for deferring repeat colposcopy until after 6 weeks post-partum (no evidence in support of this).
- Conisation and LLETZ increase the risk. Only for cases where risk for invasive cancer is high.
- Comorbidities: Haemorrhage, Infection, Pregnancy loss

What Does SASOG Advise ?

Situation	Action
Original treatment was for cGIN	Attend
Original treatment was for CIN 2 or CIN 3 but doctor not sure all abnormal areas were treated	
Ist follow-up, original treatment was for CIN I	Wait until after your baby is born
Ist follow-up, original treatment was for CIN 2 or CIN 3 and doctor sure all abnormal areas were treated	
2nd or later follow-up, you have not missed any appointments and smear tests are up to date and normal	
Not sure	Contact clinic

Conclusion

- Cervical Cytology should be part of Prenatal Screening Clinics
- Management of abnormal Pap Smear should be as per non pregnant patients
- LGSIL, ASCUS, HPV cytology findings can be deferred until after delivery
- Women over 20 years who infrequent screening should still be referred to colposcopy
- Atypical glandular cells findings should be referred to colposcopy
- Endocervical and Endometrial curetting is contraindicated
- Biopsy should be considered if HGSIL or worse is made.
- Note the thorough documentation of Pregnancy state on the form for ease of interpretation.

HPV SCREENING AT JDJ DIAGNOSTICS

- **JDJ Diagnostics,** offers primary HPV screening triage options
- We do HPV PCR as a screening test, **and if Positive**, we go ahead and do a Cytological examination
- The Assay we use is the **SEEGENE Anyplex assay**, where we can report on the specific genotype at no extra cost
- **Analytical Sensitivity (Limit of Detection):** The Seegene assays have a manufacturer-defined lower limit of detection of **50 copies/reaction**. This low threshold allows for the precise detection of minimal viral loads.
- The **Anyplex II HPV HR Detection** assay shows a clinical sensitivity of **98.3%** for identifying CIN2+ lesions.

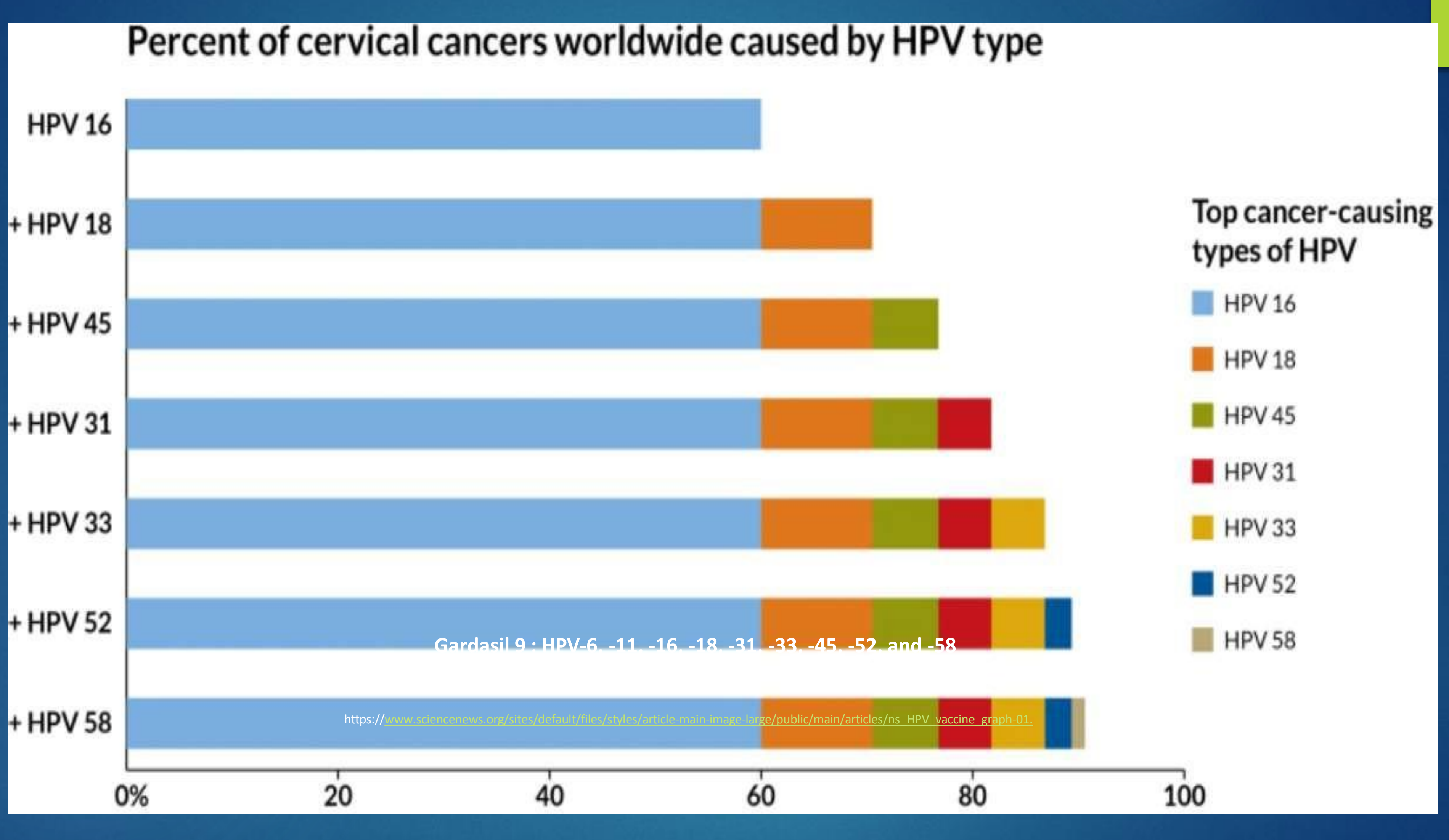
- **Genotypic Sensitivity:** At the individual variant level, Seegene's genotyping sensitivity reaches **93.4%** when cross-referenced with standard linear arrays. The assays achieve a **100% proficiency score** in World Health Organization (WHO) HPV LabNet studies for accurately typing individual isolates.
- **The best sample type for human papillomavirus (HPV) PCR testing is a clinician-collected cervical specimen.** Because high-risk HPV types have a strict biological preference for the transformation zone of the cervix, collecting cells directly from this area yields the highest viral load and the most accurate clinical diagnostic sensitivity
- Self Collection kits are also a encouraged Large global studies and organizations like the World Health Organisation (WHO) confirm that when using highly sensitive PCR assays (like Seegene, Roche cobas, or BD Onclarity), **self-collected vaginal swabs are clinically non-inferior** to clinician collections. It removes the physical discomfort of a speculum exam, significantly increasing screening participation rates

- The limitation is however, should the patient present with a HPV PCR positive result, further cytological testing cannot be done.
- For all medical aid patients, we charge for HPV Screening at the scheme rate, so there is minimal impact to patient savings and funds
- Our Primary Health Care Solution that is offered by our sister company PM Consulting allows us to empower practices to test for HPV by making use of patients risk benefits

HPV Vaccines

	2vHPV (Cervarix, GSK)	4vHPV (Gardasil, Merck)	9vHPV (Gardasil 9, Merck)
Virus types	16, 18	6, 11, 16, 18	6, 11, 16, 18, 31, 33, 45, 52, 59
Adjuvant	Yes	Yes	Yes
Licensure	Females 9–25 yrs	Females 9–26 yrs Males 9–26 yrs	Females 9–26 yrs Males 9–26 yrs
Prevents	Cervical cancer and precancerous lesions	Cervical, vulvar, vaginal, and anal cancer and precancerous lesions, genital warts	Cervical, vulvar, vaginal, and anal cancer and precancerous lesions, genital warts

World Health Organization (WHO) **recommended 2 doses of the HPV vaccine for girls below 15 y on the basis of the immune-bridging studies demonstrating non- inferior immune response of 2 doses in the adolescent girls compared to 3 doses** in the young adult women in whom the efficacy against disease is established



Gardasil 9 : HPV-6, -11, -16, -18, -31, -33, -45, -52, and -58

https://www.sciencenews.org/sites/default/files/styles/article-main-image-large/public/main/articles/ns_HPV_vaccine_graph-01.

Burden of Disease associated with HPV types

	HPV Type	Cervical Cancer	All HPV-Associated Cancers	Anogenital Warts	
Gardasil	6			90%	Gardasil 9
	11				
	16	66%	64%		
	18				
	31	15%	10%		
	33				
	45				
	52				
	58				

Gardasil 9 is approved by FDA for males and females 9 through 26 years of age. Note: Gardasil 9 was originally approved for males through age 15 only, and CDC's recommendations for vaccinating older males were off-label. But on December 14, 2015, FDA approved the vaccine for males through age 26.

Other HPV Cancers

Recommended cancer screening tests are not available yet for these cancers. These cancers may not be detected until they cause health problems.

OVER 90%
of HPV cancers are preventable through HPV vaccination.

Source: https://www.cdc.gov/cancer/hpv/statistics/cases.htm

Last updated AUGUST 2018.

Don't rely on screening to catch it later.
Protect them now with HPV vaccination.
https://www.cdc.gov/hpv/hcp/more-than-screening/index.html

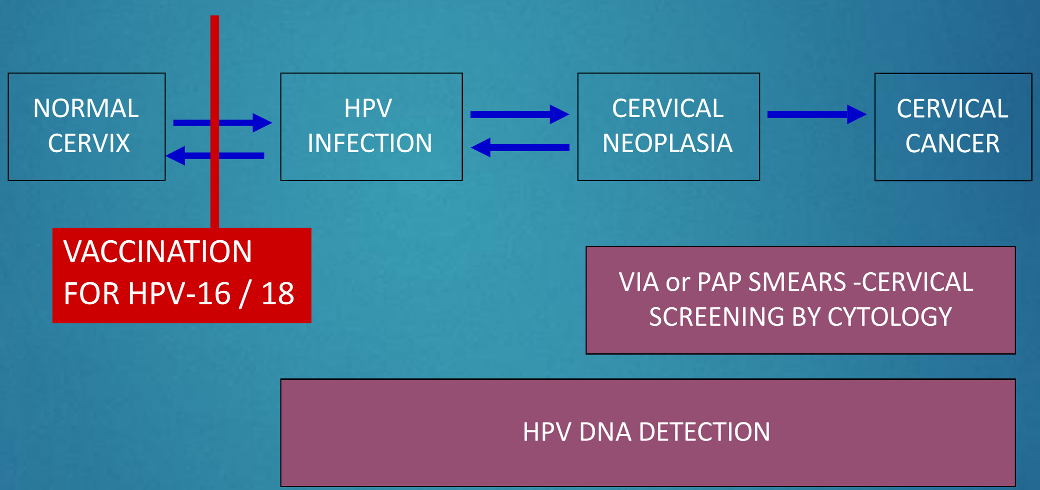
HPV VACCINE
IS CANCER PREVENTION

HPV Vaccination an essential Component of Cervical Cancer Prevention Programmes

- Primary prevention: HPV vaccination targets girls aged 9 to 13 years, aiming to reach them before they become sexually active.
- Secondary prevention: access to technology for women over 30 years of age, such as VIA (visual inspection of the cervix with acetic acid) or HPV testing for screening, followed by treatment of detected precancerous lesions, which may develop into cervical cancer.
- Tertiary prevention: access to cancer treatment and management for women of any age, including surgery, chemotherapy and radiotherapy.

- When curative treatment is no longer an option, access to palliative care is crucial.

- http://www.who.int/mediacentre/news/releases/2014/preventing-cervical-cancer/en/


CERVICAL CANCER PREVENTION STRATEGIES NEED
TO INTEGRATE VACCINATION
AND CERVICAL SCREENING PROGRAMMES
NORMAL CERVIX
HPV INFECTION
CERVICAL NEOPLASIA
CERVICAL CANCER
VACCINATION FOR HPV-16 / 18
VIA or PAP SMEARS -CERVICAL SCREENING BY CYTOLOGY
HPV DNA DETECTION

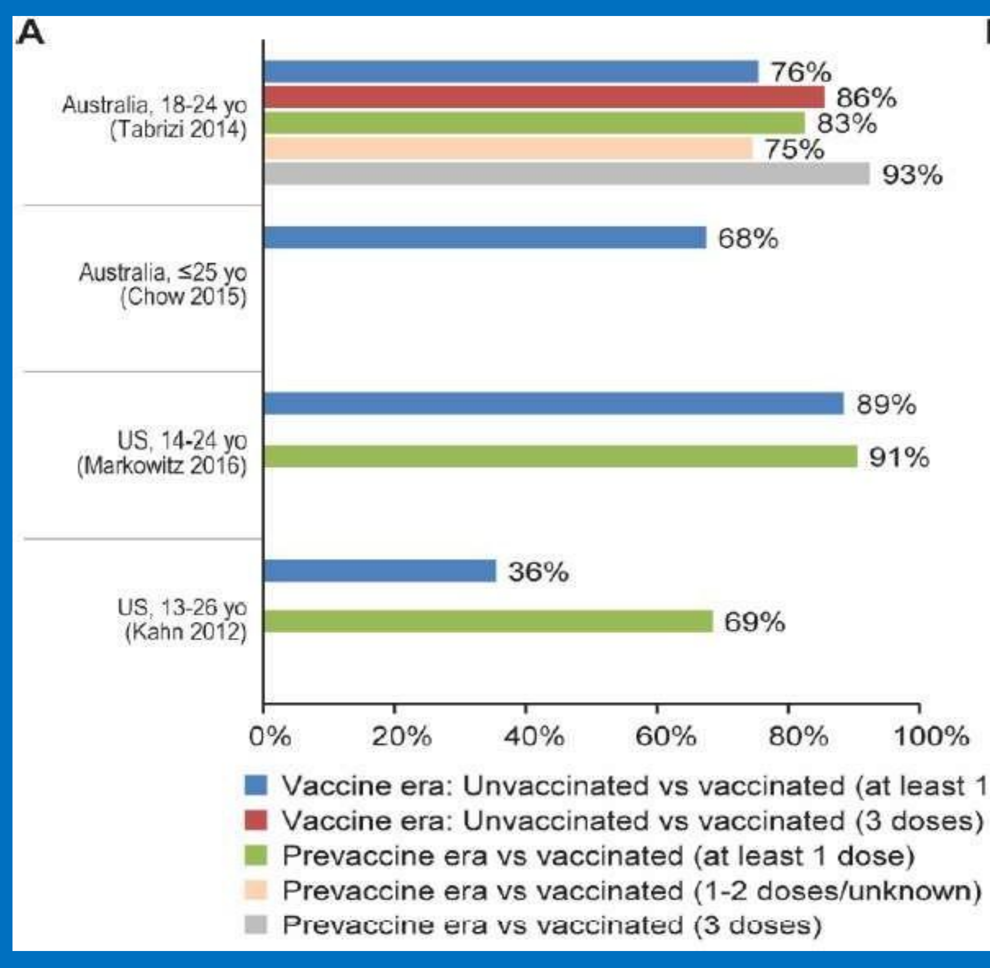
HPV VACCINES

- Vaccines induce high titres of neutralizing antibody which persist for extended times - duration of protection is unknown.
- Neither vaccine is therapeutic.
- All three vaccines are very effective against HPV 16 and 18 and will have a major impact on cervical cancer prevalence. 9 valent vaccine targets another 5 HPV types protecting against over 80% of cancers
- None of the vaccines protect from all cervical cancers and so cervical screening will need to continue on vaccinees as well as the unvaccinated women.

Vaccine options

Vaccine Type	HPV types prevented	Indication	Dosing schedule
Bivalent (2 strains)	Types 16,18	From 9 years	0, 6 months
Quadrivalent (4 strains)	Types 6, 11, 16, 18	Males 9-26 and female 9-45	0,2 & 6 months
Nonavalent (9 strains)	Types 6, 11, 16, 18, 31, 33, 45, 52, 58	Males and female 9 onwards	2 doses- 0 and 6-12 months (9-14) 3 dose- 0.2 & 6 months (15 years+) and (9-14)

Percent reduction of prevalent HPV 16/18 infection in vaccine era compared to pre vaccine era or contemporaneous unvaccinated females



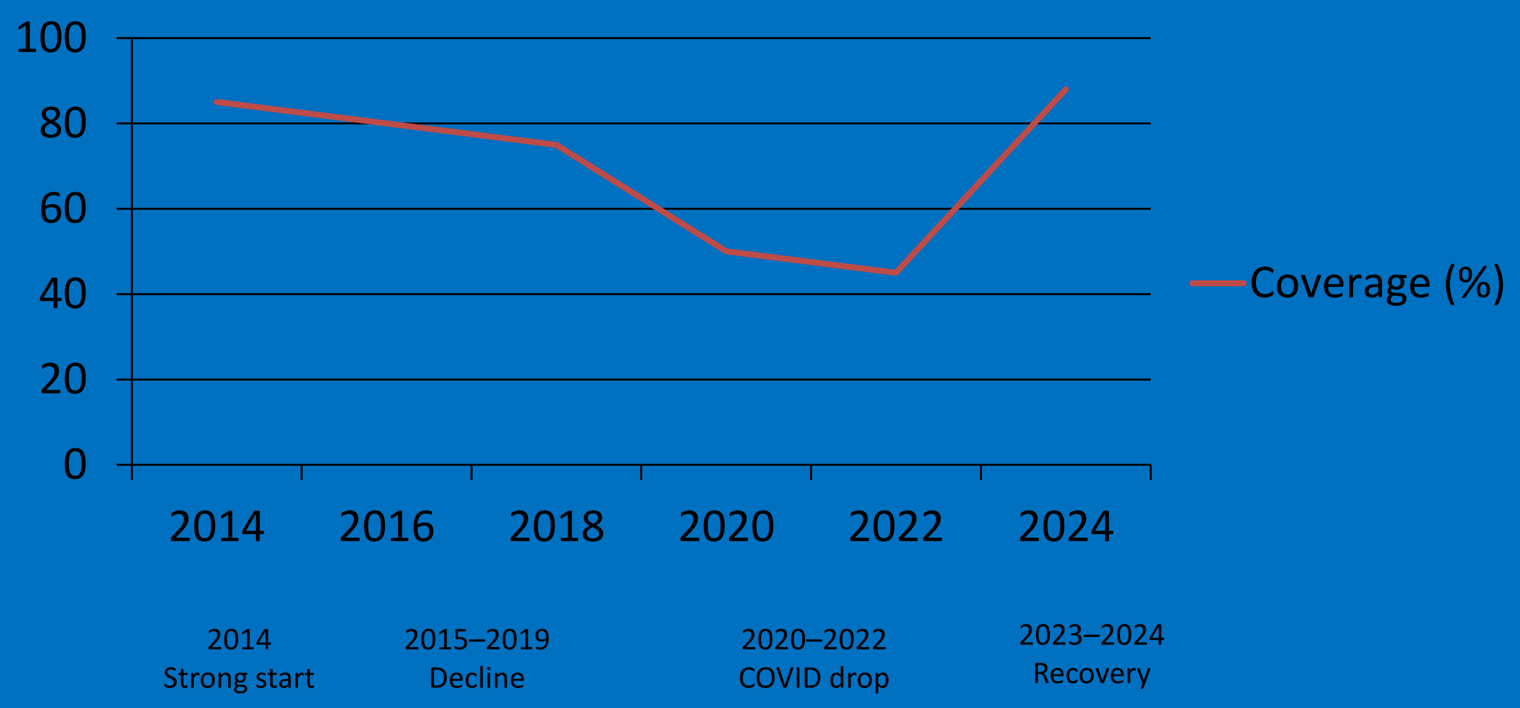
Within 6 years, prevalent HPV 6/11/16/18 infections among Australian women 18-24 years old decreased by 86% after 3 doses and by 76% after ≥1 dose, compared

to contemporaneous unvaccinated women

- In the US, 89% reductions within 6 years in nationally-representative samples of sexually active females aged 14-24 years who received ≥1 dose, in comparison to unvaccinated females in the vaccine era

Australia and the US reported decreased infection prevalence among unvaccinated females in the vaccine era compared to the prevaccine era, evidence potentially reflecting herd protection (17-49%).

HPV Vaccination Coverage Trends in South Africa (2014–2024



Strong initiation, but completion and equity gaps remain.

Target group: girls- in school

Target groups

Traditionally focused on girls in public schools, grade 4 (9-15 years) from 2014; expanded to include:

- Girls in grades 5-7 public & private schools (implemented from 2024)
- Older girls not covered in the previous cycles (catch-up)

- Girls who are not in school
- **Adolescent males**
- Adults 27-45 years old
- Immunocompromised (HIV)
- Women post-treatment of cervical intraepithelial lesions

The private sector closes the prevention gap.

Nine valent HPV vaccination After CIN Treatment

72.4% complete remission

Impact of vaccinating Adult women who are HPV positive or with confirmed Cervical SIL with the 9 valent vaccine – A systematic review Pruski et al Viruses 2025 17(10)1377 Special issue Viral infections in gynecological diseases

You're not opening the door to sex.
You're closing the door to cancer.
HPV vaccine is cancer prevention.
Talk to your child's doctor about vaccinating your 11-12 year old against HPV.
www.cdc.gov/vaccines/teens
CDC

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