



IMMUNISATION  
COALITION

2024 WEBINAR

# HUMAN PAPILLOMAVIRUS UPDATE

WEDNESDAY 13 MARCH | 6pm–7pm AEDT

Presenter: Angela Newbound

Moderator: Andrew Minton, PhD



# Moderator

## Andrew Minton, PhD

The management of the Immunisation Coalition is undertaken by our Chief Executive Officer, Andrew Minton.

Andrew has over 25 years of commercial and medical experience across a number of disease areas. Originally from New Zealand, he has worked in the United Kingdom, Sweden and Germany before settling in Australia in 2005.

His more recent roles have included business development, marketing, medical affairs, and the development of Healthcare Professional-specific CPD programs.

He now looks forward to continuing to develop the Immunisation Coalition as a leader and voice of vaccine-related information and services to healthcare providers, with the goal of improving population health against harmful infectious diseases.



# Presenter

## Angela Newbound

### **Immunisation Education Consultant and an Immunisation Coalition Member**

Angela Newbound is a nurse and is based in South Australia. She is an Immunisation Education Consultant, also a member of the Immunisation Coalition and has been involved in immunisation program delivery in South Australia for over 20 years.

Angela provides clinical advice, support and education to a wide range of immunisation providers and contributes to the development of immunisation resources to assist providers with challenging aspects of the immunisation program.

Angela is passionate about the role that nurses play in vaccinating against infectious diseases and presents regularly at IC events to mixed HCP audiences.



# Learning Objectives

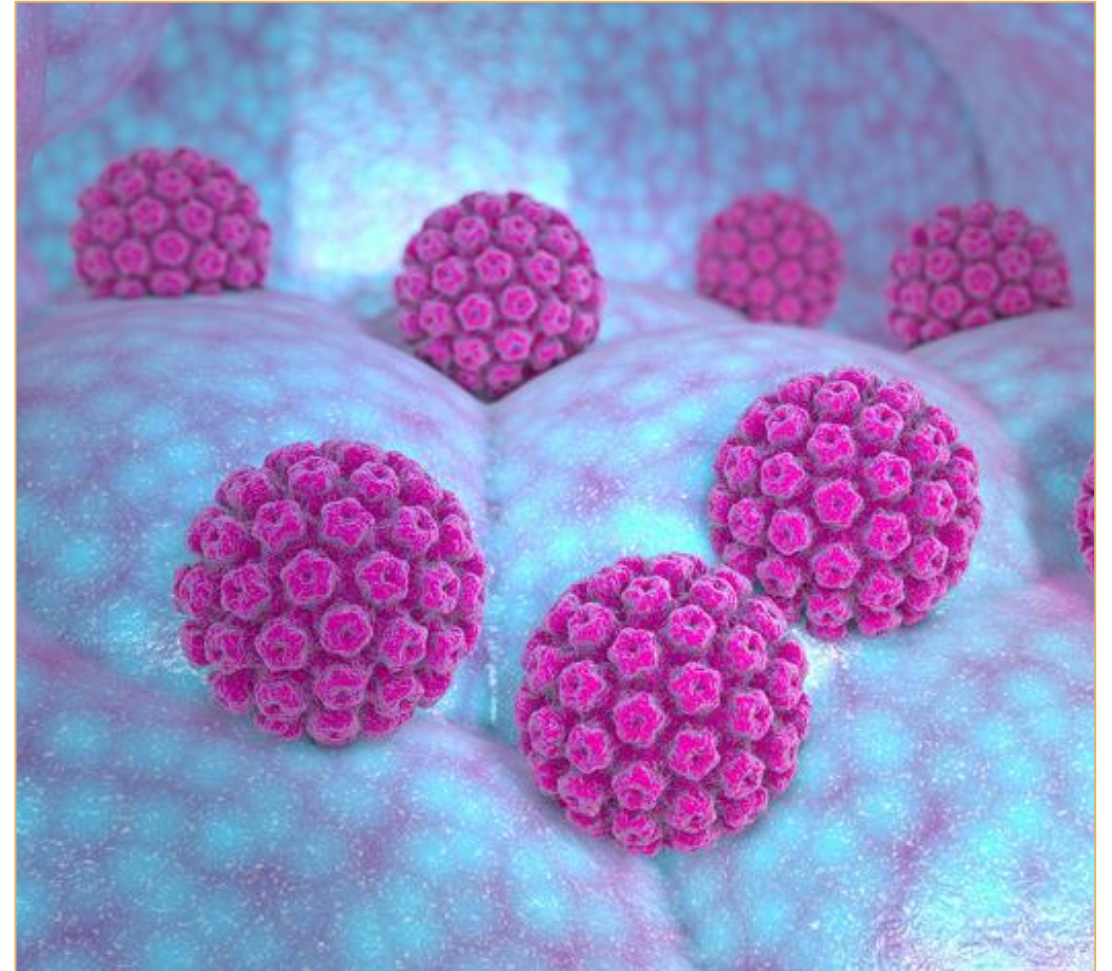
- Demonstrate an understanding of the burden of HPV related cancers
- Outline the benefits of HPV vaccination and identify the people who would benefit most from vaccination
- Demonstrate an understanding of the updated HPV vaccine dosing and the evidence to support the change
- Describe the safety profile of the HPV vaccines and be able to address any myths around HPV vaccination

# Human Papillomavirus

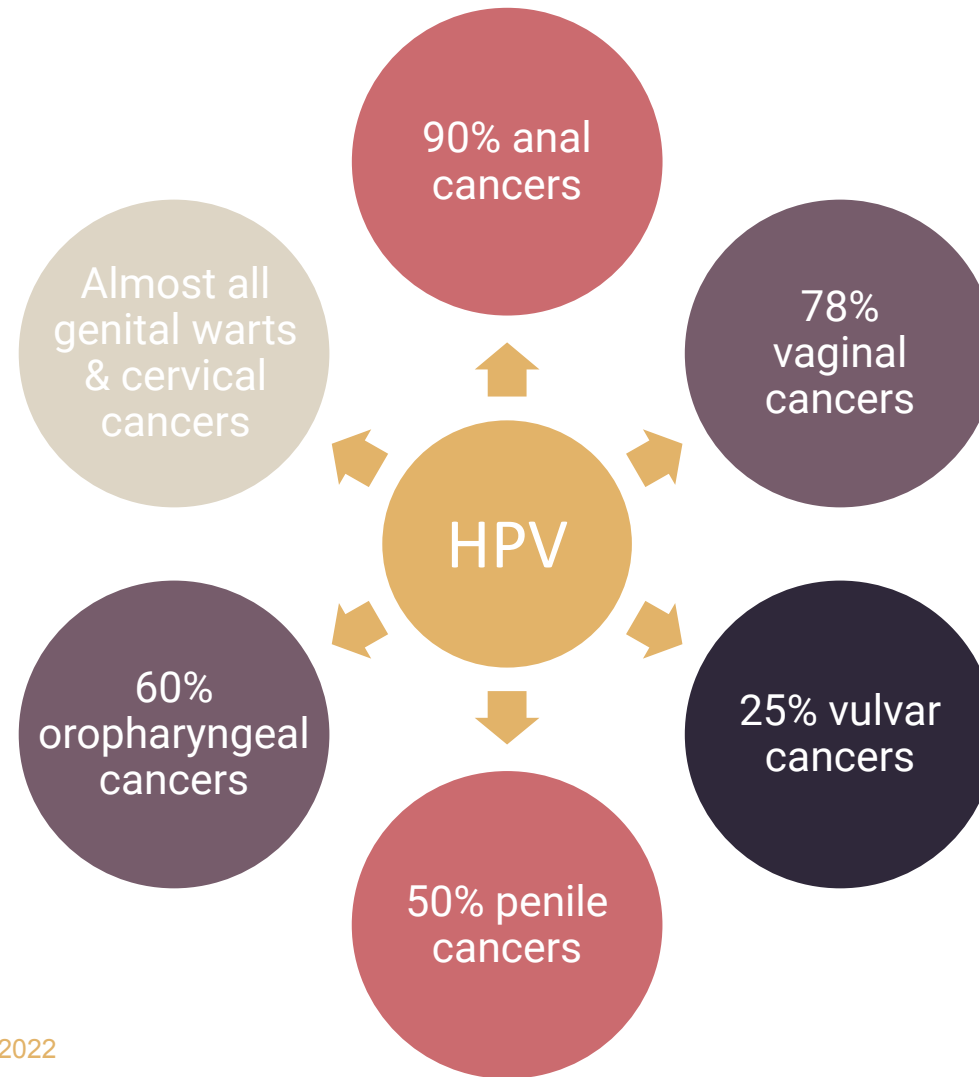


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- 90% Australians will get HPV
- Named by the warts (papillomas) some HPVs can cause
- Some HPVs can lead to cancer:
  - Cervical cancers in women
  - Cancers of genital areas, anus, mouth and throat in men and women



# HPV is responsible for



## Cause of disease

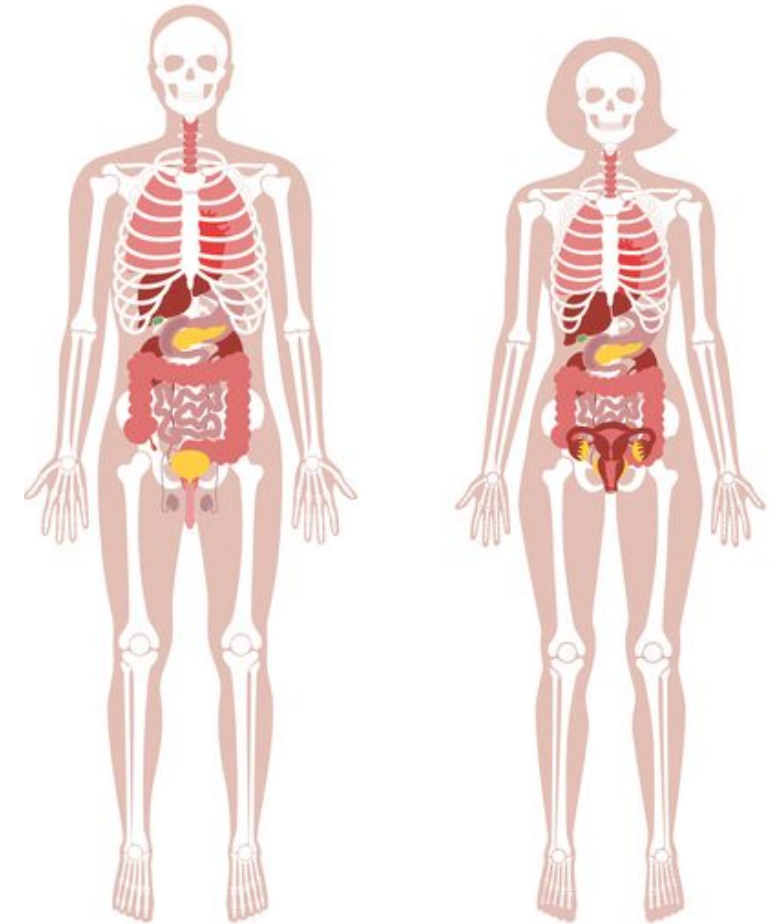
- HPV is a common virus which affects men and women
- A DNA virus from the Human Papilloma family
- Over 100 types of HPV:

Around 40 types affect the anogenital area, known as genital HPV

Depending on ability to cause cancer they are classified as high or low risk HPV

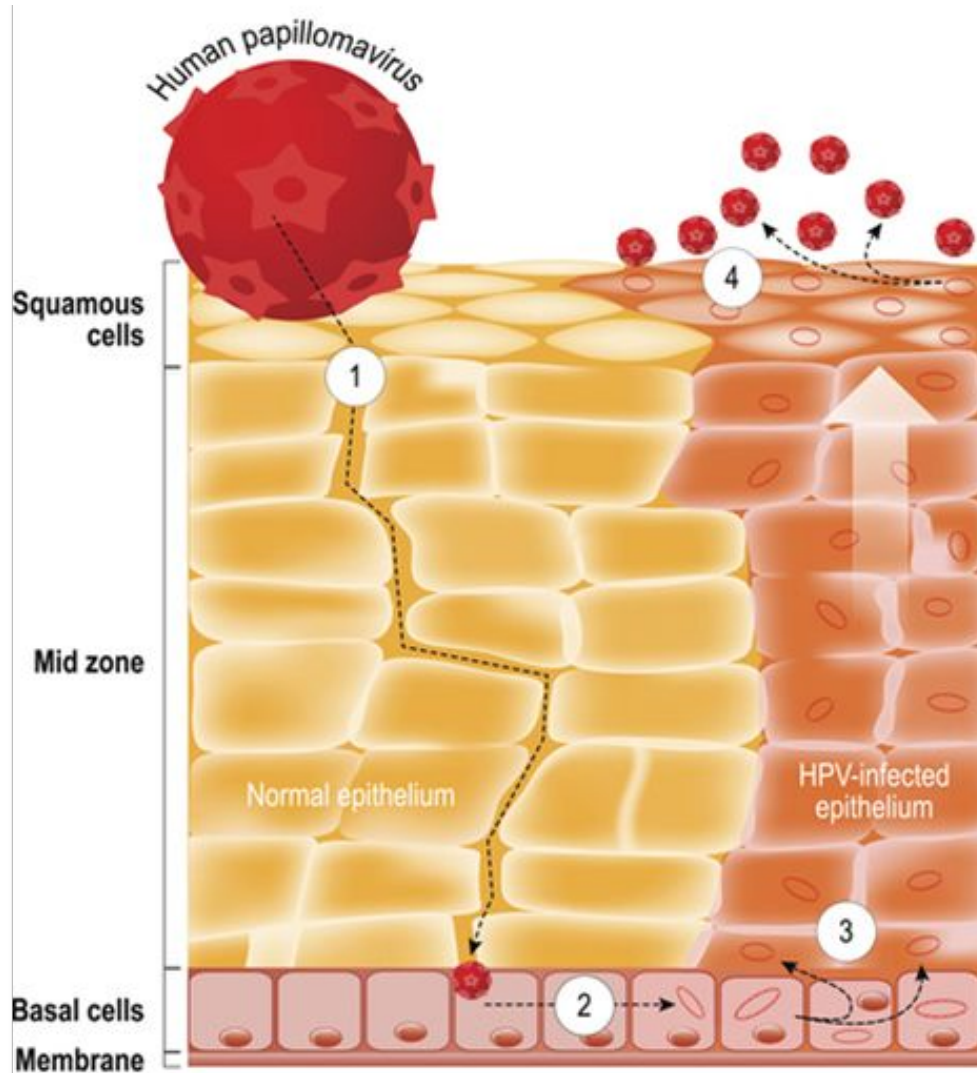


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Ref: Australian Technical Advisory Group on Immunisation (ATAGI).  
Australian Immunisation Handbook, Australian Government Department  
of Health, Canberra, 2022 <https://immunisationhandbook.health.gov.au>

# Life cycle of HPV



1. The virus invades epithelial layers
2. Infected basal cell
3. HPV in epithelial cells
4. Viral replication



# HPV symptoms



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- Most HPV infections cause no symptoms
- Low risk genital HPV types (including types 6 and 11)
  - can cause genital warts
  - genital warts do not cause cancer
  - infections caused by these HPV types are usually cleared from the body within a short time.

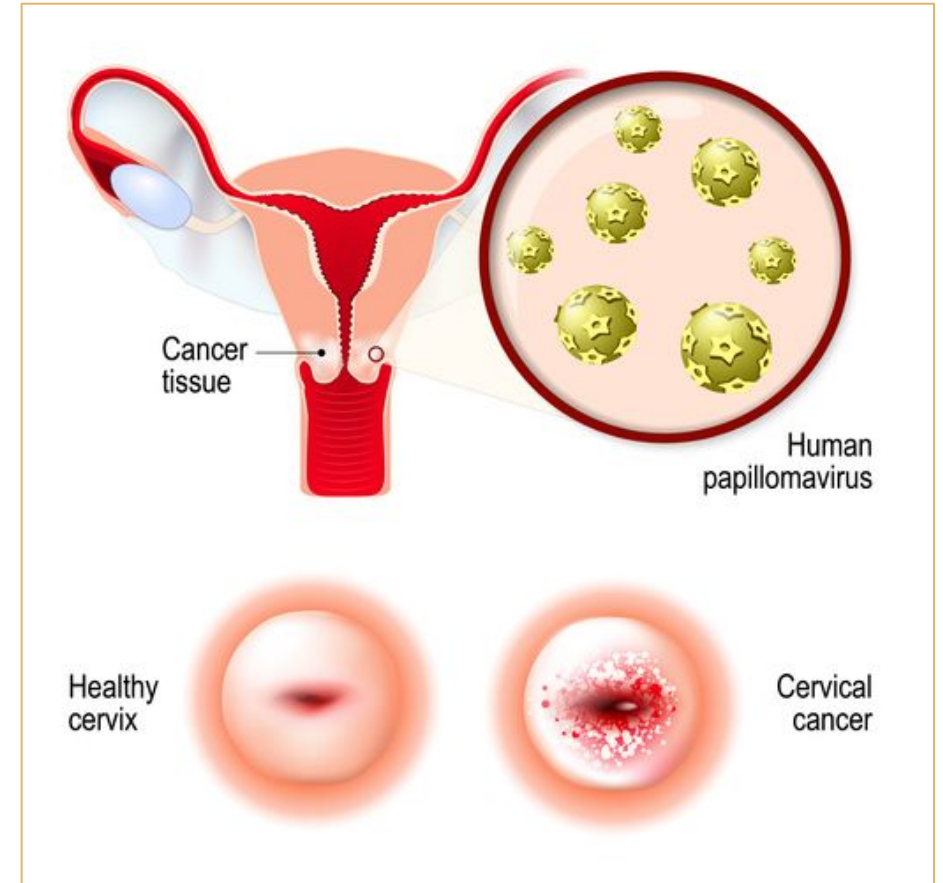


Ref: Human papillomavirus (HPV) vaccines for Australians NCIRS Fact sheet: February 2023

# Cervical cancer

## High risk genital HPV (including types 16 & 18):

- Have a higher risk of significant cell changes which can progress to cancer if not discovered and treated
- A further 11 types are classified as carcinogenic (types 31, 33, 35, 39, 45, 51, 52, 56, 58, 59) or probably carcinogenic (type 68)
- Infections with these HPV types remain in the body for a long time. HPV related cancers can take up to ten years to develop.



# Symptoms of cervical cancer

		
Vaginal bleeding between periods or after menopause	Menstrual bleeding that is longer than usual	Bleeding after intercourse
		
Pain during sexual intercourse	Persistent pelvic and/or back pain	Pain during urination
		
Needing to urinate more often	Vaginal discharge that may be heavy and have a foul odor	Weight loss

## How HPV is spread



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- By skin-to-skin contact via tiny breaks in the skin
- By intimate genital contact
- Can be exposed to HPV as soon as sexually active
- People with multiple sexual partners at increased risk



## How HPV is spread



- HPV can be passed on from a pregnant woman to her baby during delivery
- Child could develop recurrent respiratory papillomatosis where warts develop inside the throat

Ref: Tasca RA, Clarke RW. Recurrent respiratory papillomatosis. Archives of Disease in Childhood 2006;91:689-91

## Who is at risk



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- Nearly all individuals who are sexually active are at increased risk of developing HPV
- Highest prevalence amongst adolescents and young adults aged 15-25 yrs. of age



Ref: Dempsey AF. Human papillomavirus: the usefulness of risk factors in determining who should get vaccinated. Rev Obstet Gynecol. 2008;1(3):122-128.

# Biologically-based risk factors

- Host factors
- Immunosuppression
- HIV infection
- Co-infection with other STDs
- Micronutrient deficiencies
- Genetic polymorphisms
- Age at exposure to HPV
- Age at first menarche
- Viral factors
- HPV type
- Coinfection with multiple HPV types
- Viral load



Ref: Dempsey AF. Human papillomavirus: the usefulness of risk factors in determining who should get vaccinated. *Rev Obstet Gynecol.* 2008;1(3):122-128.

# Behaviourally-based risk factors



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- Sexual history
- Lifetime number of sex partners
- Recent new partner
- Older sex partner
- Oral contraceptive use
- Pattern of condom use
- Parity
- Substance use related factors
- Heavy alcohol use
- Sex while impaired by alcohol
- Current or previous cigarette use
- Current or previous illicit drug use



Ref: Dempsey AF. Human papillomavirus: the usefulness of risk factors in determining who should get vaccinated. *Rev Obstet Gynecol.* 2008;1(3):122-128.



## Cause of disease

TYPE OF CANCER	MALE	FEMALE
Cervical cancer	–	7.19
Anal cancer	1.88	2.94
Vulva cancer	–	3.56
Vaginal cancer	–	0.74
Penile cancer	1.03	–
Oropharyngeal cancer	6.26	1.20
Oral cavity cancer	14.7	7.23
Laryngeal cancer	3.89	0.5

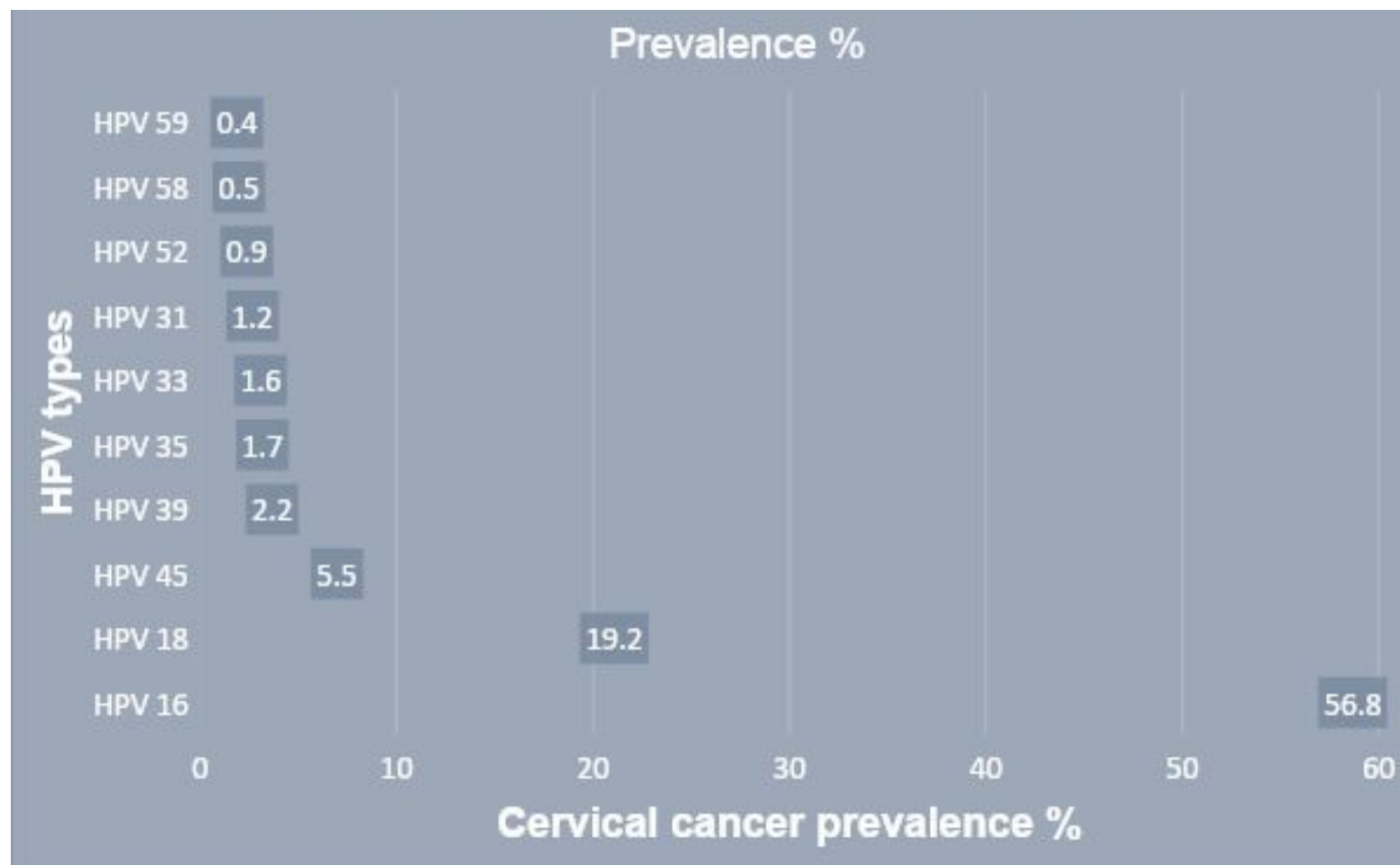
## Burden of HPV-related cancers in Australia



Current estimates indicate that **every year**, **920 women** are diagnosed with **cervical cancer** and **328 die** from the disease.

## HPV types and cervical cancer prevalence %

HPV types 16 & 18 cause up to 80% of cervical cancers in women



## HPV prevention - Who should be vaccinated?

### Adolescents – What were the changes from 6 February 2023?

- A single dose of HPV vaccine is now recommended as the routine schedule on the National Immunisation Program (NIP) for boys and girls
- People who have not received HPV vaccine by 13 years of age can receive a single dose up to 25 years of age (increased from 19 years of age)

VACCINE	WHEN IS IT GIVEN?	SINGLE DOSE	CATCH UP
Gardasil 9	12-13 years of age (Year 7)	✓	Up to 25 years of age

# HPV prevention - Who should be vaccinated?

## Why has the dosing changed?

- The program change is based on a large volume of evidence that has emerged in recent years.
- ATAGI has reviewed the international evidence and determined that a single dose gives comparable protection to two doses. The Pharmaceutical Benefits Advisory Committee (PBAC) has endorsed ATAGI's recommendations.

### **Australian Technical Advisory Group on Immunisation (ATAGI)**

The Australian Technical Advisory Group on Immunisation (ATAGI) advises the Minister for Health and Aged Care on the National Immunisation Program (NIP) and other immunisation issues.

## HPV prevention - Who should be vaccinated?

A 3-dose schedule is recommended for:

- Anyone who is immunocompromised (at any age)
- 9vHPV vaccine at 0, 2 and 6 months



0 months



2 months



6 months

Those who receive first HPV vaccine dose on or after their 26<sup>th</sup> birthday, either:

- 9vHPV vaccine at 0, 2 and 6 months
- 2vHPV vaccine at 0, 1 and 6 months

# Poll 1

What is the minimum acceptable interval in a three dose HPV vaccine dose schedule?

- A. Three weeks between dose 1 and 2 and 16 weeks between dose 2 and 3
- B. Four weeks between dose 1 and 2 and 20 weeks between dose 2 and 3
- C. Three weeks between dose 1 and 2 and 16 weeks between dose 2 and 3
- D. Four weeks between dose 1 and 2 and 12 weeks between dose 2 and 3

## HPV prevention - Who should be vaccinated?

### Men who have sex with men

- at increased risk of genital warts and anal cancer.

### Women treated with high grade cervical disease

- to prevent re-infection (from a partner) with another HPV type.

### People with significant immunocompromising conditions

- Have higher risk of HPV infection and associated disease.
- 3-dose schedule of 9vHPV vaccine is recommended for people with significant immunocompromising conditions, regardless of their age when they started vaccination.



## Poll 2

**Is routine vaccination recommended for all adults 26 years and older?**

- A. No as they are likely to have been exposed to one or more HPV types through sexual activity
- B. Yes, all adults should be routinely vaccinated with HPV vaccine
- C. No routine vaccination should be started at 17 years of age
- D. Yes, adults can be given an oral dose or an intramuscular dose of HPV

# HPV prevention – Vaccines

## Two inactivated HPV vaccines

HPV VACCINE	BRAND	AVAILABILITY
9vHPV	Gardasil 9	<p>Gardasil 9 is free at school for all males and females aged 12-13 years through the NIP.</p> <p>Registered for females 9-45 years of age and males 9-26 years of age.</p>
2vHPV	Cervarix	<p>Registered for females aged 10-45 years of age and is available on private prescription.</p>



## HPV prevention – Vaccines

### Cervarix (2vHPV)

- protects against HPV types 16 and 18

### Gardasil 9 (9vHPV)

- Gardasil 9 replaced Gardasil (4vHPV) in the 2018 NIP
- Gardasil 9 includes the HPV types covered by Gardasil (6, 11, 16 and 18) plus
- An additional five cancer producing HPV types (31, 33, 45, 52 and 58). These five HPV types cause an additional 15% of all cervical cancers above those caused by HPV 16 and 18



Gardasil 9 is **free** at school for **all males and females** aged **12-13 years** through the NIP.

This is the **best time** to **vaccinate before** individuals become **sexually active**

## Who should not receive the HPV vaccine?

- People who have had an anaphylactic reaction to the vaccine
- Pregnant women



## Poll 3

**When can women who wish to conceive following a course of HPV vaccine commence trying to fall pregnant?**

1. Immediately after their last dose as the vaccine is not a live virus
2. Four weeks after their last dose
3. One week after their last dose
4. Immediately after their last dose as the vaccine is a live virus but won't affect the foetus

## HPV prevention – Other prevention methods

### Cervical Screening

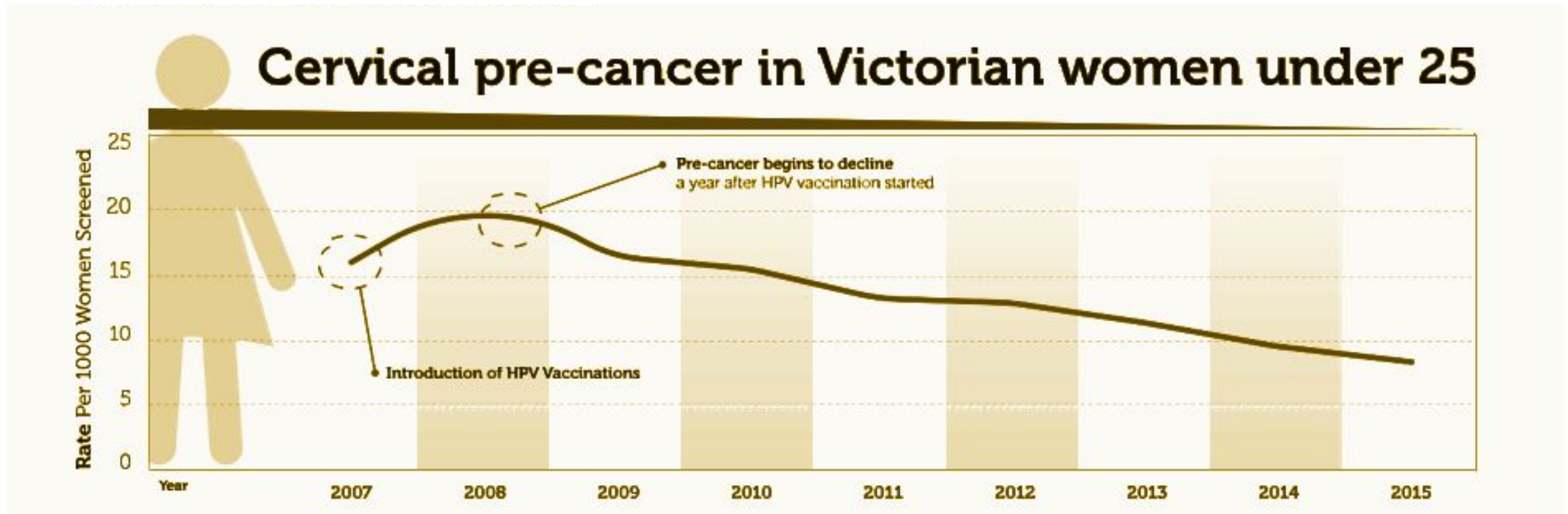
- Vaccination does not prevent infection with all HPV types
- Cervical screening remains an important preventive strategy against cervical cancer for women
- From 1<sup>st</sup> December 2017 under the renewed National Cervical Screening Program, the two-yearly Pap test for women aged 18 to 69 years changed to a five yearly human papillomavirus (HPV) test for women aged 25 to 74 years

### Condoms

- Offer some protection but not complete protection as do not cover all parts of genital areas

# Vaccine effectiveness

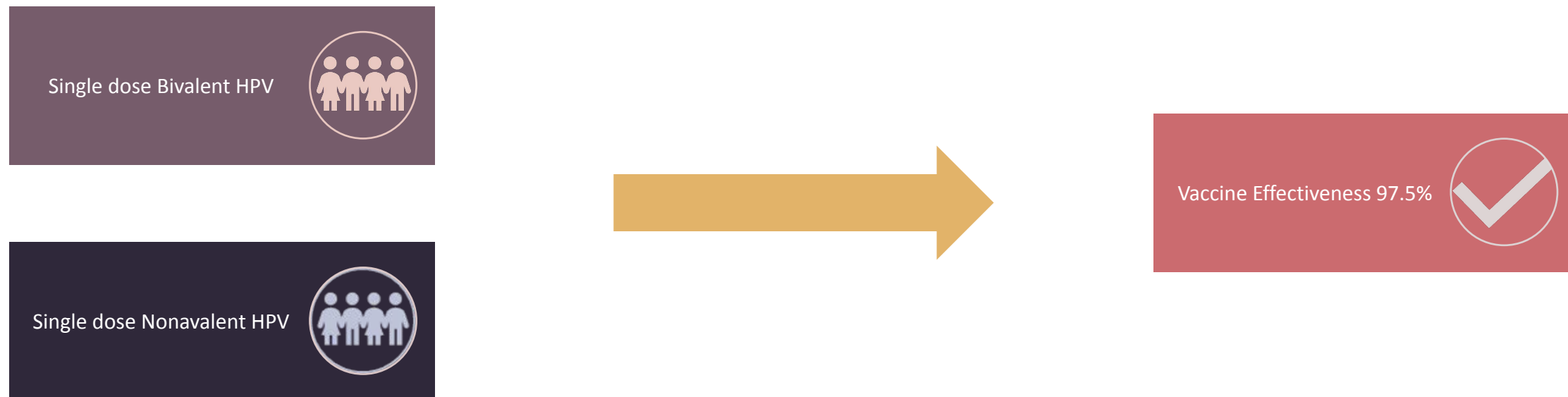
Pre-cancer begins to decline a year after HPV vaccination started





## Vaccine effectiveness – In Kenyan women aged 15-20 yrs of age

Over the 18-month time-frame, single-dose bivalent and nonavalent HPV vaccines were each highly effective (VE 97.5%) in preventing incident persistent oncogenic HPV infection, similar to multi-dose regimens.





# Vaccine effectiveness – Single dose as effective as multiple doses

Multiple studies have found a single dose of 9vHPV provides similar protection against HPV 16 and 18 as two dose and three dose schedules.

ARTICLES | VOLUME 22, ISSUE 11, P1518-1529, NOVEMBER 2021

Vaccine efficacy against persistent human papillomavirus (HPV) 16/18 infection at 10 years after one, two, and three doses of quadrivalent HPV vaccine in girls in India: a multicentre, prospective, cohort study

Partha Basu, MD   • Sylla G Malvi, PhD • Smita Joshi, PhD • Neerja Bhatla, MD • Richard Muwonge, PhD • Eric Lucas, MSc • et al. [Show all authors](#)

Open Access • Published: October 08, 2021 • DOI: [https://doi.org/10.1016/S1470-2045\(21\)00453-8](https://doi.org/10.1016/S1470-2045(21)00453-8)

Ref.: Basu P, Malvi SG, Joshi S, et al. Vaccine efficacy against persistent human papillomavirus (HPV) 16/18 infection at 10 years after one, two, and three doses of quadrivalent HPV vaccine in girls in India: a multicentre, prospective, cohort study. *The Lancet Oncology* 2021;22:1518-29.

Comparing one dose of HPV vaccine in girls aged 9–14 years in Tanzania (DoRIS) with one dose of HPV vaccine in historical cohorts: an immunobridging analysis of a randomised controlled trial

Kathy Baisley, MSc   • Troy J Kemp, PhD • Aimée R Kreimer, PhD • Partha Basu, PhD • John Changalucha, MSc • Allan Hildesheim, PhD • et al. [Show all authors](#)

Open Access • Published: October, 2022 • DOI: [https://doi.org/10.1016/S2214-109X\(22\)00306-0](https://doi.org/10.1016/S2214-109X(22)00306-0)

Ref: Human papillomavirus (HPV) vaccines for Australians | NCIRS Fact sheet: February 2023

The cervical cancer **mortality rate** was **12% lower**  
in the post-vaccine period (2008–2015),  
compared to the pre-vaccine period (2000–2007)



## HPV vaccine safety

### Safe and well tolerated

- Side effects are usually mild and transient

### Side effects may include:

- pain, swelling and redness around the injection site
- mild fever
- headache or nausea



Gardasil 9

# HPV and fertility

- Ongoing review of vaccine use in humans has shown no evidence that HPV is linked to infertility
- TGA found no evidence that polysorbate 80 in HPV vaccines is linked to infertility



The screenshot shows the top portion of a scientific article page. At the top left is the Elsevier logo. The journal title 'vaccine' is centered, with 'Volume 38, Issue 24, 19 May 2020, Pages 4038-4043' below it. On the right is a green plant icon. The main title of the article is 'No association between HPV vaccination and infertility in U.S. females 18–33 years old'. Below the title are the authors: Nicholas B. Schmuhl<sup>a 1</sup>, Katherine E. Mooney<sup>b 1</sup>, Xiao Zhang<sup>c</sup>, Laura G. Cooney<sup>a</sup>, James H. Conway<sup>d</sup>, and Noelle K. LoConte<sup>c</sup>. There are icons for email and ORCID for each author. Below the authors is a 'Show more' dropdown arrow. Further down are links for '+ Add to Mendeley', 'Share', and 'Cite'. At the bottom of this section is the DOI link: <https://doi.org/10.1016/j.vaccine.2020.03.035> and a 'Get rights and content' link.

**Highlights**

- HPV vaccines are safe and effective.
- Concerns persist regarding a purported link between HPV vaccines and infertility.
- This study found no evidence of infertility among women who received HPV vaccines.
- This result should diminish remaining concerns among clinicians and the public.

Ref: Schmuhl NB, Mooney KE, Zhang X, et al. No association between HPV vaccination and infertility in U.S. females 18-33 years old. *Vaccine* 2020;38:4038-43.  
NCIRS HPV vaccines Frequently Asked Questions February 2023

# HPV vaccine not linked to autoimmune diseases

## Aluminium adjuvant in HPV vaccines not linked to autoimmune diseases

**JIM** Journal of  
Internal Medicine  
Founded in 1863

Free Access

### Surveillance of autoimmune conditions following routine use of quadrivalent human papillomavirus vaccine

C. Chao, N. P. Klein, C. M. Velicer, L. S. Sy, J. M. Slezak, H. Takhar, B. Ackerson, T. C. Cheetham, J. Hansen, K. Deosaransingh, M. Emery, K.-L. Liaw, S. J. Jacobsen

First published: 04 October 2011 | <https://doi.org/10.1111/j.1365-2796.2011.02467.x> | Citations: 136

✉ Chun Chao PhD, Department of Research and Evaluation, Kaiser Permanente Southern California, 100 S Los Robles Ave, Suite 200, Pasadena, CA 91101, USA.  
(fax: +1-626-564-3409; e-mail: [chun.r.chao@kp.org](mailto:chun.r.chao@kp.org)).

SECTIONS

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### Abstract

**Abstract.** Chao C, Klein NP, Velicer CM, Sy LS, Slezak JM, Takhar H, Ackerson B, Cheetham TC, Hansen J, Deosaransingh K, Emery M, Liaw K-L, Jacobsen SJ (Kaiser Permanente Southern California, Pasadena, CA; Kaiser Permanente Vaccine Study Center, Kaiser Permanente Northern California, Oakland, CA; Merck Research Laboratories, Upper Gwynedd, PA; South Bay Medical Center, Kaiser Permanente Southern California, Los Angeles, CA; and Kaiser Permanente Southern California, Downey, CA, USA). Surveillance of autoimmune conditions following routine use of quadrivalent human papillomavirus vaccine. *J Intern Med* 2012; **271**: 193–203.

Ref: Chao C, Klein NP, Velicer CM, et al. Surveillance of autoimmune conditions following routine use of quadrivalent human papillomavirus vaccine. *Journal of Internal Medicine* 2012;271:193-203.  
NCIRS HPV vaccines Frequently Asked Questions February 2023

No strong evidence to suggest that HPV vaccines can induce syndromes such as premature ovarian failure (POF), postural tachycardia syndrome (POTS) or complex regional pain syndrome (CRPS)

- Genital HPV is a common sexually transmitted infection in both males and females
- Some HPVs can cause cancer of the cervix, vagina, vulva, penis, anus, head and neck
- There are many types of HPV. Types 16 and 18 are the most common causes of HPV-associated cancers
- HPV vaccine is available on the NIP as a single dose for boys and girls aged 12-13 years of age. The best time to vaccinate is before adolescents become sexually active
- HPV vaccines are safe and well tolerated
- Vaccination does not prevent infection from all HPV types. Therefore, cervical screening remains an important preventive strategy against cervical cancer for women
- Ensure doses of vaccine are reported to the AIR



