HPV infection and vaccine frequently asked questions (FAQ) for Health Professionals

What are Human Papillomaviruses (HPV)?

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The human papillomavirus (HPV) is a double stranded DNA virus.

Where in the body does the HPV infect?

HPV infects squamous epithelia of the skin and mucous membranes of the upper respiratory and anogenital tracts. This includes the skin of the penis, vulva, and anus, and the linings of the vagina, cervix and rectum.

Are there many types of HPV?

There are more than 100 different types of HPV.
Most of which are responsible for common skin warts (verrucae).

How is HPV spread or transmitted?

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Transmission of HPV can occur by skin to skin contact and contact during vaginal, oral or anal sexual intercourse or genital contact with an infected person.

Who can get HPV infection?

Anyone who is sexually active can contract HPV.

Can a person pass the HPV infection to others?

A person with HPV can pass the infection to someone else even when they have no signs or symptoms.

Do condoms work to stop you getting HPV infection?

Condom use reduces but does not eliminate the risk of transmission of HPV.

What symptoms do you get with HPV infection?

Most HPV infections do not cause any symptoms.

What are the other effects of HPV infection?

HPV infection can cause benign warts, precancerous lesions, or invasive cancer. Most HPV infections occur shortly after the onset of sexual activity.

Can your body clear HPV infection?

Yes. The body's immune system usually clears the infection without need for treatment. More than 90% of new HPV infections clear or become undetectable within 2 years

What happens when you do not clear HPV infection?

Persistent infection occurs when the body fails to clear HPV infection.

What are the signs of persistent HPV infection?

The most common sign of persistent HPV infection is cervical intraepithelial neoplasia (CIN). Over a number of years, low-grade CIN (CIN1) may progress to high-grade CIN (CIN2 or CIN3). These higher grades of CIN can progress to cancer. So, they are considered cervical cancer precursors. Persistent infection by high-risk types is detectable in more than 99% of cervical cancer

Persistent infection with high-risk oncogenic HPV types is the most important risk factor for HPV-related diseases. This includes cancer of the cervix, oropharynx, anus, vagina, vulva and penis

How are the HPVs classified?

HPV types that infect the genital tract are classified based on their link to cervical cancer.

They are split into

- low-risk (non-oncogenic)
- and high-risk (oncogenic) types

Most low-risk types are responsible for common skin warts (verrucae).

What types cause genital warts?

Genital warts are caused by low-risk types 6 and 11, which account for over 90% of genital warts and 10% of low grade cervical intraepithelial neoplasia (CIN1).

Is there a risk for the baby if the mother has genital warts?

Vertical transmission from mother to baby can cause juvenile recurrent respiratory papillomatosis

What types of HPV cause infection of the genital tract?

Around 40 HPV types can infect the genital area, including the skin of the penis, vulva, and anus, and the linings of the vagina, cervix and rectum.

Can HPV cause precancerous lesions?

HPV is also responsible for a range of precancerous lesions. These precancerous lesions are picked up with a cervical smear.

How do you know if you have HPV infection?

HPV testing is now increasingly used for primary cervical cancer screening in conjunction with smear (cytology) tests for HPV-positive cases. So, your cervical screening test tells you of you have HPV or not.

What type of HPV infection are high risk?

There are thirteen subtypes which are considered high-risk HPV types as these are more likely to cause cell changes that over time can develop into cancers The most common subtypes are subtypes 16 and 18 and the other high risk types are HPV 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 68.

Can HPV infection with high risk types cause cancer?

HPV infection has a causal role in cancers of the cervix, anus, penis, oropharynx, vulva and vagina. The high-risk types cause an estimated 530,000 cases of cervical cancer and 100,000 other cancers each year worldwide.

How many cancers does HPV infection cause?

HPV is now well-established as an important risk factor for cervical, vaginal, vulval, penile and anorectal cancers, as well as head and neck cancers.

In Europe, HPV types 16 and 18 cause over 70% of cervical cancers. Researchers estimate that HPV types 31, 33, 45, 52, and 58 cause an additional 19%.

High-risk HPV types cause about

- 90% of anal cancers.
- 65% of vaginal cancers

- 60% of oropharyngeal cancers.
- 50% of vulvar cancers
- 35% of penile cancers.

How many people get HPV infection?

Pre HPV vaccine almost all sexually active people develop HPV infections, and about half of these infections are with a high-risk HPV-type virus. These high-risk HPV infections are estimated to cause about 5% of all cancers worldwide

In 2018, about 311,000 women died from cervical cancer. Over 85% of these deaths were in low- and middle-income countries

How common is cervical cancer in Ireland?

In Ireland, cervical cancer is the 8th most common cancer. There are 260 new cases of invasive cervical per year, with under 3,000 cases of in-situ cancer.

What is the most common HPV-associated cancer?

The most common HPV-associated cancer is cervical cancer and almost all cervical cancer is caused by chronic HPV infection. Only 2% of cervical cancers diagnosed in Ireland during 2017-2021 were cancer subtypes not associated with HPV infection.

In addition, HPV infection is associated with squamous cell carcinomas (SCC) of the vulva, vagina, penis, anus, oral cavity, and oropharynx. Vaccination and regular screening play crucial roles in preventing and detecting HPV-associated cancers early.

What is the burden of HPV disease in Ireland?

An estimated average of 641 cases of HPV-associated cancers were diagnosed per year in the period 2017-2021, 65% of cases were in females and 35% in males in Ireland. There are 196 cancer deaths per year due to HPV-associated cancers in Ireland, most of which are potentially preventable by HPV vaccination.

HPV-associated cancers accounted for 2.7% of all invasive cancers excluding non-melanoma skin cancer (NMSC) in Ireland in 2017-2021.

The age-standardised incidence rate for cervical carcinoma has been decreasing since 2010, following the introduction of a population-based screening programme in 2008.

The age standardised incidence rate for most other HPV-associated cancers is increasing.

The stage at diagnosis varies by cancer site, with the majority of cervical carcinoma, vulval squamous cell carcinoma (SCC), and penile SCC being diagnosed early (at stage I or II), whereas the majority of oropharyngeal SCC were diagnosed late (at stage III or IV).

Survival for most HPV-associated cancers has increased from 1994-1998 to 2014-2018.

How many cases of cervical cancer are there per year in Ireland?

Cervical cancer is the commonest HPV related cancer in Ireland with 265 cases a year in women from 2017-2021

Table 1. Average annual estimated number of cases of invasive HPV-associated cancers and age-standardised rates 2017-2021

	Females		Males		Total	
	Cases/yr[#]	EASR† (95% CI)	Cases/yr[#]	EASR† (95% CI)	Cases/yr[#]	EASR† (95% CI)
Oropharyngeal SCC[ab]	46	2.2 (1.9-2.4)	154	7.7 (7.1-8.2)	200	4.8 (4.5-5.1)
Anorectal SCC[bc]	44	2.1 (1.8-2.4)	24	1.1 (0.9-1.3)	68	1.6 (1.5-1.8)
Cervical carcinoma[cd]	265	11 (10.4-11.6)			265	
Vulval SCC[ac]	55	2.7 (2.4-3)			55	
Vaginal SCC[ac]	9	0.4 (0.3-0.6)			9	
Penile SCC[ac]			45	2.4 (2.1-2.7)	45	
Total	419	18.3 (17.5-19.1)	222	11.2 (10.5-11.9)	641	

Cancer definitions (8,9):
[a]SCC = ICD-O-3 histology codes 8050-8084 & 8120-8131.
[b]Oropharyngeal sites = ICD-O-3 topography codes C01.9, C02.4, C02.8, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0, C10.1, C10.2, C10.3, C10.4, C10.8, C10.9, C14.0, C14.2 & C14.8.
[c]Other sites: anus (topography C21.0-C21.9); rectum (C20.9); cervix uteri (C53.0-C53.9); vagina (C52.9); vulva (C51.0-C51.9); penis (C60.0-C60.9).
[d]Carcinoma = histology codes 8010-8671 & 8940-8941.
#Estimated numbers include allowance for non-specific cancers and carcinomas (allocated respectively to carcinomas and squamous cell carcinomas in proportion to the breakdown of specific subtypes for each site, diagnosis year, sex and five-year age-group).
†EASR: European age-standardised rate per 100,000 per year (2013 European standard).

Reference: National Cancer Registry Ireland; Cancer trends report no.40I in HPV associated cancers.

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Oropharyngeal cancer accounts for 31% of all HPV-associated cancers.

HPV Vaccine:

What is HPV vaccine?

HPV vaccines are non-live vaccines. They contain virus-like particles (VLPs) prepared from surface proteins from constituent HPV types. VLPs are not infectious as they lack virus DNA. They closely resemble the virus so antibodies against the VLPs also have activity against the virus. VLPs trigger potent immune responses.

The HPV vaccines:

- contain no viral DNA and are not infectious or oncogenic
- are not live vaccines
- cannot cause HPV infection
- cannot cause cancer.

What HPV vaccines are used in Ireland?

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The HPV vaccine currently used in Ireland is:

- Gardasil 9 (manufactured by MSD), a nonavalent vaccine containing VLPs (Virus-Like Particles) for nine HPV types (6, 11, 16, 18, 31, 33, 45, 52 and 58).

It is the used in Ireland in the school vaccination programme.

What is Gardasil licensed to do?

Gardasil 9 is licensed for active immunisation of individuals from the age of 9 years against the following HPV diseases

- premalignant lesions and cancers affecting the cervix, vulva, vagina and anus caused by the constituent HPV types
- genital warts (condyloma acuminata) causally related to the specific HPV types

Are there any other HPV vaccine licensed in Ireland?

Other HPV vaccines licensed in Ireland include:

HPV2 (Cervarix, HPV 16, 18).

It is licensed for use from age 9 to prevent precancerous anogenital lesions. These include cervical, vulvar, vaginal, and anal lesions and prevents cervical and anal cancers caused by HPV 16 and 18.

HPV4 (Gardasil, HPV 6, 11, 16, 18). It is licensed for use from age 9. It prevents pre-cancerous genital lesions (cervical, vulvar, and vaginal), pre-cancerous anal lesions and cancers from certain HPV types. It also prevents genital warts caused by specific HPV types.

When did the HPV vaccination programme start in Ireland?

+ In September 2010 HPV vaccine (HPV4) was introduced for girls in second level school in first year as well as age-equivalent girls in special schools and those educated at home.

HPV4 vaccine was also offered to girls in second year or equivalent.

From 2011 to 2014, girls in sixth year of second level school or equivalent were offered HPV4 vaccine as part of a catch-up programme.

When was Gardasil 9 introduced to the school vaccination programme?

In September 2019, the Minister for Health and Children introduced the Gardasil 9 (HPV9) vaccine into the national immunisation programme. This followed recommendations from the National Immunisation Advisory Committee (NIAC).

From September 2019, all students were offered HPV 9 in first year of second level school or equivalent. This was part of the national strategy to prevent cancers attributable to HPV.

When did Ireland move to the one dose Gardasil 9 programme in schools?

The one dose programme was implemented in 2023 following recommendation from NIAC.

How many countries give HPV vaccines?

As of March 2022, over 140 countries and territories include the HPV vaccine in their national immunisation schedule.

More than 50 of them have introduced gender-neutral HPV vaccine programs. This includes the US, UK, and Australia.

Why is Gardasil 9 recommended in 1st year of second level school?

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NIAC recommends that HPV vaccine be given to 12-13 year old students (equivalent to first year of second level school) because:

The vaccine is most effective if given before sexual activity occurs. A superior immune response has been demonstrated at this age

Does the vaccine eliminate the need for cervical screening in those vaccinated?

No, the HPV vaccine does not remove the need for cervical cancer screening. This is because 10 to 30% of cervical cancers are caused by HPV types not covered in the vaccines. Cervical screening can detect CIN and cervical cancer at an early stage when treatment can be successful.

In countries with an organised cervical cancer screening programme, there has been a big drop in invasive cervical cancer. Ireland's National Cervical Screening Programme is CervicalCheck.

Why is Gardasil 9 offered to boys?

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Vaccinating boys with HPV vaccine provides direct protection to boys.

Up to 90% of people encounter HPV during their lifetime. HPV infection causes certain conditions in males. These include genital warts and cancers of the anus, penis, and throat.

On average, 641 cases of HPV cancers were diagnosed per year in Ireland annually. This was during the period 2017 to 2021. Of these, one out of three (419 or 36%) were in men and two out of three (393 or 64%) were in women.

Of the Oropharyngeal cancer 25% of all HPV-associated cancers occurred in men.

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What about other countries that give to boys how successful has their HPV programme been?

Australia introduced HPV vaccination for girls in 2007 and extended the programme to include boys in 2013.This led to a big and ongoing drop in genital warts among Australian women and heterosexual men. The drop was biggest in young people who got the vaccine at school.

Another Australian study showed that the targeted HPV genotypes decreased in young men who have sex with men. This happened after Australia started the gender-neutral HPV vaccination programme.

The Gardasil 9 vaccine protects against the HPV types that cause approximately 90% of genital warts and 90-95% of HPV related anal cancer. Studies have shown this. There is a lower rate of anal intraepithelial neoplasia or anal cancer, caused by HPV types covered by HPV vaccine, in those who got the HPV vaccine.

What cancers can HPV vaccine protect against?

There is emerging evidence that the HPV vaccine is also effective in reducing the incidence of other cancers attributable to HPV. A study looked at over 18,000 HPV-related cancer specimens worldwide. It found that the HPV9 vaccine can prevent 79% of anal, 25% of penile, 21% of oropharynx, 4% of oral cavity, and 3% of larynx cancer cases

The HPV vaccine protects against HPV types linked to HPV cancers. It lowers their prevalence. This may mean a lower risk of getting HPV cancers, like oropharyngeal cancer.

But, for non-cervical cancers caused by HPV, seeing fewer cases may take decades. This is because these cancers occur at an older age, unlike cervical cancer precursors. There is no screening test for oropharyngeal, anal, or penile cancers in men. Men face a big and growing risk of HPV disease. So, they need vaccination for protection.

How do we know it is safe and effective to vaccinate boys?

The US, Australia, and many other countries also have gender neutral vaccination programs. They vaccinate both boys and girls. This is like Ireland's program.

HPV vaccines are similarly effective. They also have a similar safety and reactogenicity profile. This is true for males and females of the same age.

Like for women, HPV vaccination protects males long term from HPV.

How effective is the HPV vaccine?

The impact of population wide HPV vaccination programmes has been demonstrated in several countries.

• **In Scotland**, 8 years after the introduction of HPV2 vaccine (3 doses in girls aged 12-13, the vaccine greatly cut CIN in all grades. The reductions mean the vaccine is ≥80% effective. Rates of CIN3+ decreased by 89%, CIN2+ by 88%, and CIN1 for those born in 1995-6 by 79%.

In England (90% uptake), 8 years after the HPV vaccine was introduced, cancer-causing HPV infections had fallen 86%. This was among women aged 16 to 21 who were eligible for the vaccine.

• **In Australia**, the HPV infection rate among women aged 18 to 24 dropped from 22.7% to 1.1% between 2005 and 2015.

• **In Denmark**, HPV4 vaccination was linked to a much lower risk of getting

Vaccinating boys also provides greater protection to women. A gender-neutral programme reduces spread of HPV and is likely to reduce the overall burden of HPV related malignancy sooner than would a girls only programme.

Randomized controlled trials have shown that gender-neutral vaccination programmes increased protection against HPV, with high coverage in males conveying significant herd effects to unvaccinated females. Vaccinating boys, as part of a gender neutral vaccination programme, helps achieve herd immunity and works towards elimination of vaccine preventable HPV.

Will the HPV vaccine eliminate related cancers in the future?

One study predicted the elimination of HPV-18, 31, 33 in young adults in 20 years and the eventual elimination of HPV-16, with a high coverage gender-neutral HPV vaccination programme.

Vaccinating boys, as part of a gender-neutral programme, creates a more robust vaccination programme

A gender-neutral programme ensures that the vaccine programme is more robust in relation to potential short-term fluctuations in uptake.

How good is the vaccine at preventing oral HPV infection?

Studies show the HPV vaccine cuts oral HPV infections. For example, in the US, it significantly reduces vaccine type oral HPV in young males and females.

How long does the vaccine effect last?

After one, two, or three vaccine doses, HPV antibodies peak early. Then, they fall to a plateau at 18-36 months and stay stable for at least 11 years.

There is now sufficient evidence that there is no significant difference in vaccine effectiveness between those aged nine to 24 years of age who are immunocompetent who receive one, two, or three vaccine doses.

The data for those aged 25 years and older and not immunocompromised provides evidence to support a two-dose schedule.

There is not enough data to support a one or two dose schedule for those with weak immune systems. This is true regardless of age. All those with immunocompromise are recommended three doses of the HPV.

How does Gardasil 9 work?

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The Gardasil 9 vaccine causes the body to mount a humoral immune response. This response makes antibodies to the antigens in the virus like particles VLPs. This then provides protection if the vaccinated person subsequently comes into contact with the HPV virus.

Are there any reasons not to give the vaccine?

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The Contraindications to the vaccine include

- Anaphylaxis to the vaccine or any of the vaccine constituents.

What are not contraindications?

- Individuals who have experienced a non-anaphylactic hypersensitivity reaction to the HPV vaccine may receive a subsequent dose.
- Yeast allergy is not a contraindication to HPV4 or HPV9 vaccines. Although the vaccines are grown in yeast cells, the final product does not contain any yeast.

As a precautions if the person getting the vaccine has an acute severe febrile illness you should defer vaccination until recovery.

Is fainting or syncope more common after the HPV vaccine?

- Syncope has been reported among adolescents before or following vaccination, particularly with the first dose. Recipients should be seated or lying down during vaccine administration.
- Vaccine should be administered with caution to individuals with coagulation defects.
- For more information, please see the NIAC Chapter 2. General Immunisation Procedures

Healthcare providers should observe vaccine recipients for approximately 15 minutes after vaccination. It is important that procedures are in place to avoid injury from fainting

Can you get HPV vaccine in Pregnancy?

- HPV vaccine is not recommended during pregnancy. Although there is no known risk associated with using recombinant vaccines during pregnancy.
- If a woman becomes pregnant during the vaccination series and needs 2 or 3 doses, the remaining doses should be delayed until after the pregnancy.

Can the HPV vaccine may be co- administered with other vaccines?

- The HPV vaccine can be given with other recommended vaccines.
- For example, MenACWY and Tdap. These should be given in the opposite limb to HPV vaccine.

When there are doubts as to whether or not to give a vaccine or issues with the number of doses required contact a Paediatrician or Consultant in Public Health Medicine or the treating consultant for those with immunocompromising conditions. You can also email immunisation@hse.ie.

A consultant or specialist must approve the 3 doses of vaccine for those with weakened immune systems.

What are the constituents of Gardasil 9?
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Virus like particles (VLPs) for HPV types

Other constituents:

- Sodium
- L-histidine
- Polysorbate 80(E433)
- Sodium borate(E2850
- Water for injection

Adjuvant (substance that enhances an immune response)

Amorphous aluminium hydroxyphosphate sulphate (0.5mg Al)

How safe is the vaccine?
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+The vaccine is safe and has been in use for a long time.

Serious allergic reactions, such as anaphylaxis, can occur on very rare occasions with any vaccine, including those for HPV.

Other potential adverse reactions are listed below

Adverse reactions following administration of Gardasil 9 occurring with a frequency of at least 1.0% from clinical trials

System Organ Class	Frequency	Adverse Reactions
Nervous system disorder	Very common Common	Headache Dizziness
Gastrointestinal disorders	Common	Nausea
General disorders and administration site conditions	Very Common Common	At the injection site: pain, swelling, erythema Pyrexia, fatigue, At the injection site: pruritus, bruising

See SPC and PIL at https://www.hpra.ie/

Post marketing adverse events have also been reported, e.g. syncope (fainting); chills; malaise; vomiting.

Post-vaccination fainting has been reported with most vaccines.

How long does a student need to be observed post vaccination?

Healthcare providers should observe vaccine recipients for approximately 15 minutes after vaccination. It is important that procedures are in place to avoid injury from fainting

Can the HPV vaccine cause Postural Orthostatic Tachycardia Syndrome (POTS)?

No, An EMA and a UK MHRA review found no evidence that HPV vaccines cause POTS.

Postural **O**rthostatic **T**achycardia **S**yndrome (POTS) is 4 times more common in females. The onset peaks in adolescence. It is likely it develops spontaneously in girls who are at the age when they have received HPV vaccine.

Health authorities worldwide have reviewed HPV vaccine safety. They all concluded that evidence does not support a link between the vaccine and the development of chronic illnesses.

Is there a link of the HPV vaccine to chronic regional pain syndrome?

In January 2016, the EMA issued a final report on the review of HPV vaccines.

This report found no evidence the vaccine was linked to complex regional pain syndrome (CRPS) or POTS. Please see link for full details at https://www.ema.europa.eu/en/documents/referral/hpv-vaccines-article-20-procedure-ema-confirms-evidence-does-not-support-they-cause-crps-pots_en.pdf

The European Commission endorsed the conclusion of the EMA.

The World Health Organization (WHO) Global Advisory Committee for Vaccine Safety (GACVS) has reviewed the evidence on the safety of Gardasil vaccine in 2007. They also did so in 2008, 2009, 2013, 2014, 2015, and 2017. WHO has never reported safety concerns with HPV vaccines. In July 2017, they said HPV vaccines are very safe.

Further information can be found at https://www.who.int/groups/global-advisory-committee-on-vaccine-safety/topics/human-papillomavirus-vaccines/safety

What is the vaccine dose and schedule?

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In November 2022, the National Immunisation Advisory Committee (NIAC) issued updated recommendations with respect to HPV vaccine dosage. NIAC now recommend:

- A single dose schedule of HPV vaccine for all those aged 9 to 24 years of age.
- A two-dose schedule of HPV vaccine at an interval of 0 and 6-12 months for those aged 25 years and older (up to the age of 45 years).

If the second dose is given less than five months after the first dose, a third dose should be administered. This should be given 6–12 months after the first dose and at least 12 weeks after the incorrect second dose.

What dose is recommended for those who are Immunocompromised?

(for further information see the NIAC Chapter 10. Human Papillomavirus)

Those with the following conditions require a three-dose schedule of HPV vaccine at 0, 2 and 6 months.

- Haematopoietic stem cell or solid organ transplant recipients
- HIV infection
- Malignant haematological disorders affecting the bone marrow or lymphatic systems, e.g., leukaemia, lymphomas, blood dyscrasias
- Non-haematological malignant solid tumours
- Primary immunodeficiency including Down syndrome.
- Within two weeks of commencing, on or within three to six months of receiving significant immunosuppressive therapy* (for further information see NIAC Chapter 3)

For those with the above immunocompromising conditions, the three dose HPV vaccination schedule should be recommended by their treating Specialist/Consultant. They can then either receive the vaccine as part of the national immunisation schedule or choose to pay for it privately.

Is there any advice from the NIAC for clinicians to aid in assessing whether their patient commencing, receiving, or post immunosuppressive therapy should receive 3 doses of HPV vaccine?

Ideally, recommended vaccines should be administered at least two weeks prior to commencing immunosuppressive therapy. Provided the HPV vaccine is administered two weeks or longer before starting immunosuppressive therapy, then the usual recommended dose schedule for age applies.

When considering vaccinating people who are about to start, are receiving or have received immunosuppressive therapy, it is important to review:

- the mechanism of action of the treatment and duration of its effect on the immune system
- the consequence of using combination therapies which can contribute to the nature, extent and length of the immunocompromising condition, e.g.,

corticosteroids with other immunosuppressive therapies such as disease-modifying anti-rheumatoid drugs
- the anticipated duration of immunocompromise due to the disease or treatment
- the underlying disease or condition
- the interval since completing treatment

The degree of immunosuppression and the interval until immune reconstitution vary with the type and intensity of immunosuppressive therapy, radiation therapy, underlying disease, and other factors. Therefore, it may not be possible to make a definitive recommendation for an interval after cessation of immunosuppressive therapy when HPV vaccine can be administered effectively. Clinical assessment of each individual case is necessary to determine the likely degree and duration of immunosuppression.

NIAC advise that following clinical assessment by the specialist treating physician, seek further expert advice from an Immunologist if needed.

What are the medications that cause immunosuppression?

Immunosuppression may occur in the following (the lists are not exhaustive):

Those who are receiving or have received in the previous six months	Immunosuppressive therapy for a solid organ transplant Immunosuppressive chemotherapy or radiotherapy for any indication Rituximab
Those who are receiving or have received in the previous three months	Targeted therapy for autoimmune disease e.g., • JAK inhibitors • Biologic immune modulators including: o B-cell targeted therapies o monoclonal tumour necrosis factor inhibitors (TNFi) o T-cell co-stimulation modulators o soluble TNF receptors o interleukin (IL)-1, IL-6, IL-17/23 inhibitors

	Non-biological oral immune modulating drugs e.g., • methotrexate ≥0.4 mg/kg/week • azathioprine ≥3.0mg/kg/day • 6-mercaptopurine ≥1.5mg/kg/day • mycophenolate >1g/day Certain combination therapies at individual doses lower than stated above, including: • on prednisolone ≥7.5 mg per day with other immunosuppressants (other than hydroxychloroquine or sulfasalazine) • methotrexate (any dose) with leflunomide
Those who are receiving high dose corticosteroids	Prednisolone or its equivalent: Adults and children weighing ≥10kg: • ≥40mg/day for more than one week, or • ≥20mg/day for two weeks or longer Children <10 kg: • 2 mg/kg/day for two weeks or longer

Why is the vaccine schedule changed to one dose for those aged 9 to 24 years of age?

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The NIAC advise is that there is now sufficient evidence that there is no significant difference in vaccine effectiveness between those aged nine to 24 years of age who are immunocompetent who receive one, two, or three vaccine doses.

See the NIAC recommendations to the Department of Health from September 2022

See updated NIAC Chapter 10. Human papillomavirus, June 2023 for further information

What protection is provided by one dose?

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In April 2022, the WHO Strategic Advisory Group of Experts on Immunization (SAGE) evaluated the evidence that has been emerging over past years that

single-dose HPV vaccine schedules provide comparable efficacy to the two or three-dose regimens.

SAGE's review concluded that a single-dose Human Papillomavirus (HPV) vaccine delivers solid protection against HPV, the virus that causes cervical cancer that is comparable to 2-dose schedules.

For more information, please visit the WHO website

What happens if a first year student is absent from school and misses their HPV vaccine dose (offered as part of the routine national immunisation schedule)?

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The student should be given one appointment for a mop-up clinic to be held at the end of the period of school vaccination clinics. **No further appointments are necessary** unless student makes contact advising they are unable to attend the mop up clinic.

Please note:

- HPV vaccination is available for MSM aged ≤45 years in GUM clinics.

What educational materials are available to vaccinators administering HPV vaccine?

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Essential training for vaccinators is available on:

- HSELand (two HPV training modules)
- Supporting information for staff

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How do I report an adverse event following vaccination?

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All adverse events should be reported to the HPRA.

What should happen with a student/individual who requires a 3 dose HPV schedule but develops a non-anaphylactic allergic reaction after the 1st HPV vaccine

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The Immunisation Guidelines for Ireland state that those who have had a non-anaphylactic allergy may be given a subsequent dose(s) of that vaccine if indicated.

The NIAC wish to draw attention to the following:

1. There are degrees of severity of hypersensitivity reactions.
2. The only absolute contraindication to most vaccines is previous anaphylaxis to the vaccine or any of its constituents.
3. Cases of hypersensitivity need to be considered on a case by case basis.
4. Mild hypersensitivity reactions are not contraindications to a subsequent dose of a vaccine.
5. More severe non-anaphylactic reactions should be discussed with a Consultant in Public Health Medicine and/or Paediatrician. In these cases, vaccination in a hospital setting may be appropriate.
6. Recommendations from the NIAC, including those in the Immunisation Guidelines for Ireland, may differ from those of the SmPC and the Health Products Regulatory Authority (HPRA).

To assist in the assessment of reactions it is important that the HPRA adverse reaction report form is completed in full for all cases. A medication error does not need to be routinely reported to the HPRA unless the student experiences harm (i.e. an adverse reaction) associated with it. In any such cases involving adverse reactions, an adverse reaction report should be submitted to the HPRA, including information on the nature of the error involved.

What should happen if a female finds out she is pregnant and has received the vaccine?

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If a female who was vaccinated subsequently finds out that she was pregnant at/or conceived around, the time of vaccination, any further HPV vaccination should be postponed. There is no evidence to date that the HPV vaccine will have caused any harm to her, the pregnancy, or the foetus. She should be advised to discuss the matter with her GP. The course of Gardasil 9 HPV vaccination may be finished when the pregnancy is completed if further doses are required.

Can Gardasil 9 affect fertility?

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No. Gardasil 9 does not affect future fertility.

See links to the U.S Centers for Disease Control and Prevention (CDC) information:

- Information for parents about HPV Vaccine Safety
- Frequently Asked Questions about Vaccine Safety

Do fully vaccinated girls need cervical screening?

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Yes. Currently HPV vaccines only protect against HPV types which cause approximately 90% of cervical cancers. Girls who have been fully vaccinated still need to be screened for cervical cancer caused by the remaining HPV types which the vaccine does not protect against. In addition, a small number of girls may not develop an adequate immune response post vaccination and a small number of girls may be already infected with HPV. Thus, it is essential that girls participate in the National Cervical Screening Programme when they are of an appropriate age.

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