

Systematic Review

A scoping review exploring the uptake of the human papilloma virus vaccine amongst young women in Ireland

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Received: 21 August 2025

Revised: 02 September 2025

Accepted: 05 September 2025

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ABSTRACT

Human papillomavirus (HPV) is a sexually transmitted infection that can resolve spontaneously but may persist and lead to complications such as genital warts and cervical cancer. The National Cancer Registry Ireland (NCRI) reported an average of 264 new cases of invasive cervical cancer annually between 2015 and 2017, and 88 deaths per year between 2012 and 2014. Many of these could have been prevented through HPV vaccination. A scoping review was conducted to explore factors influencing HPV vaccine uptake among Irish women. The Arksey and O'Malley Framework guided the review process, and a preferred reporting items for systematic reviews and meta-analyses (PRISMA) flowchart was used to map the literature selection. The search covered studies published between 2008 and 2022. Nine studies met the inclusion criteria, employing both qualitative and quantitative methods. These studies explored various perspectives, with increasing interest in recent years—six studies were published in the last seven years. Seven of the nine studies focused on adult women. This scoping review highlights the current literature on HPV vaccination in Ireland, identifies gaps in understanding vaccine uptake, and offers suggestions for future research to address these gaps.

Keywords: Human papillomavirus, Vaccination, Cervical cancer prevention, Irish women

INTRODUCTION

Human papilloma virus (HPV) is responsible for a common sexually transmitted viral infection. HPV can be classified into two categories either as high risk human papilloma virus (HR-HPV) or low risk human papilloma virus (LR-HPV) according to its association to carcinogenic potential.¹ LR-HPV are found mainly in genital warts, meanwhile HR-HPV have been associated with invasive cervical cancer.

In 2007, it was estimated that worldwide 291 million women were HPV positive.² In Ireland, cervical cancer is the 8th most common malignancy. There are 260 new cases of invasive cervical cancer per year and approximately 3000 cases of in-situ cancer.³

There are more than 100 types of HPV, out of these approximately 14 are capable of causing malignancies.⁴ HPV is transmitted by having vaginal, anal or oral sexual intercourse with someone who is infected. Even asymptomatic individuals are capable of transmitting the virus.⁵ Normally, the immune system is able to control the HPV infection and there are no complications. However, in some cases the body is unable to clear the infection and can lead to undesirable outcomes. The complications associated with HPV are plantar warts, laryngeal papilloma, which can make breathing or speaking difficult, genital warts which can cause urethral obstruction, condylomata accuminata can often become quite large leading to tissue breakdown or secondary infection.⁶ The malignancies related to HPV are shown below in Figure 1.⁷

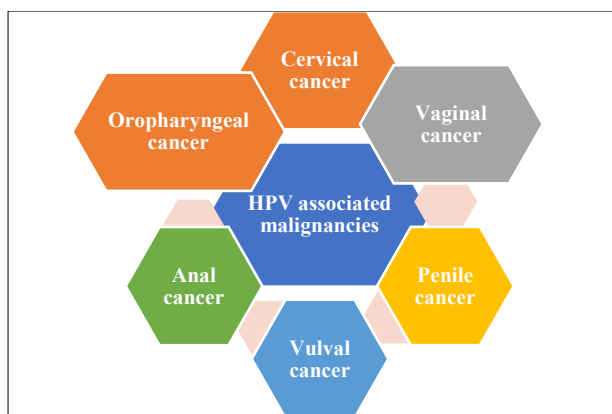


Figure 1: HPV-associated malignancies.

The aim of this report is to critically map the existing literature on factors influencing Irish women's decisions to receive the HPV vaccine, providing a solid foundation for the development of future public health campaigns. Additionally, this review identifies key research gaps that should be addressed in future studies to better inform policy and practice.

Risk factors

Several factors increase the risk of acquiring a HPV infection. One significant factor is early age at first sexual intercourse, which is often linked to riskier sexual behaviour, such as unprotected sex, multiple sexual partners, or partners with extensive sexual histories. A Finland-based study by Kataja et al compared women with abnormal cervical smears indicative of HPV-related changes (cases) to women with normal smears (controls).⁸ The study found that cases were diagnosed at a significantly younger age, with a lower mean age at first intercourse (17.3 years) compared to controls (18.7 years). The highest risk was observed in the 20–29 age group.

Risky sexual behaviour, particularly the number of sexual partners, is another major risk factor. Itarat et al found a 2.44-fold increased risk of HPV infection among women with 3–4 partners, a 4.08-fold increase with 5–9 partners, and a 7.31-fold increase in HPV-18 infection among those with more than 10 partners.⁹ Similarly, Johnson et al. reported strong associations between high-risk HPV (HR-HPV) and both lifetime and recent number of sexual partners.¹⁰ Chronic immunosuppression also increases HPV susceptibility. Organ transplant recipients (OTRs), who require immunosuppressive therapy, show significantly higher incidence of HPV-related complications. There is a 14-fold increased risk of cervical cancer, a 50-fold increase for vulvar cancer, and a 100-fold increase for anal cancer in this population.^{11,12}

Literature review

The aim of this literature review is to determine whether any scoping reviews have been conducted on HPV vaccine

uptake among Irish women and to present findings in a written report.

We begin by examining the World Health Organization's (WHO) position on the HPV vaccine.¹³ All three licensed HPV vaccines offer strong protection against HPV-16 and HPV-18, which are linked to 71% of cervical cancer cases globally. The WHO's Global Advisory Committee for Vaccine Safety (GACVS) has consistently supported the safety profile of these vaccines.

In January 2016, GACVS concluded that existing evidence showed no safety concerns. The committee also warned that vaccine hesitancy driven by weak evidence can lead to reduced uptake and long-term harm. The WHO recommends implementing HPV vaccination as part of a "coordinated and comprehensive strategy," which includes educational initiatives, healthcare worker training, and public awareness about HPV and the vaccine.

Turning to Ireland, various studies have examined facilitators and barriers to HPV vaccine uptake among Irish women. However, an extensive search of PubMed and Google Scholar revealed no existing scoping reviews focused on this population. Conducting a scoping review is essential to identify research gaps and guide future studies in this area.

Anti- HPV vaccine campaign

In 2010, Ireland launched a school-based HPV vaccination programme as part of the HSE Schools Immunisation Programme. Corcoran, Clarke, and Barrett reported that initial uptake exceeded expectations, surpassing the 80% target.¹⁴

However, this declined to 72% in 2015–2016 and sharply dropped to 50% in 2016–2017. The decline has been largely attributed to negative publicity spread by parent-led lobby groups and misinformation circulated via social media. In response, focus groups were organised to allow parents to voice concerns, leading to the development and distribution of revised information materials in affected communities.

To counter the misinformation, the HPV vaccination alliance was launched in 2017, comprising over 35 organisations from the health, women's rights, and child welfare sectors. That same year, a public awareness campaign featuring vaccinated girls was introduced. These efforts led to a gradual recovery in vaccination rates, with uptake increasing to approximately 55% in 2017 and further rising to 61% in 2018.¹⁵

This event significantly impacted HPV vaccine uptake in Ireland and highlights the importance of evaluating relevant studies to understand the influence of public perception, media, and targeted health communication on vaccination rates.

METHODS

Overview

The primary focus of this review was to identify studies exploring reasons for HPV vaccine uptake or refusal among Irish adolescents or their parents. The Irish context was crucial, as cultural and societal norms can significantly influence vaccination decisions. The Arksey and O'Malley Framework was employed for data collection.¹⁶ According to Arksey and O'Malley, the literature identification method in a scoping review must yield broad and comprehensive results, with relevance to the research question taking precedence over study design.¹⁶ Therefore, initial search terms were minimally restricted to maximise the results. A preferred reporting items for systematic reviews and meta-analyses (PRISMA) flowchart was subsequently used to map the literature selection process.¹⁷ The search followed five key steps: defining the research question, identifying relevant studies, selecting eligible studies, charting the data, and summarising the findings.

Search strategy

Preliminary searches were conducted to familiarise with the literature and identify effective keywords relevant to the Irish context. The final search was carried out on 15 June 2022, using two electronic databases: PubMed and Google Scholar. The search term used on both platforms was “human papillomavirus vaccine Ireland”, restricted to articles published from 2008 onwards and in English, to ensure inclusion of recent and relevant studies. Results were exported into an Excel spreadsheet, and duplicates were removed during screening.

Inclusion and exclusion criteria

A broad search term was intentionally used to maximise initial yield, allowing for more effective screening. The

inclusion and exclusion criteria applied were: any study type (qualitative or quantitative), English language only, studies conducted in Ireland, focus on factors affecting HPV vaccine uptake from the perspective of: Irish adolescents, their parents, healthcare workers, scientific laboratory-based studies were excluded

Study selection

Study selection was conducted in three stages, using a PRISMA flowchart to organise and visualise the process.¹⁷

Initial screening of titles and abstracts for relevance to the research question.

Full-text review of unclear articles by examining the introduction, aims, results, conclusion, and implications.

Final selection and data extraction

Out of 72 articles screened, 12 articles were retained for full review and further analysed for eligibility.

Data extraction and charting

For each article, the following data were collected using a structured proforma: title, author(s), year of publication, journal, study aim, participant demographics (age, gender, role), and data collection method. Key findings were also extracted, particularly regarding how specific factors influenced different cohorts.

RESULTS

The selection process of the studies is shown in the PRISMA flowchart below, along with the inclusion and exclusion criteria.¹⁷ The search spanned from the year 2008 to the year 2022. This ensured the studies chosen were relevant to the societal norms today.

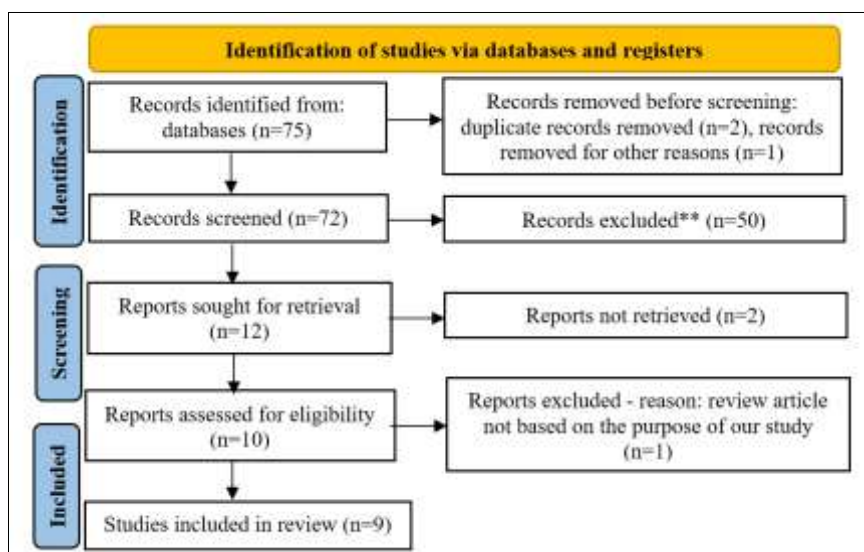


Figure 2: PRISMA flowchart.

Year of undertaking

If we choose the year 2015 as a central point as that was when the anti HPV vaccine campaign was run by lobby groups, we see prior to that year three papers had explored thoughts in relation to the HPV vaccine in Ireland, after 2015 there have been 6 studies published with two being conducted in the year 2022.^{15,18-25} This information has been represented in Figure 2.

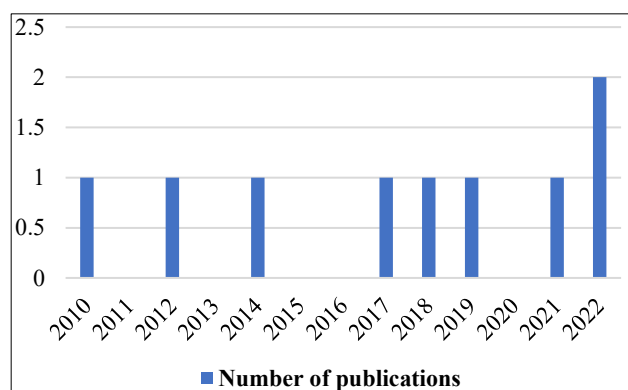


Figure 3: Distribution of studies undertaken over the years 2010-2022.

Types of studies

If we analyse the studies gathered, we find that five were qualitative, 2 were quantitative, 1 was a randomised controlled trial and one adopted a mix between qualitative and quantitative study.

Methodology

Further analyses of the methodology reveals that one study was a quantitative in nature and generated its data through the Irish Schools Immunisation System, two used focus groups, two used semi-structured interviews, 2 used questionnaires, one was a randomised control trial while a systemic review was also included. All these different approaches have their various pros and cons, but this allows us to examine the topic at hand through different lenses.

Demographics

Next, if we consider the age group recruited, we find that 7 out of 8 studies considered an adult perspective, which consisted of either women, parents, or healthcare professionals. Only two papers explored an adolescents' point of view.

Limitations and challenges

It is of utmost importance that limitations and challenges of these studies are evaluated so these can be addressed in future studies. Despite each paper having its own specific limitations, the more general limitations reported amongst

paper were small sample size, a more desirable sampling technique, and lastly and perhaps slightly concerning the limitation of social desirability bias. The issue with social desirability bias is that it can lead to participants making false claims which leads to inaccurate research results thus making them invalid.

Determinants of HPV vaccination decision

Findings from the studies included in the scoping review on factors affecting an Irish women's decision to get the HPV vaccination four key influences have been identified which are represented in Figure 3.

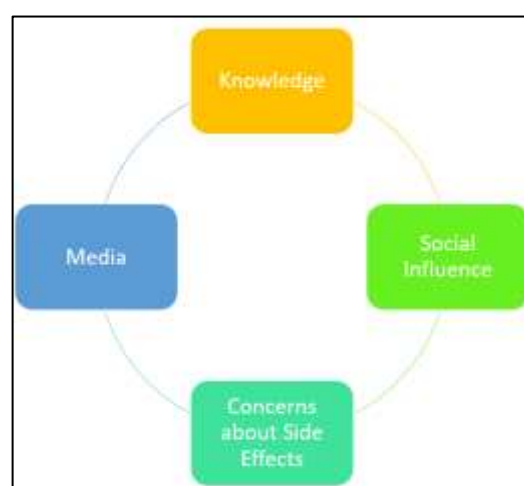


Figure 4: Factors for HPV vaccine hesitancy.

In terms of factors influencing an Irish woman's decision to get the HPV vaccine, all 9 studies highlighted how social influence plays an important part in this decision most of them reporting healthcare workers (HCWs) being key, while 7 out of 9 articles mentioned how a knowledge or lack thereof about either the HPV infection itself or the HPV vaccination affected the decision whether or not to get the vaccine.

Social influence

Eight out of nine papers highlighted how in one way or another healthcare worker's influence the decision while one paper pointed out that teachers are responsible for disseminating information regarding vaccination and obtaining consent.^{15,18,19,21-25} Revisiting the role of the healthcare workers, those receiving the HPV vaccine themselves or deciding whether or not to vaccinate their child, general practitioners or practice nurses were relied upon for their knowledge and opinions. It has also been proposed that HCWs use social media in such a way as to improve the HPV vaccine uptake.

Knowledge

The second most cited reason for vaccine hesitancy is knowledge.^{15,18,19,22-25} There seems to be a gap in either the

parent's, adolescent or the healthcare workers. If the healthcare worker is not confident in the vaccine it ultimately leads to the parent/adolescent not being confident in the vaccine.

Concerns about side effects

Several studies cited that potential side effects would deter them from either getting the HPV vaccine themselves or for their child.^{15,23-25} We know WHO's stance on the serious side effects of the HPV vaccine, it states that despite there being case reports flagging the development of new chronic conditions post-vaccination, including autoimmune in nature, "a well-conducted population-based study on post-licensure safety surveillance showed no association between HPV vaccine and such conditions".

Media

Adolescents and parents also cited negative social media campaign in the Irish studies as their reason for being hesitant to getting vaccinated for the HPV.^{15,24} As mentioned earlier, there was a massive anti-HPV vaccine campaign aired on national television in the year 2015 which negatively impacted the rate of the HPV vaccine uptake. Although such a campaign has not run since on mainstream media, there are still negative sentiments present on social media.

DISCUSSION

Now, if we turn to the world outside of Ireland, we can examine each factor in light of studies carried out in other countries.

Social influence

Will healthcare workers employing social media as their tool to increase HPV vaccine uptake in the community make efficient use of our limited resources? If we briefly look at the impact of social media on the HPV vaccination uptake in the US, we are told that a rather large proportion of American adults receive news through social media. A 2018 study of parents of American adolescents, reported that 45% of the participants had heard stories about the HPV vaccine.²⁶ Despite the higher number of pro vaccine social media posts, 19% of the 564 respondents in the study only recalled narratives about vaccine harms, 11% had heard about complications that could be prevented by the HPV vaccine, and 15% had heard stories about both HPV vaccine harm and the conditions it could prevent.

Unfortunately, participants were more likely to remember information about the cons of the HPV vaccine harms as opposed to the pros from both social media and traditional media. However, participants could recall benefits of the HPV vaccine if they were derived from having a personal conversation.

In addition, this study highlighted an association between exposure to HPV vaccine message and parental intention for child vaccination, with those who could recollect both positive and negative messages were less likely to vaccinate their child against HPV as opposed to those who remembered only the benefits. Undeniably, often at times emotion outweighs logic, while social media posts promoting the benefits of the HPV vaccine increase the knowledge about the HPV vaccine, it has not been shown to increase vaccination uptake. This brings us back to the suggestion whereby Irish healthcare workers should use social media as a way to increase the HPV vaccination uptake in the community, perhaps the way to go about is to start having personal conversations with the patients.

Knowledge

There is an American study in which an educational workshop was organised which provided education in relation to HPV first and second-year medical students at the University of Nevada.²⁷ The aim of this interactive workshop was to increase awareness of HPV and its associated complications and to increase providers' confidence level when providing information to patients on the benefits of the HPV vaccine. A follow-up survey was administered to medical students after 1.5 years to evaluate impact on information retention and vaccine uptake. The results were as follows; the long-term knowledge scores were higher when compared to the control group of medical students who did not participate in the workshop and the HPV vaccination rates at the medical school's clinic also increased, from an average of 1.89 HPV vaccines given per clinic to 3.55 and this was statistically significant ($p=0.001$).

A learning point from this could be instead of investing on social media campaigns which have shown to have little impact on the HPV vaccine uptake as mentioned above perhaps investment could be directed towards setting up GP practice for healthcare workers or school-based workshops where parents and adolescents can learn about HPV, its complications and how the HPV vaccine prevents them.

Concerns about side effects

I found two studies conducted in the US which focused on side effects as being a barrier to getting the HPV vaccine, in order to see if there is something that can be adopted into an Irish context. The first study stated that the parents that participated in their study would prefer side effects to be listed explicitly so they could determine which side effects they deemed to be "serious".²⁸ In another study parents again showed concerns regarding safety and the newness of the HPV vaccine.²⁹

It was also reported that even if the information came from a healthcare provider, they would be cautious. Perhaps studies can be conducted in an Irish setting to understand how parents can be reassured of the side effects provided

the HPV vaccine has been given the green light for use by the health service executive (HSE) and the WHO.

Media

To support HPV vaccine uptake, it is important to provide accurate dissemination of vaccine information. One increasing form of vaccine information dissemination is social media, which is concerning given that a majority of vaccine content on social media consists of misinformation, concerns about side effects, conspiracy theories with pharmaceutical companies, or other threats on vaccine efficacy.

Vosters et al tells us about a Scottish multi-media campaign (including Internet, TV and cinema) which was devised and implemented to raise awareness, understanding and acceptance of HPV immunization among girls and their parents, healthcare and education professionals.³⁰ The campaign included briefing key stakeholders, informing healthcare providers through regular professional correspondence, and training vaccinators. The tagline for all materials ‘Together we can beat cervical cancer’ and an image based on a schoolgirl talking to her peers was utilised. More work was done to reach girls who had passed out of school, including using pink campervans to promote awareness. The campaign involved public communications experts, training experts, epidemiologists and representatives from schools, education, general practice, a national health telephone help-line (NHS24), health boards and other workstreams. The chair was a senior communications expert from the National Health Service. Perhaps the HSE can consider adopting a similar nationwide campaign.

CONCLUSION

While dealing with HPV vaccine confidence it is vital to identify where pockets of vaccine hesitancy exist, survey public confidence, to create an understanding of scope, context, root causes of vaccine hesitancy, and to use region-specific, evidence-based strategies from successful campaigns elsewhere to address underlying issues effectively and efficiently.

We have identified several gaps in the Irish HPV vaccine scene through our scoping review. Firstly, only 9 studies have been carried out in the span of 12 years on such an essential topic. Further research is needed in the area. Perhaps future studies can focus on adolescents whereby campaigns are targeted at providing information to the females who will be given the opportunity to avail of the vaccine whilst in secondary so they can make their own decision or perhaps help their parents in coming to a decision. The key is to start communication strategy early, allowing for time to anticipate difficult issues, and building multidisciplinary team to integrate all relevant sectors.

Also, consideration should be given to those females that the service does not easily reach is recommended, we are

particularly considering those in the travelling community as they may be the girls who are at higher risk of developing cervical cancer and would benefit most from the vaccine. Communication is most likely to effectively reach these girls, and their parents, through channels that they identify with and trust, studies need to be conducted looking specifically at this cohort.

Of note, given that a lot of the studies adopted a qualitative approach it is understandable why the sample size was kept small but perhaps having a larger sample size will help identify other factors that may keep an individual from getting the HPV vaccine or it highlight a reason why someone would get the HPV vaccine which can be utilised when preparing a promotional campaign for the vaccine, studies with larger sample sizes will produce more generalisable results and findings.

In conclusion, despite there being an increased interest in the topic of HPV vaccination post 2015, we have marked the literature present and identified gaps present along with recommendations from other countries which can form the basis of future studies in the area.

ACKNOWLEDGEMENTS

Author would like to thank Dr. Nasih Othman for providing his valuable input in the study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Shahzad V. A scoping review exploring the uptake of the human papilloma virus vaccine amongst young women in Ireland. *Int J Community Med Public Health* 2025;12:4710-6.