



Health system barriers to HPV-vaccination in adolescent females with a Moroccan or Turkish migration background in the Netherlands: A qualitative study

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ABSTRACT

Introduction: In the Netherlands HPV-vaccination uptake is low among females with a Moroccan or Turkish migration background. The aim of this study was to identify health system barriers to HPV-vaccine uptake among these females.

Methods: A qualitative study, using semi-structured interviews and focus group discussions, was performed between October 2021 and June 2022. Included were female adolescents (12–18 years old), parents and grandparents who identify as 1st or 2nd generation migrants from Morocco or Turkey and healthcare professionals involved in childhood vaccinations working with the specific target populations. The World Health Organization (WHO) Health Systems Framework served as a conceptual model.

Results: Twenty-two community members and 12 healthcare professionals participated in the study. Health system barriers were found in four out of six building blocks. Reported barriers included a lack of awareness raising initiatives on HPV, lack of human resources available for tailored HPV vaccination, HCPs being insufficiently trained to provide tailored care, lack of or insufficient delivery of HPV (vaccination) information, language barriers, insufficient access to services, the lack of coordination between health services and providing the HPV vaccine as a stand-alone vaccine.

Conclusion: Several health system barriers to HPV vaccination among female adolescents with a Moroccan or Turkish migration background in the Netherlands were identified. To increase HPV-vaccine uptake according to the WHO global strategies to eliminate the burden of cervical cancer, we need the development of tailored interventions that address these health system barriers and target these underserved populations.

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1. Introduction

Human papillomavirus (HPV) infection is associated with different types of cancers in the anogenital region and oropharynx in men and women. It is the most common cause of cervical cancer [1–4]. It was estimated that in 2020 nearly 60,000 women were newly diagnosed with cervical cancer in Europe and almost 26,000 women died from the disease [5]. Vaccination against HPV is safe and effective in providing long term protection against HPV related disease [6–10]. A key objective of the World Health Organization (WHO) global strategy to eliminate cervical cancer as a public health concern is achieving a vaccination rate of 90 % among all 15-year-old female adolescents by 2030 [9].

Routine vaccination against HPV was introduced in the Dutch National Immunization Program (NIP) in 2010 and initially aimed at vaccinating 13-year-old females. Since 2022 both boys and girls are invited to receive the bivalent HPV vaccine through a two-dose schedule in the year they turn 10 years old. HPV vaccination within the NIP is offered through large-scale group-based immunization events which are organized twice a year and are executed by regional public health services. HPV vaccination in the Netherlands is non-mandatory and available free of charge to all children up to the age of 18 [11]. Since its introduction, the national-level uptake of the full course of HPV vaccination ranged between 45.5 % and 63.1 %, with lowest uptake in 2018 and highest uptake in 2021 [12–15].

In the Netherlands, HPV-vaccine uptake is lower among females from families with a Moroccan or Turkish migration background compared to females without a migration background. These two groups represent the largest populations with a migration background living in the Netherlands [16]. According to public health reports from 2020, the uptake of the complete HPV vaccination course among these populations in the four largest Dutch cities (Amsterdam, Rotterdam, the Hague and Utrecht) was only 14.5 % [17]. Another 2017 study found that HPV-vaccine uptake ranged between 16.5 %–18.8 % among respectively first and second-generation Moroccan female adolescents and 20.5 % - 26 % for first and second-generation Turkish female adolescents [13].

Previous research on HPV vaccination in these population groups mainly focused on individual health beliefs and attitudes and very limited evidence is available on health system barriers as a cause for low HPV-vaccine uptake in females with a Moroccan or Turkish migration background living in the Netherlands [18–24]. The aim of this study was to identify health system barriers to HPV vaccination among female adolescents with a Moroccan or Turkish migration background in the Netherlands.

2. Material and methods

2.1. Study design and study population

We conducted a qualitative study in which we included female adolescents (12–18 years old), parents and grandparents who identify as 1st or 2nd generation migrants from Morocco and Turkey (community members), and healthcare professionals (HCP) involved in childhood vaccination, especially in female adolescents with a Moroccan or Turkish migration background [16].

2.2. Recruitment

We recruited participants via purposive and snowball sampling throughout the Netherlands. Community members were recruited via 1) organizations that work with people with a migration background; 2) networks of the researchers; 3) social media; 4) poster leaflets in public spaces. Study information was provided in Dutch, Moroccan-Arabic or

Turkish. HCP were recruited via healthcare institutions (public health services, youth health services, general practices). Study information (in Dutch) was shared within the organizations. For community members, we aimed for a diversity in HPV vaccination status (for the adolescents), education level, place of residence, position in the family (adolescent, (grand) parent) and migration generation. For HCPs we strived for diversity in gender (male/female) and discipline (physician/nurse) and for variety in work setting (public health services, youth health services or general practice). Community members and HCPs that were interested in participating were asked to share their contact details after which the researchers contacted them and explained the study.

2.3. Data collection

We conducted semi-structured interviews with community members. Interviews were done in either Dutch, Moroccan-Arabic or Turkish. Interviews were conducted mostly face-to-face, with a small number conducted online. Depending on the preference of the participants the interview was conducted by a man or woman. Interviews were done individually by BvE, JdZ, OB or SB. OB was able to conduct interviews in Turkish and SB was able to conduct interviews in Moroccan-Arabic. Additionally, two Turkish students who were studying in the Netherlands for short-term periods, also contributed by interviewing some members of the Turkish communities. All interviewers received training on how to conduct interviews and focus group discussions by a qualitative research specialist. All interviews were digitally recorded and on average took 60–90 min. Transcripts were not returned to participants. All participants received a gift voucher of 10 euros after the interviews.

Focus group discussions (FGDs) – one with medical doctors and one with nurses – were held online and video-recorded. Focus group discussions were led by a moderator (JdZ) and a co-moderator (BvE). FGDs took approximately 2 h. A summary of the focus group discussion was shared with the participants.

Interviews and focus groups took place between October 2021 and June 2022.

2.4. Topic guides

To explore health system barriers, we used the WHO Health Systems Framework as guideline for the topic guides of both the interviews and FGDs [25]. This well-known framework describes health systems in terms of six building blocks: Leadership/governance, Financing, Medical products, Health information systems, Health workforce, and Service delivery [25]. The topic guide for the FGDs was refined based on the results of the interviews.

2.5. Data analysis

Audio- and video-recordings in Dutch were transcribed verbatim by a professional transcribing agency. Recordings in Moroccan-Arabic or Turkish language were transcribed verbatim by two research team members (OB and SB) that were familiar with these languages. Data were thematically analysed according to the steps described by Braun and Clarke [26]. Deductive and inductive approaches were used to identify health system barriers and themes according to the WHO Health Systems Framework. Data collection was continued until data saturation was reached [27].

The software used for analysis was Atlas.ti (version 9).

3. Results

3.1. Descriptive results

We interviewed 22 community members: nine female adolescents, 10 mothers, one father and two grandmothers (Table 1). Twelve HCPs

Table 1

Overview of community members who participated in semi-structured interviews on health system barriers to HPV-vaccination in adolescent females with a Moroccan or Turkish migration background in the Netherlands between October 2021–June 2022.

Participant ID	Migration Background	Position in the family	Age in years	Migration generation	Educational level	Place of residence in the Netherlands (Province)	Female adolescent in family received HPV vaccination	Interview face-to-face or online
Community member 1 ¹	Turkish	Female adolescent	14	2nd	High school	Gelderland	Yes	Face-to-face
Community member 2 ¹	Turkish	Female adolescent	14	2nd	High school	Gelderland	Yes	Face-to-face
Community member 3 ¹	Turkish	Mother	42	1st	High school graduate	Gelderland	See participant 1 and 2	Face-to-face
Community member 4 ¹	Turkish	Father	45	2nd	High school graduate	Gelderland	See participant 1 and 2	Face-to-face
Community member 5 ²	Turkish	Female adolescent	15	2nd	High school	Groningen	No	Face-to-face
Community member 6 ²	Turkish	Mother	35	1st	High school not graduated	Groningen	See participant 5	Face-to-face
Community member 7 ²	Moroccan	Female adolescent	18	2nd	High school	North Holland	No	Online
Community member 8 ²	Moroccan	Mother	46	2nd	High school graduate	North Holland	See participant 7	Face-to-face
Community member 9 ²	Moroccan	Female adolescent	18	2nd	Secondary vocational education	Utrecht	No	Online
Community member 10 ²	Moroccan	Mother	53	1st	Primary school or less	Utrecht	See participant 9	Online
Community member 11	Turkish	Grandmother	Not asked	1st	Not asked	Groningen	Yes	Face-to-face
Community member 12	Turkish	Mother	42	2nd	Higher vocational education	Groningen	No	Face-to-face
Community member 13	Turkish	Grandmother	63	1st	High school graduate	Groningen	No	Face-to-face
Community member 14	Turkish	Female adolescent	15	2nd	High school	Groningen	Yes	Face-to-face
Community member 15	Turkish	Mother	52	1st	Higher vocational education	Groningen	No	Face-to-face
Community member 16	Turkish	Mother	44	1st	Secondary vocational education	Groningen	Yes	Face-to-face
Community member 17	Turkish	Female adolescent	17	2nd	Not asked	South Holland	No	Face-to-face
Community member 18	Turkish	Female adolescent	16	2nd	Secondary vocational education	South Holland	Does not know	Face-to-face
Community member 19	Turkish	Mother	52	1st	Higher vocational education	Overijssel	No	Face-to-face
Community member 20	Moroccan	Female adolescent	18	2nd	Secondary vocational education	Utrecht	No	Online
Community member 21	Moroccan	Mother	41	1st	Primary school or less	Utrecht	No	Online
Community member 22	Moroccan	Mother	45	1st	Secondary vocational education	Utrecht	No	Face-to-face

¹ Family: father, mother, twin sisters. ² Mother-daughter dyad.

Table 2

Overview of healthcare professionals who participated in online focus group discussions on health system barriers to HPV-vaccination in adolescent females with a Moroccan or Turkish migration background in the Netherlands, 2022.

Participant ID	Focusgroup	Sex	Profession	Years of working experience	Place of work in the Netherlands (Province)
HCP ¹ 1	Focusgroup 1	Female	Youth healthcare physician	4	North Holland
HCP 2	Focusgroup 1	Male	Youth healthcare physician	15	Utrecht
HCP 3	Focusgroup 1	Female	Community Physician	20	South Holland
HCP 4	Focusgroup 1	Female	Community Physician	2	Utrecht
HCP 5	Focusgroup 1	Female	Community Physician	15	Gelderland
HCP 6	Focusgroup 1	Female	Community Physician	17	South Holland
HCP 7	Focusgroup 1	Female	General Practitioner	16	Overijssel
HCP 8	Focusgroup 2	Female	Nurse in youth health	27	Utrecht
HCP 9	Focusgroup 2	Female	Nurse in youth health	5.5	Overijssel
HCP 10	Focusgroup 2	Female	Nurse in youth health	15	South Holland
HCP 11	Focusgroup 2	Female	Nurse in youth health	1.5	South Holland
HCP 12	Focusgroup 2	Female	Nurse in youth health	15	Overijssel

¹ HCP: Healthcare professional.

participated in the focus group discussions: seven medical doctors (FGD1) and five nurses in youth health care (FGD2) (Table 2).

3.2. Experienced health system barriers

A variety of health system barriers were identified for the low HPV-vaccine uptake among females with a Moroccan or Turkish migration background. The identified health system barriers along with corresponding Health Systems Framework building blocks are described below.

3.3. Barriers in leadership and governance

Lack of awareness raising initiatives about vaccine preventable diseases. A first barrier that was mentioned by the participants was that previous HPV public campaigns failed to reach people. HCPs explained that with the introduction of HPV vaccination many people were afraid to get vaccinated, because it was a new vaccination. Although public campaigns were conducted, subsequent efforts to raise awareness were limited, resulting in insufficient provision of information. According to the participants, this has led to fear and misunderstandings about HPV vaccination. Moreover, HCPs indicated that the recent focus on COVID-19 vaccination has diverted attention from HPV vaccination. HCPs reported that insufficient health promotion and HPV awareness campaigns likely reinforced misunderstandings people may have about HPV vaccination, particularly among specific populations and communities.

"I witnessed the introduction of the HPV vaccine ten years ago. And at that time, there was a lot of publicity and explanation. Because it was a new vaccine, half of all people gave up because they were afraid of side effects. And there was no good information campaign or discussion partner after that. ..." (HCP 2).

3.4. Barriers in health information systems

HCPs acknowledged that extra effort is needed to reach those who are not vaccinated against HPV. However, according to HCPs, accessing and using the Dutch electronic medical records databases is both complex and time consuming. This makes it almost impossible to identify unvaccinated individuals and have a conversation with them about reasons for not coming forward for vaccination.

"And what we do with group-based vaccinations ... It is just abracadabra; you just don't know who comes. Yes, you could look into the local database and call them afterwards, but then time and research are what you need." (HCP 5).

3.5. Barriers in health workforce

Lack of human resources available for HPV vaccination. Although HCPs described large-scale group-based immunization events as an efficient use of financial and human resources, it was believed that small-scale and tailored immunization approaches would be more effective to reach the Moroccan and Turkish communities. However, HCPs explained that a lack of human and financial resources makes it impossible to organize such programs.

"And we really have staff shortages; in order to implement a smaller scale policy, we are very much confronted with a shortage of doctors and nurses. ..." (HCP 2).

Insufficiently trained and skilled healthcare providers. HCPs explained they find it difficult to actively address HPV vaccination during consultations as there is limited time and they do not feel prepared to answer difficult questions.

"...But that it is actually the point to find an opening to start the conversation. ...So that is actually the barrier, that you need to think about it and when? ..." (HCP 7).

Moreover, HCPs mentioned being reluctant to start a conversation about HPV vaccination if they had the feeling that people were critical about vaccination, because they felt that they should immediately be able to have sufficient and correct knowledge about HPV and HPV vaccination and be able to convey this.

"...You will find someone opposite of you with a lot of arguments. Well, you need to have that information and knowledge directly available. Yes, colleagues do find it difficult." (HCP 6).

3.6. Barriers in service delivery

Lack of or insufficient delivery of HPV (vaccination) information. Most community members mentioned they had heard about HPV vaccination and know that HPV vaccination is provided to prevent cervical cancer but indicated that they still lack knowledge what HPV is and what HPV vaccination entails. The invitation letters and brochures currently used, constitute barriers for people to understand and use information on HPV vaccination. Participants mentioned that they often did not read or understand the information, as the information was provided in Dutch, was found too difficult or the lay-out of the information material was not attractive to read.

"I did not read it [information folder on HPV], because I did not understand it at the time." (Community member 3).

Community members and HCPs mentioned that a lot of HPV (vaccine) information is shared and discussed through social conversation and on social media. Community members are sensitive to the information their peers provide. It was mentioned that sending an invitation letter to get vaccinated might not be the best way to reach community members.

"...Just because we know so little about it [HPV vaccination] we think, it is easiest to throw it [invitation letter] away. But we actually have a neutral stance, so I think we could be easily persuaded to get the shot. But of course, you need to have knowledge and some education. And not a letter that is similar all the time, saying something like 'get your shot'." (Community member 20).

The focus of information on sexual transmission of HPV was mentioned as a reason to not vaccinate. Community members explained that according to their Islamic faith they are not allowed to have sexual intercourse before marriage and having multiple partners. Consequently, participants believe that HPV vaccination is unnecessary.

"...Basically, I think that if you are not sexually active, then I do not think it [HPV vaccination] is necessary." (Community member 19).

This assumption is sometimes reinforced by professionals, according to some participants.

"...And he [general practitioner] told me something like: 'Because of your Turkish culture and your religion sexual intercourse before marriage often does not happen'. ...He said: 'Because it is transmitted through sexual intercourse, and if you trust your partner, I do not believe it is necessary for you to vaccinate'. ..." (Community member 12).

Insufficient coordination of health services. HCPs mentioned that they would like to work more collectively with other disciplines to overcome barriers and improve access to HPV vaccination (information). HCPs think that people probably first turn to their GPs if they have questions about HPV vaccination, because GPs are often better known and trusted by people compared to HCP working at public health services. GPs might refer people to public health services as in the Netherlands GPs are not

primarily responsible for HPV vaccination. According to HCPs all steps (making a phone call, speak to someone, finding the right person, etc.) that people need to take to get informed were considered to be potential barriers.

“...But also, to make a phone call you need to overcome some barriers; you need to speak to someone personally, you need to understand what the other is saying, you need to know the phone number. ...” (HCP 4).

Providing the HPV vaccine as a stand-alone vaccination. Another health system barrier mentioned by HCPs is that the HPV vaccination is not given together with other vaccinations. It was explained that providing the HPV vaccine as a stand-alone vaccine draws more attention to HPV vaccination which will make certain populations more reluctant to get vaccinated because they already have negative beliefs on HPV vaccination.

“...I think it would help if HPV-vaccination is given together with that MMR [Measles, Mumps and Rubella vaccination]. Because if you are invited solely for HPV then it will also be a separate moment that you will think about it [HPV-vaccination].” (HCP 10).

Insufficient access to services. Both community members and HCPs believed that a long distance to vaccination locations and having appointments scheduled during the day are barriers for vaccine uptake.

“I think, because many parents work, and I believe they have their work until 5 ..., then I think it is better to be able to schedule appointments in the evening as well. ...” (Community member 9).

4. Discussion

This study explored health system barriers to HPV vaccination among female adolescents with a Moroccan or Turkish migration background in the Netherlands. Identified health system barriers were found within four out of six building blocks of the WHO Health Systems Framework and mainly concerned a lack of awareness raising initiatives on HPV, lack of human resources available for tailored HPV vaccination, HCPs being insufficiently trained to provide tailored care, lack of or insufficient delivery of HPV (vaccination) information, language barriers, insufficient access to services, the lack of coordination between health services and providing the HPV vaccine as a stand-alone vaccine. In our study we did not identify barriers within the building blocks of Financing and Medical products.

To our knowledge no previous research using a health system barriers approach to HPV vaccination among females with a Moroccan or Turkish migration background has been conducted. For the Netherlands indirect information on health system barriers to vaccination or access to HPV services could be retrieved from studies on cervical cancer screening and studies on childhood vaccination targeting migrant populations. These studies did reveal language barriers and limited access to services [20,21]. Research among Somali women in the Netherlands aligns with our finding that people with an Islamic background believed that HPV vaccination was not necessary as according to their religion they would not have pre-marital sex [23]. In another study on intention to vaccinate against HPV, including non-Dutch parent-daughter dyads, it was suggested that the provision of large-scale group-based immunization programs might negatively affect vaccine uptake, because these programs provide limited opportunity to have a personal conversation with a healthcare professional [22].

Health system barriers that are mentioned in studies on HPV vaccination in other ethnic minority populations in different countries are insufficient delivery of information [28–34], language barriers [29–31,33,34], and financial barriers in contexts where HPV vaccination is not provided for free [31,32,34]. Moreover, barriers are described that relate to the knowledge people have on the sexual transmission of HPV [28–33], safety concerns and worries about side effects of

vaccination [28–32,34]. Finally, also a lack of trust in governmental organizations is mentioned [29,30,34].

The results of our study offer comprehensive insight into barriers within the Dutch healthcare system that contribute to low HPV-vaccine uptake among female adolescents with a Moroccan or Turkish migration background. Results show perspectives of both community members and HCPs. The use of the WHO Health Systems Framework served to identify barriers from a health system perspective instead of the perspective of participants' individual beliefs or attitudes towards vaccination. Although these beliefs or attitudes might be closely related to the identified barriers, the use of a health system perspective provides an opportunity to identify existing barriers within the health system. Additional research is required to identify the best strategies on how to overcome these barriers.

The different WHO health system building blocks are interrelated [25,35]. Therefore, it is plausible that strengthening awareness raising initiatives and increasing the health workforce for the provision of information and vaccination might address barriers related to the delivery of information and access to vaccination services. Moreover, findings such as some HCP suggesting that it is not necessary to get vaccinated if not having multiple sexual partners and community members often being informed through conversations with peers instead of using written information letters show that the current provision of information is not aligned to sociocultural customs. These results show the importance to address these barriers and to have a culture sensitive approach.

Identification of effective and acceptable strategies on how to address these barriers and development of tailored immunization programs therefore seems needed to improve HPV vaccine uptake in these underserved populations in the future. For instance, our findings showed that framing HPV as a sexually transmitted disease was found to be a barrier to HPV vaccination. Shifting the focus to present HPV vaccination as a preventive measure against various types of cancer may prove more effective.

Our findings might also be relevant for increasing the uptake of other vaccines in Moroccan and Turkish populations in the Netherlands. For example, the vaccination coverage for meningococcal disease and measles, mumps and rubella (MMR) are also lower compared to national averages [15,36,37]. Furthermore, we believe our study results are of importance for other underserved populations. Not only in the Netherlands, but also in other countries. The barriers identified add to previous findings on health system barriers affecting vaccine uptake in different ethnic minority populations in different countries.

Our study focuses on female adolescents with a Turkish or Moroccan migration background in the Netherlands. Yet, the recommendations for developing tailored immunization programs might be applicable to the broader population. In the Netherlands nationwide vaccine uptake is low and not reaching global targets, as set by the WHO, that 90 % of all female adolescents are vaccinated in order to eliminate the burden of cervical cancer [9]. Therefore, various extra efforts to improve HPV vaccination uptake in the Netherlands are needed. Based on our findings that barriers for low vaccine uptake can be found at different levels, involvement of different stakeholders, including policy makers, healthcare professionals, researchers and the public is needed.

Coinciding with the planning of our study in 2022 the national immunization program in the Netherlands has changed: both boys and girls are invited in the year when they turn 10 years old. In our study we included female adolescents 12–18 years old, as previously only female adolescents were invited (in the year they turned 13 years old). Most recent data on national HPV vaccine uptake is that in total 60.1 % of all eligible girls and 51.8 % of all boys received HPV vaccination. These are the first results on uptake among boys. [38] To our knowledge no research has been done regarding uptake among boys with a Turkish or Moroccan migration background in the Netherlands. Based on the previous findings that uptake is significantly low among female adolescents with a Turkish or Moroccan migration background it is recommended to

conduct research on HPV vaccine uptake among boys with a Turkish or Moroccan migration background and to include younger age groups.

A limitation of the study might be that we included fewer participants with a Moroccan migration background than participants with a Turkish migration background. Therefore, information on barriers to HPV-vaccine uptake in specifically this group may have been missed. Nevertheless, the participants with a Moroccan background that we included in our study mentioned the same health system barriers as participants with a Turkish background.

5. Conclusions

Several health system barriers to HPV vaccination among female adolescents with a Moroccan or Turkish migration background in the Netherlands were identified. To reduce health inequalities and to improve vaccine uptake in these underserved communities we need development of tailored interventions that address these health system barriers and target these populations.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. The study was approved by the ethics board of the University Medical Center Groningen (RIVER-EU; 202,100,489). All participants gave informed consent and anonymity was guaranteed.

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CRediT authorship contribution statement

Bert J.D. van Enter: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Janine de Zeeuw:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Okan Bakar:** Writing – review & editing, Methodology, Investigation, Formal analysis. **Siham Bakhlakh:** Writing – review & editing, Methodology, Investigation. **Maarten F. Schim van Der Loeff:** Writing – review & editing, Methodology. **Cornelis Boersma:** Writing – review & editing, Supervision, Methodology. **Michael Edelstein:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Johanna P.M. Vervoort:** Writing – review & editing, Project administration, Methodology, Funding acquisition, Conceptualization. **Danielle E.M.C. Jansen:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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Data availability

Data will be made available on request.

References

- [1] de Martel C, Plummer M, Vignat J, Franceschi S. Worldwide burden of cancer attributable to HPV by site, country and HPV type. *Int J Cancer* 2017;141:664–70. <https://doi.org/10.1002/ijc.30716>.
- [2] Smith JS, Lindsay L, Hoots B, Keys J, Franceschi S, Winer R, et al. Human papillomavirus type distribution in invasive cervical cancer and high-grade cervical lesions: A meta-analysis update. *Int J Cancer* 2007;121:621–32. <https://doi.org/10.1002/ijc.22527>.
- [3] Tjalma WA, Fiander A, Reich O, Powell N, Nowakowski AM, Kirschner B, et al. Differences in human papillomavirus type distribution in high-grade cervical intraepithelial neoplasia and invasive cervical cancer in Europe. *Int J Cancer* 2012;132:854–67. <https://doi.org/10.1002/ijc.27713>.
- [4] St. Laurent J, Luckett R, Feldman S. HPV vaccination and the effects on rates of HPV-related cancers. *Curr Probl Cancer* 2018;42:493–506. <https://doi.org/10.1016/j.cuprocancer.2018.06.004>.
- [5] Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gomez D, et al. Human papillomavirus and related diseases report in Europe. Summary Rep March 2023; 10:2023. <https://hpvcentre.net/statistics/reports/XWX.pdf>. accessed July 21, 2023.
- [6] Kjaer SK, Nygård M, Sundström K, Munk C, Berger S, Dzabic M, et al. Long-term effectiveness of the nine-valent human papillomavirus vaccine in Scandinavian women: interim analysis after 8 years of follow-up. *Hum Vaccin Immunother* 2021; 17:943–9. <https://doi.org/10.1080/21645515.2020.1839292>.
- [7] Falcato M, Castañon A, Ndlela B, Checchi M, Soldan K, Lopez-Bernal J, et al. The effects of the national HPV vaccination programme in England, UK, on cervical cancer and grade 3 cervical intraepithelial neoplasia incidence: a register-based observational study. *Lancet* 2021;398:2084–92. [https://doi.org/10.1016/S0140-6736\(21\)02178-4](https://doi.org/10.1016/S0140-6736(21)02178-4).
- [8] Lei J, Ploner A, Elfström KM, Wang J, Roth A, Fang F, et al. HPV vaccination and the risk of invasive cervical Cancer. *New England J Med* 2020;383:1340–8. <https://doi.org/10.1056/nejmoa1917338>.
- [9] World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem and its associated goals and targets for the period: 2020. p. 2020–30.
- [10] World Health Organization. Weekly epidemiological record. In: World health organization. 92; 2017. p. 393–404. <https://www.who.int/publications/m/item/WER-2017-vol.-28-28>. accessed July 6, 2023.
- [11] Rijksinstituut voor Volksgezondheid en Milieu (RIVM). HPV - vaccinatie, Factsheet 2022. <https://lci.rivm.nl/richtlijnen/hpv-vaccinatie>. Last accessed 01-02-2025.
- [12] Govers I, Dekker A. Tien jaar HPV- vaccinatie in Nederland en het buitenland. *Nederlandsche Tijdschrift Voor Medische Microbiologie* 2019;3:156–64.
- [13] de Munter AC, Klooster Tms Van T, Van Lier A, Akkermans R, De Melker HE, Ruijs WL. Determinants of HPV-vaccination uptake and subgroups with a lower uptake in the Netherlands. *BMC Public Health* 2021;21:1–13. <https://doi.org/10.1186/s12889-021-11897-0>.
- [14] Hoes J, Schurink-van't Klooster T, Pasmans H, van der Weele P, van Eer K, Woestenbergh P, et al. HPV-vaccinatie in Nederland 10 jaar in het Rijksvaccinatieprogramma, een overzicht. *Ned Tijdschr Med Microbiol* 2019;27: 210–9.
- [15] van Lier A, Oomen PJ, Giesbers H, Hament J-M, van Vliet H, Drijfhout IH, et al. Vaccinatiegraad en jaarverslag Rijksvaccinatieprogramma Nederland 2021. RIVM-Rapport 2022;2022-0017:1–64.
- [16] Centraal Bureau voor de Statistiek. Hoeveel inwoners hebben een herkomst buiten Nederland. 2023. <https://www.cbs.nl/nl-nl/dossier/dossier-asiel-migratie-en-integratie/hoeveel-inwoners-hebben-een-herkomst-buiten-nederland>. accessed June 23, 2023.
- [17] Schouten G. Feitenkaart Vaccineren. 2021. p. 1–7.
- [18] Alberts CJ, Schim Van Der Loeff MF, Hazeveld Y, De Melker HE, Van Der Wal MF, Nielen A, et al. A longitudinal study on determinants of HPV vaccination uptake in parents/guardians from different ethnic backgrounds in Amsterdam, the Netherlands. *BMC Public Health* 2017;17:1–12. <https://doi.org/10.1186/s12889-017-4091-4>.
- [19] Alberts CJ. HPV in minority populations: Epidemiology and vaccination acceptability. 2017.
- [20] Hamdi N, Marchena E, Stein ML, van Steenberg JE, Crutzen R, van Keulen HM, et al. Decision-making, barriers, and facilitators regarding cervical cancer screening participation among Turkish and Moroccan women in the Netherlands: a focus group study. *Ethn Health* 2021;0:1–19. <https://doi.org/10.1080/13557858.2020.1863921>.

- [21] Harmsen IA, Bos H, Ruiter RAC, Paulussen TGW, Kok G, de Melker HE, et al. Vaccination decision-making of immigrant parents in the Netherlands; A focus group study health behavior, health promotion and society. *BMC Public Health* 2015;15:1–8. <https://doi.org/10.1186/s12889-015-2572-x>.
- [22] Jongen VW, Schim van der Loeff MF, Boyd A, Petrignani M, Prins M, van der Wal M, et al. Human papillomavirus vaccination uptake: a longitudinal study showing ethnic differences in the influence of the intention-to-vaccinate among parent-daughter dyads. *Hum Vaccin Immunother* 2021;17:990–9. <https://doi.org/10.1080/21645515.2020.1808411>.
- [23] Salad J, Verdonk P, de Boer F, Abma TA. “A Somali girl is Muslim and does not have premarital sex. Is vaccination really necessary?” A qualitative study into the perceptions of Somali women in the Netherlands about the prevention of cervical cancer. *Int J Equity Health* 2015;14:1–13. <https://doi.org/10.1186/s12939-015-0198-3>.
- [24] Mollers M, Lubbers K, Spoelstra SK, Weijmar-Schultz WCM, Daemen T, Westra TA, et al. Equity in human papilloma virus vaccination uptake?: sexual behaviour, knowledge and demographics in a cross-sectional study in (un)vaccinated girls in the Netherlands. *BMC Public Health* 2014;14. <https://doi.org/10.1186/1471-2458-14-288>.
- [25] World Health Organization. Everybody's business - strengthening health systems to improve health outcomes - WHO's framework for action. 2007. <https://apps.who.int/iris/handle/10665/43918>. accessed July 21, 2023.
- [26] Braun V, Clarke V. Using thematic analysis in psychology using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
- [27] Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant* 2018;52:1893–907. <https://doi.org/10.1007/s11135-017-0574-8>.
- [28] Marlow LAV, Wardle J, Waller J. Attitudes to HPV vaccination among ethnic minority mothers in the UK: an exploratory qualitative study. *Hum Vaccin* 2009;5: 105–10. <https://doi.org/10.4161/hv.5.2.7368>.
- [29] Jackson C, Bedford H, Cheater FM, Condon L, Emslie C, Ireland L, et al. Needles, jabs and jags: A qualitative exploration of barriers and facilitators to child and adult immunisation uptake among gypsies, Travellers and Roma. *BMC Public Health* 2017;17. <https://doi.org/10.1186/s12889-017-4178-y>.
- [30] Ferrer HB, Trotter C, Hickman M, Audrey S. Barriers and facilitators to HPV vaccination of young women in high-income countries: A qualitative systematic review and evidence synthesis. *BMC Public Health* 2014;14. <https://doi.org/10.1186/1471-2458-14-700>.
- [31] Jeudin P, Liveright E, Del Carmen MG, Perkins RB. Race, ethnicity, and income factors impacting human papillomavirus vaccination rates. *Clin Ther* 2014;36: 24–37. <https://doi.org/10.1016/j.clinthera.2013.11.001>.
- [32] Kepka D, Bodson J, Lai D, Sanchez-Birkhead A, Villalta J, Mukundente V, et al. Factors associated with human papillomavirus vaccination among diverse adolescents in a region with low human papillomavirus vaccination rates. *Health Equity* 2018;2:223–32. <https://doi.org/10.1089/heq.2018.0028>.
- [33] Bastani R, Glenn BA, Tsui J, Chang LC, Marchand EJ, Taylor VM, et al. Understanding suboptimal human papillomavirus vaccine uptake among ethnic minority girls. *Cancer Epidemiol Biomarkers Prev* 2011;20:1463–72. <https://doi.org/10.1158/1055-9965.EPI-11-0267>.
- [34] Ganczak M, Kalinowski P, Pasek O, Duda-Duma Ł, Sobieraj E, Gołowski J, et al. Health system barriers to child mandatory and optional vaccination among Ukrainian migrants in Poland in the context of MMR and HPV vaccines—A qualitative study. *Int J Environ Res Public Health* 2023;20. <https://doi.org/10.3390/ijerph20010712>.
- [35] de Savigny D, Adam T. Systems thinking for health systems strengthening. In: *Alliance for health policy and systems research*. WHO; 2009.
- [36] De Oliveira Bressane Lima P, van Lier A, de Melker H, Ferreira JA, van Vliet H, Knol MJ. MenACWY vaccination campaign for adolescents in the Netherlands: uptake and its determinants. *Vaccine* 2020;38:5516–24. <https://doi.org/10.1016/j.vaccine.2020.05.087>.
- [37] Amsterdam GGD. Vaccinatiegraad naar migratieachtergrond. <https://www.ggdgezondheidinbeeld.nl/vaccinatie-migratieachtergrond/>; 2025.
- [38] van Lier E, Hament J-M, Knijff M, Westra M, Giesbers H, Drijfhout I, et al. Vaccinatiegraad en jaarverslag Rijksvaccinatieprogramma Nederland 2024. RIVM-Rapport 2024;2024-0044:1–83.