



BMJ Open PrEP patient attitudes, beliefs and perceived barriers surrounding HPV vaccination: a qualitative study of semistructured interviews with PrEP patients in primary care clinics in Kansas and Missouri

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To cite: Sullivan-Blum ZC, Brophy M, Didde R, *et al.* PrEP patient attitudes, beliefs and perceived barriers surrounding HPV vaccination: a qualitative study of semistructured interviews with PrEP patients in primary care clinics in Kansas and Missouri. *BMJ Open* 2022;**12**:e058510. doi:10.1136/bmjopen-2021-058510

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-058510>).

Received 22 October 2021
Accepted 27 February 2022



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ABSTRACT

Objectives Men who have sex with men who use pre-exposure prophylaxis (PrEP) have not traditionally been targets for human papillomavirus (HPV) vaccine programmes, despite their high risk for HPV-related cancers and HPV vaccine being approved by the U.S. Food and Drug Administration (FDA) for people up to age 45. The objective of this study was to assess attitudes and barriers towards HPV vaccine for adult PrEP users in the primary care context.

Methods Semistructured phone interviews of 16 primary care patients taking PrEP in the Kansas City metropolitan area were conducted, with interviews assessing HPV vaccination status, and attitudes, beliefs and perceived barriers surrounding HPV vaccine. Interview notes were open-coded by student authors, and themes were generated through code review and consensus. Data were then analysed using thematic analysis.

Results The results showed that most patients believed that preventative health was important and felt the HPV vaccine was important. Most patients were open to vaccination if recommended by their primary care physician and covered by insurance. Most participants believed HPV infection to be far worse in women, and there were gaps in knowledge surrounding HPV and its effects in men.

Conclusions While more research is needed to better understand facilitators of a linkage between PrEP and HPV vaccine in clinical settings for groups at high risk for HPV-related cancers, getting primary care providers involved in educating high-risk patients about the importance of HPV vaccination and actively recommending the vaccine to those patients has the potential to prevent HPV-related cancers.

INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the USA.¹ Almost every American who is

Strengths and limitations of this study

- Interviewers were blinded to participant health information; interview questions were modelled from previous studies; interview was scripted and semi-structured; and thematic saturation was achieved.
- Small sample size, mostly from one primary care provider; no formal recordings or transcripts, which limits verbatim quotations; and six separate interviewers, which may have affected participant responses, recorded notes, and strength of interviewers in this topic.
- There was a lack of outreach to underserved and marginalised populations, which resulted in a lack of diversity in the sample, as well as low external validity.

sexually active will get HPV at some point in their life if they do not receive the HPV vaccine.¹ Men who have sex with men (MSM) are at especially high risk for developing cancers from HPV; incidence of anal cancer in particular in this population is significantly higher than in the general population.^{2,3} An underlying human immunodeficiency virus (HIV) infection compounds the already heightened risk for HPV-related cancer, and the increased risk of HIV in this population increases the risk for HPV and related cancers.⁴ Furthermore, out of any population, HIV-positive MSM have the highest risk of anal cancer, as well as significantly higher risk of HPV-related oropharyngeal cancers.⁵ Despite these findings, little research exists on cancer prevention in the form of HPV vaccination for this specific population.

In 2009, 3 years after the HPV vaccine was recommended for the prevention of cervical cancer in adolescent females, the Advisory Committee on Immunisation Practices issued a recommendation that the HPV vaccine also be administered to adolescent males.⁶ Further research found the vaccine to be effective in some instances at preventing precancerous lesions and new HPV infection in adults, even those already exposed to HPV.⁷ In 2018, the U.S. Food and Drug Administration (FDA) approved the HPV vaccine for adults up to age 45.⁸ This does not equate to universal recommendation for everyone age 27 and older, but it does support vaccination efforts for certain populations who had previously ‘aged out’ of the vaccine. Although a large number of people have already been infected with HPV by age 27, the HPV vaccine is still beneficial to many people aged 27 and older as it can protect against new HPV infections.⁷ The HPV vaccine is immunogenic in both women and men aged 27–45,⁸ and numerous benefits outweigh the costs of vaccination, especially in high-risk populations.

Although HPV vaccination is efficacious for prevention of anal and oropharyngeal cancer,⁹ males (particularly adults) have problematically low vaccination rates. As of 2016, less than three percent of males 30 years and older had received at least one dose of the HPV vaccine.¹⁰ Barriers to HPV vaccination for MSM include: minimal awareness of health consequences to men from HPV, little to no awareness of HPV vaccination availability for adults, and lack of insurance or access to healthcare.¹¹ Particularly troubling is the fact that young MSM have low perceived risk from HPV.¹² This underscores the need to further educate both providers and patients about HPV vaccination and how to access it.

Widespread use of HIV pre-exposure prophylaxis (PrEP) among MSM in certain demographic groups suggests an existing culture of prevention in that MSM are motivated to accept and use pharmaceutical technologies to prevent disease.^{13,14} However, the high prevalence of preventable HPV-related cancers reflects the failure of healthcare thus far to leverage this culture of prevention and expand immunisation. As of 2017, 32.8% of MSM respondents to the National HIV Behavioural Surveillance System reported receiving one or more doses of the HPV vaccine.¹⁵ Given the risks for HPV-related cancers among MSM, coupled with elevated risks for contracting HIV, linking preventative strategies represents an important avenue of study.

Primary care clinics have an incredible opportunity to increase HPV vaccination rates and affect HPV-related complications in their communities. Previous studies have shown that clinic initiatives to improve HPV vaccination rates by strongly recommending the vaccine to eligible patients have been successful.¹⁶ This is likely to be especially true when HPV vaccination recommendation is paired with PrEP prescribing.

There are many parallels between access issues to PrEP and HPV vaccination among MSM, including lack of provider awareness about current guidelines and lack

of insurance coverage.^{17,18} Addressing these barriers, as well as the gap in the literature surrounding co-administration of HPV vaccination with PrEP treatment, is vital. This study aims to add to the literature by assessing PrEP patients’ HPV vaccine perceptions and determining any potential barriers to linkage and, ultimately, reducing the incidence of HPV-related cancers in high-risk populations.

METHODS

This study aimed to determine the attitudes, beliefs and barriers of primary care patients on PrEP towards the HPV vaccine. Sixteen interviews were completed (n=16). Inclusion criteria was status as a PrEP patient in the two family medicine clinics where recruitment occurred. Primary care clinics were chosen for recruitment, given the potential of future intervention in that setting. There were no exclusion criteria. Participants were selected through convenience sampling due to the physicians’ roles as coinvestigators in the study and because of the relationship and trust they had already built with their patients. Medical and graduate public health students collected data and were able to refer to their relationship with the academic medical centre, as well as with the primary care physicians.

Six students were trained in qualitative research, including how to perform a semi-structured interview. The interviewers read a script, but were also trained in interview techniques: rapport building, probing, note-taking, etc. The same script was used by all six interviewers. The interview guide may be found in [table 1](#). Interviews were not audio-recorded; interviewers took notes instead in order to maintain confidentiality and rapport. Data were entered in REDCap, a secure research platform. Data were then downloaded into Microsoft Excel for thematic analysis. Questions covered three domains: (1) demographics (age, education level, ethnicity/race, gender, sexual orientation and health insurance); (2) HPV vaccination status and (3) patients’ attitudes, beliefs and perceived barriers towards HPV vaccination. The questions were modelled after previous studies about HIV-positive MSM’s knowledge and perceptions of HPV,¹⁹ as well as incarcerated women’s engagement with cervical cancer prevention.²⁰ The interviews also included a cue to action in the form of contacting either of the primary care physicians on the team if a patient was interested in receiving the HPV vaccine after the interview.

Participants were recruited through (1) cold calls made by the research team using a secure phone app, (2) flyers distributed at in-person visits or (3) messages sent by clinic nurses through patient charts. These recruitment strategies were selected because of the COVID-19 pandemic, which meant the team could not recruit in person. If participants were called directly, a scripted voicemail was left on the first call if it was not answered. If a potential participant was given a flyer or sent a chart message, they emailed the research team, who then called the participant to conduct the interview. Of the potential

Table 1 Interview guide for perceptions about the HPV vaccine from 16 primary care patients taking PrEP

Topic	Question
HPV vaccination status	Have you ever gotten the HPV or human papillomavirus vaccine (also known as Gardasil)?
HPV vaccination status	[If vaccinated] When did you get the vaccine? How many vaccines did you get? What were the reasons you got the vaccine?
HPV knowledge	What do you know about HPV or human papillomavirus?
HPV knowledge	What do you know about the long-term effects of infection with HPV?
HPV vaccine perceptions	The FDA recently approved the 3-vaccine series for people up to age 45. The HPV vaccine prevents cervical cancer in women, but also penile cancer in men and anal, head, neck, and throat cancers. It also prevents genital warts. How important do you think it is to get the vaccine?
HPV vaccine perceptions	[If not vaccinated] What would prevent you from getting the vaccine?
HPV vaccine perceptions	Where does the HPV vaccine fit into your general health?
Cue to action	[If patient has not already been vaccinated and <45 years old] The vaccine is covered by almost all insurance companies up to age 45. And if you're not insured, the clinic nurse may be able to help you fill out a form for a patient assistance program to get the cost of the vaccine covered by the company that makes it. Would you be interested in completing the HPV vaccine at your next appointment with [doctor's name]?
Demographics	How old are you?
Demographics	What is the highest level of education you have completed?
Demographics	In terms of ethnicity or race, how do you identify?
Demographics	In terms of gender, how do you identify? [If clarification needed] Female, male, non-binary, transgender, etc.
Demographics	In terms of sexual orientation, how do you identify? [If clarification needed] Gay or lesbian, bisexual, straight or heterosexual, etc.
Demographics	Are you insured? [If yes] What health insurance company covers your healthcare policy?

FDA, U.S. Food and Drug Administration; HPV, human papillomavirus; PrEP, pre-exposure prophylaxis.

participants who were contacted (n=23), 69.6% participated (n=16).

The data underwent thematic analysis in the form of inductive coding and subsequent development of themes.^{21 22} Inductive coding was used and theme development aligned with established thematic analysis protocols.²¹⁻²³ The primary exposure was PrEP user status. The primary outcome was attitudes, beliefs, and perceived barriers toward HPV vaccination. The research team reviewed and coded the first 11 interviews individually and determined potential codes, subsequently collectively deciding on 16 codes. Codes were reviewed by the team prior to extracting overall themes. Agreement and disagreement over codes were resolved through discussion by the team. Next, the team collectively reviewed code occurrence in the data and determined three overarching themes. The five subsequent interviews were analysed in relation to the 16 codes to look for thematic saturation. The themes were determined to be the same across all 16 interviews. The research team then pulled quotes to support the themes. The goal was to complete as many interviews as possible in order to perform an exploratory study, rather than to reach thematic saturation. However, thematic saturation was reached.

Patient and public involvement

No patients or public were involved in the design, conduct, or dissemination of this research, as this was a preliminary, exploratory study to determine early attitudes and perceptions.

RESULTS

All participants were between ages 23 and 55 years old, with a mean age of 36 years old. All participants were male, with one participant identifying as transgender male. Fifteen participants (93.75%) identified as gay, and one participant identified as bisexual (6.25%). All participants had at least some college education, with the majority (n=14, 87.5%) completing at least a 4-year college degree. All participants were insured, with the majority (n=11, 68.75%) covered by Blue Cross Blue Shield. The majority of the participants identified as white/Caucasian (n=14, 87.5%), with 12.5% (n=2) identifying as Black/African American. The same number of participants were vaccinated as were unvaccinated (n=7, 43.75%), with 12.5% (n=2) participants unsure of their vaccination status. Further demographic information for the participants is listed in [table 2](#).

**Table 2** Demographics and HPV vaccination status of 16 primary care patients taking PrEP

Variables	n (%)
Age group	
<30	7 (43.75)
30–45	5 (31.25)
>45	4 (25)
Highest level of education completed	
Some college	2 (12.5)
Undergraduate college degree	7 (43.75)
Post graduate degree	7 (43.75)
Ethnicity/race	
White/Caucasian	14 (87.5)
Black/African American	2 (12.5)
Gender identity	
Male	15 (93.75)
Transgender male	1 (6.25)
Sexual orientation	
Gay/homosexual	15 (93.75)
Bisexual	1 (6.25)
Insurance status	
Insured	16 (100)
Insurance provider	
BCBS	11 (68.75)
Cigna	1 (6.25)
GEHA	1 (6.25)
United	1 (6.25)
Ambetter	1 (6.25)
Not answered	1 (6.25)
Vaccination status	
Vaccinated	7 (43.75)
Unvaccinated	7 (43.75)
Unsure	2 (12.5)

BCBS, Blue Cross Blue Shield; GEHA, Government Employees Health Association; HPV, human papillomavirus; PrEP, pre-exposure prophylaxis.

Of those patients who were vaccinated (n=7), 86% (n=6) were vaccinated 5 or more years ago. As no vaccinated participant was over age 30 at the time of their interview, (M=27 years old), no participants were vaccinated under the new guidelines extending vaccination to age 45. Rather, vaccinated participants received the HPV vaccine when they were younger than the initial guideline age of 26. Of the seven participants who were vaccinated, 71% (n=5) stated that they did so because of a doctor's recommendation. One did so because he felt he should as a gay man at higher risk for HPV. Another did so at as a teenager because his parents wanted him to.

Sixteen codes were determined and used: female/women; why not/no reason not to; cancer; warts; recommended; sexual activity; STI; preventative; vaccine; HPV is dangerous; I don't know/not sure; insurance; research; doctor; important; age. These codes led to creation of three major themes in the three domains of attitudes, beliefs, and barriers. The themes were: (1) there is a commitment to preventative health, (2) there are gaps in knowledge about HPV risks and immunisation options, and (3) other barriers include age, lack of doctor recommendation, and lack of insurance coverage. Supporting quotes for each theme are listed in table 3. Quotes were notated during each interview and are presented as directly as possible. However, these quotes are not fully verbatim and may be slightly paraphrased.

The first theme revealed a commitment to preventative health. Participants viewed the HPV vaccine very favourably. They saw HPV vaccination as part of a preventative health package, and consistently rated it as highly important to overall health. Participants found peace of mind in the knowledge that they could further protect themselves from disease, especially disease from such a common act as sex.

The second theme revealed gaps in knowledge about HPV risks and immunisation options. Participants held a variety of beliefs about HPV and its consequences. The majority of participants had inaccurate ideas about infection with HPV, particularly for males. Participants generally believed that males had little to no consequences from HPV infection. The main concern regarded transmitting HPV to females.

The third theme was that the largest potential barriers are age/lack of knowledge around new age guidelines, lack of doctor recommendation and lack of insurance coverage. Participants were unaware that age guidelines had been adjusted to recommend HPV vaccination up to age 45 for certain individuals. Some participants aged out without receiving the HPV vaccine. This is concerning for other high-risk patients who may be nearing age 45 but are unaware they may still be eligible for vaccination. Participants stated receiving the HPV vaccine was contingent on insurance coverage. They also stated that they may not get vaccinated if a doctor did not recommend it. This shows the weight of provider recommendation, as well as the importance of knowledge about insurance coverage options.

Six patients were contacted to schedule appointments for HPV vaccination. This was 37.5% of the study population and 85.7% of the unvaccinated study population. The only participant who declined to be contacted for HPV vaccination was over age 45 and ineligible for vaccination. Therefore, 100% of eligible unvaccinated participants elected to be contacted to schedule HPV vaccination.

DISCUSSION

The results from our study further support the acceptability of HPV vaccination administration to high-risk

Table 3 Themes and supporting paraphrased quotes from interviews about HPV vaccination with 16 primary care patients taking PrEP

Domain	Theme	Supporting quotes
Attitudes	There is a commitment to preventative health	‘Anything that prevents cancer is a good thing.’ – 56 years old, unvaccinated ‘All vaccines are extremely important.’ – 27 years old, vaccinated ‘[There is] peace of mind that you are protecting yourself to the extent you can.’ – 43 years old, unsure of vaccination status ‘Sex is universal, everyone is having sex. To be safe everyone should get it.’ – 23 years old, vaccinated ‘I like knowing it is another safeguard/layer of protection, similar to PrEP as a level of protection... It is another way to protect myself.’ – 29 years old, unvaccinated (with appointment scheduled to get vaccinated)
Beliefs	There are gaps in knowledge about HPV risks and immunisation options	‘I don't really know anything. I think the effects are worse in females than males.’ – 30 years old, vaccinated ‘You can get genital warts. It can be very deadly for women if they get it.’ – 26 years old, unvaccinated ‘It causes warts also known as crabs.’ – 23 years old, vaccinated ‘Males are generally asymptomatic, though if they have it, they can spread to women who can have cervical cancer. I don't really know.’ – 30 years old, vaccinated ‘It is something that is mainly an issue for girls, but I don't know much about the virus specifically or what it does.’ – 29 years old, vaccinated
Barriers	The largest potential barriers are age/lack of knowledge around new age guidelines, lack of doctor recommendation, and lack of insurance coverage	‘[The only barrier would be] my doctor not recommending it.’ – 51 years old, unsure of vaccinated status ‘[The only barrier would be] age. I did not know you could get it now, last I heard vaccine cut off was 26.’ – 29 years old, vaccinated ‘[The only barrier would be] if I didn't have any insurance or ability to pay for it.’ – 23 years old, vaccinated ‘I happen to be outside the age bracket, so it wouldn't apply specifically to me.’ – 55 years old, unvaccinated ‘I didn't even know I could get it. I thought I was too old now.’ – 29 years old, unvaccinated, (with appointment scheduled to get vaccinated)

HPV, human papillomavirus; PrEP, pre-exposure prophylaxis.

populations. Although participants lacked knowledge about the severity of HPV infection in males, they still felt that the HPV vaccine was highly important. Once participants learnt that the guidelines had been extended for HPV vaccination, they overwhelmingly wanted to receive the vaccine if they had not already. This is a promising sign for generalising to other populations who may have gaps in knowledge about HPV and its long-term adverse effects. Even with limited knowledge about HPV, participants still saw the HPV vaccine as an important part of a healthy lifestyle. Our results were consistent with other qualitative studies that have misconceptions about HPV: belief that HPV primarily affects women, belief that HPV is not a concern for men, and belief that the HPV vaccine is not available to anyone over 26.^{4 19}

The results of this study augment the sparse, although promising, literature about combination of HPV vaccination and PrEP therapy for at-risk populations. A cross-sectional survey was administered to MSM seen for PrEP consultations throughout Orléans, France.²⁴ The mean age in this study was 36 years old, identical to that of our study. The study prevalence of HPV was 93.4%, with prevalence of high cancer risk HPV subtypes being 81.9%.²⁴ Authors recommended including HPV vaccination as

primary prevention among HIV-negative MSM using PrEP.²⁴ In another study, a global systematic review examined HPV type distribution in anal cancer and anal intraepithelial lesions.²⁵ The results suggest that prophylactic administration of the HPV vaccine could prevent up to two-thirds of anal cancer and lesions in both women and men.²³

It is important to educate MSM about the risk of HPV infection in males. Participants overwhelmingly saw HPV as a primarily ‘female’ problem. This belief about HPV is especially concerning for MSM. If they are not engaging in sexual relations with females, they may see no harm in infection with HPV due to the lack of risk of passing it to females. The study population was more highly educated than the general population and they still had large gaps in HPV knowledge. Increasing knowledge of HPV infection, its effects in men, and extended eligibility of the vaccine are all tantamount to increasing vaccination rates. It is also important that providers stay up to date on insurance eligibility so that patients get the vaccine covered, whether through a commercial insurance company, Medicaid, or a patient assistance programme.

Although lack of knowledge about severity of HPV in males and the extended age guidelines for the vaccine



were barriers, overall, these barriers did not keep many participants from vaccination once offered. Indeed, there were relatively few barriers to HPV vaccination in PrEP users younger than 45. For those not already vaccinated, the results from the intervention component of the study are extremely promising. All eligible unvaccinated participants elected to be contacted for HPV vaccination scheduling. This is hugely important for direct action that can help prevent cancer. It is also strong evidence that knowledge of eligibility leads to vaccination, at least in patients who are already invested in preventative sexual health in the form of PrEP use. Finally, it demonstrates the power of healthcare providers in encouraging patients to receive the HPV vaccine.

This study had several major strengths: the interviewers were blinded to participant health information; the interview questions were modelled from previous studies; the interview was scripted and semistructured; and thematic saturation achieved. However, the study also had several major limitations: the study had a small sample size; the majority of the sample size came from one primary care provider; there were no formal recordings or transcripts (due to privacy concerns); there were six interviewers, which may affect participant responses and recorded notes; and there was low external validity (all participants were PrEP users, had insurance, were well-educated, and therefore, may not be representative of the broader population). An additional and important limitation was the lack of outreach to underserved and marginalised populations, which resulted in a lack of diversity in the sample.

It is important to recognise that PrEP users are interested in HPV vaccination. Based on this, as well as perceived barriers to vaccination, we have developed these specific recommendations: (1) Providers should capitalise on the interest in preventative medicine and should offer the HPV vaccine to patients with initiation of PrEP; (2) Providers should include a patient's background on HPV and HPV vaccination status in the 'After Visit Summary' for PrEP users; and (3) When PrEP is prescribed in the electronic medical record, the prescriber should be prompted to assess the patient's HPV vaccination status automatically. Patients listen to and trust their providers when it comes to preventative care recommendations. If providers take a moment to initiate a conversation about HPV vaccination and its benefits with patients, we may be able to increase HPV vaccination rates before patients age out of eligibility. By increasing understanding of HPV and the HPV vaccine, we have the potential to significantly decrease the incidence of HPV-related cancers in high-risk populations.

CONCLUSION

The results of this study support the idea that providers should offer the HPV vaccine to all eligible PrEP patients, even those over the age of 26. PrEP users are already invested in preventative health via their PrEP use and are excited by the opportunity for further prevention via the HPV vaccine. The PrEP patients in this study have a high acceptability of

the HPV vaccine, appreciation for disease prevention, and low vaccine hesitancy. However, we also found that many PrEP patients are unaware that the HPV vaccine is available up to age 45. It is important that providers actively educate their patients, especially those who are at high-risk, about the risks of HPV vaccine and offer the vaccine if a patient is eligible and a good candidate.

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Acknowledgements We would like to thank Brooke Abel and Karen Laird for helping make this study possible. We would also like to thank Ashlyn Lipnicky for coordinating with the IRB and the study team.

Contributors ZCS-B was responsible for all drafts of this manuscript, conducting interviews, and data analysis. Senior author MR was responsible for conception of the study, securing funding, overseeing data collection and analysis, and editing the drafts. and is responsible for the overall content as guarantor. Authors MB, RD, RN, HS and SW were responsible, with ZCS-B, for writing sections of the manuscript, conducting interviews, and data analysis. Authors KJS, CD, MA and PR worked with MR and ZCS-B on study design, conceptualisation of the manuscript, and editing drafts prior to submission.

Funding This study was supported with pilot funds from the Cancer Prevention and Control programme of the University of Kansas Cancer Centre, an NCI-designated cancer centre, to Megha Ramaswamy and Paul Rotert. No award/grant number is available.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study was approved by the IRB at the University of Kansas Medical Center (IRB #: STUDY00145228). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available.

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