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Motives of Dutch men who have sex with men for daily and intermittent HIV pre-exposure prophylaxis usage and preferences for implementation

A qualitative study

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Abstract

Although PrEP is not yet registered in Europe, including the Netherlands, its approval and implementation are expected in the near future. To inform future pre-exposure prophylaxis (PrEP) implementation, this study aimed to gain insight into motives and preferences for daily or intermittent PrEP use among Dutch HIV-negative men having sex with men (MSM).

Between February and December 2013, semistructured interviews were conducted until data saturation was reached (N = 20). Interviews were analyzed using the Grounded Theory approach.

Motives for (not) using daily PrEP were based on beliefs about PrEP efficacy and side effects, preferences for other prevention strategies, self-perceived HIV risk, self-perceived efficacy of PrEP adherence, beliefs about possible benefits (e.g., anxiety reduction, sex life improvement), and barriers of PrEP use (e.g., costs, monitoring procedures). The perceived benefits of intermittent versus daily PrEP use were the lower costs and side effects and the lower threshold to decision to start using intermittent PrEP. Barriers of intermittent PrEP versus daily PrEP use were the perceived need to plan their sex life and adhere to multiple prevention strategies. Although some perceived PrEP as a condom substitute, others were likely to combine PrEP and condoms for sexually transmitted infections (STI) prevention and increased HIV protection. Participants preferred PrEP service locations to have specialized knowledge of HIV, antiretroviral therapy, sexual behavior, STIs, patients' medical background, be easily approachable, be able to perform PrEP follow-up monitoring, and provide support.

To maximize the public health impact of PrEP, ensuring high uptake among MSM at highest risk is important. Therefore, targeted information about PrEP efficacy and side effects need to be developed, barriers for accessing PrEP services should be minimized, and perceived self-efficacy to use PrEP should be addressed and improved. To prevent increases in STIs, condom use should be monitored and PrEP should be integrated into routine STI screening and counseling.

Abbreviations: ACS = Amsterdam Cohort Studies, ART = antiretroviral therapy, CDC = Centers for Disease Control and Prevention, MSM = men who have sex with men, PEP = post-exposure prophylaxis, PrEP = pre-exposure prophylaxis, STI = sexually transmitted infection, US = United States.

Keywords: HIV, men who have sex with men, pre-exposure prophylaxis, prevention of sexual transmission, sexual behavior

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IGS and UD: Joint last authorship

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1. Introduction

HIV transmission among men who have sex with men (MSM) continues, despite widespread implementation of behavioral interventions and high coverage of antiretroviral therapy (ART).[1–4] Recent studies have shown that pre-exposure prophylaxis (PrEP), that is, offering HIV-negative MSM a daily or intermittent regime of lower-intensity ART, can significantly reduce risk of HIV infection.[5–7] The US Food and Drug Administration approved PrEP, and the Centers for Disease Control and Prevention (CDC) and the World Health Organization implemented daily PrEP for high-risk MSM in their HIV guidelines.[8,9] Although PrEP is not yet registered in Europe, including the Netherlands, its approval and implementation are expected in the near future.

The cost-effectiveness of PrEP and its impact on HIV incidence will highly depend on PrEP uptake among MSM at increased risk of HIV infection, PrEP costs, epidemic context, and adherence.[10–14] Regarding uptake, it is important to understand why MSM would choose to use or not use PrEP. Though several qualitative and quantitative studies have been conducted outside Europe regarding possible motives for PrEP use among MSM,[15–21] only 1 (quantitative) study included European MSM. In this study, the intention to use PrEP was relatively low, but higher among high-risk MSM, those with a high perceived self-efficacy to use PrEP, and high perceptions of anticipated relief when using PrEP.[22] To inform future PrEP implementation in the Netherlands, in-depth understanding of motives behind PrEP use among Dutch MSM is needed. In particular, knowledge regarding specific motives for intermittent versus daily PrEP use and preferred PrEP service characteristics. These results can guide future implementation strategies to ensure high uptake of PrEP and maximize PrEP's public health impact.

This qualitative study aims to explore more thoroughly the motives for wanting or not wanting to use PrEP if it becomes available, motives for daily versus intermittent PrEP use, the anticipated motives for condom use when using PrEP, and preferences for PrEP implementation (e.g., service characteristics).

2. Methods

2.1. Recruitment

Participants were recruited through the Amsterdam Cohort Studies (ACS). The ACS is an open, prospective cohort study initiated in 1984 aiming to investigate HIV epidemiology, natural history, pathogenesis, and evaluate the effect of interventions among MSM.[23,24] Participants visit the Public Health Service Amsterdam biannually to complete self-administrated questionnaires on sexual behavior and give blood for HIV and sexually transmitted infection (STI) testing and storage.

To identify eligible participants, we used quantitative data regarding awareness, beliefs, and intention to use PrEP obtained among HIV-negative participants during one wave (June 2012–January 2013).[22] For the present study, we included: MSM with a high intention-to-use PrEP (irrespective of HIV risk and type of steady partner); and MSM with a low intention-to-use PrEP who have been defined as eligible candidates for PrEP,[8,9] that is, MSM at increased risk for HIV (having >5 casual partners and/or reporting condomless anal sex with casual partners in the preceding 6 months) and HIV-negative MSM in serodiscordant relationships. To increase the group of MSM with a high intention-to-use PrEP, we placed online advertisements on the Public Health Service of Amsterdam website and on 2 HIV information websites to find men interested in using PrEP in the future. Recruitment continued until data saturation was reached.

The ACS research nurse contacted eligible ACS participants by phone, email, or personally during their biannual ACS visit for participation in this study. Those who accepted to participate in the study were then contacted by the researcher. The researcher contacted participants recruited through websites directly.

2.2. Procedure

Semistructured interviews of approximately 60 minutes each were conducted between February and December 2013 by 1 female interviewer (JPB, PhD-student) in Dutch or English at the Public Health Service Amsterdam or at the participants' homes. Before the interviews, participants received study information, including study purpose, a short description of daily PrEP, the iPrEX study results on effectiveness and side effects,[5] CDC recommendations on PrEP follow-up check-ups,[8] and the estimated Dutch costs of PrEP (tenofovir disoproxyl fumarate/emtricitabine: approx. €580 monthly). During one interview, the participant's steady partner was present.

As this study was conducted before the IPERGAY trial indicated PrEP can be effectively taken up to 2 hours before a risk episode,[7] we defined intermittent PrEP as using PrEP 3 days before until 3 days after a high-risk period of sexual behavior, which was explained during the interview. Before the start of the interview, the interviewer introduced herself, the study purpose and interview procedure were explained, and oral informed consent was obtained. Information regarding level of education, income, age, most recent HIV-test result and test location, and relationship status (having a steady partner and HIV-status of steady partner) were obtained at the start of the interview and recorded on tape.

The central interview topics were: intention-to-use PrEP in the future, reasons for wanting or not wanting to use daily PrEP, and perceived benefits and barriers of using PrEP. The following topics were also addressed: motives for wanting or not wanting to use intermittent PrEP, perceived motives for using or not using condoms when using PrEP, and opinions about preferred PrEP services (location of PrEP prescription and service characteristics).

All interviews were audiotaped and transcribed verbatim (quotes are translated) and short-field notes were made during and shortly after the interviews. Person identifiers were deleted from the transcripts and only the involved interviewer had access to the audiotapes. Participants received a gift certificate of €20 for participating.

Ethical approval by an ethics committee or institutional review board was not necessary for this study according to Dutch legislation as participants were not subjected to procedures or rules of behavior, which resulted in an infringement of the physical and/or psychological integrity of the participant.[25]

2.3. Analyses

The data analysis team consisted of 4 researchers from different disciplines (health sciences [JPB, IGS], medical anthropology [WMvdV], epidemiology [IGS], and psychology [UD]). Data analysis was done in accordance with the Grounded Theory approach and consisted of 3 phases.[26–28] First, JPB and WMvdV independently read and coded (open and inductive) each transcript. Labeling was concise and self-explanatory and discussed until consensus was reached. Second, after developing the provisional coding scheme, codes were combined into

categories. Third, core themes were defined in which categories could be placed. Core themes consisted of at least 1 category. Categories and core themes emerged from discussions with the complete data analysis team. Analyses were performed using MAXQDA 11.0.6 (Verbi GmbH, Berlin).

3. Results

3.1. Sample characteristics

A total of 20 interviews were conducted after which data saturation was reached. Seventeen MSM were recruited through the ACS. Response rate among ACS participants was 44% (17/39). Three MSM were recruited online. Participants had a median age of 41 years (interquartile range 38–46), 80% lived in Amsterdam, 65% were college graduates, and 45% had a high annual income level (>€33,000) according to Dutch standards.[29] Regarding steady relationships, 45% had no steady partner, 35% had an HIV-positive partner, and 15% had an HIV-negative steady partner. The HIV status of one participant's steady partner was not asked. Eight MSM expressed a high intention-to-use daily PrEP if it becomes available, 10 expressed a low intention, and 2 were in doubt about their future PrEP use.

3.2. Daily PrEP

We identified 8 motives for wanting to use daily PrEP if it becomes available (Table 1):

1. Daily PrEP can protect against possible HIV infection: Some participants believed that PrEP could give them the desired (additional) protection to prevent HIV infection (quote 1A, 1B). Also, some participants stated that PrEP would provide the opportunity to prevent the spread of HIV to others (quote 1C).
2. Daily PrEP in combination with other protection strategies offers complete coverage against HIV infection: Some participants believed that HIV protection of other prevention strategies was insufficient because of their self-perceived high HIV risk (quote 2A), they thought condoms could break or HIV could be transmitted in ways other than anal sex (quote 2B, 2C). Adding PrEP to their prevention strategies would provide the feeling of complete coverage.
3. Daily PrEP offers additional protection for discordant couples: Participants in serodiscordant steady relationships stated being worried about getting HIV from their HIV-positive steady partner. PrEP use, in combination with an undetectable viral load from their partner, would increase their perceived protection against HIV infection (quote 3A, 3B).
4. Daily PrEP reduces anxiety about HIV transmission: Because participants believed that PrEP could offer them (additional) protection against HIV infection, they believed that PrEP could increase their feeling of safety and reduce their anxiety of contracting HIV (quote 2A, 2B, 3A, 3B).
5. Daily PrEP is easier to use than condoms: Some participants stated different reasons why using condoms was difficult for them (quote 5A, 5B). The perceived advantage of daily PrEP is its continuous protection against HIV and the increase of participants' self-perceived efficacy to adhere to PrEP.
6. Daily PrEP can improve quality of sex life: Some participants felt PrEP would facilitate condomless sex or decrease HIV anxiety, which would increase the potential to experiment with sex (quote 6A), increase their own or their partners' sexual pleasure (quote 6B), and improve the quality of their sex life (quote 6C).
7. Daily PrEP makes engaging in (sexual) relationships with a potential HIV-positive partner easier: For some participants, a barrier for engaging in a steady relationship with an HIV-positive person is the necessity to use condoms during sex, as this reduces the feeling of intimacy (quote 7A). As PrEP would reduce the need for condoms, they would feel free to engage in a serodiscordant relationship (quote 7B).
8. Daily PrEP provides solidarity with HIV-positive partner: Some participants stated that PrEP would offer them the opportunity to support their HIV-positive partner in taking daily ART (quote 8A).

We identified 10 motives for not wanting to use daily PrEP in the future (Table 2):

1. Daily PrEP is not sufficiently effective as an HIV risk reduction strategy: Some participants perceived the efficacy of daily PrEP as too low. Perceptions of insufficient efficacy differed between participants, for example, some participants felt <100% efficacy was insufficient (quote 1A), whereas others perceived efficacy <50% as insufficient (quote 1B).
2. Nonbelief in present research and data: Some participants stated distrusting the results of the published PrEP efficacy trials and were therefore not willing to consider taking PrEP (quote 2A).
3. Daily PrEP is not needed because of a low self-perceived HIV risk: Some participants stated not needing PrEP because of their sexual lifestyle (e.g., number of partners [quote 3A, 3B]), or because of their current use of other effective methods (e.g., condom use [quote 3C]; negotiated safety [quote 3D]) or subjectively perceived effective preventive methods (e.g., strategic positioning and no ejaculation [quote 3E]). Some participants willing to use PrEP also stated that their future willingness might be lower if they felt less HIV risk owing to sexual lifestyle changes.
4. Daily PrEP is not needed because of treatment (of HIV-positives) as prevention strategy: Some participants in serodiscordant relationships perceived an undetectable viral load of their partner as sufficiently effective (quote 4A). Also, as some participants considered almost all HIV-positives as having an undetectable viral load, HIV transmission risk was perceived as diminishable (quote 4B).
5. Preference for prevention strategies other than PrEP: Some participants preferred other prevention strategies, for example, condoms or post-exposure prophylaxis (PEP), over PrEP use owing to the higher perceived efficacy (quote 5A), easier accessibility (quote 5B), lower costs (quote 5C), absence or reduction of side effects (quote 5D), additional protection against other STIs (quote 5E), and provision of a hygienic function (quote 5F).
6. High costs of daily PrEP: Almost all participants stated that high costs of PrEP would be a barrier for its use (quote 6A, 6B). The perceptions of high costs varied; some participants were completely unwilling to pay for PrEP, whereas others were willing to contribute a certain amount. The majority however would not pay €580 per month.
7. Anticipated side effects of daily PrEP or ART resistance: Some participants were unwilling to use PrEP because they believed that PrEP has side effects (long-term or short-term) (quote 7A), the use of PrEP could increase the risk of ART resistance (quote 7B), PrEP has similar side effects to ART

Table 1

Representative quotes from 20 HIV-negative men having sex with men in regards to motives for wanting to use daily pre-exposure prophylaxis, Amsterdam, the Netherlands (2013).

Motives for wanting to use daily PrEP		Representative quotes
1. Daily PrEP can protect against possible HIV infection	1A	"It [PrEP] would, in my situation, my current context, provide me with a kind of temporary immunity which would be nice." MSM 1
	1B	"44% effectiveness is more than what I have now." MSM 3
	1C	And what are the main reasons that you want to use it [PrEP]? "That I'm protected from getting infected with HIV. And in turn, I won't pass it on to someone else." MSM 4
2. Daily PrEP in combination with other protection strategies offers complete coverage against HIV infection	2A	"I've recently become single again after being in a relationship for a couple of years, so I'm in this stage where I'm sexually active with people that I'm not in a relationship with. I'm in a more sort of high-risk stage, I guess, so it makes sense for this sort of period to have the opportunity to take something preventative as a second backup plan. I mean, I use condoms as well, but it would be like a second option and if it was available, it would definitely make me feel a lot safer and comfortable." MSM 20
	2B	"I like to think that I play it safe, but for example a couple of months ago the condom broke when I had sex with somebody and that can be all it could take. I mean that's really scary. And in that situation it would really make you feel a lot more comfortable to reduce the anxiety. [. . .] But to be honest, I still find the whole details about how you can become positive a little bit mysterious. Like the real technicalities. [. . .] I'm just a little bit unsure about all these grey areas [cuts in mouth / bleeding gums and oral sex / cuts on finger nails]. [. . .] It [PrEP] would basically take the anxiety away." MSM 20
	2C	"You can treat HIV, but I prefer to prevent it. [. . .] HIV is not a reason for me not to have sex with someone, as long as it is safe, but if PrEP offers extra protection; it is a reason for me to use it. [. . .] Maybe for peace of mind. I come in diligently for tests every 6 months, but every time I still think: will it be okay? Because I know that even if you have safe sex you can still get HIV." MSM 3
3. Daily PrEP offers additional protection for discordant couples	3A	"It is more of a reassurance. We [participant and HIV-positive steady partner] have unsafe sex with each other, without a condom. I don't have issues with it or am not afraid of it. I know my partner well enough to know that he takes his medication and is stable [viral load]. But you never know what happens in the mean time and that is my insecurity. It [viral load] could suddenly peak and then I'm more at risk and you can miss that in the bi-annual check-up. And PrEP would provide the additional protection for that." MSM 14
	3B	"Because my partner has HIV, it [PrEP] would give us just a little bit more freedom to do more things sexually than we do now, especially when he is undetectable [viral load] and that would give me just that little bit extra." MSM 13
4. Daily PrEP reduces anxiety about HIV transmission		See quotes 2A, 2B, 3A and 3B
5. Daily PrEP is easier to use than condoms	5A	"Yes, I think it is easier than using condoms. You use a condom at the heat of the moment, so then you have to get the condom out. And PrEP, that is something you use every day. So you lay a foundation for 24 hours. And a condom doesn't do that [. . .]. It [PrEP] works much better than a condom. It is continually present." MSM 20
	5B	Is PrEP something for you personally? "I think so, yes. Because I always try to have sex as safely as possible, but yes, there are times that you just had too much to drink or the passion is so overwhelming that you forget. [. . .] It would offer me a little bit more freedom. I would worry a little bit less." MSM 17
6. Daily PrEP can improve quality of sex life	6A	"I would just take it [PrEP] to have unsafe sex and then also under the influence of drugs. I would like to experiment with that." MSM 1
	6B	What would be the reason for you to want to use it [PrEP]? "Yes, first of all to protect myself and second of all, to please a bed partner because they prefer to have sex without a condom." MSM 19
	6C	"Because my partner has HIV and I think for us it would be easier to also love each other more in a sexual sense. Because it lowers that barrier. [. . .] His HIV-status separates us sexually, in other words, we don't have sex. This is mainly due to his fear of infecting me. If I use it [PrEP] I'm better protected which will make it easier for him, and eventually also for me, to just have sex with each other." MSM 13
7. Daily PrEP makes engaging in (sexual) relationships with a potential HIV-positive partner easier	7A	"I can imagine that at a certain stage in your relationship [with an HIV-positive partner] you want unprotected [condomless] sex, because it is more intimate." MSM 15
	7B	"I never want to have an HIV-positive boyfriend again, that limits me sexually, but if PrEP would be there, there wouldn't be a barrier to engage in a relationship with someone." MSM 11
8. Daily PrEP provides solidarity with HIV-positive partner	8A	"Yes [. . .] I would want to use the medication [ART] so that he [HIV-positive partner] isn't alone in it, so from a social point of view I would take them, so that we can do it together. Now I don't need medication but in this case [if PrEP were to be available] there would be a reason for me to take them." MSM 13

ART = combination antiretroviral therapy, MSM = Men having sex with men, PrEP = pre-exposure prophylaxis.

used for HIV treatment (quote 7A, 7C), or they felt knowledge about the potential future side effects of PrEP was insufficient (quote 7D).

8. Low perceived self-efficacy to adhere to daily PrEP: Most participants used past experience in taking pills as a reference for their perceived self-efficacy to adhere to PrEP. Some participants perceived adherence to a daily PrEP regimen as difficult and were worried about decreased PrEP effectiveness if they did not follow usage instructions (quote 8A). Also, participants were worried about PrEP adherence if treatment regimens were difficult (e.g., taking >1 daily pill or if regimens dictated food or alcohol restrictions, quote 8B).
9. Monitoring procedures during daily PrEP treatment are unacceptable: Some participants were unwilling to use PrEP because of the additional blood- and/or STI screening, or counseling required for PrEP usage (quote 9A, 9B).

Table 2

Representative quotes from 20 HIV-negative men having sex with men in regards to motives for not wanting to use daily pre-exposure prophylaxis, Amsterdam, the Netherlands (2013).

Motives for not wanting to use daily PrEP		Representative quotes
1. Daily PrEP is not sufficiently effective as an HIV risk reduction strategy	1A	"I want it [PrEP] to be 100% effective. Otherwise you still take a risk." MSM 15
	1B	"I wouldn't consider it if the effectiveness is really low and there are a lot of side effects. If the additional protection is only 10%, it is too low to contribute a lot in our relationship. Then I would take a pill and I don't really know why I'm doing it. Look, if the effectiveness is high or at least above 50% or 70% then it would be the perfect addition." MSM 14
2. Non-belief in present research and data	2A	"To be honest, I don't think the study is very reliable. How can you test if someone is infected with HIV or not [. . .]." MSM 9
3. Daily PrEP is not needed because of a low self-perceived HIV risk	3A	"I don't know, I find it difficult, because first of all, I really don't have that much sex outside of my relationship that I think I constantly have to take pills for that one time I have sex [. . .]. If I were to possibly enter a phase that I have a lot of sex outside of my relationship then at some point I might consider it [PrEP]." MSM 16
	3B	"Basically, I am in a monogamous relationship and I am not really at risk of HIV, or not at great risk. If something were to happen, then I would prefer to take the morning after pill [PEP] [. . .]." MSM 12
	3C	"If you just have safe sex with condoms, I think that is the best protection, and if you use them well, make sure it doesn't brake and you follow the normal guidelines or rules for safe sex, then I don't think you need it [PrEP]." MSM 8
	3D	"If I have sex outside of my steady relationship then I'm having safe sex. But with my boyfriend, my steady partner, we have unsafe sex. So actually I don't really need PrEP." MSM 9
	3E	"Well the consideration also has to do with the number of times I have sex, maybe also with me having more passive sex, so getting fucked. Usually I am more active, that also has something to do with it. One of the considerations is being active, so the risk is lower. Actually you're reducing your risk, by not ejaculating and mainly being the active one." MSM 16
4. Daily PrEP is not needed because of treatment (of HIV-positives) as prevention strategy	4A	"I wouldn't use it, for example, because of my [HIV-positive] partner. Because I think, his viral load is undetectable, so if I only have sex with him, I will not take it into consideration [. . .]." MSM 16
	4B	"[. . .] As I understand now, almost no one has a detectable viral load, so the chance is low that you will get infected. So, I don't really see the advantage of taking PrEP." MSM 11
5. Preference for prevention strategies other than PrEP	5A	"If you just have safe sex with condoms, I think that is the best protection, and if you use them well, make sure it doesn't break and you follow the normal guidelines or rules for safe sex, then I don't think you need it [PrEP]". MSM 8
	5B	"Well, you can get them [condoms] on every street corner, they are for sale everywhere. And well, with PrEP you could forget to order it, or prescriptions don't arrive at the doctor or pharmacy, or that they have run out." MSM 8
	5C	Do you have more reasons why you don't want to use it [PrEP]? "Because it is really expensive, a condom is so much cheaper, that is also one of the reasons." MSM 9
	5D	"I see what those pills do and I see what happens if you have HIV. You really don't want that. So for me I just go for what I know are the safest options and those are condoms. Always." MSM 7
	5E	So if it [PrEP] would be available in the Netherlands, would you use it? "No, because of the thing about condoms. I just notice that without condoms you can contract so much more [STIs] than without. So condoms protect against HIV, but they also protect against so much more and therefore remain a necessity." MSM 5
	5F	"Well, safe sex [with condoms]: that is safe and it is clean. Then I don't have all that fuss. It is not difficult for me now so it is not even a question." MSM 6
6. High costs of daily PrEP	6A	"At the moment I'm on benefits so every Euro is one too many. At the moment I don't have money for it [PrEP]. So that means I have to make a different choice. But 25 Euro I would find acceptable considering my income." MSM 1
	6B	"Would there be any reason why you would not want to start using PrEP? [. . .] and the price of PrEP. I mean, I don't mind contributing but I'm not paying 500, almost 600 Euro per month. That means almost 7000 Euro annually. [. . .] If there are few side effects and the health insurance funds are willing to cover most or all of the costs, or I have to contribute a little bit, nothing would stop me." MSM 17
7. Anticipated side effects of daily PrEP or ART resistance	7A	"If it has similar side effects as other HIV medication, of what I know about them, it makes it [PrEP] a non option. In that case I would pretty much poison my body now and in 20 years face all kinds of problems. In that case I most definitely don't want to use it and I would rather sleep less soundly for a night. No, if they say that there are few side effects, I wouldn't trust that. [. . .] It should be as safe as a vitamin pill." MSM 2
	7B	"And if I got it [HIV] after all the precautions, then you're stuck taking all sorts of antiretrovirals [. . .] and then I think Truvuda would be more effective than if you have already been using it [Truvada as PrEP] for who knows how long." MSM 8
	7C	"I associate HIV medication with heavy medication that is harmful in a different way." MSM 2
	7D	"But yes, I don't know if I would use it so easily because it is kind of new. It is not clear what the effect is because they have tested it on a number of people but they don't yet know what the future complaints could be. [. . .] If the research is a bit further along, then I would think about it because of course there is nothing better than not using anything." MSM 18

(*continued*)

Table 2

(continued).

Motives for not wanting to use daily PrEP		Representative quotes
8. Low perceived self-efficacy to adhere to daily PrEP	8A	"The most important thing from daily use is that I have no doubt that I will forget it and this will decrease the effectiveness, so it is not for me, I'm very sure about my habits when it comes to condom use. I can trust myself in that. [. . .] But a daily pill, I'm not sure if I can trust myself in that. As a result I would feel guilty and I would think: I forgot it again, twice, will it be effective?" MSM 5.
	8B	What would make it more difficult to use PrEP daily? "For example, If you have to take it two hours before dinner, or not in combination with alcohol. If the treatment regimen is difficult." MSM2
9. Monitoring procedures during daily PrEP treatment are unacceptable	9A	"If I have to get my blood drawn every time, I would think, what a fuss, just use a condom, you can buy them everywhere, you can even pull one out of a wall (vending machine)." MSM 11
	9B	How would you feel about that [counselling on safe sex and additional test in combination with PrEP]? "You almost sign up for a social check up pill. Counselling etc. is a bit too extreme. [. . .] As a quite free-spirited person I don't think I would want that attached to it." MSM 12
10. Principle objections against taking daily PrEP	10A	"For me it would feel like a burden to take a pill every day. If I had HIV then I would take the medication because I want to live a healthy life for as long as possible. I want to prevent that the virus emerges but if I don't have the virus why should I burden my body with it? That would feel unnatural to me; that I would get side effects, that I have to go to the laboratory to get blood drawn because I'm taking medication while I'm not sick but do have to get my kidney and liver function tested twice a year. Well I wouldn't want that. I would not do it." MSM 6

MSM = Men having sex with men, PrEP = pre-exposure prophylaxis, STIs = sexually transmitted infections.

10. Principle objections against taking daily PrEP: Some participants believed out of principle that healthy individuals should not use medication (quote 10A).

3.3. Intermittent PrEP

After discussing motives regarding daily use of PrEP, we asked participants about perceptions regarding intermittent PrEP usage. Of 19 participants, 12 had a low intention of using intermittent PrEP, 5 had a high intention, and 2 participants were in doubt about using intermittent PrEP. For the first participant, the intention to use intermittent PrEP was not explored as it was added as an interview topic after the first interview.

We identified 3 motives for preferring intermittent PrEP over daily PrEP (Table 3):

1. The decision to start intermittent PrEP is easier compared to daily PrEP: Some participants thought it would be less hard to make the decision to use intermittent PrEP than the decision to use daily PrEP (quote 1A).
2. Intermittent PrEP has less side effects compared to daily PrEP: Some participants believed taking PrEP less frequently or for a short period (as in intermittent PrEP) reduces side effects and potentially harmful effects (quote 2A).
3. Intermittent PrEP reduces financial costs compared to daily PrEP: Some participants stated that intermittent PrEP would

Table 3

Representative quotes from 19 HIV-negative men having sex with men in regards to motives for wanting and not wanting to use intermittent pre-exposure prophylaxis, Amsterdam, the Netherlands (2013).

Motives for preferring intermittent PrEP over daily PrEP		Representative quotes
1. The decision to start intermittent PrEP is easier compared to daily PrEP	1A	"[. . .] It also sounds less hard to make the decision." MSM 10
2. Intermittent PrEP has less side effects compared to daily PrEP	2A	"I still feel like I would be putting poison into my body, but it is limited and not for a long time so I would expect it to be less harmful than if you use the medication for a longer period of time." MSM 2
3. Intermitted PrEP reduces financial costs compared to daily PrEP	3A	"Well, I can imagine myself doing it, that after a quiet period that you feel the need to do something crazy and go on a holiday. And that you take it in that way. And then you don't have all the costs, you take it for a shorter period of time so it will be cheaper and you can control it. You can say, for example: I want to pay this much and that means I can use it four times a year for a week." MSM 12
Motives for preferring daily PrEP over intermittent PrEP		**Representative quotes**
1. Intermittent PrEP requires unwanted planning of sex life	1B	"Yes, a little bit stupid. For me sex is something spontaneous and not something you plan, okay I'm having sex in three days and I'll start taking PrEP. No, I think that is nonsense." MSM 9
2. Using intermittent PrEP makes adherence to other HIV prevention strategies more difficult	2B	"That sounds even more complicated behaviour-wise. But it is also less hard to make the decision." What do you mean by more complicated behaviour? "Well the last decennium my theory was that you have to have continuous behaviour and not think: now I can do whatever I want and after that it stops. [. . .] I don't believe in having two sex lives. Maybe I'm still negative [HIV] after all those year because I had one policy. Not like: here I can do this, and there I can do that. That has been my safety. [. . .] So, no, I never had a double approach." MSM 10

MSM = Men having sex with men, PrEP = pre-exposure prophylaxis.

Table 4

Representative quotes from 20 HIV-negative men having sex with men in regards to anticipated condom use when using daily pre-exposure prophylaxis, Amsterdam, the Netherlands (2013).

Motives for combining daily PrEP with condom use		Representative quotes
1. Condoms are needed to prevent other STIs	1A	"And if you leave out condoms, you're still at risk for other STIs. Do you want them? I don't. I just see PrEP as an additional safety measure." MSM 4
2. Combining the two strategies increases protection against HIV	2A	"I'm in a sort of high risk stage, so it makes sense for this sort of period to take something preventative as a second backup plan. I mean, I use condoms as well, but it would be like a second option." MSM 20
Motives for solely using daily PrEP (without condom use)		**Representative quotes**
1. Using PrEP solely is sufficiently effective to prevent an HIV infection	1B	So for you it does not seem useful to use them [PrEP and condoms] together? "No, just because I see it [PrEP] as something to prevent getting HIV and therefore it allows you to bareback." MSM 1
	1C	Would anything change in your behavior or feelings [when using PrEP]? "Not in the beginning but if I would use it for a long time probably it will. If I see every time that I don't have HIV, I think at one point I will start taking risks." What do you mean by taking risks? "That I would be less worried about condom use. And that would be a negative side. If I were to look at myself I can see that happening." MSM 17

MSM = Men having sex with men, PrEP = pre-exposure prophylaxis, STIs = sexually transmitted infections.

increase their control over the financial costs as they could choose the period and duration of PrEP use (quote 3A).

We identified 2 motives for preferring daily PrEP over intermittent PrEP (Table 3):

1. Intermittent PrEP requires unwanted planning of sex life: Most participants stated they did not plan their sex life and that sex usually happened spontaneously. As intermittent PrEP entails planning when to start taking PrEP, participants argued that intermittent PrEP would not work for them (quote 1B).
2. Using intermittent PrEP makes adherence to other HIV prevention strategies more difficult: Some participants believed using intermittent PrEP would necessitate different prevention strategies in different situations, when on or off PrEP, which makes adherence difficult (quote 2B).

3.4. Anticipated condom use when using daily PrEP

We identified 2 motives for combining PrEP with condom use (Table 4):

1. Condoms are needed to prevent other STIs (quote 1A).
2. Combining the two strategies increases protection against HIV (quote 2A).

We identified one motive for solely using PrEP, that is, using PrEP solely is sufficiently effective to prevent an HIV infection (quote 1B, 1C).

Furthermore, some participants in serodiscordant relationships stated they would only use condoms in combination with PrEP if their HIV-positive partner's viral load was detectable.

3.5. Location of PrEP prescription

Participants preferred the following locations for PrEP prescription if it were to become available in the Netherlands: Public Health Service (i.e., STI clinic), general practitioner, and the hospital (i.e., HIV-specialist). Preference for locations was based on the following characteristics of healthcare providers (Table 5): having specialized knowledge of HIV (and ART) (quote 1); having specialized knowledge of sexual behavior and other STIs (quote 2); possibility of performing medical check-up and/or counseling (quote 3); having specialized knowledge of personal medical background and the use of current (medical) drugs (quote 4); easily accessible (quote 2); and having time to counsel men and provide support for PrEP users (quote 6). The perceived pros and cons for the distribution of PrEP services by different healthcare provider are presented in Table 5.

4. Discussion

This qualitative study revealed several motives for wanting or not wanting to use PrEP and preferences with respect to PrEP implementation among HIV-negative Dutch MSM if PrEP becomes available in the Netherlands. These results can guide future implementation strategies to ensure high uptake of PrEP and maximize PrEP's public health impact.

First, we found the motives for PrEP use were based on beliefs regarding PrEP efficacy, PrEP side effects, and trust regarding published research data. Recent trial results have corroborated that PrEP is highly effective, has minimum side effects, and risk of ART resistance is low when PrEP is taken correctly.[5–7] To correct wrong beliefs about PrEP and increase positive attitudes toward PrEP, knowledge about current and possible future data on PrEP efficacy and side effects should be increased.

Second, we found perceived self-efficacy to be an important motive for wanting or not wanting to use daily and or intermittent PrEP. To improve the perceived self-efficacy, it is important to carefully look at individual skills regarding PrEP use and adherence, and decide, based on the type of skill problems, whether daily or intermittent PrEP is most suited and which skill enhancing interventions is needed.

Third, we found environmental factors, for example, perceived difficulties in accessing PrEP services, frequent monitoring procedures, and high costs of PrEP, were potential barriers for PrEP uptake. To reduce these barriers, PrEP services should be set up in line with MSM preferences by offering PrEP in easily accessible facilities (e.g., involve efficient health monitoring procedures, offer services at convenient times and locations) with sufficient experience and specialized knowledge regarding PrEP prescription. Furthermore, it is important to advocate for the (partial) coverage of PrEP costs by insurance companies or other sources of cost coverage.

Regarding motives for PrEP use among men in serodiscordant relationships, results showed that some men perceived PrEP as a good addition to current prevention methods since it could increase their protection, reduce their anxiety, and improve sexual satisfaction in their relationships. However, some men

Table 5

Choice and perceived pros and cons for distribution services for pre-exposure prophylaxis by different healthcare providers among 20 HIV-negative men having sex with men, Amsterdam, the Netherlands (2013).

Healthcare provider	Pros	Cons
Public health service (STI clinic)	Has specialized knowledge of HIV (and ART) Has specialized knowledge of sexual behavior and other STIs Has the possibility to perform medical check-up and/or counseling	Has no specialized knowledge of HIV (and ART) Has no specialized knowledge of personal medical background and the use of current (medical) drugs Is not easily accessible (only major cities have STI clinics).
General practitioner	Has the possibility to perform medical check-up and/or counseling Has knowledge of personal medical background and the use of current (medical) drugs	Has no specialized knowledge of HIV (and ART) Does not have time to counsel men and provide support for PrEP users
Hospital (HIV-specialist)	Has specialized knowledge of HIV (and ART) Has the possibility to perform medical check-up and/or counseling Is easily accessible (currently my doctor or my HIV-positive partner's doctor)	

Supporting quotes:

1. Having specialized knowledge of HIV (and ART): "Because I think HIV is so complicated, a General Practitioner doesn't have enough knowledge about it. I think you should rather leave it [PrEP prescription] to the specialists." MSM 18
2. Having specialized knowledge of sexual behavior and other STIs: "I think an organization like the Public Health Service, which is comfortable with those things (or has experience). And all patients with HIV are already in hospitals […] therefore taking your partner with you is easy, you are already there. I wouldn't do it somewhere separate, because that could be a hurdle for someone to go there." MSM 18
3. Possibility of performing medical check-up and/or counseling: "[…] It is quite drastic. And I think you have to monitor it carefully. And when you use it [PrEP] it seems important to me that you want to monitor what it is doing to you and that you have good medical guidance." MSM 7
4. Having specialized knowledge of personal medical background and the use of current (medical) drugs: "I do believe an STI-clinic is a location where they could prescribe PrEP, but it is important that they have insight into the [medical] background of the person and which other medication they are taking. If you take PrEP and something were to happen. […] So, I think it would be wiser that the general practitioner prescribes it." MSM 9
5. Easily accessible: see quote 2 / "I think it needs to be easily accessible, but accompanied with the right information. I think the pharmacy is good in doing that. But yes, you could also go to the Public Health Service." MSM 11
6. Having time to counsel men and provide support for PrEP users: "I believe that it is a task of the Public Health Service. A general practitioner doesn't have the time to check every six months if someone has a STI." MSM 4

ART = antiretroviral therapy, MSM = Men having sex with men, PrEP = pre-exposure prophylaxis, STIs = sexually transmitted infections.

perceived PrEP as unnecessary in discordant relationships where the HIV-positive partner had an undetectable viral load because of the low transmission risk. As growing evidence supports the latter, also among MSM,[30–32] using PrEP in serodiscordant relationships might become redundant.

Our results regarding intermittent PrEP show that most men were sceptical about its use, as it requires planning of their sex life and this would not fit in with their sex life habits. However, our study was conducted before the IPERGAY trial results indicated PrEP could be effectively taken up to 2 hours before a risk episode.[7] We defined intermittent PrEP as using PrEP 3 days before high-risk sexual behavior. The shorter time frame of planning sex in advance might increase its acceptability. Furthermore, as men perceived using intermittent PrEP as having reduced costs and fewer side effects compared to daily PrEP, intermittent PrEP options could increase general PrEP acceptability.

Our results indicate that some men perceived PrEP as a substitute for condom use. Although a decrease in condom use was not observed in study settings,[6,33] a decrease was seen among PrEP users in a clinical practice settings.[34] To deal with possible decreases in condom use or increases in STIs when PrEP is implemented in real-life settings, STI prevalence should be monitored after PrEP initiation, PrEP programs should include routine STI screening, and address risk and severity perceptions in regard to other STIs.

The motives for daily PrEP use found in this study are comparable to those found in other studies among MSM.[15–22] However, the following motives found in other studies were not considered important by our study population: PrEP will help link individuals to the healthcare system,[19] fear that others will think users of PrEP have HIV,[33] others will identify PrEP users as MSM,[33] and generally feeling ashamed about using PrEP.[22] These differences are probably explained by our study population and its context, as we included mainly older, native Dutch MSM participating in a cohort study and hence accustomed to disclosure, having overcome barriers for engaging with health-care systems, and living in a country with well organized health provision and an open gay culture. Furthermore, participants of a qualitative study might be more open to discuss PrEP and feel less shame to use PrEP. As motives might differ in other countries, interventions for PrEP implementation should be adapted to the countries' healthcare system, social norms, and risk population.

Regarding limitations, although MSM are likely to be the most important target group for PrEP in the Netherlands, other groups, for example, transgenders, high-risk heterosexuals, bisexual men, and sex workers, might also be considered eligible for PrEP. If PrEP also becomes available for those groups, their specific motives and preferences should be further explored as they might differ among those groups. Furthermore, as mentioned earlier, the selection of MSM participating in a cohort study might have influenced our results. Our findings may therefore not be generalized to the broader range of MSM living in the Netherlands or outside of it. We recommend that motives to use PrEP among high risk, for example, younger MSM and those not yet readily engaged with healthcare systems, should be further explored. Finally, we measured behavioral intentions and motives to use PrEP. Although behavioral intentions provide a good indication of the general willingness to use PrEP on the individual level, they do not absolutely predict actual PrEP uptake. Actual uptake of PrEP will most likely also be influenced by a variety of other external factors, such as social, organizational, or environmental factors, and these factors should also be addressed.[35,36]

In conclusion, the future use of daily PrEP among HIV-negative MSM depends on the personal evaluation of benefits, barriers

related to PrEP, and the perceived self-efficacy to adhere to PrEP. To maximize the public health impact of PrEP, ensuring high uptake among MSM at highest risk is important. Therefore, targeted information aimed at improving knowledge about PrEP efficacy and side effects needs to be developed. Furthermore, barriers for accessing PrEP services should be minimized according to the indicated needs of the target population. Perceived self-efficacy to use PrEP should be improved and addressed differently based on individual assessments of skill problems and of preferences for daily or intermittent PrEP. Finally, as this study shows that some men perceived PrEP as a substitute for condom use, it is important to discuss, monitor, and study condom use change and its consequences, and work toward integrating routine STI screening and counseling in PrEP prescription programs.

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References

[1] European Center for Disease Prevention and Control, World Health Organization Regional Office for Europe. HIV/AIDS surveillance in Europe 2012. Stockholm: European Centre for Disease Prevention and Control; 2013.
[2] Van Sighem A, Gras L, Smit C, et al. Human Immunodeficiency Virus (HIV) infection in the Netherlands: HIV Monitoring Report 2015. Amsterdam: Stichting HIV monitoring; 2015.
[3] Jansen IA, Geskus RB, Davidovich U, et al. Ongoing HIV-1 transmission among men who have sex with men in Amsterdam: a 25-year prospective cohort study. AIDS 2011;25:493–501.
[4] Beyrer C, Baral SD, van Griensven F, et al. Global epidemiology of HIV infection in men who have sex with men. Lancet 2012;380:367–77.
[5] Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. N Engl J Med 2010;363:2587–99.
[6] McCormack S, Dunn DT, Desai M, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. Lancet 2015;387:53–60.
[7] Molina JM, Capitant C, Spire B, et al. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. N Engl J Med 2015;373:2237–46.
[8] Centers for Disease Control and Prevention. Pre-Exposure Prophylaxis for the prevention of HIV infection in the United States, 2014: A Clinical Practice Guideline. Available at: www.cdc.gov/hiv/pdf/prepguidelines 2014.pdf [Accessed on December 5, 2014].
[9] World Health Organization. Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV. Geneva: World Health Organization; 2015.
[10] Gomez GB, Borquez A, Case KK, et al. The cost and impact of scaling up pre-exposure prophylaxis for HIV prevention: a systematic review of cost-effectiveness modelling studies. PLoS Med 2013;10:e1001401.
[11] Cambiano V, Miners A, Phillips A. What do we know about the cost-effectiveness of HIV preexposure prophylaxis, and is it affordable? Curr Opin HIV AIDS 2015;11:56–66.
[12] Desai K, Sansom SL, Ackers ML, et al. Modeling the impact of HIV chemoprophylaxis strategies among men who have sex with men in the United States: HIV infections prevented and cost-effectiveness. AIDS 2008;22:1829–39.
[13] Juusola JL, Brandeau ML, Owens DK, et al. The cost-effectiveness of preexposure prophylaxis for HIV prevention in the United States in men who have sex with men. Ann Intern Med 2012;156:541–50.
[14] Schneider K, Gray RT, Wilson DP. A cost-effectiveness analysis of HIV preexposure prophylaxis for men who have sex with men in Australia. Clin Infect Dis 2014;58:1027–34.
[15] Golub SA, Gamarel KE, Rendina HJ, et al. From efficacy to effectiveness: facilitators and barriers to PrEP acceptability and motivations for adherence among MSM and transgender women in New York City. AIDS Patient Care STDS 2013;27:248–54.
[16] Brooks RA, Kaplan RL, Lieber E, et al. Motivators, concerns, and barriers to adoption of preexposure prophylaxis for HIV prevention among gay and bisexual men in HIV-serodiscordant male relationships. AIDS Care 2011;23:1136–45.
[17] Brooks RA, Landovitz RJ, Kaplan RL, et al. Sexual risk behaviors and acceptability of HIV pre-exposure prophylaxis among HIV-negative gay and bisexual men in serodiscordant relationships: a mixed methods study. AIDS Patient Care STDS 2012;26:87–94.
[18] Galea JT, Kinsler JJ, Salazar X, et al. Acceptability of pre-exposure prophylaxis as an HIV prevention strategy: barriers and facilitators to pre-exposure prophylaxis uptake among at-risk Peruvian populations. Int J STD AIDS 2011;22:256–62.
[19] Galindo GR, Walker JN, Hazelton P, et al. Community member perspectives from transgender women and men who have sex with men on pre-exposure prophylaxis as an HIV prevention strategy: implications for implementation. Implement Sci 2012;7:116.
[20] Wheelock A, Eisingerich AB, Ananworanich J, et al. Are Thai MSM willing to take PrEP for HIV prevention? An analysis of attitudes, preferences and acceptance. PLoS One 2013;8:e54288.
[21] Gamarel KE, Golub SA. Intimacy motivations pre-exposure prophylaxis (PrEP) adoption intentions among HIV-negative men who have sex with men (MSM) in romantic relationships. Ann Behav Med 2014;49: 177–86.
[22] Bil JP, Davidovich U, van der Veldt WM, et al. What do Dutch MSM think of preexposure prophylaxis to prevent HIV-infection? A cross-sectional study. AIDS 2015;29:955–64.
[23] Stolte IG, Prins M. Van Sighem A, Gras L, Smit C, et al. The Amsterdam Cohort Studies on HIV infection: Annual report. In: Human Immunodeficiency Virus (HIV) Infection in the Netherlands: HIV Monitoring Report. Amsterdam:Stichting HIV monitoring; 2015. 164–77.
[24] van Griensven GJ, de Vroome EM, Goudsmit J, et al. Changes in sexual behaviour and the fall in incidence of HIV infection among homosexual men. BMJ 1989;298:218–21.
[25] Central Committee on Research Involving Human Subjects. *Your research: does it fall under the WMO*. Available at: http://www.ccmo.nl/ [Accessed on July 21, 2016].
[26] Glaser B, Strauss A. The discovery of grounded theory: strategies for qualitative research. Chicago: Aldine; 1967.
[27] Strauss A. Qualitative analysis for social scientists. Newbury Park, CA: Sage; 1987.
[28] Green J, Thorogood N. Analysing qualitative data. In: Qualitative Methods for Health Research. London: SAGE; 2004. 173–200.
[29] CPB Netherlands Bureau for Economic Policy Analyses. *CPBs short-term forecasts September 2014*. http://www.cpb.nl/cijfer/kortetermijnraming-september-2014 [Accessed December 3, 2014].
[30] Quinn TC, Wawer MJ, Sewankambo N, et al. Viral load and heterosexual transmission of human immunodeficiency virus type 1. Rakai Project Study Group. N Engl J Med 2000;342:921–9.
[31] Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med 2011;365: 493–505.
[32] Rodger A, Bruun T, Cambiano V, et al. HIV Transmission Risk Through Condomless Sex If HIV+ Partner On Suppressive ART: PARTNER Study [abstract]. 21ste Conference on Retroviruses and Oppotunistic Infections, Boston 2014; abstract 153LB.
[33] Grant RM, Anderson PL, McMahan V, et al. Uptake of pre-exposure prophylaxis, sexual practices, and HIV incidence in men and transgender women who have sex with men: a cohort study. Lancet Infect Dis 2014;14:820–9.
[34] Volk JE, Marcus JL, Phengrasamy T, et al. No New HIV Infections with Increasing Use of HIV Preexposure Prophylaxis in a Clinical Practice Setting. Clin Infect Dis 2015;61:1601–3.
[35] Bartholomw LK, Parcel GS, Kok G, et al. Planning health promotion programs, an intervention mapping approach. San Francisco: Jossey-Bass; 2011.
[36] Glanz K, Rimer BK, Viswanath K. Health Behavior and Health Education: Theory, research, and practice. San Francisco, CA: Jossey-Bass; 2008.