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## When awareness is not a barrier to PrEP uptake among men who have sex with men who are eligible for PrEP in France

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### ABSTRACT

Despite PrEP being available and free of charge in France, a gap remains between the estimated number of men who have sex with men (MSM) with high-risk exposure to HIV and the number of MSM PrEP users. The objective of this study is to identify factors associated with non-intention to use PrEP among PrEP-eligible and PrEP-aware MSM in France, “non-intenders”. European MSM Internet Survey (EMIS)-2017 was a cross-sectional survey conducted among MSM concerning their HIV prevention needs. Logistic regression models were used to identify factors associated with “non-intenders”. Compared to PrEP users, factors associated with non-intention to use PrEP were: age (aOR[95%CI] = 3.80[2.21;6.53]); not being vaccinated against hepatitis B (2.20 [1.45;3.34]); self-efficacy (1.84[1.29;2.60]); lower knowledge about on-demand PrEP (11.48 [7.37;17.87]) and daily PrEP (2.58[1.27;5.25]); not having a PrEP discussion at a hospital (12.39 [8.90;17.27]) or at a community service/drop-in (4.93[3.48;6.97]); living in a department with few PrEP access points (1.70[1.10;2.63]). On-demand PrEP may meet the prevention needs of “non-intenders” who have lower HIV risk perception. Increasing communication from health providers and community health workers to all MSM is needed.

### ARTICLE HISTORY

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### KEYWORDS

PrEP; MSM; Europe; non-intention

## Introduction

Since the efficacy of pre-exposure prophylaxis (PrEP) was shown in several clinical trials among men who have sex with men (MSM) (Grant et al., 2010; McCormack et al., 2016; Molina et al., 2015), PrEP has increasingly been approved and more widely available throughout Europe (PrEP in Europe, 2022). Recent estimates show, however, that 500 000 MSM in Europe were likely to use PrEP but do not have access to it (Hayes et al., 2019). From PrEP approval in France in 2016 to June 2018, 10 405 people have initiated PrEP whereas 32 000 MSM were estimated to be highly-exposed to HIV in 2011 (ANSM, 2018). These results suggest a gap between PrEP availability, accessibility, and use.

Reasons for slow PrEP uptake among MSM are complex and barriers occur at the level of the individual, the health care provider, the community, and the health system (Hannaford et al., 2018). Barriers to PrEP use have been well documented in the literature which

may explain the gap between the number of people who are highly exposed, and may particularly benefit from PrEP, and the number that have initiated it, including: cost (Auerbach & Hoppe, 2015; Eisingerich et al., 2012; Hannaford et al., 2018; Holt et al., 2013; Wheelock et al., 2013), distrust in the medical system (Auerbach & Hoppe, 2015; Hannaford et al., 2018), fear of stigma (Auerbach & Hoppe, 2015; Eisingerich et al., 2012; Haire, 2015; Hannaford et al., 2018), and the act of taking a daily pill (Bernier et al., 2017; Elsesser et al., 2016). Relationship power may also influence PrEP use (Braksmajer et al., 2020) in which MSM who have an equal and/or greater dominance in sexual decision-making compared to their partner are more likely to use PrEP (Braksmajer et al., 2020). In the French context, where PrEP is available at no cost to the user (covered by the French health insurance), other barriers potentially hindering PrEP access among MSM who have the intention to use it were identified (Annequin et al., 2020). Indeed, this study

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showed that among 2 197 MSM eligible and aware of PrEP, only 50% had the intention to take it. Compared to PrEP users, these MSM who were eligible, aware and had the intention of using PrEP were younger, more likely to be students and less “out” concerning their homosexuality. Living in a small city or village and living in a department with few PrEP access points were also associated with non-uptake of PrEP.

While it is important to identify the barriers to PrEP uptake among MSM who are eligible, aware and have the intention of using PrEP, it is also important to understand the barriers among another group: MSM who are eligible and aware of PrEP but do not intend to take it. Characterization of this group, as well as the identification of the individual, behavioural and structural barriers to PrEP uptake is crucial for developing adapted communications and strategies to expand and improve PrEP uptake. The objective of this study is to identify factors associated with non-intention to use PrEP among PrEP-eligible (according to French guidelines) and PrEP-aware MSM who do not intend to use it, compared to MSM PrEP users.

## Material and methods

### Study design

The European MSM Internet Survey (EMIS)-2017 was a cross-sectional online survey conducted among MSM which aimed to understand prevention needs (Weatherburn et al., 2020). The survey was conducted in 50 countries and available in 33 languages. MSM were eligible if they were at or over the age of sexual consent in their country, living in one of the 50 specified countries, identifying as a man or trans man, being sexually attracted to men and/or having sex with men. All respondents provided informed consent before participating in the study. EMIS-2017 received a favourable ethical opinion from the Observation Research Ethics Committee at the London School of Hygiene and Tropical Medicine (review reference 14421 /RR/8805) on 31 July 2017.

The online questionnaire was available from October 2017 to January 2018. Promotion of the survey occurred through push-messages on geospatial mobile phone applications, instant messages and banner advertisement on national and international gay websites, and social media platforms, alongside engagement with key Non-Governmental Organizations (NGO). Data collection included sociodemographic characteristics, morbidities, drug use, sexual behaviours and HIV-related prevention needs and interventions. The methodological details and the overall European findings

have been published elsewhere (The EMIS Network, 2019; Weatherburn et al., 2020).

### Variables of interest

We focused our analysis on respondents who were eligible for PrEP according to French guidelines and who were also aware of PrEP but did not have the intention to use it. The analytic sample includes MSM who received a negative HIV test result in the past as well as respondents who never tested for HIV.

Consistent with a previous analysis on the EMIS-2017 France data (Annequin et al., 2020), respondents were identified as eligible for PrEP if they met one of the following criteria: condomless anal intercourse with  $\geq 2$  different steady or non-steady sexual partners within the previous 12 months, history of post-exposure prophylaxis (PEP) use or chemsex (use of stimulant drugs to increase the intensity and duration of sex) within the previous 12 months (Morlat, 2019). In the context of chemsex, stimulant drugs included ecstasy/MDMA, cocaine, amphetamine (speed), crystal methamphetamine (Tina, Pervitin), mephedrone and ketamine. The question “Have you ever heard of PrEP?” was used to identify respondents with an awareness of PrEP. Respondents were classified as PrEP users if they declared prior or current PrEP use. Finally, respondents indicated their intention to use PrEP (“If PrEP was available and affordable to you, how likely would you be to use it?”) using a 5-point Likert scale. Respondents were classified with non-intention to take PrEP if they responded “quite unlikely” or “very unlikely” or “not sure” to this question. Respondents who reported “not sure” were classified as “non intender” because they did not clearly state an intention to use PrEP.

Also consistent with the previous analysis (Annequin et al., 2020), several sociodemographic characteristics were analyzed: age, educational level, employment and financial situation, administrative region, size of the city of residence, and sexual identity. Level of “outness” was determined according to the number of acquaintances who knew about the respondent’s attraction to men: low level of outness (few or none of their acquaintances know about their attraction to men) and medium to high level of outness (less than half to all or almost all their acquaintances know their attraction to men). Frequency of condom use during anal intercourse with non-steady partners within the previous 12 months (never/ seldom/ sometimes; mostly/ always; not concerned (no anal intercourse with non-steady partners)) and the number of non-steady intercourse partners was also considered. Self-efficacy regarding safer sex was assessed with two

statements “The sex I have, is always as safe as I want it to be” and “I find it easy to say “no” to sex I don’t want” using a 5-point Likert scale. Vaccination against hepatitis A and B was considered as a proxy for overall health care use, including sexual health. HIV testing behaviour and prevention knowledge was assessed using the following: (i) reporting HIV test result within the previous 6 months, (ii) knowledge that a person living with HIV on effective treatment cannot transmit the virus through sex (undetectable = untransmittable), (iii) knowledge that PrEP can be used as an event-based (or on-demand) or as a daily regimen, and (iv) reporting a health professional-initiated discussion on PrEP and particularly at a hospital or clinic as an out-patient or at a community service or drop-in. Finally, access to PrEP services was categorized (0 or 1; 2–9; 10 or more) according to the number of PrEP access points in 2017 (Annequin et al., 2020).

### Statistical analysis

The percentage of PrEP users was calculated amongst EMIS respondents who did not report a HIV diagnosis and who were living in France (including France overseas and Monaco) (Annequin et al., 2020). For the present analysis, our population of interest will be referred to as “non-intenders” which is defined as respondents who were eligible, aware, and not intending to use PrEP.

Variables of interest were compared between “non-intenders” and PrEP users using Chi-2 tests for

categorical variables. Logistic regression models that assess the odds of being “non-intenders” compared to PrEP users were used to identify factors associated with belonging to the “non-intenders” group. Variables with a  $p$ -value  $<0.20$  in the univariable analysis were considered eligible to enter the multivariable model. A backward procedure based on the Likelihood Ratio Chi-2 test was used to select significant variables for the final model ( $p$ -value  $<0.05$ ). Stata/SE 14.0 software (StataCorp LP, College Station, USA) was used for all the analyses. Only variables with  $p < 0.05$  in the multivariable model are shown in the respective table.

## Results

### Study population

Among 7 965 respondents living in France, 9.2% ( $N = 734$ ) reported a history of PrEP use and 90.8% ( $N = 7,231$ ) reported no prior PrEP use. Among PrEP non-users, 15.2% ( $N = 1,098$ ) were “non-intenders” with a median age of 35 [IQR 26–45] years, compared to 38 [31–46] years for PrEP users. Thus, 1 832 MSM respondents (“non-intenders” and PrEP users) were included in this analysis.

### Characteristics of the study population ( $N = 1,832$ )

The sociodemographic characteristics of the study population are presented in the Table 1. Compared to

**Table 1.** Description and comparison of sociodemographic characteristics, sexual behaviours, HIV testing, HIV prevention knowledge, and access to health care of “non-intenders” and PrEP users among EMIS-2017 respondents living in France,  $N = 1,832$ .

	“Non-intenders” % (n)	PrEP users % (n)	$P$ -value	Total % (n)
	$n = 1,098$	$n = 734$		$n = 1,832$
<i>Sociodemographic characteristics</i>				
Age (in years)			<b>&lt;0.001</b>	
< 25	19.2 (211)	5.6 (41)		13.8 (252)
25–34	29.5 (324)	32.3 (237)		30.6 (561)
35–44	24.3 (267)	32.7 (240)		27.7 (507)
≥ 45	27.0 (296)	29.4 (216)		27.9 (512)
Number of years spent in full-time education since the age of 16			0.078	
0–4 years	24.1 (253)	19.6 (139)		22.3 (392)
5–6 years	23.8 (250)	26.0 (184)		24.7 (434)
7 years or more	52.1 (546)	54.4 (386)		53.0 (932)
Employment situation			<b>&lt;0.001</b>	
Employed	72.1 (790)	82.1 (602)		76.1 (1392)
Unemployed	8.9 (98)	6.7 (49)		8.1 (147)
Student	14.0 (153)	5.3 (39)		10.5 (192)
Retired/Sickness leave/Others	5.0 (54)	5.9 (43)		5.3 (97)
Financial coping			0.557	
Really comfortable to neither comfortable nor struggling	83.8 (918)	84.9 (622)		84.2 (1540)
Really struggling/Struggling	16.2 (177)	15.1 (111)		15.8 (288)
Settlement size			<b>&lt;0.001</b>	
Small town (<100,000) or village	33.9 (368)	25.3 (183)		30.5 (551)
Medium (100,000+) or big city	66.1 (717)	74.7 (541)		69.5 (258)

(Continued)

Table 1. Continued.

	"Non-intenders" % (n)	PrEP users % (n)	P-value	Total % (n)
Region of residence			<b>&lt;0.001</b>	
Île-de-France (Paris Region)	29.7 (316)	41.9 (298)		34.6 (614)
Provence-Alpes-Côte-D'Azur with Corse	10.1 (107)	9.7 (69)		9.9 (176)
Auvergne-Rhône-Alpes	12.2 (130)	12.9 (92)		12.5 (222)
Occitania	10.5 (112)	8.2 (58)		9.6 (170)
Other French Regions	37.5 (399)	27.3 (194)		33.4 (593)
Relationship status			0.281	
Single	59.2 (650)	59.0 (432)		59.2 (1082)
Steady Partner	33.1 (363)	35.1 (257)		33.9 (620)
Not sure/complicated	7.7 (84)	5.9 (43)		6.9 (127)
Sexual identity			<b>&lt;0.001</b>	
Gay or Homosexual	83.1 (911)	90.9 (667)		86.2 (1578)
Bisexual	10.0 (110)	5.2 (38)		8.1 (148)
Other	6.9 (75)	3.9 (29)		5.7 (104)
<i>Sexual Behaviours</i>				
Number of anal intercourse non-steady male partners in the previous 12 months			<b>&lt;0.001</b>	
1	6.2 (63)	2.1 (14)		4.5 (77)
2-9	45.1 (460)	19.6 (134)		34.9 (594)
10 or more	48.7 (497)	78.3 (534)		60.6 (1031)
Frequency of condom use for anal intercourse with non-steady male partners in the last 12 months			<b>&lt;0.001</b>	
Never/Seldom/sometimes	24.1 (262)	56.9 (414)		37.3 (676)
Mostly/always	69.6 (757)	36.9 (268)		56.5 (1025)
Not concerned	6.3 (68)	6.2 (45)		6.2 (113)
Use of stimulants for sex ("Chemsex") in the previous 12 months			<b>&lt;0.001</b>	
Yes	27.3 (299)	36.0 (263)		30.8 (562)
No	72.7 (796)	64.0 (468)		69.2 (1264)
<i>Level of outness</i>			<b>&lt;0.001</b>	
Low	16.9 (185)	9.7 (71)		14.0 (256)
Medium/high	83.1 (912)	90.3 (659)		86.0 (1571)
<i>Self-efficacy</i> ("The sex I have is always as safe as I want it to be"/ "I find it easy to say "no" to sex I don't want")			<b>&lt;0.001</b>	
Disagree at least once	20.6 (226)	28.6 (210)		23.8 (436)
Never disagree	79.4 (872)	71.4 (524)		76.2 (1396)
<i>Hepatitis vaccination history</i>				
Vaccinated against hepatitis A			<b>&lt;0.001</b>	
Yes	38.0 (416)	74.7 (547)		52.7 (963)
No	41.7 (457)	21.1 (154)		33.4 (611)
I don't know	20.3 (223)	4.2 (31)		13.9 (254)
Vaccinated against hepatitis B			<b>&lt;0.001</b>	
Yes	58.3 (639)	86.9 (637)		69.8 (1276)
No	26.6 (291)	9.8 (72)		19.8 (363)
I don't know	15.1 (166)	3.3 (24)		10.4 (190)
<i>HIV testing and HIV prevention knowledge</i>				
Last HIV test result within the previous 6 months			<b>&lt;0.001</b>	
Yes	72.9 (742)	97.3 (697)		83.0 (1439)
No	27.1 (276)	2.7 (19)		17.0 (295)
Prior knowledge on "undetectable = untransmittable"			<b>&lt;0.001</b>	
Yes	64.4 (707)	90.9 (667)		75.0 (1374)
No	35.6 (390)	9.1 (67)		25.0 (457)
Prior knowledge on the possibility of event-based PrEP dosing <sup>(1)</sup>			<b>&lt;0.001</b>	
Yes	34.0 (372)	94.5 (692)		58.2 (1064)
No	66.0 (723)	5.5 (40)		41.8 (763)
Prior knowledge on the possibility of event based PrEP taking <sup>(2)</sup>			<b>&lt;0.001</b>	
Yes	77.3 (847)	98.6 (720)		85.8 (1567)
No	22.7 (249)	1.4 (10)		14.2 (259)
Prior knowledge on daily PrEP <sup>(3)</sup>			<b>&lt;0.001</b>	
Yes	63.3 (695)	98.0 (717)		77.2 (1412)
No	36.7 (403)	2.0 (15)		22.8 (418)
<i>Access to PrEP</i>				
Health professional has spoken personally about PrEP			<b>&lt;0.001</b>	
Yes	21.5 (235)	90.3 (662)		49.1 (897)
No/don't know	78.5 (860)	9.7 (71)		50.9 (931)
Spoken personally about PrEP at a hospital or clinic as an out-patient			<b>&lt;0.001</b>	
Yes	8.8 (96)	62.0 (454)		30.1 (550)
No	91.2 (999)	38.0 (278)		69.9 (1277)
Spoken personally about PrEP at a community service or drop-in			<b>&lt;0.001</b>	
Yes	10.3 (113)	37.2 (272)		21.1 (385)
No	89.7 (982)	62.8 (460)		78.9 (1442)

(Continued)

**Table 1.** Continued.

	"Non-intenders" % (n)	PrEP users % (n)	P-value	Total % (n)
Number of PrEP access points within department of residence			<b>&lt;0.001</b>	
0–1 access point	26.7 (283)	15.9 (113)		22.4 (396)
2–9 access points	50.6 (536)	52.1 (369)		51.2 (905)
10 access points and more	22.7 (241)	32.0 (227)		26.4 (468)

<sup>(1)</sup>"If someone knows in advance when they will have sex, PrEP needs to be taken as a double dose approximately 24 h before sex and then at both 24 and 48 h after the double dose".

<sup>(2)</sup>Pre-Exposure prophylaxis (PrEP) involves someone who does not have HIV taking pills before as well as after sex to prevent them getting HIV".

<sup>(3)</sup>"PrEP can be taken as a single daily pill if someone does not know in advance when they will have sex".

PrEP users, "non-intenders" were younger (<25 years: 19.2% versus 5.6%) and were more likely to be a student (14.0% versus 5.3%). "Non-intenders" also more frequently lived in smaller towns or villages (33.9% versus 25.3%) compared to PrEP users and more often identified as bisexual (10.0% versus 5.2%).

Concerning sexual behaviour, "non-intenders" declared fewer non-steady anal intercourse partners compared to PrEP users (10 or more: 48.7% versus 78.3%), higher consistent use of condoms with these partners (69.6% versus 36.9%) and lower engagement in "chemsex" within the previous 12 months (27.3% versus 36.0%). "Non-intenders" declared lower levels of outness (16.9% versus 9.7%) but higher self-efficacy regarding sexual safety (79.4% versus 71.4%) compared to PrEP users.

Concerning the proxy for overall healthcare use, "non-intenders" were less likely to report vaccination against Hepatitis A and B (38.0% versus 74.7% and 58.3% versus 86.9%, respectively). Regarding HIV testing and prevention knowledge, "non-intenders" were

less likely to have received an HIV test result within the previous 6 months (72.9% versus 97.3%), to know about PrEP, including event-based PrEP dosing (measured with two items: 34.0% versus 94.5% and 77.3% versus 98.6%) and daily dosing (63.3% versus 98.0%), and to know about "undetectable = untransmittable" (64.4% versus 90.9%).

"Non-intenders" were less likely to declare a health professional-initiated discussion on PrEP (21.5% versus 90.3%) and to report PrEP discussions at the hospital or clinic (8.8% versus 62.0%) as well as in community service or drop-in settings (10.3% versus 37.2%). Finally, they were more likely to live in a department of residence with fewer PrEP access points; 26.7% lived in a department with 0 or 1 PrEP access points versus 15.9% among PrEP users.

### Factors associated with "non-intenders"

Factors associated with "non-intenders" after adjustment are shown in Table 2. Regarding

**Table 2.** Factors associated with belonging to the "non-intenders" group versus PrEP users, univariable (N = 1,832) and multivariable model (N = 1,757).

	Univariable Model (N = 1,832) OR [95%CI]	P-value	Multivariable Model (N = 1,757) aOR [95%CI]	P-value
<i>Sociodemographic characteristics</i>				
Age (in years)				
< 25	<b>3.76 [2.57;5.48]</b>	<b>&lt;0.001</b>	<b>3.80 [2.21;6.53]</b>	<b>&lt;0.001</b>
25–34	1.00 [0.78;1.27]	0.985	1.42 [0.97;2.09]	0.074
35–44	0.81 [0.63;1.04]	0.098	1.00 [0.67;1.47]	0.981
≥ 45	1.00		1.00	
Number of years spent in full-time education since the age of 16				
0–4 years	<b>1.29 [1.01;1.64]</b>	<b>0.043</b>		
5–6 years	0.96 [0.76;1.21]	0.732		
7 years or more	1.00			
Employment situation				
Employed	1.00			
Unemployed	<b>1.52 [1.06;2.18]</b>	<b>0.021</b>		
Student	<b>2.99 [2.07;4.32]</b>	<b>&lt;0.001</b>		
Retired /Sickness leave/Others	0.96 [0.63;1.45]	0.835		
Settlement size				
Small town (<100,000) or village	<b>1.52 [1.23;1.87]</b>	<b>&lt;0.001</b>		
Medium (100,000+) or big city	1.00			
Region of residence				
Île-de-France (Paris Region)	1.00			

(Continued)

**Table 2.** Continued.

	Univariable Model (N = 1,832) OR [95%CI]	P-value	Multivariable Model (N = 1,757) aOR [95%CI]	P-value
Provence-Alpes-Côte-D'Azur with Corse	<b>1.46 [1.04;2.06]</b>	<b>0.029</b>		
Auvergne-Rhône-Alpes	1.33 [0.98;1.82]	0.070		
Occitania	<b>1.82 [1.28;2.60]</b>	<b>0.001</b>		
Other French Regions	<b>1.94 [1.54;2.45]</b>	<b>&lt;0.001</b>		
<b>Sexual identity</b>				
Gay or Homosexual	1.00			
Bisexual	<b>2.12 [1.45;3.11]</b>	<b>&lt;0.001</b>		
Other	<b>1.89 [1.22;2.94]</b>	<b>0.004</b>		
<b>Sexual Behaviours</b>				
Number of anal intercourse with non-steady male partners in the previous 12 months				
1	1.00			
2–9	0.76 [0.41;1.40]	0.385		
10 or more	<b>1.10 [0.71;1.71]</b>	<b>&lt;0.001</b>		
Frequency of condom use for anal intercourse with non-steady male partners in the previous 12 months				
Never/Seldom/sometimes	1.00			
Mostly/always	<b>4.46 [3.62;5.50]</b>	<b>&lt;0.001</b>		
Not concerned	<b>2.38 [1.59;3.59]</b>	<b>&lt;0.001</b>		
Use of stimulants for sex ("Chemsex") in the previous 12 months				
Yes	1.00			
No	<b>1.50 [1.22;1.83]</b>	<b>&lt;0.001</b>		
<b>Level of outness</b>				
Low	1.88 [1.41;2.52]	<0.001		
Medium/high	1.00			
<b>Self-efficacy</b> ("The sex I have is always as safe as I want it to be"/"I find it easy to say "no" to sex I don't want")				
Disagree at least once	1.00		1.00	
Never disagree	<b>1.55 [1.24;1.92]</b>	<b>&lt;0.001</b>	<b>1.84 [1.29;2.60]</b>	<b>0.001</b>
<b>Hepatitis vaccination history</b>				
Vaccinated against hepatitis A				
Yes	1.00			
No	<b>3.90 [3.12;4.88]</b>	<b>&lt;0.001</b>		
I don't know	<b>9.46 [6.36;14.06]</b>	<b>&lt;0.001</b>		
Vaccinated against hepatitis B				
Yes	1.00		1.00	
No	<b>4.03 [3.04;5.33]</b>	<b>&lt;0.001</b>	<b>2.20 [1.45;3.34]</b>	<b>&lt;0.001</b>
I don't know	<b>6.90 [4.43;10.73]</b>	<b>&lt;0.001</b>	1.41 [0.75;2.65]	0.283
<b>HIV testing and HIV prevention knowledge</b>				
Last HIV test result within the previous 6 months				
Yes	1.00			
No	<b>13.65 [8.48;21.97]</b>	<b>&lt;0.001</b>		
Prior knowledge on "undetectable = untransmittable" <sup>(1)</sup>				
Yes	1.00			
No	<b>5.49 [4.15;7.27]</b>	<b>&lt;0.001</b>		
Prior knowledge on the possibility of event-based PrEP dosing <sup>(2)</sup>				
Yes	1.00		1.00	
No	<b>33.62 [23.88;47.35]</b>	<b>&lt;0.001</b>	<b>11.48 [7.37;17.87]</b>	<b>&lt;0.001</b>
Prior knowledge on daily PrEP <sup>(3)</sup>				
Yes	1.00		1.00	
No	<b>27.72 [16.38;46.89]</b>	<b>&lt;0.001</b>	<b>2.58 [1.27;5.25]</b>	<b>0.009</b>
<b>Access to PrEP</b>				
Health professional has spoken personally about PrEP				
Yes	1.00			
No/don't know	<b>34.12 [25.68;45.33]</b>	<b>&lt;0.001</b>		
Spoken personally about PrEP at a hospital or clinic as an out-patient				
Yes	1.00		1.00	
No	<b>16.99 [13.14;21.98]</b>	<b>&lt;0.001</b>	<b>12.39 [8.90;17.27]</b>	<b>&lt;0.001</b>
Spoken personally about PrEP at a community service or drop-in				
Yes	1.00		1.00	
No	<b>5.14 [4.02;6.57]</b>	<b>&lt;0.001</b>	<b>4.93 [3.48;6.97]</b>	<b>&lt;0.001</b>
Number of PrEP access points within department of residence				
0–1 access point	<b>2.36 [1.78;3.13]</b>	<b>&lt;0.001</b>	<b>1.70 [1.10;2.63]</b>	<b>0.016</b>
2–9 access points	<b>1.37 [1.09;1.71]</b>	<b>0.06</b>	1.18 [0.84;1.65]	0.347
10 or more access points	1.00		1.00	

<sup>(1)</sup>"If someone knows in advance when they will have sex, PrEP needs to be taken as a double dose approximately 24 h before sex and then at both 24 and 48 h after the double dose".

<sup>(2)</sup>Pre-Exposure prophylaxis (PrEP) involves someone who does not have HIV taking pills before as well as after sex to prevent them getting HIV".

<sup>(3)</sup>"PrEP can be taken as a single daily pill if someone does not know in advance when they will have sex".



sociodemographic characteristics, younger age (under 25 years old) (aOR[95%CI] = 3.80[2.21;6.53]) was significantly associated with non-intention to use PrEP.

Not being vaccinated against hepatitis B (2.20 [1.45;3.34]) and self-efficacy regarding sexual safety (1.84[1.29;2.60]) were factors significantly associated with non-intention to use PrEP.

Concerning HIV prevention knowledge and access to health care, lower knowledge about PrEP regimens (on-demand PrEP 11.48[7.37;17.87]) and daily PrEP (2.58 [1.27;5.25]), not having a PrEP discussion at a hospital (12.39[8.90;17.27]) or at a community service/drop-in (4.93[3.48;6.97]) and living in a department with few PrEP access points (0 or 1 PrEP access point: 1.70 [1.10;2.63]) were also significantly associated with non-intention to use PrEP.

## Discussion

This study aimed to study the specific factors associated with the non-intention of using PrEP among MSM aware and eligible to PrEP uptake in France. To our knowledge, this specific group has not been studied in the literature. Our results showed that MSM “non-intenders” were more likely to be young and to report more self-efficacy regarding safer sex than PrEP users but were less engaged in the sexual health pathway. Although “non-intenders” were less often facing HIV risk exposure situations compared to PrEP users (fewer non-steady intercourse partners, higher consistent use of condoms with these partners and lower engagement in chemsex within the previous 12 months), they were nonetheless eligible for PrEP according to French guidelines. The multivariable analysis shows that the lack of knowledge of on-demand and daily PrEP, the lack of discussion about PrEP at hospital and or at a community service/drop-in and the lack of PrEP access in the department of residence were also associated with non-intention to take PrEP. It is important to note that sexual behaviours were not significantly associated with the non-intention to take PrEP. These results are coherent with a recent systematic review of barriers and facilitators to use PrEP among MSM that also identified lack of knowledge, young age and the lack of sensitively trained and trustworthy providers as barriers to PrEP use (Hannaford et al., 2018).

Compared to our previous study which aimed at analyzing factors associated with the intention to take PrEP, similar factors were found (Annequin et al., 2020). However, the important difference between these analyses is that the “non intenders,” despite meeting criteria for PrEP, reported higher sex self-efficacy compared to PrEP users, whereas the previous analysis among

eligible MSM who were aware of PrEP and had the intention to use it showed low sex self-efficacy compared to PrEP users. High self-efficacy among respondents who meet criteria for PrEP (in other words, who are exposed to HIV risk) may suggest a misperception of HIV risk. A study on HIV risk exposure perception in the ANRS-IPERGAY trial has shown that a high risk exposure perception is one of the determinants of PrEP use (Di Ciaccio et al., 2019).

In the present study, “non intenders” were less likely to be vaccinated against hepatitis B than PrEP users, which contrasts with available hepatitis B vaccination data among MSM in France. Hepatitis B vaccination is recommended for MSM since 2014, and a rapid-assessment showed that among MSM not taking PrEP, 73% were vaccinated against hepatitis B (Florence et al., 2020). This result may suggest that “non-intenders” were less engaged in a sexual health pathway. Lack of vaccination also could be an indication of various factors such as: poor access to healthcare, healthcare avoidance due the experience of fear or stigma (Rhodes, 2002; Singh et al., 2018; Vet et al., 2017), or general skepticism towards vaccinations (Tafuri et al., 2014). Such barriers to healthcare could also impact access to PrEP which was initially only available in hospital settings in France. Results from a European PrEP survey showed that when asked the best places for PrEP delivery, respondents preferred general practitioners and community health centers (Bernier et al., 2017). Therefore, decentralization of PrEP services and task shifting, in terms of increasing availability of PrEP outside of the hospital setting and simplification of monitoring and counselling to trained non-specialists, may facilitate and expand PrEP uptake for those who are not reached by traditional healthcare systems (Coalition PLUS, 2017; Hannaford et al., 2018).

Although the cost of PrEP has been identified as a barrier to PrEP use in several studies (Auerbach & Hoppe, 2015; Eisingerich et al., 2012; Hannaford et al., 2018; Holt et al., 2013; Wheelock et al., 2013), our results show that the availability of PrEP free of charge is not sufficient to ensure complete accessibility of this prevention tool among certain populations with high exposure to HIV risk in France.

On-demand PrEP may be more adapted to the health sexual needs of “non-intenders” who may experience fewer or less frequent HIV exposure risk situations, due to more frequent/systematic use of condoms and fewer non-steady sexual partners. Results from an US internet survey showed that while daily PrEP was a barrier to PrEP uptake for almost all MSM respondents (92.6%), 74.3% reported willingness to take PrEP over short periods of increased risk (Elsesser et al., 2016). Our study highlighted the lack of knowledge of on-

demand PrEP use among our sample of MSM which may be a barrier to PrEP uptake. Further investigation is therefore needed to understand whether on-demand PrEP could respond to the needs of “non-intenders” MSM.

To facilitate knowledge and intention to take on-demand PrEP, health professionals should increase their capacity and efforts to identify “non-intender” MSM patients and discuss on-demand PrEP, HIV risk exposure assessments, as well as hepatitis vaccination within an overall positive sexual health and well-being approach. Community health workers should also increase their efforts to identify “non-intender” MSM, discuss on-demand PrEP and HIV risk exposure perception. However, PrEP is not the only HIV prevention tool. Both community and professional health workers should reach “non-intenders” to discuss a comprehensive HIV prevention package to propose a sexual health offer according to their needs. Better collaboration between health professionals and community health workers may facilitate the navigation of “non-intenders” through the HIV prevention and care continuum (Myers et al., 2018).

Since June 2021, private general practitioners could prescribe PrEP initiation in France. Recent French monitoring data showed that the proportion of PrEP initiations prescribed by a private general practitioners increased from 19% in 2021 to 41% in 2022 (Ameli, 2022). This change in the landscape of PrEP availability could extend and increase on-demand PrEP knowledge and sexual health discussions with physicians. Future studies should take into account the impact of this change on non-intender MSM in France. Results of the present study could be useful to private general practitioners for their PrEP discussions and prescription practices.

Our study has some limitations. Firstly, online recruitment of participants may not reach MSM who do not identify as gay (Prah et al., 2016). Secondly, we could not take into account recent STI diagnosis in the definition of PrEP eligibility (recent STI diagnosis is one of the indicators of PrEP eligibility in France), due to sub-optimal translation (The EMIS Network, 2019). Nevertheless, 89% of MSM were classified as eligible based on the number of condomless intercourse acts with different partners, thus not taking into account STI diagnoses might not have underestimated the number of eligible PrEP users. French eligibility criteria are not absolute indicators of HIV risk exposure but are formulated to give guidance and to trigger individual discussions about personal HIV prevention approaches. Third, our results on PrEP access points must be taken with some caution as we did not adjust for

population density. Finally, we had no data to explore psychological dimensions regarding intention to take PrEP, such as PrEP-related stigma and discrimination which may impact the intention to uptake PrEP (Golub et al., 2019).

## Conclusions

This analysis highlights the importance of better information and communication on PrEP toward MSM who are eligible and aware of PrEP. Enhancing and increasing communication from health providers and community health workers to all MSM, including those who perceive themselves at lower risk of HIV infection, could lead to better knowledge of on-demand PrEP and other tools of a comprehensive HIV prevention package. HIV testing is an opportunity for health care providers and community health workers to provide knowledge on PrEP and actively engage MSM in the sexual health pathway.

## List of abbreviations

EMIS: European Men-Who-Have-Sex-With-Men Internet Survey.

HIV: human immunodeficiency virus.

MSM: men who have sex with men.

NGO: Non-Governmental Organizations.

PEP: post-exposure prophylaxis.

PrEP: pre-exposure prophylaxis.

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No potential conflict of interest was reported by the author(s).

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## Consent for publication

Not applicable.

## Availability of data and materials

All data concerning the present analysis are available in the Tables.

## Competing interest

No potential conflict of interest was reported by the author(s).

## Ethics approval and consent to participate

EMIS-2017 received a favourable ethical opinion from the Observation Research Ethics Committee at the London School of Hygiene and Tropical Medicine (review reference 14421 /RR/8805) on 31 July 2017.

Informed consent has been obtained for all participants.

All methods were carried out in accordance with relevant guidelines and regulations.

## Authors' contributions

DRC, AV AJS, DM and SM designed the study and data collection tool. VV and TA performed statistical analysis. MD and RD identified research question, supervised the analysis and wrote the paper.

## Europe

PlanetRomeo, European AIDS Treatment Group (EATG), Eurasian Coalition on Male Health (ECOM), European Centre for Disease Prevention and Control (ECDC), European Monitoring Centre for Drugs & Drug Addiction (EMCDDA), European Commission (DG SANTE). France: AIDES, Coalition PLUS, Sexo-Safe, Santé Publique France, INSERM.

## References

- Ameli. (2022, November 29). *Forte augmentation de la prescription de la PrEP en ville par des médecins généralistes*. <https://www.ameli.fr/bouches-du-rhone/medecin/actualites/forte-augmentation-de-la-prescription-de-la-prep-en-ville-par-desmedecins-generalistes>.
- Annequin, M., Villes, V., Delabre, R. M., Alain, T., Morel, S., Michels, D., Schmidt, A. J., Velter, A., & Rojas Castro, D. (2020). Are PrEP services in France reaching all those exposed to HIV who want to take PrEP? MSM respondents who are eligible but not using PrEP (EMIS 2017). *AIDS Care*, 32(sup2), 47–56. <https://doi.org/10.1080/09540121.2020.1739219>
- ANSM. (2018). Suivi de l'utilisation de Truvada ou génériques pour une prophylaxie pré-exposition (PrEP) au VIH Période du 01/01/2016 au 30/06/2018 (pp. 1–21).
- Auerbach, J. D., & Hoppe, T. A. (2015). Beyond “getting drugs into bodies”: Social science perspectives on pre-exposure prophylaxis for HIV. *Journal of the International AIDS Society*, 18(Suppl 3), 4. <https://doi.org/10.7448/IAS.18.4.19983>
- Bernier, A., Delabre, R., Schlegel, V., Vilotitch, A., Duken, S., Stranz, R., Rojas Castro, D., & Jonas, K. (2017a). *Barriers to uptake of pre-exposure prophylaxis among respondents to the Flash! PrEP in Europe survey [Oral communication]*. The 9th IAS Conference.
- Bernier, A., Delabre, R., Schlegel, V., Vilotitch, A., Ghosn, J., Corbelli, G., Cairns, G., Noori, T., Pichon, F., Chanos, S., Zantkuijl, P., Spire, B., Jonas, K., Stranz, R., & Rojas Castro, D. (2017b). *What role might general practitioners play in pre-exposure prophylaxis programs in Europe? Results from a 2016 European community-based survey “flash! Prep in Europe” (FPIE) [Poster]*.
- Braksmajer, A., Zhang, C., & McMahon, J. M. (2020). Associations between relationship power and pre-exposure prophylaxis (PrEP) use among men who have sex with men. *AIDS and Behavior*, 24(5), 1358–1364. <https://doi.org/10.1007/s10461-019-02731-1>
- Coalition PLUS. (2017). *POUR UN MONDE SANS SIDA, DÉMÉDICALISONS!* (pp. 1–28). Coalition PLUS.
- Di Ciaccio, M., Sagaon-Teyssier, L., Protière, C., Mimi, M., Suzan-Monti, M., Meyer, L., Rojas Castro, D., Pialoux, G., Pintado, C., Molina, J. M., Préau, M., & Spire, B. (2021). Impact of HIV risk perception on both pre-exposure prophylaxis and condom use. *Journal of Health Psychology*, 26), <https://doi.org/10.1177/1359105319883927>
- Eisingerich, A. B., Wheelock, A., Gomez, G. B., Garnett, G. P., Dybul, M. R., & Piot, P. K. (2012). Attitudes and acceptance of oral and parenteral HIV preexposure prophylaxis among potential user groups: A multinational study. *PLoS ONE*, 7 (1), e28238. <https://doi.org/10.1371/journal.pone.0028238>
- Elsesser, S. A., Oldenburg, C. E., Biello, K. B., Mimiaga, M. J., Safren, S. A., Egan, J. E., Novak, D. S., Krakower, D. S., Stall, R., & Mayer, K. H. (2016). Seasons of risk: Anticipated behavior on vacation and interest in episodic antiretroviral pre-exposure prophylaxis (PrEP) among a large national sample of U.S. men who have sex with men (MSM). *AIDS and Behavior*, 20(7), 1400–1407. <https://doi.org/10.1007/s10461-015-1238-0>
- Florence, S., Grabar, S., Usubillaga, R., Chanal, J., Pietri, M., Le Baut, V., Cros, A., Cuvillier, Y., Sagot, P., & Salmon,

- D. (2020). Couverture vaccinale des hommes ayant des rapports sexuels avec des hommes (HSH) pour les vaccins systématiquement recommandés en France dans cette population. *Médecine et Maladies Infectieuses*, 50(6), S179. <https://doi.org/10.1016/j.medmal.2020.06.382>
- Golub, S. A., Fikslin, R. A., Goldberg, M. H., Peña, S. M., & Radix, A. (2019). Predictors of PrEP uptake among patients with equivalent access. *AIDS and Behavior*, 23(7), 1917–1924. <https://doi.org/10.1007/s10461-018-2376-y>
- Grant, R. M., Lama, J. R., Anderson, P. L., McMahan, V., Liu, A. Y., Vargas, L., Goicochea, P., Casapia, M., Guanira-Carranza, J. V., Ramirez-Cardich, M. E., Montoya-Herrera, O., Fernández, T., Veloso, V. G., Buchbinder, S. P., Chariyalertsak, S., Schechter, M., Bekker, L.-G., Mayer, K. H., Kallás, E. G., ... Glidden, D. V. (2010). Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*, 363(27), 2587–2599. <https://doi.org/10.1056/NEJMoa1011205>
- Haire, B. (2015). Preexposure prophylaxis-related stigma: Strategies to improve uptake and adherence – A narrative review. *HIV/AIDS – Research and Palliative Care*, 24(1), <https://doi.org/10.2147/HIV.S72419>
- Hannaford, A., Lipshie-Williams, M., Starrels, J. L., Arnsten, J. H., Rizzuto, J., Cohen, P., Jacobs, D., & Patel, V. V. (2018). The use of online posts to identify barriers to and facilitators of HIV pre-exposure prophylaxis (PrEP) among men who have sex with men: A comparison to a systematic review of the peer-reviewed literature. *AIDS and Behavior*, 22(4), 1080–1095. <https://doi.org/10.1007/s10461-017-2011-3>
- Hayes, R., Schmidt, A. J., Pharris, A., Azad, Y., Brown, A. E., Weatherburn, P., Hickson, F., Delpuch, V., Noori, T., & the ECDC Dublin Declaration Monitoring Network. (2019). Estimating the ‘PrEP Gap’: How implementation and access to PrEP differ between countries in Europe and Central Asia in 2019. *Eurosurveillance*, 24, <https://doi.org/10.2807/1560-7917.ES.2019.24.41.1900598>
- Holt, M., Murphy, D., Callander, D., Ellard, J., Rosengarten, M., Kippax, S., & de Wit, J. (2013). HIV-negative and HIV-positive Gay men’s attitudes to medicines, HIV treatments and antiretroviral-based prevention. *AIDS and Behavior*, 17(6), 2156–2161. <https://doi.org/10.1007/s10461-012-0313-z>
- McCormack, S., Dunn, D. T., Desai, M., Dolling, D. I., Gafos, M., Gilson, R., Sullivan, A. K., Clarke, A., Reeves, I., Schembri, G., Mackie, N., Bowman, C., Lacey, C. J., Apea, V., Brady, M., Fox, J., Taylor, S., Antonucci, S., Khoo, S. H., ... Gill, O. N. (2016). 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. *The Lancet*, 387(10013), 53–60. [https://doi.org/10.1016/S0140-6736\(15\)00056-2](https://doi.org/10.1016/S0140-6736(15)00056-2)
- Molina, J.-M., Capitant, C., Spire, B., Pialoux, G., Cotte, L., Charreau, I., Tremblay, C., Le Gall, J.-M., Cua, E., Pasquet, A., Raffi, F., Pintado, C., Chidiac, C., Chas, J., Charbonneau, P., Delaugerre, C., Suzan-Monti, M., Loze, B., Fonsart, J., ... Delfraissy, J.-F. (2015). On-demand pre-exposure prophylaxis in men at high risk for HIV-1 infection. *New England Journal of Medicine*, 373(23), 2237–2246. <https://doi.org/10.1056/NEJMoa1506273>
- Morlat, P. (2019). *Prévention et dépistage (prise En charge Du VIH – recommandations Du groupe d’experts* (pp. 1–46). CNS et ANRS.
- Myers, J. E., Braunstein, S. L., Xia, Q., Scanlin, K., Edelstein, Z., Harriman, G., Tsoi, B., Andaluz, A., Yu, E., & Daskalakis, D. (2018). Redefining prevention and care: A status-neutral approach to HIV. *Open Forum Infectious Diseases*, 5(6), ofy097. <https://doi.org/10.1093/ofid/ofy097>
- Prah, P., Hickson, F., Bonell, C., McDaid, L. M., Johnson, A. M., Wayal, S., Clifton, S., Sonnenberg, P., Nardone, A., Erens, B., Copas, A. J., Riddell, J., Weatherburn, P., & Mercer, C. H. (2016). Men who have sex with men in great Britain: Comparing methods and estimates from probability and convenience sample surveys. *Sexually Transmitted Infections*, 92(6), 455–463. <https://doi.org/10.1136/sextrans-2015-052389>
- PrEP in Europe. (2022). Comment obtenir la PrEP dans le cadre du service national de santé? PrEP in Europe. <https://www.prepineurope.org/fr/obtenez-prep/comment-obtenir-la-prep-dans-le-cadre-du-service-national-de-sante/>
- Rhodes, S. (2002). Exploring hepatitis B vaccination acceptance among young men who have sex with men: Facilitators and barriers. *Preventive Medicine*, 35(2), 128–134. <https://doi.org/10.1006/pmed.2002.1047>
- Singh, V., Crosby, R. A., Gratz, B., Gorbach, P. M., Markowitz, L. E., & Meites, E. (2018). Disclosure of sexual behavior is significantly associated with receiving a panel of health care services recommended for men who have sex with men. *Sexually Transmitted Diseases*, 45(12), 803–807. <https://doi.org/10.1097/OLQ.0000000000000886>
- Tafuri, S., Gallone, M. S., Cappelli, M. G., Martinelli, D., Prato, R., & Germinario, C. (2014). Addressing the anti-vaccination movement and the role of HCWs. *Vaccine*, 32(38), 4860–4865. <https://doi.org/10.1016/j.vaccine.2013.11.006>
- The EMIS Network. (2019). *EMIS-2017 – The European men-who-have-sex-with-men internet survey. Key findings from 50 countries*. European Centre for Disease Prevention and Control.
- Vet, R., de Wit, J. B., & Das, E. (2017). Factors associated with hepatitis B vaccination among men who have sex with men: A systematic review of published research. *International Journal of STD & AIDS*, 28(6), 534–542. <https://doi.org/10.1177/0956462415613726>
- Weatherburn, P., Hickson, F., Reid, D. S., Marcus, U., & Schmidt, A. J. (2020). European men-who-have-sex-with-men internet survey (EMIS-2017): Design and methods. *Sexuality Research and Social Policy*, 17(4), 543–557. <https://doi.org/10.1007/s13178-019-00413-0>
- Wheelock, A., Eisingerich, A. B., Ananworanich, J., Gomez, G. B., Hallett, T. B., Dybul, M. R., & Piot, P. (2013). Are Thai MSM willing to take PrEP for HIV prevention? An analysis of attitudes, preferences and acceptance. *PLoS ONE*, 8(1), e54288. <https://doi.org/10.1371/journal.pone.0054288>