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**Inequalities in HIV testing uptake and needs among men who have sex with men living in Ireland: Findings from an internet survey
(HIV testing uptake and needs among MSM living in Ireland)**

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Abstract

Objectives

HIV disproportionately affects men who have sex with men (MSM) in Ireland. The aim of this study was to improve understanding of HIV testing among MSM living in Ireland to inform prevention and testing initiatives.

Methods

We used data from MISI 2015, a cross-sectional survey of MSM living in Ireland. We identified factors associated with never having tested for HIV using univariable and multivariable logistic regression. We identified preferred sites for future tests and examined the relationships between unmet HIV testing needs and socio-demographic groups.

Results

More than one third (n=1,006; 36%) of MSM had never tested for HIV. Multivariable logistic regression showed that untested men were more likely to be aged 18-24 years, live outside Dublin; have a lower level of education; be born in Ireland, identify as bisexual, be out to fewer people and not have had sex with a man in the previous 12 months. The same groups of men also had the least knowledge about HIV and were least confident in accessing an HIV test. Men who had never tested for HIV were more likely to prefer their GP or use home-sampling HIV kits and less likely to prefer a sexual health clinic.

Conclusion

HIV prevention and testing programmes for MSM should be targeted towards younger men, those living outside Dublin and those with lower levels of education. We recommend increased promotion and availability of free HIV testing services in a range of clinical and non-clinical settings (including self-sampling and home testing).

Introduction

In Ireland, as in other Western European countries, gay, bisexual, transgender men and other men who have sex with men (collectively referred to as MSM), are a key population at higher risk of HIV infection (1, 2). Approximately 500 new diagnoses of HIV are made each year in Ireland, with just over half occurring among MSM. Between 30% and 40% of MSM in Ireland are diagnosed late, with a CD4 count of less than 350 cells/ μ l at diagnosis (1).

In 2014, UNAIDS launched new targets for HIV treatment scale-up beyond 2015 (commonly referred to as the '90-90-90' targets), advocating that the HIV epidemic can be reduced if 90% of people living with HIV know their status, 90% of those diagnosed receive antiretroviral therapy (ART) and 90% of those on treatment are virally suppressed by 2020 (3). The European Centre for Disease Control and Prevention (ECDC) have estimated that between 11% and 17% of people living with HIV (PLHIV) in the European Union/European Economic Area (EU/EEA) in 2016 were unaware of their HIV status. In Ireland, the proportion with undiagnosed HIV is estimated to be 13% of prevalent infections (4, 5). To reach the first '90', UNAIDS recommends that countries improve the effectiveness of their HIV testing services to reduce the length of time between infection and diagnosis.

HIV testing is the gateway to clinical care for people who have acquired HIV. Clinical care can result in viral suppression which also prevents onward transmission (6). Many countries recommend that MSM should test annually or more frequently if there is ongoing risk (7-9). Although there are no national HIV testing guidelines in Ireland, clinicians follow international guidance. HIV testing in Ireland is freely available at sexual health clinics and in some community services and is also available in primary care and other clinical settings. A previous European-wide survey carried out in 2010 found that 37% of MSM in Ireland had never tested for HIV (10, 11).

The MSM Internet Survey Ireland 2015 (MISI 2015) was an online cross-sectional survey undertaken to measure sexual health, morbidities, behaviours, health promotion needs among MSM living in Ireland (12). Survey content was developed through a collaboration of public health, academic and community partners. We used data from this survey to describe the socio-demographic factors associated with never testing for HIV among MSM and to identify acceptable testing services for these men. We also describe the extent of unmet HIV testing needs (poor HIV knowledge, lack of confidence in getting an HIV test and uncertainty regarding HIV status) and socio-demographic inequalities in their distribution.

Methods:

Study Population and Design

We used data from MISI 2015 which was an anonymous and self-completed survey targeted at MSM living in Ireland (12). The inclusion criteria for MISI were: identifying as a man and/or trans man; aged 18+ years; currently living in Ireland; having sexual attraction to men and/or having had sex with men or expecting to in the future; indicating having understood the nature and purpose of the study; and providing consent to take part in the study.

The survey was accessible online from March 1st to May 31st 2015. The survey was available in English only and took 14 minutes to complete on average. Questions were taken from the UK Gay Men's Sex Survey (GMSS) 2014 (13) and the European MSM Internet Survey 2010 (10) and adapted and supplemented for the Irish context. The MISI survey and protocol was reviewed and approved by the ethics committee of the Royal College of Physicians in Ireland (RCPI). The MISI survey and report can be found at <http://www.hpsc.ie/a-z/specificpopulations/menwhohaveseexwithmenmsm/msminternetsurvey2015/>.

Survey promotion

Recruitment occurred through advertising on national LGBT community, sexual health, HIV and health promotion websites, through social media and with promotional cards distributed at gay social and community venues and services. Banner advertisements were used to target subscribers to gay networking apps and targeted emails were sent to subscribers of some apps. Participants were directed to a study website (www.misi.ie) which detailed the research and routed them to the survey. Further information on the survey promotion is available in the survey report (12).

Data analysis

We restricted our analysis to men who answered the question on HIV testing, who had not received an HIV positive result, and who reported that they had ever had sex with a man.

We analysed the association between the outcome variable of never tested for HIV (based on the question "Have you ever received an HIV test result") and a number of socio-demographic variables. The socio-demographic variables included were: age (18-19, 20-24, 25-29, 30-39, 40-49, 50+ years); area of residence (living in Dublin, living outside Dublin); education (lower defined as less than degree level, higher defined as higher than degree level); employment status (employed, unemployed,

student, other); country of birth (Ireland, outside Ireland); sexual identity (gay, bisexual, other); outness (out to all/more than half of family and friends, out to less than half/few/no one). We also included a factor relating to sexual behaviour: sex with a man in the previous 12 months (yes/no).

We undertook univariable analysis to identify associations between these variables and never tested for HIV. Odds ratios (OR) were calculated with 95% confidence intervals (CI) and significance set at $p < 0.2$. Factors significant on univariable analysis were included in the multivariable model in a step-wise forward selection approach. Adjusted odds ratios (aOR) with 95% CI were calculated using logistic regression to identify independent variables that remain associated with never tested for HIV in the multivariable model.

We described the differences in preferred testing sites of men who had never tested for HIV and those who had previously tested for HIV using chi-squared tests.

We analysed unmet HIV testing needs (confidence accessing an HIV test; knowledge of HIV testing and treatment; and uncertainty about current HIV status) by socio-demographics using chi-squared tests. Respondents were asked if they were confident that they could get a test for HIV and responses were collapsed from five (very; quite; a little; not at all; don't know) to three options (very/quite; a little; not at all). Knowledge of HIV testing and treatment was assessed with seven true statements on HIV testing and treatment which respondents indicated if they knew already or not. Responses were used to derive a binary variable (knew all; did not know all). For perception of HIV status, respondents were asked what they thought their current HIV status was and their responses were recoded from five (definitely negative; probably negative; not sure; probably positive; definitely positive) into two (certain; unsure).

All data analysis was undertaken in StataSE14 (StataCorp., USA).

Results:

There were 3,090 valid respondents to MISI 2015. For the purpose of this analysis, we excluded men who reported they were HIV positive ($n=152$), men who did not answer the question on HIV testing ($n=26$) and men who reported that they had never had sex with another man ($n=143$). Our final sample was 2,770 men, of whom 64% ($n=1,764$) indicated their last HIV test was negative and 36% ($n=1,006$) had never tested for HIV.

The median age in our sample was 30 years with 31% of respondents aged 18-24 years. Approximately half (49%) of the men were living in Dublin and 86% were born in Ireland. Fifty five percent of the sample had a higher level of education and 67% were in employment. Most men (80%) identified as gay and 67% were out to all or

more than half of their friends and family. Most respondents (94%) reported that they had sex with a man in the previous 12 months.

Factors associated with never testing for HIV are presented in Table 1. In univariable analysis, these factors were: being aged 18-24 years, living outside Dublin, having a lower level of education, being a student or being unemployed, being born in Ireland, having a bisexual or other sexual identity, being out to a smaller proportion of people and not having sex with a man in the previous 12 months. We checked for multicollinearity between all variables and all pairwise Pearson correlation coefficients were <0.4 suggesting that multicollinearity was low. In the multivariable model, untested men were more likely to be aged 18-19 years (aOR 5.3, 95% CI 3.4-8.4) or 20-24 years (aOR 1.9, 95% CI 1.4-2.5), be living outside Dublin (aOR 1.6, 95% CI 1.4-2.0); with a lower level of education (aOR 1.8, 95% CI 1.5-2.0); born in Ireland (aOR 1.6, 95% CI 1.2-2.1), identify as bisexual (aOR 1.5, 95% CI 1.1-2.0), be out to fewer people (aOR 2.4, 95% CI 1.9--3.0) and not have had sex with a man in the previous 12 months (aOR 3.3, 95% CI 2.2-5.0).

The preference for future HIV testing among men who have never tested and for men who have previously tested is shown in Table 2. While men in both groups chose a range of preferred settings for future tests, there were some differences between the two groups. The preferred location for future HIV testing for both groups was a sexual health clinic although men who had never tested were less likely to prefer this option (31% vs 41%, $p<0.001$). Men who had never tested were more likely to indicate a preference for their GP (22% vs 17%, $p<0.001$) and for self-sampling (19% vs 13%, $p<0.001$) than men who had previously tested. Very few men ($<1\%$) stated that they would not test for HIV in the future indicating that testing for HIV is acceptable to most MSM.

Table 3 presents measures of unmet HIV testing needs by sociodemographic groups. Overall in our sample, 90% of respondents were very or quite confident they could access an HIV test. However, we found this was slightly lower among certain groups: 18-19 years olds (76%), 20-24 year olds (85%), those living outside Dublin (86%), those with lower education levels (87%), students (83%), those who were unemployed (88%), those who identified as bisexual (88%) or other (86%), and those who were out to less people (86%). Knowledge of HIV testing and transmission was also lower among these same groups of men and also among men who were born in Ireland. In terms of certainty of HIV status, 36% of men in our sample were unsure of their HIV status with higher levels of uncertainty among those aged 20-24 years (42%), those who were unemployed (40%) or students (40%), and among those who were out to fewer people (38%).

Insert Table 1, 2 and 3 here.

Discussion

The overall aim of our study was to improve our understanding of HIV testing among MSM living in Ireland in order to inform prevention and testing strategies. Increasing the uptake of HIV testing among MSM is crucial in reaching the 90-90-90 targets set by UNAIDS and reducing the proportion of MSM who are diagnosed late. MISI 2015 is the largest survey of MSM carried out to date in Ireland and this is the first study to explore factors associated with never testing for HIV among MSM living in Ireland.

Over a third of MSM living in Ireland who participated in the survey had never tested for HIV which was very similar to the proportion untested (37%) in a previous survey of MSM in 2010 (10). This is higher than the proportion never tested in other Western European countries including the United Kingdom (24%) and the Netherlands (21%) (14, 15). However, this comparison may be influenced by the high proportion of young MSM who responded to MISI (31% aged 18-24 years) who are less likely to have tested for HIV (10).

We found that HIV testing inequalities exist within among MSM living in Ireland. The proportion who ever received an HIV test result was particularly low among young MSM and those with a lower level of education. Lower lifetime testing among these groups has been reported by other European countries (14-18). In addition, we found that men living outside Dublin were less likely to have tested which may reflect the greater availability of testing sites in Dublin including the Gay Men's Health Service which is a dedicated sexual health and wellbeing service for MSM. We identified that men who did not identify as gay and men who are out to less than half of their friends and family were less likely to have tested for HIV than those who are gay and out. These patterns have been also observed in several other European countries (15-18) and highlight challenges in designing accessible services for the range of homosexually active men. The same groups of men who had never tested had less confidence to access an HIV test and less knowledge in relation to HIV testing and treatment.

We recommend that access to free and convenient HIV testing services for MSM should be strengthened with HIV testing made available at a wider range of settings. Since 2016, free peer-led rapid HIV testing specifically targeting MSM is available at venues in the four largest cities in Ireland (www.knownow.ie). This testing programme aims to increase the accessibility and convenience of testing by providing testing in non-clinical settings, and it has been successful in reaching people who have not previously tested for HIV. We recommend that this testing programme continues to be supported in Dublin and other areas. In addition, peer outreach among the MSM community which is currently available in a limited capacity in Dublin should be extended to all parts of the country. The provision of HIV testing in general practice also remains important as indicated by the proportion of men who chose this as their preferred choice for future testing.

In our study, we found that one fifth of the men who had never tested would choose to test at home with a home-sampling kit (HIV self-testing was not included as an option in the survey). Therefore, we suggest two additional approaches to HIV testing which should be considered. Firstly, HIV self-testing (HIVST) where individuals perform an HIV test themselves and read their own results, and secondly home sampling, where individuals take a specimen and send to a laboratory for analysis. Both approaches might facilitate easier access to HIV testing and may increase the reach of HIV testing among men who are unlikely to attend gay services and venues. Internationally a high acceptability of HIVST and self-sampling has been found among key populations and HIVST has been found to be a cost-effective method of scaling up HIV testing (19). In 2015, Public Health England launched an HIV home-sampling service for people at higher risk for HIV. In the first two years, three quarters of those tested were MSM, with the service particularly popular among younger men (41% were aged 16-25 years) and men who had never previously tested for HIV or had not tested recently (24% and 32% respectively) (20). Since August 2018, HIV self-testing kits are available privately in pharmacies in Ireland but in order to be equitable, these tests need to be provided free of charge.

In addition to increasing HIV test supply, our findings indicate that there is scope to improve and update public knowledge of HIV and the benefits of testing especially among younger MSM and those with less education. A recent survey undertaken in Ireland on HIV knowledge and attitudes found that younger people (18-24 years) in Ireland had less correct knowledge about HIV than older people and identified gaps and misconceptions in their knowledge about HIV transmission (21). These findings in conjunction with the results of our study suggest that sexual education in schools needs to be strengthened with a focus on education around HIV.

The findings of this study should also be used to inform the development of national HIV testing guidelines, recommended in the National Sexual Health Strategy for Ireland published in 2015 (22).

Some limitations should be noted. All data in the survey were self-reported and the results may have been affected by self-selection and recall bias. In convenience samples of MSM in the UK, reported HIV testing rates tend to be higher than in probability-based samples which may lead to an over-estimation of the level of testing in a population (23). The survey was only available online and this may have led to recruitment bias with older MSM less likely to have internet access (<https://www.cso.ie/en/releasesandpublications/er/iss hh/information society statistics-households2015/>). The survey was only available in English and 14% of participants were born outside Ireland. As the survey was cross-sectional, the causality of reported associations cannot be determined. The study did not explore the reasons why MSM were not tested. This would have afforded us a better understanding of the barriers MSM face in accessing and taking a test.

In conclusion, this analysis demonstrates that MSM remain a significant population for expanded HIV testing in Ireland. Efforts to increase testing among all sexually active MSM living in Ireland should be made to achieve earlier diagnosis and prevent onward transmission. Our findings indicate that targeted prevention efforts should be directed towards younger MSM, those living outside Dublin and those with lower levels of education. To widen the reach of HIV testing and to ensure that all MSM have access to testing, we recommend making free HIV testing available in a wide range of settings, both clinical and non-clinical, and by a range of approaches, including peer-led community testing, self-testing and home sampling. Ongoing national and targeted information campaigns on the benefits of HIV testing will also be vital for the success of any testing programme.

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Table 1: Factors associated with never testing for HIV among MSM living in Ireland, MISI 2015 (n=2,770)

Characteristic	n (% of N)	% never had HIV test	Univariable analysis		Multivariable analysis		
			OR (95% CI)	p value	aOR (95% CI)	p value	
Age group (years)	18-19	243 (8.8)	81.5	9.9 (6.8-14.4)	<0.001	5.3 (3.4-8.4)	<0.001
	20-24	611 (22.1)	49.9	2.2 (1.7-2.9)	<0.001	1.9 (1.4-2.5)	<0.001
	25-29	474 (17.1)	30.8	Ref	-	Ref	-
	30-39	704 (25.4)	23.9	0.70 (0.54-0.91)	0.008	0.62 (0.46-0.84)	0.002
	40-49	416 (15.0)	22.4	0.65 (0.48-0.87)	0.005	0.48 (0.34-0.68)	<0.001
	50+	322 (11.6)	29.8	0.95 (0.70-1.3)	0.766	0.51 (0.35-0.75)	<0.001
Area of Residence	Dublin	1,258 (48.7)	28.5	Ref	-	Ref	-
	Outside Dublin	1,324 (51.3)	44.1	2.0 (1.7-2.3)	<0.001	1.6 (1.4-2.0)	<0.001
Education level	Higher	1,483 (55.0)	27.0	Ref	-	Ref	-
	Lower	1,214 (45.0)	47.9	2.5 (2.1-2.9)	<0.001	1.8 (1.5-2.0)	<0.001
Employment Status	Employed	1,820 (67.0)	28.8	Ref	-	Ref	-
	Unemployed	178 (6.6)	43.8	1.9 (1.4-2.6)	<0.001	1.1 (0.76-1.6)	0.568
	Student	600 (22.1)	57.0	3.3 (2.7-4.0)	<0.001	1.2 (0.91-1.6)	0.204
	Other ¹	118 (4.3)	33.1	1.2 (0.82-1.8)	0.324	1.1 (0.69-1.9)	0.620
Country of Birth	Ireland	2,367 (86.0)	37.8	1.6 (1.3-2.1)	<0.001	1.6 (1.2-2.1)	0.002
	Outside Ireland	384 (14.0)	27.1	Ref	-	Ref	-
Sexual Identity	Gay/homosexual	2,180 (79.8)	31.4	Ref	-	Ref	-
	Bisexual	367 (13.4)	56.1	2.8 (2.2-3.5)	<0.001	1.5 (1.1-2.0)	0.010
	Other ²	184 (6.7)	53.3	2.5 (1.8-3.4)	<0.001	1.4 (0.97-2.1)	0.073
Outness	All or more than half	1,817 (67.3)	28.7	Ref	-	Ref	-
	Less than half or no one	885 (32.7)	50.4	2.5 (2.1-3.0)	<0.001	2.4 (1.9-3.0)	<0.001
Sex with a man in last 12 months	Yes	2,615 (94.4)	34.7	Ref	-	Ref	-
	No	155 (5.6)	64.5	3.4 (2.4-4.8)	<0.001	3.3 (2.2-5.0)	<0.001

¹ Retired, long-term sick leave/medically retired, other

² Heterosexual but had sex with a man previously, any other term, no term used

Table 2: Preferred location for future HIV testing among MSM by HIV testing history, MISI 2015 (n=2,770)

	Never tested (n=1,001) (%)	Ever tested (n=1,757) (%)	Chi squared	p value
Hospital or sexual health clinic	30.6	40.9	28.96	<0.001
General Practice	22.3	17.1	11.23	<0.001
At home with a home sampling kit	19.1	13.1	17.23	<0.001
Private Practice	13.7	14.7	0.58	0.224
Community HIV testing service	6.8	10.4	10.1	<0.001
At a blood bank, donating blood	2.4	0.6	17.5	<0.001
Mobile medical unit	2.0	1.3	1.9	0.08
In a bar or pub, club or sauna	0.8	0.8	0	0.497
Other	0.9	0.7	0.39	0.26
Will not test in future	1.5	0.4	9.7	<0.001

Table 3: HIV testing needs among MSM by socio-demographic groups, MISI 2015 (n=2,770)

		Confidence accessing a test				Knowledge of HIV testing and treatment		Perception of status			
		Very/Quite	A little	Not at All	χ^2 :p	All correct	Not all correct	χ^2 :p	Certain	Unsure	χ^2 :p
Total		90.2	6.8	3.0		71.5	28.5		64.4	35.6	
Age Group (years)	18-19	76.2	16.0	7.8	<0.001	41.2	58.9	<0.001	63.8	36.2	0.013
	20-24	84.9	11.4	3.7		64.3	35.7		58.5	41.5	
	25-29	93.5	4.1	2.4		74.9	25.1		66.2	33.8	
	30-39	93.2	4.8	2.0		79.4	20.6		68.2	31.8	
	40-49	93.7	4.2	2.2		80.0	20.0		64.3	35.7	
	50+	94.6	3.2	2.2		74.5	25.5		65.0	35.0	
Area of Residence	Dublin	92.6	5.3	2.2	<0.001	78.1	21.8	<0.001	66.2	36.8	0.126
	Outside Dublin	87.3	8.6	4.1		65.9	34.1		63.3	33.7	
Education Level	Higher	92.8	5.1	2.2	<0.001	79.2	20.8	<0.001	64.7	35.5	0.805
	Lower	87.1	9.0	3.9		62.3	37.7		64.2	35.8	
Employment Status	Employed	92.7	5.2	2.1	<0.001	76.6	23.4	<0.001	66.5	33.5	0.017
	Unemployed	88.0	6.3	5.7		60.7	39.3		59.9	40.1	
	Student	82.7	12.3	5.0		60.5	39.5		60.0	40.0	
	Other ³	93.8	4.5	1.8		67.0	33.0		62.4	37.6	
Country of birth	Ireland	89.9	7.2	2.9	0.119	70.8	29.2	0.027	64.6	35.4	0.459
	Outside Ireland	91.7	4.5	3.7		76.3	23.7		62.7	37.3	
Sexual Identity	Gay/homosexual	90.9	6.6	2.5	0.006	74.4	25.6	<0.001	63.8	36.2	0.118
	Bisexual	87.6	7.9	4.5		61.0	39.0		67.9	32.2	
	Other ⁴	86.4	8.0	5.7		61.4	38.6		69.6	30.4	
Outness	All/Almost all/More than half	92.6	5.4	2.0	<0.001	75.3	24.7	<0.001	66.2	33.8	0.022

³ Retired, long-term sick leave/medically retired, other

⁴ Heterosexual but had sex with a man previously, any other term, no term used

Less than half/No one

85.6

9.9

4.6

65.0

35.0

61.7

38.3
