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ORIGINAL ARTICLE

Highly visible street-based HIV rapid testing: is it an attractive option for a previously untested population? A cross-sectional study

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ABSTRACT

Background Given the shortage of community-based HIV testing initiatives in resource-rich countries not targeting most-at-risk populations, we aimed to evaluate whether a highly visible mobile programme promoting and offering rapid HIV testing in the street can attract persons at risk for infection who have never been tested.

Methods Between 2008 and 2011, the programme served 7552 persons in various Spanish cities who answered a brief questionnaire while awaiting their results. The factors associated with being tested for the first time were analysed using two logistic regression models, one for men who have sex with men (MSM) and the other for only heterosexual men (MSW) and women.

Results 3517 participants (47%) were first-time testers (24% of MSM, 56% of MSW and 60% of women). Among them, 22 undiagnosed HIV infections were detected with a global prevalence of 0.6% and 3.1% in MSM. Undergoing a first HIV test was independently associated with age <30, being from Spain or another developed country, lack of university education, having fewer partners, having had unprotected sex with casual partners and not having been diagnosed with a sexually transmitted infection. In heterosexuals, also with never injected drugs, and in MSM, with not being involved in the gay community. Among those tested for the first time, 22% had never thought of being tested and 62% decided to be tested when they passed by and noticed the programme, regardless of their previous intentions.

Conclusions This community programme attracted a substantial number of persons previously untested and particularly hard to reach, such as those with low education and MSM who were least involved in the gay community. Programme visibility was a decisive factor for almost two of every three persons who had never been tested.

INTRODUCTION

Lacking a cure or an effective vaccine for HIV, screening strategies are critical to reduce the number of undiagnosed persons and the proportion of late diagnoses in order to modify the course of the epidemic.^{1–2} Consequently, facilitating access to HIV testing to increase its coverage is a priority in developed countries. In 2006, the US Centres for Disease Control and Prevention proposed a radical change in its testing strategy by recommending standardised, non-targeted testing for persons aged

13–64 years in all healthcare settings.³ In 2010, its European counterpart, the European Centre for Disease Control, recommended the promotion of strategies aimed at key populations at risk to enable early diagnosis of infection.⁴

In this direction, one of the most widespread initiatives in recent years has been the implementation of rapid testing programmes in non-clinical settings, conducted mostly, but not exclusively, by community-based organisations (CBOs). These types of services are a good model for improving access to the test in the most vulnerable and difficult-to-reach populations because they eliminate many of the usual barriers present in the traditional health services.⁴

Many different kinds of programmes currently promote the test. Some serve especially vulnerable populations (drug injectors, immigrants, etc), while others focus their activities on the general population, serving all who perceive themselves to be at risk and request their services.⁵

Most of these programmes are located indoors, on the premises of CBOs, and some have developed different types of outreach services⁴ offering locations that are more attractive and accessible than conventional health settings.

In Europe, most evaluations of programmes offering rapid testing in non-clinical settings have been conducted in the UK, in programmes that primarily target men who have sex with men (MSM) and usually located in indoor CBO settings.⁶ However, there is little in the scientific literature about the evaluation of outreach programmes that do not target the most-at-risk groups, therefore no studies have explored whether their visibility can spark the interest of a population that, despite engaging in risk behaviours, has never considered being tested.

Our aim was to evaluate whether a highly visible mobile programme promoting and offering rapid HIV testing, anonymously and free of charge, can attract persons who are at risk for infection but have never been tested.

METHODS

Between May 2008 and March 2011, a mobile unit (van) offered free, rapid HIV testing, mainly in the city of Madrid, but also in two dormitory towns outside Madrid, as well as three cities on Spain's south-eastern coast and in the Canary Islands. The

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van was always located near railway stations or on centrally located streets with high pedestrian traffic, attempting to be as visible as possible and with some posters announcing the test.

In a tent outside the van, an educator provided interested passersby with brief counselling about how the rapid test is performed and its limitations. Those who decided to proceed with testing signed an informed consent form and entered the van, where medical or nursing staff completed the counselling and performed the test by taking a finger stick capillary blood sample. While awaiting their results, participants completed an anonymous questionnaire on paper which was linked by a code to the test results. Since no place was provided to answer the questionnaire and most people filled it out while standing in the street, it was decided to limit its length. Various versions of the questionnaire were made during the course of the programme; to keep its length constant, some questions were not always included throughout the entire programme. Information was collected on sociodemographics, sexual behaviour and history of HIV test performance. For those with limited proficiency in Spanish, a form was designed to collect the basic sociodemographic and behaviour data in English and French.

Those with reactive results were referred to a collaborating HIV/sexually transmitted infection (STI) diagnostic centre or advised to see their primary care physician. Starting in 2009 and onwards, blood was extracted at the van and sent to a collaborating STI diagnostic centre for confirmation.

Data analysis

A descriptive analysis was made stratifying the population into three groups based on their gender and sexual behaviour; the latter was understood to refer to the type of sexual relations during the person's lifetime: MSM, men who were exclusively heterosexual (MSW) and women. Persons who did not provide information about their sexual behaviour or history of HIV testing were excluded from the analysis (a total of 524). When the version of the questionnaire did not include a certain question, data were labelled as 'not in questionnaire' and the percentages were calculated on respondents.

A bivariate analysis was performed to identify factors associated with not having had a previous HIV test. To estimate the magnitude and precision of the associations, we calculated ORs and 95% CIs (95% CI). Following the methodology proposed by Hosmer and Lemeshow⁷, we then built three different logistic regression models, one for each category of gender/sexual behaviour. Due to the similarities between the models for women and MSW, however, it was decided to build only two models: one for MSM and the other combining MSW and women. The models initially included the variables that were associated with never having had an HIV test in the bivariate analysis at a significance level of $p < 0.2$. To assess the contribution of each variable to the model, we used the likelihood-ratio test. Non-significant variables were excluded from the final models.

To classify participants according to their risk behaviours for HIV infection (taking into consideration the Spanish epidemic),⁸ we created an indicator that classified them as high risk if they had ever injected drugs, engaged in sex work or had not always used condoms with casual partners in the previous 12 months.

The study was approved by the institutional review board of the Carlos III Health Institute.

RESULTS

Sociodemographic and behavioural characteristics

Of the 7552 persons who participated in the study, 34% were MSM, 31% were MSW and 35% were women. Over half were

older than 30 years, and the women were on average younger than the men (63.7% of women were under 30 vs 48.8% of MSW and 49.2% of MSM). Most were Spanish (68.7%), and Latin Americans made up the largest group (21.1%) of those who were foreign-born. Although almost half of the participants had university education, this percentage was much lower in the case of MSW (39.9% vs 54.6% of MSM and 50.6% of women). Among MSM, although 78.5% identified themselves as homosexual, 25% stated they were not involved in the gay culture (table 1).

Only 3% had ever injected drugs. In the previous 12 months, 22.9% of MSM had had unprotected sexual relations with casual partners as compared with 34.8% of MSW and 39% of women. In the same period, over half of MSM reported having had relations with five or more partners versus 26.2% of MSW and 17.1% of women. The internet was the main source of meeting sexual partners for 24.1% of MSM. Around 59.2% had never been diagnosed with an STI, although there were large differences among MSM (45.9%), MSW (65.9%) and women (66.3%). (table 1)

HIV testing

Some 46.6% of participants had never undergone an HIV test before. This proportion was less frequent in MSM (24.2%) than in MSW (56.1%) or women (59.8%), with virtually no difference between the latter two groups (table 1).

Of those 3517 first-time testers, 22 were positive (prevalence of undiagnosed HIV infection: 0.6%): 19 MSM (3.1%), 1 MSW (0.1%) and 2 women (0.1%).

In the multivariate analysis, the factors associated with being first-time testers were, in both groups: age under 30 years, having been born in Spain or another developed country, lack of university education, having had unprotected sexual relationships with casual partners in the last 12 months and never having been diagnosed with an STI. Furthermore, the risk of not having been tested previously for HIV increased with decreasing number of sexual partners in the last year. In the case of MSW and women, it was also associated with never having used intravenous drugs. In MSM, those who were not related to gay scene were more likely never to have been tested than those who were member of a gay CBO (table 2).

Among first-time testers, 21.6% reported not being at all concerned in this respect, with clear differences between MSM (10.9%) and MSW and women (24.9% and 23.3%, respectively). About 46.6% said they had intended to take the test in the next 12 months (63.3% of MSM, 48.2% of MSW and 39.3% of women). However, 61.8% said that if they had not passed by the mobile unit they would not have been tested (table 3).

The question regarding the reasons for testing in this particular programme was available in the questionnaire for 15 out of the 22 first-time testers who were positive. Of them, four MSM and one woman said that if they had not passed by the mobile unit, they would not have been tested (33.3%).

In the analysis of risk behaviours, 47.9% of persons who had never been tested for HIV were classified as persons with a high risk of infection (48.3% of MSM, 48.2% of MSW and 58% of women). Of these, 7% of MSM stated they had never been concerned or thought about taking the test, and 28% said they had been thinking about it for 2 years or more. In contrast, high-risk MSW and women with no previous test were three times more likely to express a complete lack of concern (22.5% and 17.3%, respectively) than were MSM (figure 1).

Table 1 Sociodemographic and behavioural characteristics of participants in a street-based rapid HIV testing programme in Spain (2008–2011)

	MSM (N=2559)		MSW (N=2326)		Women (N=2667)		Total (N=7552)	
	N	%	N	%	N	%	N	%
<i>Sociodemographic</i>								
<i>Age</i>								
Under 25	635	25.3	505	22.6	919	36.0	2059	28.2
25–29 years	598	23.9	584	26.2	709	27.7	1891	25.9
30 years or older	1273	50.8	1144	51.2	928	36.3	3345	45.9
<i>Country of origin</i>								
Spain	1736	69.9	1528	67.5	1783	68.7	5047	68.7
Western Europe, North America and other developed countries	162	6.5	123	5.4	154	5.9	439	6.0
Latin America	536	21.6	455	20.1	562	21.6	1553	21.1
Other developing countries	50	2.0	158	7.0	98	3.8	306	4.2
With university education	1380	54.6	910	39.9	1332	50.6	3622	48.6
Employment as main source of income	2095	84.6	1856	86.2	2011	78.6	5962	83.0
<i>Self-reported sexual orientation</i>								
Homosexual	1117	78.5						
Bisexual	165	11.6						
Heterosexual	141	9.9						
Not in questionnaire*	1057							
<i>Relationship with gay culture</i>								
Member of a gay CBO	178	11.1						
Frequents gay scene, not member of a gay CBO	1023	63.9						
Not related to gay scene	400	25.0						
Not in questionnaire*	684							
<i>Behavioural</i>								
Ever injected drugs	67	2.7	102	4.6	49	1.9	218	3.0
Unprotected sex with casual partners†‡	585	22.9	809	34.8	1039	39.0		
<i>Number of heterosexual partners†</i>								
0–1			574	27.6	962	39.3		
2–4			962	46.2	1068	43.6		
5 or more			546	26.2	419	17.1		
<i>Number of homosexual partners†</i>								
0–1	483	19.9						
2–4	691	28.4						
5–9	487	20.0						
10 or more	768	31.6						
<i>Self-reported STI</i>								
Never diagnosed with a STI	923	45.9	1188	65.9	1383	66.3	3494	59.2
Diagnosed within the last 12 months	240	12.0	68	3.8	166	8.0	474	8.0
Not in questionnaire*	549		524		581		1654	
Internet as main source of meeting partners†	362	24.1						
Not in questionnaire*	1057							
<i>History of HIV testing</i>								
Never tested	619	24.2	1304	56.1	1594	59.8	3517	46.6
Tested less than a year ago	831	32.5	297	12.8	251	9.4	1379	18.3
Tested between 1 and 3 years ago	604	23.6	298	12.8	351	13.2	1253	16.6
Tested between 3 and 5 years ago	117	4.6	97	4.2	139	5.2	353	4.7
Tested over 5 years ago	141	5.5	126	5.4	150	5.6	417	5.5

*For some time, this question was not available in all questionnaires. Percentages calculated on respondents.

†In the last 12 months.

‡Anal intercourse when referring to MSM; anal/vaginal intercourse when referring to women and MSW.

CBO, community-based organisation; MSM, men who have sex with men; MSW, men who have sex only with women; STI, sexually transmitted infection.

DISCUSSION

This is one of the first published studies to evaluate the ability of an outreach programme offering rapid HIV testing not aimed at the most-at-risk populations to attract persons with risk practices for infection who have never been tested. The high visibility of the programme—given that it was conducted in the street

in very busy areas—was a decisive factor in the decision to be tested for almost two-thirds of first-time testers.

Our results show that almost half of the persons served by the programme were undergoing testing for the first time. Comparison of our results with those of other authors is difficult because few studies have been made of outreach

Table 2 Crude and adjusted association with not having undergone an HIV test before among participants in a street-based rapid HIV testing programme in Spain (2008–2011)

	Men who have sex with men (MSM)					Men who are exclusively heterosexual and women				
	%	OR _c	(95% CI)	OR _a	(95% CI)	%	OR _c	(95% CI)	OR _a	(95% CI)
Age										
≥30 years	15.1	1.0		1.0		47.9	1.0		1.0	
<30 years	33.3	2.8	(2.3 to 3.4)	2.7	(2.2 to 3.3)	66.1	2.1	(1.9 to 2.4)	2.0	(1.8 to 2.3)
Country of origin										
Latin America and other developing countries	18.6	1.0		1.0		46.3			1.0	
Spain and other developed countries	26.2	1.6	(1.2 to 2.0)	1.6	(1.2 to 2.0)	62.5	1.0	(1.7 to 2.2)	1.9	(1.6 to 2.1)
With university education										
Yes	20.5	1.0		1.0		53.5	1.0		1.0	
No	28.5	1.5	(1.3 to 1.9)	1.3	(1.1 to 1.6)	61.9	1.4	(1.3 to 1.6)	1.4	(1.3 to 1.6)
Ever injected drugs										
Yes	20.9	1.0				43.0	1.0		1.0	
No	24.8	1.2	(0.7 to 2.3)			59.3	1.9	(1.4 to 2.7)	2.0	(1.4 to 2.8)
Self-reported sexual orientation										
Homosexual	19.1									
Heterosexual	36.9	1.0	(1.7 to 3.6)							
Bisexual	39.4	2.8	(2.0 to 3.9)							
Not in questionnaire*	25.4	1.4	(1.2 to 1.8)							
Relationship with gay culture										
Member of a gay CBO	16.9	1.0		1.0						
Frequents gay scene, not member of a gay CBO	19.3	1.2	(0.8 to 1.8)	1.1	(0.7 to 1.8)					
Not related to gay scene	32.0	2.3	(1.5 to 3.6)	1.9	(1.2 to 3.1)					
Not in questionnaire*	26.0	1.7	(1.1 to 2.7)	1.4	(0.9 to 2.2)					
Unprotected sex with casual partners in the last 12 months†										
No	22.1	1.0		1.0		58.8	1.0		1.0	
Yes	25.1	1.2	(1.0 to 1.4)	1.4	(1.2 to 1.8)	57.6	1.0	(0.8 to 1.1)	1.2	(1.0 to 1.4)
Number of heterosexual partners in the last 12 months										
≥5						48.2	1.0		1.0	
2 to 4						56.7	1.4	(1.2 to 1.6)	1.5	(1.2 to 1.7)
0 to 1						66.7	2.2	(1.8 to 2.5)	2.4	(2.0 to 2.9)
Number of homosexual partners in the last 12 months										
≥10	15.5	1.0		1.0						
5 to 9	21.8	1.5	(1.1 to 2.0)	1.3	(1.0 to 1.8)					
2 to 4	27.6	2.1	(1.6 to 2.7)	1.7	(1.3 to 2.0)					
0 to 1	35.8	3.0	(2.3 to 4.0)	2.5	(1.8 to 3.4)					
Internet as main source of meeting partners in the last 12 months										
No	20.9	1.0								
Yes	19.3	0.9	(0.7 to 1.3)							
Not in questionnaire*	25.6	1.3	(1.0 to 1.7)							
Self-reported STI										
Ever been diagnosed	14.1	1.0		1.0		44.4	1.0		1.0	
Never	36.0	3.4	(2.7 to 4.3)	2.7	(2.1 to 3.4)	62.3	2.1	(1.7 to 2.5)	1.8	(1.5 to 2.1)
Not in questionnaire*	20.8	1.6	(1.2 to 2.1)	1.5	(1.1 to 2.1)	57.6	1.7	(1.4 to 2.1)	1.6	(1.3 to 1.9)

%, percentage that have never been tested.

*For some time, this question was not available in all questionnaires.

†Anal intercourse when referring to MSM; anal/vaginal intercourse when referring to women and men who are exclusively heterosexual. CBO, community-based organisation; OR_a, adjusted OR; OR_c, crude OR; STI, sexually transmitted infection.

programmes that do not target a specific population group.⁶ However, our results are consistent with the scant literature available on non-targeted programmes.^{9–12} The notable difference found among the three exposure categories (MSM, MSW and women) in the proportion of first-time testers is consistent with the findings of other studies that identify MSM as the population group that is tested in the largest proportion and with greatest frequency.^{13–16} This is even more evident in the analysis of data from non-clinical settings.⁶

Among the factors associated with a higher probability of not having been tested, age and low educational level are involved in several ways: younger people have had fewer opportunities to be tested during their lifetimes and also have fewer sexual partners.^{15 17 18} Age takes on additional importance in the case of women, because prenatal screening is the main factor for them being tested,^{14 19 20} and younger women are less likely to have been screened in this way. Low educational level is usually associated with less perceived risk of

Table 3 Level of concern, intention to undergo HIV testing and reason for choosing a street-based rapid HIV testing programme among persons being tested for the first time

	MSM (N=619)		MSW (N=1304)		Women (N=1594)		Total (N=3517)	
	N	%	N	%	N	%	N	%
Thoughts about undergoing an HIV test								
Was never concerned or thought about it	58	10.9	257	24.9	313	23.3	628	21.6
Has been thinking about it for less than 6 months	160	30.2	237	23.0	330	24.5	727	25.0
Has been thinking about it between 6 months and <1 year	82	15.5	125	12.1	163	12.1	370	12.7
Has been thinking about it between 1 and <2 years	89	16.8	170	16.5	227	16.9	486	16.7
Has been thinking about for 2 years or more	141	26.6	243	23.5	313	23.3	697	24.0
If you hadn't taken the test today, would you have in the next 12 months?								
No or probably no	60	18.8	220	32.4	351	39.6	631	33.5
I'm not sure	57	17.9	132	19.4	187	21.1	376	19.9
Yes or probably yes	202	63.3	328	48.2	349	39.3	879	46.6
Not in questionnaire*	283		506		635		1424	
Reasons for testing in this particular programme								
I knew how it worked and I came expressly to be tested	174	36.1	328	36.0	402	34.0	904	35.1
If I hadn't passed by here, I wouldn't have done it	295	61.2	548	60.2	750	63.4	1593	61.8
Other	13	2.7	35	3.8	31	2.6	79	3.1
Not in questionnaire*	114		286		357		757	

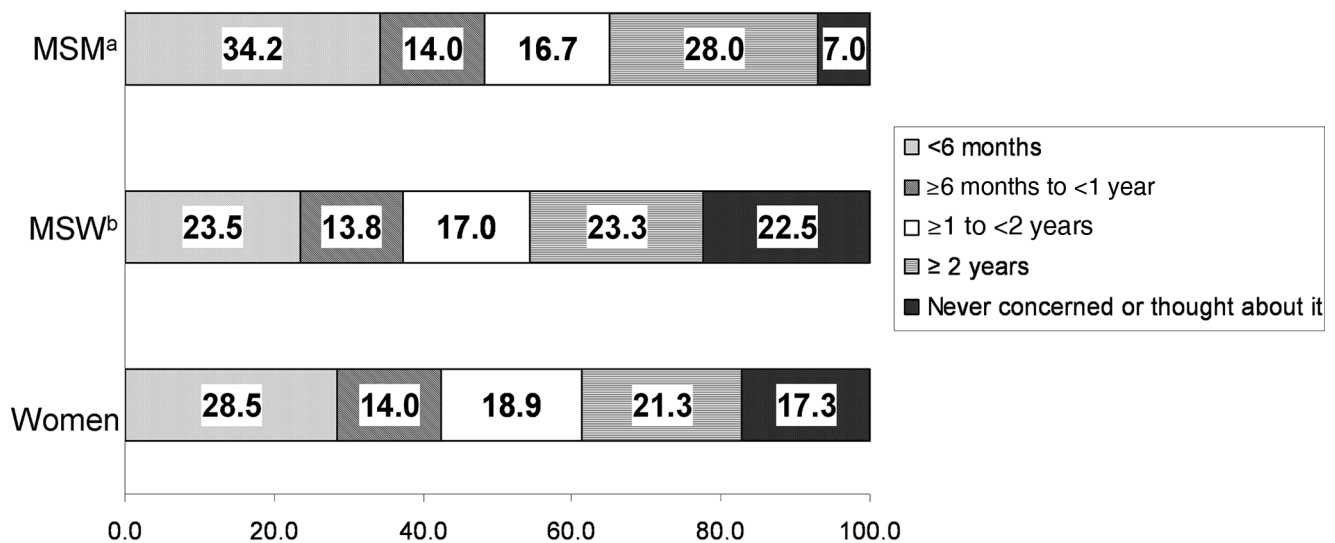
*For some time, this question was not available in all questionnaires. Percentages calculated on respondents. MSM, men who have sex with men; MSW, men who have sex only with women.

infection and, consequently, with less likelihood of undergoing HIV testing.^{15 17 18}

Persons with no or only one sexual partner in the last 12 months and who had never been diagnosed with an STI were, logically, more likely never to have been tested. This makes sense considering that persons with fewer risk behaviours are less likely to undergo a test. Also, in women and MSW, not having used injected drugs was related with never having been tested. In both models, we found that those who had never been tested were more likely to have engaged in unprotected

sex with casual partners. This is consistent with the findings of other studies,²¹ although some authors have not found any association,¹⁵ while others have reported an inverse association in MSM,²² that is, that those not previously tested were less likely to have engaged in unprotected sex.

Our findings show that almost half of the first testers had high-risk behaviours for HIV transmission. Most studies agree that the lack of perceived risk is the main barrier to never being tested.⁴ In fact, a recent study in Spain reported that slightly more than half of persons with no previous test reported



^a MSM: Men who have sex with men ^b MSW: Men who have sex only with women

*High-risk people for HIV: ever injected drugs, engaged in prostitution, or had not always used condoms with casual partners in the previous 12 months.

Figure 1 Thoughts about undergoing an HIV test for the first time among high-risk people* who get tested in a street-based rapid HIV testing programme in Spain (2008–2011).

reasons related with low-risk perception.²³ It may be that, in casual sex encounters, untested people rely on strategies of questionable safety such as selection of partners based on appearance, level of trust, romantic feelings, discussion of each partner's sexual history or their belief that those who have previously tested negative will disclose this circumstance so they can assess the risk of HIV transmission.^{22–24} The results of this study indicate that persons at highest risk for HIV, based on the report of sexual risk behaviour, are not being reached by HIV testing services, since those who had never been tested for HIV were more likely to report unprotected sex with casual partners.

It is important not to overlook the fact that, in the case of MSM, the level of involvement in the gay community predicts the likelihood of not being tested: the lower the involvement in the gay culture, the greater the probability of not being tested, as has been reported previously.^{15–22} This association is so strong that, in our case, the probability of never having been tested in those not involved in the gay community is double that of those who are members of a CBO dedicated to defending the rights of homosexuals. It is quite obvious that this especially at-risk population is not going to be reached by interventions that focus on the test promotion within the gay community. Accordingly, public health policies need to consider this 'hidden' population group that is difficult to access and recruit, but which constitutes a non-negligible percentage of all MSM (25% in our study).

It should also be emphasised that the high visibility of the programme was the most important factor for undergoing testing in nearly two-thirds of those with no previous test and for one-third of the first testers who tested positive. Whereas lack of time or interest and not knowing where to be tested are frequently cited as impediments to testing, outreach programmes can overcome these barriers by providing the opportunity to passersby. This adds value to the programme, especially considering that one out of four MSM (the group with the largest proportion of delayed diagnoses) classified as being at high risk for HIV infection and who received their first test our programme were almost entirely unconcerned about the matter. Furthermore, in the case of MSM (the group most affected by the epidemic throughout Western Europe) who had never been tested but had engaged in risk behaviours, one of every three reported having been thinking about doing it for over 2 years or not having thought about it at all. With such a low level of concern and so little interest in being tested, we believe that, without the participation of easily accessible and highly visible outreach programmes like ours, it will be difficult to meet international guideline recommendations that certain groups such as MSM and persons with multiple sexual partners should be tested at least once a year.^{25–27} It is important to note that this gap will be even greater if the frequency of recommended testing is increased, as appears likely.^{28–29} Furthermore, taking the first HIV test, as long as it is a pleasant experience (usually the case in programmes outside clinical settings⁶) should favour subsequent testing, since it helps to create the habit, eliminate fears and distrust and awaken the awareness of risk. If we take into consideration also that one-third of the first testers diagnosed would not have tested if they had not seen the mobile unit, the extreme visibility of the programme takes on even to greater prominence.

The findings in this report are subject to several limitations that should be considered with regard to the generalisation of the results. Since this population was recruited in a rapid HIV testing service, participation may have been biased by the same factors that keep some people from seeking the test. Thus, we

need to know the opinions and characteristics of those persons who, despite having risk behaviours for HIV infection, have never been tested and whose recruitment in this type of service would, obviously, not be feasible.

In conclusion, this study has made it possible to determine the ability of a street-based outreach programme of rapid HIV testing not aimed at any particular risk group to attract at-risk and hard-to-reach individuals who have never been tested. This outdoor outreach service is characterised by low threshold HIV testing in that it offers multiple and more attractive, accessible and convenient testing locations than conventional healthcare settings. Thus, in addition to other existing HIV testing services, it may increase access to HIV testing by high-risk persons unaware of their HIV serostatus.

Key messages

- ▶ This street-based outreach rapid HIV testing programme not targeting a particular risk group was able to attract and diagnose previously untested and at-risk individuals.
- ▶ The high visibility of the programme has triggered testing in a substantial proportion of the attendees and also of those diagnosed.
- ▶ This may increase access to HIV testing to some hard-to-reach populations such as MSM not related to the gay scene.

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Collaborators Madrid Rapid HIV testing Group: Jorge Gutierrez, Mónica Ruiz, Rebeca Sánchez and Enrique Regidor.

Contributors MJB, Ldelaf and SFB designed the study and wrote the protocol. MJB and Ldelaf took overall responsibility for the project. MER-S, GB and the Madrid Rapid HIV testing Group made contributions to the study design, data collection tools, pilot study and participated in the acquisition of data. SFB and JH did the analysis and interpretation of data. SFB, Ldelaf and JH wrote the manuscript. MJB critically revised the manuscript and contributed important intellectual content. All authors reviewed, edited and approved the manuscript.

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