

## TITLE PAGE

### Title

Usage of purchased self-tests for HIV infections among migrants living in the United Kingdom, France, and the Netherlands: a cross-sectional study

### Authors

Janneke P. Bil<sup>1,2</sup>, Maria Prins<sup>1,2</sup>, Ibidun Fakoya<sup>3</sup>, Alain Volny-Anne<sup>4</sup>, Fiona Burns<sup>3</sup>, Freke R. Zuure<sup>1,2</sup>

### Affiliations authors

<sup>1</sup>Department of Infectious Diseases Research and Prevention, Public Health Service of Amsterdam, The Netherlands

<sup>2</sup>Department of Internal Medicine, Amsterdam Infection and Immunity Institute (AI&II), Amsterdam UMC, University of Amsterdam, Meibergdreef 9, Amsterdam, Netherlands

<sup>3</sup>Institute of Global Health, University College London, United Kingdom

<sup>4</sup>European AIDS Treatment Group, Brussels, Belgium

### Corresponding author:

Janneke Bil, Public Health Service of Amsterdam, Department of Infectious Diseases Research and Prevention, P.O. Box 2200, 1000 CE Amsterdam, the Netherlands, Email: [jbil@ggd.amsterdam.nl](mailto:jbil@ggd.amsterdam.nl); Tel: +31205555569

## **ABSTRACT**

### **Objectives**

Self-tests are performed and interpreted autonomously by a person without involving a healthcare professional or certified laboratory. To gain insight into the usage of purchased HIV self-tests (HIVST) among migrants living in high-income countries, we studied the prevalence and determinants of HIVST usage among migrants living in the United Kingdom (UK), France, and the Netherlands.

### **Methods**

We used web-based questionnaire data collected between April 2014 and July 2015 among migrants living in the UK, France, and the Netherlands who participated in the cross-sectional community survey of the aMASE (advancing Migrant Access to Health Services in Europe) study. HIVST usage in the preceding 12 months and corresponding 95%-confidence intervals (CI) were calculated. Using univariate logistic regression analyses, determinants of HIVST usage were evaluated.

### **Results**

Among 477 migrants living in the UK (n=235), France (n=98) and the Netherlands (n=144) HIVST usage in the preceding 12 months was 1.89% (9/477, 95%-CI:0.66-3.11%). As all 9 HIVST users were men who have sex with men (MSM), we restricted our univariate analyses to MSM (n=240). HIVST usage was borderline significantly lower among MSM living in the France and the Netherlands compared to those living in the UK (UK: ref; France: OR:0.20, 95%-CI:0.03-1.14; the Netherlands: OR:0.06, 95%-CI:0.00-1.05). Age, region of birth, educational level, registration at a general practitioner, recent number of male sexual partners and hard drug use were not associated with HIVST usage among MSM.

### **Conclusions**

HIVST usage among migrants from the UK, France, and the Netherlands was relatively low between 2014 and 2015 but higher among migrant MSM. To increase HIV testing rates among migrants, programs need to be developed to promote HIVST among this group. Also, as more countries approve usage of HIVST, systems need to be established to ensure linkage to confirmatory testing and care following a positive test.

**Keywords:** HIV infections, Transients and Migrants, Europe, Cross-Sectional Studies

## INTRODUCTION

Self-tests are tests that can be performed and interpreted autonomously by lay persons without involving healthcare professionals or certified laboratories.[1] The World Health Organization (WHO) currently recommends the usage of self-tests for HIV infections (HIVST) as an additional approach to HIV testing services, as it could increase HIV testing rates. [1,2] However, ensuring linkage to confirmatory testing and specialist care for those with a positive HIVST result remains a concern.

Within Europe, migrants represent a significant group in the HIV epidemic, and migrants are more likely to be undiagnosed or diagnosed late compared with non-migrants.[3] HIVST may help overcome barriers migrants encounter in accessing traditional testing services and therefore increase HIV testing rates among this group.[1,4]

To gain more insight into recent usage of purchased HIVST by migrants living in Europe, we studied its prevalence and determinants among migrants living in the UK, France, and in the Netherlands. Furthermore, we studied the HIVST positivity rate and the extent to which users attend professional healthcare providers for confirmation testing to gain insight into linkage to care among HIVST users.

## METHODS

We included participants of the web-based community survey of the aMASE (advancing Migrant Access to health Services in Europe) study. Detailed information on the aMASE study is provided elsewhere.[5,6] Briefly, the cross-sectional aMASE community survey aimed to identify the structural, cultural, and financial barriers to HIV prevention, diagnosis, and treatment in migrant populations. The community survey was promoted between April 2014 and July 2015 via social marketing and community participatory methods in nine countries (Belgium, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, and the United Kingdom), although migrants aged 18 or older living in all countries of the World Health Organization (WHO) European area were eligible. Migrants were defined as foreign-born individuals intending to live in their current country of residence for  $\geq 6$  months. Participants completed a questionnaire (available in 14 languages) which included (1)

detailed socio-demographic data and extensive migration history data, (2) sexual and HIV risk behaviour, (3) use of health services, and (4) experiences of living with HIV, including stigma and discrimination. HIVST questions were only included in the survey of people who reported living in the UK, France, and the Netherlands. Hence, our study only includes aMASE participants living in the UK, France, and the Netherlands. Questions addressed HIVST usage in the preceding 12 months, the HIVST result, whether persons went to a professional healthcare provider for confirmatory testing, and the confirmation test results. HIV-positive participants diagnosed more than one year prior to survey completion were excluded, as were participants who did not answer the question regarding HIVST use.

Participant characteristics (age, sexual orientation, educational level, country of residence, years since migration, and region of birth) and the percentage and corresponding 95%-confidence intervals (CI) of HIVST usage were calculated. Among HIVST users, HIVST results and follow-up testing behaviour were described. To evaluate determinants of HIVST usage we calculated odds ratios (ORs) and 95%-CI by a univariate logistic regression model adapted for rare events and fit using penalized-maximum likelihood estimation. Potential determinants including country of residence, age (<27 years/27-35 years/>35 years), region of birth (developing/developed region based on UN-classification), educational level (lower secondary level/upper secondary level or more), registration at a general practitioner (no/yes), number of sexual partners in the preceding 12 months (0-5/6-20/≥21), and hard drug use in the preceding 5 years (no/yes). A *p*-value <0.05 was considered statistically significant. Analyses were performed using STATA Intercooled 13.1 (STATA Corporation, College Station, Texas, USA).

Ethical approval was obtained from the London-Bentham Research Ethics Committee (11/LO/1600) and the ethics committee of the Academic Medical Center of Amsterdam (2013\_137#C20131038).

## RESULTS

In total, 552 migrants participated in the aMASE community survey in the UK (n=265), France (n=126), and the Netherlands (n=161). Of those, 70 HIV-positive participants were diagnosed more than one year before survey completion and five participants with missing HIVST usage data were excluded from the analyses. Of the 477

included participants, median age was 34 (IQR 27-43) years, 91% (n=435) had finished at least their upper secondary educational level, and 36% (n=171) were women, 13% (n=64) were heterosexual men, 50% (n=240) were men having sex with men (MSM), and 0.42% (n=2) transgender people. Median years since migration was 7 (IQR 3-13), and 50% (n=236) were born in another European country, 21% (n=102) in Latin America/Caribbean, 14% (n=67) in Africa, 7% (n=33) in Asia and 8% (n=39) in the rest of the world.

HIVST-usage in the preceding 12 months was 1.89% (9/477, 95%-CI: 0.66-3.11%). Eight HIVST users reported their HIVST result was negative and one reported a failed/indeterminate result. Of those with a negative HIVST result, four (50%) went to a professional healthcare provider for confirmation testing, and all confirmation HIV tests were negative. The participant whose test failed or was indeterminate did not seek confirmation testing.

All nine HIVST users were MSM, corresponding to a HIVST-usage of 3.75% (9/240, 95% CI:1.33-6.17%) among MSM. Of all HIVST users, five went to a sexual health clinic or HIV testing clinic for their last HIV test, while one went to a private clinic, and three used a self-test for their last HIV test. As these HIVST users were all MSM, we included only MSM in our univariate analyses (Table 1). HIVST usage was borderline significantly lower among MSM living in the France and the Netherlands compared to those living in the UK (UK: ref; France: OR:0.20, 95%-CI:0.03-1.14; the Netherlands: OR:0.06, 95%-CI:0.00-1.05). No other variables were significantly associated with HIVST usage among MSM.

## DISCUSSION

This study shows that the overall HIVST usage in the preceding 12 months among migrants living in the UK, France, and the Netherlands is low (2%), but higher among MSM (4%). Among MSM, HIVST usage was higher in those living in the UK compared to those living in France and the Netherlands.

The low overall HIVST usage is in line with findings of previous European studies conducted among French MSM (2009),[7] Spanish attendees of a street-based HIV-testing programme (2010-2012)[8] and a Dutch study among the general population and sexual risk groups (2007-2015).[9] However, a Chinese study showed that 20% of Chinese MSM reported prior HIVST usage.[10] The differences between the HIVST usage prevalence

between Europe and China might be explained by Europe's legal restrictions on selling HIVST, whereas China has a national policy supporting HIVST. In Europe, only the UK and France have recently approved HIVST for sale (UK: April 2015; France: September 2015).[11] Although UK approval of HIVST took place during recruitment for this study, five out of eight UK self-test users participated in this study prior to the HIVST approval. Hence the approval may only partially explain the lower number of HIVST users in France and the Netherlands compared to the UK. Data from the UK showed that in the first nine months after HIVST approval approximately 25,000 tests were sold, indicating that usage is likely to increase as more countries approve HIVST usage as the tests become more easily available.[12] It is therefore important to remove legislative barriers to and promote HIVST access and establish systems to provide linkage of users to confirmatory testing and care following a positive test.

In our study, HIVST usage was reported only by migrant MSM, not by heterosexual migrants. To successfully implement HIVST as an additional approach to increase HIV testing rates among migrants, HIVST awareness and potential motives and barriers to usage should be further explored especially among heterosexual migrants.

Our results further show that most HIVST users had a negative self-test result, and 50% went for confirmation testing. When questioned about the location of their last HIV test, the majority of self-test users reported a professional sexual health clinic or HIV testing clinic. These results suggest that some HIVST users might not experience barriers in accessing regular HIV healthcare services but rather use HIVST alongside regular services. A previous qualitative study among UK MSM also described self-testing as an opportunity to 'top-up' between other tests.[13]

Regarding study strengths, we were able to assess HIVST usage among a diverse sample of heterosexual and MSM migrants living in three European countries. Limitations include the representativeness of our study population. Since we used convenience sampling and a web-based questionnaire which generally attracts persons with higher (digital) literacy, our population is unlikely to represent the whole migrant population in the UK, France and the Netherlands. Also, due to the small number of HIVST users we had low statistical power to assess determinants of HIVST usage.

In conclusion, HIVST usage among migrants from the UK, France, and the Netherlands participating in an HIV community survey was relatively low between 2014 and

2015, but higher among migrant MSM. As HIVST have the potential to increase testing rates and decrease late diagnoses, programmes should be developed to promote and facilitate HIVST among migrants, especially among heterosexual migrants. To evaluate such programs, HIVST usage should be closely monitored. In addition, as more countries approve HIVST, systems should be established to ensure linkage to confirmatory testing and care following a positive test.

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## **CONFLICTS OF INTEREST**

Maria Prins and Freke Zuure have received non-financial support (i.e., HIVST kits) from OraSure Technologies for another investigator-initiated study concerning HIV self-testing. Fiona Burns has received conference support and consultancy fees from Gilead Sciences Ltd.

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## **AUTHORS' CONTRIBUTIONS**

Janneke Bil interpreted the data, and wrote the draft manuscript. Janneke Bil, Freke Zuure, and Maria Prins designed this study on self-testing, and Freke Zuure and Maria Prins supervised the analyses and interpretation of the data. Fiona Burns led the design and implementation of the European aMASE study. Ibidun Fakoya coordinated the European aMASE study. Alain Volny-Anne was responsible for the data collection in France. All authors provided substantial contributions to the interpretation of the data and to subsequent drafts and approved the final version of the manuscript. The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non exclusive for government employees) on a worldwide basis to the BMJ Publishing Group Ltd to permit this article (if accepted) to be published in STI and any other BMJ PGL products and sub-licences such use and exploit all subsidiary rights, as set out in our licence <http://group.bmj.com/products/journals/instructions-for-authors/licence-forms>.

## TABLES

**Table 1:** Potential determinants of HIV self-test usage among 240 migrant men who have sex with men living in the United Kingdom, France, and the Netherlands, 2014-2015.

	HIVST users/		OR	95%-CI	p-value
	total population (n/N)	HIVST usage (%)			
<b>Current country of residence</b>					
United Kingdom	8/88	9.09%	1		0.042
France	1/73	1.37%	0.20	0.03-1.14	
The Netherlands	0/79	0.00%	0.06	0.00-1.05	
<b>Age</b>					
<27 year	1/70	1.43%	1		0.394
27-35 year	3/89	3.37%	1.87	0.27-13.03	
>35 year	5/81	6.17%	3.33	0.53-20.86	
<b>Region of birth</b>					
Developing regions	1/108	0.93%	1		0.076
Developed regions	8/132	6.06%	4.89	0.85-28.29	
<b>Educational level</b>					
Upper secondary or more	9/221	4.07%	1		0.705
Lower secondary or less	0/19	0.00%	0.57	0.03-10.23	
<b>Registered at a general practitioner</b>					
No	1/59	1.69%	1		0.471
Yes	8/181	4.42%	1.91	0.33-11.12	
<b>Number of male sexual partners in the preceding 12 months</b>					
0-5	2/72	2.78%	1		0.939
6-20	4/99	4.04%	1.33	0.27-6.43	
≥21	2/61	3.28%	1.18	0.19-7.07	
Missing	1/8	0.13%			
<b>Hard drug use in the preceding 5 years</b>					
No	3/129	2.33%	1		0.231
Yes	6/110	5.45%	2.25	0.60-8.46	
Missing	0/1	0.00%			

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