

# Blood donor deferral policies across Europe and characteristics of men who have sex with men screened for human immunodeficiency virus in blood establishments: data from the European Men-who-have-sex-with-men Internet Survey (EMIS)

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**Background.** The predominant mode of transmission of human immunodeficiency virus (HIV) in Europe is male-to-male transmission. Men who have sex with men (MSM) are deferred from donating blood in many countries, but nevertheless do donate blood. Based on data from 34 countries, we estimated the proportion of MSM screened for HIV in the context of a blood donation and identified individual factors associated with this HIV screening in order to propose possible public health interventions.

**Materials and methods.** In 2010, the first European MSM Internet Survey (EMIS) collected self-reported data on HIV testing from >180,000 MSM in 38 European countries. Using logistic regression, demographic and behavioural factors associated with screening for HIV in blood establishments were identified. Stratified by European sub-region, we analysed the proportion of MSM screening in blood establishments by time elapsed since last negative HIV test.

**Results.** Donor eligibility criteria for MSM vary across Europe with most countries using permanent deferral. The Western region had the lowest (2%) proportion of MSM screened in blood establishments and the Northeastern region had the highest (14%). Being <25 years old, not disclosing sexual attraction to men, never having had anal intercourse with a man, having a female partner, living in a rural area, and certain European sub-regions or countries of residence increased the likelihood of being screened in blood establishments.

**Discussion.** In spite of deferral policies, MSM are screened for HIV in the context of blood donations. Gay-friendly testing services are rare in rural areas, and young men might be reluctant to disclose their sexual orientation. Recent developments, such as home sampling, might offer new testing possibilities for those not reached by established services yet wishing to know their HIV status. Donor selection procedures should be improved. Both interventions might help to further reduce the risk of transfusion-transmitted infections.

**Keywords:** men who have sex with men, blood donation, HIV, screening, behavioural surveillance.

## Introduction

In the early 1980s, national authorities established measures to prevent human immunodeficiency virus (HIV) from entering the blood supply. Permanent deferral of men who have sex with men (MSM) from donating blood was an attempt to increase blood safety in response to the AIDS epidemic in the 1980s. In 1985, tests to detect the virus became available. Nevertheless, a residual risk of transfusion-transmitted HIV remains. This is mainly due to undetected infectious donations in the window period of an infection when infectious

disease markers are not yet detectable. In 1985, the first generation HIV antibody tests had a window period of approximately 56 days<sup>1</sup>. To reduce the residual risk of transfusion-transmitted HIV infections, HIV nucleic acid amplification testing to screen blood donations was implemented in most European countries starting in 1997<sup>1,2</sup>. This reduced the window period for potentially infectious donations from approximately 56 to less than 14 days<sup>3</sup>. Many countries worldwide retain the permanent deferral of potential donors with a sexual behaviour that puts them "at high risk" of acquiring

infectious diseases which are transmissible by blood, including HIV<sup>4</sup>.

In addition to donor screening, donor history questionnaires and donor interviews are used to identify eligible donors according to defined donor deferral criteria. These criteria aim to minimise the risks for donors as well as for recipients and include for instance medical conditions, travelling, invasive procedures such as tattooing, and sexual exposures.

With respect to sexual exposures, European Union (EU) legislation<sup>5</sup> distinguishes behaviour "at risk" and "at high risk" linked to temporary and permanent deferral from blood donation, respectively. No further definition of "risk" and "high risk" is given, nor are risk categories defined. Member States are required to transfer European regulations into national law. In order to comply with the EU directive, most member states kept the permanent deferral for MSM that was already in place since the identification of the HIV, mainly because of the epidemiological situation. In 2012, the predominant mode of HIV transmission in European countries was male-to-male sexual transmission, accounting for 40% of all new HIV diagnoses<sup>6</sup>. While MSM constitute approximately 3% of the adult male population<sup>7,8</sup>, they represented more than 30% of all people newly diagnosed with HIV in ten countries and more than half of all newly diagnosed people in another nine countries<sup>6</sup>. The rate of HIV diagnoses per 100,000 population decreased slightly from 6.4 per 100,000 in 2006 to 6.2 per 100,000 in 2012 and yet the burden of new diagnoses attributed to sex between men increased by 11% since 2006<sup>6</sup>.

The permanent deferral of MSM from donating blood is discussed intensively<sup>9</sup>. Irrespective of deferral criteria, some MSM donate blood. The first pan-European MSM Internet Survey (EMIS) in 2010 included questions on HIV testing sites within the context of HIV screening or diagnosis. We estimated the proportions of MSM who reported that they were last screened for HIV in the context of a blood donation for 34 European countries in the EMIS dataset and identified associated individual factors. Based on these findings we propose and discuss possible public health interventions to reduce the use of blood establishments for HIV test-seeking by groups with increased risk of HIV infection.

## Materials and methods

### Review of current practices

We searched literature in PubMed and Scopus as well as the grey literature to generate an overview of the implementation of the European Council directive 2004/33/EC with respect to MSM and blood donation in 2010 and expanded the search to other countries with participants in EMIS.

### Population and data collection

The EMIS survey sample and methods have been fully described in detail elsewhere<sup>10,11</sup>. In short, five primary and 77 secondary partners active in public health or in the MSM community developed a questionnaire in 25 different languages which was featured in gay online social media and by gay community organisations. Users of gay online media were invited by instant messages or banner advertisements to participate in an anonymous online survey. The core slogan to promote the survey was "Be part of something huge". It was intended to promote the benefits to the community of taking part in the study and to be intriguing and mildly suggestive of the sexual content of the survey. The questionnaire explored sexual health, access to healthcare, behaviours as well as socio-economic factors. The typical completion time was 20 minutes. No financial incentives were given. No IP addresses were collected. The survey was accessible online from June 6 to August 31, 2010. More background information, including the English version of the questionnaire, is available at [www.emis-project.eu](http://www.emis-project.eu).

### Questionnaire items used for this study

The questions on blood donation depended on the respondent's answer regarding his HIV status. Men who indicated that they were HIV-positive were asked for the year of the diagnosis. Men who replied that they had screened negative were asked when they had had their last test. All respondents were asked about the setting and could choose from ten options: primary care, private practice, hospital outpatient clinic, hospital as an inpatient, HIV testing service, blood donation, home testing, bar/pub/club/sauna, mobile medical unit, or elsewhere.

### Data analysis

We explored the regulations regarding MSM and blood donation in effect in the various countries in 2010, classifying them as permanent deferral, deferral for six or 12 months, deferral based on individual risk assessment, no MSM-specific rule, and information unavailable (if no or contradictory information was found). We calculated the proportions of participants using blood establishments among all testing sites regardless of HIV status.

We classified replies on time of last HIV screening into three categories -more than five years previously, between one and five years previously, and within the preceding year- and stratified countries by nine geographic regions, as proposed by the EMIS investigators<sup>11</sup>. We classified testing venues into two groups: blood establishment versus all others. The dataset had already been checked for consistency.

Participants had provided informed consent and were at or above the age of homosexual consent in their country of residence. Respondents who did not express sexual preference for other men or who did not report sexual contacts with other men had already been excluded<sup>11</sup>. However, we further excluded people who gave inconsistent answers on their age or their HIV testing history. In addition, participants who had never been tested for HIV, had not received their results or did not indicate where they had been tested were excluded. Those tested while hospitalised were excluded because most HIV tests would not have been self-initiated in this setting. Finally, we excluded countries with less than 100 valid questionnaires.

We considered HIV testing at a blood establishment as opposed to other testing sites as an outcome and performed a logistic regression analysing contributing factors including age, population size of place of residence, seeking testing for sexually transmitted infections (STI) within the preceding 12 months and presence of symptoms when doing so, anal intercourse with men, relationships with women, social disclosure of having sex with men (outness) and EMIS geographic region. We performed this analysis for HIV-negative and HIV-positive participants separately because, on the one hand, social, demographic and behavioural factors might have been influenced following the HIV diagnosis and, on the other, because participants who screened negative within the context of a blood donation might return in the future.

To describe regional developments in screening at blood establishments, we calculated the time elapsed (within the preceding year, within one-five years previously, more than five years previously) since the last negative HIV test in the context of a blood donation for MSM divided by geographic region to explore whether the proportion of MSM testing at blood establishments remained stable over time.

We used Stata® 13.1 (StataCorp, College Station, TX, USA) to calculate odds ratio (OR), p-values, standard errors and 95% confidence intervals (95% CI).

### Human subject protection

The Research Ethics Committee of the University of Portsmouth, United Kingdom (REC application number 08/09:21) approved EMIS 2010.

## Results

### Human immunodeficiency testing and blood donation among men who have sex with men

The dataset, cleaned according to the EMIS study protocol<sup>10</sup> and provided for analysis to study partners, contained 174,209 valid questionnaires. The EMIS population has been described fully elsewhere<sup>10,11</sup>. We excluded questionnaires containing discrepant answers on the participant's age or his HIV testing history (n=302, 0.13%). We further excluded participants who did not test for HIV (n=50,629, 29%) or had never received their test result (n=1,216, 0.70%), participants who did not indicate where they tested for HIV (n=204, 1.1%), and participants who tested for HIV as an in-patient (n=6,382, 3.7%). Finally, we excluded those from countries with fewer than 100 valid questionnaires (Bosnia and Herzegovina, Moldova, the former Yugoslav Republic of Macedonia and Malta) (n=264, 0.15%). Our analysis was thus based on 115,212 (66%) questionnaires. General practitioners, family doctors, and doctors in private practice accounted for 38% of test settings, followed by outpatient clinics (27%), dedicated HIV testing services (24%), bars, pubs, clubs, saunas or mobile medical units (0.7%) and home testing (0.7%). Three percent of MSM said they tested without specifying the location ("elsewhere"). Blood donation represented 6.3% of all HIV test settings, with 2.9% among participants diagnosed positive and 6.7% among those tested negative (Table I).

**Table I** - Number of participants using different settings to test or screen for HIV in 34 European countries, EMIS 2010.

	HIV positive (diagnosis)		HIV negative (last screening)		Total	
	N	%	N	%	N	%
General practitioner, family doctor, private physician	5,086	43.2	38,908	37.6	43,994	38.2
At a hospital or clinic as an out-patient	3,493	29.7	27,326	26.4	30,819	26.7
At an HIV testing service	2,406	20.4	25,026	24.2	27,432	23.8
At a blood bank, while donating blood	344	2.9	6,950	6.7	7,294	6.3
Used a home testing kit	48	0.4	731	0.7	779	0.7
Mobile medical unit	29	0.3	822	0.8	851	0.7
In a bar or pub, club or sauna	15	0.1	408	0.4	423	0.4
Elsewhere not otherwise specified	359	3.0	3,262	3.2	3,621	3.1
Total	11,780	100	103,432	100	115,212	100

EMIS: European Men-who-have-sex-with-men Internet Survey; HIV: human immunodeficiency virus.

### **Implementation of regulations regarding men who have sex with men and blood donation**

At the time of the survey in 2010, permanent deferral of MSM was in place in most member states. For the 34 countries represented in EMIS, we could confirm rules regarding MSM in 25 countries: permanent deferral was in place in 20 countries, deferral for six or 12 months after the last sexual contact was used in two EU-member states, two member states implemented an individual risk assessment and one country had no MSM-specific policy in place.

The proportions of participants reporting HIV tests in blood establishments were highest in Lithuania (17%), Latvia (14%), Austria (12%) and Croatia (12%) and lowest in the Netherlands (1.3%), Norway (1%) and the United Kingdom (0.9%). The reported proportions were above 10% in nine countries, between 5-9.9% in 12 countries, between 2-4.9% in six countries and less than 2% in seven countries. When aggregated by regulations in place in each country, the groups were statistically different. The proportions of MSM donating blood were highest in countries with individual risk assessment (9.4% [95% CI: 9.0-9.8%]), somewhat lower in countries with a limited deferral period (7.4% [95% CI: 6.1-8.8%]) and lowest in countries with permanent deferral (5.4% [95% CI: 5.3-5.6%]), yet blood donation took place in spite of the permanent deferral rule and varied greatly among countries (range, 0.9-12.1%) (Table II).

### **Characteristics of men who have sex with men who last screened human immunodeficiency virus negative or tested positive while donating blood**

Compared with those testing elsewhere, MSM diagnosed with HIV at blood establishments were more likely to be under 25 years old, live in a smaller town, be in a steady relationship with a woman and less out about their sexual attraction. The EMIS sub-region of the individual's country of residence increased odds to donate blood in only three regions (Table IIIa).

Compared with those testing elsewhere, MSM who last screened HIV-negative in blood establishments were more likely to be under 25 years old, live in a smaller town, be in a steady relationship with a woman and less likely to have engaged in anal intercourse with a man, to be screened for other STI in the absence of symptoms, and to be out about their sexual attraction. Compared to the EMIS sub-region West, all other sub-regions contributed, in addition to the size of the place of residence, to the likelihood of seeking out blood donation (Table IIIb).

### **Time lapse since the last negative human immunodeficiency virus screening at a blood establishment by EMIS sub-region**

Blood establishments, among all testing locations, play a role ranging from a cumulative 1.4% in the West to 14.2% in the Northeastern sub-region. Stratified by time since last HIV test and region, we observed that in regions with a low proportion of blood establishments as testing sites, the proportion of MSM reporting blood establishments as testing sites remained stable, notably in the West, Northwest and East. However, in regions with a higher proportion of blood establishments as testing sites, we observed that MSM with HIV tests within the preceding year more often reported blood establishments as a testing site than MSM who had tested longer ago. Compared to other testing options, blood establishments were visited proportionally more frequently. The proportion of all HIV screening tests in blood establishments in the EMIS sample exceeded 10% within the preceding year and represented a substantial testing venue for MSM in five sub-regions: Central-West (10.3%), non-EU Southeast (10.4%), Southwest (10.8%), Central-East (11.7%) and Northeast (18.0%) (Figure 1).

### **Discussion**

Despite being based on the same EU directive, regulations regarding blood donation depending on behaviour and risk vary across Europe and range from lifelong deferral of MSM to a temporary deferral after last sex with a man to individual risk assessment by a physician. MSM are the most affected group in the HIV epidemic in Europe<sup>6,12-16</sup>. Nevertheless, the permanent deferral of MSM from blood donation in most European countries is subject to intense debate and legal challenges<sup>17-19</sup>. In order to achieve a harmonised European approach, a working group at the Council of Europe was created to provide scientific grounds for donor deferrals due to different sexual behaviour<sup>20,21</sup>. A Resolution of the Committee of Ministers concluded that countries should only decide on a temporary deferral policy for a given risky sexual behaviour when having demonstrated that this sexual behaviour does not put the donors at high risk of acquiring severe blood-borne infectious diseases<sup>20</sup>. The United Kingdom analysed their HIV surveillance data and initiated a change in deferral policy in 2011 and now restricts only men who have had sex with another man within the preceding 12 months. The United Kingdom is also the country in which MSM were least likely to screen themselves in the context of a blood donation, which indicates that most testing needs are met elsewhere. Donor surveillance and well-designed mathematic modelling of the residual risk will indicate whether the safety of the blood supply has

**Table II -** Setting of last HIV test as reported by EMIS participants who had been tested for HIV, 2010 and deferral policies for men who have sex with men in 2010.

Regulation in 2010	Country	Test in blood establishment	Test in other setting	Number of participants reporting testing	% blood establishment	% CI
Permanent deferral	Austria	338	2,462	2,800	12.1%	10.9-13.3%
	Croatia	31	226	257	12.1%	8.6-16.7%
	Greece	176	1,541	1,717	10.3%	8.9-11.8%
	Turkey	81	765	846	9.6%	7.8-11.8%
	Estonia	32	308	340	9.4%	6.7-13.0%
	Czech Republic	121	1,166	1287	9.4%	7.9-11.1%
	Germany	2,879	32,170	35,049	8.2%	7.9-8.5%
	Slovenia	32	455	487	6.6%	4.7-9.2%
	Portugal	235	3,374	3,609	6.5%	5.8-7.4%
	Switzerland	163	3,647	3,810	4.3%	3.7-5.0%
	Finland	42	1,162	1,204	3.5%	2.6-4.7%
	Luxemburg	6	207	213	2.8%	1.3-6.2%
	Sweden	54	2,160	2,214	2.4%	1.9-3.2%
	Belgium	54	3,048	3,102	1.7%	1.3-2.3%
	France	154	8,773	8,927	1.7%	1.5-2.0%
	Denmark	19	1,204	1,223	1.6%	1.0-2.4%
	Ireland	20	1,315	1,335	1.5%	1.0-2.3%
	Netherlands	37	2,851	2,888	1.3%	0.9-1.8%
	Norway	13	1,307	1,320	1.0%	0.6-1.7%
	United Kingdom	107	12,135	12,242	0.9%	0.7-1.1%
	Subtotal	4,594	80,276	84,870	5.4%	5.3-5.6%
6- or 12-month deferral	Slovakia	33	228	261	12.6%	9.1-17.3%
	Hungary	72	1,092	1,164	6.2%	4.9-7.7%
	Subtotal	105	1,320	1,425	7.4%	6.1-8.8%
Individual risk assessment	Italy	1,145	9,452	10,597	10.8%	10.2-11.4%
	Spain	725	8,599	9,324	7.8%	7.2-8.3%
	Subtotal	1,870	18,051	19,921	9.4%	9.0-9.8%
No specific rule	Russian Federation	177	3,064	3,241	5.5%	4.7-6.3%
Unavailable information	Lithuania	42	197	239	17.6%	13.2-23.0%
	Latvia	46	272	318	14.5%	11.0-18.8%
	Poland	194	1,446	1,640	11.8%	10.4-13.5%
	Serbia	58	496	554	10.5%	8.2-13.3%
	Romania	110	1,000	1,110	9.9%	8.3-11.8%
	Bulgaria	42	581	623	6.7%	5.0-9.0%
	Cyprus	9	137	146	6.2%	3.2-11.5%
	Ukraine	40	881	921	4.3%	3.2-5.9%
	Belarus	7	197	204	3.4%	1.6-7.1%
	Subtotal	548	5,207	5,755	9.5%	8.8-10.3%
<b>Total</b>		<b>7,294</b>	<b>107,918</b>	<b>115,212</b>	<b>6.3%</b>	<b>6.2-6.5%</b>

HIV: human immunodeficiency virus; EMIS: European Men-who-have-sex-with-men Internet Survey; 95% CI: 95% confidence interval for the EMIS dataset.

**Table IIIa** - Factors associated with having been tested for HIV in the context of a blood donation, participants with HIV-positive test outcomes in 34 countries in Europe, logistic regression analysis, EMIS 2010.

Characteristics		OR	95% CI
Age	>25 years	ref	
	≤25 years	<b>2.3</b>	1.6-3.5
Being out about sexual preference(s)	Generally out	ref	
	Out to a few people	<b>1.6</b>	1.2-2.2
Relationship with female partner(s)	Not in a relationship with a female partner	ref	
	In a relationship with female partner(s)	<b>2.3</b>	1.3-4.0
Anal intercourse with a male partner	Ever	ref	
	Never	1.1	0.13-8.1
Symptoms when STI screening (<12 months)	STI test due to symptoms	ref	
	No STI test	1.3	0.9-1.9
	STI test without symptoms	0.6	0.8-1.6
Population size of place of residence	≥1,000,000	ref	
	500,000-999,999	1.1	0.8-1.6
	100,000-499,999	<b>1.7</b>	1.2-2.3
	10,000-99,999	<b>1.6</b>	1.2-2.3
	<10,000	<b>1.8</b>	1.2-2.6
Region of residence (EMIS region)	West	ref	
	Southeast (EU)	0.9	0.1-6.8
	Northwest	1.1	0.4-2.9
	East	1.6	0.7-3.7
	Central East	1.7	0.7-4.1
	Southeast (non-EU)	2.3	0.5-9.7
	Central West	<b>2.3</b>	1.6-3.3
	Southwest	<b>3.6</b>	2.4-5.0
	Northeast	<b>8.6</b>	2.9-26.1

HIV: human immunodeficiency virus; EMIS: European Men-who-have-sex-with-men Internet Survey; OR: odds ratio (bold:  $p \leq 0.05$ ); 95% CI: 95% confidence interval; ref: reference category; STI: sexually transmitted infection; EU: European Union.

been affected; preliminary data covering the first two years following the change in deferral period showed no increase in HIV-positive blood donations<sup>22</sup>.

Although MSM are banned from donating blood in most European countries, the EMIS survey showed that 6.3% of participants reported having had their last HIV test within the context of a blood donation. In countries with a permanent deferral policy in place, 5.4% of the reported last HIV tests took place in the context of a blood donation. This finding varies greatly among countries (range, 0.9-12.1%) and might reflect the availability, acceptance and ease of access to HIV testing services.

The majority of participants (65%) reported testing in traditional medical settings such as general practitioners' and family doctors' offices, in private practices or as outpatients. In our study, these settings were more often reported by HIV-positive participants. By contrast, dedicated HIV testing services, mobile medical units,

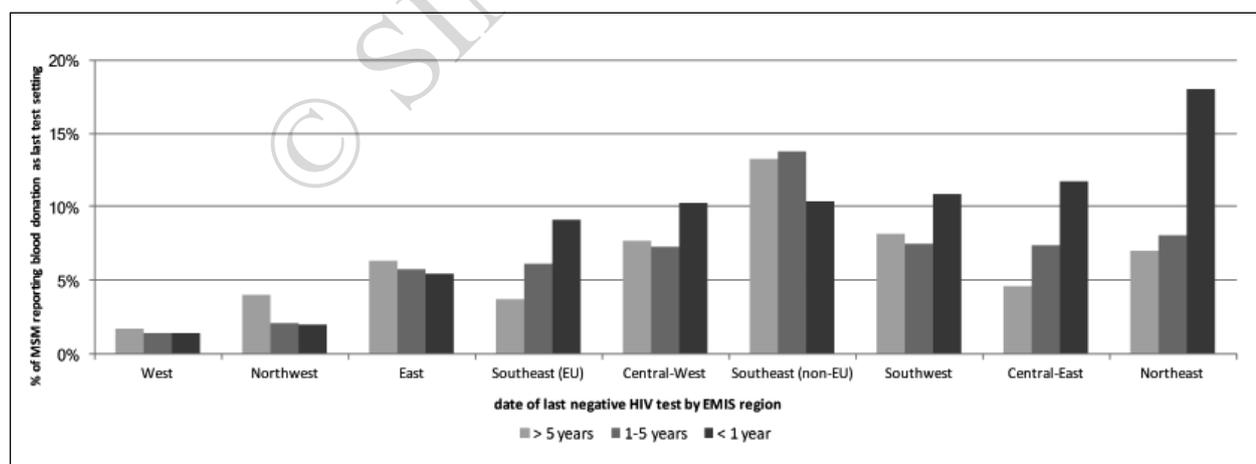
home testing, testing at bars, pubs, clubs and saunas, as well as blood establishments were more often reported as testing sites by HIV-negative participants. This finding might be attributable to more frequent screening and thus fewer diagnoses because, with the exception of blood establishments, these settings emphasise HIV screening.

EMIS data allowed us to determine characteristics of MSM who had either received their HIV diagnosis at a blood establishment or last tested HIV negative there. In many aspects, HIV-positive and -negative men did not differ. Compared to their peers who tested in regular settings, MSM who tested at blood establishments were younger and less open about their sexual preference. Notably, they were also more likely to be in a relationship with a woman. MSM frequenting blood establishments more commonly came from smaller towns and rural areas, suggesting -among other things- fewer regular testing sites and a lack of perceived anonymity/confidentiality at regular HIV testing sites

**Table IIIb** - Factors associated with having been tested for HIV in the context of a blood donation, participants with HIV-negative test outcomes in 34 countries in Europe, logistic regression analysis, EMIS 2010.

Characteristics		OR	95% CI
Age	>25 years	ref	
	≤25 years	<b>2.3</b>	2.1-2.4
Being out about sexual preference(s)	Generally out	ref	
	Out to a few people	<b>1.8</b>	1.7-1.9
Relationship with female partner(s)	Not in a relationship with a female partner	ref	
	In a relationship with female partner(s)	<b>1.6</b>	1.4-1.7
Anal intercourse with a male partner	Ever	ref	
	Never	<b>1.9</b>	1.7-2.1
Symptoms when STI screening (<12 months)	STI test due to symptoms	ref	
	No STI test	<b>2.9</b>	2.5-3.4
	STI test without symptoms	<b>2.3</b>	2.0-2.7
Population size of place of residence	≥1,000,000	ref	
	500,000-999,999	<b>1.2</b>	1.1-1.4
	100,000-499,999	<b>1.4</b>	1.3-1.5
	10,000-99,999	<b>1.8</b>	1.6-1.9
	<10,000	<b>1.8</b>	1.6-1.9
Region of residence (EMIS region)	West	ref	
	Northwest	<b>1.5</b>	1.2-1.9
	East	<b>3.9</b>	3.2-4.7
	Southeast (EU)	<b>5.0</b>	4.0-6.2
	Central West	<b>6.0</b>	5.3-6.8
	Central East	<b>6.7</b>	5.7-6.8
	Southwest	<b>6.9</b>	6.0-7.8
	Southeast (non-EU)	<b>7.0</b>	5.7-8.7
	Northeast	<b>9.5</b>	7.4-12.0

OR: odds ratio (bold: p≤0.05); 95% CI: 95% confidence interval; ref: reference category; STI: sexually transmitted infection; EMIS: European Men-who-have-sex-with-men Internet Survey; EU: European Union.



**Figure 1** - Proportion of participants who had their last negative HIV test at a blood establishment by time elapsed since last test and EMIS Region, EMIS 2010.

West (Belgium, France, Republic of Ireland, the Netherlands, United Kingdom); Northwest (Denmark, Finland, Norway, Sweden); East (Belarus, Russia, Ukraine); Southeast (EU) (Bulgaria, Cyprus, Romania); Central-West (Austria, Switzerland, Germany, Luxembourg); Southeast (non-EU) (Croatia, Serbia, Turkey); Southwest (Spain, Italy, Portugal, Greece); Central-East (Czech Republic, Hungary, Poland, Slovenia, Slovakia); Northeast (Estonia, Lithuania, Latvia). HIV: human immunodeficiency virus; EMIS: European Men-who-have-sex-with-men Internet Survey.

as possible reasons for seeking HIV screening while donating blood. Difference in HIV status affected two factors: HIV-negative MSM at blood establishments were less likely to self-report ever having had anal intercourse and were also less likely to have screened for STI other than HIV within the preceding 12 months.

These findings were not significant among those diagnosed HIV-positive in the context of a blood donation. This may be explained by the fact that STI testing, irrespectively of symptoms, is part of routine HIV care; it does not imply that men who tested positive within the context of a blood donation had already been screened for STI before being diagnosed with HIV. Routine annual STI testing, including HIV screening, is recommended to sexually active MSM in most countries by responsible authorities to identify infections early and prevent transmission<sup>23,24</sup>. Our results suggest that HIV-negative MSM using blood establishments as testing sites are less well reached by this recommendation or do not have easy access to such combined testing sites or perceive barriers to access them and are, therefore, less likely to be screened for STI when asymptomatic. They also reported fewer STI tests due to symptoms within the preceding 12 months.

An important factor characterising MSM testing at blood establishments was the country of residence, which we summarised by EMIS regions. Compared to the West region, the other regions ranged from having a small impact (testing 1.5 times more likely in the countries forming the Northwest region) to being the single largest predisposing factor (OR=9.5 in the Northeast). For HIV-negative men, the region of residence was a statistically significant factor, while only three regions (Central-West, Southwest, Northeast) remained significant in the analysis of HIV-positive men.

We expected to find that MSM frequenting blood establishments would report having no or limited access to HIV screening. Instead, this assumption was not confirmed, even among those who had been screened recently at blood establishments. This question was not significant in preliminary analysis and thus excluded from the regression model presented here. Blood establishments might be perceived as alternative HIV test settings. This should be discouraged because HIV testing in blood establishments is done for product safety and is not, therefore, accompanied by counselling. Although the residual risk of transfusion-transmitted HIV infections is very low, test-seeking donors with sexual risk exposures might pose a risk to blood safety because of window period donations or test failures. The fact that blood establishments are used as HIV testing sites underlines the need to improve donor selection.

Donor selection could be refined by better donor questionnaires, by educating potential donors and by ensuring a confidential environment at the donation

site<sup>9</sup>. Studies on unreported deferrable risks among donors demonstrated that the personal perception of risk is a key to non-compliance with donor selection criteria<sup>25,26</sup>. Well-designed donor history questionnaires and appropriate donor education material are, therefore, needed to prevent donations from individuals at risk of acquiring transfusion-transmissible infections<sup>9</sup>. In a recent study in Italy, 8.3% of HIV-positive repeat tested donors reporting a risk behaviour <4 months before donation stated that they had donated blood in order to be tested for HIV<sup>27</sup>. In another survey in Australia, the proportion of HIV-negative test-seekers among non-compliant donors was lower (0.74%) but test-seeking donors had a significantly greater likelihood of non-disclosure during the pre-donation assessment (adjusted OR, 2.39; 95% CI: 1.14-5.04) in the logistic regression<sup>28</sup>.

To assess whether blood establishments have become more or less popular testing sites among those screening negative, we compared the proportions of MSM reporting their last HIV screening from this setting among all test settings within three time frames (more than five years previously, between one and five years previously, within the preceding one year). We found that in the West, Northwest and East the proportions of men who tested at a blood establishment within the preceding year were lower than those of men living in the same regions who had tested longer ago. We do not, however, know why they chose other test settings. By contrast, in the Southeast (EU), Central-West, Southwest, Central-East and Northeast the proportions of MSM who had tested at blood establishments among all sites within the preceding year were higher compared to the proportions who last tested longer ago. Regions in which the use of blood establishments was generally higher were also those in which larger proportions of MSM screened at blood establishments more recently. As discussed above, MSM who tested at blood establishments were not more likely to report a lack of testing facilities and they might have considered blood donation an appropriate setting. Yet in countries with more recent or less pronounced epidemics<sup>29-31</sup>, blood establishments play a more important role, possibly because these countries tend to have a less well or more recently established network of testing facilities. It is also possible that the recommendation for sexually active MSM to screen for HIV has reached this group and some might use blood donation to follow this advice in an easily accessible and stigma-free setting. The need to disclose sexual risk behaviours to get tested in other test settings may be a barrier for some MSM, particularly if there is no easy access to gay-friendly and anonymous testing services. This of course points to the need for public health actions to provide appropriate and acceptable test settings to meet these prevention needs and also safeguard the allogeneic blood supply.

Although home testing kits are available in only a few countries, 0.7% of EMIS participants reported having used such kits for their last HIV test. The EMIS survey did not go into details regarding whether home testing (e.g. analysing a specimen with a quick test at home) or home sampling (taking a specimen at home, sending it to a laboratory for analysis) was used. Home sampling may be particularly useful in rural areas in which the demand for specialised services might be too low to offer MSM friendly, convenient, readily accessible, sustainable and cost-effective services<sup>32</sup>. A study in the United Kingdom investigated targeted home sampling, i.e. when a lay-person collects their own specimen to send to a laboratory for analysis, while counselling is by phone and online. This study was promoted specifically for MSM and sub-Saharan migrants. Previously untested black African heterosexual women with more sexual partners and MSM were attracted by the convenience offered through home sampling and were reached successfully with this strategy<sup>33</sup>. Home sampling would have two main advantages: epidemiological data, such as age group and sex, could be sent anonymously to the laboratory to maintain surveillance and individuals seeking testing could be informed about risks and risk management and other needs for prevention (e.g. STI screening) while pointing them to the various appropriate settings. Given the convenience and confidentiality of the home setting, home sampling could be considered as an alternative for MSM who would otherwise screen for HIV by donating blood, in addition to optimising existing or creating new testing possibilities.

Our study has a number of limitations. First, the EMIS sample was not random. The dataset was likely to be biased towards better educated, internet-literate MSM. This sample may have thus been less likely to seek HIV screening by donating blood. As a consequence, our study may underestimate the proportion of MSM who use blood donation centres to seek HIV testing. Second, the EMIS questionnaire did not differentiate MSM who donated blood in order to get tested from those who donated for other, e.g. altruistic, reasons, did not specify the number of past and planned subsequent donations, and did not specify whether donors had used a confidential unit exclusion option to withhold their blood from being used for transfusion. Because EMIS did not collect this information, the impact of these donations on blood safety cannot be estimated.

## Conclusions

In conclusion, in most European countries sexually active MSM are permanently deferred from donating blood, and yet such individuals do donate blood and are screened for HIV in this context. MSM who are less open about their sexuality and who have poor access to anonymous or confidential MSM-friendly care in less

densely populated areas more often use blood donation to screen for HIV. On the basis of these findings, we can formulate a number of recommendations. We need, first, a closer public health assessment to safeguard the blood supply and to offer appropriate prevention services and, second, local exploration of the reasons for increased proportions of MSM choosing to test at blood donation centres compared to other testing sites. Furthermore, we need to strengthen alternative testing capacities and consider novel testing approaches, such as home sampling for those not reached by existing testing avenues. Public health measures must, therefore, make sure that alternatives are made available to dissuade test seeking during blood donation by meeting screening needs outside this context.

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## Authorship contributions

SBS analysed the data and wrote the paper; RO and AJS revised and commented on the paper; UM analysed data, commented and revised the paper. All Authors critically reviewed the text and shared thoughts and inputs.

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