ORIGINAL ARTICLE

Comparison of the performance of STI Screening Services for gay and bisexual men across 40 European cities: results from the European MSM Internet Survey

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ABSTRACT

Objectives Sexually transmitted infections (STIs) such as anal/genital warts, syphilis and genital/rectal gonorrhoeal/chlamydial infections compromise the health of men who have sex with men (MSM). Rectal bacterial STIs increase the per-contact risk of HIV infection. Early detection of asymptomatic STIs requires regular screening including collection of clinical specimens (or, for warts: physical examinations) that allow for the detection of infections at sites common to men's same sex practices.

Methods From June to August 2010, the European MSM Internet Survey recruited 174 209 men from 38 European countries to an anonymous online questionnaire in 25 languages. As sexual healthcare for MSM in most countries is organised locally, we chose cities for comparison. Multivariable regression models were used to compare accessibility of services and applied diagnostic procedures across 40 cities.

Results The proportion of respondents tested for STIs in the last 12 months in the absence of symptoms ranged from 8.9% in Istanbul to 48.0% in Amsterdam. At city level, low STI screening correlated with inaccessible services (R^2=44.1%). At individual level, anal/penile inspection and anal swabbing was most common in UK cities, Amsterdam, Dublin and Stockholm. Compared to London, MSM in 30 cities had an adjusted OR (AOR) of (0.02 to 0.18) for anal swabbing; and (0.06 to 0.25) for anal/penile inspection ($p<0.001$).

Conclusions Anal/genital warts and rectal infections are likely to be profoundly underdiagnosed among MSM in most European cities. This has implications for the sexual health of MSM, HIV prevention and comparing national surveillance data. There is an urgent need to improve sexual healthcare tailored to MSM at risk for STIs.

INTRODUCTION

The sexual health of gay, bisexual and other men who have sex with men (MSM) is often compromised by the presence of sexually transmitted infections (STIs) other than HIV, notably warts, syphilis, gonorrhoea and chlamydia. Syphilis and rectal bacterial STIs in particular, but also anal warts, are known to increase the risk of infection with HIV.[1–3] Early detection of asymptomatic STIs requires routine screening of MSM with changing sexual partners, including specimen collection[4] (or, for anal warts physical examination), allowing for detection of infections at sites common to men's same sex practices.

Across Europe diagnostic services and healthcare for STIs exist within general practices and a variety of medical specialties (eg, urology and dermatovenereology) and are delivered in a range of settings (physicians in private practice, genitourinary medicine (GUM) clinics, specialised STI services within hospitals or dermatology clinics and municipal health offices). All these sites differ with respect to fees, visibility/accessibility and the services provided. The UK, Ireland, Malta and Sweden—through their respective national health systems—all provide a network of free and open access sexual health clinics. In many other European countries, physicians in private practice, including physicians specialised in infectious diseases and HIV care, play an important role in STI care. In most of the countries where the private sector plays a significant role, open access STI care is offered through municipal health offices.[5] In large cities over the last decade, there has been an increasing number of STI services targeted at MSM and tailored to their needs (eg, Amsterdam, Barcelona, Geneva, Dublin, Hamburg, London, Stockholm and Zurich[6]). However, with the advent of rapid point-of-care tests, most of these venues have been set up primarily as HIV testing sites for MSM. The extent of additional STI services is variable and often restricted to serologically detectable STIs (eg, syphilis).

We carried out a Europe-wide MSM internet survey to compare the performance of STI services used by MSM, the largest and most comparable data yet available on this subject.

METHODS

The detailed methods of European MSM Internet Survey (EMIS) have been reported elsewhere.[7] In brief, EMIS was an anonymous, self-administered online survey conducted simultaneously in 25 languages across 38 countries. Participants were recruited through more than 230 social media or dating websites for MSM. Typical completion time was 20 min (calculated from the precise completion time for each survey and auto-captured by the survey software). No financial incentives were given. No IP addresses were collected. The survey was accessible online from June 6 to 31 August

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2010. More background information, including the English version of the questionnaire, is available at http://www.emis-project.eu.

Measures

All men were asked about their access to STI testing and the time since their last STI test. Men who had tested in the last 12 months were asked about the presence or absence of symptoms at their last STI test, and which of the six diagnostic procedures were used (blood test, urine sample, penile examination, urethral swab, anal examination, anal swab). Questions were phrased in plain language avoiding specialist medical terms.

Inaccessibility was defined as not knowing whether free or affordable STI testing was available.

STI screening was defined as the last STI test being in the absence of symptoms. The six procedures were collapsed into four: *blood test* was defined as having 'provided a blood sample'; *genital test* was having had 'provided a urine sample' *or* 'something inserted into your penis'; *inspection* was defined as having had 'your penis' *and* 'your anus examined'; and *anal swab* was defined as having had 'something inserted into the anus (anal swab)'.

Statistical analysis

To compare across cities the odds of experiencing inaccessible services and undergoing the four procedures, we applied five individual-level multivariable logistic regression analyses (SPSS V.20, IBM Corporation, New York, USA) with stepwise inclusion of variables, controlling for age (<25; 25–39; ≥40), main recruitment website (PlanetRomeo vs others) and HIV diagnosis (diagnosed positive vs untested/last test negative).

Because perceived accessibility of services was likely to be higher among respondents who had used services, the odds for accessibility were controlled for time since STI test (never, over 12 months ago, within last 12 months). With respect to the four diagnostic procedures, we controlled for the number of sexual partners in the last 12 months (none, 1, 2–5, 6–10, ≥11), to ensure that the differences in intervention performance observed between cities were not confounded by differences in numbers of sexual partners in the respective subsamples. In recognition that STI testing in most countries is organised at a city level, we chose cities and not countries as units of comparison in the multivariable logistic regression analyses, choosing London as the reference. European cities were defined by self-reported postal code or subregion of residence, combined with settlement size. Forty large (500 000 inhabitants or more) European cities or country capitals were included in the analysis. Nagelkerke's R^2 was calculated to determine the degree of variance explained by the five variables included in the model.

RESULTS

Respondents

Data in this paper came from 52 430 respondents who lived in the 40 European cities shown in table 1. All are: men; above the age of sexual consent in their European country of residence; having sex with men and/or sexually attracted to men; and who passed the internal data validity checks. They represent 30.1% of all EMIS qualifiers (N=174 209). A total of 19 105(11.0%) lived in other large European cities (either not reaching 300 respondents per city, or residing in the German cities of Frankfurt, Stuttgart, Leipzig, Hannover, Düsseldorf, Essen, Dresden, Leipzig or Nuremberg, all excluded for the sake of balance); 90 306(51.8%) lived in settlements with less than 500 000 inhabitants; and 12 368 (7.1%) declined questions on region/postal code or settlement size.

Across the groups living in different cities, there was substantial variation in recruitment websites, age, diagnosed HIV and numbers of sexual partners (table 1).

Inaccessible services

Inaccessibility of services was lowest in Copenhagen (3.5%) and UK cities (Manchester 6.4%; Birmingham 7.4%; London 8.6%) and highest in Istanbul (65.8%; median proportion 32.6%, see table 1). At city level, low STI screening correlated with inaccessible services (R^2=44.1%). Cities in the same country, or in the same European region, had comparable features regarding STI screening and accessibility (figure 1).

In multivariable logistic regression, compared with men living in London, only respondents living in Copenhagen were less likely to experience inaccessible services (adjusted OR (AOR) of 0.31) and the difference for respondents living in Birmingham and Manchester (the two other included UK cities) did not reach statistical significance. In all the other European cities, respondents were more likely to experience inaccessible services than those living in London, ranging from an AOR of 1.46 for Helsinki to an AOR of 12.16 for Brussels (median AOR=3.46). Inaccessibility decreased with age, was lower among men with diagnosed HIV and among those with more recent experience of STI testing. The four remaining variables in the model (the association with recruitment was marginal and not statistically significant) explained 24.2% of the variance (table 1).

STI screening and diagnostic procedures

STI screening (in the last 12 months) ranged from 8.9% in Istanbul to 48.0% in Amsterdam (median 39.7%). The most common diagnostic procedure was a blood test (featured in more than 85% of screenings in all cities, median proportion 92.1%).

Diagnostic approaches to detect bacterial infections of the male urethra were less common (median 48.7% of screenings): 24.8% in Belgrade, 26.8% in Lyon and less than 40% of screens in Athens, Barcelona, Budapest, Milan, Paris, Sofia, Valencia and Warsaw included a urethral swab or urine sample. Only in Amsterdam, Birmingham, Dublin, Helsinki, London, Manchester, Oslo and Stockholm, were genital tests as common as blood tests (88%–98%).

The city median proportion reporting a physical inspection of anus and penis was 17.9%, and varied from 6.4% in Bucharest and less than 10% in Belgrade, Brussels, Lyon, Paris, Sofia and Valencia to more than 50% in Amsterdam, Birmingham, London, Manchester, Oslo and Stockholm, up to 70.7% in Dublin. The city median for the proportion of screens that included anal swabbing was 16.1%, and varied from 3.6% in Belgrade and less than 10% in Brussels, Bucharest, Istanbul, Paris and Warsaw, to more than 50% in Birmingham, Dublin, London, Manchester, Oslo and Stockholm, up to 72.4% in Amsterdam.

Multivariable logistic regression analyses

In multivariable logistic regression analysis, the adjusted odds for receiving the four diagnostic procedures (without the condition of being screened) steadily increased with the number of sexual partners in the last 12 months and were up to four times higher for men with diagnosed HIV. Compared with men aged 25–39 years, younger and older men were less likely to report any STI testing (table 1).

Table 1 City profiles and individual-level multivariable logistic regression

	Respondents	Recruitment[1] PlanetRomeo.	Age[2]		Diagnosed HIV[3]	More than10 sexual partners[4]	Screening[5]	Inaccessibility of STI services[6]		Blood test[7]		Genital test [8]		Inspection [9]		Anal swab [10]	
City	N	%	% <25	% 40+	%	%	%	%	AOR	%	AOR	%	AOR	%	AOR	%	AOR
Amsterdam	957	59.6	5.2	50.3	23.4	42.9	48.0	11.3	1.72	95.8	***1.22	88.0	*1.01	57.8	°1.11	72.4	°1.12
Athens	1406	80.9	20.3	19.6	11.6	31.7	26.1	44.4	6.55	94.1	0.41	31.4	0.11	15.1	0.12	11.5	0.06
Barcelona	1946	63.3	18.5	22.2	12.7	42.7	36.1	19.9	2.20	93.0	0.65	36.8	0.18	12.2	0.14	12.5	0.09
Belgrade	442	91.0	30.3	9.7	4.1	18.7	26.0	35.7	3.71	94.6	0.43	26.8	0.11	8.0	0.06	3.6	0.02
Berlin	5920	81.9	16.4	33.9	16.5	35.7	31.1	24.9	2.98	92.2	0.51	49.3	0.22	19.5	0.18	24.6	0.16
Birmingham	338	7.1	18.3	34.0	12.2	30.4	39.9	7.4	*0.65	85.5	***0.77	97.7	*0.92	36.6	0.47	56.5	0.66
Brussels	1192	64.2	14.2	31.5	8.7	39.7	36.0	53.2	12.16	96.1	0.71	42.4	0.23	7.3	0.08	5.8	0.05
Bucharest	629	66.0	32.6	10.3	3.5	28.0	31.5	52.5	8.50	89.8	0.60	45.5	0.22	6.4	0.06	6.4	0.04
Budapest	1158	70.0	26.1	10.9	4.3	23.0	26.3	49.6	6.83	95.6	0.46	36.7	0.14	19.7	0.17	12.9	0.09
Cologne/Bonn	2168	84.3	16.9	30.7	15.3	33.8	31.5	24.5	2.94	92.6	0.49	48.0	0.20	15.0	0.13	14.6	0.08
Copenhagen	696	22.3	15.8	30.9	13.7	36.4	31.3	3.5	0.31	94.9	0.69	65.0	0.44	32.7	0.41	40.2	0.35
Dublin	882	19.5	22.3	18.0	7.2	29.2	37.1	23.9	2.67	95.6	***0.84	91.0	0.75	70.7	°1.07	69.2	0.76
Hamburg	2143	83.9	16.7	33.7	11.5	29.9	27.3	25.2	2.70	90.2	0.42	43.9	0.18	20.0	0.17	15.7	0.10
Helsinki	657	40.3	16.1	29.7	5.8	22.0	20.8	15.7	1.46	94.0	0.40	91.0	0.37	47.0	0.38	49.3	0.31
Istanbul	991	75.8	35.0	9.5	1.4	36.0	8.9	65.8	10.60	91.6	0.15	42.2	0.09	18.1	0.06	8.4	0.02
Kiev	514	13.2	26.3	7.6	7.6	18.1	22.7	40.6	5.62	87.3	0.47	55.5	0.31	13.6	0.13	15.5	0.08
Lisbon	1537	12.4	20.8	24.9	10.0	25.1	23.4	47.2	6.93	91.9	0.41	67.1	0.26	11.1	0.08	11.1	0.05
Ljubljana	298	50.7	24.5	13.1	4.4	15.6	21.3	32.2	3.15	90.3	0.43	40.3	0.18	25.8	0.23	32.3	0.18
London	4816	25.4	11.6	33.3	15.4	40.6	43.6	8.4	1.00	93.5	[R] 1.00	93.3	[R] 1.00	57.8	[R] 1.00	71.5	[R] 1.00
Lyon	436	60.8	26.4	21.1	7.1	38.9	34.6	23.4	2.48	93.8	0.65	24.8	0.13	8.3	0.09	4.1	0.03
Madrid	2630	40.8	20.8	19.5	10.1	37.1	31.5	22.6	2.46	95.7	0.69	42.4	0.25	12.5	0.14	14.9	0.11
Manchester	586	11.6	20.5	29.0	15.2	35.3	41.1	6.6	*0.70	89.5	°0.89	94.9	*0.97	51.1	°0.83	65.8	°0.86
Milan	1657	78.8	18.6	23.4	10.4	41.8	33.6	32.9	4.14	96.7	0.56	32.3	0.13	11.7	0.11	11.3	0.07
Moscow	1609	15.2	19.8	11.8	9.7	26.7	36.3	39.2	6.84	91.3	°0.92	68.4	0.57	21.0	0.25	18.4	0.13
Munich	2144	86.8	14.6	32.5	11.3	31.8	26.7	27.9	3.18	90.3	0.40	42.5	0.17	15.1	0.12	16.6	0.09
Oslo	763	13.0	20.6	28.6	5.2	23.5	36.5	14.5	1.59	90.0	**0.85	88.2	***0.80	44.6	0.71	61.3	0.76
Paris	3412	55.7	15.7	30.3	13.6	46.6	40.6	23.0	2.93	94.6	0.73	33.8	0.18	9.2	0.11	7.7	0.06
Porto	562	8.5	33.8	17.1	7.9	20.5	23.0	47.8	6.37	90.0	0.39	56.7	0.21	10.0	0.09	6.7	0.04
Prague	864	24.9	27.2	12.5	5.0	22.5	21.8	47.1	5.85	93.8	0.40	59.7	0.24	18.8	0.16	16.5	0.10
Riga	418	19.9	25.8	15.6	3.4	18.1	24.9	54.0	9.35	90.6	0.49	65.6	0.29	17.7	0.14	16.7	0.08
Rome	1578	76.3	20.2	27.4	8.5	34.0	24.0	42.2	5.73	91.5	0.37	43.5	0.14	13.5	0.10	17.1	0.08
Sofia	483	33.3	30.2	7.9	1.9	25.8	24.0	49.5	7.62	85.0	0.43	37.4	0.18	9.3	0.08	11.2	0.05
St Petersburg	667	11.2	25.2	10.0	5.6	23.7	32.0	40.7	6.59	90.0	0.71	76.6	0.56	32.8	0.38	26.9	0.18
Stockholm	1160	18.4	12.7	37.2	7.7	26.9	37.5	15.7	1.82	90.7	0.79	94.9	***0.84	61.9	°0.94	68.2	0.83
Tallinn	312	34.0	26.3	16.3	1.9	17.9	20.1	41.0	4.79	91.5	0.42	50.8	0.24	18.6	0.12	20.3	0.10
Turin	539	76.1	19.7	23.4	6.1	35.5	27.5	30.5	3.21	95.1	0.53	64.3	0.32	37.1	0.41	46.2	0.37
Valencia	422	43.6	24.6	23.2	7.9	29.7	26.3	33.0	3.77	92.4	0.48	32.4	0.13	8.6	0.09	4.8	0.03
Vienna	1671	74.7	23.3	25.0	8.2	31.1	28.3	22.3	2.16	88.8	0.46	56.2	0.26	21.8	0.20	25.7	0.17
Warsaw	818	70.2	23.5	9.2	7.4	24.5	22.4	44.5	5.85	90.4	0.36	38.8	0.13	11.2	0.10	6.2	0.03
Zurich	1009	88.3	10.1	38.9	15.0	39.4	33.0	36.1	5.76	92.7	0.54	47.3	0.24	17.6	0.17	15.3	0.09
Sum/*Median*	52430	*53.2*	*20.6*	*23.3*	*8.1*	*30.2*	*29.7*	32.6	*3.46*	*92.1*	*0.50*	*48.7*	*0.23*	17.9	*0.14*	*16.1*	*0.09*

Continued

Table 1 Continued

		Respondents	Recruitment[1] PlanetRomeo.	Age[2]		Diagnosed HIV[3]	More than10 sexual partners[4]	Screening[5]	Inaccessibility of STI services[6]		Blood test[7]		Genital test [8]		Inspection [9]		Anal swab [10]	
City		N	%	% <25	% 40+	%	%	%	%	AOR	%	AOR	%	AOR	%	AOR	%	AOR
Control variables for multivariable logistic regression analyses	Age						<25			1.24		0.80		0.84		***0.89		°0.94
							25–39			[R] 1.00		[R] 1.00		[R] 1.00		[R] 1.00		[R] 1.00
							40 +			0.77		0.75		0.79		0.74		0.65
	HIV diagnosis						Yes			0.36		5.19		3.60		2.76		3.70
	Number of sexual partners in the last 12 months						None			n.a.		[R] 1.00		[R] 1.00		[R] 1.00		[R] 1.00
							1			n.a.		1.29		1.28		1.37		1.29
							2–5			n.a.		1.86		1.87		1.90		1.81
							6–10			n.a.		2.58		2.45		2.55		2.60
							> 10			n.a.		3.97		3.60		3.78		3.94
	Recency of last STI test						Last 12 months			[R] 1.00		n.a.		n.a.		n.a.		n.a.
							Longer ago			1.80		n.a.		n.a.		n.a.		n.a.
							Never tested			3.82		n.a.		n.a.		n.a.		n.a.
	Recruitment						PlanetRomeo			**0.99		0.99		0.99		*0.99		*1.00
Explanation of variance							NAGELKERKE's R^2			0.242		0.183		0.206		0.211		0.286

(1) Per cent recruited through individual message on PlanetRomeo; (2) Per cent under 25 years of age, Per cent aged 40 years or more; (3) Per cent with diagnosed HIV; (4) Per cent with more than 10 sex partners in the last 12 months; (5) Per cent tested in the absence of symptoms for STIs other than HIV in the last 12 months; (6) Per cent who did not know whether STI testing is for free or affordable where they live. Among those screened for STIs in the last 12 months, (7) Per cent having provided blood, (8) Per cent having provided urine sample *or* had something inserted into their penis, (9) Per cent having had their penis *and* anus inspected, (10) Per cent having had something inserted into their anus (anal swab). AOR, Adjusted OR for (7–10) the effect size is combined for being screened for STIs and having undergone the respective diagnostic procedure; Statistical significance: AOR was significantly different from 1 ([R]=Reference) with p≤0.001 unless marked otherwise: *p>0.5; ° p>0.1; ** p>0.05; *** p>0.01.
STI, sexually transmitted infection; n.a., not applied.

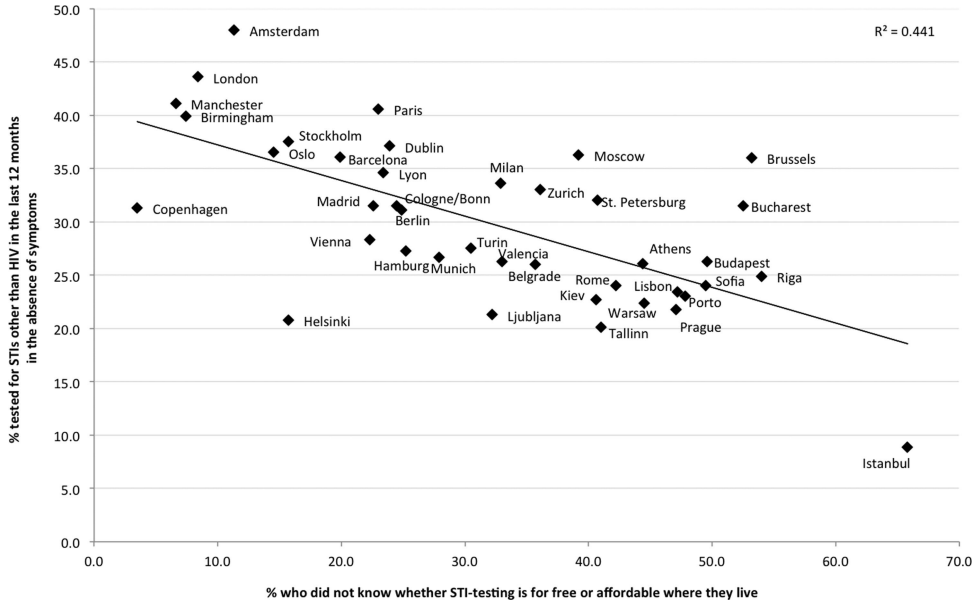

Figure 1 City-level analysis. Rates of STI screening as a function of inaccessibility of STI testing services in 40 European major cities.

Blood test

When adjusting for the previously described variables, the rate of blood tests in the last 12 months did not significantly differ in Amsterdam (p=0.012), Manchester (p=0.220), Moscow (p=0.172) or Oslo (p=0.056) compared with London. In all other cities, men were less likely to have received a blood test (median AOR=0.50). Cities with AORs at or below the median were Athens, Belgrade, Budapest, Cologne/Bonn, Hamburg, Helsinki, Kiev, Lisbon, Ljubljana, Munich, Porto, Prague, Riga, Rome, Tallinn, Sofia, Valencia, Vienna and Warsaw, and was least common in Istanbul (AOR=0.15).

Genital test

The adjusted odds for receiving a genital test were not significantly different from London for men in Amsterdam (p=0.901), Birmingham (p=0.501) or Manchester (p=0.714). In all other cities, men were less likely to have received a genital test (median AOR=0.23). Cities with AORs at or below the median were Athens, Barcelona, Belgrade, Berlin, Brussels, Bucharest, Budapest, Cologne/Bonn, Hamburg, Ljubljana, Lyon, Milan, Munich, Paris, Porto, Rome, Sofia, Valencia and Warsaw, and was least common in Istanbul (AOR=0.09).

Inspection

The adjusted odds for receiving a genital/anal inspection were not significantly different from London for men in Amsterdam (p=0.189), Dublin (p=0.413), Manchester (p=0.062) or Stockholm (p=0.415). In all other cities, men were less likely to have received a penile and anal inspection (median AOR=0.14). Cities with AORs at or below the median were Athens, Barcelona, Brussels, Cologne/Bonn, Kiev, Lisbon, Lyon, Madrid, Milan, Munich, Paris, Porto, Riga, Rome, Sofia, Tallinn, Valencia and Warsaw, and was least common in Belgrade, Bucharest and Istanbul (AOR=0.06).

Anal swab

The adjusted odds for receiving anal swabbing were not significantly different from London for men in Amsterdam (p=0.134) or Manchester (p=0.119). In all other cities, men were less likely to have received anal swabbing (median AOR=0.09). Cities with AORs at or below the median were Athens, Barcelona, Brussels, Bucharest, Budapest, Cologne/Bonn, Kiev, Lisbon, Lyon, Milan, Munich, Paris, Porto, Riga, Rome, Sofia, Valencia, Warsaw and Zurich, and was least common in Belgrade and Istanbul (AOR=0.02).

At city level, AORs for having received an anal swab and for having had an anal and penile inspection showed an almost perfect correlation (R^2=94.3%), suggesting that STI testing sites either offer none or both (figure 2). In summary, offering anal swabs for the detection of rectal bacterial STIs and physical inspections of penis and anus were best in UK cities, Dublin, Amsterdam, Oslo and Stockholm, followed by Copenhagen and

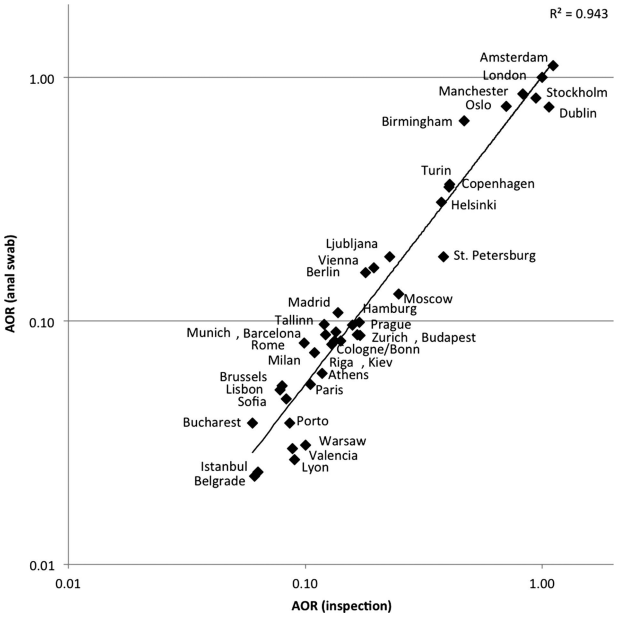

Figure 2 City-level analysis of 40 European cities. Adjusted OR (AOR) for a physical examination for sexually transmitted infections (inspection of anus and penis) versus AOR for having received an anal swab ('As part of an STI-test in the last 12 months, has something been inserted into the opening of your anus? (Anal Swab)').

Helsinki, and exceptional among Italian cities, Turin. An intermediate performance was reported from Ljubljana, Vienna, Berlin, Moscow and St Petersburg. In all other cities compared with London, men were 6–17 times less likely to have had their genitals and anus inspected, and 10–50 times less likely to have received an anal swab. Low performance could be demonstrated for a culturally and geographically broad spectrum of cities such as Belgrade, Brussels, Istanbul, Lisbon, Paris, Sofia, Valencia and Warsaw.

DISCUSSION

Accessible medical services and adequate diagnostic procedures are important dimensions of healthcare.[8] This is the first study to compare the accessibility of STI screening, STI screening rates and STI testing procedures for MSM across European cities.

Both accessibility and testing rates varied considerably across cities and demographic groups. Respondents' lack of clarity about charges for STI screening may be a function of the variety of STI testing and care services available, even within countries,[5] each with different policies and prices. A first step towards comprehensive STI testing for MSM could be to increase awareness of current services and, where unavailable, to establish accessible testing sites.

However, accessible services and regular testing do not guarantee that STIs are comprehensively diagnosed and treated. Gonococcal infections of the male urethra are typically symptomatic,[9] presenting with discharge and painful urination, and therefore, do not require further diagnostics apart from inspection of the penis and taking a medical history, unless bacterial resistance or bacterial coinfection (particularly *Chlamydia trachomatis*) are suspected. Given that a blood test was almost universally performed upon STI testing, it is likely that STIs diagnosed with blood-based tests (syphilis and viral hepatitis) are detected among MSM who regularly test for STIs. However, a blood test alone does not constitute a sexual health screening, and a range of asymptomatic STIs will remain undiagnosed if this is the only procedure performed. These include urethral *Chlamydia* infections whose detection require nucleic acid amplification tests (NAAT) from urine samples or from urethral swabs, and rectal infections with *C trachomatis* or *Neisseria gonorrhoea*,[9 10] requiring microbiological culturing (gonorrhoea) or NAAT from anal swabs.[11] Manifestations of viral infections such as anal or genital warts, or anal or genital herpes can only be diagnosed if both penis and anus are inspected. Anal/genital warts may remain untreated if inspection of genitals and anus is not part of STI screening.

Unlike chlamydial infections of the oropharynx, pharyngeal gonorrhoea is very common following oral sex between men,[9 10] providing another reservoir for onward transmission. However, we did not query diagnostic approaches for detecting pharyngeal gonorrhoea.

In EMIS, the cities with the highest number of gay social and sexual venues reported to be visited were Berlin, Brussels, Cologne, Barcelona, Zurich, Madrid, Paris and Amsterdam. All these cities also attract international gay travellers. It is striking that with the exception of Amsterdam, these cities seem to lack the full spectrum of diagnostic approaches for asymptomatic STIs. Although some of these cities have established MSM-specific STI services, our findings suggest that the proportion of MSM reached by those services is not large enough to counterbalance the observed deficits. These deficits not only impact the sexual health of MSM, but also add to the problem of non-comparability of surveillance data[5] submitted to supra-national agencies such as the European Centre of Disease Prevention and Control.

Following the Ljubljana Gay Health Meeting on May 2008, a group of European non-governmental lesbian, gay, bisexual and trans and HIV/AIDS organisations published a call for tailored, individualised support and referral for HIV/STI testing and treatment, to be streamlined across Europe, with voluntary and anonymous testing services for STIs that are non-judgemental, gay-friendly and easily accessible by MSM.[12] The UK, Ireland and Sweden already have established networks of open access GUM clinics.[5] It is not feasible to change healthcare systems across Europe by introducing GUM clinics but, as demonstrated in Amsterdam, MSM-tailored services are possible even in countries where the healthcare system is highly privatised.[13] In the context of the changing epidemiology of STIs, increased mobility[14 15] and pan-European sexual networks, harmonised systems for the detection and monitoring of asymptomatic STIs are desirable.[5]

Limitations

Our self-reported data are subject to recall bias (and social desirability bias, which we think for this analysis is negligible). The four diagnostic procedures are constructs based on questions about what was done as part of STI testing; thus, the validity of what is called, for example, a *genital test* may be questioned. However, our survey pre-testing in a variety of languages showed that the non-medical language was appropriate and understood by respondents.

Due to the absence of denominator studies and sampling frames, representative random samples of MSM are impossible, so we rely on convenience samples. However, the Law of Large Numbers suggests that for the larger city samples, range is adequately represented. In this analysis, we compared performance of STI testing for MSM between cities, controlling only for variables likely to reflect recruitment biases (main recruitment site, age composition,[16] prevalence of diagnosed HIV[17]). MSM populations in different European cities also differ with respect to migration status, sexual identity, outness, gay community attachment and the degree of legal, societal and institutional homophobia.[18 19] Although all these variables were substantially and significantly associated with the presented outcomes, we did not include them in the multivariable regression models, because they would mask the differences between cities. Nevertheless, they all contribute not only to the degree to which MSM are reached by targeted information, what they know about STI transmission or where and how frequently to present for STI testing, but also to the likelihood of disclosing their homosexual activity in the context of STI testing.

We acknowledge that unawareness about the affordability of STI testing is only one aspect of inaccessibility, as services could be available but MSM may not be aware of them. However, good policy in the provision of services includes raising awareness in the target groups. As the focus of this paper is not individual knowledge but performance of services, we felt that inaccessibility was the better term for this analysis.

CONCLUSION

Comprehensive diagnostic approaches can only be tailored to MSM if the individuals presenting for STI testing can be open about their sexuality.[20] To facilitate this disclosure, clinical staff requires skills in sexual history taking alongside positive attitudes to sexual diversity.[21] The heterogeneity of current STI diagnostic approaches hampers direct comparison of reported STI rates for MSM across Europe. High national levels of diagnosed STIs may reflect high levels of non-symptomatic screening and comprehensive diagnostic procedures as much as high levels of infections. A definition of standardised minimum diagnostic procedures could

improve comparability of data arising from national surveillance systems, and aid in the design of effective public health responses.

Our data suggest that in most major European cities, anal/genital warts and rectal gonorrhoea and *Chlamydia* infections are profoundly underdiagnosed among MSM. Inaccessibility of respective STI services in many cities further complicates the situation. There is an urgent need to implement or improve sexual healthcare tailored to MSM at risk for STIs.

Key messages

- This is the first city-level comparison of STI screening, service accessibility and comprehensiveness of screening among MSM across Europe.
- Asymptomatic STI screening in the last 12 months ranged from 8.9% (Istanbul) to 48.0% (Amsterdam) with city median of 39.7% and was inversely related to inaccessible services.
- In most cities, anal/genital warts and gonorrhoeal/chlamydial rectal infections among MSM are likely to be profoundly underdiagnosed.
- There is an urgent need to increase the accessibility and comprehensiveness of STI screening for gay men and other MSM.

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Contributors AJS co-ordinated the study and the EMIS network, performed the statistical analyses and wrote the manuscript. UM initiated the project and contributed to the manuscript. PW co-ordinated EMIS promotion. PW and FH were responsible for the technical implementation of the online questionnaire and contributed to the manuscript.

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