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Hidden from health: structural stigma, sexual orientation concealment, and HIV across 38 countries in the European MSM Internet Survey

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Abstract

Objective—Substantial country-level variation exists in prejudiced attitudes towards male homosexuality and in the extent to which countries promote the unequal treatment of MSM through discriminatory laws. The impact and underlying mechanisms of country-level stigma on odds of diagnosed HIV, sexual opportunities, and experience of HIV-prevention services, needs and behaviours have rarely been examined, however.

Design—Data come from the European MSM Internet Survey (EMIS), which was administered between June and August 2010 across 38 European countries (N=174 209).

Methods—Country-level stigma was assessed using a combination of national laws and policies affecting sexual minorities and a measure of attitudes held by the citizens of each country. We also assessed concealment, HIV status, number of past 12-month male sex partners, and eight HIV-preventive services, knowledge, and behavioural outcomes.

Results—MSM living in countries with higher levels of stigma had reduced odds of diagnosed HIV and fewer partners but higher odds of sexual risk behaviour, unmet prevention needs, not using testing services, and not discussing their sexuality in testing services. Sexual orientation concealment mediated associations between country-level stigma and these outcomes.

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Conflicts of interest

The authors declare that they have no competing interests.

Conclusion—Country-level stigma may have historically limited HIV transmission opportunities among MSM, but by restricting MSM's public visibility, it also reduces MSM's ability to access HIV-preventive services, knowledge and precautionary behaviours. These findings suggest that MSM in European countries with high levels of stigma are vulnerable to HIV infection. Although they have less opportunity to identify and contact other MSM, this might change with emerging technologies.

Keywords

concealment; MSM; policy; sexual orientation; stigma

Globally, MSM are at a heightened risk for HIV infection compared with men who have sex only with women [1]. Stigma, which occurs when an individual possesses a socially devalued identity [2], has been theorized to exacerbate the spread of HIV [3]. Stigma restricts MSM's public visibility and keeps them hidden from prevention efforts due to fear of discrimination or physical harm upon disclosure of their sexual identity and/or behaviour [4,5]. Therefore, a better understanding of stigma and the mechanisms through which it affects the health of MSM can help the field better predict future HIV epidemic trends among MSM and maximize the impact of biomedical and psychosocial interventions for this population [3].

Stigma operates at several levels to affect health, including internalized (e.g. sexual minorities' negative thoughts, feelings, and behaviours about their own sexuality), interpersonal (e.g. discrimination) and structural (e.g. legislation that enshrines disadvantage in law) [6–8]. Recognizing the wide variation in stigma across countries and its potential role in HIV transmission among MSM, the WHO has called for reductions in structural forms of MSM stigma to reduce HIV transmission [9]. However, the impact of structural stigma on HIV outcomes has rarely been examined given the difficulty of sampling MSM in a single survey across multiple environments with varying degrees of stigma.

Because stigma in the form of discriminatory national legislation and prejudiced attitudes towards sexual minorities may constrain MSM's open sexual expression, including opportunities to identify and contact other MSM, we hypothesized that these forms of country-level stigma would predict lower odds of HIV infection. However, because country-level stigma might also keep MSM underground and out of reach of HIV prevention programmes, we hypothesized that country-level stigma would also predict MSM's inability to avoid HIV infection through inadequate HIV prevention knowledge; infrequent HIV and sexually transmitted infection (STI) testing; not discussing sexuality in HIV testing services; and higher odds of incorrect and inconsistent condom use and not discussing HIV with sexual partners.

We further advance the literature on structural drivers of HIV risk by exploring sexual orientation concealment as a pathway through which country-level stigma might yield HIV-relevant outcomes. In this study, sexual orientation concealment refers to a man having few or no other individuals who know about his sexual attraction to other men; it describes the state of being closeted, which is the opposite of being 'out'. Sexual orientation concealment may restrict MSM's public visibility and the accessibility and appropriateness of HIV-

prevention services [5,10,11]. Although stigmatizing climates have been argued to drive stigma concealment [12,13], no study to date has linked an objectively defined measure of country-level stigma to MSM's odds of sexual orientation concealment or examined concealment as a pathway through which structural stigma generates HIV-relevant outcomes.

Materials and methods

We used data from the European MSM Internet Survey (EMIS), administered in 25 languages between June and August 2010 across 38 European countries. Over 235 local, national and international sexual minority websites recruited participants online through instant messages and banner advertising and offline through posters, recruitment cards and face-to-face communication. Eligibility criteria included male identification, European residence, at or above the age of homosexual consent in their country, and sexual attraction to and/or behaviour with men. Eligible participants had to indicate understanding the study's purpose and provide consent. Typical completion time was 21 min. No material inducement was offered. EMIS items were generated through consultation with nongovernmental organizations (NGOs), pilot testing for comprehension and length with MSM in 21 countries, and cognitive interviewing to ensure accurate interpretation. The survey development and methods are described elsewhere [14,15].

Sample

The survey had 184 469 submissions. Three cases were lost to data corruption. Cases were removed for participants who did not specify a home country or indicated a country outside the study area (n =2427); were from a country that did not reach 100 qualifying cases (n =291); indicated being women, having no same-sex attraction or experience, or being outside the 13–89 age range or providing no age (n =544); or submitted more than one inconsistent response (n =6995), resulting in a final sample size of 174 209 MSM. Given our focus on concealment of sexual attraction to men, present analyses omitted participants who did not report being only or mostly attracted to men (n =16 998). The present analytic sample contained 157 211 MSM from 38 European countries.

Measures

Predictor: country-level stigma—Following previous analyses of EMIS data [7,8], we assessed country-level stigma using a combination of national legislation and general population attitudes towards sexual minorities. We derived legislation from the International Lesbian, Gay, Bisexual, Trans, and Intersex Association-Europe (ILGA-Europe) Rainbow Index 2010 [16], an aggregate of the presence of 10 supportive legislative policies (e.g. same-sex marriage, employment nondiscrimination legislation), which were given positive scores, and four discriminatory practices and legislative policies (e.g. violation of freedom of assembly), which were given negative scores. The data range from −2 (unsupportive) (i.e. Russia, Ukraine) to + 10 (supportive) (i.e. Sweden) (M =3.18, SD =3.34). We derived country-level attitudes towards sexual minorities from the 2008 wave of the European Values Survey, a cross-national survey of social attitudes that randomly sampled approximately 1500 residents per European country. We included the proportion of respondents in each

country who thought homosexuality could be justified; agreed that homosexual couples should be able to adopt children; and did not indicate not wanting to have homosexuals as neighbours. We calculated the standardized mean of these three items. We then averaged this mean with the standardized policy index to create a country-level index of support towards sexual minorities in each country. The inverse standardized score of this index was used in all analyses to facilitate interpretation as standard deviation units of stigma.

Mediator: sexual orientation concealment—Concealment was assessed with the item, 'Thinking about all the people who know you (including family, friends and work or study colleagues), what proportion know that you are attracted to men?' Response options included the following: 'all or almost all', 'more than half', 'less than half', 'few' and 'none'. Participants reporting 'few' or 'none' were classified as high concealment; all other responses were considered low concealment. We also ran sensitivity analyses with high concealment limited to those who reported that 'none' knew of their attraction to men. Previous analyses of EMIS data have used the terms 'outness' and 'closetry' to describe this measure. Concealment ('outness' and 'closetry') represents a central variable to EMIS planning and data analysis. In fact, when planning the EMIS, we recognized that the proportion of men who do not conceal their sexual orientation would be a key way to group the included countries and could serve as a proxy for nonstigmatizing environment [15]. Previous EMIS reports have found associations between concealment and internalized homophobia, HIV testing and perceived control over sexual risk [8].

Outcome variables: HIV diagnosis—Participants were classified as either 'HIV diagnosed' or 'last test negative or untested' on the basis of their response to the question: 'Have you ever received an HIV test result?' Answer options included 'Yes, my last test was negative (I did not have HIV infection at the time of the test', 'Yes, I've tested positive (I have HIV infection)', and 'No, I've never received an HIV test result'. A significant proportion (n =50 777; 29.4%) reported never having been tested.

Number of nonsteady male sex partners—Participants were asked, 'How many different nonsteady male partners have you had sex with in the last 12 months?' We dichotomized this outcome at the median number of nonsteady sex partners (i.e. 5).

HIV-preventive services, knowledge and behaviours—We assessed eight HIV-preventive services, knowledge and behavioural outcomes largely based on recommendations of the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS [17] and the European Centers for Disease Control (ECDC) [18]. (1) EMIS-modified UNGASS-indicator #9: Participants were classified as being inadequately reached by HIV prevention services if, in the last 12 months, they were not confident they could access HIV testing (if not diagnosed HIV-positive) or reported not having visited a provider for HIV monitoring (if diagnosed HIV-positive), reported unprotected anal intercourse due to lack of condom access, or reported not seeing or hearing MSM-specific information about HIVor STIs. (2) EMIS-modified UNGASS indicator #14: To assess HIV knowledge, participants were presented with five true statements about HIV and for each were asked whether they already knew this. Although this approach likely underestimates ignorance, it

avoids providing falsehoods while serving an educational purpose. Lack of HIV-risk knowledge was classified as not knowing all of the five items. The EMIS Network suggested the above modifications of the original UNGASS indicators as more appropriate for the European situation. The ECDC has accepted the suggested alternatives for the regional Dublin Declaration Monitoring. (3) UNGASS indicator #8: Having received an HIV test in the previous 12 months was measured by asking tested-negative participants when they had last received a negative HIV test result, and tested-positive participants if they were first diagnosed within the last 12 months. (4) Participants were asked whether they had received a blood or urine test for STIs or anal and penile inspection or swab in the absence of symptoms to determine whether they had been asymptomatically screened for STIs in the past 12 months (yes/no). (5) Participants who reported any condom use in the past 12 months were asked whether they had engaged in any of seven condom failure related behaviours in the previous 12 months (yes/no). (6) Participants who reported having had anal sex with a nonsteady male partner within the previous 12 months were asked about frequency of condom use (’not at all’ or ‘seldom’ versus ‘sometimes,’ ‘mostly’ or ‘always’). (7) Participants were asked, ‘The last time you tested for HIV, did you talk about the sex you have with men?’ to assess comfort and perceptions of safety in discussing same-sex sexual behaviours as part of testing (yes/no). (8) Participants who reported a nonsteady male sex partner in the preceding 12 months were asked about disclosure of HIV status before or during sex with their most recent nonsteady sexual encounter (’I said nothing about my HIV status’ versus those who shared a positive, negative or unknown status).

Covariates—Individual-level covariates included age, relationship status, employment status, education and settlement size. HIV testing history was covaried in analyses that included diagnosed positive and not diagnosed positive participants. We also included each country’s 2009 Gini coefficient, an index of income inequality, as a country-level covariate given the association of this index with country-level stigma (r =0.34, P <0.05), consistent with previous research showing associations between income inequality and stigmatizing attitudes towards homosexuality [19].

Statistical analyses—Given the nested structure of the data, we used SPSS 19.0 GENLINMIXED to test the full mediation models [20]. Fixed effects were calculated for explanatory variables. Nesting of respondents within countries was accounted for using a random intercept model. For each outcome, mediation was tested with the distribution-of-the-product method using R-Mediation [21], which builds confidence intervals (CIs) for the mediated effect.

Sample size for each full model depended on the amount of missing data relevant to that model and the relevance of each outcome to each respondent (e.g. according to HIV-testing history). Less than one percent (n =144; 0.1%) of respondents did not provide data for the concealment variable. Missing data on outcomes ranged from 226 (0.1%) for service coverage to 8301 (5.3%) for STI screening.

Results

Table 1 reports descriptive statistics by concealment status. Respondents who reported high concealment were significantly younger, more likely to be single, be employed, have less education, live in a smaller settlement, be not diagnosed HIV-positive, and live in a high-stigma country than those who reported low concealment.

Country-level stigma and HIV outcomes: main effects

Country-level stigma, examined as a continuous variable in all models, predicted HIV diagnosis, number of nonsteady sex partners, and HIV-preventive services, knowledge, and behaviours in the expected direction (Table 2). Specifically, MSM living in countries with higher levels of stigma had lower odds of diagnosed HIV [adjusted odds ratio (AOR) =0.68, 95% CI 0.57–0.82], fewer nonsteady sex partners (AOR =0.74, 95% CI 0.67–0.83) and higher odds of: inadequate HIV-related knowledge; not testing for HIV or STIs; not using condoms at last sexual intercourse; and not discussing sexual behaviour during HIV testing (range: AORs = 1.14–1.52). Nonsignificant outcomes included incorrect condom use and HIV status disclosure to nonsteady partners.

Mediation analyses

Table 2 summarizes the mediation models. Providing support for the second mediation pathway (from the predictor to the hypothesized mediator), country-level stigma significantly predicted the odds of concealment (AOR: 2.47, 95% CI 2.10–2.91).

We also found support for the third mediation pathway (from the hypothesized mediator to the outcome). Concealment predicted all outcomes in the expected direction (i.e. lower odds of HIV diagnosis; fewer sex partners; higher odds of inaccessible services, knowledge and behaviour) except HIV status disclosure to nonsteady partners, which was not statistically significant.

Finally, we tested mediation for the outcomes wherein relationships were statistically significant and in the expected direction for each mediation pathway. We found support for mediation for each of these outcomes.

Sensitivity analyses

We ran sensitivity analyses in which we defined concealment as no other person knowing of a participant’s attraction to men. In every case, the direction and magnitude of associations and mediation findings remained the same.

Discussion

Although researchers have hypothesized that structural factors, including country-level stigma, contribute to HIV-related outcomes among MSM [4,22], it has proven difficult to empirically test these hypotheses due to challenges in operationalizing country-level stigma and to the lack of data structures with adequate variation in its distribution. Our study overcomes many of these methodological difficulties through the use of a unique dataset, the European MSM Internet Survey (EMIS). EMIS provides a rare opportunity to capture

country-level variation in HIV-related variables in a single survey. It also provides the ability to examine an individual-level mechanism, sexual orientation concealment, through which country-level stigma predicts HIV-related outcomes.

Our study shows that country-level stigma is associated with lower odds of HIV diagnosis and fewer sex partners but with higher odds of unmet needs, sexual risk behaviours and suboptimal service use. Further, concealment was more likely to occur in countries with high levels of stigma. In turn, concealment mediated the relationship between country-level stigma and HIV diagnosis and preventive outcomes. These findings suggest that, by keeping MSM relatively invisible, even from each other, stigma suppresses opportunities for HIV transmission while also limiting MSM's easy access to HIV prevention services, knowledge and precautionary behaviours [23,24]. Our results suggest that MSM in highly stigmatizing countries are particularly vulnerable to HIV infection (i.e. have little control over it) if and when they have opportunity to be exposed to it [25]. Although the high-stigma European countries identified in our country-level index have historically reported lower prevalence of HIV among MSM than low-stigma countries, recent surveillance indicates an increase in new HIV diagnoses among MSM across Europe, especially in high-stigma European countries [18,25]. Our findings, therefore, suggest that stigma might increase the rate of new HIV infections as opportunities for transmission increase with technological advancements. Stigma's impact on the future of the epidemic might be particularly relevant in those countries where technology (e.g. mobile sex seeking applications) is quickly overcoming the relative lack of brick-and-mortar MSM venues (e.g. bars, saunas) to facilitate sexual contact among men. Stigma, therefore, can serve to exacerbate other determinants of the epidemic, such as technology and travel that are increasingly relevant to the future epidemic among MSM in high-stigma locales.

The study has several limitations. Given the cross-sectional observational design, we infer, but cannot test, causal relationships. Although a significant strength of the study is that the outcome cannot cause the predictor, it is possible that an unmeasured common factor (e.g. HIV criminalization) could still underlie the observed associations. At the same time, because it is unethical to randomly assign individuals to environments with and without stigma, observational studies are the most feasible method to test associations between country-level stigma and HIV risk outcomes. Because no MSM sampling frame exists, it is not possible to create an adequate probability sample, which limits generalizability of the results. EMIS participants differ from the broader population of MSM, overrepresenting younger men and men with diagnosed HIV [11,26]. However, the degree and direction that this selection bias might under or overestimate the relationship between country-level stigma, sexual orientation concealment and HIV outcomes remains unknown. Although the EMIS relies on self-reported HIV diagnosis, previous research demonstrates that diagnosis as measured by the EMIS is highly correlated with actual prevalence as measured with biological and modelling approaches using country-level surveillance data [27]. Our finding of lower HIV-positive diagnosis among MSM in high-stigma countries is further supported by our finding that stigma is associated with fewer male sexual partners. For these reasons, our interpretation that stigma predicts reduced opportunities for HIV transmission is unlikely to be confounded by avoidance of testing, inaccurate risk attribution or inadequate surveillance. Finally, this study captures stigma at the country level, which may obscure

important within-country variation. Because of this potential limitation, our results are particularly noteworthy, given that country-level factors are distal determinants of health; thus, our results are likely conservative estimates of the sexual health consequences of structural stigma.

The study also has numerous methodological strengths, including the largest and most geographically diverse dataset to date to examine country-level stigma and the pathways through which it operates to suppress both HIV-risks and HIV-precautions among MSM. The use of an objectively coded measure of stigma overcomes same-source bias, which can create spurious associations when both the exposure and outcome are self-reported [28]. Further, through linking country-level stigma to individual-level measures, we overcome the ecological fallacy [29], which can occur when inferences about the effect of ecological influences on health rely solely on aggregated reports of the outcome.

Although individual-level HIV prevention interventions are capable of reducing the risk of HIV infection among individual MSM [30], structural-level interventions are increasingly recognized as essential to tackling HIV incidence in populations [31,32]. Our results support a theory whereby oppressive legislation and social attitudes regarding homosexuality encourage the concealment of same-sex attraction, which suppresses both the odds of HIV diagnosis and opportunities for sexual contact, as well as access to prevention services and accompanying knowledge and precautionary behaviours. These results therefore contribute to a growing empirical literature documenting the role of social and political drivers of the HIV epidemic among MSM [3,22], as well as other syndemic risks among MSM, including mental health, substance use and suicidality [33–35].

This study highlights the need for structural and policy-level interventions to reduce the burden of oppression among this highly stigmatized population, without increasing opportunities for HIV risks. Our results suggest both practical and ethical considerations in developing such interventions. Practically, structural and policy interventions must simultaneously reduce stigma towards MSM while also providing support to reduce their HIV transmission risk especially in current high-stigma countries. Ethically, arguments for reducing stigma among MSM cannot rely on demonstrating stigma's negative health effects, because some forms of stigma might be associated with lower prevalence of behaviours linked to disease [36,37]. In addition to showing associations between stigma and HIV-relevant outcomes (i.e. lower odds of diagnosis; fewer sex partners; lower odds of access to preventive knowledge, services and behaviour), our results also show that stigma restricts MSM's public visibility. Although the case for strengthening sexual minority civil rights must cooccur with the case for strengthening MSM's health, these arguments cannot be contingent on each other. Those interested in public health should encourage open self-expression among all individuals and promote the environmental conditions that facilitate it, regardless of individuals' sexual orientation, and regardless of associations among stigma, concealment and health.

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References

1. Beyrer C, Baral SD, van Griensven F, Goodreau SM, Chariyalertsak S, Wirtz AL, Brookmeyer R. Global epidemiology of HIV infection in men who have sex with men. Lancet. 2012; 380:367–377. [PubMed: 22819660]
2. Crocker, J.; Major, B.; Steele, C. Social stigma. In: Gilbert, D.; Fiske, ST.; Lindzey, G., editors. Handbook of social psychology. Vol. 2. Boston, MA: McGraw Hill; 1998. p. 504-553.
3. Parker R, Aggleton P. HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. Soc Sci Med. 2003; 57:13–24. [PubMed: 12753813]
4. Halkitis PN, Wolitski RJ, Millett GA. A holistic approach to addressing HIV infection disparities in gay, bisexual, and other men who have sex with men. Am Psychol. 2013; 68:261–273. [PubMed: 23688093]
5. Wall KM, Khosropour CM, Sullivan PS. Offering of HIV screening to men who have sex with men by their healthcare providers and associated factors. J Int Assoc Phys AIDS Care. 2010; 9:284–288.

6. Hatzenbuehler ML, Link BG. Introduction to the special issue on structural stigma and health. Soc Sci Med. 2014; 103:1–6. [PubMed: 24445152]
7. Berg RC, Ross MW, Weatherburn P, Schmidt AJ. Structural and environmental factors are associated with internalised homo-negativity in men who have sex with men: findings from the European MSM Internet Survey (EMIS) in 38 countries. Soc Sci Med. 2013; 78:61–69. [PubMed: 23261257]
8. Ross MW, Berg RC, Schmidt AJ, Hospers HJ, Breveglieri M, Furegato M, Weatherburn P. Internalised homonegativity predicts HIV-associated risk behavior in European men who have sex with men in a 38-country cross-sectional study: some public health implications of homophobia. BMJ Open. 2013; 3 pii: e001928.
9. World Health Organization. [Accessed 7 September 2014] Guidelines: prevention and treatment of HIV and other sexually transmitted infections among men who have sex with men and transgender people: recommendations for a public health approach. http://www.who.int/hiv/pub/guidelines/msm_guidelines2011/en/
10. Fay H, Baral SD, Trapence G, Motimedi F, Umar E, Iipinge S, et al. Stigma, healthcare access, and HIV knowledge among men who have sex with men in Malawi, Namibia, and Bots-wana. AIDS Behav. 2011; 15:1088–1097. [PubMed: 21153432]
11. Marcus U, Hickson F, Weatherburn P, Schmidt AJ. The EMIS Network. Age biases in a large HIV and sexual behaviour-related internet survey among MSM. BMC Public Health. 2013; 13:826. [PubMed: 24020518]
12. Pachankis JE. The psychological implications of concealing a stigma: a cognitive-affective-behavioral model. Psychol Bull. 2007; 133:328–345. [PubMed: 17338603]
13. Riggle ED, Rostosky SS, Horne S. Does it matter where you live? Nondiscrimination laws and the experiences of LGB residents. Sex Res Soc Policy. 2010; 7:168–175.
14. Weatherburn P, Schmidt AJ, Hickson F, Reid D, Berg RC, Hospers HJ, Marcus U. The European Men-who-have-sex-with-men internet survey (EMIS): design and methods. Sex Res Soc Policy. 2013; 10:243–257.
15. The EMIS Network. EMIS 2010: the European men-who-have-sex-with-men internet survey. Findings from 38 countries. Stockholm: European Centre for Disease Prevention and Control; 2013. http://www.emis-project.eu
16. International Lesbian, Gay, Bisexual, Trans, and Intersex Association Europe. [Accessed 7 September 2014] Rainbow Europe Map and Country Index. May. 2010 http://www.ilga-europe.org/homepublications/reports_and_other_materialsrainbow_europe_map_and_country_index_may_2010
17. Joint United Nations Programme on HIV/AIDS. Monitoring the declaration of commitment on HIV/AIDS: guidelines on construction of core indicators. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS; Mar. 2009
18. European Centre for Disease Prevention and Control. Mapping of HIV/STI behavioural surveillance in Europe. Stockholm, Sweden: European Centre for Disease Prevention and Control; Sep. 2009
19. Andersen R, Fetner T. Economic inequality and intolerance: attitudes toward homosexuality in 35 democracies. Am J Polit Sci. 2008; 52:942–958.
20. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J Personal Soc Psychol. 1986; 51:1173–1182.
21. Tofighi D, MacKinnon DP. RMediation: an R package for mediation analysis confidence intervals. Behav Res Meth. 2011; 43:692–700.
22. Baral S, Logie CH, Grosso A, Wirtz AL, Beyrer C. Modified social ecological model: a tool to guide the assessment of the risks and risk contexts of HIV epidemics. BMC Public Health. 2013; 13:482. [PubMed: 23679953]
23. Schmidt AJ, Hickson F, Weatherburn P, Marcus U. The EMIS Network. Comparison of the performance of STI screening services for gay and bisexual men across 40 European cities: results from the European MSM Internet Survey. Sex Trans Infect. 2013; 89:575–582.

24. Poteat T, Diouf D, Drame FM, Ndaw M, Traore C, Dhaliwal M, et al. HIV risk among MSM in Senegal: a qualitative rapid assessment of the impact of enforcing laws that criminalize same sex practices. PLoS One. 2011; 6:e28760. [PubMed: 22194906]
25. European Centre for Disease Prevention and Control. Men who have sex with men (MSM): monitoring implementation of the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia, 2012 progress. Stockholm: ECDC; 2013.
26. Marcus U, Hickson F, Weatherburn P, Schmidt AJ. Estimating the size of the MSM populations for 38 European countries by calculating the survey-surveillance discrepancies (SSD) between self-reported new HIV diagnoses from the European MSM internet survey (EMIS) and surveillance-reported HIV diagnoses among MSM in 2009. BMC Public Health. 2013; 13:919–931. [PubMed: 24088198]
27. Marcus U, Hickson F, Weatherburn P, Schmidt AJ. The EMIS Network. Prevalence of HIV among MSM in Europe: comparison of self-reported diagnoses from a large scale internet survey and existing national estimates. BMC Public Health. 2012; 12:978. [PubMed: 23151263]
28. Diez Roux A. Neighborhoods and health: where are we and where do we go from here? Rev Epidémiol Santé Publique. 2007; 55:13–21. [PubMed: 17320330]
29. Schwartz S. The fallacy of the ecological fallacy: the potential misuse of a concept and the consequences. Am J Public Health. 1994; 84:819–824. [PubMed: 8179055]
30. Johnson WD, Diaz RM, Flanders WD, Goodman M, Hill AN, Holtgrave D, et al. Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. Cochrane Database Syst Rev. 2008:CD001230. [PubMed: 18646068]
31. Wohlfeiler D. Structural and environmental HIV prevention for gay and bisexual men. AIDS. 2000; 14(Suppl 1):S52–S56. [PubMed: 10981475]
32. Amon JJ. The political epidemiology of HIV. J Int AIDS Soc. 2014; 17:19327. [PubMed: 25059653]
33. King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D, Nazareth I. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. BMC Psychiatry. 2008; 8:70. [PubMed: 18706118]
34. Hatzenbuehler ML. The social environment and suicide attempts in lesbian, gay, and bisexual youth. Pediatrics. 2011; 127:896–903. [PubMed: 21502225]
35. Pachankis JE, Hatzenbuehler ML, Starks TJ. The influence of structural stigma and rejection sensitivity on young sexual minority men's daily tobacco and alcohol use. Soc Sci Med. 2014; 103:67–75. [PubMed: 24507912]
36. Bayer R. Stigma and the ethics of public health: not can we but should we. Soc Sci Med. 2008; 67:463–472. [PubMed: 18502551]
37. Stuber J, Galea S, Link BG. Smoking and the emergence of a stigmatized social status. Soc Sci Med. 2008; 67:420–430. [PubMed: 18486291]

Table 1

Characteristics of study respondents by concealment status in the European MSM Internet Survey.[a]

Variable	Analytic sample *n* =157 211	High concealment[b] *n* =40 870 (26.0%)	Low concealment *n* =116 197 (73.9%)
Age (mean, SD)	33.99 (11.19)	33.16 (11.90)	34.28 (10.91) ***
Relationship status			
Single	86 238 (54.9)	31 914 (58.4)	60 024 (51.7) ***
Steady relationship	70 566 (44.9)	22 583 (41.3)	55 887 (48.1)
Employment status			
Unemployed	9391 (6.0)	2300 (5.6)	7079 (6.1) **
Employed/student/retired/sick leave	147 820 (94.0)	38 570 (94.4)	109 118 (93.9)
Education (ISCED levels[c])			
High (ISCED 5,6)	79 192 (50.4)	20 813 (50.9)	58 310 (50.2) ***
Mid (ISCED 3,4)	64 644 (41.1)	16 383 (40.1)	48 216 (41.5)
Low (ISCED 1,2)	12 296 (7.8)	3262 (8.0)	9014 (7.8)
Settlement size			
≥1 million	48 553 (30.9)	10 446 (25.6)	38 072 (32.8) ***
500 000–999 999	23 470 (14.9)	4 787 (11.7)	18 664 (16.1)
100 000–499 999	33 173 (21.1)	8345 (20.4)	24 799 (21.3)
10 000–99 999	29 415 (19.2)	9518 (23.3)	19 870 (17.1)
<10 000	18 914 (12.3)	6659 (16.3)	12 238 (10.5)
HIV diagnosis			
Diagnosed positive	13 048 (8.3)	1498 (3.7)	11 534 (9.9) ***
Last test negative or untested	143 147 (91.1)	39 007 (95.4)	104 025 (89.5)
Country-level stigma[d]			
High	34 641 (22.0)	16 305 (39.9)	18 300 (15.7) ***
Low	122 570 (78.0)	24 565 (60.1)	97 897 (84.3)

Statistical significance for categorical demographic variables evaluated by Chi-square. Statistical significance for age evaluated by independent samples *t*-test.

[a] Percentages may not equal 100 due to missing data.

[b] High concealment respondents indicated that ‘few’ or ‘none’ of the people they know are aware of their same-sex attraction. Low concealment respondents indicated that ‘less than half’, ‘more than half’, or ‘all or almost all’ of the people they know are aware.

[c] ISCED: 1997 International Standardized Classification of Educational Degrees.

[d] High stigma is ≥median, low stigma is <median.

** $P<0.01$,

*** $P<0.001$.

Table 2

Odds of HIV diagnosis and preventive services, knowledge, and behaviour by concealment status and country-level stigma for respondents in the European MSM Internet Survey.[a]

		Concealment		Country-level stigma		Country-level stigma[b]		
Outcome	***n***	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**Mediation[c]**
Diagnosed HIV-positive	151 297	0.41***	0.37–0.45	0.68***	0.57–0.82	0.78**	0.66–0.93	Yes
Five or more nonsteady male sex partners (12 months)	153 494	0.73***	0.71–0.75	0.74***	0.67–0.83	0.78***	0.71–0.86	Yes
Inadequate HIV service coverage	151 292	1.48***	1.34–1.64	1.43***	1.27–1.62	1.34***	1.19–1.50	Yes
Lack of HIV transmission knowledge	151 242	1.29***	1.22–1.36	1.16***	1.08–1.26	1.11*	1.03–1.20	Yes
No HIV test result (12 months)	142 047	1.70***	1.59–1.82	1.14**	1.05–1.24	1.04	0.96–1.13	Yes
No STI screen (12 months)	143 680	1.60***	1.49–1.71	1.21**	1.07–1.36	1.12	0.99–1.26	Yes
Any incorrect condom usage	91 837	1.13***	1.09–1.18	1.03	0.91–1.18	1.01	0.89–1.15	Yes
Condoms never/seldom (nonsteady 12-month partners)	87 584	1.10*	1.03–1.17	1.30**	1.10–1.54	1.28**	1.09–1.51	Yes
No discussion of sexuality when testing	109 543	1.83***	1.70–1.97	1.52***	1.29–1.80	1.39***	1.17–1.65	Yes
Did not disclose HIV status (last nonsteady partner)	101 939	0.96	0.90–1.03	0.93	0.87–1.00	0.94	0.87–1.01	No

CI, confidence interval; OR, odds ratio.

[a]All models adjusted for age, relationship status, employment status, education, settlement size, HIV status (except HIV diagnosis outcome) and Gini index.

[b]Models run with covarying concealment.

[c]Mediation tested with distribution-of-the-product method.

*$P \leq 0.05$,

**$P \leq 0.01$,

***$P \leq 0.001$.