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A Tale of Two Cities: Stigma and Health Outcomes Among People with HIV who Inject Drugs in St. Petersburg, Russia and Kohtla-Järve, Estonia

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Abstract

Experiences of stigma are often associated with negative mental and physical health outcomes. The present work tested the associations between stigma and health-related outcomes among people with HIV who inject drugs in Kohtla-Järve, Estonia and St. Petersburg, Russia. These two cities share some of the highest rates of HIV outside of sub-Saharan Africa, largely driven by injection drug use, but Estonia has implemented harm reduction services more comprehensively. People who inject drugs were recruited using respondent-driven sampling; those who indicated being HIV-positive were included in the present sample ($n=381$ in St. Petersburg; $n=288$ in Kohtla-Järve). Participants reported their health information and completed measures of internalized HIV stigma, anticipated HIV stigma, internalized drug stigma, and anticipated drug stigma. Participants in both locations indicated similarly high levels of all four forms of stigma. However, stigma variables were more strongly associated with health outcomes in Russia than in Estonia. The St. Petersburg results were consistent with prior work linking stigma and health. Lower barriers to care in Kohtla-Järve may help explain why social stigma was not closely tied to negative health outcomes there. Implications for interventions and health policy are discussed.

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Keywords

Kohtla-Järve; Estonia; St. Petersburg, Russia; HIV; injection drug use; internalized stigma; anticipated stigma

HIV and injection drug use are highly stigmatized, even relative to other health conditions and other forms of drug use (Crandall, 1991; Crawford, Rudolph, Jones, & Fuller, 2012; Earnshaw, Smith, Cunningham, & Copenhaver, 2013). Experiencing stigma, through anticipation of others' biases (anticipated stigma or stigma consciousness) and/or endorsement of negative beliefs about oneself (internalized stigma), adversely affects health both directly, by activating stress responses and obstructing access to healthcare, and indirectly, by undermining health-promoting behavior (Earnshaw, Bogart, Dovidio, & Williams, 2013; Earnshaw & Chaudoir, 2009; Major, Mendes, & Dovidio, 2013). Both anticipated and internalized stigma have been linked to depressive symptoms (Earnshaw, Smith, et al., 2013; Herek, Saha, & Burack, 2013; Mak, Poon, Pun, & Cheung, 2007). These two forms of stigma also inhibit willingness to seek medical care (Sayles, Wong, Kinsler, Martins, & Cunningham, 2009; Simmonds & Coomber, 2009), in part because health care providers themselves may enact stigmatizing behaviors (Schuster et al., 2005). Both HIV and drug-related stigma have been linked to poorer medical treatment and negative mental and physical health outcomes (Katz et al., 2013; Logie & Gadalla, 2009).

The present work tested the associations between these forms of stigma and health-related outcomes in two northeastern European populations of people with HIV who inject drugs. Understanding the experiences of people who experience HIV and drug-related stigma jointly is important both physically, because of the unique effects of comorbidity on health, and psychologically, because it can illuminate the potentially separable effects of stigma associated with HIV and drug use (Earnshaw, Bogart, et al., 2013; Earnshaw & Chaudoir, 2009). Examining both anticipated and internalized stigma is useful because they are typically only modestly correlated and often have different psychological and physical consequences, contributing separately to explaining negative health outcomes (Corrigan, Larson, & Rusch, 2009; Krajewski, Burazeri, & Brand, 2013; Pearl, Puhl, & Dovidio, 2014).

Although people living with HIV and people who use injection drugs experience stigma in many regions throughout the world (Li, Wang, He, Fennie, & Williams, 2012; Logie, Newman, Chakrapani, & Shunmugam, 2012; Rudolph et al., 2012; Simbayi et al., 2007), there may be national differences in the nature and implications of these forms of stigma due to differing laws and values. Comparing Russia and Estonia provides a useful case study to explore differences in the impact of stigma on health in epidemiologically similar but structurally different societies. Both countries emerged after the fall of the Soviet Union and soon thereafter experienced large epidemics of HIV and drug addiction. Both have among the highest population prevalence of HIV outside of sub-Saharan Africa (Central Intelligence Agency, 2014; Jon Cohen, 2010). The timing and trajectory of their HIV epidemics have been similar, driven by transmission among people who inject drugs, most commonly opioids (Mathers et al., 2008; Uusküla, Kalikova, Zilmer, Tammai, & DeHovitz, 2002; World Health Organization, 2013a, 2013b). The co-occurrence of HIV and injection

drug use is particularly pronounced in Kohtla-Järve, Estonia and in St. Petersburg, Russia, perhaps due to changes in the availability of commercial heroin (Eritsyan et al., 2013; Platt et al., 2006; Rakhmanova et al., 2007).

Despite the surface similarities in the nature of their HIV epidemics, structural differences between Russia and Estonia may shape the relationship between experiences of social stigma and health care outcomes. Estonia provides low-threshold HIV prevention and care for people who inject drugs, including governmentally established opioid substitution and harm reduction programs (European Monitoring Centre for Drugs and Drug Addiction, 2014). Specifically, the Estonian system of care has incorporated most evidence-based public health practices, including syringe exchange programs, for approximately 10 years, featuring extensive collaboration between the government and non-governmental organizations (Drew et al., 2008). In contrast, opioid substitution is illegal in Russia, harm reduction is not supported by the Russian government, and Russian police sometimes interfere with existing harm reduction services (Jon Cohen, 2010; Csete et al., 2004; Tkatchenko-Schmidt, Renton, Gevorgyan, Davydenko, & Atun, 2008; Wolfe, Carrieri, & Dhepard, 2010). While the Russian government does provide free HIV testing, treatment, and other services, it lacks effective control measures targeting the most at risk populations. Syringe exchange programs are run by non-governmental organizations operating without much political or financial support (Degenhardt et al., 2014), and despite the fact that Russia doubled funding for antiretroviral therapy in 2007, in the years that followed, as few as 1% of people who inject drugs who needed such treatment received it (Mathers et al., 2010).

Some qualitative evidence suggests that HIV stigma is particularly intense in Russia because of its association with injection drug use, and that this stigma can serve as a major barrier to treatment (Bobrova, Rhodes, & Power, 2006). Indeed, Russians report highly stigmatizing attitudes toward people with HIV (McCrae et al., 2007), and people living in St. Petersburg with HIV who use injection drugs report frequent and serious discrimination (Amirkhanian, Kelly, & McAuliffe, 2003). People living with HIV in Estonia also report experiencing social exclusion, economic discrimination, and internalized stigma (Estonian Network of People Living with HIV, 2012). Neither location has concrete stigma reduction programs (European Centre for Disease Prevention and Control, 2013). In both locations, there is little research about the roles that social marginalization and stigma play in the joint health risks associated with HIV and injection drug use, making it difficult to obtain quantitative information about these processes (Katz et al., 2013; Platt et al., 2006).

In the present work, we tested the association between stigma and health-related outcomes in St. Petersburg, Russia and Kohtla-Järve, Estonia. We investigated the extent to which internalized and anticipated stigma related to HIV and drug use (specifically, internalized HIV stigma, anticipated HIV stigma, internalized drug stigma, and anticipated drug stigma) predict outcomes related to physical and mental health. We hypothesized that these forms of stigma would be related to mental health (depressive symptoms), physical health (subjective health rating, CD4 count, and symptom count), and self-reported access to HIV care. Moreover, we predicted that these relationships would vary by location. Because Estonia's provision of low-threshold HIV prevention and care for people who inject drugs might

mitigate some of the negative impacts of stigma, we hypothesized that stigma would be more predictive of health outcomes in St. Petersburg than in Kohtla-Järve.

Method

At both sites, people who use injection drugs were recruited using respondent-driven sampling (Heckathorn, 2002; Iguchi et al., 2009; Salganik & Heckathorn, 2004; Stormer et al., 2006). Respondents were eligible to participate if they reported injecting drugs in the past four weeks, were at least 18 years old, spoke Russian (at either location) or Estonian (in Estonia), and were able to provide informed consent. Surveys were administered by a team of trained fieldworkers, in confidence, in rooms of the needle and syringe program in Estonia and in healthcare vans that traveled to seven recruitment locations across regions of St. Petersburg to obtain city-wide coverage. Participants were also tested for HIV and received post-testing counseling. Recruitment and data collection were conducted from May 2012 to July 2012 in Kohtla-Järve and from November 2012 to June 2013 in St. Petersburg. Approval was obtained from the human research ethics boards at [hidden for peer review] in Estonia, [hidden for peer review] in St. Petersburg, and [hidden for peer review] in the United States.

The present analysis focuses on those participants who knew they were HIV positive at the time of the interview and who responded to the measures about both HIV stigma and drug-related stigma.

Measures

Examining the relationships between stigma and health-related outcomes was one of many purposes of the data collection effort, so the measures described for the present analysis were part of a larger survey. The questionnaire for both of the sites was based on the World Health Organization (WHO) Drug Injecting Study Phase II survey (version 2b, rev. 2; Des Jarlais, Perlis, Stimson, & Poznyak, 2006), originally developed to monitor risk behavior among people who inject drugs, and therefore contained similar questions on demographic characteristics, drug injection, and harm reduction service utilization. The instrument was modified to obtain information on the illicit drugs known to be available in St. Petersburg and Kohtla-Järve. Items developed in English were translated into Russian and Estonian and then translated back into English to verify fidelity to the original. This process revealed no discrepancies of meaning, and all items were retained. Despite the availability of the Estonian-language survey instrument, only two participants living with HIV chose to complete the survey in Estonian; the remainder of the Kohtla-Järve sample (and all of the St. Petersburg sample) completed it in Russian.

Demographic and Health Information—Age was computed based on self-reported year and month of birth paired with year and month of interview. Gender and formal education were self-reported. Participants indicated their current level of financial difficulty by indicating whether they were living comfortably, coping with their present income, finding it difficult to cope, or finding it very difficult to cope. Only one participant in Russia (and none in Estonia) said they were living comfortably, so we grouped this participant with those who said they were coping. Participants also indicated how many days in the past four

weeks they had injected drugs, and how many years it had been since they first injected drugs. These variables must be accounted for to understand the relationship between stigma and health care outcomes because they may relate to both stigma and health (Pascoe & Richman, 2009). For example, older people may have had more time both to experience stigma and to develop health problems associated with HIV, men and women differ in baseline risk for depression, education and financial well-being may mitigate health problems and encourage adherence to treatment, and more frequent and more long-lasting drug use may be associated with elevated risk for health problems and stigma.

Internalized Stigma—To measure internalized HIV stigma, we used the six-item Internalized AIDS-Related Stigma Scale, previously validated in both Africa and North America (e.g., “I am ashamed that I am HIV positive”; Kalichman et al., 2009). To measure internalized drug stigma in an equivalent manner, we adapted the same six items to refer to injection drug use rather than HIV. In the Russian sample, both the drug ($\alpha = .91$) and HIV ($\alpha = .89$) scales showed evidence for reliability based on internal consistency. Similarly, in the Estonian sample, both the drug ($\alpha = .84$) and HIV ($\alpha = .87$) scales showed evidence for reliability. All items had five-point response scales, and composite scores for each participant were computed by taking an unweighted mean of the six items.

Anticipated Stigma—To measure anticipated stigma, we adapted the Stigma Consciousness Questionnaire, which has been extensively validated in relation to many stigmatized groups, to refer to HIV and injection drug use separately (e.g., “Most people have a lot more negative thoughts about HIV positive individuals than they actually express”; Pintel, 1999). We selected six of the original items due to time constraints in the interview process. Evidence for reliability based on internal consistency was modest (Russia: drug $\alpha = .63$, HIV $\alpha = .72$; Estonia: drug $\alpha = .60$, HIV $\alpha = .63$). All items had five-point response scales, and composite scores for each participant were computed by taking an unweighted mean of the six items.

Health Care Outcomes—Depressive symptoms were assessed using the five-item Mental Health Inventory (MHI-5; example item, “How much of the time during the last four weeks have you felt so down in the dumps that nothing could cheer you up?”; Berwick et al., 1991; Ware, Kosinski, & Gandek, 2000). All items had six-point response scales, and composite scores for each participant were computed by taking an unweighted mean of the five items ($\alpha = .84$ in both samples). To measure subjective health ratings, each participant was asked to indicate their current status on a thermometer-like scale ranging from 0 (worst health you can imagine) to 100 (best health you can imagine). CD4 count was assessed by asking participants to report their latest CD4 count result. CD4 counts below 350 were categorized as “low” because this was the eligibility cutoff for antiretroviral therapy in both locations. Because many participants did not respond to this item, this outcome variable was tested on a smaller sample than the others (see *ns* in Table 1). Participants also reported the presence or absence of ten physical health problems commonly associated with HIV and/or injection drug use (fatigue, fever, chills, loss of weight, nightly sweating, loss of appetite, cough lasting over two weeks, blood in sputum, chest pain, and swollen lymph nodes; Des Jarlais et al., 2006). We totaled the number of symptoms each participant reported (symptom

count, ranging from 0 to 10). Finally, to measure access to regular HIV care, participants were asked whether they received regular HIV care. In accordance with different treatment norms at the two locations, regular care was defined for participants as visiting an HIV physician at least once every year in Estonia and once every six months in Russia. Because of this difference, we did not conduct direct comparisons of the proportions of people receiving regular care, but we did model the relationship between stigma and regular care in the two locations.

Analysis

First, we obtained descriptive statistics for the variables of interest and compared them across samples, using independent samples *t*-tests for numeric variables and chi-squared tests of independence for categorical variables. Next, in each sample separately, we computed Pearson product-moment correlations between each pair of variables among the four stigma variables and the five health care outcomes. These correlations provide standardized measures of the magnitude of the relationship between each stigma variable and each outcome variable without adjusting for any other variables. To determine if the associations between stigma and health outcomes were stronger in Russia than in Estonia, we compared these correlations across samples using Fisher's *r*-to-*Z* transformation. We then fit linear regression models in each sample using all four stigma variables simultaneously to predict each numeric outcome variable (depression, subjective health rating, and symptom count). These models also included participant gender, age, education category, financial difficulty category, recent frequency of drug use, and years since first drug use as covariates, so that the results isolate the effects of each unique stigma variable over and above the effects of demographic variables and drug use. Finally, we fit logistic regression models in each sample using all four stigma variables (and the above-mentioned covariates) to predict low CD4 count and the receipt of regular HIV care. Secondly, because numeric CD4 counts were available, we fit linear regression models predicting CD4 count; such models confirmed that the outcomes of hypothesis tests regarding stigma variables did not depend on the dichotomization of CD4 count. None of our analysis procedures employed imputation.

Results

In the Russian sample, 381 participants (of 811, 47.0%) reported that they were HIV positive at the time of the interview and responded to the measures about both HIV stigma and drug-related stigma. In the Estonian sample, 288 participants (of 588, 49.0%) met these specifications. In both samples, most participants were ethnically Russian (in St. Petersburg, 366 of 381, 96.1%; in Kohtla-Järve, 235 of 288, 81.6%). See Table 1 for additional participant demographic characteristics, descriptive statistics about the variables of interest, and comparisons between samples.

Table 2 presents the correlations between the four stigma variables and the five health-related outcomes in both samples. In the Russian sample, the stigma variables consistently predicted health-related outcomes. As expected, both internalized drug stigma and internalized HIV stigma were significantly correlated with all five health outcomes in the

expected directions, with small to moderate effect sizes (Jacob Cohen, 1988). Anticipated drug stigma and anticipated HIV stigma were both correlated with depressive symptoms and physical health symptom count (moderate effect sizes), but neither was correlated with subjective health rating or low CD4 count, and only anticipated HIV stigma was correlated with regular HIV care ($r=.15$, a small effect).

In contrast, in the Estonian sample, the relationships between stigma and health-related outcomes were generally weaker. The only significant relationship in the predicted direction was the correlation between anticipated drug stigma and depression, $r(284)=.16$, $p=.006$. Surprisingly, internalized HIV stigma was related to *less* depressive symptoms, $r(284)=-.12$, $p=.040$. Both of these effects were small. None of the stigma variables were associated with any of the three physical health indicators or with receiving HIV care.

These results suggest that the associations between stigma and health outcomes were weak or absent in Estonia; we also compared the strength of the effects across samples. The eight bivariate relationships between each of the four kinds of stigma and depression, and between each of the four kinds of stigma and symptom counts, were significantly stronger in the Russian sample than in the Estonian sample, all $Z>3.34$, $p<.001$. For the subjective health rating, CD4 count, and receipt of regular care, the bivariate relationships with internalized stigma were significantly stronger in the Russian sample, all $Z>2.19$, $p<.03$, but the relationships with anticipated stigma were not significantly different between the two samples, all $Z<1.55$, $p>.15$.

Table 3 presents the results of regression models using all four stigma variables and relevant demographic covariates to predict health-related outcomes. In the Russian sample, internalized drug stigma, anticipated drug stigma, and anticipated HIV stigma were significant predictors of depressive symptoms. Only internalized drug stigma explained unique variance in subjective health ratings and low CD4 count. All four stigma variables explained unique variance in symptom count. In the logistic regression model predicting regular HIV care, both internalized stigma variables were significant predictors. In contrast, in the Estonian sample, only anticipated drug stigma significantly predicted depressive symptoms; none of the other stigma variables significantly predicted depression, and none predicted any of the other health-related outcomes.

Discussion

We tested the associations between stigma and health-related outcomes in samples of people living with HIV who inject drugs in St. Petersburg, Russia and Kohtla-Järve, Estonia. St. Petersburg and Kohtla-Järve are only about 200 kilometers apart and their HIV epidemics began around the same time. However, they have developed divergent political approaches and social responses to HIV and injection drug use. For example, the Estonian government is much more supportive of harm reduction programs than the Russian government is (Jon Cohen, 2010; Csete et al., 2004; EMCDDA, 2014; Tkatchenko-Schmidt et al., 2008; Wolfe et al., 2010). Our samples at both locations began with seeds from existing harm reduction programs, but the program in Kohtla-Järve has a single stable location whereas the programs in St. Petersburg operate out of vans that are sometimes targeted by police. The current

research revealed that participants in both locations reported high levels of internalized and anticipated stigma related to HIV and drug use. However, reported stigma explained less variance in health-related outcomes in Estonia than in Russia, where feeling stigmatized was closely related to poor health outcomes. Respondents in Estonia experienced equivalently high levels of stigma, but such feelings seemed to be decoupled from health outcomes. This pattern of results was consistent regardless of whether associated demographic variables were omitted (Table 2) or statistically accounted for (Table 3).

The St. Petersburg results were consistent with substantial prior work showing links between stigma and health (Earnshaw, Bogart, et al., 2013; Earnshaw & Chaudoir, 2009; Katz et al., 2013; Logie & Gadalla, 2009; Major et al., 2013). Lower barriers to care in Estonia may help explain why social stigma was not closely tied to negative health outcomes there. People who experience stigma are highly vigilant for cues of discrimination and potential harm (Vorauer, 2006). Structural barriers in the health care system, particularly ones that communicate that a stigmatized identity is devalued, may lead people with that identity to avoid or underutilize the system, and ultimately face health risks (Earnshaw, Bogart, et al., 2013). Thus, even though participants in Estonia recognized their stigmatized status in ways comparable to participants in Russia, stigma was only systematically related to the relevant physical health outcomes in our Russian sample.

The systematic differences we observed in the relationship between stigma and health-related outcomes between St. Petersburg and Kohtla-Järve implicate the role of structural and macro-level factors, such as culture and government. These results underscore the importance of considering how these structural factors operate *jointly* with individual-level factors (such as internalized stigma, fear of stigma, and health indicators) to shape health. For example, the effectiveness of specific HIV care programs, which may differ between countries or cities, may depend on how well they address patients' mental resources, including attitudes and perceived norms (Johnson et al., 2010). Future research might examine more comprehensively the specific workings of each health care environment, the extent to which others in the patient's social network express stigmatizing attitudes on a day-to-day basis, and the experience of internalized stigma (Kaufman, Cornish, Zimmerman, & Johnson, 2014).

The present research, which investigated stigma of HIV and drug use jointly, also revealed separable effects for these different types of stigma. Specifically, of the four forms of stigma that we examined, internalized drug use stigma was the only one that explained unique variance in all five health outcomes in Russia. The importance of this form of stigma in our sample is consistent with prior work in Russia on the intensity of injection drug stigma and its qualitative relevance in accounting for the expression of HIV stigma (Amirkhanian et al., 2003; Bobrova et al., 2006; McCrae et al., 2007).

We acknowledge some potential limitations of the current work. For example, while we identify meaningful differences between our Russian sample and our Estonian sample, we cannot be certain that these differences derive from their respective political climates and health care systems. There are, to be sure, other cultural differences between St. Petersburg and Kohtla-Järve, perhaps related to the fact that St. Petersburg is more than 100 times as

populous as Kohtla-Järve. There may also be additional differences introduced by our snowball sampling techniques in the two locations. One possible strength of our samples was that most participants in both locations were ethnically Russian. However, being Russian in St. Petersburg signifies membership in the advantaged ethnic group, whereas being Russian in Kohtla-Järve signifies membership in a disadvantaged ethnic group. Being in a disadvantaged group can increase feelings of stigma and social vulnerability (Major et al., 2013), which might be expected to exacerbate the negative effects of stigma on health. Nonetheless, we did not find systematically greater experiences of stigma in Estonia than in Russia, and the relationship between stigma and health was weaker in Estonia than in Russia. Future research might gain from sampling from both advantaged and disadvantaged ethnic populations across different cultural contexts to determine if ethnic status systematically moderates the health implications of HIV and drug-related stigma.

Future research could also test some of the possibilities our results have raised concerning the differences between St. Petersburg and Kohtla-Järve. For example, if one mechanism for the relationship between stigma and negative health outcomes in Russia is that stigma deters people from using health care services, then both stigma and regular HIV care should be related to perceived ease of access to care. These relationships could be best tested by including on future surveys a number of items related to fear of stigma in healthcare contexts and other deterrents.

In the present work, anticipated stigma exhibited relatively low variability; most participants were highly aware of stigmatizing attitudes around them (see Table 1). These low variances may dampen relationships between anticipated stigma and other variables, including health outcomes. Future work should consider adopting more strongly-worded scale items or response options to capture more of the potential differences between individuals living in highly stigmatizing environments. Furthermore, because of medical confidentiality policies, our health outcome measures were based on self-report. Future research might include information from medical records to further validate the results.

Also, whereas the present research focused on the joint effects of HIV and drug-related stigma among people who used injection drugs and were HIV-positive, future research might examine how having this “intersectional identity” can produce additional vulnerabilities beyond the independent additive effects of the two stigmas. For example, prior work in the United States suggests that, among people living with HIV who use drugs, the combination of high levels of HIV stigma and drug stigma can carry mental health risks over and above what would be expected due to either form of stigma separately (Earnshaw, Smith, et al., 2013). Future research might also introduce additional comparisons with people living with HIV who do not use drugs and people who use drugs but are not HIV-positive.

Although we cannot be certain that our results reflect differences in political systems, they are at least consistent with the possibility that such differences can meaningfully shape the harms associated with stigma. A more direct exploration of the potential harms and benefits of Russian and Estonian policies would be fruitful. Policy changes in Russia to reduce governmental opposition to harm reduction programs might be expected to help decouple

stigma from health outcomes there. First, such policy changes might mitigate the presumably stigmatizing effect of the government publicly modeling rejection of people with HIV and people who use injection drugs. Second, such changes might increase access to health care services, helping to decrease the negative *consequences* of stigma. Previous research suggests that perceived community support may mitigate the impact of anticipated HIV stigma on stress and HIV symptoms (Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2014). Enhancing HIV service availability while advertising it in the community may be one way to encourage perceived community support; similarly, developing and expanding evidence-based drug treatment programs and widely promoting their use may help to reduce felt stigma and diminish its negative health consequences.

While the present results hint at possible social and structural changes to combat stigma and its negative impact on health-related outcomes, it is also valuable to intervene at the interpersonal and individual levels to reduce the influence of stigma on social interactions, to enhance resilience to stigma, and to reduce internalized stigma (Cook, Purdie-Vaughns, Meyer, & Busch, 2014; Earnshaw, Bogart, et al., 2013). For example, therapeutic strategies aimed at assisting clients in modifying negative perceptions (Heijnders & Van Der Meij, 2006) could be beneficial. Furthermore, strengthening individuals' perceptions of instrumental social support, for example by including significant others in therapy sessions, may help to mitigate the impact of anticipated stigma on stress and health outcomes (Earnshaw et al., 2014). Rather than operating in isolation, such interventions could bolster the positive effects of structural reforms and HIV treatment services (Cook et al., 2014; Reid, Dovidio, Ballester, & Johnson, 2014).

The present results demonstrate that comparable levels of stigma can have different associations with health outcomes in different environments, and that simply measuring differences in the amount of stigma across locations would be insufficient to understand stigma's health implications. This feature of the work coheres with a recent emphasis on the importance of culture in psychology and public health research: similar experiences of felt and anticipated stigma may elicit different health outcomes in different contexts. Understanding the effects of stigma in a given context is essential to developing an appropriate public health response.

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Research Highlights

People with HIV who inject drugs in Kohtla-Järve and St. Petersburg reported stigma.

Stigma was more closely linked to negative health outcomes in Russia than in Estonia.

Lower barriers to care may explain why stigma was less related to health in Estonia.

Demographic Information and Descriptive Statistics from Samples of People with HIV who Inject Drugs in St. Petersburg, Russia and Kohtla-Järve, Estonia

Table 1

	St. Petersburg Sample		Kohtla-Järve Sample		Sample Comparison
	Mean (SD) or Count (%)	<i>n</i>	Mean (SD) or Count (%)	<i>n</i>	
Age in Years	32.92 (4.16)	381	30.58 (4.23)	288	$t=7.13, p<.001$
Gender		381		287	
Male	302 (79%)		210 (73%)		$\chi^2=3.06, p=.08$
Female	79 (21%)		77 (27%)		
Formal Education		381		288	
9th grade or lower	36 (9%)		152 (53%)		
Secondary education	121 (32%)		58 (20%)		$\chi^2=164.12, p<.001$
Vocational education	192 (50%)		78 (27%)		
Higher education	32 (8%)		0 (0%)		
Financial Difficulty		378		285	
Coping	86 (23%)		19 (7%)		
Difficult	239 (63%)		127 (45%)		$\chi^2=104.56, p<.001$
Very Difficult	53 (14%)		139 (49%)		
Frequency of Drug Use ^a	21.50 (7.41)	381	17.25 (9.09)	288	$t=6.65, p<.001$
Years Since First Use	14.50 (4.44)	380	12.81 (4.52)	288	$t=4.83, p<.001$
Internalized Drug Stigma ^b	3.78 (1.01)	381	3.53 (0.76)	288	$t=2.15, p=.032$
Internalized HIV Stigma ^b	3.45 (1.00)	381	3.67 (0.84)	288	$t=3.13, p=.002$
Anticipated Drug Stigma ^b	3.87 (0.58)	381	3.69 (0.49)	288	$t=4.30, p<.001$
Anticipated HIV Stigma ^b	3.74 (0.67)	381	3.71 (0.51)	288	$t=0.75, p=.45$
Depressive Symptoms ^c	3.49 (0.89)	381	3.54 (0.92)	286	$t=0.77, p=.44$

	St. Petersburg Sample		Koitla-Järve Sample		Sample Comparison
	Mean (SD) or Count (%)	<i>n</i>	Mean (SD) or Count (%)	<i>n</i>	
Subjective Health Rating ^d	58.88 (14.48)	380	54.29 (16.41)	284	$t=3.81, p<.001$
CD4 Count ^e		197		145	
Less than 350	67 (33%)		72 (46%)		
350 or Greater	134 (67%)		84 (54%)		$\chi^2=6.23, p=.013$
Symptom Count ^f	2.62 (2.38)	380	3.37 (2.02)	287	$t=4.32, p<.001$
Receiving Regular HIV Care ^g		378		287	
Yes	121 (32%)		201 (70%)		
No	257 (68%)		86 (30%)		

^aFrequency of drug use refers to the number of days participants indicated using drugs in the past four weeks, up to 28.

^bStigma scales ranged from 1 (least stigma) to 5 (most stigma).

^cThe depression scale ranged from 1 (least depressed) to 6 (most depressed).

^dThe subjective health rating scale ranged from 0 (least healthy) to 100 (most healthy).

^eThe mean CD4 count in St. Petersburg was 428.95 (SD=197.85). The mean in Koitla-Järve was 387.24 (SD=238.73).

^fParticipants reported the presence or absence of ten physical health problems commonly associated with HIV or with injection drug use, so counts could range from 0 to 10.

^gIt is not meaningful to establish absolute differences between samples in rates of receiving regular HIV care, because "regular care" is defined differently in the two locations (see Measures section).

Table 2

Bivariate Correlations Between Stigma and Health Variables Among People with HIV who Inject Drugs in St. Petersburg, Russia and Kohtla-Järve, Estonia

St. Petersburg Sample	Depressive Symptoms	Subjective Health	Low CD4 Count	Symptom Count	Regular HIV Care
Subjective Health Rating	-.31**				
Low CD4 Count ^a	.28**	-.32**			
Symptom Count	.55**	-.51**	.39**		
Receiving Regular HIV Care ^a	-.25**	.41**	-.19**	-.38**	
Internalized Drug Stigma	.20** ^b	-.34**	.26**	.43**	-.35**
Internalized HIV Stigma	.29**	-.24**	.18*	.39**	-.43**
Anticipated Drug Stigma	.40**	-.01	-.02	.38**	-.01
Anticipated HIV Stigma	.46**	-.02	.11	.39**	-.15**

Kohtla-Järve Sample	Depressive Symptoms	Subjective Health	Low CD4 Count	Symptom Count	Regular HIV Care
Subjective Health Rating	-.35**				
Low CD4 Count ^a	.12	-.09			
Symptom Count	.21**	-.56**	-.12		
Receiving Regular HIV Care ^a	-.07 ^b	-.05	.05	-.01	
Internalized Drug Stigma	-.09	.07	-.08	-.05	.03
Internalized HIV Stigma	-.12*	.05	-.06	-.02	-.06
Anticipated Drug Stigma	.16**	-.05	.00	.00	.07
Anticipated HIV Stigma	.10	-.05	.01	.01	-.04

* $p < .05$

** $p < .01$

Note. Correlations are computed based on all valid observations for the given pair of variables. CD4 count was only available for some of the participants, so correlation tests involving CD4 are less statistically powerful than other correlation tests in this table (see Ns in Table 1).

^a To illustrate the strength of the bivariate relationships on equivalent scales, correlations were computed with binary variables representing low CD4 count (below 350) and receiving regular HIV care.

^b Past work (e.g., Lennon, Huedo-Medina, Gerwien, & Johnson, 2012) has identified a persistent negative relationship between depression and health promotion behavior in the context of HIV. In the Estonian sample, the correlation between depressive symptoms and receiving regular HIV care was not significantly different from zero. This null result should not be interpreted as evidence against any

relationship between depressive symptoms and care in Kohla-Järve. However, it does reflect a weaker relationship in Kohla-Järve than in St. Petersburg, $Z=2.32$, $p=.020$. This result may be related to our primary results of interest pertaining to stigma—lower barriers to care in Estonia may help explain why depressive symptoms were not as closely tied to negative health outcomes there.

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Table 3

Internalized and Anticipated Stigma as Independent Predictors of Health-Related Outcomes Among People with HIV who Inject Drugs in St. Petersburg, Russia and Kohtla-Järve, Estonia

St. Petersburg Sample	Depression (<i>n</i> = 377)			Subjective Health Rating (<i>n</i> = 376)			Low CD4 Count ^a (Logit) (<i>n</i> = 194)			Symptom Count (<i>n</i> = 376)			Regular HIV Care (Logit) (<i>n</i> = 374)		
	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>
Internalized Drug Stigma	0.10 0.12	0.05 0.06	.036	-4.49 -0.31	0.88 0.06	<.001	0.92 0.89	0.25 0.24	<.001	0.80 0.34	0.13 0.05	<.001	-0.44 -0.44	0.16 0.16	.006
Internalized HIV Stigma	0.06 0.07	0.05 0.06	.24	-0.74 -0.05	0.97 0.07	.45	-0.04 -0.04	0.25 0.24	.87	0.30 0.12	0.14 0.06	.041	-0.85 -0.85	0.18 0.18	<.001
Anticipated Drug Stigma	0.29 0.19	0.08 0.05	<.001	0.92 0.04	1.46 0.06	.52	-0.59 -0.34	0.39 0.22	.13	0.85 0.21	0.22 0.05	<.001	0.17 0.10	0.27 0.16	.54
Anticipated HIV Stigma	0.28 0.21	0.08 0.06	<.001	0.99 0.05	1.40 0.06	.48	0.64 0.45	0.37 0.26	.078	0.60 0.16	0.21 0.06	.006	-0.29 -0.20	0.26 0.17	.26

Kohtla-Järve Sample ^b	Depression (<i>n</i> = 282)			Subjective Health Rating (<i>n</i> = 280)			Low CD4 Count ^a (Logit) (<i>n</i> = 143)			Symptom Count (<i>n</i> = 283)			Regular HIV Care (Logit) (<i>n</i> = 283)		
	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>	Slope	SE	<i>p</i>
Internalized Drug Stigma	0.02 0.01	0.10 0.08	.87	-0.61 -0.03	1.77 0.08	.73	-0.36 -0.28	0.33 0.25	.28	-0.01 -0.00	0.22 0.08	.97	0.15 0.11	0.26 0.20	.56
Internalized HIV Stigma	-0.17 -0.15	0.09 0.08	.067	1.41 0.07	1.63 0.08	.39	0.01 0.01	0.30 0.26	.97	-0.07 -0.03	0.20 0.08	.75	-0.33 -0.27	0.24 0.20	.17
Anticipated Drug Stigma	0.29 0.15	0.14 0.08	.044	0.07 0.00	2.56 0.08	.98	-0.09 -0.04	0.47 0.24	.86	-0.14 -0.03	0.32 0.08	.66	0.68 0.33	0.39 0.19	.078
Anticipated HIV Stigma	0.07 0.04	0.14 0.08	.60	-2.45 -0.08	2.51 0.08	.33	0.24 0.13	0.47 0.25	.61	0.17 0.04	0.31 0.08	.58	-0.53 -0.27	0.37 0.19	.16

Note. Estimates are drawn from models including all four stigma variables simultaneously, as well as participant gender, age, education category, financial difficulty category, recent frequency of drug use, and years since first drug use (see Table 1). Italicized slopes stem from models featuring standardized versions of predictors (and, for linear models, standardized versions of each outcome variable).

^aLow CD4 count was defined as below 350. Fitting a linear regression model predicting numeric CD4 counts did not alter the outcomes of hypothesis tests reported in this table.

^bIn the Estonian sample, all models were separately fit with an additional covariate indicating whether the participant was involved in an opioid substitution program; this covariate did not alter the outcomes of any of the hypothesis tests reported above. A similar covariate could not be included in the Russian sample because substitution treatment is illegal in Russia.