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Development of a Global Index Measuring National Policy Commitments to HIV Prevention and Treatment among People Who Inject Drugs

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Measuring National Commitments to HIV Prevention and Treatment among People Who Inject Drugs

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Keywords

HIV prevention and treatment; injection drug use; composite indicators; data envelopment analysis; benchmarking and performance assessment; comparative policy analysis

Abstract

Background: People who inject drugs (PWID) around the world are disproportionately affected by the HIV epidemic. National policy responses to the epidemic heavily influence risk factors for HIV acquisition among this key group. Prior efforts to monitor national policy responses to HIV/AIDS among PWID were limited both in scope and coverage. In this paper we develop and validate the HIV-PWID Policy Index (HPPI) to benchmark and monitor national commitments to HIV prevention and treatment among PWID.

Methods: Composite indicator was constructed employing fuzzy multilayer data envelopment analysis (FMLDEA). Model inputs based on data from 105 countries included 27 variables measured across six conceptual domains, including needle and syringe programs, opioid substitution treatment, testing and counseling, information and education, monitoring and evaluation, and legal and policy climate.

Results: According to the HPPI, the top performing countries in commitment to HIV prevention and treatment among PWID were Spain (0.988), Switzerland (0.982), Luxembourg (0.970), Moldova (0.970), and Kyrgyzstan (0.945), whereas the poorest performing included Nicaragua (0.094), Japan, (0.094), Cape Verde (0.097), Syria (0.174), and Benin (0.185). Regionally, commitment to HIV services targeting PWID was highest among European countries (0.81) and lowest among African countries (0.50), with Oceania (0.76), Asia (0.66), and the Americas (0.56) in the mid-range. Subregional differences were even more prominent, with West and Central European nations (0.84) and Central American nations (0.22) earning the highest and lowest HPPI scores, respectively.

Conclusions: The HPPI documented substantial national and regional variation in policy responses to the HIV epidemic among PWID. Our analysis also revealed that many countries have limited HIV/AIDS data collection and monitoring capabilities. Continued enhancement and standardization of global HIV/AIDS monitoring efforts are therefore vital to articulated

national and international benchmarking and performance assessment goals.

Introduction

Injection drug use is a major global public health issue. There are an estimated 15.6 million people worldwide who inject illicit drugs each year, and about one in six of these individuals live with HIV (Degenhardt, et al., 2017). People who inject drugs (PWID) are 24 times more likely to acquire HIV than people in the general population, with new HIV infections among PWID continuing to climb in many regions of the world (UNAIDS, 2015a, 2016).

National educational, prevention, treatment, and legal responses to the problem of injection drug use heavily influence both the macro and micro risk factors for HIV acquisition among PWID. Investments in evidence-based prevention and treatment interventions—such as opioid substitution, needle exchange, and antiretroviral therapy—can substantially curtail the spread of HIV among PWID (Strathdee, et al., 2010). However, only about half the world's countries implement evidence-based harm reduction policies aimed at preventing the spread of HIV among PWID (Harm Reduction International, 2016), and many others continue to subject this population to punitive criminal justice measures and other counterproductive responses (Lunze, et al., 2014; Strathdee, Beletsky, & Kerr, 2015).

In reaffirming international efforts to end the HIV/AIDS epidemic by 2030, the UN General Assembly adopted the *Political Declaration on HIV and AIDS* (United Nations, 2016). UNAIDS has set a goal of achieving 90% access to PWID-tailored HIV prevention services by 2020, including HIV testing, antiretroviral therapies (ART), needle and syringe exchange programs (NSPs), opioid substitution therapy (OST), safe sex programming, education and outreach, and related clinical services (UNAIDS, 2015b). Systematic reviews of the global epidemiology of HIV/AIDS among PWID and the associated global, regional, and national policy responses emphasize the need for comprehensive monitoring and assessment tools to achieve these objectives (e.g., Mathers, et al., 2010; Mathers, et al., 2008). Indeed, Beyrer, et

al. (2010) articulated a specific need for a national HIV/AIDS accountability matrix to document country-level interventions targeting PWID (see also Degenhardt, et al., 2014). Toward this end, the current study develops the HIV-PWID Policy Index (HPPI), which is the first global policy index measuring national commitments to HIV/AIDS prevention and treatment interventions for PWID. During the last decade, many composite indexes (CIs) have been developed in the domains of economics, governance, security, environment, sustainability, and public health (Botero, Nelson, & Pratt, 2011; Moxham-Hall & Ritter, 2017; Pissourios, 2013). The proliferation of these types of CIs is an indication of their importance for performance evaluation, benchmarking, and decision-making.

Previous HIV/AIDS Policy Monitoring Efforts

Several prior efforts have been undertaken to monitor national policy responses to HIV/AIDS, but they remain limited in scope and coverage with respect to PWID. Desmond and colleagues (2008) developed an early model to rank country efforts against HIV/AIDS based on three narrowly targeted indicators (prevention of mother-to-child HIV transmission, antiretroviral treatment coverage, and the ratio of orphans to non-orphans attending school). The AIDS Accountability Country Scorecard (AIDS Accountability International, 2008) represents a more comprehensive effort based on monitoring data across eight domains (data collection, at-risk populations, treatment, prevention, coordination, civil society, financing, and human rights). Individual country scores were not reported, however, limiting the scorecard's utility for informing national strategic responses.

Other monitoring efforts have developed composite indexes (CIs) that aggregate different policy indicators into a single score. The AIDS Program Effort Index (API) measures levels of national HIV programming and support for 54 countries across ten policy domains (political support; policy and planning; organizational structure; program resources; evaluation, monitoring, and research; legal and regulatory environment; human rights;

prevention programs; care and treatment services; and mitigation programs) (Stover, 2001; see also USAID, UNAIDS, WHO, & the POLICY Project, 2003). Alfven, et al. (2014) developed the HIV Monitoring and Evaluation System Capacity Index (MESCI) based on reports for 78 countries measuring national HIV commitments, government engagement, partner/civil society engagement, and data generation. None of these prior indices, however, focus on the target population of PWID that motivates the current study.

To our knowledge, the Policy Environment Index for PWID (PEIP) is the only monitoring effort that addresses the HIV/AIDS policy environment for injection drug users (Platt, et al., 2015). The index is based on six indicators measured across three domains: *meaningful engagement of stakeholders* (evidence of a national organization of drug users), *coordinated national strategy for HIV prevention and drug use* (evidence of explicit inclusion of harm reduction in national-level strategy, monitoring/evaluation studies documenting HIV among PWID), and *evidence-based HIV prevention intervention approaches* (presence of OST and NSP, presence of OST and NSP in prison settings, evidence of decriminalization of drug possession and use). PEIP was constructed for 50 European region countries, with higher (lower) index scores suggesting an enabling (constraining) policy environment for HIV prevention among PWID. Although representing a step forward in measuring commitments to HIV prevention and treatment among PWID, PEIP is based on a small number of indicators for European countries. In developing the HIV-PWID Policy Index (HPPI), the current study aims to extend prior research by expanding the number of underlying indicators, increasing coverage to more world regions, and presenting individual results for each country.

Methods

Construction of the HPPI proceeded in several steps. First, we developed a conceptual framework to guide the identification of domains and selection of policy indicators for constructing the HPPI. Second, we reviewed the quality and availability of country-level

indicators, while also addressing missingness and normalization concerns. Third, we employed fuzzy multilayer data envelopment analysis (FMLDEA) to aggregate the indicators into a composite index, with higher scores reflecting a stronger commitment to HIV risk reduction among PWID. Each of these steps is discussed in more detail in the following sections.

Conceptual Framework

The HPPI conceptual framework was developed based on a comprehensive review of the evidence-based literature on HIV interventions targeting PWID and the first two authors' subject area expertise. Our conceptual framework comprises six policy domains: (1) Needle and Syringe Programs, (2) Opioid Substitution Treatment, (3) Testing and Treatment, (4) Information and Education, (5) Monitoring and Evaluation, and (6) Legal and Policy Climate. To populate the domains with relevant indicators, we examined data sources produced by leading international governmental (UNAIDS, UNODC, WHO, EMCDDA) and nongovernmental organizations (Harm Reduction International). We also reviewed relevant peer-reviewed publications and other reports for additional data. Table 1 presents the conceptual framework and associated indicators, with more detailed definitions and source information presented in Appendix I.

Domain 1, Needle and Syringe Programs (NSPs), captures traditional and prison-based syringe distribution programming with demonstrated effectiveness in reducing HIV transmission and other injection risk behaviors among PWID (Fernandes, et al., 2017; Gibson, Flynn, & Perales, 2001; Wodak & Cooney, 2006). We also include supervised injection facilities (SIFs) in this domain since these sites offer a host of services that promote safer injection conditions and practices that reduce rates of HIV infection among PWID (Andresen & Jozaghi, 2012; Kennedy, Karamouzian, & Kerr, 2017; Pardo, Kilmer, & Caulkins, 2018; Pinkerton, 2011; Potier, Laprévote, Dubois-Arber, Cottencin, & Rolland, 2014). Domain 1 also captures the domestic policy environment pertaining to the promotion of safe injection

behaviors, which can influence the development and sustainability of NSP interventions (Hayle, 2018).

Domain 2, Opioid Substitution Treatment (OST), measures opioid agonist treatments that have been shown to be effective in reducing HIV infections and risky behaviors among injection drug users (Ahamad, et al., 2015; Karki, Shrestha, Huedo-Medina, & Copenhaver, 2016; MacArthur, et al., 2012; Marks, et al., 2019), including in prison-based settings (Larney, 2010). The national policy stance toward OST among PWID is also measured in Domain 2, as political will and national commitments influence the ability to scale up OST interventions (Reid, Sharma, & Higgs, 2014).

Testing and Treatment interventions are captured in Domain 3. Despite often poor treatment adherence among injection drug users (Lert & Kazatchkine, 2007), detect-and-treat interventions can significantly reduce HIV transmission risk among PWID (Des Jarlais, et al., 2016; Montaner, et al., 2010). Consequently, national preventive strategies regarding HIV testing and counseling among PWID, as well as the accessibility of antiretroviral treatment (ART), are measured in this domain.

Domain 4, Information and Education, captures national policy efforts designed to improve health and reduce risky behaviors among PWID. Although the evidence regarding the health-promoting effects of mass media information, education, and communication efforts targeting PWID is not strong (Aggleton, Jenkins, & Malcolm, 2005), social media and mobile health interventions are promising and require further investigation (Cao, et al., 2017; Genz, et al., 2015). Domain 5, Monitoring and Evaluation, captures national HIV monitoring and evaluation efforts, which are integral to understanding and shaping HIV interventions among PWID and other vulnerable populations (Alfven, et al., 2017; Gall, et al., 2017; Weir, et al., 2018). Finally, Domain 6, Legal and Policy Climate, captures aspects of the policy environment concerning both HIV and PWID, as de-stigmatization and decriminalization of these statuses

can promote and reinforce effective prevention and treatment efforts (Baker, et al., 2019; DeBeck, et al., 2017; Strathdee, et al., 2015; Strathdee, et al., 2010).

[INSERT TABLE 1 ABOUT HERE]

Assessment and Treatment of Indicators

Across all indicators, we initially collected data on 181 countries. We dropped 76 countries from the analysis due to missing data on five or more policy indicators, resulting in a final analytic sample of $n = 105$ countries. Among included countries, the ratio of missing to total data was just 1.4%.[1] We imputed data in these instances by taking either the modal value for binary indicators or using the average ratio method for continuous and ordinal data (Tamaddon, Jahanshahloo, Lotfi, Mozaffari, & Gholami, 2009).

Next, we normalized the data to place all measures on a similar scale, which is a necessary step prior to index construction. We adopted the distance-to-reference approach, using the maximum reported indicator value as the reference for continuous and ordinal data; binary data were not normalized (see Organisation for Economic Co-operation and Development, 2008).

Constructing the HIV-PWID Policy Index

Recent progress in the development of CIs includes both objective methods and subjective methods (Greco, Ishizaka, Tasiou, & Torrisi, 2019). A common feature of many of these methods is the assumption of uniform indicator weights for the DMUs under study, which ignores the relative 'importance' of each indicator and makes it difficult to ascertain unit-specific predictors of performance. In this respect, data envelopment analysis (DEA) offers several advantages over other CI construction methods. First, DEA can be used to combine multiple indicators without prior knowledge of their trade-offs, i.e., weights. Second, DEA

[1] The percentage of missing data by indicator was 0% except as follows: v1.2 (8.6%), v3.2 (5.7%), v5.2 (4.8%), v6.1 (7.6%), v6.3 (1.9%), v6.4 (1.0%), v6.6 (1.0%), v6.7 (1.0%), v6.8 (1.0%), and v6.9 (4.8%).

evaluates the relative performance of DMUs to ensure that each unit obtains the best possible set of indicator weights (Cherchye, Moesen, Rogge, & Puyenbroeck, 2007). Any other possible set of weights would produce a lower (i.e., less favorable) composite index score.

Applications of DEA for CI construction often focus on policy indicators. Basic DEA models assume that the data are both quantitative and nonhierarchical. Neither of these assumptions holds for the current study. To combine both quantitative and qualitative data, we follow Shen and colleagues (Shen, Hermans, Brijs, & Wets, 2014; Shen, Ruan, et al., 2011) in implementing a fuzzy DEA approach that interprets qualitative data as fuzzy numerical values, which can be incorporated into the model with varying degrees of certainty, h. When h=1, qualitative data are treated as numerical and the results are equivalent to crisp DEA. When h<1, a more cautious approach is taken regarding measurement precision, resulting in a wider range of index scores for each country. Further, within each h degree, we present three different scenario weights for each DMU in producing a set of pessimistic, indifferent, and optimistic index scores. To account for the hierachical nature of our conceptual framework, we follow Shen and colleagues (Shen, Hermans, Brijs, & Wets, 2013; Shen, Hermans, et al., 2011) multilayer DEA model which incorporates different types of the possible weight restrictions for each domain. Integrating these two approaches produces a fuzzy multilayer DEA (FMLDEA) model. Finally, we employ a cross-efficiency extension to DEA developed by Sexton, Silkman, and Hogan (1986) to effectively rank the DMUs (i.e., countries) on performance. See Appendix II for technical details of these specifications. All models were solved with the optimization modeling software Lingo 13.0 (Lindo Systems, 2017).

Results

Country-level results of the FMLDEA-based CI model are presented in Table 2. CI scores are presented as the cross efficiency scores for the indifferent scenario for h=0.5, reflecting medium performance while incorporating some decision-maker uncertainty about

the crispness of the data (see Appendix III for sensitivity analyses). The quartile distribution of these index scores is mapped in Figure 1. The discriminatory power of the model could be improved by imposing some restrictions on the indicator weights derived from expert opinion, but given that the scores derived from the cross-effeciency matrix provide good discrimination among the DMUs, we allow the weights to be calculated freely and directly by the model.

[INSERT TABLE 2 ABOUT HERE]

[INSERT FIGURE 1 ABOUT HERE]

The top-performing decile of countries include six from Europe (Spain, Switzerland, Luxemborg, Moldava, Norway, and France), three from Asia (Kyrgystan, Armenia, and India), and one each from the Americas (Canada) and Oceania (Australia). Conversely, the bottom performing decile of countries includes five from Asia (Maldives, Bahrain, Oman, Syria, and Japan), four from Africa (Seychelles, Libya, Benin, and Cape Verde), and two from the Americas (Honduras and Nicaragua).

Table 3 presents the mean HPPI scores by region, revealing that commitment to HIV services among PWID is highest among European countries, with index scores for each European subregion above the global mean index score (0.67). Among European countries, only Cyprus (0.65), Croatia, (0.64), Macedonia (0.57), and Turkey (0.46) had index scores below the global mean. Oceanic countries also recorded above-average index scores on commitment to HIV programming among PWID, an outcome driven by high-performing Australia (0.91). Overall, index scores from Asian countries were on par with the global average, but this average masks considerable subregional variation. Central Asian countries, for instance, are substantially higher performing (0.85) than Near and Middle East countries (0.33). Countries in the Americas recorded an average index score lower than the global mean, but this average also obscures substantial variation by subregion as indicated by the extremes reported for North America (0.82) and Central America (0.22). Lastly, both regionally and

subregionally, African countries performed poorest on commitment to HIV programming among PWID, with no African subregion attaining a mean index score above the global average, despite certain individual African countries performing highly (e.g., top-20 ranked Mauritius and Morocco).

[INSERT TABLE 3 ABOUT HERE]

Construct Validity of the HIV-PWID Policy Index

The HPPI is broadly consistent with national and regional commitments to HIV prevention and treatment as indicated by a recent systematic review of available literature and data (Larney, et al., 2017). To more formally assess the construct validity of the HPPI, we compared our results with Platt et al.'s (2015) Policy Environment Index for PWID. As shown in Figure 2 for the 44 overlapping countries, there is a moderate sized positive correlation (r = 0.51) between the two composite indicators.[2] Although Platt et al. (2015) used six indicators across three domains compared to the 27 indicators across six domains used to construct the HPPI, the convergence of the two indices provides supporting evidence that the HPPI is measuring national commitments to HIV prevention and treatment among PWID.

[INSERT FIGURE 2 ABOUT HERE]

Discussion

The global prevalence of HIV and other infectious diseases among PWID has increased in recent years, with a growing list of countries documenting evidence of injection drug use (Degenhardt, et al., 2017). At the same time, effective interventions for preventing and treating HIV among PWID are being increasingly adopted by nations across the globe (Larney, et al., 2017). Still, reliable and comprehensive information about national implementation and local coverage of these interventions remains scarce, especially among vulnerable populations. While international agencies such as UNAIDS and WHO have greatly expanded monitoring

[2] Note that instead of reporting raw index scores, Platt et al. (2015) grouped scores into five ranked categories.

and evaluation capabilities, few efforts have systematically documented country-level progress and commitments supporting the international goal of ending the HIV/AIDS epidemic by 2030 (UNAIDS, 2016).

Against this backdrop, the current study developed the HIV-PWID Policy Index (HPPI) to parsimoniously measure national commitments to HIV prevention and treatment interventions targeting PWID. Specifically, we marshalled 27 indicators across six conceptual domains and implemented an innovative fuzzy multiple layer data envelopment analysis (FMLDEA) model to summarize national efforts for 105 countries. Previous index construction efforts in this area used less robust methods, incorporated fewer measures, or focused on a smaller subset of countries. The HPPI thus stands as a promising new tool with utility for country-level performance evaluation, benchmarking, and decision-making for HIV interventions targeting PWID.

The HPPI documented substantial national and regional variation in policy responses to the HIV epidemic among PWID. Top performing countries on the HPPI clustered in several world subregions: Central Asia (0.85), West and Central Europe (0.84), Eastern Europe (0.83), and North America (0.82). High performance of Western European and North American countries might be explained by their sizable and entrenched numbers of PWID that necessitated and justified public health oriented and evidenced-based responses to the HIV epidemic among this population. High performace of Central and Eastern European countries might be attributable to the acuteness of the HIV epidemic among PWID following the collapse of the Soviet Union, together with national coordinating mechanisms (excepting Russia) that support the implementation of evidenced-based responses recommended by the major international public health bodies, such as WHO and UNAIDS.

In contrast, the poorest performing countries tended to be located in Southern Africa (0.48), West and Central Africa (0.38), Near and Middle East (0.33), and Central America

(0.22). A partial explanation for poor policy performance in these regions could be that the numbers of PWID are relatively low—e.g. 0.12% among people aged 15–64 years in the Middle East and North Africa, and 0.28% in the Sub-Saharan Africa compared to 1.30% in the Eastern Europe (Degenhardt et al., 2017). Accordingly, the HIV epidemic among PWID in countries of these regions may not be percevied as salient enough to warrant adopting domestic policies that are in accordance with international public health guidelines.

As a monitoring tool, the HPPI is only as reliable as the underlying data that goes into its construction. Measuring stigmatized behaviors and populations, including the associated policy responses that may not be officially sanctioned (e.g., needle exchange, safe injection sites), is challenging. Doing this well across dozens of countries is even more daunting, especially when high-level policies do not reflect what is actually happening on the ground or political considerations impede reporting to international agencies. As a case in point, Kyrgyzstan is ranked fifth on the HPPI because the government promotes evidence-based interventions targeting HIV prevention and treatment among PWID, including official support for NSPs. However, recent research has documented significant individual-level barriers to accessing NSP services by PWID in Kyrgyzstan (Deryabina & El-Sadr, 2017), which are unlikely to be captured by national policy indicators. Another limitation of the HPPI is that the applied model cannot be used to decompose the rank of countries by domain. Nevertheless, country-level indicators are reported in a supplemental data file to enable detailed inspection and assessment of each nation's policy stance.

Our findings point to the urgent need for both country-specific and regional efforts to improve HIV prevention programming, treatment service delivery, and legal/policy environments for PWID. However, as demonstrated in the global heat map of the HPPI in Figure 1, countries from certain world regions, including much of sub-Saharan Africa and South America, have limited HIV/AIDS data and monitoring capabilities, highlighting regional

opportunities for improving targeted data collection efforts. Continued enhancement and standardization of global HIV/AIDS monitoring efforts efforts are therefore vital to national and international benchmarking and performance assessment goals.

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Table 1. Conceptual Framework for HIV-PWID Policy Index (HPPI) and Selected Indicators

Domains and Indicators	Measurement Range
1. Needle and Syringe Programs (NSPs)	
1.1 NSPs Operational	0-1
1.2 Syringes Distributed per PWID	0-565
1.3 NSPs Operational in Prison	0-1
1.4 Supervised Injection Facilities Operational	0-1
1.5 National Policy Promotes Use of Clean Needles in HIV Awareness	0-1
1.6 National Policy Promotes Needle Exchange among PWID	0-1
2. Opioid Substitution Treatment (OST)	
2.1 OST Programs Operational	0-1
2.2 OST Operational in Prison	0-1
2.3 National Policy Promotes OST among PWID	0-1
3. Testing and Treatment (TT)	
3.1 National Policy Promotes Testing and Counseling among PWID	0-1
3.2 Antiretroviral Treatment Accessibility	2.5-5
4. Information and Education (IE)	
4.1. National Policy Promotes Use of Condoms among PWID	0-1
4.2. National Policy Promotes Reproductive Health among PWID	0-1
4.3. National Policy Promotes Stigma Reduction among PWID	0-1
4.4. National Policy Promotes Risk Reduction among PWID	0-1
4.5. National Policy Promotes Vulnerability Reduction among PWID	0-1
5. Monitoring and Evaluation (ME)	
5.1 National HIV Monitoring and Evaluation Plan	1-3
5.2 Quality of HIV-Related Monitoring and Evaluation	0-10
6. Legal and Policy Climate (LPC)	
6.1 Support for Harm Reduction in National Policy Documents	0-1
6.2 Country Has National HIV Coordinating Body	0-1
6.3 Vulnerable Populations Involved in HIV Policy Development	0-1
6.4 Country Has No HIV-Related Travel Restrictions	0-1
6.5 National Strategy Addresses PWID	0-1
6.6 PWID Identified as Target Group for HIV Programming	0-1
6.7 Nondiscrimination Laws Protect PWID	0-1
6.8 Laws Support Effective HIV Response among PWID	0-1
6.9 Extent of Harm Reduction Resources for PWID	1-4

Note: See Appendix I for detailed definitions and sourcing information.

Table 2. HIV-PWID Policy Index (HPPI) Results

			Index Scores for Indifferent and *h*=0.5	
Country	Region	Subregion	Score	Ranking
Spain	Europe	West and Central Europe	0.9883	1
Switzerland	Europe	West and Central Europe	0.9822	2
Luxembourg	Europe	West and Central Europe	0.9703	3
Moldova	Europe	Eastern Europe	0.9701	4
Kyrgyzstan	Asia	Central Asia	0.9452	5
Armenia	Asia	Central Asia	0.9253	6
Norway	Europe	West and Central Europe	0.9213	7
France	Europe	West and Central Europe	0.9209	8
Canada	Americas	North America	0.9176	9
Australia	Oceania	Oceania	0.9056	10
India	Asia	South Asia	0.8963	11
Montenegro	Europe	South Eastern Europe	0.8846	12
Portugal	Europe	West and Central Europe	0.8833	13
Mauritius	Africa	East Africa	0.8814	14
Sweden	Europe	West and Central Europe	0.8812	15
Estonia	Europe	West and Central Europe	0.8804	16
Morocco	Africa	North Africa	0.8796	17
Iran	Asia	Southwest Asia	0.8794	18
Vietnam	Asia	East and Southeast Asia	0.8788	19
Poland	Europe	West and Central Europe	0.8766	20
Indonesia	Asia	East and Southeast Asia	0.8766	21
Germany	Europe	West and Central Europe	0.8764	22
Macau	Asia	East and Southeast Asia	0.8755	23
Serbia	Europe	South Eastern Europe	0.8738	24
Tajikistan	Asia	Central Asia	0.8726	25
Slovenia	Europe	West and Central Europe	0.8718	26
Lithuania	Europe	West and Central Europe	0.8705	27
Latvia	Europe	West and Central Europe	0.8697	28
Bulgaria	Europe	South Eastern Europe	0.8697	29
Georgia	Asia	Central Asia	0.8678	30
Romania	Europe	South Eastern Europe	0.8344	31
Italy	Europe	West and Central Europe	0.8321	32
Netherlands	Europe	West and Central Europe	0.8292	33
Denmark	Europe	West and Central Europe	0.8280	34
Cambodia	Asia	East and Southeast Asia	0.8268	35
Tunisia	Africa	North Africa	0.8241	36
China	Asia	East and Southeast Asia	0.8162	37
Myanmar	Asia	East and Southeast Asia	0.8137	38
Bangladesh	Asia	South Asia	0.8064	39
Slovakia	Europe	West and Central Europe	0.8036	40
Hungary	Europe	West and Central Europe	0.8033	41
Kazakhstan	Asia	Central Asia	0.7989	42
Tanzania	Africa	East Africa	0.7964	43
Nepal	Asia	South Asia	0.7958	44
Azerbaijan	Asia	Central Asia	0.7955	45
Afghanistan	Asia	Southwest Asia	0.7951	46
Ukraine	Europe	Eastern Europe	0.7940	47
Belarus	Europe	Eastern Europe	0.7921	48
Senegal	Africa	West and Central Africa	0.7906	49
Mexico	Americas	North America	0.7899	50

Kenya	Africa	East Africa	0.7896	51
Thailand	Asia	East and Southeast Asia	0.7872	52
United Kingdom	Europe	West and Central Europe	0.7841	53
Belgium	Europe	West and Central Europe	0.7836	54
Greece	Europe	West and Central Europe	0.7828	55
Czech Republic	Europe	West and Central Europe	0.7750	56
United States	Americas	North America	0.7668	57
Uzbekistan	Asia	Central Asia	0.7554	58
Russia	Europe	Eastern Europe	0.7449	59
Egypt	Africa	North Africa	0.7445	60
Philippines	Asia	East and Southeast Asia	0.7276	61
Dominican Republic	Americas	Caribbean	0.7190	62
Malta	Europe	West and Central Europe	0.7097	63
Finland	Europe	West and Central Europe	0.6994	64
Bosnia and Herzegovina	Europe	South Eastern Europe	0.6917	65
Lebanon	Asia	Near and Middle East	0.6890	66
Albania	Europe	South Eastern Europe	0.6806	67
South Africa	Africa	Southern Africa	0.6799	68
Pakistan	Asia	Southwest Asia	0.6795	69
Malaysia	Asia	East and Southeast Asia	0.6785	70
Brazil	Americas	South America	0.6759	71
Paraguay	Americas	South America	0.6706	72
Cyprus	Europe	West and Central Europe	0.6519	73
Croatia	Europe	South Eastern Europe	0.6393	74
DR Congo	Africa	West and Central Africa	0.6384	75
Argentina	Americas	South America	0.6362	76
New Zealand	Oceania	Oceania	0.6147	77
Macedonia	Europe	South Eastern Europe	0.5700	78
Colombia	Americas	South America	0.4941	79
Turkey	Europe	South Eastern Europe	0.4567	80
Uruguay	Americas	South America	0.4541	81
Jordan	Asia	Near and Middle East	0.4465	82
Algeria	Africa	North Africa	0.3993	83
Madagascar	Africa	East Africa	0.3910	84
Nigeria	Africa	West and Central Africa	0.3707	85
Ghana	Africa	West and Central Africa	0.3704	86
Togo	Africa	West and Central Africa	0.3591	87
Sri Lanka	Asia	South Asia	0.3585	88
Côte d'Ivoire	Africa	West and Central Africa	0.3293	89
Saudi Arabia	Asia	Near and Middle East	0.3159	90
Kuwait	Asia	Near and Middle East	0.3104	91
Liberia	Africa	West and Central Africa	0.3080	92
Guatemala	Americas	Central America	0.2815	93
Mozambique	Africa	Southern Africa	0.2808	94
Honduras	Americas	Central America	0.2789	95
Seychelles	Africa	East Africa	0.2470	96
Libya	Africa	North Africa	0.2271	97
Maldives	Asia	South Asia	0.2098	98
Bahrain	Asia	Near and Middle East	0.1970	99
Oman	Asia	Near and Middle East	0.1966	100
Benin	Africa	West and Central Africa	0.1846	101
Syria	Asia	Near and Middle East	0.1739	102

Cape Verde	Africa	West and Central Africa	0.0972	103
Japan	Asia	East and Southeast Asia	0.0942	104
Nicaragua	Americas	Central America	0.0935	105

Table 3. HIV-PWID Policy Index (HPPI) Scores by Region

Region	Mean	Min	Max
Europe	0.81	0.46	0.99
Eastern Europe	0.83	0.74	0.97
South Eastern Europe	0.72	0.46	0.88
West and Central Europe	0.84	0.65	0.99
Asia	0.66	0.09	0.95
Central Asia	0.85	0.76	0.95
East and Southeast Asia	0.74	0.09	0.88
Near and Middle East	0.33	0.17	0.69
South Asia	0.61	0.21	0.90
Southwest Asia	0.78	0.68	0.88
Americas	0.56	0.09	0.92
Caribbean	0.72	0.72	0.72
Central America	0.22	0.09	0.28
North America	0.82	0.77	0.92
South America	0.59	0.45	0.68
Oceania	0.76	0.61	0.91
Africa	0.50	0.10	0.88
East Africa	0.62	0.25	0.88
North Africa	0.61	0.23	0.88
Southern Africa	0.48	0.28	0.68
West and Central Africa	0.38	0.10	0.79
Global	0.67	0.09	0.99

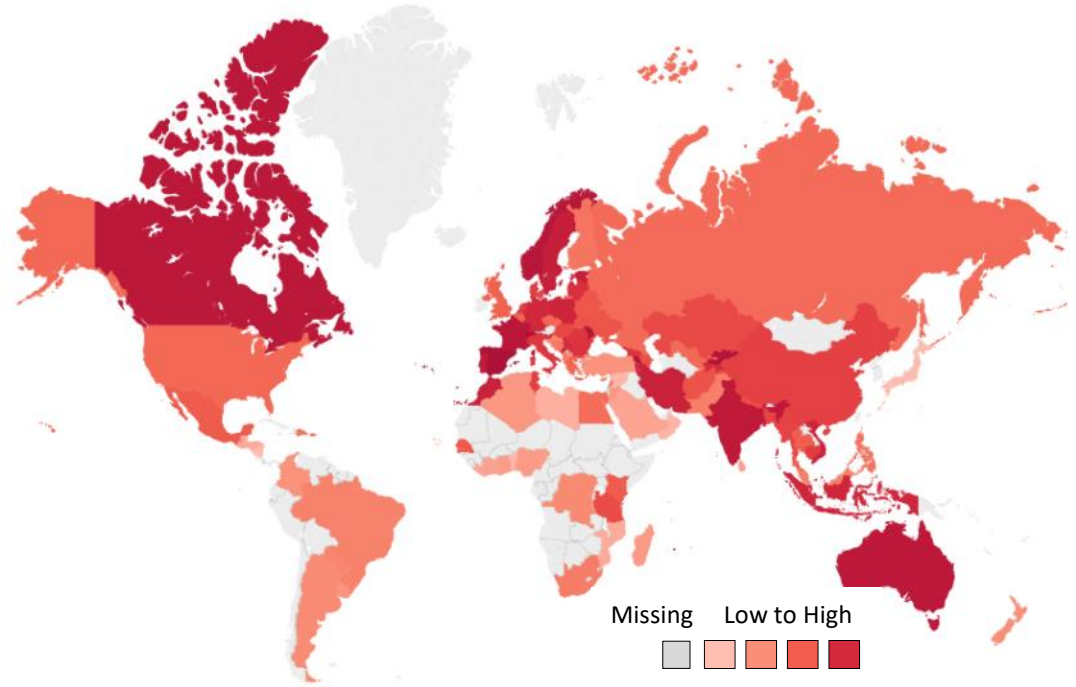

Figure 1. HPPI Scores Indicating Commitment to HIV Programming among PWID

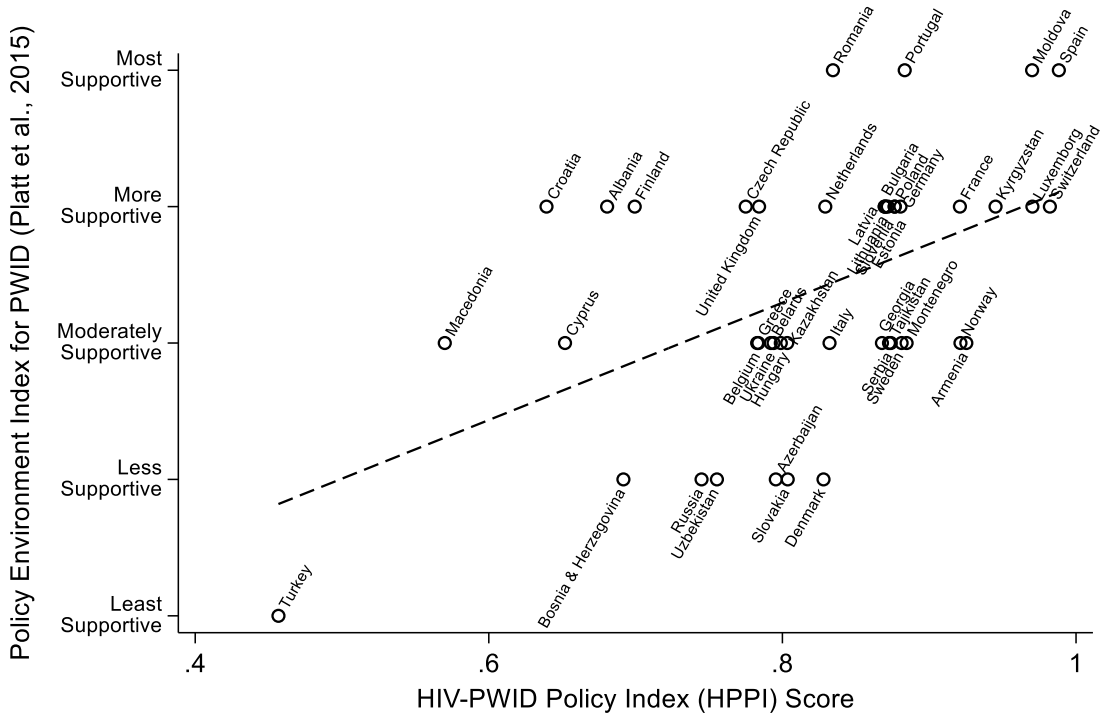

Figure 2. Comparison of HPPI Results with Platt et al. (2015) for 44 European Countries