

The Ukrainian SORT IT Course

Engaging people who inject drugs and their peers in HIV testing and harm reduction in Ukraine: do they make a difference?

Nataliia Kravchenko¹, Olga Denisiuk¹, Julia Kuznetsova¹, Joshua Chadwick Jayaraj², Rony Zachariah³, Pavlo Smyrnov¹

¹ ICF Alliance for Public Health (Formerly ICF International HIV/AIDS Alliance in Ukraine), Kiev, Ukraine

² Tuberculosis Research and Prevention Center, Yerevan, Armenia

³ WHO Special Programme for Research and Training in Tropical Diseases (TDR), Geneva, Switzerland

Abstract

Introduction: People Who Inject Drugs (PWID) should be offered HIV-testing and harm reduction services. We assessed the effectiveness of including PWID and their peers in HIV-testing by comparing for a period before (2013-2014) and after their introduction (2015-2017), the a) numbers HIV tested b) number enrolled in harm reduction and c) frequency of HIV-testing.

Methodology: An analysis of programme data involved PWID aged ≥ 14 years (1st January 2013-31st December 2017) in Ukraine. Between 2013-2014, HIV-testing (VCT) was done by trained health workers. From 2015, this was Directly Assisted HIV Self-testing (DAST) done by social workers and peers. Optimized HIV case finding (OCF) was introduced (in 2016) as an overlapping strategy with DAST.

Results: A total of 844,837 HIV tests were done with 23,427 (2.8%) HIV-positive results. With VCT, there were 164,417 HIV tests compared to 639,685 after engagement of PWID and their peers (>3-fold increase). The highest HIV positive yield (20%) was when OCF was included. With increasing HIV-testing caseload, a progressive decrease in enrollment in harm reduction was seen (85% in 2014 to 47% in 2017, χ^2 for trend $P < 0.001$). OCF resulted in enrollment into harm reduction of 2722 HIV-positives, which was 35% higher than through DAST alone (7.5%). HIV re-testing almost doubled with DAST.

Conclusion: Active engagement of PWID and their peers in HIV-testing increased uptake of HIV-testing. Including OCF has a synergistic effect in HIV-positive yield. Strategies are urgently needed to ensure that individuals who are HIV tested are enrolled in harm reduction.

Key words: Key populations; HIV-testing; SORT IT; optimized case finding; operational research; HIV self-testing.

J Infect Dev Ctries 2019; 13(7S):118S-125S. doi:10.3855/jidc.11293

(Received 31 January 2019 – Accepted 25 May 2019)

Copyright © 2019 Kravchenko *et al.* This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Globally, an estimated 36.7 million people (30.8-43.9 million) were living with HIV in 2017 and there were 1.8 million (1.4 - 2.4 million) new HIV infections [1]. An estimated 50% of all new HIV infections occur in key populations [2].

Key populations include defined groups namely: people who inject drugs (PWID); men having sex with men; prisoners; sex workers and transgender people [3]. Injectable drug use has been reported in 158 countries of which 78% reported associated HIV [2]. In Ukraine, the risk of contracting HIV infection among PWID is at least 20 times higher than that in the general population (0.96%) [4]. PWID thus have a multiplier effect on HIV transmission and a third of recent global HIV infections have been attributed to them [2]. Despite the importance of PWID in the dynamics of HIV transmission and response, public health service coverage for them is inadequate. Accentuating this

underlying problem are legal and social barriers to accessing health care as well as criminalization [5].

The international community aims to end the global HIV/AIDS epidemic by 2030 through the Sustainable Development Goals (SDGs) [6]. This can only be achieved by finding innovative ways for improving coverage and equity of HIV testing and harm reduction services for key populations including PWID.

Ukraine hosts the largest HIV-prevention program for key populations in Eastern Europe and Central Asia (EECA) which is implemented by the International Charitable Foundation “Alliance for Public Health” (APH). APH coordinates the activities of about 100 Non-Governmental Organizations (NGOs) in the country.

A unique aspect is the “differentiated service delivery model” for PWID. Differentiated care refers to an operational approach that simplifies and adapts HIV services to move closer to and serve the needs of people

living with, and at risk of acquiring HIV. By so doing, unnecessary burdens of the health system are alleviated [3]. Differentiated care was introduced in a phased manner. The initial strategy voluntary HIV counselling and testing (VCT) in 2013-2014 involved decentralization of HIV testing and harm reduction services to NGO service delivery points close to PWID communities [7]. HIV testing was performed by trained health workers. This was replaced by “task shifting” through directly assisted HIV self-testing (DAST) done by social workers often peers (in 2015). Finally, optimized HIV case finding (OCF) was introduced (in 2016) as an overlapping strategy with DAST. OCF is based on respondent-driven sampling (RDS) [8]. Importantly, the latter makes PWID active partners in the recruitment mechanism for HIV testing and is intended to reach individuals who may otherwise be left behind.

Table 1 shows the building blocks of the three HIV testing strategies in terms of accessibility (time and location), service provider (who provides and/or offers the services), recruitment mechanism and package of services offered. Service providers were trained additionally in terms of methodology, counselling specifics, confidentiality, software usage and other by Alliance for each cycle of changing strategy in correspondence to their level of engagement.

Assessing trends in HIV testing and uptake of harm reduction services in relation to these three strategies would be useful to inform program strategies. Although a few previous studies have assessed HIV testing among PWID, there have been no studies from Ukraine

that compared HIV testing strategies and the effect on enrollment in harm reduction [9], [10].

We aimed to assess the effectiveness of including PWID and their peers in HIV-testing in Ukraine. The specific objectives were to compare for a period before (2013-2014) and after introducing PWID and their peers (2015-2017) in the operational strategy: a) the trends in HIV testing stratified by socio-demographic characteristics of PWID b) the number of HIV positive and negative individuals enrolled in harm reduction and c) the frequency of HIV testing among PWID.

Methodology

Study Design

A retrospective cohort study (with a before and after comparison) using routine program data.

Study setting

General setting

Ukraine is the second largest country in Eastern Europe bordered by Belarus in the northwest, the Russian Federation in the east, the Republic of Moldova, Romania and Hungary in the south-west, and Slovakia and Poland in the west. Ukraine has an estimated population of 42 million [11].

The first cases of HIV/AIDS were registered in 1987 and until 2017, a total of 306,295 cases were registered in the general population [4]. Kyiv and Odesa had the highest HIV/AIDS burden in Ukraine and as from 2017, these areas have embarked on Fast-track Cities partnership for HIV testing and enrollment in HIV/AIDS care [12].

Table 1. HIV testing strategies offered through NGO sites in terms of Who (who delivers the services), How (accessibility and mechanism) and What (services offered) in 24 regions of Ukraine (2013-2017)*.

| Strategy and period of implementation | Testing made by | | Accessibility | | | Recruitment mechanism | | | Services offered |
|--------------------------------------------------------------------------|-------------------|------------------|------------------|----------------------------------------------|---------------------------------------------------------|---------------------------------------|-------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Healthcare worker | PWID themselves* | Timing schedules | Location | Recommended frequency | Testing frequency | Recruitment specifics | Incentives | |
| VCT (2013-14) | + | - | fixed | NGO based stationary | 3 months after 1st negative result, than every 6 months | uncontrolled | - | - | a) Counselling and HIV testing b) Post-test counselling and referrals of HIV positives to health care facilities c) HIV prevention and available harm reduction package: needles, syringes, HIV re-testing, counselling on drug overdose prevention and safe behavior, condoms and lubricants. |
| Engagement of PWID and their partners in the HIV testing strategy | | | | | | | | | |
| DAST (2015-17) | - | + | flexible | NGO based stationary and outreach | 3 months after 1st negative result, than every 6 months | uncontrolled | - | - | a) Counselling, and directly assisted HIV self-testing - Post-test counselling and referrals of HIV positives to health care facilities - HIV prevention and available harm reduction package: needles, syringes, alcohol wipe, disinfectant, directly assisted HIV and HCV testing, counselling on drug overdose prevention and safe behavior practice, condoms and lubricants |
| OCF (2016-17) | - | + | flexible | NGO or health care facility based stationary | | controlled with application algorithm | RDS based, conducted by PWID and their partners | + | a) Same package as 2015 and in addition: b) Coupons for active recruitment of PWID partners and peers for HIV testing c) Incentives to PWID for recruitment of individuals |

* Offered through fixed and outreach sites. PWID: People who inject drugs; RDS: Respondent driven sampling; HCV: Hepatitis C virus.

Table 2. Numbers of HIV tests stratified by socio-demographic characteristics before (2013-2014) and after (2015-2017) their engagement in HIV testing, Ukraine (2013-2017).

| | | VCT 2013-2014 | DAST 2015-2017 | OCF 2016-2017 | Total |
|---------------------------------------------------------------------------|-----------------------------------------|-------------------|-------------------|--------------------|----------------|
| | | Number (%) | Number (%) | Number (%) | |
| Total number of testing | | 164 417 | 639 685 | 40 735 | 844 837 |
| Total number of HIV positive results | | 5458 (3,3) | 9802 (1,5) | 8167 (20,0) | 23 427 |
| Variables | Subgroups | | | | |
| Age groups (missing 14) | | | | | |
| | 14-19 | 164 411 | 639 678 | 40 734 | 844 823 |
| | 20-24 | 1817 (1,1) | 2848 (0,5) | 398 (1,0) | 5 063 |
| | 25-29 | 17864 (10,9) | 33881 (5,3) | 1564 (3,8) | 53 309 |
| | 30-34 | 38595 (23,5) | 131894 (20,6) | 6295(15,5) | 176 784 |
| | 35-39 | 46948(28,6) | 163954 (25,6) | 11028 (27,1) | 221 930 |
| | 40-49 | 29925 (18,2) | 157610 (24,6) | 10442 (25,6) | 197 977 |
| | 50+ | 25287 (15,4) | 127703 (20,0) | 8796 (21,6) | 161 786 |
| | | 3975 (2,4) | 21788 (3,4) | 2211 (5,4) | 27 974 |
| Gender (3 missing) 164 414 | | | 639 685 | 40 735 | 844 834 |
| | Male | 119469 (72,7) | 468646 (73,3) | 33168 (81,4) | 621 283 |
| | Female | 44944 (27,3) | 171039 (26,7) | 7565 (18,6) | 223 548 |
| | Transgender | 1 (0) | 0 | 2 (0) | 3 |
| Education (326652 missing) | | 88 450 | 418 982 | 10 753 | 518 185 |
| | Partially completed secondary education | 8039 (9,1) | 30736 (7,3) | 528 (4,9) | 39 303 |
| | Secondary education | 40484 (45,8) | 182207 (43,5) | 4321 (40,2) | 227 012 |
| | Vocational school | 31253 (35,3) | 157103 (37,5) | 4619 (43,0) | 192 975 |
| | Incomplete higher education | 5536 (6,3) | 30885 (7,4) | 594 (5,5) | 37 015 |
| | Higher education | 3138 (3,5) | 18051 (4,3) | 691 (6,4) | 21 880 |
| Source of income (missing 305396) | | 92 381 | 435 620 | 11 440 | 539 441 |
| | Regular job | 15073 (16,3) | 67509 (15,5) | 1901 (16,6) | 84 483 |
| | Casual work | 32982 (35,7) | 158384 (36,4) | 3600 (31,5) | 194 966 |
| | Unemployed | 39157 (42,4) | 187760 (43,1) | 5454 (47,7) | 232 371 |
| | Commercial sex | 2061 (2,2) | 99,25 (2,3) | 164 (1,4) | 12 150 |
| | Student | 1803 (2,0) | 6013 (1,4) | 94 (0,8) | 7 910 |
| | Gov. pension | 89 (0,1) | 606 (0,1) | 53 (0,5) | 748 |
| | Other | 1216 (1,3) | 5423 (1,2) | 174 (1,5) | 6 813 |
| HIV testing site (missing 6472) | | 164 417 | 633 213 | 40 735 | 838 365 |
| | Fixed | 104041 (63,3) | 468854 (74,0) | 38757 (95,1) | 611 652 |
| | Outreach | 54666 (33,3) | 161556 (25,5) | 1441 (3,5) | 217 663 |
| | Unspecified | 5710 (3,5) | 2803 (0,4) | 537 (1,3) | 9 050 |
| Frequency of injecting drug use in the last month (missing 299868) | | 93 916 | 439 502 | 11 551 | 544 969 |
| | Several times per day | 18269 (19,5) | 91845 (20,9) | 2753 (23,8) | 112 867 |
| | Once per day | 24853 (26,5) | 114089 (26,0) | 3363 (29,1) | 142 305 |
| | Several times per week | 19621 (20,9) | 87418 (19,9) | 1681 (14,6) | 108 720 |
| | Once per week | 7089 (7,6) | 37095 (8,4) | 674 (5,8) | 44 858 |
| | Time to time | 24084 (25,6) | 109055 (24,8) | 3080 (26,7) | 136 219 |
| Type of main drug used in the last month (missing 444275) | | 52 856 | 337 143 | 10 563 | 400 562 |
| | Opioid | 41129 (77,8) | 273454 (81,1) | 9243 (87,5) | 323 826 |
| | Sedative | 74 (0,1) | 336 (0,1) | 3 (0,0) | 413 |
| | Stimulant | 10480 (19,8) | 58707 (17,4) | 1303 (12,3) | 70 490 |
| | Hallucinogen | 747 (1,4) | 1288 (0,4) | 8 (0,1) | 2 043 |
| | Other | 422 (0,8) | 3350 (1,0) | 6 (0,1) | 3 778 |
| | Undefined | 4 (0,0) | 8 (0,0) | 0 (0,0) | 12* |
| Imprisonment history (missing 345106) | | 83 965 | 404 980 | 10 786 | 499 731 |
| | Never imprisoned | 42596 (50,7) | 204979 (50,6) | 4932 (45,7) | 252 507 |
| | Has been imprisoned | 21313 (25,4) | 105705 (26,1) | 3865 (35,8) | 130 883 |
| | Has been on probation | 20056 (23,9) | 94296 (23,3) | 1989 (18,4) | 116 341 |

PWID engagement in the HIV testing strategy

* 12 individuals reported alcohol use more frequent than injecting drug, thus no dominating drug was defined.

In 2017, HIV prevalence among PWID was 21,9% and contributed 25,5% of newly diagnosed HIV cases in 2017 [13,14].

Specific setting and study sites

The study involved all the 27 administrative units of Ukraine where HIV/AIDS services were offered by NGOs in collaboration with the public health system. APH has sub-granted to implementing NGO partners, coordinated and monitored their activities and ensured reporting to donors. The prevention and harm reduction programs in Ukraine were implemented with financial support of The Global Fund to Fight AIDS, Tuberculosis, and Malaria (GF) and Centers for Disease Control and Prevention (CDC) under the United States President's Emergency Plan for AIDS Relief (PEPFAR).

As of 2017, 84,5% of all officially registered individuals, diagnosed with psychiatric and behavioral disorders induced by drugs, reported using injectable drugs. The most commonly used injectable drugs included opioids, amphetamines, methadone, hallucinogens, and hypno-sedatives which have been obtained through peers and drug dealers [13]. 70,13% of individuals, who applied for drug dependency treatment, reported opioids as main drug [15]. NGOs led the harm reduction intervention package for key populations [16].

HIV testing for PWID

Table 2 shows the variations in HIV testing strategies between 2013 and 2017. As from 2016, OCF was introduced. In OCF, an HIV positive index case was first given coupons and counselled on recruiting PWID partners (both, sex and drug injecting partners) and others closely linked to the transmission risk network. The number of coupons given to an individual was defined through a software application (OCFa, Alliance for Public Health Version 3.2.6.) taking into account various risk determinants. An incentive equivalent to 3 USD in local currency was given to each individual who has been HIV tested and about 1.5 USD was given for each referred partner who was eligible for HIV testing. The same cycle repeated with every partner of the index case until there were no newly recruited HIV positive individuals in a given risk network chain [17]. This brought on board PWID and their partners who might have been left behind without this approach of "active case finding".

HIV prevention and harm reduction for PWID

All individuals who were HIV positive were offered harm reduction services in line with WHO guidelines [2]. They received sterile injecting equipment through a free-of-charge needle and syringe exchange programs as well as donation of condoms. Access to opioid substitution therapy in Ukraine remains limited. Those found HIV negative were also offered sterile injecting equipment, condoms and counselling on safe drug-use and sexual behaviors, as well as drug overdose prevention. This aimed to have HIV negative individuals remain HIV negative. Subsequently HIV testing (retesting) was recommended every six months. In the event of risk behavior, a repeat test maybe done within three months at any preferred site of the client.

Study population, study sites and study period

All PWID aged ≥ 14 years who underwent HIV testing between 1st January 2013 and 31st December 2017 at NGO fixed and outreach service delivery points in all regions of Ukraine (for HIV testing) and in 12 regions for OCF. Total number of PWID, who underwent testing, is 378 425. Each PWID counted several times depending on the project and the year of testing, which gives 679,927 of unique subjects. Each unique subject might have several tests during a year within project, thus number of tests included in the study counts 844 837.

Data collection, sources and statistical analysis

Information on variables related to the study objectives were extracted from a dedicated database for key populations (SyrEx 2+) and the OCFa database. Data variables included sociodemographic characteristics, injecting drug type and frequency, imprisonment history, HIV testing, HIV re-testing status, inclusion in the harm reduction program, type of service delivery points and region.

Data were exported to Microsoft excel and analyzed using SAS software (version 9.4, SAS Institute Inc, Cary, NC, USA). Descriptive statistics and measures of central tendency were used for reporting. The χ^2 test was used compare differences between groups if necessary. P value ≤ 0.05 was considered significant. Routine program data was used for analysis. Questionnaire, which was filled in during routine program activities, contains self-reported information about client and some of its fields were not mandatory. Social worker entered data in database. Thus, some extracted records with incomplete or incorrect information were excluded from final dataset.

Table 3. Enrollment in harm reduction after the first HIV test for PWID stratified by HIV status in Ukraine (2013-2017).

| Year | Total number of PWID tested for HIV | Enrolled in harm reduction. | | |
|--------------------------------------------------------------------------|-------------------------------------|-----------------------------|--------------------|--------------------|
| | | Total N (%)* | HIV positive N (%) | HIV negative N (%) |
| VCT | | | | |
| 2013 | 14 070 | 11 505 (81,8) | 1 128 (9,8) | 10 377 (90,2) |
| 2014 | 12 297 | 10 399 (84,6) | 1 034 (9,9) | 9 365 (90,1) |
| Engagement of PWID and their partners in the HIV testing strategy | | | | |
| DAST | | | | |
| 2015 | 40 026 | 31 420 (78,5) | 2 020 (6,4) | 29 400 (93,6) |
| DAST+ OCF | | | | |
| 2016 | 49 535 | 31 880 (64,4) | 3 154 (10,0) | 28 726 (90,1) |
| 2017 | 65 865 | 30 978 (47,0) | 3 889 (12,6) | 27 089 (87,5) |
| Total | 181 793 | 116 182 | 11 225 | 104 957 |

* 32 missing HIV test result.

Ethics

Permission to conduct the study was secured from the Senior Management of the Alliance for Public Health in Ukraine and ethics approval was obtained from the Institutional Review Board of the Ukrainian Institute on Public Health Policy, Kiev, Ukraine.

Results

Trends in HIV-testing and socio-demographic characteristics of PWID

Table 2 shows the trends in HIV testing and sociodemographic characteristics among PWID before (2013-2014) and after (2015-2017) their engagement in the operational strategy. There was a total of 844,837 HIV tests done with 23,427 HIV-positives results. HIV testing more than tripled after engagement of PWID and their peers. The highest HIV positive yield (20%) was when OCF was included along with DAST. Forty-seven percent of tests involved individuals using injectable drugs daily (once or several times a day) with over 80% on opioids. OCF HIV testing strategy picked the highest proportion of positive tests among those with a history of imprisonment.

Enrollment of PWID in harm reduction services

Table 3 shows enrolment of PWID into the harm reduction programme after HIV testing. A person is considered as enrolled in harm reduction and prevention program if he/she received at least one harm reduction and/or prevention service after being tested for the first time in reporting period.

There was a five-fold increase in the numbers tested for HIV between 2014 (12,297) and 2017 (65,865) associated with engagement of PWID in HIV testing. Conversely, enrollment in the harm reduction programme showed a progressive decrease from 85% in 2014 to 47% in 2017 (χ^2 for trend $P < 0.001$). OCF itself resulted in enrollment of 2722 HIV-positive cases into harm reduction (35% over all enrolled), while the proportion of HIV-positives enrolled in harm reduction in DAST vary from 6,43% to 8,05%.

Frequency of re-testing for HIV

Table 4 shows that after engagement of PWID in HIV testing, the mean frequency of re-testing almost doubled with the DAST strategy.

Table 4. Frequency of retesting for HIV among PWID before and after engagement of PWID and their partners in the HIV testing strategy in Ukraine (2013-2017).

| Strategy | VCT | | | | PWID engagement in the HIV testing strategy | DAST | | | | | | OCF | | | |
|------------------------------------------------------|-----------------|------------|-----------------|------------|---------------------------------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|--|
| | 2013 | | 2014 | | | 2015 | | 2016 | | 2017 | | 2016 | | 2017 | |
| Year | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % | |
| Total of HIV tests | 71 216 | 100 | 68 710 | 100 | 156 129 | 100 | 172 148 | 100 | 171 589 | 100 | 12 168 | 100 | 27 967 | 100 | |
| Number of HIV tests per PWID | | | | | | | | | | | | | | | |
| 1 | 60 283 | 84,7 | 59 555 | 86,7 | 110 759 | 70,9 | 129 975 | 75,5 | 131 455 | 76,6 | 11 968 | 98,4 | 27 587 | 98,6 | |
| 2-3 | 10 413 | 14,6 | 8 959 | 13,0 | 44 341 | 28,4 | 41 499 | 24,1 | 39 709 | 23,1 | 200 | 1,6 | 380 | 1,4 | |
| 4-10 | 519 | 0,7 | 196 | 0,3 | 1 014 | 0,7 | 673 | 0,4 | 425 | 0,3 | 0 | 0,0 | 0 | | |
| >10 | 1 | 0,0 | 0 | 0,0 | 15 | 0,0 | 1 | 0,0 | 0 | 0,0 | 0 | 0,0 | 0 | 0,0 | |
| Mean HIV tests (Range) | 1 (1-11) | | 1 (1-8) | | 1 (1-16) | | 1 (1-12) | | 1 (1-9) | | 1 (1-3) | | 1 (1-3) | | |
| Mean duration in days between HIV tests (SD±) | 145 (79) | | 161 (73) | | 163 (61) | | 181 (61) | | 192 (61) | | 107 (66) | | 152 (87) | | |

Discussion

This is one of the first and largest studies from the EECA region that focused on HIV-testing and harm reduction among PWID. Following engagement of PWID in the HIV testing strategy and introduction of an optimized case finding strategy, there was an almost twenty-fold increase in HIV positive yield. Although there was also a five-fold increase in numbers of PWID tested for HIV, a progressive drop in their enrollment in harm reduction was observed which is of concern.

As HIV testing is the gateway to offering prevention and care for high risk HIV groups such as PWID, these findings are important to the SDG goal of “leaving none behind” and eliminating the epidemic of HIV by 2030 [6]. Notably, when HIV testing activity increased, the NGOs seemed unable to cope with the incremental caseload for enrolment into harm reduction. The operational capacity to absorb newly tested cases seemed defiant and needs correction.

The strengths of the study were that it was country-wide and involved almost 100 implementing partners and thus likely to be representative of the situation on the ground. In addition, the analysis covered a period of five years allowing trend analysis. We also adhered to the STROBE guidelines for standardized reporting of operational research [18]. The main study limitations included missing data on socio-demographic characteristics, types of injectable drugs and imprisonment history. This may be attributed to shortcomings in data recording which needs increased vigilance during supervision visits. It may also reflect the challenge of gathering information through self-reports from people who may have an altered state of mind when on injectable opioids and sedatives. Fear of disclosure and legal implications might also have contributed to this finding.

The study findings have a number of policy and practice implications. First, the engagement of PWID positively influenced HIV testing. Their involvement (along with peers) in active case findings within social risk networks through OCF resulted in an exponential increase in HIV positive yield. The Global Fund and PEPFAR have recently embraced the OCF strategy within their operational plans for Ukraine and the evidence from this study suggests that this decision is justified. The OCF strategy maybe particularly effective in concentrated epidemics. Since OCF picks up a higher proportion of HIV positives, it is likely to be an effective manner of routing PWID to ART initiation as part of a test and treat strategy. OCF faces the following barriers in long term perspective: proactive targeted testing strategy causes risk-network

yield stagnation - thus it requires changing location (moderate mobility), which is justified with operational on-time assessment. OCF has downward HIV yield in long term perspective, but gives dramatically increasing HIV detection rate at its’ start. This peak caseload requires operational resilience and secured capacity in terms of referring HIV-positive cases in harm reduction and linkage to care.

During the study period, NGOs provided over 800,000 HIV tests and reached 181,793 new PWID outside the health care system. This contribution highlights the important role of these non-state actors in providing prevention and care and needs to be formally recognized.

Second, while HIV testing activity increased five-fold after engagement of PWID, the progressive drop in enrollment in harm reduction is of concern. This may be directly related to NGOs being unable to cope with the increased caseloads of PWID pouring into the system through HIV testing. Importantly, the primary programme performance target was to increase “numbers of HIV testing” and no specific target has been assigned to monitor enrollment of those HIV tested into harm reduction. It is imperative that the programme also sets a minimum target of say 80% enrolment in harm reduction. Monitoring and reporting of both targets will allow programme coordinators to calibrate resource allocations and adapt operational strategies to cope with increased caseloads. Understanding the operational reasons behind this finding would be useful to institute corrective measures and needs specific research.

Finally, retesting for HIV was higher after engagement of PWID and their peers in routine testing which is encouraging as this allows early knowledge of HIV status and may influence positive health seeking behavior and enrollment in harm reduction.

Conclusion

In conclusion, active engagement of PWID and their peers in community-based HIV testing models increased identification of HIV positive individuals. OCF helped identify more HIV positive individuals and using DAST and OCF strategies together is synergistic. Shortcoming were observed in subsequent enrolment in harm reduction and we have highlighted opportunities to improve this situation.

Acknowledgements

This research was conducted through the Structured Operational Research and Training Initiative (SORT IT), a

global partnership coordinated by the Special Programme for Research and Training in Tropical Diseases at the World Health Organization (TDR). The specific SORT IT program that led to these publications included a partnership of TDR with the European Tuberculosis Research Initiative (ERITB) at the WHO Regional Office for Europe and was implemented by: Tuberculosis Research and Prevention Center NGO, Armenia, Centers for Disease Control and Prevention (CDC), Central Asia Regional Office, Kazakhstan, The Alliance for Public Health, Ukraine, and TDR.

We thank Samvel B. Gasparyan for assistance with final dataset merging, data cleaning and analysis, comments that greatly improved the manuscript.

We thank to Tetiana Myhalchuk for assistance with data extraction from SyrEx database and comments that greatly improved the data analysis.

Author contributions

NK, OD, PS and JK defined the main idea and hypothesis of the study. NK, RZ, PS and OD focused study objectives and conducted interpretation of study analysis. OD, PS supervised planning and work. NK, OD, RZ and JC were involved in drafting the manuscript. All authors provided critical feedback and helped to shape the study, analysis and manuscript.

Funding

This SORT IT program was funded by USAID and supported by implementing partners.

References

1. The Joint United Nations Programme on HIV/AIDS, Global HIV/AIDS statistics, fact sheet (2018) Available: <http://www.unaids.org/en/resources/fact-sheet>. Accessed 10 December 2018.
2. World Health Organization (2014) HIV prevention, diagnosis, treatment and care for key populations: 1–8. Available: http://apps.who.int/iris/bitstream/10665/128049/1/WHO_HIV_2014.8_eng.pdf.
3. World Health Organization (2017) Key considerations for differentiated antiretroviral therapy delivery for specific populations: children, adolescents, pregnant and breastfeeding women and key populations.: 66. Available: http://www.differentiatedcare.org/Portals/0/adam/Content/JIN_hklgtyESj7ariurMSuA/File/Key_considerations_for_differentiated_antiretroviral_therapy_delivery_for_specific_populations-children,adolescents,pregnantandbreastfeed.pdf. Accessed: Day month year
4. Nizova N, Kuzin I, Hetman L, Shcherbinska A, Soroka I, Martinsynska V, Alexeeva A, Yatsyk V, Riabokon S, Gritsenko T (2017) HIV infection in Ukraine, Factsheet №48, 2017, Public Health Center of the Ministry of Health of Ukraine. Available: <https://phc.org.ua/uploads/documents/c21991/be9c07b20fdcd077045761e95d0d82a6.pdf>. Accessed: 10 December 2018. [Available in Ukrainian]
5. World Health Organization (2012) Social contexts of access to treatment and care for HIV, hepatitis C and tuberculosis among people who inject drugs in European cities. Available: http://www.euro.who.int/__data/assets/pdf_file/0018/183231/Scaling-up-access-to-high-quality-harm-reduction,-treatment-and-care-for-injecting-drug-users-in-the-European-Region-final.pdf. Accessed 30 May 2018.
6. United Nations Department of Economic, Division for Sustainable Development Goals (DSDG) (2018) Goal 3. Sustainable Development Knowledge Platform. Available: <https://sustainabledevelopment.un.org/sdg3>. Accessed: 18 May 2018.
7. Alliance for Public Health (2013) Kyiv: Annual Report. 1–143 Available: http://aph.org.ua/wp-content/uploads/2016/08/ar_2013_en.pdf Accessed: 18 May 2018.
8. Heckathorn DD (1997) Respondent-driven sampling: A new approach to the study of hidden populations. *Soc Probl* 44: 174–199.
9. Ompad DC, Wang J, Dumchev K, Barska J, Samko M, Zeziulin O, Saliuk T, Varetska O, DeHovitz J (2017) Patterns of harm reduction service utilization and HIV incidence among people who inject drugs in Ukraine: A two-part latent profile analysis. *Int J Drug Policy* 43: 7–15.
10. Booth RE, Davis JM, Dvoryak S, Brewster JT, Lisovska O, Strathdee S, Latkin C (2016) HIV incidence among people who inject drugs (PWIDs) in Ukraine: results from a clustered randomised trial. *Lancet HIV* 3: e482–e489. Available: <http://www.ncbi.nlm.nih.gov/pubmed/27658879>. Accessed 18 May 2018.
11. State Statistics Service in Ukraine (2017) Intergated statistical publications Available: http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ1_u.htm. Accessed 18 May 2018. [Available in Ukrainian]
12. About | Fast-Track Cities (2016) About fast-track cities. Available: <http://www.fast-trackcities.org/about>. Accessed: 21 May 2019. [Available in Ukrainian].

13. Alliance for Public Health (2016) Monitoring of behavior and HIV prevalence among people who inject drugs and their sexual partners. Available: http://aph.org.ua/wp-content/uploads/2015/05/Monitoryng-povedinky-SIN__Eng__Na-RED.pdf. Accessed: 18 May 2018.
14. Kuzin I, Martsinovska V, Grabovyi S, Riabokon S, Antoniak S, Ivanchuk I, Andrianova I, Shcherbinska A, Liulchuk M, Sergeeva T, Honcharenko S (2018) HIV infection in Ukraine. Factsheet №49, 2018, Public Health Center of the Ministry of Health of Ukraine. Available: <https://phc.org.ua/uploads/documents/c21991/40fc8f955d5286e602e5ce1e8fac0fe2.pdf>. Accessed 10 December 2018.
15. Ministry of Health of Ukraine (2018) Monitoring of drug and alcohol situation – Mental health and, drugs and alcohol monitoring Center of the Ministry of Health of Ukraine, 2018. Kyiv, Ukraine p. Available: <http://ummcda.org.ua/моніторинг-наркотичної-та-алкогольн/>. Accessed: 24 May 2019. [Available in Ukrainian]
16. World Health Organization (2014) HIV prevention, diagnosis, treatment and care for key populations (Policy brief). Available: http://apps.who.int/iris/bitstream/handle/10665/128049/WHO_HIV_2014.8_eng.pdf?sequence=1. Accessed: 18 May 2018.
17. Alliance for Public Health (2017) Annual report 2016. Available: <http://aph.org.ua/en/our-works/ukraine/>. Accessed: 18 May 2018.
18. Elm E von, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative (2007) Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ* 335: 806–808.

Corresponding author

Nataliia Kravchenko

International charitable foundation “Alliance for Public Health”

9th floor, building 10A, 5 Dilova str., Kyiv 03150, Ukraine

Tel: +380632422714

Fax: +38 (044) 4905489

Email: kravchenko@aph.org.ua

Conflict of interests: No conflict of interests is declared.