Hidden Populations: A Follow Up Study of Risk Behaviours in The Drug Using Populations in The Republic of Georgia

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Research

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Abstract

Background:

Georgia has a significant risk of ongoing HIV and HCV outbreak. Within this context, harm reduction aims to reduce risk associated with drug use through community activities, such as peer recruitment and involvement. The aim of this study was to compliment earlier research, and attest to the ongoing utility of peer-driven intervention across multiple years in recruiting high-risk, vulnerable populations through peer networks. It was hypothesised that significant differences would remain between known, and previously unknown, members of the drug-using community, and that peer-driven intervention would continue to recruit individuals with high-risk, vulnerable individuals.

Methods:

Sampling occurred across 9 months in 11 cities in Georgia, recruiting a total of 2807 drug-using individuals. Standardised questionnaires were completed for all consenting and eligible participants, noting degree of involvement in harm reduction activities. This data underwent analysis to identify statistically significant different between those known and unknown to harm reduction activities, including in demographics, knowledge and risk behaviours.

Results:

Peer recruitment was able to attract a significantly different cohort compared to those already known to harm reduction services. Important differences in drug use, behaviour and risk were seen between the two groups, with the peer-recruited cohort undertaking higher-risk injecting behaviours. A mixture of risk differences was seen across different sub-groups and between the known and unknown population. Overall risk, driven by sex risk, was consistently higher in younger people (0.59 v. 0.57, p=0.00). Recent overdose was associated with higher risk in all risk categories. Peer-recruited individuals reported much lower rates of previous HIV testing (34.2% v. 99.5%, p=0.00). HIV knowledge and status were not significantly different.

Conclusions:

Significant differences were seen between the known and unknown drug-using populations. The recruitment strategy was successful in recruiting females and younger people. This is especially important given that this sampling followed subsequent rounds of peer-driven intervention, implying the ability of peer-recruitment to consistently reach hidden, unknown populations of the drug using community, who have different risks and behaviours. Risk differences were seen compared to previous samples, lending strength to the peer-recruitment model, but also informing how harm reduction programmes should cater services, such as education, to different cohorts.

Introduction

The Republic of Georgia is at considerable public health risk from Human Immunodeficiency Virus (HIV) and Hepatitis C Virus (HCV) due to injecting drug use. The last figures available, from 2016, estimate that 1.41% of the Georgian population partake in injecting drug use, with a 2.24% prevalence in the 15 - 64 age group[1]. These figures applied to the Georgian population estimates at the start of 2020 would estimate a number of just over 52700 people who use injecting drug, based on a population of 3716900[2]. Experts warned of a serious HIV epidemic, partly due to these figures, and the most recent number of officially registered cases of HIV/AIDS stood at 8299 (0.22% of the population), though it is estimated that the true figure is higher[3]. Of these, 37.3% are believed to have been attributed to injecting drug use[3]. The statistics are higher for HCV infection; a prevalence study from 2016 estimated HCV-antibodies to be present in 7.7% of the Georgian population, with 5.4% testing positive for active infection[4]. People Who Inject Drugs (PWID) remain a particularly high-risk group for HCV infection, with one-third of the figures in the general population thought to be related to injecting drug use[5], and with up to 75% of PWIDs exposed to HCV[6]. Like with HIV, Georgia is particularly vulnerable to HCV epidemic[7].

Exact figures for the number of PWID in Georgia are difficult to estimate. Surveys are undertaken periodically. There may be years between publishing of wide-reaching research. Therefore, it is difficult to know whether the number of PWID has increased since the previous report. Regardless, harm reduction programmes and public health measures are essential, due to the vulnerability to epidemic that Georgia faces. Needle and Syringe Programmes (NSPs) have been active in Georgia since 2005. A number of local non-government organisations (NGOs) conduct local harm reduction activities in towns across Georgia. It is from their activities that the data for this report was collected. Drug use is criminalised in Georgia[8]. In recent years there have been some changes to reduce penalties for marijuana possession, but not for harder drugs and drugs of injection[8].

In Georgia, local NGOs provide a package of harm reduction activities, including NSP, point-of-care testing for bloodborne diseases and other high-risk infections, counselling, education, referral, and overdose prevention (such as provision of naloxone). This includes the harm minimisation organisation conducting this report, the Georgian Harm Reduction Network (GHRN). In 2019, GHRN provided just under 4 million syringes across its reach of 35800 clients, up from 25000 in 2015. In 2019, this equalled 76 syringes per client per year, slightly lower than 2015 ratios, and still below the WHO recommendation of 300 per client per year[9]. In 2019, just over 28000 clients were tested for HIV, as well as 2400 family members of clients. These programmes have proved successful in attracting people in the drug using community to harm reduction services, evidenced by growing engagement with services.

GHRN published a report around a Peer-Driven Intervention (PDI) in 2019, from demographic sampling conducted in 2015[10]. Peer-Driven interventions recruit clients known to harm reduction programmes and encourage those clients to recruit people in their social or community network to harm reduction activities. PDIs show positive results internationally, being able to recruit previously difficult to reach drug-using populations to harm reduction programmes. Literature shows that PDIs can recruit younger PWIDs, reduce injection frequency, reduce rates of syringe and equipment sharing, and reduce rates of unprotected sex, overall, reducing health risk[11]. The differences between knowledge and risk-taking behaviours between populations known to NSPs and those recruited by PDI are significant, and PDIs are able to reach a more diverse drug-using population[12].

The previous report strengthened these findings. The PDI analysed was able to recruit previously hidden drug using populations, with statistically different demographics, risk behaviours and knowledge to the NSP sample. Statistically significant differences were found, with the PDI group having higher rates of unemployment, lower rates of home ownership, younger age and a higher proportion of people identifying as homosexual[10]. They were more likely to exchange sex for drugs or money, and less likely to 'always' use a condom[10]. Those recruited by PDI started injecting at a younger age, and shared syringes and equipment more frequently[10]. They were dramatically less likely to have ever been tested for HIV, were less likely to have been recently tested for HIV, less likely to know their HIV status and scored lower on measures of HIV knowledge[10]. The PDI was very successful in recruiting diverse populations of the drug using community to harm reduction activities that represent particularly high risk. PDI is an extremely useful tool in helping control bloodborne disease, and drug use-associated health risk[11].

Literature published since the research of the previous report has gone on to lend more strength to the importance of PDIs. The use of peers to engage the IDU population was seen to increase trust of the staff running harm reduction activities among the recruited, which can counteract the barrier of criminalisation, if it is present[13]. Trust was identified as an important facilitator, especially when aiming to recruit vulnerable minority groups, and this trust was associated with a decrease in stigma and increase in ongoing engagement with harm reduction programmes[14]. Financial incentives were a motivator, but not the only motivator; knowledge gaining was also seen as a benefit of those newly recruited[13]. The use of peers in programmes focussing on PWIDs and HCV found that they can act as a "bridge" between harm reduction programmes and peer networks, and can play a central role in harm reduction efforts[15]. They can also help to identify people previously engaged in harm reduction programmes who have since dropped out[16]. Peers have a surprising amount of social connection within their population, with a modelling showing that engaging just 5.6% of the drug using community could reach 70% of a drug using population through peer recruitment[17]. The modelling also demonstrated that peer-guided recruitment was able to reach vulnerable users who sat on the "periphery" of social networks[17]. Peer-driven interventions have also been further quantified to be cost-effective[18].

PDIs offer a promising method by which to recruit people who were previously out of the reach of harm reduction programmes. International evidence both prior to the previous report, and published since, agrees. The efficacy of these programmes in recruiting vulnerable, high-risk populations has also been shown in Georgia in the previous report. Since the pilot programme, PDIs have gone on to be used as a recruitment method for PWIDs in Georgia. This report details of sampling of peer-recruited PWIDs against previously-known NSP clients, to identify the ongoing significance of differences between populations as PDI recruits further into drug using populations. The purpose is to provide further evidence of the efficacy of PDIs to recruit vulnerable, high-risk populations, and to provide evidence of the power of PDIs to continually recruit previously unknown populations in subsequent rounds of recruitment. We hypothesise that important, significant differences will continue to exist between the two populations.

Methods

Two comparative cross-sectional surveys with respondent-driven sampling in the PDI group, and convenience sampling in the NSP group were conducted; one of the NSP clients already recruited and familiar with harm reduction activities, and one PDI sample, recruited by peers. Special incentive was given to recruit women and young people (under 25) by PDI methods. An ethics framework was produced and submitted to ensure that all participants were voluntary, competent to make an informed decision, and that confidentiality was protected as much as practicable. Sampling was performed over a 9-month period between October, 2018 and June, 2019, in 11 cities in Georgia (Tbilisi, Batumi, Akhaltsikhe, Rustavi, Kutaisi, Zugdidi, Telavi, Ozurgeti, Samtredia, Poti, and Borjomi). A trained consultant of voluntary counselling and testing carried out the standardised questionnaire. PDI sampling continued until sample size was adequate, and not exceeding 2600 participants. All those eligible for participation in the survey were included. Eligibility criteria included:

1. Older than 18 years old
2. Participation on voluntary grounds
3. Competent to consent and participate in study (in reference to medical conditions and mental health conditions)
4. Minimum 6-month involvement with NSP program (NSP participants only) / Non-participation in HIV prevention programmes, including NSP, in the year prior (PDI participants only)
5. Recruited by peer as part of PDI activity, with coupon (PDI participants only)
6. Presence of drug injection track marks (PDI participants only)

The PDI started with NSP 'seed' participants who were incentivised to educate and recruit peers previously unknown to the programme. A minimum of 2, and maximum of 9 recruiters were used as 'seeds' in each city, a total of 54. On first introduction, new PWIDs were offered to participate in sampling, and to become involved as recruiters. They were offered an education session, and then any PWIDs they recruited (linked by a coupon number) were

tested on knowledge. Education session included HIV transmission, window periods, injected drug-related harm, homemade drugs, overdose and first aid, tuberculosis, sexually-transmitted infections, and viral hepatitis. No new PWIDs who were not recruited by a peer were included in the PDI sample. Financial incentives were provided in reference to knowledge of topics covered in original education session with new recruits, with 1 Lari (GEL, €0.25) provided for each correct answer. Incentives were also provided for time and transport costs. If the second-generation recruit did not score any correct answers in knowledge, their recruiter was not provided further recruitment coupons (though they were also offered follow up services and education). If the respondent answered questions correctly, the first-generation recruiter was offered 3 further coupons. Incentives were provided based on the number of correct answers, up to 30 GEL (€7.6). Extra incentives were given for recruitment of the target subgroups of women and young people who inject drugs (5 GEL, €1.3). Ten GEL (€2.6) was provided for completing the survey questionnaire. All PWIDs were offered harm reduction services.

The same tool was used to assess knowledge, practice, behaviours, belief and risk in both NSP and PDI groups, which had been used in previous rounds of PDI recruitment. There were 6 survey sections used; demographic data (17 questions), drug use practice (28 questions), Risk Assessment Battery (29 questions), service assessment (3 questions), HIV knowledge (5 questions) and hepatitis C knowledge (19 questions). Risk Assessment Battery (RAB) was used in the previous report to define the risk undertaken in terms of risky drug and sex behaviour, indicating an average score out of a possibly 40 points, whereby individual risk is tallied, with an average risk score able to be derived for the risk categories. These scores can be averaged across demographic groups. Further information on RAB analysis follows below. Interviewing took 20 - 30 minutes. JotForm online data entry form was used to collect survey data from all participant organisations. JotForm's online form, by automating complex tasks, ensured the minimisation of data entry errors. The collected data were downloaded and merged into one dataset in Microsoft Excel, and later underwent statistical analysis with IBM Statistical Package for Social Sciences (SPSS), versions 21 and 26. Participants whose data had not been entered by the time of analysis were not included. "Refused to answer" answers were included in the analysis (as most presented data refers to a positive response). A Chi-square test was used for categorical data and independent t-test for continuous data. RAB index values were compared by one-way ANOVA, comparing for each characteristic in NSP and PDI samples separately, and then as an aggregate. Statistical significance was considered for p-values < 0.05.

To test the study hypothesis that the peer-recruited population were significantly different and had different risk tendencies to the client population, it was assumed that PWIDs with more than 6 months NSP program experience would have familiarity with harm reduction programmes, and their knowledge of risky drug use behaviours, transmission risks and sexual risks, and risk characteristics such as injecting behaviours, syringe sharing, risky sexual behaviours and overdose frequency. The results of the known population could be compared to PDI-recruited PWIDs who had no previous access to harm reduction programmes in the year prior and the education that comes with involvement, and the results could show whether differences did indeed exist. To increase the chance of identifying differences between those currently using harm reduction services, and those not, NSP participants have to have been using services for greater than 6 months, and PDI participants had to have not used any such service in at least 1 year. The results of the two groups were aggregated and averaged to allow comparison between the two groups of very different sizes.

Results

A total of 2807 participants were recruited. Of these, 987 were participants already known to NSP services. In the PDI sample, 1820 participants were recruited, from an initial 54 seed recruiters. A total of 5998 coupons had been issued, with 1990 returned (33%). Data was incomplete for 170 participants linked to a coupon number, giving a total of 1820 valid entries. Tbilisi was the most represented city in the survey (it also has the largest population as the capital). The mean age in the NSP group was 41.5, compared to 35.3 in the PDI group, and age range was 18 to 73. Age of first injection was younger in the PDI group (19.5 v 20.0) with a range of 10 to 49. Young people were much more represented in the PDI group compared to the NSP group (25.1% v 3.2). Females were also more represented in the PDI group (6.9 v 2.0). Most participants reported being heterosexual, and differences were not statistically significant.

The PDI sample was mapped for some of the seeds and their recruited peers. The mapped results for two example networks are shown for two of the harm reduction sites involved in PDI in Figure 1 and 2.

Full descriptive statistics are available in Tables 1 and 2. Not all questions and results are included in Tables 1 and 2; a number of questions asked about services availability, and were not included in this review. Questions and answers were also not included if they were considered negligible value, or had very few relevant answers.

Stark differences were seen in drug-related behaviours between those who had had harm reduction exposure (NSP) and those that had not (PDI). There were differences in the types of drugs used, with more PDI respondents injecting methadone and buprenorphine. The NSP group reported use of most other drugs, significantly heroin, suboxone, vint (home-made amphetamines), ephedrine, amphetamines and antihistamines in mixture, more frequently. The PDI group reported injecting less days in the past month, and in smaller groups, both of which were significantly different from the NSP group. However, they reported double the rate of episodes of intoxication that they termed as drug-induced overdose (6.4% v 3.6%). Risk behaviour showed large, significant differences between the PDI and NSP groups, with PDI partaking in a much higher rate of risky activities. The PDI group shared syringes, equipment and instruments at a much higher rate than the NSP group sharing syringes at nearly double the rate of the NSP group (33.6% v 15.3%) and had shared a syringe with someone with HIV nearly 6 times more frequently (2.9% v 0.5%). The largest difference however was seen in HIV testing; 67% of the PDI group reported never being tested for HIV, compared to just 0.6% of the NSP group. However, point-of-care testing for HIV during data collection interview showed no significant difference in HIV diagnosis (PDI 0.4% v NSP 0.8%, p - 0.14).

There was less divergence in HIV knowledge. Out of 5 standardised questions, only two showed a statistically significant difference in the rates of being answered correctly ("can a person with HIV look healthy?" and "can HIV be transmitted by mosquito bite?"). Though the differences were significant for two questions, the difference in the rate of correct answers was still less than 5% between the two groups.

The Risk Assessment Battery results showed differences in risk behaviours between the NSP and PDI groups. The results of selected characteristics, the drug, sex and overall risk, across the NSP and PDI groups are shown below in Table 3. The scores were derived by calculating the total risk score for each individual, based on a risk behaviour and the frequency with which this behaviour was partaken in ("never", "few times", "several times", "one or two times a week"), and then mean risk score for each participant was derived by dividing an individual's score by the number of questions. Different groups' scores were average as below, and compared between other variables. The scores reported are the group average score Table 3 looks compares results between different responses within the same group (NSP or PDI).

Differences in risk behaviours were seen between the NSP and PDI samples, and within the different groups of responders to RAB. Younger people (under 25) were found in both samples to have a significantly higher sex risk, but non-significant differences in drug risk or overall risk. Women had a significantly lower sex risk in both samples, but non-significant differences in drug or overall risk. Those who had overdosed in the previous 30 days had a significantly higher risk in nearly all 3 categories across both NSP and PDI groups (with the exception of drug risk in the PDI sample). Those in the PDI group who always used new syringes when injecting had a significantly lower risk in all categories, which was not reflected in the NSP sample. Those who always used new syringes in the NSP group only had a significantly lower risk for sex risk. Those who always used condoms in the past 6 months had a significantly lower risk for sex risk and overall risk in both samples. Education beyond secondary school was not associated with any decreased risk.

In terms of specific HIV-focussed questions, fewer differences were seen. In the NSP sample, those who reported being "not bothered" about their personal risk of having HIV showed significantly higher scores for drug and overall risk, whereas in the PDI sample, the opposite was true across all three categories. Scoring 5 correct answers for questions assessing HIV knowledge, was associated with a significantly lower drug risk in the NSP group. However, in the PDI group, scoring 5 correct answers in the HIV knowledge questions was associated significantly with higher drug risk and overall risk. Sex risk was the same for those who scored 5 correct answers, and those who didn't, in the PDI group. Finally, in the NSP group, there were no significant differences between those who had never been tested for HIV, those who had been tested and were negative, and those who had been tested and were positive. However, in the PDI sample, sex risk and overall risk were higher in those never tested, and this was statistically significant. There was no significant difference in drug risk between those never tested and those tested and negative. There were no PDI respondents who had been tested positive in the sample.

Table 4. shows a selected further RAB analysis of characteristics across the entire sample of NSP and PDI combined, as guided by the results of Table 3. When treated as one sample, sex risk, and therefore overall risk, remained higher in the young (age under 25) group, and this was statistically significant. Drug risk was not significantly different. Females had a significantly lower sex risk, but not drug or overall risk. Having had an overdose in the previous 30 days was associated with a significantly higher risk in drug, sex and overall risk categories. Always using a new syringe when injecting was associated with a significantly lower drug, and therefore overall, risk across the aggregated group. Interestingly, scoring 5 correct answers on HIV knowledge questions was associated with a significantly higher drug, and therefore overall, risk score across both groups. There were no significant differences for sex risk.

Discussion

Significant differences were shown between the clients known to harm reduction programmes across Georgia, and those recruited through peers to the programmes, who hadn't interacted in the previous 12 months. The recruitment strategy of encouraging recruitment of younger people and females was successful, and significantly higher proportions of these two groups were able to be recruited compared to the sample clients already known to services. Younger people showed higher sex risk in the NSP, PDI and overall groups. There were mixed differences in drug use types across the two groups, but large differences were seen in terms of risk, with the PDI samples having significantly higher rates of risky sharing practices, and much, much lower rates of testing for HIV. Knowledge of HIV was not as divergent as expected between the two groups. There were no significant differences seen in actual HIV status from point-of-care testing between the two groups at the time of interview.

These findings add further insights into the differences that were shown in the previous report from sampling in 2015. Similar to the previous sampling, this sample showed efficacy in recruiting previously-unknown clients to harm reduction programs. Special incentive to recruit young people and females was successful in this sample. Similar to last time, PDI was effective in recruiting young people under the age of 25 to harm reduction programmes. However, in this sample, recruiting women was much more successful, as our prior sampling actually recruited fewer women through PDI sampling. This success is more in line with what has been observed in some of the literature in other ex-Soviet nations, such as in Ukraine, where PDI was efficacious in recruiting a higher proportion of young people and females, compared to normal methods[19]. It is worth noting that the current survey showed that less than 0.3% of respondents reported a sexual orientation other than heterosexual. Usually prevalence of homosexuality in a society is many times higher than this[20], implying people may be under-reporting their sexual orientations, habits, and potentially, risk.

Similar to the 2015 sample, this sample showed that NSP clients were less likely to practice sharing behaviours during injection, and more likely to have been tested for HIV in the past. The difference in testing rates between the NSP and PDI groups in our current sample is a cause for concern, with only 33% of PDI respondents saying they had been previously tested, compared to more than 99% in the NSP group. It would be assumed that these differences were due to the education received when attending harm reduction services and the ability for testing, counselling and referral while attending the services. Part of this difference in risk may be due to drop out of client. It is possible that clients who may have dropped out, and have subsequently been re-recruited, have intrinsic differences in risk behaviour than those who remain engaged, as other studies have shown that peer recruitment is able to re-engage clients who may have dropped out[16]. Similar to the previous study, and other studies in drug use and risk, and HIV testing[21], this emphasises the importance of recruitment of drug users to harm reduction programmes, and potentially, the importance of retaining PWIDs in harm reduction engagement.

The previous report highlighted the shifting drug use scene in Georgia, which is moving away from traditional drugs of injection. This has been shown to be a wider trend regionally[19]. The current sample also confirms this; the PDI sample showed significantly lower rates of heroin use, and higher rates of use of diverted street drugs, such as methadone and buprenorphine. Information such as this is critical in directing harm reduction efforts. Differences exist between those in NSP, who may have a higher likelihood of using some traditional drugs of injection, and those who lie outside of these programmes, who may be influenced by other drug culture changes. Other studies support this, such as in the increasing use of diverted medications and adulterated opiates in the United States[22]. The increasing use of fentanyl has been identified as a culture shift in other countries[22], and our sample showed that PDI respondents had significantly higher rates of the use of fentanyl. Fentanyl was not reported in our previous report based on the 2015 sample.

The differences seen in the Risk Assessment Battery are crucial for planning ongoing harm reduction services. Comparing the results of the RAB for the current sample and the 2015 sample illustrates the need for ongoing assessment and update of information provision and intervention target; the previous sample showed lower sex risk in younger people in the PDI group, and no significant differences in the NSP group. This sample however showed the opposite, significantly higher sex risk in younger people, in both NSP and PDI groups. Further, the 2015 sample showed lower drug risk and higher sex risk in females in both the NSP sample, and lower risk for all three categories in the PDI sample. In the current sample however, women showed a significantly lower rates of sex risk behaviour across the two groups, which continued when aggregated. The importance of tailored, flexible programmes that meet the needs of clients has been identified in other locations[23], as has the ability of drug harm reduction programmes to impact sex risk[23]. These findings will be vital in guiding harm reduction activities in Georgia into the future.

It was an unexpected finding that knowledge on HIV did not differ dramatically between the NSP and PDI groups. The 2015 sample showed large differences in HIV knowledge; 75.2% of NSP respondents were deemed knowledgeable, whereas only 53% of the PDI respondents were deemed so, a difference which was statistically significant. However, across the two groups in current sample, there were no significant differences between NSP and PDI for 3 of the 5 standardised HIV knowledge questions. It is possible that HIV knowledge has been disseminating through peers in their drug using networks, independently of peer-driven sampling for recruitment to programmes. It is also possible that those recruited had previously been involved in harm minimisation activities, and that knowledge from previous education had been retained. Details of whether any of the PDI participants were ever previously involved with harm minimisation services was not sought.

The use of peers in recruiting and guiding harm reduction programmes is widely documented, and supported in literature published since our 2015 analysis[13, 14, 15, 16]. Peer leadership has been identified as an asset in building, guiding and implementing new concepts in the realm of public health, such as Whole Systems Approaches, where the interacting, complicated factors that influence individuals are mapped, and interventions planned around managing multiple contributory factors on multiple levels of personal influence simultaneously. A pilot study in Australia of a Whole Systems Approach for HIV and Hepatitis C testing involved peers as an integral part of the harm reduction programme, and supported the use of peers in such programmes into the future[24]. As public health evolves into the future to meet new and evolving challenges, it will be essential that a peer focus is included in considering how to meet these challenges and how best to recruit and serve the client populations, including in drug-related harm reduction.

Conclusion

The Republic of Georgia continues to be at risk of expanding bloodborne disease epidemics, including related to drug use. Though programmes are continuously growing, social limitations remain, and populations still remain hidden to harm reduction services, such as Needle Syringes Programmes and point-of-care HIV and infectious disease testing. Peer-driven interventions are seen as a way to build trust in drug-using populations and involve people previously unknown in harm reduction services to improve public health. The involvement of peers in planning, recruiting and delivering public health services, including around drug harm reduction, is promoted, including in new types of public health interventions.

Ongoing vulnerabilities and risks exist between different subgroups of the drug-using community. The previous report based on 2015 figures showed some similarities, as well as some disparities, between these vulnerabilities and risks compared to the 2019 figures. This underscores the need for ongoing monitoring and evaluation of programmes and the populations which they serve. Realising the dynamic change seen in client populations is essential in guiding and adapting services into the future to best reduce harm and tailor programmes to the client population. This report quantified that different levels continue to exist between people known to harm reduction services and those who remain hidden to them. It speaks to the power of peer-driven interventions in reaching clients not only previously unknown, but also those at different levels of risk, to the known population. This report

also underscores the importance of repeated peer-driven interventions, as this intervention was able to recruit high-risk, vulnerable populations that were different to the previous peer-driven interventions.

Future directions should further quantify how subsequent PDI programmes can recruit different high-risk populations from previous interventions. Running subsequent programmes seems to be beneficial to the target population; in this sample, people of different risk to previous recruitments were introduced to the harm reduction programmes. There should also be investigation into how these high-risk groups are retained in programmes and the factors that contribute to whether they remain engaged with harm reduction programmes, or if they drop out. It is this evidence-based guidance of dynamic change that is needed in public health programmes. Programmes, including harm reduction services, need to update their models continuously to meet the needs of the populations. Involvement of peers, building trust, provision of harm reduction materials and education remain important ways to reduce harm in this vulnerable population, and improve public health.

Limitations

There were several limitations that mean the data above should be treated with some caution. The most striking feature was the likely under-reporting of bisexuality or homosexuality. This is most obvious in identification of sexual orientation, as rates of people identifying as non-heterosexuality are known to be higher than what was reported in our sample. Global surveys usually report a prevalence of heterosexuality at around 90%[20], whereas our sample report 99.7% heterosexuality. It does however highlight the potential for under-reporting throughout all self-reported data, and the potential influence of stigma around sex risk.

Other events reduce the power of our study. The sampled population is not representative of the wider society, nor were people included sequentially. The sample was in people who presented to harm reduction services and consented to participate. A significant number of people did not attend compared to how many coupons were given out, did not have valid answers recorded, or could not be analysed within the time frame of the sampling. These all place limitations on the generalisability of the data, and no inferences about population levels of drug use can be made from our data, as it refers to a cohort of drug users.

Abbreviations

GHRN - Georgian Harm Reduction Network

HCV - Hepatitis C Virus

HIV - Human Immunodeficiency Virus

IDU - Injecting Drug User

MSM - Men who have Sex with Men

NGO - Non-Government Organisation

NSP - Needle Syringe Program

PDI - Peer-Driven Intervention

PWID - People Who Inject Drugs

RAB - Risk Assessment Battery

WHO - World Health Organization

Declarations

Ethics Approval and Consent to Participate

Study protocol is based on intervention protocol, and questionnaire (administrated by an interviewer) was the same between NSP and PDI participants. Two types of informed consent forms were provided; consent to participate and consent to recruit other peers. The protocol and all forms, including consent forms, were submitted to the Commission of Bioethical Issues, Health Research Union (HRU, IRB 00009520 - 47 Tashkenti Street, Tbilisi) for consideration of study participants rights. The ethics commission of Health Research Union is registered in the Registry of Human Rights Ethics Commission.

Consent for Publication

Not applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to the sensitive nature of the data and affiliations within harm reduction organisations of the participants, but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests. The harm reduction project is a part of the National HIV Prevention Programme, supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria.

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Author's contributions

CL provided report writing, statistical analysis and literature review. MG provided consultation and data. IK provided data curation, formal analysis, review & editing, as did KS, GJ and TZ.

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References

1. Bemoni Public Union (BPU) and Curatio International Foundation (CIF). Population Size Estimation of People who Inject Drugs in Georgia 2016: Study Report. *Bemoni Public Union and Curatio International Foundation*. 2017. Retrieved June 10, 2020, from: http://curatiofoundation.org/wp-content/uploads/2018/02/PWID-PSE-Report-2017-ENG.pdf
2. Population. *National Statistics Office of Georgia*. 2020. Retrieved June 10, 2020, from: https://www.geostat.ge/en/modules/categories/41/population
3. AIDS Centre. HIV/AIDS epidemiology in Georgia. *AIDS Centre*. 2020. Retrieved June 10, 2020, from: http://aidscenter.ge/epidsituation_eng.html
4. Gvinjilia, L., Nasrullah, M., Sergeenko, D., Tsertsvadze, T., Kamkamidze, G., Butsashvili, M. et al. National Progress Toward Hepatitis C Elimination — Georgia, 2015–2016. *Centre for Disease Control and Prevention: MMWR Morbidity and Mortality Weekly Report*. 2016;65:1132–1135. doi: 10.15585/mmwr.mm6541a2
5. Baliashvili, D., Kasradze, A., Kuchukhidze, G., Salyer, S., Gamkrelidze, A., Zakhashvili, K. et al. Prevalence and genotype distribution of hepatitis C virus in Georgia: a 2015 nationwide population-based survey. *Journal of Hepatology*. 2017;66:S277. doi: 10.1016/S0168-8278(17)30870-X
6. Curatio International Foundation (CIF) and Bemoni Public Union (BPU). HIV risk and prevention behaviors among People Who Inject Drugs in seven cities of Georgia. *Curatio International Foundation and Bemoni Public Union*. Retrieved June 10, 2020, from: http://curatiofoundation.org/wp-content/uploads/2018/02/PWID-IBBS-Report-2017-ENG.pdf
7. Chikovani, I., Ompad, D. C., Uchaneishvili, M., Sulaberidze, L., Sikharulidze, K., Hagan, H. et al. On the way to Hepatitis C elimination in the Republic of Georgia—Barriers and facilitators for people who inject drugs for engaging in the treatment program: A formative qualitative study. *PLoS ONE*. 2019;14(4):e0216123. doi: 10.1371/journal.pone.0216123
8. Human Rights Watch. Harsh Punishment: The Human Toll of Georgia's Abusive Drug Policies. *Human Rights Watch.* Retrieved July 26, 2020, from: https://www.hrw.org/report/2018/08/13/harsh-punishment/human-toll-georgias-abusive-drug-policies
9. World Health Organization (WHO). Global Health Sector Strategy on Viral Hepatitis 2016 - 2021: Towards Ending Viral Hepatitis. *World Health Organization*. 2016
10. Gogia, M., Lawlor, C., Shengelia, N., Stvilia, K. & Raymond, H. F. Hidden populations: discovering the differences between the known and the unknown drug using populations in the Republic of Georgia. *Harm Reduction Journal*. 2019;16:15. doi: 10.1186/s12954-019-0287-5
11. Broadhead, R. S., Volkanevsky, V. L., Rydanova, T., Ryabkova, M., Borch, C., van Hulst, Y. et al. Peer-driven HIV interventions for drug injectors in Russia: First year impact results of a field experiment. *International Journal of Drug Policy*. 2006;17(5):379–92. doi: 10.1016/j.drugpo.2006.06.001
12. Broadhead, R. S., Heckathorn, D. D., Weakliem, D. L., Anthony, D. L., Madray, H., Mills, R. J. et al. Harnessing peer networks as an instrument for AIDS prevention: results from a peer-driven intervention. *Public Health Reports*. 1998;113(supp 1):42–57. Retrieved June 10, 2020, from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1307726/pdf/pubhealthrep00030-0046.pdf
13. Abadie, R., Goldenberg, S., Welch-Lazoritz, M. & Fisher C. B. Establishing trust in HIV/HCV research among people who inject drugs (PWID): Insights from empirical research. *PLoS ONE*. 2018;13(12): e0208410. doi: 10.1371/journal.pone.0208410

14. Treloar, C., Hopwood, M., Cama, E., Saunders, V., L. Jackson, C., Walker, M. et al. Evaluation of the Deadly Liver Mob program: insights for roll-out and scale-up of a pilot program to engage Aboriginal Australians in hepatitis C and sexual health. *Harm Reduction Journal.* 2018;15(5). doi: 10.1186/s12954-018-0209-y
15. Stengel, C. M., Mane, F., Guise, A., Pouye, M., Sigrist, M. & Rhodes, T. "They accept me, because I was one of them": formative qualitative research supporting the feasibility of peer-led outreach for people who use drugs in Dakar, Senegal. *Harm Reduction Journal*. 2018;15(9). doi: 10.1186/s12954-018-0214-1
16. Schwartz, S., Lambert, A., Phaswana-Mafuya, N., Kose, Z., Mcingana, M., Holland, C. et al. Engagement in the HIV care cascade and barriers to antiretroviral therapy uptake among female sex workers in Port Elizabeth, South Africa: findings from a respondent-driven sampling study. *Sexually Transmitted Infections*. 2017;93:286–292. doi:10.1136/sextrans-2016-052773
17. Bouchard, M., Hashimi, S., Tsai, K., Lampkin, H. & Jozaghi, E. Back to the core: A network approach to bolster harm reduction among persons who inject drugs. *International Journal of Drug Policy*. 2018;51:95–104. doi: 10.1016/j.drugpo.2017.10.006
18. Stevens, E. R., Nucifora, K., Zhou, Q., Braithwaite, S., Cleland, C. M., Ritchie, A. S. et al. Cost-effectiveness of peer- versus venue-based approaches for detecting undiagnosed HIV among heterosexuals in high-risk New York City neighborhoods. *Journal of Acquired Immune Deficiency Syndromes*. 2018;77(2):183–192. doi:10.1097/QAI.0000000000001578
19. Smyrnov, P., Broadhead, R. S., Datsenko, O. & Matisyash, O. Rejuvenating harm reduction projects for injection drug users: Ukraine's nationwide introduction of peer-driven intervention. *International Journal of Drug Policy*. 2013;23:141–7. doi: 10.1016/j.drugpo.2012.01.001
20. Rahman, Q., Xu, Y., Lippa, R. A. & Vasey, P. L. Prevalence of Sexual Orientation Across 28 Nations and Its Association with Gender Equality, Economic Development, and Individualism. *Archives of Sexual Behaviour*. 2020;49:595–606. doi: 10.1007/s10508-019-01590-0
21. Asher, A. K., Hahn, J. A., Couture, M. C., Maher, K. & Page, K. People who inject drugs, HIV risk, and HIV testing uptake in sub-Saharan Africa. *Journal of the Association of Nurses in AIDS Care*. 2013;24(6):e.35–44. doi: 10.1016/j.jana.2012.09.003
22. Ciccarone, D. Editorial for "US Heroin in Transition: Supply Changes, Fentanyl Adulteration and Consequences" IJDP Special Section. *International Journal of Drug Policy*. 2017;46:107–111. doi:10.1016/j.drugpo.2017.06.010
23. Wang, K., Fu, H., Longfield, K., Modi, S., Mundy, G. & Firestone, R. Do community-based strategies reduce HIV risk among people who inject drugs in China? A quasi-experimental study in Yunnan and Guangxi provinces. *Harm Reduction Journal*. 2014;11:15. doi: 10.1186/1477-7517-11-15
24. Brown, G., Reeders, D., Cogle, A., Madden, A., Kim, J. & O'Donnell, D. A Systems Thinking Approach to Understanding and Demonstrating the Role of Peer-Led Programs and Leadership in the Response to HIV and Hepatitis C: Findings From the W3Project. *Frontiers in Public Health*. 2018;6:231. doi: 10.3389/fpubh.2018.00231

Tables

Table 1. Participants' socio-demographic characteristics (NSP N=987; PDI N=1820)

Characteristic		NSP (%^) n=987	PDI (%^) n=1820	p-value
Demographics				
City	Akhaltsikhe	0	5.0	-
	Batumi	2.6	4.3	
	Borjomi	0.2	5.9	
	Gori	3.4	0	
	Kutaisi	2.7	7.2	
	Ozurgeti	2.2	5.6	
	Poti	2.0	5.3	
	Rustavi	3.6	4.0	
	Samtredia	2.5	4.0	
	Tbilisi	10.5	16.4	
	Telavi	2.5	2.3	
	Zugdidi	2.9	7.5	
Age[α]	18-25	3.2	25.1	**0.00**
	>26	96.8	74.9	
	Mean^	41.5	35.3	**0.00**
Sex[α]	Female	2.0	6.9	**0.00**
	Male	98.0	93.1	
Sexual orientation	Heterosexual	99.9	99.7	0.31
	Bisexual	0.1	0.1	
	Homosexual	0.0	0.2	
Education[α]	Secondary (incomplete)	7.5	9.0	**0.00**
	Secondary (complete)	47.3	46.1	
	Tertiary (incomplete)	13.4	16.6	
	Tertiary (complete)	16.3	10.2	
	Professional	15.1	18.0	
Employment[α]	Unemployed	57.0	60.8	**0.00**
	Self-employed	23.9	21.8	
	Temporary work	12.1	11.1	
	Full time work	6.4	5.1	
	Pensioner	0.1	0.3	
Income source*[α]	Employment	37.7	36.5	**0.00**
	Renting or selling	13.7	16.1	
	Friends, relatives, partners	29.9	32.3	
	Welfare, pension	4.9	4.4	
	Illegal activities	2.3	2.2	
	Gambling	5.6	8.5	
Living conditions[α]	Own apartment	38.9	30.0	**0.00**
	Apartment sharing	49.2	57.9	
	Renting	9.9	10.7	
	Shelter	1.0	0.7	

	Homeless	0.6	0.7	
Previous or current medication-assisted treatment[α]	Yes	30.7	11.6	**0.00**
	Currently being treated	11.8	6.4	

^ unless otherwise specified

* in the last 30 days

[α] as a percentage proportion by recruitment group (NSP v PDI)

Table 2. Risk-related behaviours, HIV-related knowledge and history of HIV and HCV testing (NSP n=987; PDI n=1820)

Drug use behaviours, including drugs injected			
Age of first injection^ (mean)	20.0	19.5	**0.00**
Injections per day*^ (mean)	1.4	2.1	0.23
Injection days*^ (mean)	17.7	13.8	**0.00**
Injection group size*^ (mean)	3.9	3.5	**0.02**
Drugs used in the past 30 days[β]			
Heroin/sirets	58.3	54.9	**0.00**
Fentanyl	1.2	2.0	**0.00**
Street methadone	9.9	13.2	**0.00**
Methadone diverted from opioid substitute therapy	5.5	7.1	**0.00**
Street buprenorphine	30.0	36.5	**0.00**
Buprenorphine diverted from opioid substitute therapy	34.2	20.0	**0.00**
Vint (homemade amphetamines)	15.5	12.7	**0.00**
Ephedrine	32.3	23.5	**0.00**
Amphetamines	5.5	2.3	**0.00**
Antihistamines in mixture	7.7	2.7	**0.00**
Overdose in the last 30 days	3.6	6.4	**0.00**
Drug- and sex-related risky behaviours (behaviours over the past 6 months)			
Shared equipment	33.4	52.0	**0.00**
Shared syringe	15.3	33.6	**0.00**
Used a syringe after someone	4.6	26.3	**0.00**
Someone used syringe after	6.4	25.4	**0.00**
Shared syringe with someone HIV positive	0.5	2.9	**0.00**
Always used new syringe	77.1	68.1	-
Shared instruments	35.2	53.2	**0.00**
Exchange sex for drugs	1.9	1.6	0.65
Exchange drugs for sex	3.1	1.8	0.05
Exchanged sex for money	0.7	0.9	0.82
Exchanged money for sex	6.4	6.9	0.63
Sex with someone HIV positive	0.0	0.6	0.05
Past number of blood tests for HIV?^	3.1	0.6	**0.00**
Never tested for HIV	0.6	67.0	**0.00**
HIV knowledge (correct answers)			
HIV risk is reduced if you have only one partner	98.9	98.8	0.61
HIV risk is reduced if a condom is always used	99.5	98.7	0.13
A person with HIV can look healthy	91.2	86.8	**0.00**
HIV can be caught by sharing food or water with an infected person	98.2	98.1	0.94
HIV can be transmitted by mosquito bite	93.1	91.0	**0.00**
HIV and HCV Testing			
Ever tested for HCV	99.5	34.2	**0.00**
HIV positive on point-of-care testing at interview	0.8	0.4	0.14

^ unless otherwise specified

* in the last 30 days

[α] as a percentage proportion by recruitment group (NSP v PDI)

[β] use of multiple substances gives cumulative prevalence of greater than 100%

NB: drug types were not included if both groups had less than 5% use

Table 3. Drug, Sex and Overall Risk Index for selected demographics across NSP and PDI groups (95% confidence intervals)

Characteristic		Sample Group											
	Groups	NSP						PDI					
		Overall Drug Index	p-value	Overall Sex Index	p-value	Overall Risk Index	p-value	Overall Drug Index	p-value	Overall Sex Index	p-value	Overall Risk Index	p-value
Age	<25	.50 [.46-.53]	.67	.70 [.67-.74]	**.01**	.59 [.56-.62]	.14	.49 [.48-.50	.96	.71 [.70-.71]	**.00**	.59 [.58-.59]	**.00**
	>26	.49 [.48-.49]		.67 [.66-.67]		.57 [.56-.57]		.49 [.48-.49]		.66 [.66-.67]		.57 [.56-.57]	
Sex	Female	.47 [.42-.51]	.42	.63 [.60-.67]	**.04**	.54 [.51-.57]	.11	.50 [.49-.52]	.10	.66 [.64-.67]	**.04**	.57 [.56-.59]	.88
	Male	.49 [.48-.50]		.67 [.66-.67]		.57 [.56-.57]		.49 [.48-.49]		.67 [.67-.68]		.57 [.57-.57]	
Education	Secondary	.49 [.48-.50	.71	.67 [.66-.68]	.17	.57 [.56-.58]	.35	.49 [.48-.50]	.37	.67 [.66-.68	.15	.57 [.57-.58]	.91
	Higher	.49 [.47-.50]		.66 [.66-.67]		.57 [.56-.57]		.48 [.48-.49]		.68 [.67-.68]		.57 [.57-.58]	
Overdose in the past 30 days	Yes	.58 [.53-.64]	**.00**	.71 [.70-.75]	**.00**	.64 [.60-.68]	**.00**	.51 [.49-.54]	0.20	.70 [.68-.72]	**.01**	.60 [.58-.61]	**.00**
	No	.48 [.48-.49]		.67 [.66-.67]		.57 [.56-.57]		.49 [.48-.49]		.67 [.67-.68]		.57 [.57-.57]	
Syringe Use in the last 6 months	Always used a new syringe	.48 [.48-.49]	.05	.67 [.67-.68]	**.03**	.57 [.56-.57]	.60	.46 [.46-.47]	**.00**	.67 [.66-.67]	**.00**	.56 [.55-.56]	**.00**
	Re-used syringes	.50 [.48-.52]		.68 [.67-.68]		.60 [.59-.60]		.54 [.53-.55]		.68 [.68-.69]		.60 [.60-.61]	
Condom Use in the last 6 months	Always	.49 [.47-.50]	.86	.63 [.62-.64]	**.00**	.55 [.54-.56]	**.00**	.48 [.47-.49]	.28	.62 [.61-.63]	**.00**	.54 [.54-.55]	**.00**
	Not always	.49 [.48-.49]		.69 [.68-.69]		.58 [.57-.58]		.49 [.48-.50]		.68 [.68-.69]		.58 [.57-.58]	
Level of Worry about HIV	Not bothered	.51 [.49-.53]	**.00**	.66 [.65-.67]	.41	.58 [.57-.59]	**.00**	.47 [.46-.49]	**.00**	.65 [.64-.66]	**.00**	.55 [.54-.56]	**.00**
	Somewhat	.49 [.48-.50]		.67 [.66-.68]		.57 [.56-.59]		.50 [.49-.50]		.67 [.66-.67]		.57 [.57-.58]	
	Significantly	.45 [.43-.46]		.67 [.66-.68]		.55 [.54-.55]		.48 [.47-.49]		.70 [.70-.71]		.58 [.57-.59]	
HIV Knowledge	Yes	.48 [.48-.49]	**.00**	.67 [.66-.67]	.26	.58 [.56-.60]	.08	.49 [.49-.50]	**.00**	.67 [.67-.68]	.34	.58 [.57-.58]	**.00**
	No	.51 [.47-.54]		.66 [.65-.67]		.56 [.55-.57]		.46 [.45-.47]		.67 [.66-.68]		.55 [.55-.56]	
Tested for HIV previously and know the result	Never Tested	.34 [-.53-1.21]	.05	.67 [-.39-1.37]	.53	.49 [.33-.65]	.06	.49 [.48-.50]	.05	.68 [.68-.69]	**.00**	.58 [.57-.58]	**.00**
	Tested Negative	.49 [.48-.50]		.67 [.66-.67]		.57 [.56-.57]		.48 [.47-.49]		.65 [.64-.66]		.56 [.55-.56]	
	Tested Positive	.41 [.23-.59]		.63 [.57-.69]		.51 [.40-.61]		n/a		n/a		n/a	

Table 4. Drug, Sex and Overall risk across total group for selected characteristics

Characteristic							
	Groups	Overall					
		Overall Drug Index	p-value	Overall Sex Index	p-value	Overall Risk Index	p-value
Age	<25	.49 [.48-.50]	.89	.71 [.70-.71]	**.00**	.59 [.58-.59]	**.00**
	>26	.49 [.48-.49]		.66 [.66-.67]		.57 [.56-.57]	
Sex	Female	.50 [.48-.52]	.23	.65 [.64-.67]	**.01**	.57 [.56-.58]	.72
	Male	.49 [.48-.49]		.67 [.67-.68]		.57 [.57-.57]	
Overdose in the past 30 days	Yes	.53 [.51-.55]	**.00**	.70 [.68-.72]	**.00**	.61 [.59-.62]	**.00**
	No	.49 [.48-.49]		.67 [.67-.67]		.57 [.56-.57]	
Syringe Use in the last 6 months	Always used a new syringe	.47 [.47-.48]	**.00**	.67 [.66-.67]	.05	.56 [.56-.56]	**.00**
	Re-used syringes	.53 [.52-.54]		.68 [.67-.68]		.60 [.59-.60]	
HIV Knowledge	Yes	.49 [.49-.49]	**.02**	.67 [.66-.67]	.19	.57 [.57-.57]	**.01**
	No	.48 [.46-.49]		.67 [.67-.67		.56 [.55-.57]	

Figures

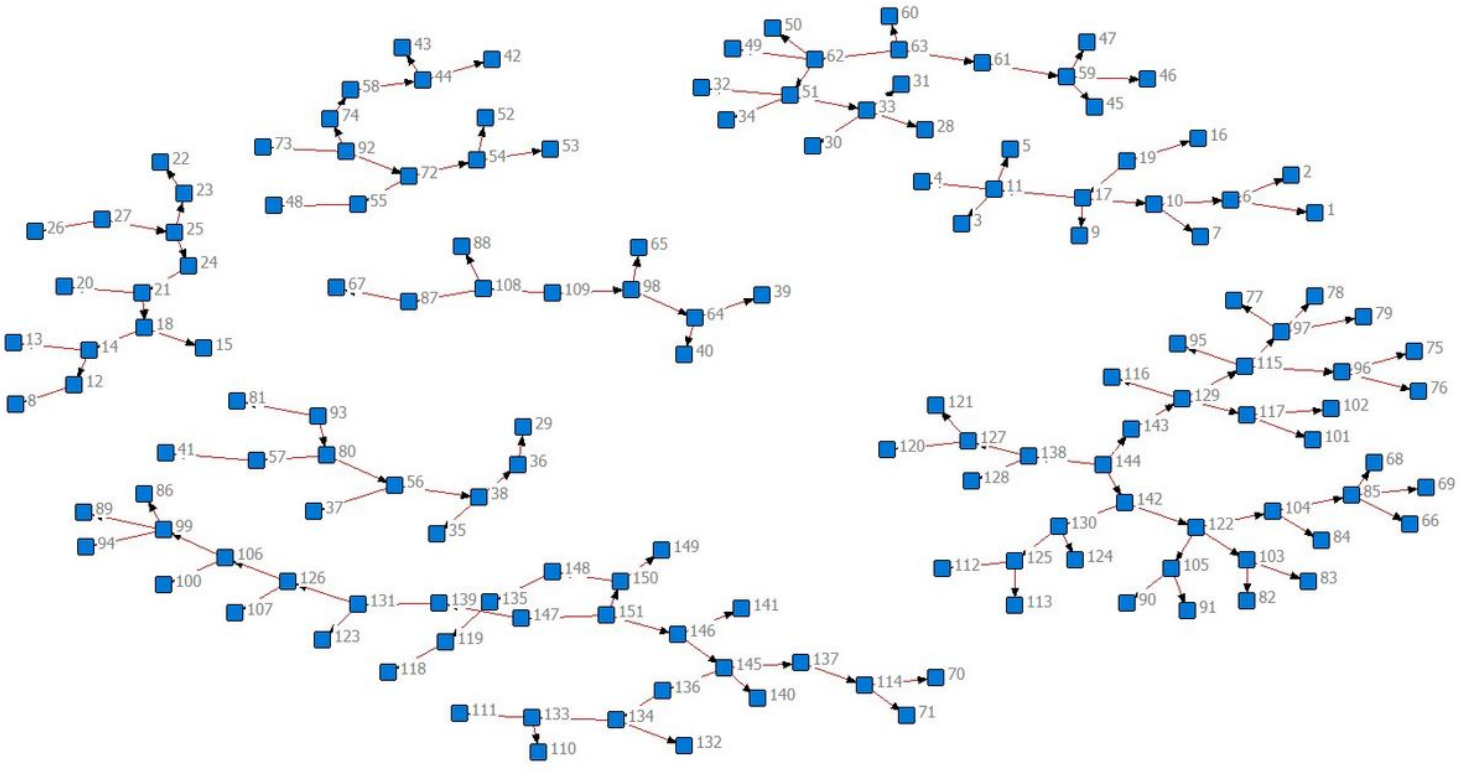
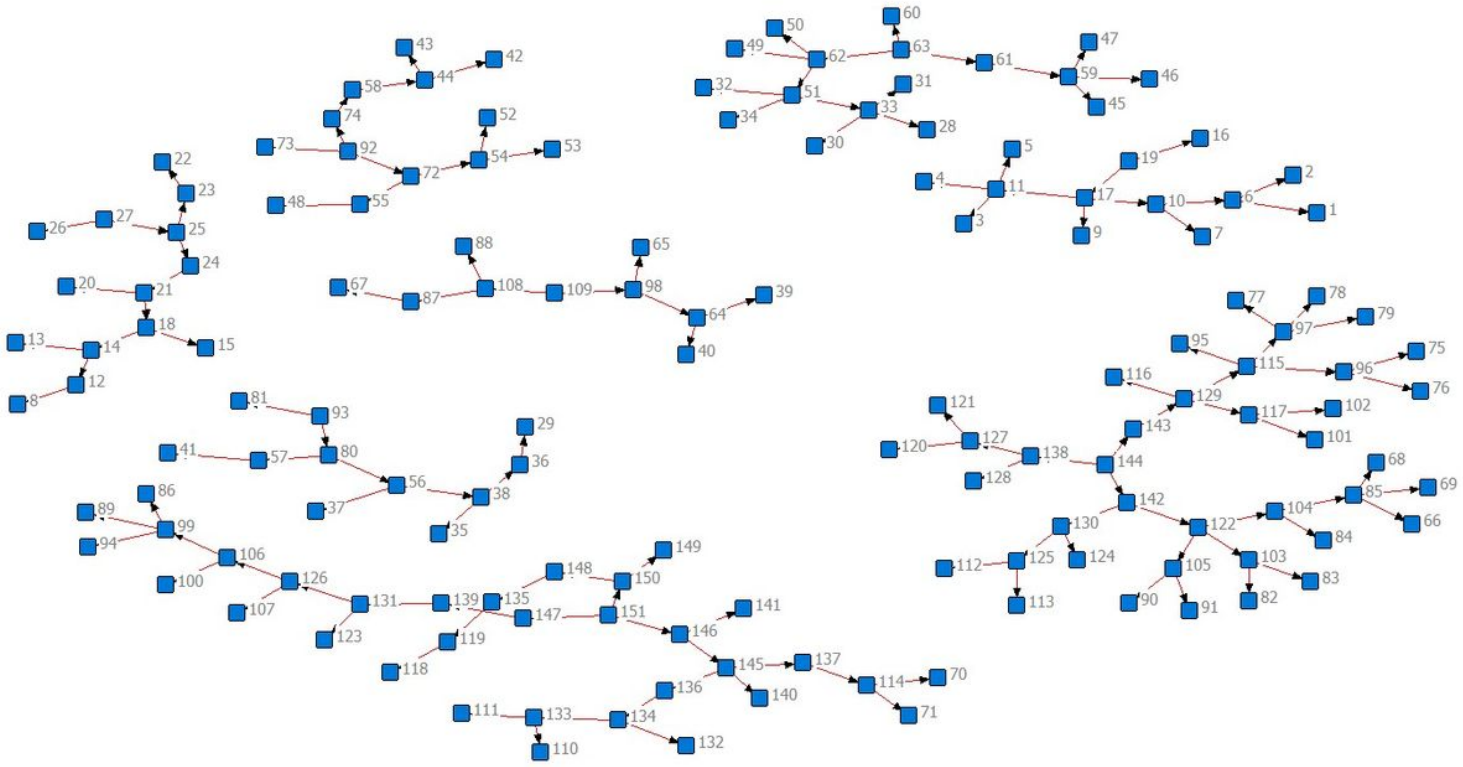


Figure 1

Peer-driven recruitment network from initial seed clients as recruited by the harm reduction organisation New Vector



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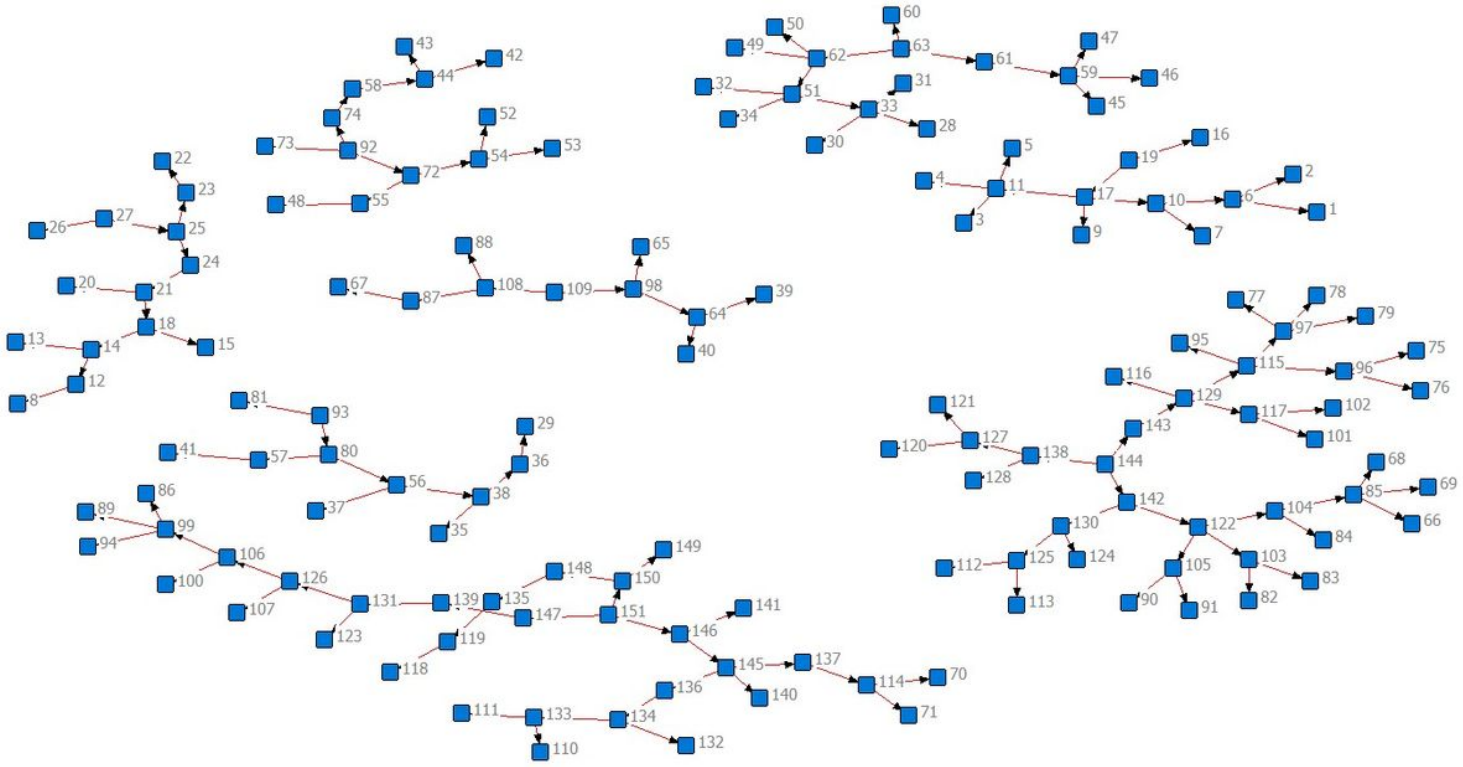
Peer-driven recruitment network from initial seed clients as recruited by the harm reduction organisation New Vector



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Peer-driven recruitment network from initial seed clients as recruited by the harm reduction organisation New Vector

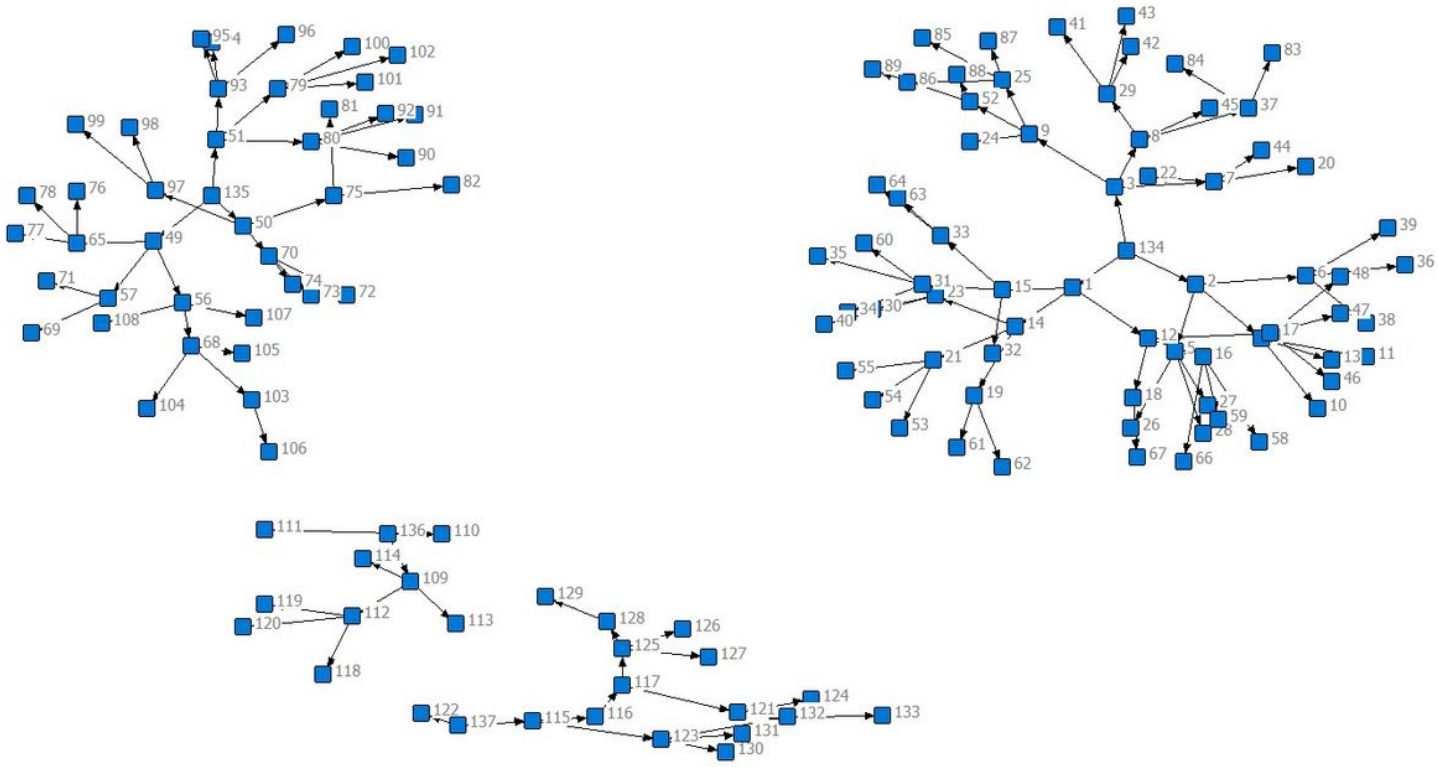
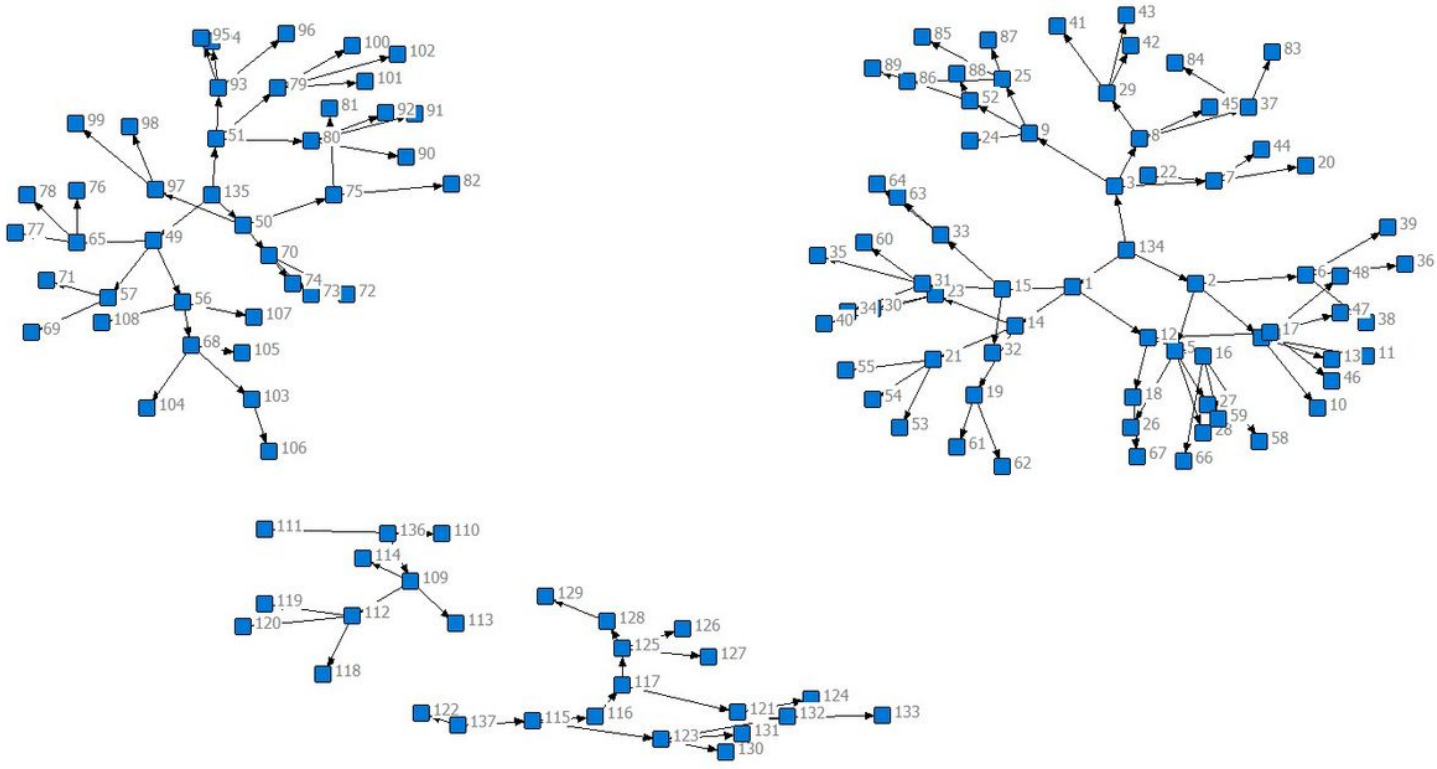


Figure 2

Peer-driven recruitment network from initial seed clients as recruited by the harm reduction organisation Aceso



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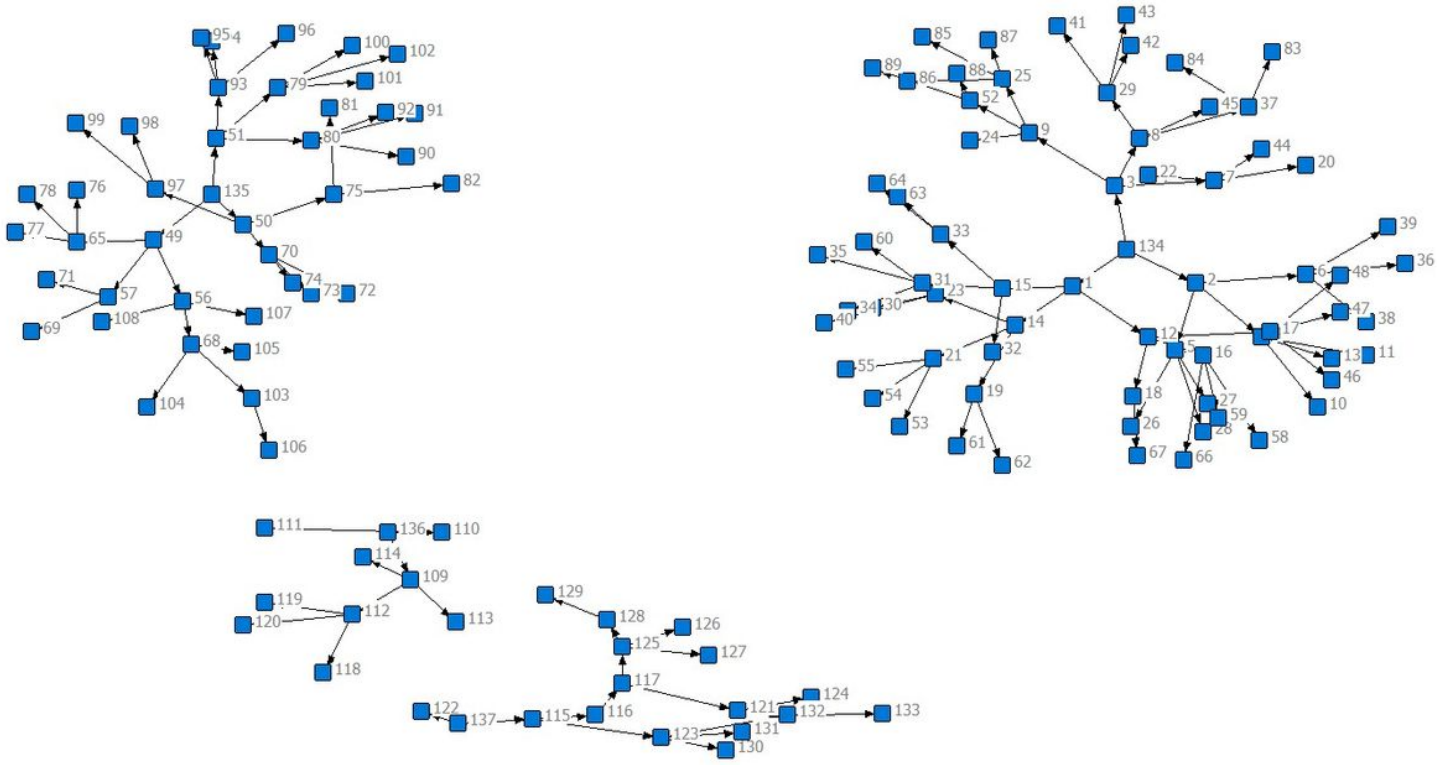

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