# Injecting risk behaviours and harms associated with injecting drug use in Australia: Are there differences by gender?

**Authors: Seraina Agramunt and Simon Lenton**
***National Drug Research Institute***
***Curtin University***

## Key findings

- There were more females than males who reported lending a used needle to someone else and being injected by a partner or friend after they had injected themselves with either a new or used needle.
- There were no significant differences between females and males in terms of injection-related health problems.
- However, when controlling for potential confounding factors, gender ($p$=0.030), duration of injection ($p$=0.002) and the total score on the anxiety and depression checklist (K10) ($p$=0.019) were the only factors associated with lending a used needle to someone else.
- The duration of injection ($p$=0.001) and gender (females versus males) ($p$=0.005) were the only predictors of being injected by a partner or friend after they had injected themselves with either a new or used needle.
- Duration of injection and gender (females versus males) seem to be important factors associated with distributive and receptive needle sharing, with females and recent consumers being more likely to report having shared a used needle, and being injected by a partner or friend after they had injected themselves with either a new or used needle.

## Introduction

Preventing the transmission of blood-borne virus (BBV) among people who inject drugs (PWID) has been a primary public health concern (1). Despite high coverage of interventions (e.g., needle-syringe programs (NSP), opiate agonist therapy) to reduce BBV transmission in Australia, needle and equipment sharing is still a common occurrence among PWID (1, 2).

A recent systematic review on the prevalence of HIV, HBV and HCV among PWID worldwide estimated that 1.3% (1.0 - 1.6%) of PWID in Australia were HIV positive, 53.5% (50.2% - 56.9%) were HCV-antibody positive, and 3.8% (2.4% - 5.2%) were HBV-antibody positive (3). Another study conducted in Australia found that in the last month, approximately one-quarter (24%) of clients attending a NSP in 2019 had reused their own needles/syringes, while receptive syringe sharing (RSS) accounted for 16% of participants, and 30% had shared other types of equipment (4).

Funded by the Australian Government Department of Health under the Drug and Alcohol Program ©NDARC, UNSW SYDNEY 2020. This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. All other rights are reserved. Requests and enquiries concerning reproduction and rights should be addressed to the information manager, NDARC, UNSW Sydney, NSW 2052, Australia.

In addition to the transmission of BBV, PWID were also exposed to a variety of injection-related health problems, such as bacterial infections (5).

While there is an increasing amount of recent literature about the gender differences in injecting drug use (e.g. 6, 7), with males being more likely than females to report opioid misuse (e.g. 6) or use of almost all types of illicit drugs (8), little is known about gender differences in terms of risky behaviours, and harms associated with injecting drug use in Australia among recent samples of PWID.

Early research with PWID as part of the Illicit Drug Reporting System (IDRS) sample suggested that the frequency of drug use and drug use patterns were relatively similar between males and females (9, 10). However, females who injected drugs were more likely to lend their needles to other people than their male counterparts (20% versus 9% in 2003; 17% versus 15% in 2011) (10, 11). No gender differences were found in terms of sharing other equipment such as spoons, water and filters (9). In the 2010 IDRS sample, females were significantly more likely to use a tourniquet after someone else than males (10).

Moreover, a higher proportion of females reported injection-related health problems than males in previous IDRS samples (77% versus 51% in 2003; 67% versus 48% in 2010) (9, 10). In the 2010 IDRS sample, females were more likely to report difficulty injecting (42% versus 25%), infections and/or abscesses (13% versus 7%), bruising and/or scarring (50% versus 30%), and thrombosis (7% versus 3%) than males (10).

Similar results have been found in other international studies, with females being more likely than males to share needles and syringes with someone else (11, 12). Another study conducted in the UK found that females were also more likely than males to receive needles/syringes, or syringes from others in the last 6 months (13). However, the same study found that males were more likely to report having shared paraphernalia than females in the six months prior to interview (13). However, these studies were published approximately 10-20 years ago and it is therefore worthwhile to examine whether these gender differences are still encountered in a current sample of PWID.

This bulletin examines the gender differences among a recent group of PWID surveyed in Australia in 2019, on a series of survey questions related to injecting risk behaviours, and injection-related health problems.

## Method

Data were obtained from the 2019 (IDRS) national survey. The IDRS is an ongoing illicit drug monitoring system conducted in all states and territories of Australia since 2000. The aim of the IDRS is to monitor the use, market features, and harms of illicit drugs in Australia. The results of the IDRS are not representative of all PWID in the general population, as they are issued from a non-randomly selected sentinel population of people who regularly inject drugs.

A total sample of 902 PWID were recruited nationally across all capital cities and territories of Australia, between May and July, 2019. Participants were recruited through advertisements in NSPs and peer referral.

To be eligible, participants had to be at least 17 years of age, have injected at least monthly during the preceding six months of the interview, and had to be residing in the capital city in which they were interviewed for the past 12 months.

Participants were administered a structured questionnaire via face-to-face interviews that assessed a variety of topics including participants' socio-demographic characteristics, patterns of drug consumption, price, perceived purity and availability of drugs, as well as drug-related harms and other risk factors. Participants were reimbursed $40 for their time.

For the purpose of this bulletin, we examined a series of survey questions related to injecting risk behaviours and injection-related health problems among the 2019 national IDRS sample. Due to the lower number of participants having reported being currently non-binary/ gender fluid (1%, n=8) or other (0%, n=2), only males (68%, n=610) and females (31%, n=281) were included in the analysis. Full details of the methods for the 2019 annual interviews are available for download.

## Results

Table 1 illustrates the socio-demographic characteristics of the national IDRS sample in 2019. Participants were aged 18 to 72 years with a mean age of 44 (SD=9). The majority of participants were male (68%), non-indigenous (78%) and identified as heterosexual/straight (87%). Over half the participants had obtained a trade/technical/university qualification (57%), and lived in their own home or flat (70%). The majority of the sample were unemployed (88%), and on a government pension, allowance or benefit (89%). The median weekly income was $350 (IQR=$275-$450) per week.

**Table 1: Socio-demographic characteristics of the 2019 national sample (n=891).**

| | National |
|---|---|
| | **N=891** |
| Mean age (years; SD) | 44 (9) |
| % Male | 68 |
| % Aboriginal and/or Torres Strait Islander | 22 |
| **% Sexual identity** | |
| Heterosexual | 87 |
| Homosexual | 3 |
| Bisexual | 8 |
| Queer | 1 |
| Different identity | 1 |
| **Education** | |
| **% Post-school qualification(s) ^** | **57** |
| **% Employment status** | |
| Unemployed | 88 |
| % Gov't pension, allowance or benefit main income source | 89 |
| Median weekly income ($; IQR) | (N=886) 350 (275–450) |
| **% Accommodation** | |
| Own house/flat~ | 70 |
| Parents'/family home | 6 |
| Boarding house/hostel | 6 |
| Shelter/refuge | 2 |
| No fixed address | 9 |
| Other | - |

Note. ^Includes trade/technical and university qualifications. ~ Includes private rental and public housing. - Values suppressed due to small cell size (n≤5 but not 0).

Table 2 illustrates the injecting risk behaviours among males and females from the 2019 national IDRS sample. Chi-square tests for independence with Yates Continuity Correction indicated a significant difference between males and females among the 2019 national sample in terms of lending a needle ($X^2$ (1, N = 866) = 5.857, $p$=0.016); and being injected by a partner or friend after they had injected themselves with either a new or used needle ($X^2$ (1, N = 883) = 14.565, $p$<0.001). Indeed, females were more likely to lend a needle than males, and also more likely to be injected by a partner or a friend after they had injected themselves. However, there were no significant differences between gender in terms of borrowing a needle ($X^2$ (1, N = 883) = 0.010, $p$=0.918); reusing personal needles ($X^2$ (1, N = 882) = 0.684, $p$=0.408); injecting someone else after self-injecting ($X^2$ (1, N = 883) = 0.223, $p$=0.637); reusing other injecting equipment ($X^2$ (1, N = 890) = 0.001, $p$=0.978);

sharing other injecting equipment ($X^2$ (1, N = 891) = 0.000, $p$=1.000); and self-reported injecting-related injuries and diseases ($X^2$ (1, N = 856) = 1.472, $p$=0.225). Moreover, Fisher's exact test revealed that there were no significant differences between gender in terms of sharing cotton or other filters ($p$=0.533).

**Table 2. Injecting risk behaviours among males and females from the 2019 national sample.**

| | Males | Females | P |
|---|---|---|---|
| **% Borrowed a used needle** | | | |
| Yes | 8 (n=47) | 8 (n=23) | 0.918 |
| No | 92 (n=557) | 92 (n=256) | |
| **% Lent a used needle** | | | |
| Yes | 10 (n=56) | 15 (n=42) | 0.016* |
| No | 91 (n=536) | 85 (n=232) | |
| **% Reused own needle** | | | |
| Yes | 45 (n=271) | 42 (n=117) | 0.408 |
| No | 55 (n=331) | 58 (n=163) | |
| **% Injected partner/friend after injecting self (with either a new or used needle)** | | | |
| Yes | 34 (n=204) | 36 (n=100) | 0.637 |
| No | 66 (n=399) | 64 (n=180) | |
| **% Somebody else injected them after injecting themselves (with either a new or used needle)** | | | |
| Yes | 17 (n=105) | 29 (n=81) | <0.001*** |
| No | 83 (n=498) | 71 (n=199) | |
| **% Shared cotton or other filter** | | | |
| Yes | 1 (n=7) | 2 (n=5) | 0.533 [a] |
| No | 99 (n=603) | 98 (n=276) | |
| **% Reused other injecting equipment** | | | |
| Yes | 28 (n=169) | 27 (n=77) | 0.978 |
| No | 72 (n=440) | 73 (n=204) | |
| **% Shared other injecting equipment** | | | |
| Yes | 5 (n=28) | 5 (n=13) | 1.000 |
| No | 95 (n=582) | 95 (n=268) | |
| **% Self-reported injecting-related injuries and diseases** | | | |
| Yes | 44 (n=256) | 48 (n=130) | 0.225 |
| No | 56 (n=331) | 52 (n=139) | |

Note. [a]Fisher's Exact Test has been applied, as there was a violation of the Chi-Square minimum expected cell frequency assumption.
$p$<0.05*; $p$<0.001***.

Figure 1 shows the percentage of males and females reporting lending their used needles to someone else. This followed a similar trend over the past four years.

**Figure 1: Lending used needles in the month prior to interview by gender, nationally, 2016-2019.**

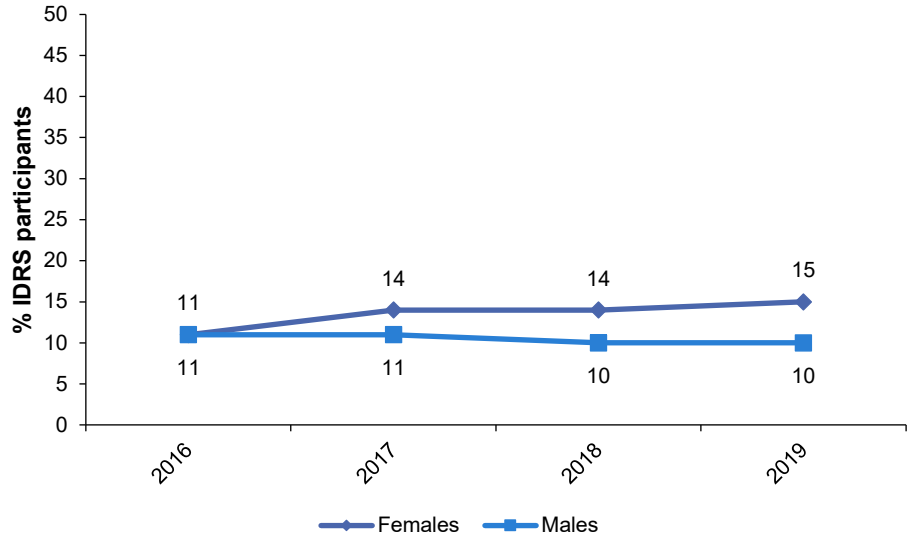
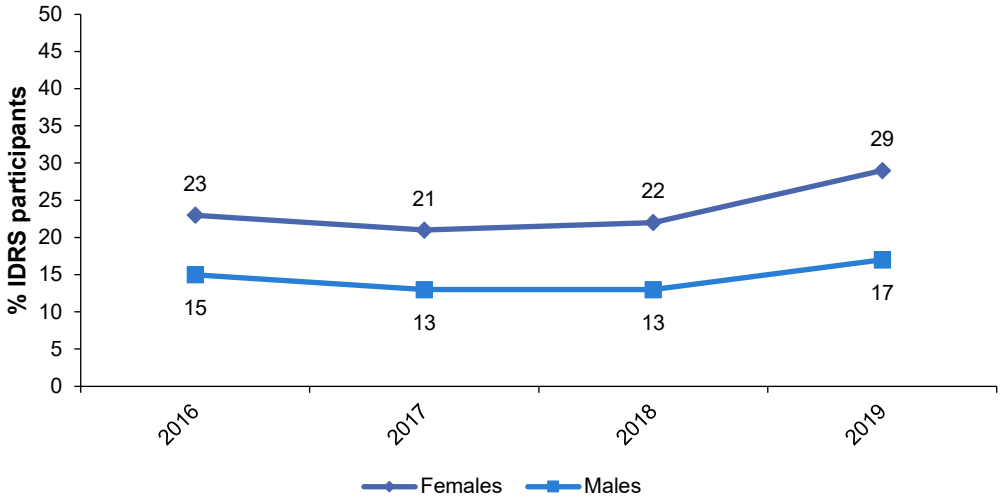



Figure 2 demonstrates that the percentage of males and females who were injected by someone else after they had injected themselves with either a new or used needle remained quite similar between 2016 and 2019, with a higher percentage of females recording this behaviour relative to males.

**Figure 2: Percentage of males and females who were injected by someone else after they had injected themselves (with either a new or used needle), nationally, 2016-2019.**



The injection-related health issues in the past month among males and females from the 2019 national sample are illustrated in Table 3. Chi-square tests for independence with Yates Continuity Correction revealed that there were no significant differences between males and females in terms of artery injection ($X^2$ (1, N = 853) = 0.101, $p$=0.751); nerve damage ($X^2$ (1, N = 864) = 3.727, $p$=0.054); skin abscess or cellulitis ($X^2$ (1, N = 870) = 2.330, $p$=0.127); blood clot near the surface of the skin ($X^2$ (1, N = 858) = 2.249, $p$=0.134); blood clot in the deep veins ($X^2$ (1, N = 856) = 0.014, $p$=0.907); endocarditis ($X^2$ (1, N = 865) = 3.207, $p$=0.073); as well as dirty hits ($X^2$ (1, N = 869) = 0.003, $p$=0.960).

**Table 3: Injection-related health problems in the past month among males and females from the 2019 national sample.**

| | Males | Females | p |
|---|---|---|---|
| **% Artery injection** | | | |
| Yes | 14 (n=84) | 15 (n=41) | 0.751 |
| No | 86 (n=503) | 85 (n=225) | |
| **% Nerve damage** | | | |
| Yes | 18 (n=105) | 24 (n=63) | 0.054 |
| No | 82 (n=491) | 77 (n=205) | |
| **% Skin abscess or cellulitis** | | | |
| Yes | 11 (n=65) | 15 (n=40) | 0.127 |
| No | 89 (n=534) | 85 (n=231) | |
| **% Blood clot near the surface of the skin** | | | |
| Yes | 8 (n=38) | 10 (n=26) | 0.134 |
| No | 94 (n=550) | 90 (n=244) | |
| **% Blood clot in the deep veins** | | | |
| Yes | 2 (n=13) | 3 (n=7) | 0.907 |
| No | 98 (n=575) | 97 (n=261) | |
| **% Endocarditis (i.e. an infection in the heart)** | | | |
| Yes | 2 (n=12) | 4 (n=12) | 0.073 |
| No | 98 (n=583) | 96 (n=258) | |
| **% Dirty hit** | | | |
| Yes | 22 (n=132) | 22 (n=59) | 0.960 |
| No | 78 (n=465) | 78 (n=213) | |

Two logistic regressions were performed to assess the impact of a number of factors (duration of injection, gender, total score on the Kessler Psychological Distress Scale (K10)) on the likelihood that the participants would report that they had lent a used needle to someone else (see Table 4), and that they had been injected by someone else after they had injected themselves (see Table 5) among the 2019 national sample. Explanatory variables were selected based on the literature.

When controlling for potential confounding factors, gender ($p$=0.030), duration of injection ($p$=0.002) as well as K10 scores ($p$=0.019) were the only factors associated with lending a used needle to somebody else (Table 4). Females were more likely than males to report having lent their used needle to someone else. The longer participants had been injecting, the less likely they reported lending a used needle. The higher the participants' scores on the K10 were, the more likely they reported sharing a used needle. There was no significant interaction between duration of injection and gender.

**Table 4: Factors associated with lending a used needle to someone else among the 2019 national sample.**

| | | Exp (B) | Standard Error | 95% CI | p |
|---|---|---|---|---|---|
| **Lending a used needle** | | | | | |
| | Duration of injection | 0.939 | 0.020 | 0.903-0.977 | 0.002** |
| | Gender | 0.310 | 0.540 | 0.108-0.892 | 0.030* |
| | Total score on the K10 | 1.030 | 0.013 | 1.005-1.056 | 0.019* |
| | Duration of injection x Gender | 1.043 | 0.025 | 0.993-1.095 | 0.090 |

Note. $p$<0.05*; $p$<0.01**

When controlling for potential confounding factors, duration of injection ($p$=0.001) and gender ($p$=0.005) were the only factors significantly associated with participants being injected by someone else after they had injected themselves (Table 5). Females were more likely to report having been injected by someone else after they had injected themselves. The longer participants had been injecting, the less likely they reported having been injected by someone else after they had injected themselves. No significant interaction between duration of injection and gender was found.

**Table 5: Factors associated with being injected by someone else after they had injected themselves among the 2019 national sample.**

| | | Exp (B) | Standard Error | 95% CI | p |
|---|---|---|---|---|---|
| Being injected by someone else after they had injected themselves | | | | | |
| | Duration of injection | 0.949 | 0.015 | 0.921-0.978 | 0.001** |
| | Gender | 0.296 | 0.432 | 0.127-0.690 | 0.005** |
| | Total score on the anxiety and depression checklist (K10) | 1.017 | 0.010 | 0.998-1.037 | 0.077 |
| | Duration of injection x Gender | 1.035 | 0.019 | 0.998-1.074 | 0.064 |

Note. $p$<0.01**

## Discussion

This bulletin examined the gender differences among a group of 902 PWID interviewed across all capital cities in Australia on a series of survey questions related to injecting risk behaviours, and injection-related health problems.

Univariate analyses indicated that there was a significant gender difference among the 2019 national sample in terms of lending a needle, and being injected by a partner or friend after they had injected themselves with either a new or used needle. However, there were no significant differences between males and females in terms of borrowing a needle, reusing personal needles, injecting someone else after self-injecting, reusing other injecting equipment, sharing other injecting equipment, self-reported injecting-related injuries and diseases, as well as sharing cotton or other filters. There were also no significant differences between males and females in terms of injection-related health problems. These findings are consistent with previous research conducted with earlier IDRS samples which found that females were more likely to lend their needle to other people than males (9, 10). However, in previous IDRS samples, more females than males reported having had injection-related health problems in the past month than in the current sample (9, 10).

When controlling for potential confounding factors, gender, duration of injection, as well as K10 scores were significantly associated with lending a used needle. For instance, analyses showed that females were more likely to report having shared their used needles than males. The longer participants had been injecting, the less likely they reported lending a used needle. The higher the participants' scores on the K10 were, the more likely they reported sharing a used needle. Similarly, duration of injection and gender were the only factors significantly associated with participants being injected by someone else after they had injected themselves. Females were more likely to report having been injected by someone else after they had injected themselves. The longer participants had been injecting, the less likely they reported having been injected by someone else after they had injected themselves.

These results are consistent with previous IDRS research conducted on earlier samples of PWID which found that females were more likely to lend their used needles than their male counterparts (9, 10). Similarly, other studies found that the proportion of PWID who reported sharing used needles and syringes were greater among females than males (11, 12). These results are also consistent with a cross-sectional study analysing the risk of receptive syringe sharing among a cohort of Iranian PWID which found that syringe sharing was negatively associated with being a male (14).

In the same study, receptive needle sharing was also negatively associated with being a male (14), even though there was no significant differences between males and females in terms of receptive sharing in our study sample. Similarly, a recent systematic review and meta-analysis aiming to estimate country, regional, and global prevalences of injecting risk behaviours found that females were also more likely than

males to receive needles/syringes, or syringes in the previous months (15). In our study sample, females were more likely to report having been injected by someone else after they had injected themselves with either a new or used needle.

There are a number of possible explanations for these findings. Previous research found that receptive needle sharing is driven by pragmatic factors, such as economic motivations (14, 16). Females might therefore be more inclined to share and receive used needles, due to their lower socioeconomic status which prevents them from buying sterile equipment. However, in our study sample, females did not have a lower socio-economic status than males. Previous research also found that females are more likely to have sexual partners who inject drugs (17, 18) and have a larger percentage of sexual partners than males (19). This might therefore increase their exposure to receptive and distributive needle sharing. In addition, females are often supplied with drugs by their male partners and might therefore have less control over their injecting equipment than males (20). Their specific relationship dynamics with their male counterparts might also prevent them from accessing treatment (21). Additionally, females might also be concerned that their children might be removed from them, which may also prevent them from accessing harm reduction services (22) and reduce their exposure to sterile equipment.

Our findings are also in line with a previous study conducted among 6449 PWID in India which found that depression symptoms in males, and younger age in females were significantly associated with higher rates of needle sharing (23). Similarly, another international study conducted among 387 people who use cocaine and who inject drugs, found that anxiety disorders were significantly associated with needle sharing (25). It has been found that people with anxiety and depression symptoms have greater difficulties in decision-making (25). This might interfere with their ability to plan ahead (25) and therefore reflect about the long-term consequences of their risky behaviours.

Our findings are also consistent with an Australian survey analysing the risk behaviours among 16000 PWID between 1998 and 2008 which found that females reported higher rates of receptive needles and syringe sharing than males in the early years of injecting (18). However, the interaction between duration of injection and gender was non-significant in our sample. Further research among a larger sample may be required to confirm the association between gender, duration of injection and receptive and distributive needle sharing reported here. Similarly, another international cross-sectional study analysing HCV transmission among young/recent and long-term PWID found that people who recently injected were more likely to share their used needles than people reporting long-term use (26). In the same way, other studies found that there were higher risky injection practices among less experienced PWID than those with more experience (e.g. 27, 28).

There are a few potential explanations for these results. As recent consumers might be younger than more experienced consumers, they might have minimal knowledge

about the transmission and symptoms of blood-borne viruses, as well as a general tendency to
minimise the risk of contracting these (29). Younger PWID might also be less inclined to know where to access sterile equipment (30). Moreover, younger PWID might be less likely to attend NSP services than older PWID, and might therefore be less likely to obtain new needles. For instance, recent data published in the 2019 National Data Report found the majority of PWID attending NSP services in Australia were aged between 30 and 49 years (62%), followed by those aged over 50 years (15%) (31). Young PWID (aged less than 25 years old) only accounted for 4% of public sector NSP attendees nationally (31). People who have injected for at least 10 years have been found to be three times more likely to utilise NSP than recent consumers, as reported by an international study conducted in Bangladesh (32). Additionally, socio-economic factors, such as unemployment rates (14), as well as having to live with parents might also contribute to needle sharing, as people might have to hide their drug use from their family members (33).

Sharing equipment among PWID continues to occur. Our findings suggest that it may be worthwhile to consider specific targeted BBV prevention programs aimed at those who are at higher risk of sharing their equipment (e.g. less experienced consumers, females and people with higher anxiety and depression scores), as well as those who are at higher risk of receiving a needle form someone else (e.g. less experienced consumers and females).

## References


1. Gilchrist, G., Swan, D., Shaw, A., Keding, A., Towers, S., Craine, N., ... & Strang, J. (2017). Preventing blood-borne virus infection in people who inject drugs in the UK: systematic review, stakeholder interviews, psychosocial intervention development and feasibility randomised controlled trial. Health technology assessment, 1-311.
2. Larney, S., Peacock, A., Leung, J., Colledge, S., Hickman, M., Vickerman, P., ... & Cunningham, E. B. (2017). Global, regional, and country-level coverage of interventions to prevent and manage HIV and hepatitis C among people who inject drugs: a systematic review. The Lancet Global Health, 5(12), e1208-e1220.
3. Degenhardt, L., Peacock, A., Colledge, S., Leung, J., Grebely, J., Vickerman, P., ... & Lynskey, M. (2017). Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review. The Lancet Global Health, 5(12), e1192-e1207.
4. Heard, S; Iversen J; Geddes L & Maher, L. (2020). Australian NSP survey: Prevalence of HIV, HCV and injecting and sexual behaviour among NSP attendees, 25-year National Data Report 1995-2019. Sydney: The Kirby Institute, UNSW Sydney.
5. Degenhardt, L., Whiteford, H. A., Ferrari, A. J., Baxter, A. J., Charlson, F. J., Hall, W. D., ... & Flaxman, A. (2013). Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010. The Lancet, 382(9904), 1564-1574.
6. Silver, E. R., & Hur, C. (2020). Gender differences in prescription opioid use and misuse: Implications for men's health and the opioid epidemic. Preventive Medicine, 131, 105946.
7. Milani, S. A., Lloyd, S. L., Serdarevic, M., Cottler, L. B., & Striley, C. W. (2020). Gender differences in diversion among non-medical users of prescription opioids and sedatives. The American Journal of Drug and Alcohol Abuse, 1-8.
8. Center for Behavioral Health Statistics and Quality. Results from the 2016 National Survey on Drug Use and Health: Detailed Tables. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2017. https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs-2016/NSDUH-DetTabs-2016.pdf. Accessed June 1, 2020.
9. Breen, C., Roxburgh, A., & Degenhardt, L. (2005). Gender differences among regular injecting drug users in Sydney, Australia, 1996–2003. Drug and alcohol review, 24(4), 353-358.
10. Stafford, J. & Burns, L. (unknown). Exploring gender differences among people who inject drugs in Australia: Findings from the 2011 Illicit Drug Reporting System (IDRS). Retrieved from https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/Jenny%20Stafford%20-%20poster.pdf

11. Durante, A. J., Hart, G. J., Brady, A. R., Madden, P. B., & Noone, A. (1995). The Health of the Nation target on syringe sharing: a role for routine surveillance in assessing progress and targeting interventions. Addiction, 90(10), 1389-1396.
12. Gossop, M., Marsden, J., Edwards, C., Stewart, D., Wilson, A., Segar, G., & Lehmann, P. (1996). The National Treatment Outcome Study (NTORS): Summary of the project, the clients, and preliminary findings. Department of Health, London, UK.
13. Bennett, G. A., Velleman, R. D., Barter, G., & Bradbury, C. (2000). Gender differences in sharing injecting equipment by drug users in England. AIDS care, 12(1), 77-87.
14. Assari, S., Ahmadi, K., & Rezazade, M. (2015). Socio-economic status determines risk of receptive syringe sharing behaviors among Iranian drug injectors; a national study. Frontiers in Psychiatry, 5, 194.
15. Tran, L. T., Peacock, A., Colledge, S., Memedovic, S., Grebely, J., Leung, J., ... & Hickman, M. (2020). Injecting risk behaviours amongst people who inject drugs: A global multi-stage systematic review and meta-analysis. International Journal of Drug Policy, 84, 102866.
16. Mandell, W., Vlahov, D., Latkin, C., Oziemkowska, M., & Cohn, S. (1994). Correlates of needle sharing among injection drug users. American Journal of Public Health, 84(6), 920-923.
17. El-Bassel, N., Shaw, S. A., Dasgupta, A., & Strathdee, S. A. (2014). Drug use as a driver of HIV risks: re-emerging and emerging issues. Current Opinion in HIV and AIDS, 9(2), 150.
18. Iversen, J., Wand, H., Gonnermann, A., & Maher, L. (2010). Gender differences in hepatitis C antibody prevalence and risk behaviours amongst people who inject drugs in Australia 1998–2008. International Journal of Drug Policy, 21(6), 471-476.
19. Sherman, S. G., Latkin, C. A., & Gielen, A. C. (2001). Social factors related to syringe sharing among injecting partners: a focus on gender. Substance Use & Misuse, 36(14), 2113-2136.
20. Wagner, K. D., Jackson Bloom, J., Hathazi, S. D., Sanders, B., & Lankenau, S. E. (2013). Control over drug acquisition, preparation, and injection: implications for HIV and HCV risk among young female injection drug users. ISRN Addiction, 2013.
21. Pinkham, S., Myers, B., & Stoicescu, C. (2012). Developing effective harm reduction services for women who inject drugs. The global state of harm reduction, 125-136.
22. Taplin, S., & Mattick, R. P. (2014). Supervised contact visits: Results from a study of women in drug treatment with children in care. Children and Youth Services Review, 39, 65-72.
23. Sabri, B., McFall, A. M., Solomon, S. S., Srikrishnan, A. K., Vasudevan, C. K., Anand, S., ... & Lucas, G. M. (2017). Gender differences in factors related to HIV risk behaviors among people who inject drugs in north-east India. PloS one, 12(1), e0169482.
24. Lévesque, A., Roy, É., Jutras-Aswad, D., Zang, G., Artenie, A. A., & Bruneau, J. (2016). Examining the link between psychological distress, mental health disorders and sharing behaviors among cocaine users. Addictive behaviors, 62, 54-59.

25. Bishop, S. J., & Gagne, C. (2018). Anxiety, depression, and decision making: a computational perspective. Annual review of neuroscience.

26. Oliveira, M. D. L. A., Bastos, F. I., Telles, P. R., de Andréa Hacker, M., de Oliveira, S. A. N., Miguel, J. C., & Yoshida, C. F. T. (2009). Epidemiological and genetic analyses of hepatitis C virus transmission among young/short-and long-term injecting drug users from Rio de Janeiro, Brazil. Journal of clinical virology, 44(3), 200-206.

27. Buxton, M. B., Vlahov, D., Strathdee, S. A., Des Jarlais, D. C., Morse, E. V., Ouellet, L., ... & Garfein, R. S. (2004). Association between injection practices and duration of injection among recently initiated injection drug users. Drug and alcohol dependence, 75(2), 177-183.

28. Maher, L., Li, J., Jalaludin, B., Chant, K. G., & Kaldor, J. M. (2007). High hepatitis C incidence in new injecting drug users: a policy failure?. Australian and New Zealand journal of public health, 31(1), 30-35.

29. Jost, J. J., Tempalski, B., Vera, T., Akiyama, M. J., Mangalonzo, A. P., & Litwin, A. H. (2019). Gaps in HCV knowledge and risk behaviors among young suburban people who inject drugs. International journal of environmental research and public health, 16(11), 1958.

30. Frajzyngier V., Neaigus A., Gyarmathy V.A., Miller M. & Friedman S.R. (2007) Gender differences in injection risk behaviors at the first injection episode. Drug and Alcohol Dependence, 89, 145–152.

31. Heard S., Iversen J., Kwon J.A., & Maher L. Needle Syringe Program National Minimum Data Collection: National Data Report 2019. Sydney: Kirby Institute, UNSW Sydney; 2019.

32. Des Jarlais, D. C., Feelemyer, J. P., Modi, S. N., Abdul-Quader, A., & Hagan, H. (2013). High coverage needle/syringe programs for people who inject drugs in low and middle income countries: a systematic review. BMC public health, 13(1), 53.

33. Bailey, S. L., Ouellet, L. J., Mackesy-Amiti, M. E., Golub, E. T., Hagan, H., Hudson, S. M., ... & DUIT Study Team. (2007). Perceived risk, peer influences, and injection partner type predict receptive syringe sharing among young adult injection drug users in five US cities. Drug and alcohol dependence, 91, S18-S29.

## Participating Researchers and Research Centres

The National Drug and Alcohol Research Centre (NDARC), UNSW Australia, coordinated the IDRS. The following researchers and research institutions contributed to IDRS 2019:

- Antonia Karlsson, Julia Uporova, Daisy Gibbs, Rosie Swanton, Olivia Price, Georgia Kelly, Professor Louisa Degenhardt, Professor Michael Farrell and Dr Amy Peacock, National Drug and Alcohol Research Centre, University of New South Wales;
- Amy Kirwan, Cristal Hall, Dr Campbell Aitken and Professor Paul Dietze, Burnet Institute Victoria;
- Callula Sharman and Associate Professor Raimondo Bruno, School of Psychology, University of Tasmania;
- James Fetherston, Dr Seraina Agramunt and Professor Simon Lenton, National Drug Research Institute, Curtin University, Western Australia;
- Chris Moon, Northern Territory Department of Health; and
- Catherine Daly, Jennifer Juckel, Leith Morris and Dr Caroline Salom, Institute for Social Science Research, The University of Queensland.

## Other Acknowledgements

We would like to thank all the participants who were interviewed for the IDRS in the present and in previous years, the agencies that assisted with recruitment, as well as the Australian Government for the funding. We acknowledge the traditional custodians of the land on which the work for this report was undertaken. We pay respect to Elders past, present, and emerging.

## Suggested Citation

Agramunt, S. & Lenton, S. (2020). Injecting risk behaviours and harms associated with injecting drug use in Western Australia: are there differences by gender? Drug Trends Bulletin Series. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney.